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THE FUTURE OF AGRICULTURE

*Technology, Policies
and Adjustment*

PAPERS AND REPORTS

FIFTEENTH INTERNATIONAL CONFERENCE OF AGRICULTURAL ECONOMISTS

*Held at Parque Anhembi
São Paulo, Brazil*

19–30 AUGUST 1973

OXFORD
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INTRODUCTION

THIS is the sixth IAAE Conference for which Discussion Groups were organized to consider current topics of critical significance. The purpose was to provide Conference attendees a time and place to meet informally with a small group of people from various parts of the world to explore in some breadth and depth, subject matter of mutual interest.

The 18 Discussion Groups at São Paulo met for four sessions, each of some two hours duration, and included 552 participants. The topics for each Group were these:

Group 1. Agricultural Credit

2. Methodology of Educating, Teaching, Training, and Extension
3. Collection, Tabulation, Analysis and Use of Agricultural Data
4. Economics of Agricultural Science and Technology
5. Interaction of Natural Resources, Technology and Environment
6. Dualism in Agriculture—Large-Scale vs. Small-Scale Farming
7. Motivation of Farmers
8. Agrarian Reform and Land Tenure
9. Policy on Rural Employment and Income Distribution
10. Administration, Organization and Control of Agriculture
11. Farm Management and Production Economics
12. New Analytical Techniques in Farm Management and Production Economics
13. Demand and Marketing Problems
14. New Analytical Techniques in Marketing
15. International Trade Policies
16. The Role of Multi-national Firms in Agricultural Development Programmes
17. Planning and Implementation of Economic Development Programmes
18. Population Problems, National and International

Topics were selected after careful consideration of current problems and relevance to the theme of the Conference, 'The Future of Agriculture'. Suggested topics were solicited from the Executive Committee, from members contacted in international travel, from a special inquiry circulated to the 2000 agricultural economists attending a conference in the United States in 1972, and from other informed sources.

As members registered for the Conference in São Paulo, they were requested to indicate their first, second, and third choices of Discussion Groups in which they preferred to be a participant. Fortunately, the Groups determined on this basis were sufficiently nearly equal in size to allow each person to be in the Group of his first choice. Members were requested to participate in only one Group and not to shift about from one

Group to another. This restriction is considered essential if the Group topics are to be adequately explored, worthwhile reports prepared, and participants are to become well acquainted and establish a lasting rapport.

In advance of the Conference a Chairman, Rapporteur, and two Consultants were selected for each Group—a total of 72 leaders from 41 countries. The selection process and subsequent follow-up procedures were long, somewhat complicated, and required an exchange of more than 700 letters. The primary source of names was an inquiry that I sent in February 1973 to 76 Country Correspondents and 14 Alternates, requesting nominations from their countries of prospective attendees whom they thought would make effective Chairman, Rapporteurs, or Consultants, their three principal subject-matter interests, and something about their education and work experience. Actually some 24 factors were taken into account in making the selections. Every effort was made to obtain a distribution of leadership roles that would reflect regional and national differences, and economic, social, cultural, and ideological variations in approximate proportion to IAAE membership. Repeating the use of leaders from previous Conferences and duplication with people appearing in other parts of the programme was avoided if at all possible. This, of course, required close synchronization with the plans of the Programme Chairman, Vice-president K. E. Hunt, in Oxford, England. Realistic suggestions for simplifying the task of selecting Discussion Group leaders would be received with rapture.

Over the years there has been much debate concerning the extent to which the Discussion Groups should be structured. At the Conference in Minsk in 1970 and in São Paulo, the pattern was one of requesting the Chairman to open the first of the four sessions with an introductory statement designed to stimulate thinking and get a spirited dialogue under way. No formal papers are desired, but rather a free-wheeling, uninhibited exchange of views. The Rapporteurs had the difficult assignment of preparing a thousand-word synoptic review of the Group's deliberations suitable for publication in the Conference Proceedings, along with a picture of the Group.

In 1963 the Executive Committee, at the request of Dr H. C. Trelogan, originator of the Discussion Group programme in 1958, invited me to assist in organizing the Groups, selecting the leaders, and performing related duties for the 1964 Conference in Lyons, France. Subsequently I was asked by the Executive Committee to take the lead in organizing the Discussion Groups for the Conference in Sydney, Australia (1967), Minsk, U.S.S.R. (1970) and São Paulo, Brazil (1973). This has been an exceedingly interesting and rewarding experience, but I think the time has come for this responsibility to be taken over by someone else. I will always be grateful for the opportunity to work closely with the Founder-President Leonard K. Elmhirst (England), Past-President Nils Westermarck (Finland), President S. R. Sen (India), Vice-President K. E. Hunt (England), and his predecessor, John R. Raeburn (Scotland), the retiring Secretary-Treasurer, Joseph Ackerman (U.S.A.), and his

successor, Dr R. J. Hildreth, and many other fine people including especially Madelyn Naumes of the Farm Foundation, and Jane Abbate, Lillian Breshears, and Dorothy Baldwin of the U.S. Department of Agriculture who spent countless hours struggling with Conference problems. I deeply appreciate, also, the co-operation accorded me by the Country Correspondents, and in particular the pleasant and effective efforts over the past decade of the 220 Discussion Group leaders from literally all parts of the world to make the Group sessions interesting, informative, and a dynamic part of the triennial Conference of the International Association of Agricultural Economists.

Emerson M. Brooks

GROUP 1. AGRICULTURAL CREDIT

Chairman: R. Aktan, Turkey

Rapporteur: F. Warren, U.S.A.

Consultants: S. S. Deen, Sierra Leone and P. Thisa-Mondol, Thailand

Four general areas were selected for discussion:

1. The role of agricultural credit in DC and LDC countries.
2. Providing the supply of funds for agriculture.
3. Proper institutions for agricultural credit.
4. Loan management.

1. The role of agricultural credit in DC and LDC countries

The role of agricultural credit varies widely from country to country. From the discussion it is clear the role of agricultural credit in the LDCs is closely related to providing needed resources which farmers cannot secure from their own available capital. In the DC countries, borrowed capital plays a broader role. It becomes a basic tool of production by providing the farmer with capital to acquire resources at the most opportune time, in the most advantageous amount, and in the most efficient manner. In addition to credit needs for production, credit is used for marketing, and even processing of many farm products on the farm.

Providing adequate funds for farm credit directly affects total production as well as the production per unit of land. The role of credit to provide adequate production is related to the role of credit as a means of allocating limited working capital from non-farm sources.

As an allocator of scarce funds, credit could have a major role in shaping the social structures. If allocated to increase production, marginal and inefficient farmers could be forced to leave the farm and migrate to urban areas. On the other hand, if allocated in such a way that the marginal farmer is provided needed capital for production, the result may be the maintenance in rural areas of a larger population. The use of new technology such as proper use of fertilizer and better seed should increase production per unit of land regardless of the size of area farmed.

The participants found it difficult to define the role of credit so that the definition would cover all levels of agricultural development, all groups of farmers, and all countries. Farms in practically all countries can be divided into four groups when considering the role of agricultural credit;

- large-scale capitalistic type of farms such as plantations;
- typical average farms that generally provide an adequate income for the livelihood of the farm family;
- marginal farms which need managerial and technical help;
- farms too small to provide a livelihood for the farm family.

Based on comments by the participants, the role of agricultural credit could be summarized as follows: (a) To increase agricultural output in ways and amounts consistent with socio-economic objectives; (b) to raise

farm incomes to eliminate disparities between farm incomes and incomes in other sectors; (c) to transfer resources into agriculture for transformation and growth of the agricultural sector; and (d) to increase the livelihood of the farm family through increased productivity and income.

2. Providing the supply of funds for agriculture

The availability of funds to finance agricultural production is directly related to the level of country development. In the developed countries there is generally no problem for farmers to secure all the credit they need. Even for marginal or below marginal farmers, there is usually some kind of governmental assistance such as subsidized interest rates or guaranteed loans.

In the LDCs, the risk involved in loans to farmers is so great that the usual lending institutions will not loan money to farmers. In addition, farmers are not familiar with banks and are afraid to go to such institutions.

The group emphasized that the best possible way to make money available to farmers in the LDCs would be to establish a system which would minimize risk for the lender, provide guidance to the lenders, and technical advice and supervision to the farmer.

3. Proper institutions for agricultural credit

Proper institutions for farmers are well established in the developed countries and include governmental institutions, commercial lenders, co-operatives, merchants and dealers, and private lenders. In general, these facilities are adequate. However, in the LDCs the lack of credit facilities for the total population is a major hindrance to development.

Money-lenders provide considerable credit in the LDCs, and despite high interest rates they perform a useful function. It is apparent, however, that the money-lenders need to be supervised to provide a more efficient source of credit. They cannot provide the volume of credit needed to expand and develop farm production.

Credit societies or co-operative credit unions in conjunction with government banks or governmental support offer the greatest opportunity for supplying rural credit needs in the LDCs. However, co-operatives cannot be organized unless guidance is provided. In addition, to be effective, the co-operatives must provide technical help to the farmers in utilizing the credit.

In the LDCs there should be developed sources of credit other than co-operatives and governmental institutions. Individuals should be encouraged to participate in programmes to provide a private source of loan funds for agriculture.

4. Loan management

The participants all stressed that agricultural credit, in itself, will not provide the necessary stimulus needed in the LDCs. Additional technical

knowledge and loan management are essential, particularly for farmers at the marginal level of output. This management must be provided by individuals located in the rural communities so that farmers can easily visit with them and so that the advisers can visit the farmer. A significant element of loan management is the working out with the farmer a loan programme in advance of his actual needs.

The interest rates charged on loans to farmers vary extensively from country to country depending upon the cost of money and risks involved. Within a given country the cost of money to farmers is directly related to the element of subsidy and government participation. For this reason farm interest rates in LDCs do not follow the interest rates established in the world money market. The relationship between the cost of short-term money and long-term also varies from country to country depending upon, among other things, government programmes and goals.

Due to limited time the group was unable to discuss three important problems which were raised. First, the too frequent practice of trying to solve rural problems in both DC and LDC areas by allocating funds for rural credit rather than trying to search out and remedy the cause of low farm family incomes. Secondly, the hesitancy of commercial banks to loan funds in rural areas should be studied. Thirdly, the entire field of training and education of research staffs should be explored. Agricultural credit is one of the most important aspects of agricultural production today and little attention is being given to this important area in our educational and banking institutions.

GROUP 2. METHODOLOGY OF EDUCATION, TEACHING, TRAINING AND EXTENSION

Chairman: F. A. S. Rocha, Brazil

Rapporteur: A. Kraal, Netherlands

Consultants: J. Oloya, Uganda and A. Khan, Pakistan

Introduction

Twenty-five participants from eleven countries attended the meeting of this group. The majority of the participants came from low-income countries. In the higher-income countries the poorest farmers were thought to give similar problems as the majority of the farmers in the other countries. Therefore, the group thought that the interest of the participants would be greatest if the group concentrated the discussion on low-income farmers.

Exchange of experiences and analysis

Various participants gave a short description of the main problems they had met, the methods they had applied to solve their problems and the results they got.

It clearly was a consolation for many participants to discover that their

colleagues from other countries had experienced a lot of disappointment too. Some could report relatively good results.

The analysis of the causes why some colleagues had booked rather good results and others booked disappointing results led to the following conclusions:

- (a) The applicability of a method is dependent on many specific circumstances for its success.
- (b) It does not pay to copy a method which was successful at a certain moment in a given area in a district where the environment is different.
- (c) A 'conditio sine qua non' for a successful method is that it motivates the group to be trained and educated, and also motivates the trainers.

Motivating the group to be trained

To get results on the farm level it is necessary for the trainer to be accepted by the farmer. It means that the farmer is not only willing to listen to the trainer but to do what he suggests.

In the opinion of the group, the necessity to get accepted was insufficiently stressed in the education of the various categories of trainers, teachers, etc. In particular, they were not taught how to get accepted and how to motivate the farmer. This was especially true with the low-income farmer.

Examples of motivation methodology

In a certain low-income area in Brazil it happened to be impossible for the extension workers to become accepted by the farmers directly. Then they tried indirect methods. It was discovered that the trainer could get acceptance by the young girls of the farmers' families by organizing sewing courses. Thereafter he could go on with providing health courses, etc. The enthusiasm of the farm girls opened a possibility to get the interest of the teenage boys. Thereafter, it was possible to start successful contacts with farmers, but first with the younger ones. Other examples of successfully applied methods of motivation were given from India and Eire.

Motivating the trainer

Though it was stated that sometimes lack of success was due to the low motivation of the extension officers, the group wished to presume the willingness of the officers to do their best.

Institutional constraints

Examples were given to show that sometimes substantial progress could be made only if structural changes would occur. It was agreed that in such cases an extension officer could see it as his task to try to change the structure. In many cases this was thought possible only if he could get co-operation of specific central or regional, public or private agencies.

Conflicting interests

Normally activities for structural changes induce conflicts with interests which will be damaged if these changes might occur. The extension officer who tries to change the structure is in that case badly in need of assistance of other agencies and persons. He has to know this before he starts. He has to know too that the structural changes he wishes cannot be considered in isolation, but have to be integrated in a broader plan of regional development.

The group thought that these aspects too did deserve more attention in the education of extension officers.

Interrelationships

All participants were aware of interrelations between farmers, extension officers, general policy-makers, technical experts, etc. A rather common complaint was the lack of co-operation between the various agencies, and the disharmony between the attention paid by general policy-makers to the agricultural sector and the non-agricultural sectors. Participants from European countries thought that in their countries too much of the national product was transferred in the agricultural sector and that consequently too many persons preferred to stay in agriculture. In developing countries the lack of public investments in the infrastructure of agrarian areas and in general, and vocational education of the young people was thought to be the main cause that too many young people were practically compelled to remain in agriculture.

The group concluded that it belongs to the task of the extension officer to draw the attention of the farm families to alternatives outside agriculture. The regional planners and policy-makers should create alternatives for the agricultural population. Extension service work should be supported by regional development, especially in low-income areas.

GROUP 3. COLLECTION, TABULATION, ANALYSIS AND USE OF AGRICULTURAL STATISTICS

Chairman: K. Bachman (FAO, U.S.A.)

Rapporteur: D. Narain, India

Consultants: W. Porteous, Canada and S. Schattan, Brazil

The discussion in this group revolved around the following issues: (a) Kinds of data required, (b) adequacy of data systems, (c) difficulties in data collection, (d) the Agricultural Census Programme, (e) co-operation between the economist and the statistician, (f) improving the accuracy and timeliness of world food production estimates, (g) technology of tabulation and analysis and (h) measurement of technological change.

As regards the kinds of data required, it was felt that these fall into two broad categories. One comprised data on production, land utilization and prices, etc.; i.e. current statistics. The other category consisted of data on

the structure and operation of agriculture which are required for purposes of planning. The latter data pertain to (a) the structure of operational and ownership holdings and the tenurial structure, (b) resource inventory, (c) technical coefficients such as, for example, those relating to the response of yield to fertilizer application, and (d) specific problem-oriented data pertaining, for example, to the various aspects of the problem of unemployment in a country.

Some of the input data and those needed for supply utilization accounts could be obtained as part of the current surveys by analysing ancillary information. Farm management investigations and cost of production data provide information needed for national accounts and other purposes. In this context the possibility of maintaining farm records through book-keeping and utilizing this information was suggested. The importance of preparing financial accounts besides the commodity data was emphasized.

The major difficulty in collecting data of satisfactory quality, it was pointed out, lies at the level of the agent who collects the primary data. The result in Brazil, for example, is that the data collected at the state level does not add up to the data collected at the national level. In Canada, where benchmark data is collected through the census which is then supplemented with data collected through annual surveys on the percentage changeover the previous year, the experience showed that the agent was not a good medium for the latter kind of assessment as he tended to normalize the estimates but was quite satisfactory for obtaining information on the levels of per acre yields. The experience with the satellite experiment in Brazil showed that although as a technique to be used in the future it was promising, it is at present not operational.

The difficulty of obtaining reliable data at the primary level via a census is that the census is carried out at discrete intervals of five years, with the result that there is no continuing staff and the whole work has to be finished within a few months. In a big country like Brazil, for example, it was therefore suggested that the census operation be staggered areawise—one area to be covered in the first year, another to be covered in the second year and so on. This could enable the appointment of the supervisory staff on a continuing basis so that better training could be given to the agents collecting the primary data.

Another suggestion was to stagger the census operations on the basis of the questionnaires. Complete information, but on a limited number of questions, could be collected every five years and information based on a sample of farms on different aspects of agriculture could be collected in the intervening years in a phased manner. Through a follow-up of a sample of farms over a period of time, it would also be possible to study changes in the farm structure.

While discussing the adequacy of the data systems, it was mentioned that for production data a farm would be the basic unit of observation. For socio-economic data and data on community facilities, a household or even a village would need to be the basic unit of observation. While on this

theme, it was pointed out that for collecting socio-economic data, reliance could be placed on the population census by linking it up with the agricultural census through the adoption of uniform concepts and definitions in the two censuses.

Among the areas of joint interest to the economist and the statistician where the two need to co-operate, farm management and supply disposition accounts came up for specific mention. To enlarge the area of such co-operation, it was considered generally desirable to devise institutional arrangements which could either take the form of an organization in which economic and statistical functions were combined or of a co-ordinating body in which the economists and the statisticians were represented.

To insure the timeliness and accuracy of world food production estimates it was recognized that it would not be possible for the FAO to obtain from the governments of the different countries official estimates of production before they are formally released. A feasible course, therefore, would be to make the country representatives of the FAO arrive at their own assessments which could be used by the FAO for giving provisional estimates for regions.

It was also suggested that for countries where variations in cropped area and production were sensitive to weather, meteorological and price data could be used as a basis for forecasting production. While desirable to carry out work in this direction, it was felt that information obtained from farmers and/or extension agents could form a reasonable basis for arriving at the provisional estimates. Supply disposition accounts, though they cannot reveal the right levels for the estimates, can help improve the data by pointing to the discrepancies between the pattern they disclose and that underlying the production estimates.

In the discussion on the technology of tabulation and analysis the advantages of computer use were well recognized. But so also were recognized some of the difficulties in putting them to effective use especially in the developing countries. One of these difficulties arose from the shortage of trained personnel and equipment. Further, it was agreed that computers were no substitutes for efforts to collect accurate data and the proper editing of the completed questionnaires. Unless the above-mentioned difficulties were overcome, the computers could not deliver what was expected of them.

The discussion on the measurement of technological change brought forth a suggestion that the per acre yield be compared at two points of time. To eliminate the vitiating effect of weather, it was suggested that the technique of paired comparisons based on control plots be adopted so that comparisons could be made between two areas similar in all respects except the adoption of the new technology. Production function approach too could be tried to isolate the contribution of the different inputs to the enhancement of yields. More elaborate work in this area, however, calls for the building of sophisticated models—an area in which the economist and the statistician can very profitably co-operate.

GROUP 4. ECONOMICS OF AGRICULTURAL SCIENCE AND TECHNOLOGY

Chairman: *J. Dillon, Australia*
 Consultants: *H. Schieck, E. Germany* and *D. Tomic, Yugoslavia*

Rapporteur: *Y. Kislev, Israel*

The subjects discussed by the group were divided into three broad areas:

1. Production (supply) of technology.
2. Adoption and diffusion of (demand for) technology.
3. Second generation (after adoption) problems.

Production

(a) Positive analysis (*ex post*)

The issue of the existence of a knowledge creation production function was raised. On the one hand, it was stressed, research is an economic activity, employing scarce resources creating a valuable product—the theoretical frameworks for the analysis of such processes has been the production function. On the other hand, research is characterized by specific attributes—an unusually large degree of uncertainty, a high dependence on the quality of the labour employed, unpredictable direction of outcome, the production of knowledge utilizes knowledge as an intermediate good, and the creation of new knowledge destroys and makes obsolete existing knowledge. These special characteristics are not duly expressed and covered by the traditional theoretical production function framework.

It was also pointed out that a distinction should be drawn between the existence of a production function and its empirical estimation and, further, that the theoretical model to be used depends on the kind of economic analysis in which it is to be employed.

As an example of empirical work in this area, a study was described in which the output of the research system was measured by the number of scientific publications and inputs by man-years, monetary expenditures, and basic biological knowledge.

(b) Normative (*ex ante*) analysis

Several examples of work in this area were reported. The United States Department of Agriculture is trying now to adopt the method of 'management by objectives'. As a case study, the objective of increasing red meat production was taken up. Possible ways to achieve this objective were enumerated and graphically summarized (Figure 1). In the second stage probability of success of research and expected rates of adoption (periods of 50 per cent adoption) were assessed by questioning knowledgeable persons. Funds are then allocated to the most promising avenues of research.

As an example of work done in Australia, the case of research into improved precipitation forecasting methods was described. In this case it was assumed that three classes of precipitation prediction are possible:

- complete rain distribution;
- annual amount of rainfall;
- higher or lower than last year.

The benefits to the farmers from advance knowledge of precipitation are in better fertilizer application. It was estimated that these benefits can be in the range of 15 million Australian dollars. Relative to a complete rain distribution projection, knowledge of annual rainfall or of direction of change with respect to last year will yield 40 per cent and 8 per cent benefits.

Probability of research in the field of improved forecasting has not been assessed in this study.

The major work of the economic group at CIAT (Centro Internacional de Agricultura Tropical) is in delineating technically and economically relevant production processes so that researchers can have a clear notion in which area of research economic potentials may be highest.

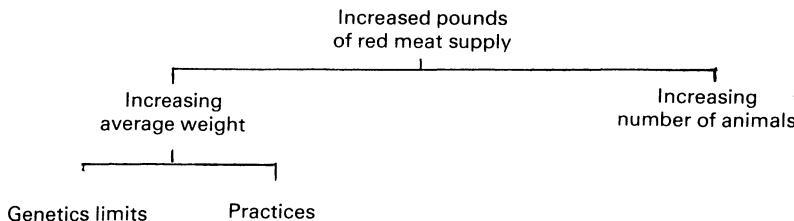


FIG. 1. 'Possibilities tree' for increasing red meat production (partial)

(c) Organization

The problems of the organization of the research system fall also under the heading of production and supply. Various organizational arrangements were considered, particular attention was given to the need of creating institutions which will be responsive to economic changes and the agricultural sector's needs. The need for an economic theory of institutional behaviour was stressed.

Adoption and diffusion

Two bases for an economic theory of the adoption of new technology were suggested:

- (a) The sociological theory of the diffusion of innovation.
- (b) The economic theory of decision-making viewing the farmer as if contemplating a payoff matrix with risk attached to new technologies and making his decision accounting to a von Newman-Morgenstern utility function. The need to aggregate from the representative farm firm to the agricultural sector level was stressed.

The role of extension in technology diffusion was discussed. It was stressed that extension may have a different role in different economic situations. Big farmers, for example, can search for information on their

own. For small farmers the search can be too expensive and knowledge has to be provided publicly. This may mean that the role of the extension system will have to be modified with the development of agriculture and increase of farm size.

The diversity of farm size and technological level, even in the developed countries, makes conclusions on the role and contribution of extension work in countries too general.

Second generation problems

It was stressed that we do not have as yet a good dynamic theory on the distributional effects of new knowledge. The first to adopt a new technology enjoy rent to their innovativeness, but the farm sector as a whole might lose while the consumer reaps the benefits of greater supply. These subjects merit further study.

The issue of the financing of research work is tied to its distributional effects. To the extent that the consumer benefits from the new technology, the creation of new knowledge should be financed from the general tax fund. Research on crops which are mostly export oriented, can be justly financed by levies on the products. Such a system, if adopted generally, can fix research in existing patterns and no funds will be available for research on new crops.

GROUP 5. INTERACTION OF NATURAL RESOURCES, TECHNOLOGY AND ENVIRONMENT

Chairman: Q. West, U.S.A.

Rapporteur: J. Wittenberg, U.K.

Consultants: D. Muybarto, Indonesia and J. Zapata, Argentina

The agenda chosen by the group for discussion covered several areas, many of which were inevitably interrelated. The topics chosen embraced a broad spectrum of the subject of the relationship between the environment and the economy.

The initial topic discussed—namely, the problems of economic growth versus environmental issues, and of definition and measurement of environmental quality—served as an introduction to the field to be surveyed in subsequent discussions. It was said that it has not been proved empirically that economic growth and the environment were necessarily conflicting goals, and that it would be remembered that environmental quality is a relative term which depends upon the state in which we live and our income level. Also, at the present time many people are prophesying that our main reserves of important resources will soon be exhausted, but the speaker considered that technology may, in fact, save the day.

The discussion then turned to the problem of measurement of economic growth. It was said that the term itself is misleading since the exploitation

of new natural resources should *not* be considered as contributing to our economic well-being. Rather, the definition should be modified so as to take account of the fact that we are using up irreplaceable resources, and that at the same time we are increasing the levels of pollution and waste in our countries.

The discussion closed with the recognition of the fact that it is the politicians who make the ultimate decisions affecting our environment, and that the role of the economist should be to provide the policy-makers, either directly or through influencing public opinion, with the necessary information to make the best decisions affecting our well-being.

The problem of how to organize appropriate disciplines to work together on environmental issues was next on the agenda. It was stated that the main stumbling-block between the co-operation of the scientists and economists was the fact that they each use different languages and did not fully understand each other's aims and areas of concern. Although the two groups had got together on some issues, these were relatively few and, in most cases, such as the determination of acceptable pollution levels, legislation had been based solely on the views of scientific advisers without any account being taken of the economic consequences of these statutes.

The group then turned to the problem of the relationship between agriculture and energy. It was said that although agriculture accounted for a relatively small proportion of the total energy consumption of developed countries, it could in fact, contribute efficient energy inputs to the community. It was felt that as the prices of fossil fuels are now rising rapidly, agriculture may be forced to find new forms of energy which may not be as efficient as those used at the present time.

The group then split into two camps on the subject of the future outlook for energy. The pessimists (who may call themselves 'realists') considered that although new technology would inevitably be forthcoming, because of the high costs of research and implementation it would not provide a solution to the overall problem. The optimists, however, thought that we would soon see a change in what were once firmly established price ratios, so that existing sources of fuel, which are at present uneconomical, would eventually become feasible, together with new power sources which are now being researched.

The discussants then examined the problem of the extra market valuation of goods which have not previously been priced. This included natural resources which, up to now, have been in abundant supply, but are now threatened with either pollution or exhaustion. The major problem in pricing these goods is who pays for them, how do they pay for them, and how can this payment be enforced? It was asked whether economists can provide the answers to these questions or whether we have to look elsewhere for our solutions.

The next topic on the agenda was that of internalizing external costs. It was said that it was necessary to develop new institutions which will provide incentives to decision-makers to act in a more socially desirable man-

ner, though the definition of this last phase was not attempted. It was then pointed out that even if internalization of externalities is achieved, this does not necessarily mean that the externality has been eliminated. Various solutions to the problem were presented, but it was recognized that although they would by no means be perfect solutions, they may alleviate the problem to some extent.

The next topic considered was the problem of land-use control. The main question posed here asked whether we should be concerned about the irreversible conversion of farm land to non-agricultural uses. Several examples of land-use control were cited and most of these embraced problems which had been inadequately solved from an environmental and, sometimes, a moral viewpoint.

The mechanization of forestry was the next subject considered, and it was said that the increasing use of heavy mechanized equipment in some countries was leading to a serious deterioration in the environment of the forest areas. It was felt that the technicians were now concerned with producing bigger and better machinery, while ignoring the ecological implications of their use.

On the subject of pesticide use and its consequences it was said that chemicals used by farmers tended to evaporate into the atmosphere, and eventually enter the food chain. But, it was pointed out that the farmer is by no means the main culprit in the misuse of chemicals; the industrial use and dumping of chemicals was also a serious threat to the environment.

The discussion concluded with the question, 'Can developing countries afford to make the same mistakes as developed countries made with respect to the environment?' The representatives of the developing countries thought it was unfair that their hard climb up the ladder of higher incomes would be impeded by new standards imposed, but not previously adhered to by the developed countries. They felt their problems so acute that they could ignore environmental issues until they had put their economic house in order.

GROUP 6. DUALISM IN AGRICULTURE—LARGE-SCALE VS. SMALL-SCALE FARMING

Co-Chairmen: M. Haq, Pakistan and M. Bueno, Spain

Rapporteur: J. P. Bhattacharjee (FAO), India

Consultants: B. Andreaa, West Germany and E. Elstrand, Norway

In the course of a considerable amount of time spent on interpretation of the topic for discussion, the group agreed on a number of definitional points. First, dualism should be considered not only in terms of technological gap and the resulting factor proportions, but also in respect to disparities in income levels, resource endowments and socio-economic

attitudes. Secondly, intersectoral dualism as discussed in development theory was outside the scope of the topic which related only to agricultural intra-sector disparities in scale, etc. Thirdly, the scale of farming cannot be discussed without reference to the enterprises, it being generally recognized that tropical tree crops offer scale advantages which necessitate a nucleus farm-cum-processing plant even in a small-holder set-up. Fourthly, it is not possible to lay down objective invariant criteria for classifying small farms, area, volume of business, capital and income are the elements to be considered in the context of each country. For high-density Asian countries, the area criterion is easier to apply and farms below 5 hectares can be considered as small. Finally, the problem of small farms is there also in developed countries and should not be minimized, even though the situation in developing countries calls for immediate attention.

In most developing countries there are compelling reasons for giving far greater attention in development strategy to improving productivity and income of small farmers, however they are defined. The anatomy of poverty (say the poorest 40 per cent of the population) and the roots of political and social tension point towards the small farms, tenants and agricultural labourers. Their income level has grown relatively slowly—less than 2 per cent annual growth rate in the subsistence sector which is largely the small farm sector. The income of about one billion people is dependent on farming of holdings below five hectares, and there is not much physical (availability of suitable land) and financial (investment) possibility of increasing the size (area) of these farms significantly. Yet if employment and income distribution are to be improved and a larger market is to be provided, they cannot be ignored as a lost cause in agriculture and left to the expectation of being painfully absorbed in the non-agricultural sector—a hope which past experience has shown to be unlikely and unrealistic.

The solution lies in plans, policies and programmes aimed at raising the productivity of small farms at rates higher than heretofore. The likely adverse implications of such a strategy for growth of savings, exports and efficiency (the so-called conflicts between large and small farm strategies) are often exaggerated; and, in any case, data throwing light on these are unavailable and constitute a priority area for survey and research. Assuming a positive trade-off, the group concentrated its attention on ways and means of achieving productivity increase in small farms and reviewed relevant experiences in Japan, Spain, India, Brazil, U.S.A., and U.K.

The group emphasized the small farm as a problem situation if in the country context it did not provide an income level to the farm family regarded as desirable or acceptable in the country. Since land productivity on small farms in many developing countries is higher, the main issue relates to the cost, feasibility and institutional services necessary to insure a differentially higher growth rate of land productivity in the future which would raise productivity per man as well as narrow the income gap. The

problem should be looked at in the dynamic context of the evolution of agriculture *vis-à-vis* development of other sectors. While the immediate employment possibilities outside agriculture may be limited, this should not be assumed for all time to come, and the small size structure should not be frozen for the future. This is the lesson to be drawn from the high-density developed countries in Europe and in Japan. The evolution in low-density countries in the American continent has been different.

Within this historical context the problem of the next decade or two, especially in high-density countries, will relate to raising at fast rates land productivity on small farms. Among the necessary measures, the role of credit, government subsidy, extension and other support services, institutional organization, particularly of farmers groups assumes importance, as the experience of Japan and more recently Taiwan indicates. Further, non-agricultural opportunities need development, for most small farms and tenants can earn acceptable levels of income by continuing the two as the growth of part-time farmers indicates.

Wherever land is available, enlargement of farm size should be a feature of the policy. However, rising land values often makes the capital costs of size increase prohibitive. The recent Japanese experience indicates a lowering of efficiency in spite of considerable subsidy. The country experiences in this respect are diverse and no generalization can be made. The importance of education, managerial ability, and grouping of small farmers in co-operatives or other organizations deserves to be stressed, along with public investment in social services. Further, productivity of small farms cannot be increased except within a programme of integrated area development and in the absence of improvement of the social structure.

The group also gave some attention to the problem of large farms. In the developed countries, the policy bias seems to be in favour of large scale and there is no ceiling on farm size. However, large farms face many problems once the size goes beyond a certain point. For example, managerial problems of multiple units, lack of personal incentive, financial risk, death duties, and taxes pose serious problems. In general, economies of scale weaken or disappear once the farm size goes beyond the employment of six or seven men.

Finally, the group noted that there were many contradictions in government policy regarding small farms in a number of countries.

GROUP 7. MOTIVATION OF FARMERS

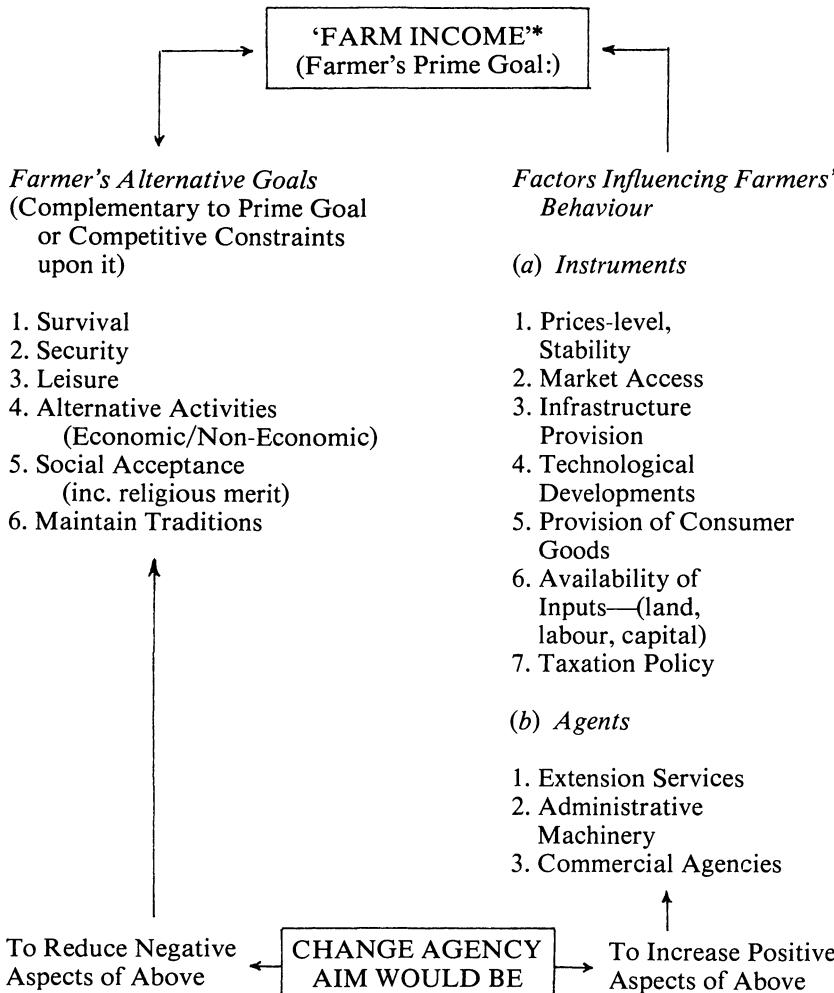
*Chairman: Fabian Tiongson, Philippines
Consultants: Frank Pettri, Sweden and G. C. Mandal, India*

Rapporteur: John Cleave, U.K.

1. The groups' objective was to identify the factors which influence a farmer's behaviour and which may cause changes in his production

pattern, resource use, or way of life. These will comprise, on the one hand, a range of objectives comprising the farmer's utility function: and on the other hand a series of factors which are to some degree within the control of governments and therefore become the policy variables of change agencies.

2. A two-part classification of motivating factors is shown in the diagram below. Although 'Farm Income' is shown as a prime goal, it is



* Including consumer good demand, wealth or property, capital formation, education, etc.

recognized that the motivating factors may operate on farmers who are at any point on the continuum between wholly subsistence producers and fully commercial farmers. Farm income in this context therefore includes non-

monetary rewards to farming as a business and way of life. It also includes the objectives to which income may be applied—the acquisition of consumer goods or services and the accumulation of property or capital. The nature of the prime goal may vary over time and according to the mores of the farmer's society. In some situations one or more of the alternative goals may be constraints on the achievement of (increased) farm income to the point that they become the prime goal.

3. The various influences will interact. Sometimes they will be in conflict with each other and at other times be mutually reinforcing. It is not possible on present knowledge to quantify or even to rank the importance of the various motivating factors, and most of them, viewed as influences on the prime goal, may act in both a positive and negative way according to circumstances. Thus, the desire for survival or security may lead a farmer to avoid risks involved in seeking a greater farm income: but in other circumstances could encourage production, perhaps by reducing the influence of other potential constraints such as the desire for leisure or social acceptance.

4. A few examples of the factors operating on farmers' motivation were given. Security was seen as a reason for farms continuing to produce all or most of their subsistence needs: examples were quoted from continental Europe as well as many LDCs. From the U.K., instances were given of changes in farm organization and investment to ensure the survival of the farm in the face of death duties; and of diversification of resources into non-farm activities for both economic and social reasons. Changes in cropping patterns and resource use (including entrenched traditional allocations) following the creation of alternative employment and building of a school were quoted from a Gambia study.¹ Examples from Togo and Zambia were discussed in which farmers were not motivated in the way expected by agencies seeking to affect change. It was emphasized that an agency may need to work to reduce several potential constraints, or use a number of policy variables, at one time—a motivation package similar in justification to the more familiar input package. Also discussed was the need for participatory planning, which would give farmers and intermediaries in production an opportunity to identify their goals; and for resultant plans and projects to be of sufficiently long-term to accommodate the slow process of farm adjustment.

5. There is an urgent need for in-depth research into the question of farmer motivation, particularly in the LDCs. The approach to such work would be familiar: to set up hypotheses concerning farmers' objectives and response to policy variables, and test these:

- (a) by analysis of observation of farmers' actions in the adjustment, either over time or by comparison within a cross-section;
- (b) by drawing inferences from answers to questionnaires put to farmers or their neighbours; or
- (c) from analysis of existing micro-studies.

6. Existing literature is sparse. Most of the published work on farmer

motivation concerns the type of farmers who respond to innovations, the type being described with reference to, for example, education level or social standing rather than on the underlying behavioural influences. Myren's bibliography² gives such sources: the writings of Rogers³ are a useful starting point, and a recent article by Rochin gives some information from Pakistan.⁴ Direct studies of farmers' goals are rare;⁵ however, existing opinion surveys of farmers⁶ may provide valuable insights, and comparative analysis of adjustments in resources use derived from farm surveys can provide useful information.⁷ A request for empirical findings for a current project was made by Dr Alvin Egbert:⁸ and the group suggested that the topic of farmer motivation, particularly in LDCs, be a topic for further discussion at the 1976 meeting of IAAE.

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GROUP 8. AGRARIAN REFORM AND LAND TENURE

Chairman: J. Ballesteros, Mexico. *Rapporteur: J. Sta. Iglesia, Philippines*
Consultants: A. Giles, Peru and Y. T. Chang, Taiwan

The chairman opened the discussion with an introductory statement which drew attention to the nature of agrarian reform, its objectives, and the needed programme instruments and resources. The essential points he raised are incorporated below as part of the total discussion.

The group pursued the topic via two approaches: (a) discussion of specific country cases and (b) discussion of general issues. The country cases discussed were those of Brazil, Peru, Mexico, Taiwan, Japan and the Philippines. The specific elements of the cases are not included in this summary, but essential points are used to focus the main issues of agrarian reform which follow.

1. Agrarian reform revolves around problems concerning use and ownership of land. Its general or broad objective may be considered universal, covering a wide range of philosophical, social, political, and economic dimensions of man and society. Among the more common statements of general objectives are the following: (a) to liberate the farmers from poverty; (b) to liberate the farmers from feudal bondage; and (c) to improve man and society.

Such general statements are broken down into more specific objectives such as the following: (a) to transfer the power of decision-making about use and ownership of land from the present landowners to those who actually till the land; (b) to increase productivity of the land; and (c) to improve income distribution.

2. The concept and model for agrarian reform were represented by two general lines of thought. One group advanced the idea of agrarian reform as drastic, radical, complete and must be accomplished by government in a short time. This line of thought proposes the application of the most complete model which includes all instruments of development that bear upon the following spheres of problems: land market, agricultural input and product market; and agricultural services or technical assistance.

The land market includes cadastral survey, titling, etc. The input and product market includes transport, facilities for marketing, etc. The agricultural services or technical assistance includes extension, mechanization, rural electrification, irrigation, etc.

The other school of thought allowed flexibility in the choice of programme instruments and strategies depending upon the problem situations and resource requirements and capacities of the society or government. It was pointed out that over-ambitious agrarian reform programme may fall flat and foster the *status quo* because of the non-availability of resources to carry out the programme.

The experiences of the different countries that were discussed commonly leaned towards this second school of thought. Different strategies were used at different times or simultaneously: they include such strategies as purchase or expropriation of large landed estates and subdivision of such to the farmers: colonization of public lands: and regulating/improving landlord-tenant relations.

It was also pointed out that a real agrarian reform is done through the democratic process.

3. Related but not central to the above are the following observations.

(a) Agrarian reform cannot be done by colonization. The latter applies to areas not occupied and cultivated. Agrarian reform is needed in areas where tenure and use of land is a problem. Such areas are occupied and cultivated.

(b) Co-operatives, while invariably looked upon as a necessary or even the most critical factor for success in agrarian reform, have generally been a failure in many countries. The reasons for this are numerous. Again, the problems range from social, economic, leadership, technical, and other considerations.

4. It was urged that agricultural economists should vigorously get involved in the formulation of agrarian reform programmes. Earlier programmes, e.g. those in Europe, have been primarily political decisions. Although in the end the political leaders make the decisions, they may be able to make better decisions if they are supplied with sufficient data and results from analysis.

5. One crucial point that everybody agreed was the recognition of agrarian reform as a part of the general process of economic development.

GROUP 9. POLICY ON RURAL EMPLOYMENT AND INCOME DISTRIBUTION

Chairman: P. Knight (Ford-Peru), U.S.A. *Rapporteur: M. Cuadra, Mexico*
Consultants: A. Librero, Philippines and F. Bordeaux, U.S.A.

The basic assumption of the discussion group was that income distribution is not satisfactory in general, and in particular many rural farm and non-farm families have incomes that are too low to provide a reasonable level of living. Much of this can be attributed to limited employment opportunities in rural areas. Problems of employment and income distribution in rural areas cannot be separated from those of the total society. However, given restriction on time, discussion was concentrated on the rural sector in the less-developed countries.

In trying to define and narrow the discussion to a reasonable level, concentration first on employment and later on income distribution was accepted and the following comments were enumerated as two problem areas.

1. Policy on rural employment and income redistribution cannot be separated from policy regarding these problems embracing the economy as a whole.

2. Employment generation has to be economically meaningful. The postulation of employment as an end rather than as a means to achieve other goals is highly suspect. The basic objective must be kept in mind, to satisfy real human needs via the production of goods and services although socialization may be a beneficial by-product.

In regard to this problem it was agreed that productive employment (employment that increases the welfare of the people) is of major concern. Emphasis was put on policy measures and unsettled questions, rather than on discussions of theoretical economic analysis and its limitations.

Although increased employment does not necessarily guarantee an acceptable income distribution, to a certain extent they are compatible as simultaneous goals with exceptions which are discussed later.

Discussion on employment was related to the following main questions:

—What constraints prevent farmers from generating more employment

opportunities?

—What are the demand patterns of the farmers (will increased employment lead to demand pressures for certain goods)?

—What is the potential for employment generation of different programmes?

—How do we generate greater demand for labour in rural areas?

—How do we change ownership of assets or alter the marginal value productivity of labour?

Keeping in mind the main questions set forth above, it was concluded that the maximizing of GNP will not necessarily have a neutral effect on income distribution and that if emphasis is given to employment generation, assurances should be taken in order to evaluate new projects by taking into account the impact on income distribution.

Since migration from rural areas is occurring at an accelerated rate, measures need to be taken by governments to consider decentralization of industrial growth. To increase non-agricultural employment in rural areas, various policies may be used, including direct controls on new investment and incentives to locate in rural regions. Several members of the group noted that incentives may often include credit subsidies, tax exemptions for profits invested in the target areas, exchange rate subsidies for imported capital goods, and other forms of subsidies to capital which may result in the choice of overly capital-intensive techniques and thus prove to be a very expensive form of generating new employment while possibly further skewing the distribution of income in favour of owners of capital.

Rural public works programmes such as road building, small irrigation works, and other forms of infrastructure creation may generate employment directly, but attention must also be paid to their effects on demand for basic wage goods. If supply of the goods does not increase, inflation is likely to result unless imports are an available alternative.

Evidence is mounting to suggest that in order to create employment in the rural areas as well as improve income distribution it is necessary to take measures to the *direct provision of public services to those who need them*. In providing these services, employment factors need to be considered. Services to be provided should include the traditional areas such as education, health, etc., but it is necessary that they contain the provision of the basic social amenities which do not currently exist in rural areas and may be becoming a necessary condition in the rural sector to accompany employment and population retention.

It is also necessary to find a means to permit operators of economically viable small farms to increase their agricultural output. Services such as credit, extension, irrigation facilities which may permit multiple cropping, and the distribution of manufactured inputs should be provided. It was noted, however, that returns to scale in the provision of such services have traditionally militated against their provision to small units. Either larger units must be created or the higher costs accepted.

Taxation and expenditure policy may directly affect the distribution of

income, goods, and services. On the taxation side, the group agreed that taxes which fall primarily on labour, such as most social security taxes, have basically regressive income distribution effects while increasing the cost of labour and discouraging its uses. Taxes on property (especially land) and income tend to have less distorting effects on resource allocation, a progressive impact on income distribution, and may encourage the use of labour relative to capital and land. But there are often serious problems in securing political support to implement such taxes, and their administration may present other difficulties. Substantial increases in employment and more equal income distribution are unlikely to be achieved without profound institutional changes involving new forms of economic organization and redistribution and redefinition of property rights.*

Such structural changes are required:

1. To mobilize under-utilized manpower and creative ability.
2. To compensate for unequal endowments of natural resources and capital between production units without eliminating incentives for efficient production and growth.
3. To provide off-farm employment opportunities within the rural sector.

It was observed that most economists spend most of their time on problems of allocating resources within a given institutional framework rather than in developing new forms of organizations and making comparative analysis of different organizational models with regard to their ability to contribute to employment, growth, and income distribution objectives. It was urged that these priorities be reordered. The group recognized that price policy is an effective means of redistributing income towards the agricultural sector, but noted that this may be a relatively blunt instrument for increasing the incomes of the rural poor, especially the landless and subsistence farmers who do not participate in the market economy. Those among the rural poor who own some land and market a surplus, assuming they are concentrated in well-defined geographic areas or produce crops not also produced on larger farms, may be helped by higher prices for their products on a price discriminatory (by region or crop) basis. In any case some income transferred through higher agricultural prices is likely to reach the richer farmers and/or suppliers of credit and marketing facilities when such suppliers possess local monopoly or oligopoly power.

To fully utilize the most abundant resource in most less-developed countries, namely labour, agricultural research should be directed towards developing superior technologies which are more labour absorbing, saving on capital and land. It was noted that an overall programme of manpower planning is rarely included within development plans. Such plans should become an integral part of overall development plans.

* Land reform is a central part of this process in most cases, but in view of the fact that another discussion group is considering this topic, it was agreed merely to recognize its importance for income redistribution.

**GROUP 10. ADMINISTRATION, ORGANIZATION AND
CONTROL OF AGRICULTURE**

*Chairman: V. Nazarenko, U.S.S.R.
Consultants: W. Kiene, Austria and O. Tanaka, Japan*

Rapporteur: J. Mackenzie, Australia

The group included 24 members from 11 countries ranging from the less- developed countries to the highly developed industrial economies. This diversity provided a wide range of experience in agricultural control and administration throughout the world.

The group initially discussed different economic systems, and the structure of administration and control in the agricultural sector. Levels of organization were also recognized and divided into three categories for the purpose of discussion.

- A. Macro scale—concerned with national policies.
- B. Intermediate—relating to regional or large groupings, corporations, and co-operatives.
- C. Micro scale—concerned with individual farm units.

It was decided to concentrate group activities in a discussion of national policies, and the methods, used in their administration. Intermediate and micro-scale concepts were also included where relevant to the broader issues. Examples of national systems currently in use were used to illustrate the policy and mechanisms of modern agricultural administration.

1. A developed European economy—Sweden.
2. A semi-developed economy—Brazil.
3. A centrally planned socialist economy—U.S.S.R.
4. A lesser-developed country—India.
5. A large developed capitalist economy—U.S.A.

The Swedish system was described as being characterized by a comprehensive system of data collection followed by government-sponsored bargaining between consumer and producer organizations. A guarantee of return to people engaged in farming is also a feature of this system. The overall policy aim of the system is balanced self-sufficiency with fair wages and prices.

The Brazilian system has been developed to allow for a rapidly expanding economy with diversification of agricultural production, and an increase in agricultural exports. Government incentives are provided for certain products where increased production is desired, and similar incentives are provided to promote agricultural development in the more remote parts of the country. Much of the administrative control is related to specific commodities, and is frequently administered by semi-autonomous organizations, but with some government intervention.

The main feature of U.S.S.R. agricultural policy is to increase internal production. One of the more interesting developments in administration and control has been the formation of large agri-business units in which

the collective and state farms participate.

As an example of a lesser-developed country, Indian experience in agricultural administration was discussed. The main aim in India is to rapidly increase production and distribution facilities to the stage of internal self-sufficiency. Additional objectives are related to price stabilization and a restructuring of rural land holdings. Responsibility for the implementation of agricultural policy is divided between state and federal agencies.

In the past United States agriculture has been characterized by a free enterprise, open-market system but in recent years there has been a tendency to vertical integration which may be modifying the performance of the market bargaining system. Although the government does not intervene directly in farm business in the U.S.A. a number of government programmes have a significant effect on production and distribution.

The group discussed the examples in some detail, commenting on points of similarity and difference. The general conclusions may be summarized as follows:

1. It is no longer adequate to discuss the farm sector in isolation. Administration, organization, and control should be related to the whole of the food business, from the supply of inputs to the disposal of the products to the final uses.

Policy decisions should be related to the needs of the interrelated units within the food industry complex.

2. The food industry complex is currently undergoing rapid change throughout the world. Systems of administration, organization, and control will need to be modified to meet the needs of these rapidly changing conditions. Systems should be constructed which will be flexible enough to respond promptly to these changes.

3. There is a great need for additional data collection and analysis. If administration and control is to be adequate and efficient in the future, information and advice to policy-makers will have to be improved.

4. There will need to be a more vigorous approach to assessing policy alternatives. Administration, organization, and control systems should only be assembled after analysis of all the relevant information. In this regard it will be useful to ask the following basic questions:

(a) What should we produce and why?

(b) How will we measure performance?

(c) What rewards will need to be provided to ensure success of a particular programme?

5. The institutions and special interests engaged in bargaining which give rise to price formation and aggregate production should be examined in greater detail. A better understanding of these mechanisms must result in the formation of more adequate administrative systems.

A major area of unfinished business for agricultural economists is to provide better research and analysis facilities to enable decision-makers to formulate better administrative systems. Agricultural economists should

also strive to promote greater contact and understanding between consumers, policy-makers, and technologists.

GROUP 11: FARM MANAGEMENT AND PRODUCTION ECONOMICS

Chairman: A. Baptist, Belgium

Rapporteur: M. Afzal, Pakistan

Consultants: W. Brandes, West Germany and N. Frean, South Africa

Twenty-four participants from sixteen countries attended the meeting of this group. The participants focused their discussion on data collection; methods and techniques of farm analysis and farm planning, financing the farm and the pattern of ownership, farm organization, forms of integration and inflation in Brazil.

Traditional farm management tools, i.e. accounting, survey methods, comparative analysis and budgeting, and new farm management techniques, i.e. linear programming, parametric programming, simulation methods, cash-flow analysis and production functions were discussed in the context of developed as well as developing economies.

Data collection

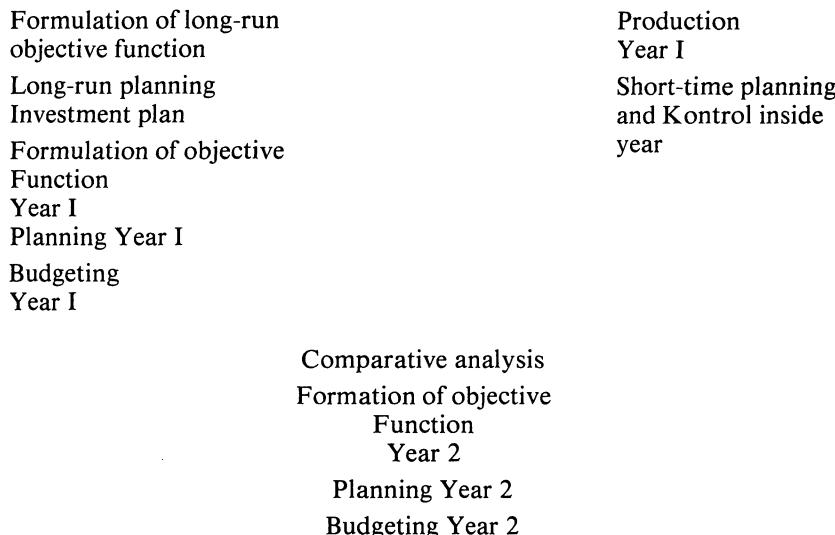
All the participants agreed on the difficulty of getting accurate information from illiterate farmers especially in the developing countries. Furthermore, it was observed that there were no well-painted statistical organizations in some of the developing countries and therefore the validity of data to be used in various techniques is questionable. Surveys made in co-operation with local organizations was proposed to be one of the possible solutions in order to overcome data problem in such countries.

Methods and techniques of farm analysis and farm programming

The participants agreed that the traditional methods were useful in finding out deficiencies in the farm business. It was also pointed out that the literacy of farmers was a prerequisite for using this method successfully. The danger of biased sample was identified as the major problem in applying survey methods. It was agreed that the method of comparative analysis, was useful for the farmer who adjusts for the first time and can later shift to other methods. Budgeting, with exception of partial budgeting, was considered to be an involved and lengthy method. However, partial budgeting, which is a foundation for linear programming, was thought to be more useful for individual farmers. The participants observed that the tools to be used in farm management could not be universally applied and had to be modified in accordance to the prevailing conditions and circumstances. Some of the participants stressed the incorporation of variables that surrounded uncertainty into the models which will help farmers in the decision-making process.

A participant presented the following sketch being used by the specialized farmers.

ENVIRONMENT-EXTER INFORMATION



The participants observed that the farmers in Denmark did not use this information to work out plans for the second year, and that short-time planning and control assumed more significance in specialized farms.

A participant pointed out the gap between the new farm management techniques and this recursive type of analysis which led to a state of dilemma—static analysis versus dynamic analysis—or which the farm management has to face. Some participants rightly emphasized the role of price relationship in the success of our analysis.

The role of technology in farm planning was thoroughly discussed. The participants agreed the higher the level of technology, the more the significance of short-term planning.

The participants observed that cost minimizing and profit maximizing were the prime objectives of the farmers and therefore, costs and returns had to be taken into account for evaluation purposes. One participant pointed out the very low utility of this technique for smaller farmers where the size of farm is smaller and the farmer knows by experience how to maximize his gains and therefore, this costly technique is seldom applied on such farms.

Some participants pointed out that linear programming technique had little acceptance in their, and many other countries, especially developing economies. However, in actual farm planning the application of linear programming and parametric programming by big farmers in many countries has achieved very satisfactory results. Programme planning has, however, met with a fair amount of success in many countries.

Cash-flow analysis

The cash-flow analysis tries to strike a balance between profitability and liquidity within the firm on the one hand and relationship between household and actual production unit on the other. This method enables us to see whether a farmer has really made any progress during the year or not. It can be used for planning and finalizing operations and tell us about capital expenditure in the framework of planning for the future. We need a complete inventory of the farm both physical and financial as well as very good planning and control in this method. The cash-flow method is costly in terms of time for the analyst but not for the farmers.

Organizations of farm enterprises

The participants discussed various farm organizations and development of institutions in developed as well as developing countries.

It was pointed out that the farmer should not necessarily be owner of the land and that the security of tenure should be guaranteed. A number of participants presented information on the tremendous increase in the value of land in the last couple of years as compared to its rental value in the same time period especially for land which allows a high intensity of farming. It was further observed by some participants that average income of tenants was higher than the average income of owners and that the farm structure was changing in favour of tenancy and even more in favour of owner-cum-tenant farming. Farm growth occurs in more cases by renting rather than by buying additional land.

Financing of credit to farmers

The participants explained in detail the credit system prevailing in different countries of Africa, South America, U.S.A., European countries, Pakistan and Brazil. It was noted with satisfaction that adequate credit facilities existed in almost all the countries. Private, public and semi-public institutions were providing credit facilities to farmers under various terms and conditions and different interest rates. In some countries the escalation system according to inflation rate was also stated to be operating. However, the participants stressed the need for a world agricultural extension service to familiarize farmers with basic principles involved in the use of credit.

Forms of integration

Integration may be classified into horizontal integration and vertical integration. Vertical integration implies a fixed contract between firms of different branches while horizontal integration signifies the fixed contract between firms of the same sector. Participants concentrated their discussion on vertical integration which is very common in Europe, U.S.A., South Africa and South American countries in various industries like vegetables, broilers, eggs, etc. It was observed that in most of the countries, the system of integration was operating in various forms. In certain cases, firms provided only technical information, while in other cases,

farmers got all their capital from the integrator. In the latter case, the farmer's role was confined to the provision of labour only. It was pointed out by some participants that bargaining positions of the farmer regardless of the fluctuations in prices or inflationary pressures remained weaker as compared to the firm.

Inflation in Brazil

The discussion on this topic centred on the inflationary situation in Brazil. It was pointed out that real incomes of the lowest wage earners have been falling for the last 8-10 years, in spite of the fact that the minimum farm wage of around CR300.00 per month is increasing by 18 per cent per annum along with monetary corrections. Some participants pointed out that most of the loans advanced by various banks in Brazil for different purposes were with monetary correction. However, some of the loans were with no monetary correction. It was further observed, that agricultural machinery was exempted from sales taxes in Brazil and that inflation was an important factor in the export drive of Brazil. The participants agreed that because of the existence of money illusion, the decline of real wages and/or farm product prices was often not noted by the people in Brazil.

GROUP 12. NEW ANALYTICAL TECHNIQUES IN FARM MANAGEMENT AND PRODUCTION ECONOMICS

Chairman: Y. Maruyama, Japan

Rapporteur: L. Martens, Belgium

Consultants: L. Rankine, Trinidad and J. McInerney, U.K.

The group included 28 persons from 18 countries, thus allowing the exchange of experiences from all continents, and from developing as well as from developed nations. It was recognized that the plenary paper by Throsby provided a listing of the techniques that the group could discuss, but only a subset of these were selected as being of interest to the participants. The discussions did not remain limited to techniques *per se*, and much attention was paid to applications of different research methods. A problem-oriented approach was preferred from the outset, the group agreeing that research techniques are only relevant in relation to the problems they can help to solve.

Most topics which were treated can be classified into three groups, namely:

- the discussion of a number of applied problems in production economics and alternative methods of analysing them;
- the consideration of some recently developed analytical techniques;
- discussions on shortcomings in available techniques, with suggestions for needed developments.

Problems in farm management and production economics

A distinction was made between farm management problems and problems at the multi-farm level, to be used for policy decision-making. It was agreed that few of the recent developments in analytical techniques are as yet used as tools for decision-making by the individual farmer. Only the basic linear programming, and to some extent production function analysis are used by farmers and for extension work.

In the field of production economics research, mainly 3 subjects were analysed. The group first discussed problems of analysing policy choices with regard to price formation and structural change in agriculture. This was illustrated by examples of policy problem in the EEC and the Australian dairy sector, wherein it was desired to identify both the micro- and sectoral-level implications of changing policy variables. The discussion centred on the applicability of LP models in this context. Their prediction ability was criticised. On one side there is the problem of the appropriate level of disaggregation and on the other side the difficulty of accurately modelling the basic units of analysis. These make abstraction of human behaviour and aspects such as fixed costs and discrete investments difficult to handle. It was agreed that one should be careful in using such results for policy-making and also that the available techniques do not allow one to construct a single model to handle the whole set of policy-making problems.

As one approach to the identification of representative farms, the use of simulation procedures as a clustering device was suggested. This was highlighted with an example from dairy-farming in England. Traditional clustering techniques to select representative farms had given aggregated farms which were inconsistent with logical system formulation. Therefore, systems based on a profit maximization motive were simulated to see if farms in reality could be approximated to these models. The identified systems were then combined by way of multi-period integer LP.

A further research problem discussed concerned models to analyse ways to minimize unit costs on sugar mill farms in Brazil. The production of sugar-cane was represented by a standard and generalized Cobb-Douglas function, in an attempt to identify the nature and extend of scale economics. Alternative possibilities to analyse the least cost combination of resources were discussed. Elements such as entrepreneurial, capacity, motivation and behaviour were emphasized as important considerations for this type of analysis.

New analytical techniques

Views were exchanged concerning some recently developed computational methods. First, a technique for two parametric LP was explained. In the past, no adequate methods were available to obtain a systematic solution to LP problems with two variable parametrics. A method, developed in the Netherlands, makes it possible to find all optional solutions corresponding to a given set of parameters.

In the second place, linear fractional functionals programming was

discussed. In L F F P, the objective function is a fraction of two linear functions of the decision variables. The algorithm has a close resemblance to the simplex algorithm and can be used for optimization such as maximizing the rate of return on capital. The method has potential applications at both macro- and the micro-level problems.

Views were also expressed with regard to some recent analytical techniques combining linear programming with some aspects of the theory of games, making it possible to take account of uncertainty in the objective function. Furthermore, the group examined the possibilities of recursive programming for the estimation of supply response.

Finally, the possibilities of non-optimizing simulation models in agricultural production economics were explored. Such models can be used as complementary to optimization techniques, and especially for problems which cannot appropriately be formulated in an LP framework.

Shortcomings and suggestions

During each of the four sessions critical remarks were made concerning some weaknesses and shortcomings of the research techniques, and of their results. It was pointed out that, partly due to the development of sophisticated methods, there is a tendency to expect too much from agricultural economics research. Research workers, as well as policy-makers, should recognize the limited possibilities. Regardless of the methods used, the research results should never be dissociated from the complete set of underlying assumptions.

On several occasions it was emphasized that special attention should be paid to the behavioural aspects of farmers, as well as to the quantification of the entrepreneurial capacity. A greater effort should be made to identify the objectives of farmers, since research workers often lack information on what should be incorporated into objective functions of models. More attempts should be made to modify the standard profit-maximizing objective. The models should incorporate stochastic elements, human behaviour and institutional aspects. However, it was once more recognized that there is still a lack of adequate data and that the possibilities for data collection do not keep up with the latest methodological developments.

GROUP 13. DEMAND AND MARKETING PROBLEMS

Chairman: Q. Anthonia, Nigeria

Rapporteur: J. Alcaide, Spain

Consultants: M. Hawkins, Canada and D. Trebeck, Austria

The discussion group deals with the relationship between production specialization and different marketing systems for agricultural products. At the outset, the topic introduced was the way in which marketing systems interfere and/or promote new types of production and the sort of

influences at the production level that oblige us to design new systems of agricultural marketing.

Marketing systems depend upon the types of products (perishable or storable): on the market orientation-domestic versus processing, distribution and inventories stages. It is obvious that those systems are influenced by tariff barriers, health, and quality control and the development level of the global economy.

It is worth pointing out that marketing systems (role of commodity agreements, multilateral and state agreements) depend upon, and have to be suited to, each kind of product. In real terms we must deal with marketing systems for specific products which are very different between countries, even for the same product in the same market.

To develop modern marketing systems in LDCs, as DCs do, it is necessary to provide the market with a workable infrastructure, including, communications, transport and inventories facilities before putting products into the market. DC marketing systems must provide ways to defend producer and consumer rights and also to improve and maintain quality of the commodities. The only reason to maintain a marketing system is to provide the best efficiency level for the national and/or world economy.

Secondly, the role of government and local institutions to develop agricultural markets was presented to the discussion group. The two extreme situations: (a) no control from government side, and (b) absolute control of the market by government forces, were removed from the agenda. The analysis, on a partial government control basis, digs into the several actions government can take in order build up a useful structure and to develop and improve markets. The following actions from government and/or local institutions were considered the key ones:

1. To supply transport and communication infrastructure.
2. To give to the market clear and efficient information.
3. To encourage and prepare inventory facilities.
4. To rule money forces in a flexible way.
5. To maintain healthy quality of commodities.
6. To encourage promotion activities for domestic and export markets.
7. To set up and regulate international trade agreements.
8. To build up a rational price policy and a flexible administration of such a policy.
9. To improve and/or create legal institutions in order to establish rational bargaining power in the market.
10. To grade commodities for standardizing marketing transactions.
11. To promote market research to avoid failures and needless risks.

Thirdly, the group dealt with priorities of processes in changing from traditional to more modern markets. It is clear that these kinds of priorities can be taken only after getting political stabilization in developing countries. The public must know values of products and this is the first step one must provide in order to change into a more modern

market. As a consequence priority has to be given to information as far as possible to the sellers and buyers in order to fix the real value of products. At this stage it might be useful to introduce a government agency to provide information and grading in a reliable way.

Moving into more modern markets in LDC is constrained by many reasons: enormous distances between producer and consumer areas without a good communication network; supply scattered out among many producers and difficulties in setting up grading systems.

The last topic on the table was related to very modern markets in DC, in which retailers manipulate the consumer, and also direct habits of the householders. How to defend consumer's rights was a very important matter without any satisfactory reply.

GROUP 14. NEW ANALYTICAL TECHNIQUES IN MARKETING

Chairman: H. Trelogan, U.S.A.

Rapporteur: S. Brandt, Brazil

Consultants: S. Tongpan, Thailand and A. Slama, Tunisia

The group represented varied backgrounds, experiences and interests. Areas of common interest were selected for discussion by grouping each topic that each member wished to have discussed into four major areas, as follows:

1. Structure, marketing costs and margins, efficiency and other performance measures.
2. Marketing services, including market news, data collection, and grades and standards.
3. Price forecasting and evaluation of other anticipated events for decision-making in market development projects.
4. Export promotion and competition; market problems to which known techniques of analysis do not apply.

It was also considered that the group could choose to approach these topics either from the stand point of problems or methods. The latter was chosen.

I. Structure, margins and costs, performance

The outcome of the discussion was that one cannot reach a consensus on the meaning of structure, leaving the clear implication that one should define structure of a particular problem.

The discussion went on to consider the marketing costs and margins and how to measure them efficiently. A marketing structure may give rise to transactions where there are prices to be measured or it may not. Sometimes the only measureable prices exist at the final retail level. In the latter case, consideration was given to improving prices, from the retail level to the farm level, using cost data. This procedure would be desirable in other cases where some wholesale prices are available as a check on

their significance.

In analysing the margin one needs to disaggregate it into its various costs components, reflecting the functions and the services to be performed at the various stages. Representativeness of prices was recognized as a continuing issue in view of many factors including price policy of the country. With respect to the farmer's share of the retail price it was agreed that this share is not a good indicator of the efficiency of the marketing system. The share is a result of many forces acting on the quantity and price for various marketing services at the different levels. It was recognized that appropriate techniques of analysis would need to be developed to accurately identify the sources of change in the farmer's share. A common cause of a declining farmer's share in developing countries is the increase in relative importance of marketing services. But this might not be the only reason. Sometimes monopoly pricing of marketing services is a cause. Declining farm prices may also be a cause.

II. *Marketing services*

Three topics were discussed, namely, market news, grades and standards, and data collection.

Market news was defined, using fruits and vegetables and the U.S. as an example, as being a system of gathering and disseminating on a regular base (often daily, also weekly or monthly) information on current prices and quantities marketed, by grades and standards. Prices are given in a way to reflect the range of prices observed and the 'Mostly' transactions.

The methods of price reporting varies from situation to situation and from country to country. In the U.S., for instance, it is done by personal interviews at the wholesale markets and largely by telephones at shipping points. In Brazil it is done by using information registered at wholesale markets.

The Yugoslavia pricing system, however, does not require as elaborate market news system. There is a social control over pricing at different stages for basic products; for many perishable items the transactions are conducted directly with consumers. The latter is often the situation in under-developed countries.

The accuracy of the prices published as market news was carefully considered. These data often are not precise enough for research purposes.

It was pointed out that in order to have an efficient system of market news, *grades and standards* are needed. The lack of standard units of measurement in a country poses difficult problems in assembling meaningful prices. Prevailing grading systems are too much producer oriented.

In designing grading systems one should also reflect the needs and the realities of the consumer. Based on the U.S. experience, the simpler the grading system often the better it is. One should also avoid a very wide range in grading a farm product because of the tendency for many people to consider other grades than grade Number 1 as poor quality products.

In undertaking economic analysis, the researcher should take full

advantage of the information given by grades and standards in order to be more precise in his analysis. In the case of farm products for processing, the grading system is well developed both in the advanced countries and the developing countries because of competitive necessity especially in the world market.

Data collection mainly covers prices, quantities, stocks, livestock numbers and other such items. Use of standard measuring units for data collection should be observed. Since the data collected have multiple purposes, one should get the best information he can find. In the process of releasing the data, a careful explanation of the methods used for collection and the possible limits and constraints for their use should be given. In using sampling as a technique for data collection, one should adapt his sample to the situation he is facing. Four different kinds of samples were discussed:

1. *The uncontrolled sample* should be used only in situations where there are no alternatives. The uncontrolled sample does not tell about the reliability of the data.

2. *The census*, which is really a very large sample, is recommended when it can be afforded from the standpoint of money, time and technical capability.

3. *The probability sample* always is recommended when it is feasible. The probability sample has a limitation from the standpoint of its cost when a very small standard error is required demanding a much larger sample size.

4. *Remote sensing*. This technique is advantageous in certain situations, like counting tree numbers and total cultivated areas. But its accuracy in distinguishing among certain cultivated crops, like small grains, is only about 85 per cent. This is less accurate than prevailing measurements in developed countries, but it may be more accurate than methods available to many under-developed countries. Unit costs of obtaining information are quite low, but the processing of such information into useful form usually is high and may be technically difficult. The role of the research economist here is to specify the data needs—a role that is under developed.

III. *Forecasting prices and other variables*

Some newer techniques that may have a role in forecasting supply, demand and price were discussed in the light of their technical features, underlying assumptions and data requirements. These include Bayesian methods, Markov chains, sketral analysis, regression using cross-section data, among others.

The importance of understanding the economics that underlay the choice of a mathematical model cannot be overemphasized. The best fitting model is not necessarily the best economic indicator. Also the choice of model must be tempered by the quality of data available, which requires an understanding of the structure of different models, as well as the meaning of data.

The usefulness and possibilities for forecasting hog production 2 or more years ahead was examined as an illustrative problem. The need for even longer-term price forecasts, especially as they bear in deciding whether to invest in new market facilities (like transplant) to develop a region, was briefly discussed. But the techniques were not adequately explored due to the lack of time. Similarly, other topics on the agenda remained for discussion in other occasions.

GROUP 15. INTERNATIONAL TRADE POLICIES

Chairman: A. Mitra, India *Rapporteur: C. van der Noort, Netherlands*
Consultants: H. Abdelsamie, U.A.R. and J. Lohoar, Canada

International trade is part of very complicated network of interdependent relationships between nations. These relationships are affected by trade policies. These policies vary from country to country in strategy, tactics and impact.

One of the important changes in international trade policies has been initiated by the U.S.A. as part of an overhaul of the total body of foreign policies, e.g. changing relationships between U.S. and Asia (Japan and China) and Europe (EEC and U.S.S.R.) and to the developing countries. It is no use to comment on this process of reconstruction of U.S. policies. Let us mention only the policies directly concerning international trade. These are the proposals to change U.S. agricultural policies, U.S. trade policies and U.S. energy policies.

Some of the products from the U.S. that could compete within the rich markets are agricultural products. Now the prices of agricultural products in the U.S. are high, farm income has improved very much and the internal political situation changed somewhat now. President Nixon launched the plan to phrase out the measures to protect U.S. agriculture. This would not harm farmers if they could expand their exports. So we understand that is a very important part of U.S. policy to get access to extra markets, especially in Western Europe. The U.S. position is not yet determined. Free trade would move U.S. grains into Europe, however, it might move dairy products in the opposite direction.

The demand for access to the European market creates a big problem for the EEC countries. The U.S. claims an extra export of about 10 million tons of grains to Europe. To import this quantity it could be necessary to decrease the import duties on grains in the EEC and this would create internal and external problems. The internal problem might be a sharp decline of farm incomes and a collapse of the common agricultural policy, which might be too great a shock for the European Economic Community. This in itself could be too high a price to meet U.S. demands. But there are also external effects. The extra grain would drive out substitutes such as, for example, soybeans or manioc. The first would have

an inverse effect for the U.S., because it means a reduction of American exports; the second would have an inverse effect for developing countries in Asia for which the EEC and America, too, accept some kind of responsibility.

The only way to get a solution can be via international trade negotiations, as for example the Kennedy round and the coming Nixon rounds. The outcome of such a conference depends on the strength of the position of the U.S., the EEC and the developing countries, and on the degree of uncertainty the negotiators can take. These uncertainties are: the strength of the Nixon administration, the agricultural policies of the U.S.S.R. and China and the trend in world market prices. World market prices are rising. Is this a fluctuation or the beginning of a long-term development? Nobody knows. Some facts about population growth, however, indicate that the need for food will increase enormously in the years ahead and it would only be a mere coincidence if the agricultural production could keep pace with need; at that there are the random fluctuations in production as well as a consequences of 'economic convulsions' as from weather conditions and diseases. So perhaps we can expect a rise in the prices of agricultural products, but we are sure about fluctuations in prices of these products. This lead to reflections about commodity agreements to stabilize markets with buffer stocks for various products.

Such a trade conference especially about agricultural products is very important for the U.S.A. and its government will use all its influence to get what it wants. This makes it necessary for European nations to negotiate together as EEC.

This Economic Union, for example, has serious internal difficulties: monetary problems and agricultural problems. In fact there is no 'common' or 'united' market for agricultural products because of the monetary problems, and each monetary crisis will increase the difficulties. The EEC position, therefore, seems not to be strong. But to give in to the bargain on agricultural products could destroy the CAP, one of the prestigious projects of the EEC. So we can expect a very dedicated opposition to, or even rejection of, the American demands. Where the pressure is high and the interests of different groups and nations very large it is no wonder that there is also a search for a new CAP, this is expressed for example in some studies in which either a adoption of CAP is proposed, or even a total different income policy, e.g. some kind of direct income payments or compensation payments for European farmers. It was not the objective to discuss these proposals but only to show that national agricultural policies of U.S. and EEC depend on international trade conditions and vice versa. The fundamental changes in the international (economic) conditions require different international trade policy for America but also for Western Europe and it is just on the point of agriculture the two clash.

The developing countries, too, want access to the European markets, but this interest does not go parallel with those of America, because they

can be hit by expansion of American grain exports to Europe. The Americans may object to the present ties between the Common Market and the associated countries. The relationships between EEC and her associated countries are slightly beneficial for the developing countries. Europe, however, accepts some responsibility to other developing countries too, and it is hardly possible to reconcile the interests of both groups of developing countries and the American interest as well as in this field.

This brought us to the problem: free trade or protection? Economists among us pointed to the benefits of free trade (better international division of labour and higher welfare). Realists among us pointed to the divergent interests in the countries and between various countries who have protection and say that only marginal or step-by-step procedures are possible to come to the much desired state of free trade. Exceptions to free trade may be necessary for some commodities, pending further study of effects.

For the LDCs it is very important to know how the terms of trade will be. The feeling was that in the next ten years or so the terms of trade will not be favourable to the LDCs. This would change in case of zero growth in the DCs. In this case we can expect that there will be protection in the field of agricultural products. About 50 per cent of the exports of LDCs are affected by various kinds of measures of protection. This percentage may change in the next 10 years but it is realistic that the measurements will stay with us. There are already liberalization policies going on: association with EEC, giving preferences to LDCs. It is further not true that trade liberalization will always be beneficial to LDCs.

The conclusion of trade is made by payment. So the problems of international liquidity, exchange rates and balance of payment problems come in. This is true as well for Europe, U.S. and LDCs. The fear that expansion international liquidity will endanger international trade was brought to our attention, but also the idea that increasing international liquidity (via special drawing right with OMF) may only increase inflation. It was clear that international trade policies are extremely difficult because of the enormous uncertainties of all kinds. It was clear that international trade offers a field for new and important research.

GROUP 16. THE ROLE OF MULTI-NATIONAL FIRMS IN AGRICULTURAL DEVELOPMENT

Chairman: D. Paarlberg, U.S.A.

Consultants: B. Warmenhoven, Netherlands and A. Malassis, France

Rapporteur: K. Ingersent, U.K.

It was agreed that a distinguishing feature of the multi-national company is the dispersion of production facilities to overseas subsidiaries. In many instances the results are beneficial to the host country, but power is

concentrated in the parent country, raising the possibility that the multi-national company may take decisions which are adverse to the host country's interests.

It was noted that in 1971 the overseas investments of multi-national companies amounted to approximately U.S. \$165,000 m. and that the overseas investments of multi-national companies based in the U.S.A. grew from U.S. \$12,000 m. in 1950 to U.S. \$70,000 m. in 1970.

The rapid growth in the number and size of multi-national firms since the Second World War was noted and it was agreed that the reasons for this included the advantages of integration, the multi-national firm's superiority in technology and in the energy of their managers, the scope afforded for lowering manufacturing costs, especially through access to cheaper labour, and the advantages of finding a means to circumvent trade barriers.

In discussing the possible effects of the activities of multi-national firms on host countries it was agreed that these may increase employment and national income, thus improving living standards. Moreover, multi-national firms may be prepared to undertake government-inspired enterprises; such as the establishment of plants in depressed areas which local firms will not adopt.

However, on the negative side, the behaviour of foreign-controlled firms may conflict with national values or offend national sensitivities; for example, by causing pollution, by refusing trade-union recognition, and by the permanent holding of higher management positions by foreigners.

The activities of multi-national firms sometimes result in the premature adoption of capital intensive technology in countries with plentiful labour. For example, agricultural machinery firms may increase rural unemployment by encouraging the substitution of capital for labour on farms.

It was thought that a multi-national company procuring its raw material supplies in a host country would rarely be willing to grant its suppliers a guaranteed price, due to the risk of unforeseen price fluctuations.

It was agreed that the effect of multi-national companies on their host country was generally beneficial. However, whether their net effect is one of advantage or disadvantage will depend upon circumstances prevailing in individual countries.

The effects of the activities of multi-national companies on the parent countries were then discussed. It was thought that the main effects would be upon employment, the balance of payments, autonomy in economic policy, and diplomatic relations. Moreover, multi-national firms sometimes avoid taxation by manipulating transfer prices within the company.

The spokesmen of organized labour in the United States have accused multi-national firms of 'exporting jobs'. In the short run there may be some substance in this accusation but the long-run effect should be beneficial in accordance with the principle of comparative advantage. By

increasing the mobility of resources over national frontiers multi-national firms also make international markets more competitive.

The most obvious short-term effects of a multi-national company's operations on the parent country's balance of payments are the loss of export revenue, either actual or potential, and the outflow of capital. However, if exporting firms are able to remain competitive in international markets only by setting up subsidiaries in countries where relatively low cost labour and other factors are available, then the balance of payments effect may be favourable in the long term. Furthermore, the balance of payments is strengthened by the restriction of savings. The acid test is whether or not multi-national operations enhance the value of currency in the long run.

To the extent that the decisions of multi-national firms affect employment and the balance-of-payments governments may experience a loss of autonomy in economic policy. Due to their size, multi-nationals are in a good position to switch short-term capital funds from one currency to another in response to speculative pressures.

Multi-national company operations may affect the diplomatic relations of the parent country's government if those operations divert trade away from countries where the government wishes to strengthen the country's trading or other economic links.

The establishment of the Overseas Private Investment Corporation in the United States, to assist firms wishing to undertake new investment abroad, would appear to signify that, on balance, the government approves of the activities of multi-national firms.

As well as setting up plants to manufacture fertilizers, agricultural machinery and other farm inputs, multi-national companies can finance research and development on 'new' agricultural products in developing countries. Such developments might be especially appropriate for products which are in short supply, such as soybeans and sunflower seeds.

In view of the various social and political sensitivities towards multi-nationals in developing countries and attendant dangers of economic domination, it is necessary to encourage joint ventures of various kinds, including those involving the participation of international agencies. For example, in some countries and for some projects the combination of a development bank loan plus technical assistance from an international agency, or aid plus technical assistance, represents an alternative and perhaps preferable means of development, subject to the availability of skilled management. Alternatively, in some instances a host country government might enter into a fruitful partnership with a multi-national company (the government usually holding a minority of the shares).

The feasibility study which the multi-national firm itself will conduct prior to investment is frequently insufficient for the host government. To protect its own interests, the host government should conduct a cost-benefit study, taking account of all externalities such as 'linkage' and 'learning' effects, and the effects on the structure of the economy, as well as the more obvious effects on employment and the balance of payments.

The possibility was discussed that multi-national firms should be required to adhere to a code of conduct drawn up by an appropriate international body. The multi-nationals themselves might tend to favour such a code if it improved their public image. The argument that multi-national firms require regulation, as monopolies are regulated in certain parent countries, appears to have some substance. The main arguments against a code are that no single set of rules is likely to suit all countries and that some larger host countries may wish to set up their own codes.

The taxation of multi-national companies in the host countries was briefly discussed, together with the possibilities of limiting the repatriation of earnings or setting a time limit to foreign ownership of the firm. It was agreed that although from the point of view of host country governments, such measures might sometimes be justified, the multi-national firms would inevitably discount them by raising the required pre-tax rate of return on their investment.

GROUP 17. PLANNING AND IMPLEMENTATION OF ECONOMIC DEVELOPMENT PROGRAMME

Chairman: J. Hardaker, Australia

Rapporteur: S. Bose, Bangladesh

Consultants: J. Sebestyen, Hungary and M. Kadhi, Tunisia

The initial discussion dealt with the experience with development planning in the past decade or two. The difficulties involved in quantifying the benefits from planning were noted, but it was observed that planning had not always worked well and that mistakes had often been made. It was suggested that some planning had been too ambitious, in the sense that many countries set targets of savings and investment rates, that, in the absence of appropriate policy measures were unattainable. Secondly, some errors had been made in planning the balance between agricultural and industrial development. Doubts were expressed about whether planners have had, or do have, operational models of the economic development process which can be used to guide plan formulation and implementation. In particular, it was suggested that such models were deficient with regard to their failure to account for socio-economic obstacles in the way of effective measures for resource mobilization.

The discussion then moved on to the multiple objectives of development planning. The consensus was that, while growth of output must be a prime objective, especially in LDCs, planners should also take account of secondary objectives, including increased employment, better income distribution, better rural-urban population distribution, reduced regional inequalities, etc.

The main theme of the second session was mobilization of resources. The initial discussion centred around the thesis that as far as land mobilization was concerned, if a good market for land exists then land

passes to the best uses and hence land reform is not necessary for the economic objective, but only for socio-political objectives. Many participants disagreed with this view. The consensus was that land reform is necessary for both economic and social political objectives. The market did not transfer land to the best users in many countries. But land distribution should be supported by public assistance to small farmers through extension service, input supplies, cheap credit, etc., for augmenting agricultural output and the spread of the green revolution in developing countries.

The group noted the need for taking into account the problem of mobility of farmers and rural people in connection with projects of colonization, resettlement, and large-scale infrastructure construction. China's success with labour mobilization for works programmes was recalled, and the consensus emerged that for effective mobilization of labour it is necessary to have institutional changes in rural areas, and to ensure closer communication and understanding between planning and people for whose benefit planning is done.

The discussion then moved on to the mobilization of capital from agriculture for general economic development. Voluntary savings, taxes, and changes in intersectoral terms of trade came up for discussion. The consensus was that such open or concealed taxation to squeeze resources out of agriculture would conflict with the policy of providing incentives for agricultural development. Also, predominantly agricultural countries, while recognizing the long-term need for industrialization, should give more emphasis to agriculture partly because agriculture will have to absorb an increasing labour force for many years to come.

The initial discussion in the third session centred around how agricultural projects are conceived and to what extent they reflect the ideas and interests of the people. The opinion was expressed that while in many countries local people play some role in the conception of local level projects, the big projects with national priorities are determined at the top without much communication with the people. Often political systems do not allow for public opinion to influence decisions, and even if decisions are market determining the development agencies tax the interests of their powerful clients. While recognizing that large multi-purpose projects need careful co-ordination, and is better done at the central level, the group noted the importance of taking into consideration the ideas and opinions of people who are benefited by the projects.

The discussion then moved on the criteria for selection of projects. The participants indicated that in selection of projects not only the effort involved but also the effects on income distribution, employment, inter-regional, inequality, etc., should be carefully considered. It was observed that while initial screening of projects on a multiple objectives criteria is fairly easy, the final selection is difficult, and no decision in this regard can be independent of value-judgment. Although one cannot expect a general agreement on these value-judgments, it is better to make them explicit rather than implicit.

The discussion on co-ordination of projects and multiple-level planning was inconclusive. Note was taken of the compartmentalization of bureaucracy, the political and administrative obstacles to proper project co-ordination, and the need for optimal co-ordination between programmes, and projects was underlined. The difficulties of building up the national plan from the local and regional level plans and the inadequacy of the optimization techniques in this regard was discussed, but no general conclusion could be reached.

The discussion of the final session was on implementation of agricultural development programmes and projects with emphasis on institutional and staffing aspects. The group disagreed about the most appropriate type of institutions for programme implementation. However, it noted that agricultural ministries are weak in most countries.

The group thought that agricultural development is typically a multi-departmental activity, and agreed upon the need for good co-ordination and systems approach. Note was taken of the danger of having too many departments and multiple bureaucracy in implementation of one project. Any institution successful in implementing one project should be given further responsibility and support for undertaking other similar projects. Co-operatives, religious and social institutions, and private farms, may all be necessary for implementation of development programmes, the particular institutional pattern depending on the circumstances of the country. Also, participation of the people is vital for programme implementation.

The group noted that plans often break down implementation due to poor staff, and discussed the pros and cons of staff training at home and overseas, and the role of expatriates and foreign consultants in this regard. It concluded that countries must not be too ambitious in regard to number and magnitude of projects far exceeding available staff resources. Staff requirements should be considered before undertaking projects. The need for the appropriate ways of staff training depend on the state of development of the country, as well as other circumstances. In many developing countries it is essential to have a breakthrough in staff training below the graduate level. Local training is desirable because knowledge can be imparted in the context of local conditions. Only good foreign experts can be useful, their role being that of a catalyst. It was further agreed that incentive policies for rewarding indigenous experts should be so designed that they may be induced to undertake seriously the task of solving practical development problems rather than spending time on publication of academic papers of little or limited relevance to development problems.

Finally, the group considered it essential to ensure that existing knowledge reaches down to the farmers from the departments, universities, and research centres.

GROUP 18. POPULATION PROBLEMS, NATIONAL AND INTERNATIONAL

Chairman: D. Ensminger, U.S.A.

Consultants: S. Kim, Korea and S. Atsu, Ghana

Rapporteur: D. Densley, Australia

The group considered it as particularly significant that this was the first time that population problems had been a subject for group discussion at the International Conference of Agricultural Economists. This tended to suggest that population questions up to now had generally not been recognized as problems operative within the general activities of agricultural economists. Many group members made the point that agricultural economists, whether involved in the formulation and implementation of policies such as those relating to food production programming and agrarian reform and resettlement or in the application of farm management knowledge in fields such as rural mechanization are often not fully aware of the related population issues. The role or objective of the agricultural economist was seen as 'the application of the science of agricultural economics in the improvement of the economic and social conditions of rural people and their associated communities'.*

Agricultural economists are therefore not only concerned with problems involved in ensuring the adequate supply and distribution of food and basic raw materials to an expanding world population, but also to an improvement in social conditions or the 'quality of life'. The group considered that agricultural economists individually and collectively through its professional bodies such as IAAE must focus more attention on population problems and thus ensure that the policy process fully takes these into account.

The group in its discussions had available a paper by the Chairman, Dr D. Ensminger,† and a further paper by Dr S. Krašovec.‡ These discussed at some length the population problems which are of concern to the agricultural economist. These include:

1. Anticipated doubling of world's population by the year 2000 will give rise to problems of ensuring the adequate supply and distribution of food.
2. Expected future distribution of population between more-developed and less-developed regions will mean that a large proportion of the world's population will be living on the margins of security and insecurity in terms of basic food needs and that little will be able to be achieved in terms of improvement in the quality of life. In fact, this may deteriorate.
3. Increasing environmental and ecological problems (including air and water pollution) especially in more developed countries.
4. Continuing problem of large population growth in rural areas especially in LDCs.

* Article II of the proposed constitution of IAAE.

† Ensminger, Douglas, 'Population problems, national and international', prepared for Group Discussion XV Congress of IAAE.

‡ Krašovec, S., 'The outcome of population policies', presented at XV Congress—IAAE.

5. Problems created by rural-urban population shifts both in socio-economic problems in urban and rural wage inflation in rural areas.
6. Influence of changing population structures on markets for agricultural products.
7. Problems created in inter-regional population shifts.
8. Social and financial problems of changing age structure.

The two papers presented provided evidence that many countries of the world have now officially adopted a population control policy. However, the group noted that many countries giving verbal support to the concept of controlled population growth had little or no practical commitment to implementation of population control programmes. The important role of economic development in achieving desired national objectives was stressed. However, neither economic development nor family planning or population programmes by themselves was seen as giving rise to an improvement in social conditions and quality of life. The approach must be 'total and integrated rural area development',* where population objectives are set against the overall development objectives (social, economic, ecological) which in turn must be developed against the social and cultural background of the country or region concerned.

Population control programmes where they have been introduced have met with mixed success for reasons which the group listed as follows:

(a) Organizational and institutional constraints

Most family planning programmes were the responsibility of health departments and there was often no real co-ordination of objectives with either planning or policy units or with implementation and development agencies such as Departments of Agriculture.

(b) Religious, social, and cultural constraints

People living in rural areas in LDCs have as their main concern production for survival or subsistence. This, together with the absence of educational and hygiene facilities in these areas, mean that population control measures in these areas have had little success.

(c) Educational constraints

The level of education of people, especially in rural areas in LDCs, is a big factor in determining the impact of population control programmes. The group discussed at some length the types of extension services required to implement these programmes. It was clear that there was a need for women workers in this field to insure that contact with women was made and that the farm family was considered as a unit. The group noted with interest moves being made in some African countries to develop a rural extension service combining not only technical, agricultural and business advice but also handling social and community development problems as well. The group considered more attention

* Ensminger's paper, p. 8.

needed to be given in the training of agricultural economists to population questions if agricultural economists are to understand or work in teams with demographers and other social scientists.

(d) *Political constraints*

It was recognized that the diversion of scarce resources away from development to population control expenditure was not always politically attractive, especially in LDCs. This seemed to highlight the need for presentation of population programmes as part of integrated development.

The group then sought to identify areas of research which needed to be undertaken in order that population policies could be oriented and integrated into overall development policies. Some of this research may directly involve agricultural economists either individually or as part of a multi-disciplinary team.* Some suggested fields of research include:

I. What population growth rates are desirable from both national and international points of view to insure that economic, social, and ecological objectives in specific development programmes are met?

II. What are the trends in population growth, density, and distribution regionally and nationally, and what are the means of achieving specific social and economic objectives such as required growth in the labour force, growth in employment opportunities, and required rural-urban and regional distribution of population?

III. What are the 'push' and 'pull' factors in rural-urban migration? What are the constraints operating? What are the social and economic effects both nationally and regionally of various rates of population shift on both the urban and rural sectors (housing, education, movements in rural-urban wages, etc.)?

IV. What are the implications on population and environmental issues of specific agricultural development programmes such as rural mechanization and intensification?

V. What types and quantities of institutional, educational and extension inputs will be required to meet given population control objectives within the framework of overall socio-economic development policies.

VI. How is the 'level of living' to be defined in terms of a specific country's social and cultural environment?

VII. Identification and resolution of the problems which exist at the farm family level.

The group wished to place before agricultural economists and the IAAE in particular the following recommendations:

1. That the IAAE go on record as being prepared, if funded by foundation or other outside sources, to fund a nucleus population staff to work through the Association's regional and country contacts in promoting social research relative to population policies and in assisting in working out linkages between agricultural economists and other related

* See p. 14 of Dr Krašovec's paper.

social scientists with population policy-makers.

2. That the IAAE seek to insure that agricultural economists become increasingly aware of the need to consider population questions in rural programming and seek as a matter of priority to encourage more agricultural economists to undertake research in the problems listed above so that integrated policies and programmes for population control and economic development can be developed.

3. That the IAAE and its members encourage institutions involved with training of agricultural economists and relative social scientists to include training in the population area.