Improving Farm Management Teaching in Asia

Tan Bock Thiam and Shao-Er Ong

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The seminar on Farm Management Teaching in Asia held in Bangkok represents the culmination of a four-year project to improve the teaching of farm management in Asian universities. During this period, two planning workshops for a small group of Asian professors were convened at the office of the Agricultural Development Council (A/D/C) in Singapore from 25 to 27 November 1975 and from 2 to 4 June 1976 respectively. Arising from the recommendations of these two workshops, a seminar was also organised for U.S. farm management professors at Michigan State University in April 1977. The objective of this seminar was to provide a forum for an exchange of views on the content and methods of teaching farm management courses in leading U.S. universities.[1] The two planning workshops and the U.S. seminar were organised by Shao-er Ong of the A/D/C, while the seminar in Bangkok was organised jointly by Shao-er Ong and Tan Bock Thiam. A list of participants for the Bangkok seminar is attached as Appendix I and the titles of papers presented are attached as Appendix II.

Tan Bock Thiam, Associate Professor University of Malaya; Shao-er Ong, Associate of the Agricultural Development Council for Nepal.

1. Shao-er Ong, *Proceedings of Farm Management Teaching Workshop* (New York: Agricultural Development Council, 1977).

Background

For the 1975 workshop, eight farm management professors from leading Asian universities exchanged views and notes on the content and methods of teaching farm management courses. From their discussions, it was apparent that the subject of farm management is and will continue to remain a core course in many agricultural economics programmes of Asian institutions of higher learning. There is no doubt that enrolment in these courses is increasing and its importance in the overall curriculum is widely recognised.

While acknowledging the importance and relevance of farm management courses in Asian universities, the major problem encountered in their teaching remains one of the lack of availability of suitable teaching materials relevant to the management problems of small farms. Most of the available textbooks are written by American professors based on the management problems encountered in large commercial farms and are meant primarily for U.S. campuses. Another disadvantage of these textbooks lies in their retrospective nature. Most of them were written more than twenty years ago and hence do not incorporate some of the advanced analytical techniques developed more recently. The few books and reading materials written by Asian professors are published either in the vernacular and therefore cannot be widely circulated or in local journals with very limited readership. In view of these problems, the Asian professors agreed that priority should be accorded to either developing new teaching materials or to exchange existing ones among their respective countries.

Other issues relating to the teaching of farm management discussed at the 1975 Workshop relate to the large class size and the consequent problem of organising field visits. Many Asian students do not possess a farming background and hence there is a greater need to expose them to farm problems either in the classroom or in their reading materials. The workshop came to the conclusion that priority should be given to compiling and exchanging teaching materials such as articles and laboratory exercises suitable for Asian universities.

At the second workshop which was held in 1976, the same group of Asian professors compiled a list of sixty articles which are either being used or being considered as suitable teaching materials in their farm management courses. Their relevance and usefulness were discussed. The workshop then came to the conclusion that a collection of selected articles from this list would constitute useful supplementary reading materials for their farm management teaching. Subsequently, two members of this committee undertook the task of editing these articles and publishing them under the sponsorship of the A/D/C.[2] The 1976 workshop also recommended that a seminar on teaching farm management with emphasis on the preparation of new teaching materials including laboratory exercises relevant to small farm problems be organised in the near future.

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2. Tan Bock Thiam and Shao-er Ong (ed.), *Readings in Asian Farm Management* (Singapore: Singapore University Press, 1979).

In response to this recommendation, a third workshop was held in Bangkok in November 1978. A total of twenty participants were invited and eighteen papers covering a wide range of subjects taught in farm management courses were discussed.

Organisation

The Bangkok seminar focused on six topics. Each represented a major area of concern in farm management. The participants were requested to prepare papers with the objective of utilising them as guides for teachers in farm management. Whenever relevant, laboratory exercises on the topic covered should be presented. Such a move was made because the seminar planning group felt strongly that in the past, insufficient attention was rendered to the significance of laboratory exercises in the conduct of farm management courses.

Role of Farm Management in Asia

Four papers were presented on the role of farm management in Asia. Ong in his paper, "Adjusting Farm Management Teaching with Changing Conditions in Asia," stressed that agriculture in Asia has undergone many notable changes during the last two to three decades and these changes had important repercussions on the content and methods of teaching farm management. Some of these changes included the following:

- Asian small farmers have become more business oriented and they are no longer content with producing for subsistence requirements only.
- Small farmers are more willing to adopt new technology if it is appropriate and beneficial for their farming enterprises.
- Small farmers are now in a better position to comprehend a number of basic economic principles and are able to apply them in their decision-making processes.

At the same time, government policy has also evolved towards a "two-pronged approach" where national planning by the state is being coordinated with local planning at the farm level.

For the teacher of farm management, these developments necessitated a reorientation of the farm management curriculum. Ong suggested that greater emphasis should be placed on rearranging the course content to ensure that it relates to a structure that has a vertical basis, where one course is dovetailed into another, to avoid or minimise duplication. In addition, increased emphasis should be accorded to practical applications such as laboratory exercises and field visits. Supplementary lectures by extension agents or farmers were also considered useful in some instances.

Besides recognising the need to adjust farm management teaching with changing conditions in Asia, it was also realised that constraints exist in attempts to improve the teaching of farm management courses. The major ones include the lack of prestige which is attached to working with small farmers, the communication problems which arise between university professors and the rural farmers, and the

inability of professors to specialise in any one subject area because of the multiple responsibilities assigned to them.

Flinn in a discussion of Herdt's paper, "On-Farm Yield Constraints of Modern Varieties of Rice," drew attention to a project which is currently being undertaken by the International Rice Agro-Economic Network (IRAEN) on the constraints to increasing rice production in Asia. The results of this project have been published in two volumes and a methodology handbook.[3]

This IRAEN study involved collaborative research between six Asian countries, the format involving on-farm experiments and socio-economic surveys. The rice yield gap existing between the average yield and the highest yield ranged from 0.4 to 1.8 tons per hectare during the wet season, and from 0.4 to 2.2 tons per hectare during the dry season. The average yield during the dry season was generally higher than that of the wet season by a factor of 20 to 25 percent. Increased fertiliser levels and better weed and insect controls were identified as the three main factors inhibiting increases in rice production. The preliminary analysis indicated that greater use of fertiliser and better insect control could lead to a rise in the average yield by 0.8 tons per hectare and 1.5 tons per hectare respectively for the wet and dry seasons in Asian small rice farms. Farmers can increase their net gains by $23 and $73 per hectare respectively for the wet and dry seasons.

In examining the institutional constraints encountered by small Asian farms, Taylor argued that institutions should involve themselves with the values, beliefs, socio-psychological, and political perspectives that influence the behaviour of people. Institutional innovations required to promote growth and development included the transformation of traditional organisations into ones which can support the processes of change, and the restructuring of those which will lead to a more equitable distribution of wealth and income. To succeed, these innovations will have to encompass institutional reforms such as those which impinge on the property rights, patterns of resource ownership, and economic and political power of the populace; this must take place in a dynamic environment with some degree of external interaction.

Taylor also pointed out that the management of a traditionally oriented large U.S. farm with its emphasis on within-farm resource reallocation is not relevant to the needs of Asia, since many of the possibilities for improved production depend on changes in factors exogenous to the farming system. Therefore, instead of following the pattern of small farm development in the West, the role of farm management in Asia should be to overcome the various institutional constraints inhibiting small farm development. Farm management teachers should not take the existing institutions as fixed factors. Instead, they should attempt to contribute to the determination of the kind of institutional innovations which they would like to see

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3. IRRI, *Constraints to High Yields on Asian Rice Farms: An Interim Report* (Los Banos, Philippines, 1977); IRRI, *Farm Level Constraints to High Rice Yields in Asia, 1974 - 1978* (Los Banos, Philippines, 1979); S. K. De Datta *et al., A Handbook on the Methodology for an Integrated Experiment: Survey on Rice Yield Constraints* (Los Banos, Philippines, IRRI, 1978).

materialise and to accord them the appropriate priorities they deserve. The strategies which are considered most effective to realise these objectives include the following:

— obtaining field level views on the main institutional constraint which hinder development;
— granting attention to local values and beliefs which relate to the proposed organisational reforms;
— examination of the micro and macro impact of agricultural development policies;
— describing and analyzing key rural institutions.

De los Reyes in his paper, "New FAO Programmes in Small Farm Management in Asia," stressed that a multidisciplinary approach is necessary for small farm development. Recent FAO programs emphasise that micro-level planning at the farm level should be coordinated with macro-level planning. At the same time, farms should be organised into small functional groups to take advantage of the services provided for them by government agencies. Farm management activities should be conducted on a group basis. To facilitate efficient planning, a need exists for more reliable data. This can be fulfilled by the FAO Farm Management Collection and Analysis System (FMDCAS) which, if widely used in surveys, will furnish data for various well-defined agro-ecological zones.

Economic Principles and Application

L.R. Singh's paper, "Economic Principles of Production," explained that small farmers in Asia must apply some basic economic principles in order to assist them in making sound farm management decisions regarding the use of their limited resources. Factor-product, factor-factor, and product-product are the major production relationships. All these are important in attaining profit maximisation, even on small farms.

The relationship between input and output must be established before the optimum level of inputs to be used can be determined. Factor-factor relationship is important in assisting the farmer to determine the optimum combination of inputs for producing a given level of output. The product-product relationship as described by Singh is useful in deriving the optimum enterprise combination for a small farm. In this case, with the input factor available to the farmer assumed to be fixed, the problem is then one of deciding which combination of enterprises would result in maximum revenue.

L.R. Singh presented three problems in his laboratory exercises — one dealing with the method of obtaining the most profitable level of nitrogen application, the second with the determination of the least cost combination of cattle feed ration, and the third with the examination of the optimum combination of enterprises.

Two other papers — one by Chiew on Simplified Programming and the other by Lee on Linear Programming — focused on the role of these techniques in farm planning. Simplified programming has the advantage of being a manual exercise, whereas linear programming is computer-based. However, the case of using the former is in some instances offset by the loss of precision and applicability. Its use incorporates the material and non-material restrictions in the formulation of a farm

plan. The optimum plan obtained is consistent and feasible within the constraints imposed.

In simplified programming, activities are selected and included in the trial farm plan in order of their descending gross profit per unit of resource. After the supply of this resource is exhausted, an enterprise in the plan is replaced by another enterprise which gives a higher return per unit of the second limiting resource. The main disadvantage of using this technique in teaching as explained by Chiew is that the data required will have to be worked out in detail. This includes the formulation of the objective function, identification of feasible activities, input and output coefficients, and available resource.

Lee argued that linear programming allows for the formulation of a comprehensive and optimal plan, with great speed in computation when computer services are available. However, the main disadvantages are caused by the great deal of computations, its inability to handle subjective personal preferences, and its lack of power in predicting farmers' behaviour.

Linear programming is employed primarily in Korea as a planning tool in a constantly changing environment. The farming community is always in a state of flux owing to changes in the product and price factor, technology, institutions, human relations, and supplies of other resources. Besides information on an inventory of resources available, input requirements, and expected prices, there is also a need to incorporate information on alternative enterprises, alternative processes, and the possibilities of purchasing, investing, or disposing of resources.

In teaching linear programming, Lee suggested that it is advisable to discuss the assumptions and limitations together with measures that can be adopted to overcome them. Students may also need guidance on how to translate a specific real world phenomenon into a linear programming model. In view of the complexities involved in building a large model, it is advisable to initially familiarise them with simple small farm models. The building block approach where structures can be added on to the simple model is desirable for developing larger models which can be used for farm planning and policy analysis. One tutorial problem on simplified programming and four assignments on linear programming are presented in these two papers.

Aslam in his paper entitled "Choice of Research Technique" discusses the role of production function in the analysis of survey data from small farms. The Cobb-Douglas or log function was employed to trace the relationship between cottonseed yields and input factors such as area cultivated, labor utilised, bullock power, and the amount of irrigation water and fertiliser applied to the crop. Cross-sectional data from seventy-five farms were obtained at one point in time. Since the estimated equation is usually a poor predictor of future conditions, Aslam stressed that unless efforts are made to collect a time series of cross-sectional data in Asian countries, the usefulness of production function analysis for forecasting future conditions has its limitations. This paper also discussed the problems of simultaneous equation bias, the limitations of the Cobb-Douglas production function, the lack of homogeniety in the quality of inputs and outputs, and the specification and interpretation problems.

Farm Business and Management Analysis

While it is recognised that farm records and accounting are important considerations in farmers' decision-making process, their application in developing countries have been hampered by the inability or unwillingness of farmers to maintain a good bookkeeping system. In this respect, Japan is one of the few Asian countries where farm records and accounts have been widely utilised by the farmers. Nishimura's paper touched on the teaching and application of these topics in Kyoto University which has played a leading role in the adoption of this technique by the Japanese small farmers.

Farm records and accounts reflect the financial position of the business and indicate the profits or losses during the accounting period. This information is relevant for planning changes in farm operations in order to increase efficiency and profits. At the University of Kyoto, a bookkeeping system kept by the farmers themselves has been developed to assist them in maintaining appropriate records and accounts. This system includes forms for cash records, daily record books, net worth statements, and summary tables on closing accounts, gross income, gross expenses, and living costs.

Nishimura pointed out that comprehensive records and accounting procedures may involve considerable time and effort. The kinds and levels of records which should be kept depend on the size and type of farms as well as the educational level and interest of the farmers. In the initial stages, farmers would also need assistance and guidance from advisers on keeping correct records and practising appropriate accounting procedures.

Ban's paper, "Measures of Farm Income," stressed that success in farm business management must be measured by the degree of accomplishment of predetermined goal or goals. As the market economy develops, the major aim of farming becomes one of profit maximisation. Data to calculate farm income are usually obtained from a national sample survey. Farm household income consists of net income from farming, net income from business other than farming, wages and salary earnings, remunerations received, rental, interest earnings, and gifts and subsidies received. This can be regarded as the sum of returns to productive factors owned by the farm and the transfer of income obtained by the farm household.

The other measures of farm income include net cash income, net family cash income and returns to labor and management. Examples of the use of these measures for a typical Korean farm were discussed in Ban's paper.

Partial Plan and Budget were discussed by Adulavidhaya. Budgeting is defined as a detailed statement of a farm plan in quantitative terms. The partial budget is used to estimate the cost and receipt of making relatively small changes to an existing farm organisation. This change is normally associated with either factor or product substitution. Factor substitution is usually related to changes in techniques of production, whereas product substitution is normally brought about by changes in enterprise profitability. In preparing partial budgets, particular attention must be paid to the anticipated changes that result in either a decrease or an increase in income. Two exercises on partial budgeting for a rice and corn farm in Thailand were included in this paper. One of them deals with the problem of a changeover

from the use of hired labour to mechanical weeding, while the other deals with the effects of changes in corn varieties.

Soeharjo's paper, "Whole Farm Business Analysis", offered some suggestions on examining a farm business. Since most Asian farms are small, efforts to increase agricultural productivity will only succeed when there are improvements in productivity from them. Using the data obtained from rice farms in West Java, Soeharjo found that these farms have a substantial investment in fertilisers and work animals and yield high net return.

Two measures of efficiency have been used. Firstly, net income from farming is used to compare farms in the same region. Secondly, receipts from investment show the relationship between farm receipts and total investment. In the example of rice farms in West Java, it was shown that farmers receive 395 rupiahs for every 100 rupiahs of investment. This is a high return to capital investment and proves that farms are being managed efficiently.

Institutional Factors Affecting Management

Two papers dealing with group action in management in Taiwan and Bangladesh respectively were discussed in this section. These two countries emerge as distinct contrasts because group action has been practised for many years in Taiwan while in Bangladesh it is a new phenomenon.

Taiwan is undergoing rapid industrialisation. Lack of rural manpower is a serious problem. Group action is viewed as a means of pooling together farm labor during planting and harvesting operations. Other benefits of group farming include the possibilities of enlarging the scale of farm operations while maintaining individual landownership and increasing productivity of land and labor in the agricultural sector.

Farmers participate in the group sale of products and in the group purchase of inputs in order to reduce costs. Such a cooperative action enables small farmers with small amounts of marketable surplus to form economic marketing units. Joint operations in production are more difficult to establish but must be undertaken if these small farmers are to enjoy the efficiencies associated with large farms. This type of operation is more successful in specialised areas where a package or a series of operations is required. The main advantages of group action for small farms lie in the savings of labor, increased productivity of land and labor, and better access to extension services. It also facilitates government investment in infrastructure development.

A more complex arrangement than group action is the formation of specialised producing areas where all the small farmers produce the same crops and practise joint operations in production and marketing.

It is envisaged that the management of small farms in Taiwan will become more complicated as small farmers increasingly integrate their own decision with those of other farmers.

Agriculture in Bangladesh as in Taiwan is characterised by small farms. However, wage rates in the former are extremely low and there is generally a surplus of farm labor. Group farming is being viewed as a means of increasing farm

productivity and the farmer's income. Its programs are, however, only at an experimental stage of implementation and it consists mainly of two projects — the Joint Farming Project (SHIMLA) sponsored by the Bangladesh Agricultural University and the Field Action-cum-Research Project on the Development of Small Farmers and Landless Labourers (ASARRD) sponsored by the Food and Agriculture Organisation of the United Nations (FAO) and the Government of Bangladesh.

The objective of the SHIMLA experiment is to study the conditions necessary for successful cooperative farming and to increase the economic and social benefits of the farmers involved in the project. The nature of its organisation is still being evolved but preliminary analysis indicates that group farming has resulted in some productivity increases. These increases are also equitably distributed among all members, that is, among the landowners and the landless laborers. There is also greater participation on the part of the latter group and the poor in the village leadership structure. This joint production program is carried out for only one crop — the winter rice (baro) crop and for only part of the total land belonging to the members. Until an optimal organisational structure has been established, it is unlikely that this joint venture will be practised in other parts of Bangladesh.

The ASARRD project was started in 1976 and it was designed to raise farm income through group action of the participants. They are encouraged to form small multifunctional groups with access to supervised credit, extension services, and the delivery mechanism which is at present directed more towards influential farmers and landowners. At this stage, it is still premature to evaluate the success or failure of this project, but it is significant to note that the small farmers in these programs generally feel that their living conditions have improved.

Farm Policy Issues and Implications

Two papers which deal with the problems of farm mechanisation and decision-making during times of uncertainty were presented. Farm mechanisation represents an important advancement in the level of technology for many small farmers. Chiang in his paper, "Farm Mechanisation Analysis," pointed out that more attention should be paid towards the mechanisation of small farms because apart from the heavy capital investment involved, it leads to changes in farming practices and has serious policy implications in the areas of income distribution, employment, and land consolidation.

Taiwan's initial push towards mechanisation occurred between 1947 and 1960 when there was a shortage of work animals. Small power tillers of two to three horsepower were imported to do the work formerly done by animals. Between 1960 and 1970, it was apparent that the supply of farm labor was declining while wage rates and total agricultural production cost were increasing. The use of the power tiller to reduce the reliance on farm labor rose as high as sixfold during this period. These power tillers were generally larger than the earlier ones. Other power tools such as pumps and sprayers were also increasingly employed. Since 1970, mechanisation has been accepted as a basic necessity for maintaining the desired level of agricultural productivity in Taiwan. Government policies such as the

provision of loans and subsidies for the purchase of farm tractors have also encouraged greater use of farm machinery. Extension and research programs have also been geared towards promoting mechanisation.

Based on Taiwan's experience, it is apparent that mechanisation can only succeed if the following conditions were fulfilled:

— Proper farm machinery must be available to perform the different farm operations.
— The appropriate agricultural environment for mechanisation must be present.
— The cost of mechanical farming must be more economical than intensive labor farming.
— Farmers must have sufficient capital to invest in farm machines.
— Farmers must be able and willing to adopt mechanical farming.

In view of the above factors, it is essential that government policy be oriented towards actively supporting mechanisation in situations where the shortage of either draft animals or farm labor can lead to a fall or stagnating level of production.

I.J. Singh's paper, "Farm Decisions under Uncertainty", pointed out that analysis and recommendations associated with traditional farm management decision-making often adopt the assumption that risks do not exist. An attempt was made in this paper to employ the utility function approach as an aid for better decision-making for small farmers. Decisions are made to maximise expected utility rather than income or profits.

Using the Bernoulli principle, risky prospects were ranked in order of preference, the most preferred prospect being the one with the highest or maximum utility. Data from a ten hectare irrigated farm in Haryana state were used to quantify risk under different weather conditions. The utility function for farmers' aversion for risk and his preference for the avoidance of money losses were constructed from the information on the money payoff for different possible actions and type of season. A utility curve for the farmer was then derived from the utility function which is also used to construct the utility indices for each possible action. The highest utility indices corresponded with the farmers' preference on the possible action to undertake. Two problem sets dealing with utility function analysis were presented at the end of this paper.

Student Research Projects

The two papers presented on this subject focused on data collection undertaken by students as part of a survey or case study. Tan's paper, "Standardisation of Data Collection," touched on the problem of variability of data collected and analysed by different farm management workers. Such data are usually collected for individual research projects and are not available to other research workers. This *ad hoc* approach stems from the fact that researchers rarely view themselves as producers of basic information. With the scarcity of good quantitative data in many developing countries, and the cost involved in their collection, it is important that immediate steps are taken to standardise the kind of data collected and to make them available to other farm management workers.

The standard farm management questionnaire for data collection and the format for data analysis developed by the Food and Agriculture Organisation of the United Nations (FAO) provides an important beginning for developing a uniform approach to this technique. It is envisaged that when this method becomes more widely adopted by researchers, the problem of the scarcity and non-uniformity of good data will diminish. This will facilitate the availability and easy comprehension of research results which will benefit students of farm management and increase the range of materials that can be used for teaching purposes.

Some salient points on the changing realities in farming and the scope of farm management surveys are discussed by Amerasinghe. Agriculture in Asian countries has over the years become more dynamic, intensive, and diversified. Further development of the agricultural sector will require rapid advancement of the support services, improvements in labor productivity, and better farm management decision-making at the rural level which must be integrated with planning at the regional and national levels.

Farm management surveys are important since they form the basis of virtually all investigations at the farm level. In order to ensure that the quality of data collected is good, these surveys should be carefully planned and executed. Students should be taught the sequence of activities involved in carrying out a survey and the importance of relating theory to their applied work. Care should also be taken when defining the objective and formulating the hypothesis to be tested. Other topics which need consideration are data coverage and accuracy, questionnaire design, organisation, collection, tabulation, and analysis of data.

Concluding Remarks

This seminar has provided an opportunity for Asian farm management professors to exchange their views and perspectives on how farm management is and should be taught in various Asian universities. The major problems encountered in teaching this course have been identified. Some of them, such as the problem of lack of teachers and the large class size, must be solved within the individual institutions. Others, including the inadequacy of teaching materials relevant to the management of small farms, can be alleviated by the exchange of appropriate teaching matter or by the availability of such publications as the *Readings in Asian Farm Management*. The growth of national or regional agricultural economics or farm management journals will provide more incentive for the publication of articles by Asian farm management researchers. The publication of new textbooks on this topic by Asian professors was also discussed. It is likely that more Asian textbooks written in an international language will be available in the near future.

The range of immediate future programmes which can be undertaken by Asian professors was another subject of interest among the participants of the seminar. There was strong support for initiating joint research programs and joint publications among professors of the Asian region. However, such projects will be dependent on funds being made available either from local institutions or from other agencies.

APPENDIX I

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APPENDIX II
Titles of Papers Presented

Role of Farm Management in Asia

1. Adjusting Farm Management Teaching with Changing Conditions in Asia — S. Ong
2. On-Farm Yield Constraints of Modern Varieties of Rice — R.W. Herdt
3. Farm Management: Its Role in Alleviating Institutional Constraints Facing Asian Small Farms — D.C. Taylor
4. New FAO Programs in Small Farm Management in Asia — B.N. de los Reyes

Economic Principles and Applications

1. Economic Principles of Production — L.R. Singh
2. Simplified Programming — F.C. Chiew
3. Teaching Linear Programming as a Tool for Farm Planning — J.H. Lee
4. Choice of Research Techniques: A Methodological Focus on the Production Function — M. M. Aslam

Farm Business and Management Analysis

1. Farm Records and Accounting — N. Nishimura
2. Measures of Farm Income — S.H. Ban
3. Partial Plan and Budget — K. Adulavidhaya
4. Whole Farm Business Analysis — A. Soeharjo

Institutional Factors Affecting Farm Management

1. Group Action in Farm Management in Taiwan — Y.K. Mao
2. New Programs for Group Action in Management — M.A. Jabbar

Farm Policy Issues and Implications

1. Farm Mechanisation Analysis — Y.C. Chiang
2. Farm Decisions under Uncertainty — I.J. Singh

Student Research Projects

1. Standardization of Data Collection — B.T. Tan
2. Changing Realities in Farming and the Scope of Farm Management Survey — N. Amerasinghe