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**KASS DEVELOPMENT ISSUES**

by

**George E. Rossmiller and Dong Hi Kim**

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## KASS DEVELOPMENT ISSUES

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George E. Rossmiller and Dong Hi Kim\*

As we review with you and among ourselves the progress made by the KASS team over the past two years, we must also face a number of issues which will affect the continued growth, viability, and relevance of the KASS unit. An absolutely necessary condition for the KASS unit to survive its infancy and be nurtured to maturity is that it be useful enough to you decision makers to deserve your support. While relevance and usefulness are necessary conditions for long term viability of the KASS unit, they alone are not sufficient conditions. In order to detail some of the issues comprising the sufficient conditions, 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; the need for KASS to be institutionalized into the decision making process; the training requirements for KASS team members; 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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\*Paper presented at the Korean Agricultural Sector Study (KASS) Decision Maker Workshop, Seoul, Korea, 6 - 9 August, 1973. George E. Rossmiller is an Associate Professor of Agricultural Economics at Michigan State University, and former Field Project Director of the Korean Agricultural Sector Study Team (Aug. 1971 - June 1973). Dr. Dong Hi Kim is Director, Agricultural Economics Research Institute, Ministry of Agriculture and Fisheries, ROK. KASS is a section within AERI.

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 source 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 requisites for the successful employment of the additional capital investment indicated. This study was conducted by KASS investigators during the summer of 1972,

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

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 with a purpose of improving and developing 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 be totally 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 component is in the initial stages of development. We should also be considering other program components in the areas of agricultural capital and credit, land development and water management, and others as you help us identify the needs. 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 rounds of planning the Fourth Five-Year Plan (1977 - 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 non-agricultural 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 MAF and KASS.

#### Personnel Training and Manpower Requirements

A major current emphasis is the training of Korean personnel of KASS to continue the work. 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. Professor Tom Manetsch has done considerable thinking about the training requirements to provide the long term capacity for development, maintenance, and operation of large computerized simulation models such as the KASS model. Professor Manetsch has listed six basic functions required for successful institutionalization of such models. They are: (1) data acquisition, storage, and updating, (2) model development, (3) parameter estimation, (4) model testing and validation,

(5) use of models in decision analysis, (6) model refinement and updating, and (7) model documentation. The carrying out of these functions require professionals with a unique mix of disciplinary talent who are capable of operating effectively as members of a multidisciplinary team.

The full time core of such a team must be composed of systems scientists, agricultural economists, and computer scientists. In addition the team must be able to draw upon professionals from many other disciplines on a project and/or consultant basis. These other disciplines include the various fields of technical agriculture, statistics, sociology, econometrics, political science and public administration, nutrition, mathematics, and others as needed.

Korea is fortunate in having well trained people in many of these disciplines. Mechanisms must be developed, however, whereby this talent can be utilized effectively to contribute to the KASS team efforts.

Adequate training in some areas is still lacking. Presently this training can best be accomplished through graduate course work at MSU or in another U.S. university, or through specialized programs such as the one year system science-agricultural economics training program under development at MSU by Professor Manetsch. This specialized training program may, but does not necessarily, lead to a graduate degree.

Based mainly upon our experience here in Korea the Manetsch training program will have components for professionals who will function as model developers and maintainers, for computer scientists and programmers working on such models, and, very importantly, for decision makers and administrators (such as yourselves) who will be the prime users of the models. Another long run aspect of the training function, of course, needs to be centered in the university so that Korea can internalize the capability of this kind of training at home.

While the offshore training component is an absolute imperative at this point in time, we should also realize the importance of "on-the-job training" within the KASS team. This type of training can be particularly effective while MSU continues to have permanent party members of the KASS team.

The KASS 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) 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. 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 and preferably three 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.

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 core full-time 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 three computer 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 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, make wider use of the NCC facilities. It would be useful at this point for MAF, in anticipation of increasing computer usage, to think through 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, (3) contract for computer services with another agency, such as KIST, or (4) some combination of the above. 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 for the major part of the required computer services 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. Questions such as the following must be addressed: Should each agency or group within MAF deal directly with the provider of computer services or should MAF have a central computer services office to consolidate all computer work and to deal with the computer services supplier 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 at the location of the computer services supplier? What time access arrangement would be most useful and efficient? And probably most importantly how much influence should MAF and other users have on the operational policies of a contracted computer services supplier?

AERI has worked out a special arrangement with KIST which includes the rental of a remote terminal for access to the computer directly from the AERI offices. This can be a major help in more efficient model development and testing. Eventually you may want other equipment allowing for visual display of output as well as providing the capability of obtaining hard copy output as needed. Another feature currently being developed at MSU which will make the terminal installations even more useful is a more straight formal and simplified computer access language which will allow users such as yourselves to interact much more directly with the computer in using the models.

As MAF thinks through its computer services question other related issues will undoubtedly surface. In any event, it is not too early 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 mechanisms of KASS team linkages with the Korean research establishment concerned with structural economic research and economic studies related to the agricultural sector must be dealt with if KASS is to have an ability to draw upon this pool of professional talent and professional stature to contribute to the general advancement of knowledge in Korea and in the international research community.

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 and the team along with many of you has had serious concerns and reservations about the quality of the historical statistical series which we have been using. A statistics and data gathering system should have as its only objective an accurate reflection of reality and changes in that reality through the statistics collected. This calls first for the taxonomy of reality into concepts; and second the precise definition of the variables concerned with each concept in terms both measurable and relevant to the user. The KASS team has already confronted some of the difficult problems of conceptualization and definition. They need to coordinate much more closely with the statistics agencies in order to assure a common set of concepts and definitions. In addition KASS can help the statistics collection agencies through 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.

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

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.

KASS Special Report 1. The National Agricultural Cooperative Federation: An Appraisal. Sorenson, Vernon L., et al. Agricultural Economics Research Institute, Ministry of Agriculture and Forestry, Seoul, Korea; and Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, 1972.

- \* KASS Special Report 2. Rural Infrastructure. Libby, Lawrence W., and Kim, Sang Gee. Agricultural Economics Research Institute, Ministry of Agriculture and Forestry, Seoul, Korea; and Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, 1972.

- \* KASS Special Report 3. An Analysis of New Land Development in Korea. Barlowe, Raleigh, et al. Agricultural Economics Research Institute, Ministry of Agriculture and Forestry, Seoul, Korea; and Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, 1972.

- \* KASS Special Report 4. An Analysis of Supply Response on Major Agricultural Commodities in Korea. Ferris, John N., and Suh, Han Hyeck. Agricultural Economics Research Institute, Ministry of Agriculture and Forestry, Seoul, Korea; and Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, 1972.

KASS Special Report 5. Agricultural Research and Guidance. Chung, Moo Nam; Miller, Mason E.; Wittwer, Sylvan, H. Agricultural Economics Research Institute, Ministry of Agriculture and Forestry, Seoul, Korea; and Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, 1972.

- \* KASS Special Report 6. Population, Migration, and Agricultural Labor Supply. Beegle, J. Allan, et al. Agricultural Economics Research Institute, Ministry of Agriculture and Forestry, Seoul, Korea; and Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, 1972.

- \* KASS Special Report 7. Organization and Performance of the Agricultural Marketing System in Korea. Shaffer, James D., et al. Agricultural Economics Research Institute, Ministry of Agriculture and Forestry, Seoul, Korea; and Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, 1972.
- KASS Special Report 8. Crop Production Data and Relationships. Wright, Karl T.; Kim, Young Sik; and Kim, Kwang Hee. Agricultural Economics Research Institute, Ministry of Agriculture and Forestry, Seoul, Korea; and Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, 1972.
- KASS Special Report 9. The User's Manual. Carroll, T. W. (Ed.) and the KASS Team. Agricultural Economics Research Institute, Ministry of Agriculture and Forestry, Seoul, Korea; and Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, 1973.
- 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.
- KASS Working Papers as listed in the bibliography of Korean Agricultural Sector Analysis and Recommended Development Strategies, 1971-1985 (above).
- \* Translated into Korean.