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Opening Remarks on

Cropping Systems Evaluation: Procedures and Issues

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Cropping Systems Evaluation: Procedures and Issues

In this opening discussion, I would like to briefly describe procedures used to evaluate cropping systems introduced to farmers in Northern Thailand and important issues for cropping systems evaluation derived from lessons learned from that experience.

The geographical area in which the project took place was characterized by densely settled river valleys with farmers having increased water availability due to the construction of a number of irrigation dams, canals, and lateral ditches. There were a large number of crops being grown by farmers at any one time and increased water availability (which allowed two-three crops/year) made the set of feasible cropping systems very large.

After having worked with farmers in two village areas of one river valley, the project personnel asked farmers to volunteer a part of their land for testing new cropping systems which would be jointly determined by the farmer and project agricultural researchers. These research personnel were committed to providing the best advice they could on the new cropping system management, but all the inputs and labor would have to be obtained and applied by farmers except in cases where there were obvious severe constraints. When this situation occurred, the project would obtain the input or labor and sell it at market prices to the farmer. Therefore, the farmers had to manage the agreed upon new cropping system within the environment in which they normally had to operate to see if, in fact, that was possible. Representative farmers with approximate equal land quality and comparable crop systems to the systems being introduced were utilized as a control group. Village enumerators were hired and trained to keep records.

The evaluation strategy consisted of establishing the control group of farmers and of taking a thorough socio-economic agricultural baseline survey. The baseline survey was to be used for "before and after new cropping system introduction" measurements and the control group for "with and without new cropping system" evaluation criteria.

Evaluation criteria consisted of averaging net returns (calculated in alternative ways) for each crop and cropping system for the control (traditional methods of operating) and testing (new recommendations) groups. Intensity of cash and labor use were also ranked by crop and cropping system observed in each group. Since several observations were obtained for the same crops in both the control and testing groups, probability distribution functions of net returns were calculated, which indicated the probability of obtaining greater than or equal to any specified net returns. With this data, stochastic dominance of net returns was evaluated for the crops grown by traditional and recommended methods. This allowed the development of net return risk measures such as standard deviation and coefficient of variation for the same crops in the control and testing groups. The probability of loss was also determined. If new recommendations for crops and cropping systems as managed by farmers were stochastically dominant by net return criteria and had smaller net return standard deviation and probabilities of loss than farmer managed comparable traditional crops and systems, the new recommendations were considered for extension to other farmers. Price variations over several years and average variations throughout the likely weeks of harvest were also calculated. Finally, labor profiles were compared for the new cropping systems and ongoing systems to see if major bottlenecks were likely to occur in the process of moving from established to newer systems. Participant observations were also made on major problems faced by farmers in operating the new systems.

Several lessons were learned using these evaluation strategies and methods.

(1) It is important to define clearly the precise objective(s) of the evaluation effort. Alternative, but somewhat overlapping, evaluation objectives could include determining the following:

a. The "best" input levels and crop configurations to test in farmer managed trials;

b. The most profitable and appropriate systems to extend to the larger areas in the recommendation domain;

c. Reasons for lack of adoption of new cropping system technologies;

d. Problems of cropping system technology performance as managed by farmers; and

e. Consequences of cropping system technology adoption.

One set of evaluation procedures cannot be used to accomplish all of these objectives. Different strategies and methods must be employed and somewhat different data must be collected. Without a clear definition of objectives for evaluation efforts, important questions will be left unanswered, irrelevant data may be collected, and intended evaluation results slow in materializing.

(2) When the precise objectives are determined, careful consideration of data needs is required before data collection is started. The socio-economic agricultural baseline survey taken in this project was much too broad in terms of number of farmers interviewed and types of information gathered. This was partly due to lack of clarity regarding subsequent use of the data. A more efficient mechanism would have been to first conduct informal discussions with farmers and then develop and implement a focused

stratified random sample survey. The persons involved in continuing work on cropping system technology development and work with farmers should be involved in survey design and analysis. To have a group structure and conduct the survey that will not be further involved in crop technology development and testing wastes important information integration.

(3) In most evaluation efforts, attention must be directed toward institutions and systems to which farmers must have access. Many of the problems farmers had in managing the new cropping systems in Northern Thailand involved problems of:

a. Input availability and timing—e.g., farmers lacked information about water schedules;

b. Tenure arrangements and certainty—e.g., annual planning by tenants was severely restricted because of tenure insecurity throughout the year;

c. Input quality—e.g., fertilizer and seed quality were very low;

d. Off-farm labor competition—e.g., semi-monthly labor opportunity costs had to be estimated to understand labor movement to part-time off-farm jobs; and

e. Government agency delivery ability.

(4) The identification of major constraints that need to be considered in cropping system technology development is best done by observation of farmer managed trials through one cropping year. This is true not only because of information gathered by direct observation but also because agricultural researchers become more experienced and capable of understanding possible

productive research avenues they might develop. While ex ante prediction of problems is important and possible, quick ex post analysis is a key step in technology development feedback.

(5) Better methods of evaluating appropriateness of new cropping systems over wider areas and through time are needed. Concepts are needed to establish the flexibility or adaptability of new cropping systems over geographical areas as well as the stability of systems over time in order to guide research strategies in cropping systems programs in major regional and national systems. Can cropping systems be developed that are well adapted to a wide range of environments or does cropping system development have to be tailored to given environments? For farmers, the relevant question relates to the stability of cropping systems over time. Are these more macro evaluation criteria being considered and measured?

(6) More distinction is needed on appropriate evaluation criteria for judging performance of cropping system technology produced at various cropping system program levels. What criteria should be used for judging technology produced at the International Center cropping system programs as contrasted to national or sub-national regional programs? Should the evaluative effort be peer evaluation of program and publications? If so, who are the peers? Should it be the area where specific cropping systems are adopted? Should it be the adoption by other cropping system units of methods and methodologies developed?