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9. ABSTRACT  
 As the Ministry of Agriculture and Fisheries and the Agricultural Economics Research Institute review their short and long term plans, budget, personnel, and other requirements for the support of the Korean Agricultural Sector Study team, a number of issues should be considered. In order to detail some of the issues, a restatement of the short and long term objectives of KASS is appropriate. From this a look is in order at the possible future operational use of the KASS work by MAF and other government agencies; and at the long term correlary activities of MAF, such as statistics processing, short term forecasts, policy analysis, basic economic analytical studies, and computer related activities.

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## SHORT AND LONG TERM KASS DEVELOPMENT ISSUES

As the Ministry of Agriculture and Fisheries and the Agricultural Economics Research Institute review their short and long term plans, budget, personnel, and other requirements for the support of the Korean Agricultural Sector Study team, a number of issues should be considered. In order to detail some of the issues, a restatement of the short and long term objectives of KASS is appropriate. From this a look is in order at the possible future operational use of the KASS work by MAF and other government agencies; and at the long term correlary activities of MAF, such as statistics processing, short term forecasts, policy analysis, basic economic analytical studies, and computer related activities.

### Present Status of KASS

The first objective of the KASS project was to carry out a study of the Korean agricultural sector including an inventory of resources available, demands on the sector, its physical and economic structure, and its social, political, and institutional environment; to analyze the consequences

of following alternative development strategies and to recommend a development strategy, policies and programs to achieve development goals consistent with national values relative to agricultural sector development over fifteen year planning horizon. This objective was accomplished with the publication of the Korean Agricultural Sector Study report in both English and Korean, and the publication in English of eight KASS special reports and translations of five of those into Korean.<sup>1/</sup>

A second objective of the KASS project was to identify those elements or subareas revealed by the Agricultural Sector Study which require further investment to optimize the development of the agricultural sector giving the priority sequence, and time frame in which these investments should be made, the magnitude of the investment schedule, the most feasible sources of investment funds, and the rationale for selecting investment areas given selected price, program, and policy alternatives. In addition, the study was to outline policy, program, institutional, and other pertinent

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<sup>1/</sup> A list of major KASS publications is attached as Appendix A.

requisites for the successful employment of the additional capital investment indicated. This study was conducted by a team of KASS investigators during the summer of 1972, and an Investment Priorities study report was published in October, 1972, thus accomplishing the second objective of the project.

The third objective of KASS has a twofold purpose -- (a) to develop a computerized simulation model of the agricultural sector for use as a continuing policy planning tool to improve and develop the capabilities of Korean decision makers in planning, policy formulation, and program development; and (b) to develop a Korean capacity for further development of such a model for updating projections, and for analyzing policy alternatives as conditions change and as new and improved data becomes available. The KASS team began work toward accomplishing this objective from the beginning, along with the other two, since a great deal of complementarity existed between the objectives. The third objective, however, will probably never totally be accomplished as long as a KASS model and a KASS team are employed by the Ministry. Quite simply, as problems and issues arise,

new developments must take place to keep the model current; and as time moves on, new data and information must be incorporated into the existing model to maintain its operational capacity and relevance.

The first conceptualization of the agricultural sector simulation model for Korea was extremely broad in scope since a broad view of the agricultural sector was necessary in accomplishing the first of the KASS objectives. This broad scope is also necessary to maintain perspective and to understand the broad interrelationships among the various components of the agricultural sector and its linkages to the rest of the economy.

As the KASS team went through the process of conceptualizing and building the skeleton of the broad sector model, it became apparent that while the broad model was extremely useful at quite an aggregated level, it was also important to take a much finer look at certain parts of the sector in order for the model to be of most use to decision makers. Thus, several "program" model components should be developed as decision maker priorities dictate. For example, work is presently under way on a program component of the grain

management program which will be incorporated into the broader sector model, and a livestock program model is under consideration. It is important to note that the sector model is necessary in order to gain the full advantage of the program components.

The KASS team is presently working on a combination of improving existing components; developing new components, both additional sector model components and program components; and using the currently operational version of the model as an aid in developing the MAF contribution to the initial round of planning for the Fourth Five Year Plan (1976-1981). More specifically, work presently under way and to be accomplished during the next year includes (1) a grain management program component referred to above, (2) a recursive linear programming component for micro level resource allocation, and a necessary component in order to make price determination endogenous in the model, (3) a livestock program component, (4) refinement and improvement of the data input in the urban demand component, (5) refinement and linkage to economic determinants of the migration portion of the population component, (6) disaggregation

and improvement of the input/output component linking the agricultural sector and the nonagricultural sector, (7) incorporation of evaluative and analytical detail on the international trade and balance of payments implications of policy decisions in the agricultural sector, (8) development of further components as defined through interaction and decision between KASS, ROK, and AID.

#### Personnel Training Objectives

A major emphasis over the next period to March, 1974, when the Michigan State University permanent party is presently scheduled to depart, is the training of Korean personnel of KASS to continue the work. This training objective is at two levels --- one of maintaining the model in its state as of March, 1974, and another of continued component development and component improvement after March, 1974. Maintenance includes ability to update the data base of the model, to change model parameters in accordance with new information, analysis, and the results of further study, and to reflect changes in policy alternatives in the data and parameters and model structure in order to test the consequences of tentative new planning and policy formulations.

New development includes the ability to conceptualize and operationalize entirely new model components, and to install new and more sophisticated linkages and feedback mechanisms between and within existing components. This is an extremely important aspect of the work if the KASS model is to become even more useful and relevant to decision makers.

During the first year of the project, the stringent deadlines imposed on the KASS work were in direct conflict with the on-the-job training objectives, even though the overseas training program was successfully launched. That is, the additional time required for explicitly training Korean team members in either the development or maintenance functions was not available if the deadlines were to be met. At this stage the major time deadlines have been met and emphasis has shifted to include on-the-job training as an important project function.

The question of how the training function can best be carried out is a difficult one. Training for the new development function requires substantial theoretical and conceptual backgrounding of individuals in agricultural

economics, mathematics, and systems science. This training can best be accomplished through more general graduate course work at MSU or in another U.S. university, or through specialized programs such as the one year systems science-economics training program under development at MSU by Professor Manetsch. The specialized training programs may, but do not necessarily, lead to a graduate degree. (Presently Mr. Kim, Young Sik of AERI is at MSU in graduate school and Mr. Kim, Dong Min and others of AERI are scheduled to go to MSU during the next year for special training.)

The model maintenance training function can be addressed in Korea in an "on-the-job training" context. The model has already become large enough and incorporates enough different methodologies among the components that some specialization is necessary within the KASS team in building and maintaining components. Even now it is almost impossible for a single individual to know in detail and to understand fully the total of the KASS model by its components.

With this in mind it is clear that the Korean members of KASS must (1) take on an assignment to the KASS team with the idea of remaining for a rather long period of time in

order to know their jobs well and to provide continuity, (2) plan on an organizational structure among team members which delegates specialized responsibility for specific components to specific individuals, and (3) begin immediately to operate with their foreign counterparts on a full time basis to effectively learn their specialty and to provide valuable input into the components for which they will ultimately be fully responsible.

While the agricultural economist team members are specializing on the model components, it is no less important to effective team operation that other members specialize in a slightly different way. All model development, maintenance, and operation activities require the services of competent and well trained computer programmers. While the "professionalism" of the programmer may not be as high as that of the economist, he is no less necessary or important to the team. Programmers must know the KASS model and its components from a programming standpoint. Since thorough knowledge of the model takes time to acquire, they also should view their position on the team as specialized with respect to the KASS model and should be recruited and hired

with long term employment in mind. Further, a single programmer on the team is not enough. This specialty requires enough programmer positions to provide the depth and backup functions necessary to operate effectively over time and to provide continuity as normal personnel activity (vacation, sickness, leave) and peak workloads occur. Thus, it is imperative that at least two full time computer programmers be assigned to the KASS team at all times, and additional computer programming capability should be developed in AERI as insurance and backup. (Presently, Mr. Lee, B.K. and Miss Cho are filling these slots. Miss Cho is scheduled to attend the six month KIST computer programmer school beginning in May, 1973. AERI might seriously consider employing Miss Cho on a full time basis to have full control over her job activities rather than sharing her with MAF. In addition, AERI might consider sending Mr. Lee, H.B. to the KIST computer programmer school and providing him with some job experience with KASS.)

Another specialization required on the KASS team needing at least one and possibly two persons is that of a policy agricultural economist who can act as a bridge and perform

a liaison function between the rest of the KASS team and its model on the one hand, and the user decision makers on the other. This person or these persons should have a comprehensive view of the model and how its components fit together and know the data input and output and how the model can be used as an analytical aid in the decision making process. He must be able to talk and understand both the "language" of the systems scientist and the "language" of the decision maker and to interpret between the two in both directions.

Thus, minimum Korean personnel requirements for the KASS team to maintain and operate the existing model include at least three agricultural economists specialized by model component, at least one agricultural economist policy analyst to perform the liaison functions with decision makers, and at least two programmers. In support of these personnel a secretary and at least one agricultural economist assistant are required. For further model development, the KASS team requires at least one, and preferably two, trained systems scientists who are capable of conceptualizing and operationalizing new components as well as improving existing components.

Expansion of the KASS team beyond this minimum level depends upon how much KASS related research (such as farm management, cost and return studies, production and supply studies, market system and transportation studies, infrastructure and institutional studies, technical agricultural studies, demand studies, demographic studies, macro-economic studies, sociological studies, and the like) will be done by the team as opposed to relying on outside research sources. It also depends on how much the KASS team can rely on the users' staffs to furnish data and information in the proper form for use in the model. For planning purposes over the next two to three years the KASS team should be slightly larger than the minimums detailed above. The team should be encouraged to build upon their contacts throughout the Korean research establishment and to rely on this establishment for part of their research needs. Since persons from many disciplines (i.e. technical agriculture, economics, sociology, political science, statistics, etc.) can contribute to the KASS work, contract and short term consultant arrangements should be considered. KASS should also be responsive to the needs of decision makers throughout MAF.

and in EPB in devising new components and in incorporating new dimensions into existing ones.

### Computer Services

Another issue which must be resolved is the institutional environment within which KASS, AERI, and MAF will be operating with respect to computer services. Undoubtedly over time, AERI and MAF will become much heavier users of computer services. Thus, the long term issue is how MAF and its subagencies can best go about obtaining dependable, reliable, timely, low cost computer services.

KASS is presently receiving computer services from the National Computer Center, an agency of the Ministry of Science and Technology. The fact that NCC is organized for data processing rather than research has created problems of access and timeliness for KASS. To partially compensate for these problems, several special computer sessions have been arranged for KASS with NCC. While these sessions have been a short term expedient toward accomplishing immediate objectives, they are not a permanent solution.

These same problems will occur as other sections of AERI, and to a lesser extent MAF, take wider use of the NCC

facilities. It would be useful at this point for MAF in anticipation of increasing computer usage, to think through the alternative means and institutional arrangements for computer use by the various agencies of the Ministry. A number of alternatives should be considered. A major set of options with respect to the obtaining of computer services are to (1) remain with NCC, (2) establish an MAF computer center with its own equipment, or (3) contract for computer services with another agency, such as KIST. As long as NCC provides computer services to government agencies on a no charge basis, and as long as the anticipated computer usage remains relatively low, the option of staying with NCC appears most likely due to economic considerations. Since in the aggregate, excess computer capacity appears to exist in Korea, and since computer hardware is expensive, MAF should probably not consider the second option above in the foreseeable future.

Under any of the above options, including staying with NCC, another set of issues arise concerning how MAF should organize internally to make the most efficient use of required computer services. If MAF will continue to rely on

NCC for their computer services. Should each agency or group deal directly with NCC or should MAF have a central computer services office to consolidate all MAF computer work and to deal with NCC as a single spokesman for the Ministry?

Should programmer services be centralized, dispersed throughout using agencies, or contracted from outside? Should key punching and related activities be done in MAF or contracted out? Should MAF be linked to the computer by one or more terminals or should they work directly with the NCC computer room? Should MAF have a fixed block of computer time reserved each day for their exclusive use, or would some other time access arrangement be more useful and efficient? How much influence should MAF and other users have on the operational policies of NCC or another contracted computer installation?

On the basis of the KASS computer related activities at this point at least two major issues should be considered. The first is the acquisition of a key punch machine to be placed in the KASS office in MAF for use by the team. Presently two means of having cards punched are available. If only a few cards are required they can be taken to the first

basement where the computer is located and the key punch operation performed in the computer room. The key punch operator in that location, however, is provided with an inadequate quota of cards each day, and often runs out of cards early in the day causing at least one day's delay for the KASS team. The other route for larger key punch jobs is to submit coding sheets to the key punch division of NCC in the third basement of the building. Once a set of coding sheets are submitted for punching, there is usually a two to three day time lag before the cards are completed. In addition to the delays, time is consumed in preparing the coding forms, in transporting the forms and cards over the distance between the thirteenth floor and the basement, and in correction of the rather high incidence of errors in the cards punched from the coding forms. Reportedly, NCC is presently renting 55 key punch machines from Univac, and have some of these machines loaned out to offices in various Ministries. It would be worthwhile inquiring as to the availability of one of the NCC key punch machines for installation in the MAF-KASS office either on loan or on a sub-rental arrangement. At the same time, this arrangement is

being made, arrangements should also be made for card supply support in sufficient quantities from NCC.

A second issue and one of lower priority than the first is the question of installing a terminal facility in the KASS office in MAF or in AERI for direct access to the computer. If this were to be contemplated, negotiations with NCC would need to first take place in order to make sure that access through the terminal to the computer could be accomplished on an "as needed" basis. While the NCC computer hardware is capable of operating in a time sharing mode, NCC present policies leave the job specification and priority control to the operator. This mode of operation would not be compatible with terminal usage.

As MAF thinks through its computer services question other related issues will undoubtedly surface. In any event, it is not too early for MAF to begin addressing the issues.

#### Other Issues

As the KASS work figures more prominently in the economic planning and policy analysis of the Ministry, the relationships and linkages between the KASS team and other units in

the system must be evaluated. The question of KASS team linkages with the Korean research establishment concerned with structural economic research and economic studies related to the agricultural sector has been raised above.

In addition, close liaison and linkage may be useful with the units responsible for collecting and processing agricultural statistics. KASS is a heavy user of statistics, but can also be useful to the collectors of the statistics in providing insights as to usefulness of new series, value of selective improvement in accuracy, and in helping to perform some of the basic reconciliation and processing of data.

A close working relationship could also be fruitful between the units charged with short term forecasting and KASS. These units can provide KASS with much of the data required for keeping the KASS model current for running on the fine time mode (40 times per year) and KASS can provide model assistance in making short term forecasts of various types.

Finally, as far as new component development, component disaggregation, and component improvement and expansion are concerned, the possibilities are almost unlimited. Potential

work for the KASS team is only limited by the imagination and abilities of team members for conceptualizing and operationalizing additions to the model which address the many and real planning and policy issues faced by decision makers. Continuous interaction between the KASS team and the decision makers is necessary in order to identify, articulate, and assign priorities to these issues.

Again, how the short and long term development of KASS should proceed and to what extent the linkages indicated above should be built in are issues for discussion and resolution by the concerned parties and agencies in MAF.

## Appendix A

### MAJOR KASS PUBLICATIONS UNDER CONTRACT 184

- \* Rossmiller, et al. Korean Agricultural Sector Analysis and Recommended Development Strategies, 1971-1985. Agricultural Economics Research Institute, Ministry of Agriculture and Forestry, Seoul, Korea; and Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, August, 1972.  
  
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- \* KASS Special Report 3. An Analysis of New Land Development in Korea. Barlowe, Raleigh, et al. East Lansing: Michigan State University, 1972.
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KASS Special Report 5. Agricultural Research and Guidance. Chung, Moo Nam; Miller, Mason E.; Wittwer, Sylvan H. East Lansing: Michigan State University, 1972.
- \* KASS Special Report 6. Population, Migration, and Agricultural Labor Supply. Beegle, J. Allan, et al. East Lansing: Michigan State University, 1972.
- \* KASS Special Report 7. Organization and Performance of the Agricultural Marketing System in Korea. Shaffer, James D., et al. East Lansing: Michigan State University, 1972.

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Ferris, John N., et al. Investment Priorities in the Korean Agricultural Sector. Agricultural Economics Research Institute, Ministry of Agriculture and Forestry, Seoul, Korea; and Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, 1972.

Hathaway, Dale E.; and Rossmiller, George E. "The Organization of the Ministry of Agriculture and Forestry, Republic of Korea." For limited distribution, primarily in ROKG. Seoul: KASS, 1972.

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\* Translated into Korean.