POLICIES, PLANNING AND MANAGEMENT FOR AGRICULTURAL DEVELOPMENT

PAPERS AND REPORTS

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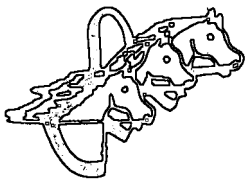

INTRODUCTION

At the Minsk Conference 17 Discussion Groups met on four afternoons to discuss, in as much breadth and depth as possible, these topics:

Group 1 FARM POLICY IN *AGRICULTURAL ECONOMIES*
2 FARM POLICY IN *INDUSTRIAL ECONOMIES*
3 FARM MANAGEMENT AND PRODUCTION ECONOMICS IN *AGRICULTURAL ECONOMIES*
4 FARM MANAGEMENT AND PRODUCTION ECONOMICS IN *INDUSTRIAL ECONOMIES*
5 MARKETING IN *AGRICULTURAL ECONOMIES*
6 MARKETING IN *INDUSTRIAL ECONOMIES*
7 PRICE, INCOME, AND INTERNATIONAL TRADE POLICY IN *AGRICULTURAL ECONOMIES*
8 PRICE, INCOME, AND INTERNATIONAL TRADE POLICY IN *INDUSTRIAL ECONOMIES*
9 AGRIBUSINESS METHODS AND PROBLEMS
10 ORGANIZATION AND MANAGEMENT OF COOPERATIVES
11 AGRICULTURAL CREDIT
12 LAND TENURE PROBLEMS
13 DEVELOPMENT OF HUMAN, NATURAL AND COMMUNITY RESOURCES
14 EDUCATION, TEACHING AND EXTENSION PROGRAMS
15 ECONOMETRIC APPLICATIONS TO AGRICULTURE
16 COLLECTION, TABULATION, ANALYSIS, AND USE OF AGRICULTURAL DATA
17 TECHNIQUES AND STRUCTURES FOR INCREASED OUTPUT IN AGRICULTURAL ECONOMIES

The topics had been designated in advance but members of the various groups were determined at registration when each person indicated the group he wished to be in by designating his first, second, and third preference of topics. At previous conferences this procedure had resulted in a disproportionate number of people by groups and consequently laborious and sometimes frustrating adjustments had to be made in order to more nearly equalize group sizes. At Minsk, however, on the first count all groups were of adequate and usable size, thus participants could join the Group dealing with the topic of their first choice. Later registrations, primarily by Russians, altered the distribution somewhat but not to the extent that any Group was of unmanageable size.

For each Group a Chairman, Rapporteur and two consultants–68 in all from 38 countries–had been selected in advance of the Conference. These Discussion Group leaders were chosen primarily from names submitted in January 1970 by 87 Country Correspondents. However, some 24 factors were taken into account in making the final selections, including, in addition to the recommendations of the Country Correspondents, geographical distribution, prospects for actually attending the Conference, subject matter expertise, language facility and previous Discussion Group experience. With only one or two exceptions all 68 people who had accepted a leadership role actually got to the Conference and served as planned. In one instance, two men served as Co-Chairman since the one originally designated arrived too late for the Tuesday evening orientation session for Group Leaders.

The four half-day sessions of the Discussion Groups at Minsk afforded a unique opportunity for an exchange of views and experiences between 670 skilled technicians from 58 socialist and non-socialist economies. This exchange, of course, was hampered by language barriers, especially since no professional interpreters were provided, but even so an earnest attempt at a dialogue was made with the result that despite the difficulties involved, there was more communication between representatives of the two economic systems than ever before achieved. With both sides gaining a better insight into mutual problems and with many contacts and friendships established, a framework was achieved for future exchanges of ideas and experiences. The stimulus to learning more about the two systems–the similarities as well as the differences–may be one of the lasting benefits of the Conference.

A Rapporteur for each Group was expected to listen carefully to the discussions, prepare a daily summary, and then before leaving the Conference, submit a statement of some eight hundred words giving his views of the Group's findings.

My thanks are extended to all those who helped make the Discussion Groups a success.

Emerson M. Brooks

GROUP 1. FARM POLICY IN AGRICULTURAL ECONOMIES

Chairman: D. Paarlberg, *U.S.A.* *Rapporteur*: V. S. Vyas, *India*

The discussion in the group started with an initial agreement that meaningful context to economic policies can be given only by defining and dilineating the goals which are sought to serve. In determining these goals economists have no special competence. Even when the goals are defined their implications in terms of concrete policy instruments will differ according to the socio-economic context on the one hand and the time perspective accepted by the policy makers on the other. The economists can assist in identifying these policy instruments and more importantly in suggesting their internal consistency and mutual complimentarity.

There was general agreement that the more proximate and identifiable goals of agrarian policies in the developing countries can be justice in the distribution of costs and rewards, efficiency in the use of resources, and economic growth with as much stability as possible. The goals listed above do not exhaust the basic objective of agrarian policy nor is there any implied suggestion of priority among these goals.

There can be two approaches to discuss the relevance and efficacies of various policies in fulfilling the basic objectives. One, identifying the policy areas, like institutional changes, creating suitable infra-structure, creating suitable economic environments (e.g. price and income policies) etc. Second, approach will be to identify the basic problems of agrarian sector in these economies, e.g. problem of rural unemployment and under employment, and to suggest what type of policy measures will be useful in resolving them. It is difficult to have clear-cut distinction between these approaches, but the group opted for the second approach.

Three major problem areas were identified and their mutual interaction was highlighted in the subsequent discussion. There are (1) problems of employment and under employment, (2) problems of structural change including land reform, and (3) problems of technological transformation with particular reference to high yielding varieties program.

While discussing the problem of rural employment and under employment Prof. Myrdal's paper read in the Plenary Session of the conference was taken as the starting point. The basic assumptions underlying Myrdal's formulations are (1) a high and rapid rate of population growth, (2) limited possibilities of adding new cultivable areas, (3) difficulties in adopting new technology on a vast number of small farms, which constitute the bulk of the holdings. The latter is mainly due to unfavorable factor endowment but is also due to the institutional and physical constraints which make the effective participation of labor a difficult proposition. It is further assumed in this model that in the absence of a deliberate state policy the larger and enterprising farmers will opt for a capital intensive technology and will, thus, further aggravate the employment situation in the rural areas.

Though no explicit solutions are provided to resolve this predicament, one can infer that measures to break the vicious circle will include (1) transfer of capital from developed countries to underdeveloped countries, (2) measures to protect the traditional and household industries from the back wash effects of capital intensive industrialization, and simultaneous efforts to modernize them, and (3) institutional changes which will facilitate more effective participation of labor in the process of economic development.

The assumptions as well as the implicit solution of this model were challenged by some participants. There was, however, a greater degree of agreement on the need for structural changes in the countryside with the land reform measures. A rapidly increasing population is putting pressure on the means of subsistence. The economy does not respond to these pressures in an adequate manner and hence an acute inflationary situation is created which is further aggravated with the passage of time. Devaluation of money transfers income from working classes to the merchants and entrepreneurs. Agricultural exports suffer due to deterioration in terms of trade. With foreign difficulties, lack of effective demand, and foreign competition, the pace of industrialization slackens. And all this further accentuates the unemployment problem.

Both from the point of view of social justice and, in many cases for production efficiency, strong land reforms were considered inevitable. The main difference in this respect was whether the land reforms have to be total and part of an all pervasive social and institutional change as in the case of U.S.S.R. and Eastern European countries, or they can be of a correctional type (e.g. putting ceiling on private holdings, ensuring security of tenure, etc.) as were tried in some countries of South East Asia, notably in India. There was a viewpoint that if the inequalities in the ownership of land is not of an extreme kind and terms on which tenants operate are not very onerous, probably correctional type of reforms can be adequate, or else a more fundamental change becomes inevitable. Also, whatever might be the type of land reforms they will be frustrated if these ultimately do not result in the creation of invertible surpluses.

It was in this context that the group took up the discussion of the program of high yielding varieties. Most of the participants felt that important as the program was it would be wrong to call it 'Green Revolution'. At this stage it is a varietal improvement program which has been fairly successful in some crops, e.g. wheat in some areas, e.g: areas of assured rainfall or irrigation, and on some farms, i.e. mostly the big and medium farms.

The urgency for a technical breakthrough in agriculture and also the prospects, under the favorable circumstances, of this program were not doubted. However, several important areas for effective policy measures were identified. For instance, in the areas under this program, once again the problem of land reform has come to the fore, because a tenant and a small farmer is distinctly handicapped in adopting this capital intensive program. Secondly, the problem of regional inequalities, which were already serious, have further worsened as non-irrigated areas are by and large by-passed by this technological change.

Thirdly, until and unless effective measures are devised to mobilize and re-invest the capital, soon a plateau in agricultural production will be reached even in the favorable situated areas. Besides, the need continues for investment in research. Modifications of extension agencies to suit the requirements of a sophisticated technology, arrangements for adequate and timely supplies or inputs, and careful adaptation of marketing arrangements to suit the new requirements, have to be fully conceded. Much more important than all these measures would be the measures influencing capital formation on the farm and creating a wide network of infra-structure, so that prospectively more and more rural workers can participate in process of economic growth in the rural areas.

GROUP 2. FARM POLICY IN INDUSTRIAL ECONOMIES

Chairman: D. E. Hathaway, *U.S.A.* *Rapporteur*: John A. Dawson, *Canada*

Although the group was rather large, numbering about 70, with participants from more than 15 countries, there was an effective exchange of information on agricultural developments, the organization of the agricultural sector, and farm policies. It took place with a minimum of ideological debate. The discussion was more in the nature of an exchange of information and ideas than an analytical exercise, with certain common issues the subject of the exchange. The participants from the U.S.S.R. and other socialist countries were particularly patient in explaining the way their agricultural sectors were operating, in response to many questions from other participants.

The common issues discussed were encompassed by the chairman's opening of the discussion, in which he outlined the characteristics of an industrial economy—a high proportion of the labor force employed outside of agriculture, incomes and the nutritional level of the population relatively high, heavy dependency of agriculture on the use of modern technology (much of which comes from off the farm), a relatively low proportion of income in the economy spent on food and low income elasticity of demand for food—and suggested three categories of policy considerations that might be considered for discussion (with specific points under each category):

(1) Industrial farm policies;
(2) Trade policies for agriculture and industrial products related to agriculture; and
(3) Aid policies of industrial economies and their relevance to the development of developing countries.

Most of the discussion centred on the first category. There was some discussion of the implications for trade and aid of internal agricultural policies but it was not too fruitful. Most of the participants were reluctant to do much more than point out the reasons for present policies. The self-centred nature of the agricultural policies of the common market and other

countries was noted and the inefficiency of certain types of agricultural production was recognized but little progress was made on where cut-backs in production might best take place. Reference was made to the Indicative World Food Plan and to the need to leave more scope for trade in the products of the developing countries.

In contrast, the discussions of a number of topics that fell under the general category, Internal Farm Policies, were relatively productive.

Policies Related to the Welfare of Farm People

Following emphasis by both of the consultants on questions related to the welfare of farm people, a relatively full and frank exchange of information on relative incomes (and other amenities) of farm people in relation to non-farm people took place. The extent to which income in agriculture is lower than in non-agricultural pursuits varies between countries and with the size of farms. The discussion of actual differences was rather inconclusive, especially for the socialist economies. Also, the comparisons for other countries are complicated by the extensive non-farm income earned by many of those defined as farmers, for example in the United States. A lot of the discussion focussed on the incomparability of net income concepts between market and socialist economies. In the latter countries one of the inputs, land, is generally owned by the state. Also, the cost of labor that is deducted in arriving at net income includes all labor, not just hired labor as in the case of market economies.

The policies that have an influence on the distribution of income in socialist economies include differential pricing of farm products (based on regional differences in long-term average costs), state redistribution of some of the net income, special credits for investment in farms that have not yet built up their own resources to the same extent as others, etc. The fact that the state provides more extensive services than in market economies also influences the interpretation that can be placed on net income differentials. With respect to market economies, in addition to price policies, which were discussed separately, there was some consideration of farm adjustment and consolidation policies, with special reference to existing or proposed policies in Sweden, Australia and Canada.

Policies Related to Labor Utilization in Farming

The participants were from countries with a considerable range in the proportion of the labor force engaged in agriculture, even though practically all were from 'industrial countries'. For the U.S.S.R. the proportion of 44 per cent was given but, because of the extent of other activities on collective and state farms, this was not comparable with much lower proportions in most non-socialist industrial countries where such activities as processing, marketing and services to farmers show up in the non-farm sector.

The policies for off-farm movement in many non-socialist economies appeared at first glance to be in sharp contrast with those in the socialist countries but it was apparent that the planning process in these latter countries in fact enabled some shift of labor out of agriculture, through

youth going on for training in non-farm jobs, including service industry jobs in the collective or state farm operations, transfers to labor short areas of the country where wages are higher, etc. As in market economies there was under-employment in socialist agriculture. This could occur through some of the workers having only part-time work on the collective or state farms when the labor supply was more than adequate to meet the planned requirements.

Agricultural Price Policy

Price policies were discussed, with some consideration of the effects of setting farm prices on incomes, incentives of farmers to change occupations, on the overall quantity of agricultural products produced, and particularly on the mix of products produced. The criteria and effects of price policies in a number of countries were discussed, including the United States, U.S.S.R., and other countries.

There was an extended discussion and many questions to the participants from the U.S.S.R. which brought out the following information. The prices of grain, meat and milk, among others, are differentiated by areas of the country to take account of cost variations due to weather and soil conditions and other considerations. General price revisions took place in 1952 and 1953, 1965, and 1970, with new prices for meat, milk, eggs and wool in the latest revisions. Prices are 50 per cent higher for the amount produced over and above procurement quotas which are established on the basis of farm plans. Increased production in order to have more of these products available for domestic consumers was the apparent objective. There was some discussion of the extent of the 'subsidy' involved in that the recent rise in meat product prices was not accomplished by a rise in the price of these products at retail. The fact that the collective and state farms are multi-product enterprises was made, indicating that consideration of the individual farms is on a total farm basis. The rise in meat prices is intended to stimulate increased investment and increased production.

For market economies, the price policies were recognized as needing to serve two purposes:

(1) to facilitate outmigration in socially acceptable forms; and
(2) to enable remaining farms to be able to absorb the land.

It was suggested that price policy was protection for individuals against their own wrong decisions, and it was noted that relative freedom of decision is valued highly, although it comes at a cost.

Other Issues

One could enumerate a large number of other matters touched on in the discussion but one will suffice to illustrate the variety of ideas presented. One of the participants characterized the method of supporting farm incomes as being in general related to the level of industrial development of a country, as follows:

Method	*% of Labor Force in Agriculture*
Direct subsidies through high price supports	5 per cent or less
High consumer prices	8–20 per cent
Input subsidies	20 per cent or more

The above characterization was not intended to suggest that a single method was used in each country but that the general balance was as indicated.

GROUP 3. 'FARM MANAGEMENT AND PRODUCTION ECONOMICS IN AGRICULTURAL ECONOMIES'

Chairman: M. Shafi-Niaz, *Pakistan* *Rapporteur*: R. W. M. Johnson, *New Zealand*

Thirty-six participants from 12 countries attended the meeting of this group. The participants discussed data collection, farm organisation, size of farm, technical progress and specialisation, requirements for introducing change, and agricultural planning in the context of developing or agricultural economies.

The participants discussed the countries which could be described as 'agricultural economies'. As well as Africa, Asia and South America, it was agreed that the experience of the U.S.S.R. and Bulgaria could be included in its early stages of collectivisations. The distinguishing characteristics of 'agricultural economies' were considered to be the high proportion of agricultural income in national income and the widespread occurrence of family subsistence units of farming.

Data Collection

A number of participants presented information on the difficulty of obtaining accurate information on farm organisation from illiterate peasant farmers. In addition, there is inadequate provision in these countries for specialist statistical services. Sample surveys are essential in such conditions and most information has to be collected by questionnaire and repeated visits to the subsistence household. Greater use of local organisations was suggested to overcome such deficiencies. It was noted that in the U.S.S.R. and in Bulgaria, the large farm units formed by collectivisation were able to keep extremely adequate farm records. These are handed on to the appropriate state organisations.

Farm Organisation

The discussion on farm organisation was based on the Gezira irrigation scheme in Sudan. In this example, it was pointed out that far-reaching changes in the organisation of peasant agriculture were brought about by

large scale irrigation works. The scheme made it possible to introduce a new export crop, cotton, new seeds, fertilisers and pesticides, and better methods of farm management.

The case of collectivisation in Bulgaria since 1945 was put forward as another example of far-reaching changes in farm organisation. Instead of individual holdings of 3.5 hectares, collectives were organised on the basis of 1200 hectares, and later amalgamated into units of 4000 hectares. In this way, the advantages of machine cultivation, and farm rationalisation were achieved in a comparatively short period. Wheat yields have risen from 700 kg. to 3000 kg. per hectare and milk yields from 450 to 2800 kilograms per cow.

Some participants pointed out that such systems of organisation would not be acceptable in their countries. Farm organisation changes must be brought about gradually by introducing new techniques and technology, better seeds and fertilisers, and small scale adjustments to land tenure problems such as over-coming fragmentation and communal ownership of land.

Size of Farm

The discussion on this topic centred on the economies of size achieved on state farms in the U.S.S.R. It was suggested that average unit costs were falling up to a size of 12,500 hectares, (for example in the South Urals) but after this size unit costs tended to rise again. For the U.S.A. it was suggested that lowest unit cost was reached at 900 hectares for wheat farms, 350 hectares for maize farms and 100 hectares for fruit and vegetable farms.

In developing countries, large scale farms are seldom found. Family farmers do not have adequate resources to cultivate large areas. In such regions, there are opportunities for organising tractor stations (state owned, co-operative or private), co-operative buying of inputs and marketing of products, and extension services to overcome the disadvantages of small size.

Technical Progress and Specialisation

Technical progress involves bringing better quality inputs to farmers and better methods of farm management. The advantages of some new technologies are independent of size, and are equally adaptable to small and large farms, e.g. seed and fertiliser. It was observed that benefits could be brought more quickly to farmers, if several new inputs were introduced together. In many cases, such as seed and fertiliser, one new technique is of no advantage without the other.

Technology can permit farmers to specialise more. A new high yielding wheat variety in Tunisia has increased the specialisation in wheat production of some arable farmers. But it was noted that some new forms of technology, such as the introduction of tractors, by increasing the area planted by farmers, can permit a greater variety of crops to be grown and hence less specialisation.

As agriculture becomes more industrialised, specialisation becomes increasingly important. The example was given of state farms in the Moscow

region where output per workers had been increased by 50 per cent by specialising in the fattening of pigs alone.

Better methods of farm management can be independent of technology. At each state of technology there is usually a best system of management. As new technologies are introduced new standards of managements are required.

Requirements for Introducing Change

The discussion on the requirements for changing from traditional to modern methods in agriculture covered the following points:

(1) The need for education, general and agricultural, and for extension services.
(2) The need for developing markets.
(3) The need for new technologies, economically feasible and adaptable to developing economies.
(4) The need for credit.
(5) The need for institutional changes, including land reform.
(6) The need for growth and development in other sectors of the economy, particularly those servicing agriculture.
(7) The need for political stability was regarded by some participants as essential.
(8) The need for a strong desire by government and the people for economic development.

Some participants would place education above all other requirements but no general agreement was reached on this point. It was stressed that development is a continuous process and that all the above factors need to be continually modified and developed in the light of changing requirements.

The Role of Agricultural Planning in Economic Development

In this section the differences between socialist countries and capitalistic countries were most apparent.

In socialist economies, such as Bulgaria, purchasing prices and market contracts are fixed 5 years in advance. Planning is the process whereby national needs are reconciled with expected levels of production. In the U.S.S.R., planning is concerned with the needs of the national economy and the agricultural plans must be consistent with the many welfare needs of society as a whole. Such a definition of agricultural planning was accepted by many participants as applicable to their own countries.

It was pointed out how impossible it would be to assign a quota of output to a peasant producer. Would the peasant agree to fill the quota? Would the nation state be able to insist that he should? Clearly, direct planning was not applicable in such countries, and more indirect methods of planning must be used instead. In such countries, the more gradual introduction of new forms of farm organisation, of new technology and better management methods, must remain the basis of agricultural planning.

GROUP 4. PRODUCTION ECONOMICS AND FARM MANAGEMENT IN INDUSTRIAL ECONOMIES

Chairman: J. van Riemsdijk, *Netherlands* *Rapporteur*: Michel PETIT, *France*

At the first meeting of this group, 59 persons registered, 28 coming from socialist countries and 31 from non-socialist countries (essentially from Western Europe, North America and Australia).

This proportion between economists of the two major socio economic systems remained roughly constant throughout the four meetings. Such a composition of the discussion group was fortunate because it made it necessary to face the communication gap between economists using different terminologies. The difference in terminology results from different conceptual framework. Nevertheless both groups of economists are confronted with several common problems. Thus it is not surprising that an important portion of the time was devoted to exchanging basic information on the ways the two types of economic systems function; concentrating on economic mechanisms within agricultural production units and on relation between farms and their economic environment. Although the information exchanged was mainly factual, it will be briefly summarized here. It is felt that the information on one system is not readily available to economists of the other system, even though most of it has been published before.

Afterward three problems were discussed: specialization versus diversification, the use of mathematics and the impact of the migration of young people out of agriculture. The main points touched upon will be presented in the second part of this report.

At the onset, communication difficulties were encountered when the group attempted to specify the topic of its forthcoming discussion. A short time was devoted to the definition of industrial economies. Western economists emphasized such criteria as level of income, remuneration of labor, substitution of capital to labor, degree of involvement in the market economy. Russian economists emphasized the degree of industrialization of sectors supplying inputs to agriculture, the degree of mechanization and the degree to which seasonal variations in the requirements for farm labor can be reduced. This divergence was not much explored. The definition of farm management raised more important difficulties. For Western economists, farm management is an activity whereby economic principles are applied to the organization and operation of a farm. The emphasis is clearly on individual decision making. In centrally planned economies having large farms with several hundred workers, farm management emphasizes the design of organization structures and of effective means of control. This divergence showed the absolute necessity of better mutual information.

1. *Incentives to farm workers and information received by farm managers.*

In Western countries, the problem of incentives concerns only the salaried workers. Their wages depend mainly on the general level of wages in the economy and secondly on their bargaining power in negotiations with

employers (in this respect seasonal workers are often at a disadvantage). There are some bonus schemes but these vary from country to country and within each country. In socialist economies, the remuneration of labor is made up of a guaranteed wage plus a bonus which depends directly upon the net income of the farm (sales minus prime costs). Farm workers are further interested in a higher net farm income since social and cultural investments in their village are financed from it. (For instance in U.S.S.R. sovkhoses: 2.5 per cent of net income goes to bonuses for management, 10 to 15 per cent to bonuses for hand workers, 10 per cent to self financing of investments, 15 per cent to cultural funds, 10 per cent to insurance and the remainder to the State budget.)

In both types of system, management of farms requires much information particularly on prices and new techniques. In the West this information is passed to the farmer through numerous channels including various kinds of market news reports, publicity of price policies, extension service, newspapers and radio stations. In Russia and Eastern Europe much information reaches farm decision makers through the planning authorities. Price uncertainties are much less important than in the West since prices are often determined for a period of several years (up to five).

2. *Current issues*

The last two meetings were devoted to a discussion of three specific questions.

(a) *Specialization versus diversification*

A general trend towards specialization of agricultural production units can be observed in most countries. It is clear that this results from the advantages of the division of labor permitted by technical progress which induces economies of size. There is however a limit to the degree of specialization. The optimum degree will vary with time. It is the result of conflicting forces within and outside the farm. The study of specialization cannot be separated from that of vertical integration. The latter can be a means of alleviating the dangers, in particular to decrease the risks, of specialization. These two forces (specialization and diversification) probably play an important role in the dynamics of agribusiness

(b) *Use of mathematical models to solve practical problems*

A consensus was easily reached within the group that model building is only one aspect of the scientific approach. The role of data collection and farm record analysis was strongly emphasized. The isomorphism of the model should also be questioned in order to narrow the gap between the results of the model and their application. Thus in both socio-economic systems, it has been found necessary to establish institutions[1] who act as intermediaries

1 The extension services in the West, the 'Centers of scientific organization of labor and production' in the Soviet Union.

between the scientists and the farmers. The former should be conscious that, in most cases, the gap results from deficiencies of his science.

(c) *Migration of young people*

In all industrial economies, economic development pulls labor away from agriculture. Because of higher mobility, younger people are more likely to migrate from agriculture than older people. As a result the average age of the farm population becomes older. The resulting problems seem to be viewed with more apprehension by economists of socialist countries than by their Western colleagues. In the Soviet Union a consensus of agricultural economists seems to have been reached on the necessity to develop industries in rural areas. It is believed that this will provide greater employment opportunities and an economic basis for an urban-like cultural environment.

GROUP 5. MARKETING OF AGRICULTURAL ECONOMIES

Chairman: G. A. Hiscocks, *Canada* *Rapporteur*: J. D. Amaral, *Portugal*

The group applied the conference theme to marketing in those countries with agricultural economies (essentially developing countries). In considering the economic policies, programs and management both national and international (the conference theme) as applied to marketing, the subject was divided into the (a) role of government, (b) the role of institutions, (c) the needs of input marketing and (d) the need of processing. Agricultural marketing in developing countries has some very special characteristics and it is important to clarify these before a more detailed discussion under the sub-heads.

In all countries and through all phases of economic development the pace of advance is quickened as agricultural marketing improves. Marketing improvements affecting procedure and organization which lead to an expansion in the volume of commercial trade, raise the level of income of all people and the country and add to the economic wealth of the community. It is important, however, to ensure that the level of marketing services is directly related to the level of sophistication the market can fully utilize.

The level of education, particularly of farmers, is invariably very low in developing countries and marketing developments must be closely related to the educational level and the progress in its improvement. The reduction of cost and margins in marketing is one of the best ways to improve farm incomes because it allows the rest of the population to benefit from a relative lowering of agricultural prices.

In recent years attention has turned from the allocation of limited food supplies to the disposal of an increased agricultural output. The accumulation of surpluses of agricultural products concurrently with the continuance of low food consumption in many countries, emphasises the importance of better marketing mechanisms as a means of keeping production and

consumption in better balance. It is of critical importance to a country to ensure at each stage in its development that the marketing system is efficient relative to the economic conditions of the country. Rising incomes in regions where the bulk of the population formerly lived at subsistence levels call for development of new marketing channels and handling methods. This is particularly apparent where exports of agricultural products are a main source of the foreign exchange.

As countries become more commercialized with an increasing population and this population living in towns, sound internal marketing machinery becomes essential for the satisfaction of food needs at reasonable prices, especially as urban incomes in these countries remain relatively low.

The role of government in marketing development

This is an essential role to be played by government in the following way:

(1) Without active government participation, essential marketing development would not otherwise occur;
(2) Basic marketing support and organization is required covering such aspects as grades, standards and enforcement, public warehouses, markets and credits;
(3) To develop the necessary transportation and communications facilities so frequently lacking;
(4) To provide procedures of mechanisms to
    (a) Ensure supplies of essential foods are available in domestic markets;
    (b) Minimize problems of surplus production;
    (c) Minimize the impact of annual variation supplies.

In general it was felt that the participation of the government was required in an active manner but this did not necessarily involve total investment in every aspect of marketing. Given the initial drive and comprehensive approach of the government in the significant features of education, communication, and basic marketing facilities, other improvements will frequently take place.

The role of institutions in market development

Institutional development includes not only the formal structures such as marketing boards and co-operatives, but also the establishment of producers and organization on agreed rules: such as banks in place of money lenders; incorporated business, supervised contracts and so on. While there is a useful role for marketing boards, there are also dangers where their establishment has led to an accumulation of capital for general economic use. There is also a real danger of political involvement in government institutions. Co-operatives are a valuable mechanism and although social development especially education is essential, co-operatives are not always the best machinery for this.

It was agreed that those co-operatives that operate on strictly business lines will best serve agriculture and that the essential social development

should be provided separately. Government could encourage in different ways business oriented co-operatives in agriculture to perform some of the middlemen functions.

The middlemen function is essential in agricultural marketing and in some areas there is exploitation and in others very little. This function is often misunderstood. In the improvement of marketing it is critical to decide what middleman functions are required, the cost of performing these functions and the pay off likely to result. Only after this analysis should decisions be made as to what institutions are required.

The marketing inputs

Marketing inputs as seeds, fertilizers, machinery, etc. is frequently more difficult than for products because the volume of business is initially low and thus tends to be monopolistic. Services, distribution facilities, some promotion and extension are also required to be newly set up. In addition, producers need credit to obtain these innovations and the credit supply must be linked with the selling of inputs. Government can play a valuable role by establishing 'yardsticks' but experience has indicated that inputs must be sold at market prices to avoid misuse of supplies and of credit with consequent inefficiencies.

The needs of processing

Economic development is achieved if processing takes place within the country and thus agricultural marketing should be concerned with this subject. It is important that the system for this be studied carefully as marketing boards for example, which develop processing as well, is frequently the primary task of marketing. Within government it was agreed that production, marketing and processing should be within the same organization.

General

A major problem in improving marketing is co-ordination and balance within the whole economic sector. Not only are facilities, procedures and organizations required but rules and protection and practices must move in step with actual marketing and innovations. Examples of systems and methods and of failures and mistakes were given from many developing countries. Explanation of how marketing takes place in U.S.A. and the system of the U.S.S.R. were also given. Within any particular developing country it is essential 'first' to look carefully at all the local conditions and problems and 'second' to review the different methods used by other countries, and 'third' to choose and adopt the procedure that will improve the marketing in that country.

GROUP 6. MARKETING IN INDUSTRIAL ECONOMIES

Chairman: W. E. Clement *Rapporteur:* L. M. Sturgess, *Australia*

Improving levels of living are placing new demands on the farm marketing system. More perishable livestock products have to be built into products, and consumers become more discriminating in their wants. Though the proportion of income spent on food declines with rising income, the effectiveness of the marketing system in transforming farm materials into consumer products and in transmitting information still importantly affects economic welfare.

Technological changes in farming, processing, transport and household equipment are also leading the pressures for change in the organization of the marketing system. (Such adjustments may, however, be facilitated by parallel improvements in communication and data processing.) Changes in technology often lead to an extension of economies of scale not only in production and processing but also in procurement, distribution and promotion. The resulting increase in concentration in many marketing industries leads to concern about the manipulation of consumers and the exploitation of farmers. In the interests of consumers, the market discipline enforced by competition between products and the continuous development of new consumption opportunities may need to be supplemented by public schemes of grading and legislation on market structure. To improve the market power of farmers, governments are, variously, instituting monopoly marketing boards, supporting producer groups for forward integration and bargaining, and using new means of communication to better inform producers of attractive market outlets.

Consumer demands for a more precise and regular satisfaction of their needs and the introduction of new labour saving methods of mechanised and automated processing and of self-service retailing are leading to requirements for more predictable, constant and consistent quality of product at the farm level. The need for accurate and timely transmission of information on these requirements and the means of meeting them often induce contractual or ownership integration between processor and farmer or distributor and farmer. Such arrangements sometimes lead to improvements in operational efficiency by, for example, reducing inventories or excess capacity in processing. Also—and this is often a dominant feature—the integrator wishes to increase market security or simplify problems of planning, while the integrated party wishes to transfer the risks of unforeseen price and environmental changes to those who are better able to bear them. In deciding the proper division of revenue between the parties to integration arrangements, both in the market and centrally planned economies, considerations of both efficiency and equity must be taken into account.

It is to be noted, however, such vertical integration, and consequent discovery of prices by bilateral or collective bargaining, is far from general in the agricultures of the market economies. Many products in many countries are bought directly, outside the terminal markets, but are nevertheless not

subject to long term contractual arrangements; integration of products which we produced under heterogeneous and uncertain conditions is rare; in some countries of uniformly dense population direct small scale selling from producer to consumer remains important; in other cases voluntary integration is precluded by the existence of government marketing monopolies; in yet other situations futures markets and teletype auctions may provide viable alternative means of price discovery by many participants.

It is further noteworthy that integration may sometimes, and in some countries increasingly, be initiated at the farm level. This occurs particularly in cases where, through either public policy or economies of scale, farms are very large, and in countries and regions of countries where there is a strong tradition of farmer cooperatives to provide pacesetting competition for middlemen.

Integration is also taking place between other links in the marketing chain, especially between wholesaling and retailing. This integration has been initiated not only by chain organisations but also by retailer cooperatives, wholesalers and consumer cooperatives. The market share of these different groups varies greatly between countries, but in all countries the importance of the independent retailer is declining rapidly. Retail chains have also expanded their manufacturing operations but it is not certain this will be a continuing trend. As in other facets of the industrialization of food production, broadly defined, the advantages of functional specialisation and planning coordination are pulling in opposite directions.

In the process of industrialisation, the development of the farm supply, farm production, processing, transport and distribution sectors must be somehow coordinated in all economies. The many types and degrees of government intervention in market economies underscore the fact that their problems are not totally different from those of the planned economies. It is relevant also that the planned economies find a certain amount of product differentation useful in improving product quality and consumer information.

Whatever point on the spectrum between central direction and *laissez faire* the surrounding economy may lie, increasingly the most successful farmers, or farmer groups, will be those who are market oriented rather than production oriented.

GROUP 7. INTERNATIONAL TRADE, PRICE AND INCOME POLICY IN AGRICULTURAL ECONOMIES

Chairman: *Rapporteur:* R. A. Dias, *Brazil*

The chairman discussed the theory of comparative advantage and pointed out that the traditional conclusion that foreign trade by itself stimulates economic growth in agricultural economies, has been seriously challenged. He went on to argue that the role of trade in the growth process depends upon

the demographic characteristics of the economy being considered. In countries with low population densities where resources in agriculture and raw materials production are poorly utilized, trade in agricultural commodities does stimulate growth, (e.g. Thailand, Malaya, and Australia). In nations of high population pressure but with limited resources (e.g. Ceylon, Singapore and Japan) trade is essential to balance the economy. For the large heavily populated countries (e.g. India) with a traditionally small trade sector in relation to the domestic economy, trade by itself will not be the 'engine of growth'. Not surprisingly therefore, nations belonging to the last two categories may view trade as subsidiary or complementary to other national goals. Starting with a planned rate of growth to be achieved by industrialization and agricultural development, trade is regarded as of secondary importance. Unfortunately the domestic price and income policies designed to achieve both industrialization and agricultural development, may seriously restrict trade opportunities.

The following agenda for discussion was then compiled: The role of international trade in the growth process; the conflict between price, income and trade policies; the need for international negotiations about domestic agricultural price and income policies; income policy measures; consumer prices; international commodity agreements; control over production; regional trade blocks and agreements; exchange rate questions; patterns of trade; the infant industry case; and trade and technology.

There was not complete agreement with the demographic classification but it was acknowledged as useful. One alternative approach which attracted support was to examine agricultural trade in terms of commodities rather than countries. Trade clearly has been, and will continue to be, an important factor in world economic development. The most serious restriction on the further expansion of trade in agricultural commodities, is the domestic price policies of the developed nations. It was also recognized that equity considerations in the developing nations may out-weigh efficiency goals, making it increasingly difficult for these countries to compete on the world market. When the question of international negotiations on domestic price and income policies for agriculture was being discussed, the EEC agricultural policy negotiations were mentioned as an example. The consensus was that progress on a world wide basis comparable with that achieved in connection with tariffs under GATT, was highly unlikely.

In connection with income policies for agriculture, the Indian case was reviewed. India is now beginning to place more emphasis on programs designed to distribute the gains from the new agricultural technology more evenly. Such policies aim to re-distribute ownership of resources and control over income generating capacity rather than income itself. It was pointed out that education, roads, irrigation, communications, recreational facilities and many other forms of public investment, may be effective means of re-distributing income. This approach is especially important in developing nations where price augmentation or direct income payments are not feasible.

On the point of command over resources, it was agreed that no one form of organization of agricultural production was perfect. Large scale

cooperatives and state farms do appear to offer advantages under some conditions. The major problem, however, especially in the less developed nations is how to provide the individual members of such large concerns with sufficient incentive.

One aspect of income policies sometimes overlooked, is the impact they have on the rate of accumulation of investment in the agricultural sector. The USSR representatives consider that one of the possible ways of progress in developing countries may be cooperation and state price and income planning in direction of increasing investment for industrialization of agriculture.

A breakthrough in technology in type of agricultural production may have serious consequences on trade. For example the new HYV's of grain in W. Pakistan and India are so profitable that resources are drawn away from the production of cash crops (fiber and oilseeds) and the supply of these products is reduced. As a result both higher domestic prices and the smaller surplus available for export, make it difficult to maintain exports of these products at traditional levels. Another serious repercussion of the green revolution is that many cereal growers in Asia cannot make use of the new technology. These traditional farmers now face ruin as the increased production depresses prices. In connection with the movement of technology across international borders, it was argued that a genuinely philanthropic effort seems to have been made both by the USA and the USSR. It was emphasized that it was the importation of technology, not capital goods, which sparked off the green revolution.

Exchange rates and various import and export taxes were discussed. Of particular interest was the export bonus voucher system used in Pakistan in various forms for more than a decade. It was agreed that the many different forms of selective devaluation could be replaced by complete devaluation but that this is frequently not a politically acceptable alternative and, from the economic standpoint, it may unduly increase the domestic price of products using a high proportion of imported inputs. One very important result of over-valued currencies is to encourage the importation of capital goods. As a result capital intensive production techniques tend to be used when the factor endowment of the country in question strongly indicates that production ought to be labor intensive.

No new ground was broken during the discussion on commodity agreements. However, the exchange of views on the bilateral trade agreements between USSR and India aroused considerable interest. It was agreed that both countries have benefited considerably from these arrangements and that goods have been exchanged at prices which compared favorably with world prices.

GROUP 8. PRICE, INCOME AND INTERNATIONAL TRADE POLICY IN INDUSTRIAL ECONOMIES

Chairman: *Rapporteur:* T. Dams, *BRD*

At the time of the 1967 Conference of Agricultural Economists held in Sydney, there were more grounds for optimism in the industrial countries in respect to domestic policy and trade than today. During the past 3 years the growth of trade in agricultural products in relation to world trade as a whole, and in relation to output of agricultural products, has been slower than for manufactured goods. The trend towards agricultural self-sufficiency in the industrialized importing countries continues upward. The large increases in production plus a slowing down in international trade have created surpluses in the industrial countries and exerted downward pressure on prices in high-income countries.

Industrial countries including the European socialist countries exported approximately 70% of the world exports of food products and they imported nearly 80% of the food moving in world trade. The socialist countries' exports and imports were respectively about 10% of world total. Of the total industrial countries' exports of food products nearly 75% went to industrial countries (the socialist countries are not included in these figures); only 4% of the industrial country exports of products went to the socialist countries.

There are three main economic goals influencing agricultural policy: rational allocation of resources, output and income. Between these goals we have traditions on the international as well on the national level. Agricultural policy is therefore a compromise and may differ from policy purely specified by economic theory.

To understand the agricultural and trade policy of a given country we must know the reative importance of the three main goals mentioned above. Therefore the first discussion was concerned with country analyses.

Price policy in the USSR was discussed initially to see the nature of price determination on the national as well as on the regional level. The farm prices, established as part of the plan, cover industrial inputs in cooperative and state enterprises. The objective of state not to assure capital formation necessary for the planned development of agriculture which includes inter sectoral transfers of resources.

Planned farm prices has the aim to assure a certain level of income for agricultural workers. The state also influences the income of agricultural workers through a system of taxes, differentation of prices according to different natural zones, and other measures.

In countries other than socialist prices are determined by a combination of market forces and governmental interventions. In order to establish some degree of price stability and to raise the income level of farmers governments set up support levels and transfers of income from other sectors to agriculture. To facilitate structural adjustment, it was stressed that income support should be accomplished through measures other than high price support policy.

Due to differing views on income, price and trade policy it is not enough to have analyses of the kind mentioned above. We need a theory to deal with adjustment of the unsatisfactory situation of today. Economists have different theories which are useful to help to solve part of the total policy problem (i.e. trade versus growth theory, theory of regional intergration) but we do not have models which incorporate all of the variables of the complex problem. Therefore we do not have the basis to solve the problem of 'income, price and international trade' as a whole. We can only list some of the principles and criteria to guide instrumental steps in the direction of such an optimum. In the socialist economy it is felt that the principles of Marx and Lenin are adequate to solve these problems.

We might describe the world market today as consisting of four major trading groups of countries (Socialistic countries, EEC/EFTA, USA and Japan). Considering the existence of these groupings, discussions centered around the feasibility of negotiating trade, price and income policies as follows: negotiations between groups, between individual members of the group (internal), between individual members of different groups. If the price agreed upon is unrealistically high then there is considerable doubt about the success of such negotiations among the different groups.

International negotiations by commodities as well as a negotiated single price level do not offer much hope of solving the problem. Therefore we have to look for another approach, i.e. to negotiate the support-level or the self-sufficiency-level for agriculture as a whole. But then there will be other problems to be solved: what are the actual prices which do not overstimulate the level of production, and what is the economically 'realistic' price at the international level to permit a workable competition.

This effective combination of internal and international agricultural policy cannot succeed where price policy is the only means used to get parity income for agriculture. We need measures to accelerate resource adjustment between agricultural and other sectors of the economy and–in the case of subsidies–means which are not output increasing.

To conclude, we need realistic international prices for the different commodities as well as in the internal markets so as to ensure that there is an equilibrium between supply and demand, that will prevent surpluses which deteriorate international competition.

Economists have theory and techniques for analysing the allocation of production within countries. The same tools can be applied to many of the problems dealing with international trade.

GROUP 9. AGRIBUSINESS METHODS AND PROBLEMS

Chairman: *Rapporteur:* A. L. Tulupnikov, *U.S.S.R.*

The group consisted of participants from both developed and developing countries, including Australia, Bulgaria, Canada, Czechoslovakia, France, FRG, Hungary, India, Iran, Ireland, Netherlands, Pakistan, Philippines, Spain,

Sweden, Switzerland, United Kingdom, USA, USSR, and Yugoslavia. It was clear that within so large and diverse a group, many shades of meaning were attached to the term 'agribusiness'. As a working definition the group adopted the concept of an agro-industrial complex including farm production, storage, transport, processing and marketing of farm products as well as the supply of the means of production, services and finance. This wide framework included notions of agribusiness used by all members of the group. Essentially the common concern was with a wide variety of economic relationships which linked farms with various sectors with this complex.

In order to share our varying experience it was decided to invite members of the group to indicate and briefly describe research projects in their own countries. Each member was asked to state the objectives of the study, the methods used, problems encountered and conclusions drawn. Projects were classified according to their central subject matter, two dealt with the growth of the firm, ten with interactions between various elements within the agro-industrial complex, four with new trends in agribusiness and three with a systems approach to the analysis of agribusiness.

Inadequate time was available for a full discussion of each study but the following points drawn from those which were considered were of particular interest.

Several studies dealt with the problem of attaining an efficient economic structure of the industrial complex under conditions of rapidly changing technology. It was indicated how a co-ordinated system of organization, including many elements within the complex could increase the overall efficiency with which resources were used. Gains could be attained, for example, by the improved location of plants for processing and marketing farm products.

The process of integration was not without difficulties. In particular, problems arose in relation to finance, managerial resources and income distribution. Some contribution to a better understanding of these problems had been made by studies of managerial training and the liquidity of firms.

The role of the development of agribusiness in relation to the growth of farms was considered. It was recognized that whilst this process assisted some firms to expand more rapidly others might be unable to participate. The approach to the problems of changing scale involved in this process differs between the centrally planned and free market economies.

It was pointed out that in developing countries problems of devising suitable agro-industrial complexes were of equal importance with the application of improved farming techniques in assisting the growth of agricultural efficiency.

Case studies were reported by many speakers which indicated that in all our societies there existed common features and similar trends in the development of agribusiness. It was clear that many problems remained unresolved and members of the group hoped that future studies would examine these.

GROUP 10. ORGANIZATION AND MANAGEMENT OF COOPERATIVE

Chairman: G. M. Loza, *USSR* *Rapporteur*: C. W. Smith, *USA*

This group included 53 persons from 23 countries, including 17 from the USSR. and 14 from other socialist countries. The other 22 persons were from 7 developing countries and 7 developed countries. Views were expressed from 16 of the 23 countries.

The discussion by days was divided by the chairman into the following topics: 1) economic and social aims, 2) regional and national experience, 3) horizontal and vertical integration, and 4) organization and management. The following main points of view were expressed.

All speakers agreed that cooperatives can be of great benefit to peasants and farmers. In the USSR and other socialist countries the economic and social conditions of peasants have been greatly improved by cooperatives. But in some developing countries cooperatives have been slow to develop and have sometimes failed because of not being properly organized or adapted to local conditions. When these mistakes have been corrected, re-establishment of cooperatives has been successful.

There is a sharp difference in objectives of cooperatives in socialist and capitalist societies. The objectives in socialist societies have been to improve the economic and social conditions of poor peasants. In the USSR these objectives. have been achieved with great success by applying Lenin's cooperative plan. His plan consisted of ownership of all land by state and development of collective farms, which can form an alliance of the peasantry and the working class to build a socialist society. This plan of collective farms has been followed in some other socialist countries, with the result of great improvement in the condition of peasants and large increases in food production and yield rates of the land. Some socialist countries have not followed the USSR in developing a complete system of collective and state farms, but they have developed mutual aid for credit and consumer cooperatives.

In the capitalist countries, the objectives have been mostly to serve the economic interests of members who own or rent the land, through marketing and supply cooperatives, but without aiming to improve social conditions. These cooperatives have been successful in serving members, but as the size of farms has increased, many small farmers have sold their land and found employment in industry or other occupations.

Horizontal integration has occurred to a great extent in all types of cooperatives in most countries. In the USSR it has occurred by combining collective farms to form larger collective farms. This has increased benefits to workers through ability to make use of new scientific knowledge which increases production and lowers cost by using more and better mechanization and improved crop varieties, as developed by the state farms. Also, larger collective farms have made possible the use of systems of management planned by the use of computers. Now scientists and economists in the USSR

are determining the best size of collective farms for various natural local conditions of soil, climate, etc. Many marketing and supply cooperatives have consolidated to improve efficiency and to be able to employ higher skilled managers.

Vertical integration has occurred with all types of cooperatives. In the USSR the trend was from combining 30-60 small peasant farms into one collective farm at first to later combining all of the farms in a village into one farm with schools, recreational and community center facilities becoming part of the collective farm. Now larger collective farms are beginning to add industrial development to meet the needs of the farm's production factors. In capitalist countries vertical integration to include such industrial operations as feed, fertilizer and machinery plants has occurred in supply cooperatives. Food processing plants and transportation functions have been added by marketing cooperatives.

In some developing countries with mostly a peasant economy, simple organizations like credit associations and supply cooperatives have been the only type of cooperative that would succeed at first, because of lack of education, scarcity of skilled managers and scarcity of technical and scientific aid. There was emphasis from some developing countries on need for land reform to give peasants ownership of land and need of government assistance with development capital before cooperatives can get started on the way to success. Lack of education was stressed as the reason for failure of cooperative in Malaysia. An educational program for peasant farmers and cooperative managers later led to successful cooperatives.

Well qualified management was stressed as necessary for the success of all types of cooperatives. This has been one of the principal reasons for consolidation. Only large cooperatives can afford high quality management. At the same time, larger and more complex cooperatives increase the problems of management. But the potential of greater productivity from application of new technical and scientific knowledge offers great reward from the use of superior management. Large cooperatives can profitably use specialists in agronomy, economics, accounting, biology, animal nutrition and engineering to apply the results of new research. Managers should direct their economists to devise the most profitable combinations of land and other production resources to apply in their collective farm plans.

GROUP 11. AGRICULTURAL CREDIT

Co-Chairmen: M. B. Butterwick *U.K.*
R. Akton *Turkey* *Rapporteur*: Ronald Aines *U.S.A.*

The great need for agricultural credit of appropriate quality and quantity, granted under appropriate terms, was universally supported. In the developing countries it is required to increase farm output, and as a basic ingredient to initiate balanced economic development of the total economy. In developed

countries it is required for continued resource adjustment. The terms and conditions under which credit is extended can be either a help or a hindrance to optimum resource adjustment both in capitalistic and socialistic economies.

Discussion of the question concerning whether agriculture should pay lower rates of interest than other industries led to several interesting conclusions. The interest rate charged to agriculture should be sufficiently high to attract adequate capital for agricultural loans from institutionalized financial channels. Otherwise the government must be prepared to subsidize agricultural credit if an adequate volume of loans is to be available.

Interest rate subsidization was considered to be an inefficient method for income transfer if that is a government's policy goal. In free market countries where adequate agricultural credit is not provided either by subsidization or adequate institutionalized financial channels, many lenders thrive at exorbitant interest rates.

Agriculture in many nations does appear to have special needs and peculiar economic characteristics. Thus special credit institutions or at least special departments within major financial institutions are justified.

In many countries concessional rates of interest are provided to agriculture for various types of credit, particularly to small farms. The qualifying definition for a small farm is very different in various countries.

No sound economic justification was found, with respect to resource adjustment, for concessional rates of interest, but justifications were presented concerning economic development and welfare. In a number of countries, use and management supervision for farm credit is provided with the concessional credit. Credit policy is really a part of economic development policy and cannot be treated separately, particularly in developing countries.

Many other methods of credit subsidization, in addition to concessional interest rates, are used; such as collateral requirements, length of loan, deferred payment, porportion loan is of the total project cost and consulting services. A greater number of agricultural economists and business planners are needed to help farmers develop loan applications, to appraise the feasibility of projects and make recommendations concerning proposal approval. Bankers normally emphasize the ability of the project to repay the loan, the value of the collateral in case the loan is not repaid and the deposits accruing to the bank as a result of the business relationship established by the bank granting the loan.

The discussion of the relationship between agricultural credit and land tenure conditions and policies pointed out the necessity for evaluating each economic situation. Under most circumstances having title or long term lease to land does increase the ability of the farmer to obtain loans. Some land tenure reform programs however, have problems if the farms created are too small to provide for credit previously forthcoming from the landlord.

Some countries have not resolved a system for granting loans to farmers with little or no land. In other countries loans are granted by having a number of farmers or a co-operative be responsible for the loan which is based on

income producing capacity rather than collateral. Having the marketing agency be responsible for collecting loan repayments is particularly effective if the marketing agency, by virtue of its organizational structure or geographical location, is assured of being the sole marketing entity for the farmers involved.

Farm related industry provides a significant amount of agricultural credit in many countries of the world. In the case of farm products for food processing, certain inputs (seed, fertilizer, pesticides, feed, medicinals) are often furnished in order to standardize the quality of product for processing. In total it is advantageous to the farmer to have this additional source of much needed credit. Whether the terms of the credit provided are advantageous or disadvantageous to the farmer depends upon the supply demand relationship for the input or the farm product involved in the business relationship between the farmer and the farm related industry. In some countries groups of farmers or groups of co-operatives have found it economically advantageous to band together and collectively negotiate with farm related industry for credit and supplies.

Co-operative credit institutions in some countries suffer from a shortage of capital and liquidity while in other countries such institutions provide capital to the non-agricultural sector of the economy. The situation appears to depend on two major factors: (1) what financial functions are performed by the co-operative credit institution, and (2) the level of income and savings (deposits) of the clientele being served. In countries where co-operative credit institutions accept deposits and pay at least competitive rates of interest, obtaining adequate funds for making agricultural loans is no problem.

A major problem of some credit co-operatives is adequate control both from the point of view of management of the co-operatives as a business without undue outside influence, and from the point of view of adequate control of member commitment. In situations where most or all agricultural credit comes from the government, and there are large numbers of small farms, co-operatives originally organized for other purposes can often be used successfully to administer the agricultural credit program. In countries with fewer very large farms with sophisticated management this intermediate administrative step between the central bank and the farmer is not needed.

In summary it is obvious that an agricultural credit system can take many forms and can include any combination of a wide variety of functions and still be effective under different systems of economic organization and growth. A developing country in organizing an agricultural credit system should combine the banking and credit functions, permitted by the domestic banking policies and laws, that most efficiently meet the needs of its agriculture. An agricultural credit system must provide a volume of agricultural loans, adequate for resource adjustment, under terms commensurate with farm income levels as determined by the total agricultural and development policy of the government.

GROUP 12. LAND TENURE

Chairman: M. L. Dantwala *India* *Rapporteur*: W. F. Musgrave *Australia*

It was agreed that land tenure deals with the rights of individuals and of society to land. It follows then that land reform is concerned with redistribution of these rights to achieve either efficiency or redistributional objectives. It was also recognized that any discussion of land reform would be incomplete without including treatment of supporting policies such as extension, credit and other auxiliary services.

The main points covered in discussion were:

(1) The impact of land reform on economic development of underdeveloped countries.
(2) The most desirable types of land tenure and farm size.
(3) Desirable structural improvements in land tenure conditions in capitalist and planned economies.

The discussion provided evidence that the very large, multi-family units of the U.S.S.R. could provide instructive information and guidance to those considering expansion of co-operative and state farming elsewhere. It was pointed out that the U.S.S.R. farms are quite dynamic entities which can change in response to economic forces. In particular, weak farms amalgamate with neighbouring strong farms. This has happened to such an extent that the total number of collective farms has declined substantially. In addition, the rural population of the U.S.S.R. is declining both relatively and absolutely

In the case of the U.S.A. it was pointed out that farms were getting fewer and larger. These changes are in response to economic forces and it was emphasized that high levels of industrial activity and employment and a well-developed transport system are important in this process of change if only because of the opportunities they provide for off-farm migration and part-time farming.

The topic of co-operative farming in non-socialist countries was introduced by means of discussion of the Working Producers' Associations in Spain. These associations consist of individuals who operate their land together. Methods of remuneration vary. For example, some pay according to the labour contributed, others according to the land contributed. The scheme has been in operation about 15 years and there are now 2,000 associations covering 400,000 hectares and involving 150,000 farmers.

In France pressures for change in agriculture became strong after 1945 and led to a need for farm enlargement and for government intervention. Some concentration of farm resources is being achieved through the establishment of farmers' groups ('gaec'). Once again, the importance of continued growth in the non-farm sector as an adjunct to any programme of reform in developed countries was emphasized.

There have been two land reform programmes in Japan, one at the time of the Meiji restoration which brought about a transition from a feudal agriculture to a semi-modern one, the other after World War II which abolished the tenacy system and substantially reduced the number of tenants.

As the latter of these reforms did not attack the problem of farm size there now appears to be a need for enlargement.

The significance of the enclosure movement of the 18th century to the comparative health of U.K. agriculture was indicated. However, as with the U.S. it was felt that existing tenure arrangements did tend to impede the intergenerational transfer of land.

A comparatively critical situation, with human resources pressing strongly on land, was described in the case of the Dominican Republic. It was considered that private ownership of land was unrealistic and that some form of collective or state farm was needed. The political conservatism of the large landholders was seen as a major obstacle to reform

In Mexico the ideals of land reform which followed the 1915 revolution were seen as being negated by the concentration of ownership of the private land which remained outside the village co-operatives or 'yidos'. In the case of Indonesia a land reform programme was launched in 1960 but must be judged a failure as only 5 per cent of the land outside plantations had been re-distributed. On the other hand, reform in Chile has met with greater, but still only partial success. In all cases the significance of adequate supporting programmes was stressed. However, in the case of Chile particular emphasis was placed on the possible need to reform not only land tenure but also the marketing and banking structure. A similar situation to that in Chile, before land reform, exists in most Latin American countries. Reform measures have been undertaken in recent years only by Chile, Peru, Bolivia and Venezuela.

The main reform activities in India have concentrated on simplifying a complex set of legal and institutional relationships and on reducing the extent of tenacy and increasing the number of owner-cultivators. These changes have been only partially successful and it is now felt that the security of tenants should serve a more important role. It was noted that the significance of rents in the cost structure of Indian farms has declined.

Although the group felt that its meetings would have been successful merely if there had been a fruitful exchange of ideas it was apparent that more than this had been achieved. Some relevant generalizations appeared to emerge from the discussions. Among them were:

(i) In developed countries land tenure should not impede processes of adjustment, but reform to facilitate adjustment may be pointless without continued growth in the non-agricultural sector.

(ii) Land reform is naturally an important engine of change in developing countries, if only because of the way it can redistribute income and political power. However, it was noted that among the possible alternative reforms, the one which most promotes efficiency, or least impedes it, should be selected.

(iii) Producers Association and co-operative farming should have an important part to play in land tenure reform in both developed and developing countries.

(iv) In developing countries land reform because of its above mentioned redistributional powers, may be a necessary precursor of industrial development and general economic growth.

GROUP 13. DEVELOPMENT OF HUMAN NATURAL AND COMMUNITY RESOURCES

Chairman: *Rapporteur:* K. Harrison *U.S.A.*

Four aspects of the more general topic were chosen by the group for detailed discussion. They were:

(1) Rural-urban migration
  (a) Population balance
  (b) Unemployment underemployment and fuller use of rural human resources.
(2) The impact of urban demand for rural resources.
(3) Development of human resources
  (a) Human capital investment
  (b) Agricultural training programs
(4) Techniques for combining human, natural and community resources for profitable farming.

During the discussion of these topics a number of discussants described conditions in their own countries relating to these issues. From these comments several things became apparent: (1) adjustment (sometimes drastic ones) in human and natural resource use are inevitable in all national economies; (2) Specific adjustment problems will vary depending on political, economic, social and cultural conditions; (3) Effective solutions to resource adjustment problems must take those special conditions into account.

Perhaps the most pervasive and complex problem of resource adjustments in all countries is that related to the effective utilization of human resources. The process of economic development requires improvements in agricultural labor productivity and a corresponding transfer of labor to industrial and commercial employment. Since such activities are commonly concentrated in larger urban centers, human migration is unavoidable. It was agreed that the factors causing migration are basically the same in all countries. They are:

(1) Economic–improvements in agricultural productivity release labor and the expansion of industrial and commercial activities increases demand for labor in those sectors resulting in better income perspectives in urban areas for displaced farm people.
(2) Sociological–the quality of life is usually better in urban centers because of the greater educational, cultural and entertainment opportunities made possible by the population concentration.
(3) Psychological–migration to a new area presents man with the opportunity for 'adventure', it permits one to establish independence from parents and it may offer the prospective of a more exciting and improved way of life.

Rural-urban migration becomes an economic and social problem when the rate of migration is either too great or too little. In the first case, the result is high rates of unemployment and poverty in urban areas with similar conditions in rural areas where the impact of agricultural productivity

improvements has been greatest. On the other hand, too little rural-urban migration produces non-farm labor shortages, high labor costs, and reduces industrial development.

In most developing countries, the problems of unemployment and under-employment are most prevalent. It was noted that in India, where population growth rates and densities have created chronic unemployment problems, an effort is being made to encourage labor intensive farming methods where possible and to identify intermediate urban growth centers which can be stimulated through public investments in infra structure and credit to provide greater commercial and industrial employment opportunities. Discussants agreed that this approach may be useful as a method of dealing with unemployment and migration problems but it is not yet clear how one effectively identifies such urban growth centers nor how to go about efficiently stimulating employment opportunities there under a private enterprise economic system. Discussants from socialist countries pointed out that these problems do not exist under their form of government. Central government planning and control of all productive resources make it possible to allocate industrial and agricultural investments in such a way as to avoid drastic unemployment problems.

It was absurd that in the early and intermediate stages of urbanization and industrialization the value of human resources migrating to urban areas greatly outweigh any other form of rural contribution to urban development. But in the later stages of urbanization there seems to be a greater demand on rural natural resources, particularly land for such uses as living space, industrial and commercial expansion and recreation. There is an urgent need in both advanced and developed economies for improvements in planning for more rational development of living and working centers. This calls for regional rather than strictly urban planning and zoning. Frequently highly fertile land is taken for urbanization or industrialization when lower quality agricultural land would be equally suitable for urban development. Large cities are increasingly considered to be unmanageable and asthetically disagreeable places to live. But little has been done in most countries to encourage the growth of smaller industrial and commercial centers which might permit workers to live in rural areas and smaller surrounding towns while commuting to their places of work.

It was observed that we seem to have a tendency to limit ourselves to presently applied technology in the area of population distribution planning. It has been said that with available communication and transportation technology, there is no reason why people performing primarily mental work could not live and work in rural areas or at least in intermediate sized cities.

It was agreed that investment in human resources is a critical factor in maximizing econonomic growth in both agricultural and non-agricultural sectors of an economy. Rural educational programs must be directed both toward improving the productive capabilities of those who will remain on farms and those who will migrate into non-farm employment. Evidence from countries represented in the group left some uncertainty as to the relationship between improvements in general rural education programs and the rate of

migration from those areas. It appears likely that in general the better educated are most likely to migrate but this relationship may be altered by the interaction of the many other social, economic, and psychological variables affecting migration.

GROUP 14. EDUCATION, TEACHING AND EXTENSION PROGRAMS

Chairman: J. Scully, *Ireland* *Rapporteur*: F. Lom, *Czech*

The group discussed the following topics:

(1) Education needed to improve agricultural productivity.
(2) Methods of disseminating new techniques and research findings among farmers.
(3) Training of specialists in extension.

Educational Needs

For low income farmers a knowledge of basic farming techniques is of primary importance. This knowledge is best given to them through simple demonstrations, group discussions, informational bulletins, etc. In West European countries where the majority of low income farmers operate small farms this communicational problem is of particular importance because of the individual farmer's inherent resistance to change from traditional methods of operation.

In Eastern Europe, where extremely large collective and State farms predominate, the main problem appears to be one of providing collective farmers and state farm workers with the knowledge *they seek themselves* in their efforts to maintain a continuing increase in farm productivity. Special price incentives have been introduced for all production increases of basic products over and above the quota embodied in the State plan for purchasing farm products. These incentives create a favourable climate for the introduction of new farm technology.

In all countries the educational needs of commercial farmers relate to improved farm management and resource-use efficiency. In some Western countries an increasing number of young farmers now receive a full technical education. There is, however, an urgent need to improve the management training of technical extension workers and of farmers themselves. In a number of countries teaching programmes of varying duration, group discussions and management publications are designed to achieve these objectives. Economic research to provide farm management data is undertaken on an increasing scale. But technical advice is still important also.

In a few countries farm management associations which plan discussion and management activities for members, are a new development. Some of the more affluent farmers now employ management consultants. There is,

however, no single and rapid road to success in translating new ideas into practice at farm level.

In Eastern Europe, specialists are appointed as managers-cum organizers of collective and State farms. These receive advanced education up to University level. Within each farm, team leaders receive a specialised technical education. Collective farmers and State farm workers receive training in crop and animal husbandry, machine operation and so on.

In all cases, higher qualifications are needed to meet the educational requirements of farmers in a situation where the economic climate of farming is changing progressively.

Dissemination of New Techniques

Methods vary accordingly to the prevailing level of education of farmers. Simple demonstrations are best for illiterate people. Other low income farmers benefit from demonstrations, group discussions, informational bulletins and so on. *Supervised credit* and *oriented credit* facilitate the introduction of new technology and improved farm productivity in Latin American countries. In some Latin American countries the lack of such basic farm inputs as fertilizers and high yielding crop varieties, other than hybrid corn, is an additional inhibiting factor to farm development. A substantial improvement in applied research is needed to overcome this deficiency.

In India a package programme, combining knowledge, incentives, means and services, has now evolved into the 'New Agricultural Strategy' for development. Various forms of group activity, ranging from local neighbourhood discussion groups in Irish pilot areas to sophisticated farm management groups in the United Kingdom have a major role to play in farm development.

In Socialist countries demonstrations of various types are most effective in transmitting new techniques to farmers. In addition, regular conferences and seminars organized by research institutes and scientific societies aim at achieving a rapid diffusion of new information among professional State farm workers and collective farmers.

Often the failure of farmers to introduce a new technique may be due to lack of information of its true worth, or lack of necessary facilities. Conservatism among some farmers is also responsible.

Training of Specialists

In Socialist countries specialist technicians as a rule work on State and collective farms at team level. Graduate specialists operate at management level. Training of both categories of specialists is geared to farm needs. Methods of training are revised as the need arises. Currently, the most urgent need for specialists is in agricultural economics, accountancy, cybernetics, and labour organization. With improving organization of collective and State farms a further differentiation of specialist function is needed. A substantial increase in the annual training of specialists at intermediate technical colleges and universities is embodied in the current five-year plan for Soviet agriculture.

In Western countries, the most urgent training needs of technical extension workers are in farm management and extension methods. In addition, they must keep up-to-date in technical agricultural developments. The appointment of management specialists within the extension service is a current development in all commercial farming areas. In the U.S.A. farmers in many states now have university degrees. In these States, a master's degree is desirable for county extension agents. Furthermore, a Ph.D degree in the more important subject matter areas is desirable for extension specialists.

In a few Western European Countries and in Australia special post-graduate courses in extension methods are established in some universities. Such courses, have long been available at universities in the U.S.A.

The development of specialists in various disciplines is, and will continue to be, a primary requisite for progressive agricultural development in Socialist countries as well as in those of the Western World.

GROUP 15. ECONOMETRIC APPLICATIONS TO AGRICULTURE

Chairman: C. C. Throsby, *Australia* *Rapporteur*: L. Folkesson, *Sweden*

The group discussed topics in three areas of current importance in quantitative analysis in agriculture, viz. national and regional planning models, statistical theory and applications to agriculture, and stochastic programming.

The discussion of the possibilities to use mathematical programming methods in relation to economic planning problems was opened by one of the pioneers in this field, L. Kantorovich.

In the discussion following, the group studied the possibilities for constructing hierarchical and interconnected systems of models, in order to secure consistency between planning on national, sectoral and regional levels. It was agreed that in theory such a system of models would be an ideal solution. The group noted that progress in this direction is being made in a number of countries such as in the U.S.S.R. and Hungary and also in a number of non-centrally planned countries. Due to limitations on data supply and computational facilities, however, more partial approaches have also to be used in many cases.

In the discussion about which objective functions should be considered in the models, the group agreed that the choice of goal function has to be adjusted to the national policy of respective countries. Examples of objective functions that were mentioned during the discussion are:

–maximization of consumption, subject to predetermined ratios between output of different products

–maximization of aggregate value of production, and

maximization of foreign exchange earnings.

The problem of how shadow prices derived from optimal solutions of programming models can be interpreted and used was also intensively discussed. The group reached the conclusion that more methodological work has to be done in this area. It was generally agreed, however, that shadow prices for inputs can be very useful as guidelines for resource allocation decisions.

The group noted that a mathematical model covering the whole national economy or a substantial part of this economy may be very large in terms of number of variables and equations. In this situation, one useful approach is to use a block-diagonal matrix structure, where each block refers to a specific industry, branch or region. This approach has been followed for example in Hungary. A problem is then how the size of the master model can be kept within reasonable size limits. Different approaches to this problem were studied, in relation to a model developed by the World Bank for the Mexican economy. In this model it is possible to obtain meaningful solutions for subsectors without having to resort to complete solution of the whole model.

Four topics of current interest in theoretical and applied econometrics were discussed in detail. Firstly, the problem of specifying systems of input demand equations which are consistent with an underlying production function was discussed. The theory of duality has recently been applied to this problem. If one has a consistent system of demand equations satisfying certain conditions, then there exists a corresponding production function, and vice versa. For example, it is possible to start from a convenient set of demand equations and determine the nature of the corresponding production function, even though this production function cannot be easily described in closed form. Demand and production functions of square root form were examined as examples of this method. Secondly, a computational procedure for obtaining separate estimates for demand and supply parameters from price series data according to whether prices are rising or falling was discussed. Thirdly, the use of block recursive systems to simplify the estimation of parameters of some large econometric models was considered. It was pointed out that the theory of block recursiveness is in principle untestable, but even so the model could still prove a useful means of estimating large models when data series are limited in extent.

Finally the group discussed some theoretical and empirical problems in the use of macro- and micro- level production functions. It was agreed that data limitations are still a substantial obstacle to the development of production function techniques.

Techniques for incorporation of stochastic components into programming models were discussed. A model was described in which all coefficients were subject to discrete joint probability distributions, thus enabling the underlying risk situation to be spelt out completely in terms of a finite number of equations or requations. Such a model may be used to study the most undesirable outcomes with respect to the objective function and the wide constraints, thus identifying the tradeoff between adversity level and the level of the objective function. In discussion it was agreed that in applying stochastic models, emphasis should be laid on delineating the full set of

efficient plans according to relevant criteria, since little progress could be hoped for in identifying explicit utility functions which would be necessary for a complete general solution to these models.

GROUP 16. COLLECTION, TABULATION, ANALYSIS AND USES OF AGRICULTURAL DATA

Chairman: H. C. Trelogan, *U.S.A.* *Rapporteur*: A. Sattar, *Pakistan*

Uses of Data in Relation to Costs and Benefits:

Statistics are of no value unless actually used. Statisticians should not only produce data but should also promote their use by demonstrating the importance of using proper statistics in the process of decision making. This is best done by providing the right kind of statistics at the right time, and with the requisite degree of accuracy. To promote and facilitate economic planning, the data must also be consistent with the prevalent economic theory and the fiscal model of the country. Extraordinary expenditures are sometimes justifiable on data of limited use on account of the importance of the decisions to be based on those data but, by and large, the priorities in data collection should be determined in the light of their usefulness to a wide range of users.

Similarly, quality standards for data should also be set in relation to specific uses. One of the most important uses of agricultural data, for instance, is in national accounts where a start can be made with less detailed data. The degree of sophistication can be increased as additional expenditures are justified by the expanding multipurpose uses of data. In certain cases the data required for studying internal relationships can be collected at relatively low cost with the requisite degree of accuracy if aggregate data are adequate to provide the ratios required.

Governmental statistical agencies often neglect the interests of the farmers and other private users of agricultural data. Even in the public sector there is a communication gap between the statisticians and the users of data with the result that users don't get all they want and some of the collected data do not find users. In the interest of efficient use of funds allocated to statistical programmes the statisticians should be guided by the potential users in determining what data to collect. Preference should be given to multipurpose data so that the costs can be spread over a broader base. The rule cannot, however, be applied rigidly as some data are useful over a long period of time, and their usefulness increases with the length of the time series. Further, it is possible sometimes to collect important data at low cost as a by product of other regularly established activities such as revenue collection, and reports from regulated markets and state and collective farms.

Collection of Agricultural Data:

A. *Censuses and Current Statistics*:

Current agricultural data are frequently collected through sample surveys. Census data are collected by complete or nearly complete enumeration. Greater dependence is being placed on the use of sampling in relation to censuses especially in countries with large numbers of holdings. Census data can be expected to be more accurate than sample estimates but high aggregate costs and heavy requirements of personnel and other resources for complete enumerations are often prohibitive. The results from complete enumerations also cannot be made available as quickly as in sample surveys. In sample surveys the aggregate cost is less and usually the sample can be tailored according to the available resources.

In practice complete enumeration is more available in small universes while sampling is often the only feasible proposition in very large universes. Quite often sampling can be used with advantage in conjunction with complete enumeration(a) to broaden the content of the census,(b) to check the quality of enumeration, and(c) to speed up the results by sample tabulation of important data. Consensus provide the sample frame to up-date information during the inter-censal period. Survey costs can be minimized while maintaining the desired standard of accuracy by carefully designed probability samples. Complete enumeration of specialized farms and of all large holdings helps in improving the reliability of sample estimates. The reduced scale of operations tends to reduce non-sampling errors; for example, by permitting more resources for training and supervision of the enumerators.

B. *Farm Management and Farm Accounts Surveys*:

To amplify the aggregate data mentioned above, farm account and management studies may be undertaken to determine the differential rates of return on different types of farms under varying conditions of inputs and to identify the factors responsible. Usually these studies have the objective of collecting data for micro analyses and for advising farmers on maximization of incomes with efficient use of resources. In the Western developed countries and in the centrally planned economies where elaborate farm accounts are available, data may be extracted from book-keeping records.

In the developing countries, however, special sample surveys use recording agents to prepare the accounts because survey interviewers have failed to obtain accurate estimates of current inputs especially of labour. Except in socialist countries where statistics from all state and collective farms are available for analysis, the results of farm managment surveys cannot be blown up to national levels. They may be used advantageously for inter-sectoral comparisons and for providing data that are lacking in a model.

Multivariate Analysis and Response Functions:

Multivariate analyses using data of a number of independent variables as they affect one dependent variable to calculate regression coefficients for use by the planners has been greatly facilitated by modern computers. Greater

use of this technique is anticipated as we come closer to working out simulation models. The technique, however, can be used to advantage even with simple mathematical models which do not require complicated data. Multivariate analysis has been used to calculate marginal productivity of labour but the disturbing effect of multi-colinearity has to be guarded against.

Production functions are needed by planners for estimating resources required for achieving specific targets of production and for allocating resources to different inputs so as to provide a balanced package which would give the desired results. For this purpose data are needed on the effect of varying doses of agricultural inputs on the yields and such data, in order to be realistic, must come from the farmers' fields. Composite yardsticks thus developed can be used for advance planning; but for the purpose of forecasting yield in a given year specific response curves should be established for different crops. These curves would reflect not only the interaction of controlled inputs but also that of other factors such as rainfall, temperatures, humidity and number of sunny days.

Automatic Data Processing:

Large masses of data can now be analysed in a relatively short time with computers. They are expensive machines, hence it is often necessary to centralize processing at state or regional levels as in U.S.S.R. The development of appropriate software and adequate training of programmers and systems analysts are essential for deriving a full benefit of the capabilities of the computers. Status symbolism sometimes provides computer power far beyond abilities to use it.

GROUP 17. ECONOMICS OF NEW TECHNIQUES AND STRUCTURES FOR INCREASING OUTPUT

Chairman: S. S. John *India* *Rapporteur*: P. K. Ray *FAO*

Four main topic items were discussed by the group: Technology generating activities; Profitability of new techniques at macro and micro level; Interrelationship of structures and new techniques; and Sociological aspects. The discussions were concerned primarily with the problems and prospects of developing countries, drawing upon such experience of developed countries—both socialist and non-socialist—as would serve as a guide to the adoption of new techniques by farmers in developing countries.

The group recognized that the generation of new technology in farming should aim at achieving higher productivity per unit of land, labor and capital. Appropriate research on complementary techniques such as irrigation, drainage, soil conservation, fertilizer, machinery, seeds, pesticides, etc. at national and international level is an essential prerequisite for new technology generation. The main emphasis in such research should be on adaptive

techniques, that is on adapting the improved techniques already involved in developed countries to particular needs of developing countries, country by country and even by regions and areas within a country. This would ensure economy, take care of the cost functions in terms of risks involved in "borrowing" technology from outside and provide the optimum benefit to farmers and countries concerned.

The results of adaptive research should be available to farmers for practical uses at the earliest opportunity. The group considered that a positive philosophy and a determined policy to promote the use of new technology by farmers in developing countries was essential to have an effective impact on farm productivity within a reasonable space of time. Indeed, time is a key to the success of new technology in these countries. Once the initial inertia and structural problems are overcome the use of new technology tends to accelerate subject to the availability of resources–technical inputs and finance–to the farmers.

On the profitability of new techniques the group addressed itself to two questions: how far the new techniques already applied to developing countries have been profitable, and what are the experiences of the developed countries and to what extent such experiences could be applied to developing countries. In this latter context an elucidation of the system of indicators for evaluation of new techniques in the U.S.S.R. was found to be of considerable interest. They included the resulting cost of production in units of material and labor inputs, labor productivity and technical and economic parameters. Complex mathematical formulae are used to determine cost and labor productivity in the U.S.S.R.

For developing countries the particular experience of the Punjab in India showed that the use of new techniques in a package form that is, a well-selected 'mix' of high-yielding varieties of seeds, fertilizers, water, mechanization, etc. increased considerably the productivity of land and labor and thus the profitability of farms.

The group considered that the profitability of certain techniques at the farm level might not necessarily be beneficial at the national level, e.g. if they result in the substitution of a foreign exchange earning crop by one having a great internal demand with higher profitability to individual farmers. Similarly a rush towards mechanization might divert resources from other areas which might be of higher profitability from the overall national standpoint. There might also be a possibility of conflict between profitability in the short and long run.

Some apprehension was expressed at the possible effect on employment of the use of more sophisticated labor-saving machinery. In the opinion of some participants the use of intermediate technology would be desirable particularly in areas with a high density of population. While enhancing the efficiency of small farmers it would not create large scale unemployment. At least two countries, Indonesia and Pakistan, have therefore decided in favor of intermediate technology for the farms in certain areas. On the other hand, in Punjab (India) the use of new technology has resulted in an increased use of labor because of more intensified agriculture with double and triple cropping

which the application of new technology has made possible. Some participants therefore considered that it would be more appropriate to have selective and guided mechanization rather than intermediate technology. It was recognized, however, that the two could be applied side by side according to the needs of the situation.

The group agreed that the farm structures have an important impact on the techniques and vice versa. The following elements in the farm structure were of particular significance–size of farm tenurial system system of farming and labor-capital situations. Where sizes of farms are relatively large it is more profitable to use modern techniques and especially for mechanization the farm size should not be too small. Some participants felt that a distinction should be made between the biological and the mechanical innovations. While biological innovations (e.g. improved seed and fertilizer) could be applied to all size of farms, the application of mechanical innovations was conditioned by the farm size. Others said it would be more appropriate to differentiate between divisible technology (seeds, fertilizers, etc.) and invisible technology (machinery), the former being applicable to all size of farms and the latter only to farms of certain minimum size.

The group noted that for the purpose of application of new techniques what was important was the operational holding rather than owner holding. In the Punjab (India) the available power unit (first bullocks and later tractors) determined the average size of operational holding. With substitution of bullocks by tractors the size of operational holdings is increasing–a trend likely to accelerate further in the future. Joint farming on a co-operative basis had not been a success so far in most developing countries, but the system of custom hiring under which, e.g. a private tractor owner hires out his tractor for cultivation of others' lands on payment basis, seemed to have greater prospect. There was a difference of views as to the different impacts of ownership and tenacy on the introduction of new technology but it was agreed that uncertain tenancy rights and an inequitable distribution in share of produce do act as inhibiting factors.

There was a prolonged discussion of the sociological aspects on the introduction of new technology. It was generally recognized that existing socio-economic factors often have an adverse impact; on the other hand the introduction of new technology results in changes of the existing social structure, attitude and values.

The group considered the possibility and the dangers of a greater income disparity arising out of the application of modern techniques involving greater capital costs as only the more affluent farmers can have the resources to use them. Such disparity and an uneven sharing of the benefit of new techniques among others, tenants and landless laborers have already created the so-called 'second generation' problems and social and economic unrest in countries like Pakistan and India. Therefore the group considered it important that the introduction of new technology should be parallelled by essential complementary structural and socio-economic reforms which would reduce income inequality and create additional employment opportunities on and off the farms.

The group recognized that the high rate of population growth tended to offset the benefits from new techniques. It felt that the problems need to be tackled within the wider context of overall plans of economic development including the development of agro-industrial complexes in the rural areas somewhat along the similar lines as being developed in collective farms in the U.S.S.R. but without the collectivization.