PARTICIPATORY RESEARCH AND EXTENSION FOR SUSTAINABLE DEVELOPMENT IN MOUNTAIN AREAS OF MAINLAND SOUTHEAST ASIA: THE CMU EXPERIENCES

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Abstract

This paper describes the 30 year experience of the Faculty of Agriculture of Chiang Mai university in the development of a participatory extension approach to promote sustainable development of agriculture in Northern Thailand and the extension of the approach to neighboring countries in the Mainland Southeast Asia. It begins with the historical development of system approach to lowland agriculture in Chiang Mai valley when the Faculty had put its emphasis on agricultural intensification in a government irrigation project begun in early 1970s. Conventional extension method was adopted to introduce the improved rice-based, multiple cropping systems for the local people. Many Aimproved@ technologies had been packaged to replace traditional technologies which were assumed to be inferior in agronomic as well as economic criteria. Later, these assumptions were found to be inadequate to explain problems and constrains to technological adoption and diffusion. Furthermore, farmers= perception, knowledge and local capability have helped them to intensify and diversify traditional rice-based multiple cropping systems in the Chiang Mai valley on a large scale without any impact of Agreen revolution@ technological pack. A system approach was introduced in early 1980s to review the overall research and extension activities. A set of criteria was used to assess the performance of alternative (improved) cropping technology including productivity, stability, sustainability and equitability. These criteria ›helped research and extension workers 10 modify the extension approach toward farmer-focussed, participatory approaches. With experiences in rural extension and highland development in Northern Thailand, the Faculty of Agriculture has developed programs for the region, especially the mountain areas of the mainland Southeast Asia. This program is expected to introduce a participatory approach for the development of sustainable land use and community forest management as the key to rehabilitating degraded hill areas.

Introduction

Mainland Southeast Asia is undergoing dramatic economic growth. The mountain area is isolated approximately one-half of the land area of the six countries in this region harbour an immense wealth of natural resources including globally important stocks of biological diversity and a rich heritage of indigenous cultures. Many areas recently opened to outside influences are experiencing profound and widespread changes. The remaining natural forests are under threat as timber is being out forest lands converted to alternative uses traditional swidden fields are transformed into plantations of cash crops and commercial timber tree species. Massive infrastructure projects are started and may alter not only the physical but also the social and economic aspects of the landscape.

Collaborative research and training are urgently needed to build institutional capacity in those critical areas of the region participatory collaboration for sustainable environment is critical to promote the development and exchange of ideas and approaches on a regional scale in a shorter period of time. With over 30 years of experience in Northern Thailand, the faculty of agriculture is currently working collaboratively with various institutes in

Vietnam, Laos and Yunnan of Southwestern China.

Purpose

The purpose of this study aimed to present the concepts and approaches on participatory collaboration on sustainable environment future in the mountain areas of the mainland Southeast Asia. The specific objectives of study were to:

1. Review past experiences on system research and extension in agriculture and natural resource management in Northern Thailand;
2. Discuss the extension of the concepts and approaches to neighboring countries in Southeast Asia;
3. Present specific case where training on participatory approach in sustainable land use and community forestry have been recently carried out, and
4. Discuss the shift in agricultural extension teaching towards sustainable environment issues in the region.

Methodology

Various methods were used in this study. Secondary data provided results of the Faculty of Agriculture during the past 30 years. Technical papers from members of the Faculty and other sources were examined and included in the study. Key informant interviews were carried out where appropriate.

Evolution of Participatory Extension Approaches

The evolution of participatory extension approaches for sustainable development in the Faculty of Agriculture may be broken into two phases:

1. The beginning phase during late 1 960s to early 80s when the Faculty started multiple cropping system research and village programs in the lowland valleys and agronomic research for ethnic minorities on the highlands;

2. The developing phase (1980s to early 90s) when participatory extension approach was extended locally and regionally.

The beginning phase (late 1960s-early 1980s)

In the beginning phase, newly introduced crops and alternative (improved) multiple cropping patterns were screened, assembled and field tested under research station environments before they were packaged for village extension programs in both lowland and highland areas. Figure 1a illustrates the extension model that has been adopted. In this model, the interface between research and extension activities are linearly linked from technology development on the top and connected to the extension plot by means of large scale or pilot programs at the bottom (e.g. MCP 1980a,b and CMU 1979).

When this approach reached the village testing stage, evidence accumulated which suggested that the systems developed did not fit farmers= real needs (Rerkasem et al. 1983). Many were accepted and incorporated into farming systems. However, none of the cropping systems were successful enough under farm conditions to warrant the projects proceeding towards the extension stage. After intensive interviews it was concluded that a reorientation of research and a revision of the functional objectives would be required if the projects were to make any real contribution to the development of cropping systems in the valleys or on the mountains.

The developing phase (1980s-early 1990s)

After intensive review at the later stages of the project cycle, the linear extension model has been revised and replaced by a complex Close-knit Model in which feedback between theory and practice dominates the research and extension program (Figure 1b). In this model farmer practices have been readily incorporated right at the beginning of the research stage, i.e., Problem identification, and these are also subjected to evaluation and analysis prior to actual agronomic field trails and/or socio-economic research. The importance of Afarmers@ is being= recognized at all stages of the Model, the Ahuman@ component of agricultural systems

provides a focus for research and extension in the Close-knit Model.

In order to identify research and development problems, an ecosystem-based human ecology model (Rambo, 1983), the agroecosystem analysis (Conway, 1987) and rapid rural appraisal (Grandstaff and Grandstaff. 1987 and Chambers, 1992) can be easily adopted by interdisciplinary teams to evaluate field results in a very short time, i.e., maximization of available human, financial and time resources. These conceptual frameworks and analytical procedures are summarized below.

1. Ecosystem-based human ecology model

In human ecology the analytical framework is built around the basic questions which can be very helpful in examining the rural agroecosystems and identifying specific topics for research, development and extension (Rambo 1983). Three questions are:

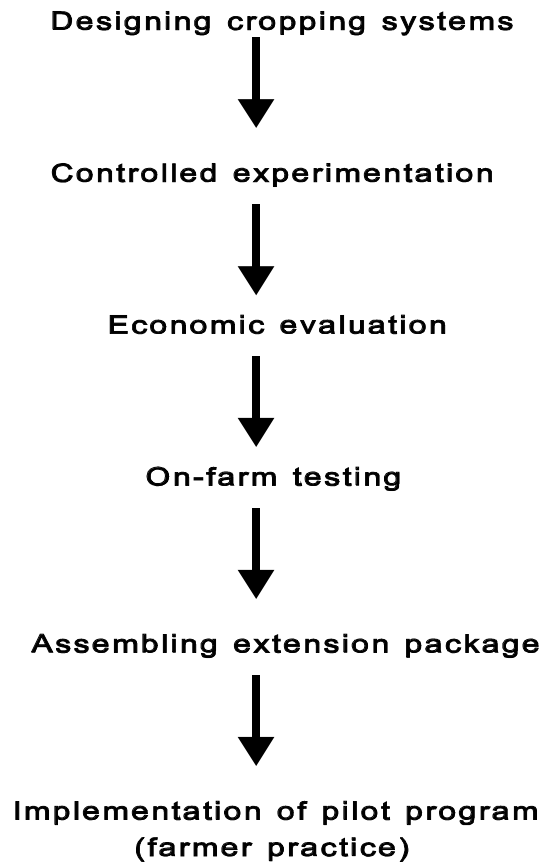
1. What is the flow of energy materials and information from the ecosystem to the social system and from the social system to the ecosystem?

2. How does the social system respond to changes in the ecosystem? (a question of adaptation), and

3. What impacts do human activities have on the ecosystem?

Interactions occur in the form of flows as is materials and information between the social and the ecosystems. The flows influence the structure and functioning of each system. For example, social system, requires a steady flow of energy from the ecosystem in the form of food and fiber for the people and fuel for cooking and manufacturing activities. The magnitude of these flows influences the size and settlement pattern of the human population. The social system, in turn, releases materials into the ecosystem in the form of wastes and pollutants. These inputs influence the biotic composition of the ecosystem, which in turn affects the availability of energy and materials to the social system. The relationship between social system and ecosystem, therefore, is a dialectical change in each system continuously affects the structure and functioning of the other system.

(a) The Linear Model (1960-1980s)



(b) The Close-Knit Model (1980-1990s)

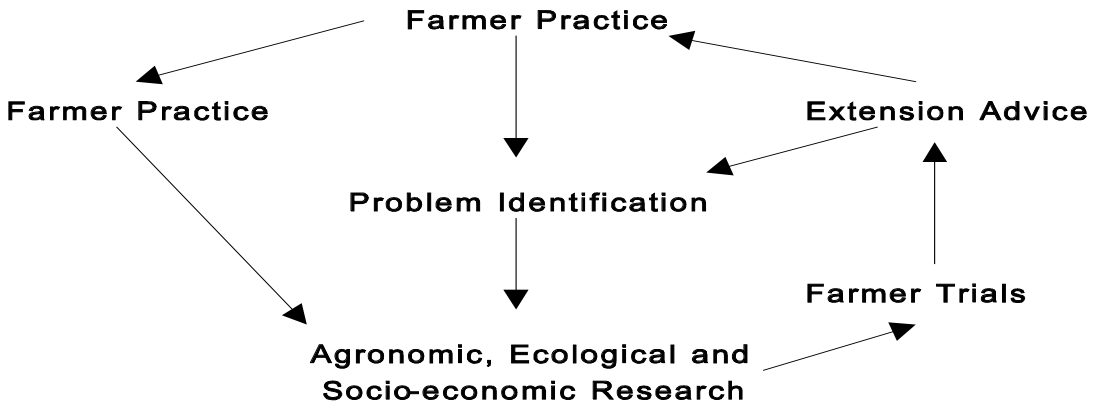


Figure 1. Extension models for crop and cropping systems research and development in lowlands and highlands of Northern Thailand. Sources: MCP 1980a, b, and Rerkasem et al. 1983.

Population size and composition are extremely important in ascertaining the impact of the social system on the ecosystem. Large, very dense population have greater impact on the environment than do small, dispersed populations. In the valley where the holding size of paddy land is very small, extending growing season for double and triple cropping could provide adequate food and supplementary cash income. Spared space for forests and wildlife however, is not feasible. On the other hand, populations are considerably less dense on the highlands, only part of the area is being used for food production. Hill tops and other less fertile areas may be used for forestry or agroforesty purposes.

2. Agroecosystem Analysis (AEA)

Agroecosystem analysis (AEA) (Conway, 1987) provides an important tool for focusing on key relationships. It rests on four basic assumptions.

1. Knowing everything about an agroecosystem is not necessary to produce a realistic and useful analysis.
2. Understanding the behavior and important properties of an agroecosystem requires knowledge of only a few key functional relationships.
3. Producing significant improvements in the performance of an agroecosystem usually requires changes in only a few key management decisions.
4. Identifying and understanding these key relationships and decisions requires that a limited number of appropriate key questions be defined and answered.

A full agroecosystem analysis (AEA), involves three basic steps:

1. Systems definitionCdelineation of the agroecosystem and its key components and description of important interactions and flows among these components as they affect the overall properties of the systems;
2. Pattern analysisCidentification of constraints and opportunities for management of the system;
3. Research design and implementationCidentification of key questions about the functioning of the system, especially with regard to possible ways to overcome constraints to enhance productivity and sustainability.

These key questions are intended to suggest promising direction for future in depth research and development plans of the systems under investigation. The elaboration of this ABA procedure may be found in more detail elsewhere (e.g., MCP 1980 a and b, Conway 1985, 1987 and 1993).

3. Participatory, Rapid Rural Appraisal (PRRA)

Rapid rural appraisal (RRA) is one method that allows researchers, government officials and development workers to gather qualitative data in a timely and cost-efficient way the method seeks to find a middle way between short-term and long-term research. It is a process of learning about rural conditions in an intensive manner. This method relies on small interdisciplinary teams using a variety of data collecting techniques to enhance understanding of rural conditions. Particular emphasis is placed on tapping the knowledge of local people and combining that knowledge with scientific expertise. Rapid rural appraisal (RRA) allows a direct learning experience for senior level researchers and officials to learn from and with local people. Reliance on small, intensively engaged interdisciplinary teams allows the exploration of subjects and relation ships the do not fit neatly within disciplinary boundaries.

Participatory Extension in Northern Thailand

Our experience with participatory extension shows that the human ecology framework (HE), agroecosystem analysis (ABA) and participatory and rapid rural appraisal (PRRA) are often used in conjunction. While the human ecology provides researchers and extension workers with a variety on conceptual frameworks to link their research and extension tasks in natural and social system interactions, agroecosystem analysis offers a powerful tool for assessing an ecosystem (within the complex nature of hierarchical arrangement). Sustainability is a criterion to assess the performance of an ecosystem in connection with other criteria such as productivity, stability and equitability. The trade-off between these properties helps to bring up issues and problems for research, development and extension.

A case study in Muser Paktang village in Chiang Mai may be given as an example of the trade-off between these properties (Table 1). In this village, Arabica coffee was introduced as an alternative cash crop to replace opium in early 1970s. At that time, coffee price on the international market was very high with low and variable annual production global. This made Arabica so attractive to the opium growers and the replacement rate to opium was very successful the crop was grown more or less as pure culture on production scale (Angkasith et al. 1988). In the late 1980s, coffee price markedly dropped and impacted growers, many of them have begun to diversify with some annual crops and fruit tree species such as lychi. In many cases, the)- also left local tree species, bamboo and medicinal herbs to regenerate naturally in these plots. The growers now return to harvest these plots including the remaining coffee trees when the price is favorable.

Cabbage was also introduced recently in this village and the crop offers very high income to the growers with highly fluctuation price but the impact on the environments and the health of the growers remains questionable, because of heavy use of pesticides and chemical fertilizers. The dosage of pesticide application for the cabbage also increases considerably over time because of building up of insect pests and disease. This PRRA case study in Table 1 suggests alternative agroforestry systems that may help to alleviate problems. This agroecosystem analysis (AEA) has been extended to the diverse agroecosystems of Southeast Asia.

Table 1

A Comparison of Coffee-Based Agroforestry System and Cabbage Fields in Ban Muser Paktang of Omkoi District, Chiang Mai.

Criteria	Coffee-based Agroforestry	Cabbage Fields
Productivity	Higher standing biomass Higher net income on longer term basis (lower inputs) Greater variety of production	Higher gross income
Stability	Year round production (Aliving granary@) Higher year-to-year stability	Seasonal production Vulnerable to climate, pest and disease variation
Sustainability	Maintenance of social fertility (e.g., fruits for children and neighbors) Protection from soil erosion	Increasing debts and risks from pesticide applications
Equitability	Easy to establish in most Households Barter of products	Product to landowners and/or outside traders Incised Discrepancy between the rich and the poor

Source: HCRDC 1992.

Regional Training and Special Services

With the above experiences in Northern Thailand, the Faculty of Agriculture has short term regional training on participatory approaches and sustainable highland development for policy makers, government officials, project personnel as well as local leaders. Priority is given to the mountain area of mainland Southeast Asia. The main reason is because of the faculty-s regional relevance in terms of both ecological similarity and ethnicity. Experiences or lessons learned from Northern Thailand could readily be shared regional for example crop replacement strategies for highland development programs, infrastructure development in remote areas and the intrusion of trading and commercialization to the highland.

In 1996, the Faculty of Agriculture worked with the Committee for Ethnic Minorities and Mountain Area (CEMMA) of the government of the Socialist Republic of Vietnam with joint funding support from the Department of Technical and Economic Cooperation (DTEC) of the Royal Thai Government and the Highland Peoples Program of the United Nations Development Program (HP P/IJN DP). The HPP/UNDP and DEMMA selected the pilot areas and assessed needs in pilot villages of Thua Thien Hue and Bac Thai provinces (HDTC, 1996). PRRA has been introduced to provincial and local officials as well as local leaders in the pilot areas. Specific actions, e.g., food security and nutrition, require technical and analytical skills and project management skill. ~n addition to the specific tasks for PRRA training, CEMMA would also like to establish are organizational structure where different

levels of existing organizations from national provincial, district, and community can be can linked and effectively manage the project. The training workshop was organized with two sessions (1) a study tour to northern Thailand for the Vietnamese delegation to gain technical and management skills from the experiences of the existing development projects and government and non-government agencies, and (2) a PRRA field workshop in pilot areas in Vietnam. The later session increased local capacity to identify development activities in relation to food crop growing, livestock and pasture improvement, development of paddy land, water resource development and conservation farming.

The session in northern Thailand promoted interaction and communication between participants from a wide range of technical backgrounds and development experiences. An interdisciplinary team of eight CMU core staff represented a balance between natural and social sciences. The 20 Vietnamese participants included 11 officials from CEMMA and provincial offices and local universities and nine local leaders and farmers from pilot villages, i.e., A Nag and Ngoc Phai-communes. The group visited most of the offices to discuss and exchange views. The local leaders and farmers went to the fields in Chiang Mai and Mae Hong Son provinces to interview field officers and villagers. At the end of the session, the participants gave a briefing on what they saw and identified some useful knowledge and information which may be extended to the development activity in their pilot areas. Participants also formulated a working plan for Vietnam.

In Vietnam, the CMU team split in to two groups; one group joined the team to that visited A Loui village in Thua Thien Hue province and the other group joined the Cho Don group in Bac Thai province. At the commune and village, more than 30 people joined the workshop and actively participated in field activities. A series of PRRA field meetings took place at province, district and commune levels. Social mapping and maps of existing land use were obtained through key informant interviews and transact walks with local people who are very knowledgeable about shier systems. Household interviews was also undertaken to obtain household information. At the end of the field work in the village, the group outlined specific areas for future improvement.

At the end of the field training workshop in pilot areas, the two teams from A Loui in Thau Thien and Cho Don in Bac Thai rejoined in Hanoi and prepared the policy meeting that I provided field information and encouraged policy dialogue among government officials and representatives from major funding agencies. As a result the Vietnamese government, with assistance from the Highland Peoples Programme of UNDP and other foreign donors, have undertaken further steps to implement development activities for sustainable environments in the pilot areas according to the recommendations from PRA field workshop.

Conclusions

Since 1965 the Faculty of Agriculture at Chiang Mai University has gained considerable experience and academic competence in research, development and extension in the mountain ecosystems in Northern Thailand. In the developing phase of the Faculty when many young staff returned from their graduate studies abroad, they were eager to put their new skills and experiences to the tasks of helping local farmers. Soon they found difficulties in transferring new technology to farmers. This raised questions about then role as university researchers in helping poor farmers in marginal areas of Northern Thailand. Where did their comparative advantage lie? Should they continue to design the new technology or improved practices? If not what kind of research should they undertake? These questions have had a great impact on the development of

research and extension within the Faculty than service the highlands.

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