ประเด็นและข้อเสนอแนะเกี่ยวกับงานวิจัยระบบการปลูกพืชและสังคมศาสตร์

โดย

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เรื่องย่อ

เป็นที่กล่าวกันโดยทั่วไปในที่ประชุมระดับนานาชาติ ถึงความร่วมมือของนักสังคมศาสตร์ต่องานวิจัยระบบการปลูกพืช แต่ความร่วมมืออันแท้จริงยังหาตัวอย่างได้น้อยมาก ผู้เขียนได้ทำงานวิจัยด้านสังคม-มนุษยวิทยา ร่วมกับโครงการระบบการปลูกพืช ที่จังหวัดแพร่ และกำแพงเพชร รายงานนี้เป็นการเสนอผลงานของผู้เขียน จากประสบการณ์ที่ได้รับจากงานวิจัยที่เกี่ยวข้องกับบทบาทของนักสังคมศาสตร์ ที่มีต่องานวิจัยระบบการปลูกพืช ประเด็นสำคัญที่จะยกขึ้นมากล่าว ได้แก่ประเด็นที่เกี่ยวข้องกับการวางแผนงานวิจัย การทดสอบ และงานวิจัยสังคมศาสตร์

(1) นักสังคมศาสตร์ สามารถอำนวยผลของการวิเคราะห์การเกษตรที่เป็นอยู่ รวมทั้งตัวเกษตรกรเอง ผลของการวิเคราะห์นี้จะแนะแนวว่า เกษตรกรจะได้รับประโยชน์อะไรจากเทคโนโลยีของระบบการปลูกพืชหนึ่ง ๆ ภายในพื้นที่นั้น

(2) ได้เสนอแนะ และวิจารณ์ข้อโต้เถียงที่ว่า การทดสอบในสภาพไร่-นา ของเกษตรกรนั้น เป็นแง่ "วิชาการ" หรือ "การสาธิต" นอกจากนี้ยังได้วิจารณ์และให้ตัวอย่างประกอบในแง่ของปัญหาที่เกิดขึ้น เนื่องจากการกระจายเทคโนโลยีอย่างไม่เป็นทางการ ก่อนที่จะมีการส่งเสริม และถ่ายทอดอย่างจริงจัง

(3) ได้วิจารณ์งานวิจัยสังคม-มนุษยวิทยา ที่มีลักษณะค่อนข้างยาวนาน และต้องศึกษาในสภาพท้องถิ่น ซึ่งงานลักษณะนี้จะก่อให้เกิดปัญหาต่าง ๆ ติดตามมา ซึ่งได้แก่ ค่าใช้จ่ายบุคคลากร

การแลกเปลี่ยนข่าวสาร ฯลฯ ได้ยกเอาวิธีการที่เรียกว่า "Quick and clean" ซึ่งเป็นวิธีการสำรวจพื้นฐานทางสังคมศาสตร์ออกมาพิจารณา วิธีการนี้อาจจะมีการดัดแปลงให้เหมาะสมต่อการคัดเลือกเกษตรกรเข้าร่วมกับโครงการ การเลือกสถานที่ทดลอง การพัฒนาระบบฟิย์ การทดลองระยะสั้น และปัญหาที่เกี่ยวข้องกับการจัดการระบบการทดลองใน ไร่-นา เกษตรกร รวมทั้งการส่งเสริมในประเทศไทย

CROPPING SYSTEMS RESEARCH AND THE SOCIAL SCIENCE ISSUES AND SUGGESTIONS.

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SUMMARY.

Social science participation in cropping systems research has been frequently advocated in international research symposia, but seldom undertaken. The author has been conducting anthropological research concerning cropping systems experiments in Phrae and Khampeng Phet provinces for more than a year. In this paper the contributions which social scientists can offer to cropping systems research, based upon the author's data will be discussed. Three issues among many in research design, testing, and social science research will be addressed.

1) Social scientists can provide a analysis of farmers' existing agricultural practices and economic strategies which allows some prediction of what use they will make of cropping systems technology in an area. Examples from the author's research will be given.

2) The problem of 'science' vs. 'demonstration' in on-farm testing will be discussed. The problems of the informal spread of the experimental technology prior to the extension/technology transfer effort will be discussed and examples given.

3) The problems of long-term, on-site anthropological research for cropping systems in terms of cost, personnel, information exchange, etc. will be discussed. A proposal that a 'quick and clean' baseline social science methodology could be developed to aid in farmer-cooperator recruitment, experimental site selection, cropping pattern development, short-term experimentation and other problems of on-farm test organization and implementation in Thailand.

Cropping Systems, as Gordon Banta (1980:1) notes, is a multi-disciplinary effort requiring a high degree of interaction between the prople conducting research on cropping systems in farmer's fields. It has been noted that social scientists, specifically anthropologists and sociologists, can be "useful participants" in cropping systems research teams. The research approach of both disciplines can produce socio-economic data of use to the agricultural scientist in formulating area-specific cropping patterns and technology, and in choosing research sites and recruiting farmer-cooperators for on-farm testing. Anthropologists and sociologists can also assist agricultural scientists in monitoring the on-farm test phase of research to note how cropping systems technology spreads in the test villages, what uses and modifications farmers make of the technology, and agricultural and non-farm economic strategies in the villages which could affect the adoption of the new technology.

Most sources agree that the most effective use of such social scientists can be made at the baseline survey phase of research. Data on labor, land tenure, and other socioeconomic factors which social science research can identify can assist the research team in formulating appropriate and feasible technology for testing. The actual inclusion of anthropologists and sociologists in the baseline survey phase of cropping systems research in the past in Thailand has been almost nil. Chambers (1979:90) notes accurately that technical scientists "cannot be uniformly pleased with their social science colleagues for having made decisions more complicated". Social scientsts tend to multiply criteria which need to be taken into account which complicates the research process. However, if an effective research process is to be achieved which accomplishes one of the basic goals of cropping systems identified by Banta (1980:1). That the goal of the system (identified as the farmers) is the goal of the research, then socioeconomic data are crucial as input prior to the design of technology.

The author has been engaged in anthropological research concerning on-farm tests of cropping systems in two sites in Thailand, in the North in Phrae province and in the Central Plain region in Khampeng Phet province. In both cases on-farm tests were designed and implemented without social science input. As a result some of the issues to be raised in this paper must take the form of after-the-fact suggestions of what observations should have been made in the sites and

taken into account before designing cropping patterns to be tested for the areas in question.

Two issues will be discussed in this paper which arise from the point of view of an anthropologist involved in the on-farm test process. The first is a reitteration of the point that socioeconomic input is important and needs to be included before technology is designed and testing is implemented. Anthropologists and sociologists should be included in the team conducting the baseline survey, not later. This point will be illustrated with data from the present research. The second point, which arises from the first, is the problem of differentiating between an experiment and a demonstration in on-farm testing and the perceptions of the farmers performing the tests in both sites, and the farmers outside of the experimenting group who are observing the experiments. One warning which must be given here is the fact that research is still in progress. Data are still in the process of being gathered, collated, and coded for analysis. Any statistics given here were drawn from the sample of data completed to date and do not reflect the final form of the research.

Farmers' Past and Present Practices

Hildebrant (1976:272) provides the simplest prescription for certain kinds of information needed in designing new agricultural technology for introduction at the village level. He notes it is

necessary to know what farmers do, how they do it, and why. To this I would append that it is useful to know these past practices as well and how these have affected their approaches to cropping systems at the time of the beginning of the on-farm test phase of research. I would in no way argue that social scientists are the only ones capable of gathering such data, but would assert that the approaches of social science research in conjunction with research in a multidisciplinary team could provide useful results at the baseline survey stage. Two instances from the research in progress will be cited. Binswanger and Ryan (1980:121-122) have commented on the differences of the ethnographic approach of cultural anthropologiss and the special purpose surveys of sociologists. The first is of longer duration but provides qualitative data and a broad overivew, as well as pertinent quantitative data, useful to the baseline survey, while the second is of shorter duration and more focused in its subject matter.

The cropping systems experiments being studied in Khampeng Phet province began with attempts at sequential cropping using mung beans and other crops after the rice harvest. Adverse rainfall conditions have forced the Department of Agriculture personnel to concentrate on experiments with improved varieties of rice, fertilization, and new agronomic practices to raise rice yields in the area. Experiments have been performed using RD 7, RD 9, RD 11, and a new semi-dwarf variety, involving direct-seeding, broadcasting, and transplanting.

It is generally agreed that matters of land, labor, power, and other factors directly affecting agricultural practices should be taken into account before introducing new crops or technology to see if any of these factors would affect the farmers' ability to adopt the new crops or practices. A survey of land holdings, agricultural practices, and non-farm activities as well as problems of credit and capital indicate that farmers in the Khampeng Phet test village might have difficulties in significantly increasing rice yields with the present practices being tested in the area.

One of the most striking features of the test villages is farm size. Individual families consider farms of 20-30 rai (3.2-4.8 hectare) to be small and some farmers in the sample own and farm over 100 rai (16 hectare). The land tenure picture is quite complex. Younger farmers tend to put together their farms from purchased land, land owned by parents or parents-in-law but not rented, and rented land. Land rental agreements in the area are low compared with the North, averaging 20% of the yield from the rented field. Similarly older landowners have frequently divided large portions of their fields to married children in the village, short of turning over legal title to the land. The mean area of riceland owned or farmed in the test village is 38.7 rai (6.2 hectare). In the sample gathered to date 69% own or farm 20-40 rai and 31% farm more than 40 rai.

One of the major difficulties for families in the area to adopt widespread use of the improved varieties of rice in the local agricultural practice is a shortage of labor. Families in the test village are dependant upon the sale of surplus rice for their main source of cash income. There is little else that can be done to raise cash agriculturally and few opportunities in the local labor market, aside from limited work cutting sugar cane locally. Aside from rice production the area is virtually at subsistence production. Rice growing alone in the large land holdings prevalent in the area takes a great deal of time and many subsistence-related activities are performed during the rice growing season requiring the labor of various family members which would make the adoption of new agronomic practices in rice cultivation difficult. There is no custom of cooperative labor exchange in the area beyond limited assistance between close family members.

Adverse rainfall conditions force families to put in as many as four staggered plantings of seedbeds, beginning with the first rains late April to early May, to assure that there will be viable seedlings for transplanting if the rains are late. Plowing and transplanting begin in early to late June, as soon as rainfall is sufficient to provide enough water in any given plot. It is difficult to estimate the amount of time spent in any single task as a plot is plowed, harrowed, and immediately transplanted as soon as there is enough water.

As soon as transplanting is completed one member of the family must see to water control between plots in the family fields daily until the rice begins to flower in October. In good rainfall years this can take approximately two months of daily labor. In years with sparse rainfall plots must be broadcast seeded in August to try and insure some yield at harvest. Havest begins in early December. For families farming as much as 60 rai, harvest, threshing, and storage can take as long as three months until the last grain is in the granary. Farmers' extimates of time spent in labor directly related to rice production vary from as much as 4½ months, including water control, for farms of 20-25 rai, to 6½ months for farms of 30 or more rai, and as much as 8 months for farms of 40 or more rai.

Numerous subsistence-related tasks must compete for family labor during the rice growing season. Large numbers of cattle and buffalo are maintained for plowing and pulling carts. When rice transplanting is finished local pasturage for these animals is almost impossible to come by. Theft is also a frequently mentioned danger. In July and August male heads of households will form groups and take as many as 60 to 100 animals to mountain pasutres for a month to six weeks. Adolescent boys too young to work in the rice fields but old enough to herd buffalo are taken along to help guard the herd from theft.

The people in the test villages also make widespread use of gathered wild produce and fauna. Throughout the rainy season and as long as standing water remains into the dry season family members are engaged in catching as many as nine species of fish and eel as well as freshwater shrimp and snails. Larger fish are preserved in a number of ways and smaller varieties are used to make homemade fermented fish sauce. Women also make their own fermented shrimp paste. From the time the rice flowers until harvest begins families are involved in intense fishing and preservation. Preserved fish forms the protein staple of the diet during the intense labor of rice harvest.

Other forms of subsistence production in the area include the planting of up to .75 rai (.12 hectare) of sugar cane which is pressed and boiled down to make raw sugar for household consumption. Kitchen gardens of as large as .5 rai (.08 hectare) are also planted in the rainy season which provide the family needs of vegetables and condiments until the beginning of March.

All of these practices mean that it would be difficult for families in the area to adopt any new labor-intensive agronomic practices in rice growing without hiring labor. People seldom have sufficient captial to purchase fertilizer. Farmers in the village have used fertilizer for as long ten or more years. Farmers buy no more than 50-100 kilograms regardless of farm size. In local practice farmers will spot fertilize plots where the rice does not appear to be doing well.

The most successful rice variety in the experiments, in the farmers' opinions, is RD 7. It has deomonstrated advantages in yield, but requires fertilizer and weeding. Of the sample of farmers interviewed to date who are not members of the farmer cooperator group 84% were growing one of the improved varieties of rice introduced in the on-farm tests, primarily RD 7, and some had begun growing it as early as 1979. The mean percentage of their fields devoted to plantings of the improved varieties, however, was 4.2% with none higher than 12.75%. The primary reasons cited by farmers for such small plantings are lack of family labor to weed larger plantings and a lack of money for fertilizer. Many farmers have said that it is difficult to find labor to hire during the rice-growing season. People are busy with their own fields or have other things to do. RD 7 is non-photoperiod sensitive and farmers planting it have mentioned other difficulties with labor in early harvest before neighbors' fields were ready, causing transportation problems, and harvesting while the fields were still wet. Other families said they couldn't afford sufficient fertilizer for larger plantings, or planted it without any at all. As one farmer put it "RD 7 is just like other rices (in yield) if you don't fertilize it."

This large number of farmers planting RD 7 and other improved varieties of rice, outside of the farmer-cooperator group, indicates a high level of interest in intensifying rice cultivation in the area. Constraints of labor and capital make it difficult for farmers to plant larger areas of their fields in RD 7 despite its demonstrated advantages

in yield, of which the farmers are aware. Taking into account the farmers' extant problems in rice production, the importance of subsistence-related activities and the problems of capital and labor availability might have helped in introducing alternative rice varieties and practices to those presently being tested. It seems improbable that the present technology, as practiced by the farmers in the village, can significantly intensify rice production in ways affordable and feasible for the farmers. A study of labor, land, and agricultural and non-farm economic strategies at the beginning of the on-farm test phase might have brought these problems to the fore.

The agricultural situation in the test site studied in Phrae province is more complex than that in Khampeng Phet. On farm tests have involved the introduction of mung beans, sweet corn, and white sesame planted in irrigated fields before the beginning of rice transplanting, improved varieties of glutinous rice, and experiments with plantings of sweet corn, soybeans, peanuts, and other crops after rice harvest. As in Khampeng Phet a condideration of farmers' existing agricultural practices and their past experiences could have helped in technology design and would have assisted the research personnel in understanding farmers' reactions to the experiments and the uses they have made of it.

Land holding in the area are small. The mean area of irrigated rice land onwed by farmers in the sample gathered to date, including

farmer-cooperators, is 5.3 rai (.85 hectare), but this figure is deceptive. 12.3% of the sample own no irrigated fields and must rely on rainfed upland fields for subsistence or rent irrigated riceland. Land rent in the area is much higher than in Khampeng Phet with 50% of the yield generally being the landlord's share. Another 53% of the sample own only one to four rai (.16-.64 hectare). Many families in this category grow only enough rice for subsistence or must rely on yield from upland, unirrigated fields to achieve rice subsistence. Only 12% of the farmers in the sample have more than 9 rai (1.4 hectare). For most cash income has to be derived, agriculturally, from the planting of cash crops.

Several factors should have been taken into account in a baseline survey at the beginning of the experiments. Prominent among these is the pervasive influence of tobacco production in the area. This has been discussed in detail in another work. (Lando 1981) It is sufficient to state here that farmers in the two test villages depended upon tobacco as their main source of cash income, some for more than 25 years. 97% of the farmers in the sample had planted tobacco at some point in the past. The people received as much as ฿ 5,000 in net profits from one rai of tobacco in good years. Problems of irrigation, world markets, capital support of production, and other factors have meant that in 1979-1981 one village has lost access to capital support for tobacco production and production was severely curtailed in another.

Cropping systems tests were introduced into these villages in 1980 when they were experiencing the beginning of an income vacuum. The enthusiasm shown for cropping systems, the large of number of volunteers to become farmer-cooperators, and the rapid spread of aspects of the cropping patterns can be explained by this fact alone.

Other factors associated with tobacco production will also influence farmers' acceptance and use of the cropping patterns being tested in the villages. Farmers in the area have planted all of the cash crops tested in the cropping patterns commonly, with the exception of sweet corn and white sesame. The attitude in the past has been that such crops were peripheral to tobacco. If they succeeded they provided providential extra income, and if they failed little was risked or lost as the common practice was to plant them with family labor and to use no insecticide or fertilizer. When farmers have been asked about past cropping practices a common response to questions concerning fertilizer and insecticide use, and whether plantings were weeded was "no, just plant it and leave it". Another fallout of the system of tobacco production is the extension of the custom of cooperative labor to tobacco production and planting other crops as well. In other areas of the North of Thailand the custom is reported to be declining or is restricted to the annual rice crop (Potter 1976; Abha et. al. 1979). Farmers in the area can accomplish large-scale planting of cash crops without capital outlay for hiring labor. This is an important factor to take into account in assessing the viability of cropping systems in

the area as it may not hold true outside of the local area of the test villages.

Another aspect of studying farmers' existing practices is to find local practices which could profitably be included in the development of cropping patterns and practices for the area. The cost of seed represents one of the highest opportunity costs for farmers in planting peanuts, soy beans, or mung beans. One thang (20.1.) of seed for mung beans reached as high as ฿ 250 during planting season in 1981 and the price of Tainan-9 seed peanuts were as high as ฿ 60 per thang and farmers plant 20 thang per rai of seed. Farmers in and out of the farmer-cooperator group have experimented with propagating small amounts of seeds in plots during the rice-growing season, or in post-rice plantings, and saved the yield as seed for future plantings. One farmer planted two liters of seed of the improved variety of mung beans introduced in an upland field during rice-growing season. The yield from this provided sufficient seed to plant four rai of mungbeans after rice harvest. Another farmer intercropped mungbeans with a post-rice planting of peanuts. The yield from the few mungbeans plants in the plot provided enough seed for 1.5 rai planted in the pre-rice plantings in early May. Such practices as this could be noted during a baseline survey and profitably included in the development of cropping patterns to be experimented with in on-farm tests.

Another factor of local agricultural practice which could have been usefully taken into account in the baseline survey and incorporated in on-farm tests in the Phrae area is the use the villagers make of upland diked rainfed ricefields and cleared forest fields. 57% of the farmers interviewed to date in both villages farm some forest or upland fields. Many families have developed their own cropping patterns for yearround farming, moving from upland fields to irrigated fields. Some farmers plant two crops of peanuts a year, one in upland fields at the beginning of the rainy season and another in irrigated fields directly after rice harvest. Others have cropping patterns built around fast - maturing varieties of dry rice planted in upland fields in May and harvested in October. This allows crops planted after rice harvest in these fields to take advantage of late rains. Farmers treat these upland plantings as they do lowland cash crop plantings. Insecticide is used occasionally and the only fertilizer used is a liquid fertilizer known locally as "hormone" which is mixed in with the insecticide solution and sprayed on.

In the design of technology for on-farm testing in the villages it might have been useful to have taken the importance of these upland plantings into account and included experiments in improving rainfed cash cropping in upland fields as well as that in lowland, irrigated fields. This could benefit the farmers' profits as well. Peanuts harvested from such upland plantings and marketed at the Sime Darby

peanut oil plant in Phrae in March of 1981 brought prices as high of ฿ 7 per kilogram. Peanuts harvested from the plots planted in lowland fields in the tests planted in late December of 1980 brought only ฿ 5.50 top price at the same market.

In the two cases discussed here an attempt has been made to show how socioeconomic factors concerning existing and past agricultural practices, revealed by social science research, might have been taken into account in the designing and implementing of on-farm tests in Khampeng Phet and Phrae provinces. Anthropologists and Sociologists working in conjunction with agricultural scientists at the baseline survey phase of research could bring such data to the attention of agricultural scientists who could incorporate it into technology design.

Experiment vs. Demonstration : Information and the Farmer

A second issue in the organization of on-farm testing in cropping systems is the differentiation in the minds of the agricultural scientists, and the farmers of an experiment and a demonstration. The farmers in the two areas surveyed have been included as active participants in the research process, receiveing free inputs and directions on how to plant the cropping patterns and risking their labor and land in the performance of the tests. As active participants in the research in their own fields farmers should be made aware of the

rationale behind agronomic practices being tested, the value of different kinds of fertilizer for different crops, and the nature of an experiment in general. Scientists argue that the training and teaching of farmers is the responsibility of extension personnel-on farm-tests are scientific experiments. On-farm tests in farmers' fields are demonstrations to farmers observing them if the farmer-cooperators are unaware that "trials are for research, not for deomonstration" as Carangal advocates (1977:38-39). Farmer-cooperators in on-farm tests are potential contact farmers for the spread of the experimental technology. If they are misinformed or uninformed on the nature of an experiment, the rationale of new agronomic practices, the importance of proper fertilizer and insecticide use, and other aspects of the cropping patterns the benefits of cropping systems as an integrated package of new varieties of crops, practices and inputs may be disregarded by the farmers who will adopt what they view as advantageous and ignore the rest. Farmers need to be trained and informed from the beginning of the research process to them effective participants rather than performers of the required tasks.

One useful practice would be to periodically ask farmers' opinions concerning the tests and to test their comprehension of them in informal conversation. Farmers' judgements and opinions are generally mistrusted by writers on cropping systems research. Vincent (1977:129) notes that some scientists feel that normative information involving value judgements such as "better" and "worse" have no place in cropping

systems research. Gomez (1977:255) contends that aspects of cropping systems technology should be "determined" on the basis of external constraints, not on the basis of farmers' thoughts and opinions. Norman and Palmer-Jones (1977:255) are less negative but note that honest opinions are difficult to elicit. An example from Khampeng Phet in relation to farmers' opinions and judgements, within the range of information they possess, are accurate and important.

Farmers in the sample in Khampeng Phet were asked to name what characteristics of the improved varieties of rice from the Rice Division were more advantageous than those of local varieties, and likewise what characteristics made them less advantageous to use than local varieties. As a group the interviews reveal detailed observations on the part of the farmers on both physical charactterstics of the Rice Division rices and problems and advantages of cultivating them. RD 7 was praised for its yield potential and milling quality. Farmers also noted that its stem was too short and did not produce as good a quality of rice straw as local varieties and they contended that it was less resistant to local pests and diseases than local varieties. They noted that the longer-stemmed local varieties could grow up through a thick growth of weeds while RD 7 had to be weeded or it was smothered by the weeds. The most oft-heard complaint about the RD varieties was that they flowered too early or were too short-aged. Complaints of high pest damage in fields ready for harvest before neighboring fields, and

difficulty of transport of grain from such plots and the problems of harvesting while the ground was still wet are all related to this problem.

This range of observations revealed that farmers are keen observers of new rice varieties and their merits and disadvantages. What is missing in farmers' perceptions of the merits of the RD rices viz. the local varieties is the fact that they are not photoperiod sensitive like the local varieties. Direct questions on the subject showed that farmers were unaware of the distinctions. Information on the nature of the new rices, their characteristics, requirements, and age at the begining could have influenced farmers' judgements of their merits and disadvantages and farmers's planting practices. Farmers could have been informed that plantings of RD 7 and other varieties could be delayed so that they would flower together with local varieties, if water conditions in fields permitted.

Problems of information and the understanding of the nature of an experiment exist in Phrae as well. Farmers in the farmer-cooperator group have been observed planting plots of the new-cash crops outside of their experimental plots without making use of the reccomended inputs or planting practices they had been instructed to perform in the experimental plots. Lacking an explanation of why the experimental practices were beneficial they dismissed them as "too detailed" and planted crops according to established local practice. 1981 saw a wide

use of post-rice and pre-rice crops similar to those in the experimental plots of the on-farm tests. But again farmers tended to adopt those aspects of the cropping patterns they found immediately advantageous, improved varieties of crops or a novel planting period for irrigated, lowland fields, and to ignore the rest. Information as to the nature of experiments, the rationale for the reccomended planting practices and input use, and other aspects of the process of on-farm testing could have improved farmer comprehension of the test process and the informal spread of the technology through village channels.

Conclusion

In this paper I have tried to demonstrate that data derived from an anthropological assessment of on-farm tests in progress would have been valuable in the organization and implementation of the tests, if it had been included as baseline information. I have also tried to show information needs of farmers which interviews have also revealed. Cropping systems is a multidisciplinary research effort. Farmers' goals and needs, agricultural practices, and potential constraints to the adoption of cropping systems technology under consideration for any given area should be established before proceeding with the design of technology and implementation of on-farm tests. The gathering of pertinent socioeconomic data during the baseline survey phase is important in this and anthropologists and sociologists should be included

in the research team gathering data prior to the establishement of on-farm testing. I have also tried to raise the question of the role of the farmer in on-farm testing. The farmer-cooperator can either be a compliant performer of tasks in testing cropping patterns or a full and effective participant in the research process, as is advocated by the Cropping Systems literature. What is required is to instruct the farmer-cooperator in the content as well as in the method of the experiments being performed which will help in the effective spread of the technology through informal village channels during the on-farm test phase and will help in the extension effort once the on-farm tests move to turn demonstrations and production testing.

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Summary

In the past four years, per capita income of Khon Kaen farmer has greatly increased from 1,666 baht in 1976 to 3,797 baht in 1980. This is mainly due to the non-farm activities. In the present study it was also evident that cassava rapidly replaced kenaf. In terms of cropping systems, this peper discusses the problems in farmers' adoption of improved cropping systems. However it should be noted that the Cropping System Project is currently in the experimental stage with less emphasis on extensition.

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