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# THE SCIENTIFIC FOUNDATIONS OF THE PLANNING OF AGRICULTURE IN THE U.S.S.R.

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I SHOULD like to begin by conveying the greetings of the Academy of Sciences of the Soviet Union to the members of this Conference and by wishing it continued success. Allow me at the same time to express, on behalf of our delegation, our appreciation to the organizers, particularly Professor Westermark, for the opportunity extended to us to participate in its work, and for the attention shown us which has made our stay in Otaniemi pleasant as well as useful.

We are assembled at a time when cultural and scientific ties between countries are on the increase, when there is a steady growth of mutual understanding and confidence between peoples. Clear evidence of this is provided by the international conference in Geneva on the peaceful uses of atomic energy, the agreement on scientific and technical collaboration just recently concluded between Finland and the Soviet Union, by the exchange of agricultural delegations between the United States and the Soviet Union, and the sending of a Soviet agricultural delegation to England. This present congress also testifies to the growth of international scientific contacts.

Agriculture is by its very nature a peaceful branch of economics. Hence, among us agricultural economists mutual understanding can be most fully realized.

The problem posed before this Conference, that of the implications of technical change in agriculture, is of unique importance, since the level of consumption of the people and, therefore, their health and longevity depend on the degree of development of agricultural production.

## *The Necessity and the Possibility of Planning Agricultural Production in the U.S.S.R.*

In the U.S.S.R. technical progress, like agricultural development as a whole, is achieved by planning. The planned organization of a socialist national economy is not the invention of some scientist or

politician. According to economic science, it is the sovereigns who in all ages have been subject to economic conditions, but it is never they who have dictated laws to them. Economic planning, including the planning of agricultural production, is, under conditions of socialism, an economic necessity, which arises out of the social ownership of the means of production. The socialization of the land and means of production has converted our agriculture into the largest in the world, uniting the labour of tens of millions of people having at their disposal hundreds of millions of hectares of agricultural land and tremendous numbers of agricultural machines.

At the present time, instead of the 25 million small individual peasant farms existing before the collectivization, Soviet agriculture has up to 5,000 State farms (sovkhozes), 89,000 collective farms (kolkhozes), and more than 9,000 State-owned machine and tractor stations (M.T.S.). Soviet State farms (sovkhozes) represent the highest form of organization in socialist agriculture. They are the same type of enterprise as State-owned factories and plants, and all their means of production and everything produced by them belong to the State. In their technique and organization of production they are model farms, whose experience is utilized by the peasant collective farms. These latter have the form of agricultural artels. They are co-operative enterprises conducted collectively by the labour of collective farmers on land and with basic tools of production that belong to the State. The land has been given to the collective farms in permanent and free tenure. All that is produced in the kolkhozes belongs to the kolkhozes. M.T.S. are State enterprises, created to render to the kolkhozes technical, agronomic, and zoo-technical aid. They form the material and production basis of the collective farm systems and play a leading role in collective farm production. The M.T.S. service the kolkhozes on the basis of contracts concluded with them.

The sovkhozes, kolkhozes, and M.T.S. are very large agricultural units. The average sovkhoz has 15,415 ha., and the average kolkhoz 6,200 ha., although in the grain districts the dimensions of sovkhozes and kolkhozes are still larger. In 1954 each M.T.S. had an average of 117 tractors (counted on the basis of 15 h.p. units) and 31 combines. It is quite clear that it would be impossible to conduct such a large economy without a plan.

Professor Niehaus asserted in his report that Marx's theory of the displacement of small-scale by large-scale production as the result of the development of technique in agriculture has been proven fallacious and that the existence in the U.S.S.R. of large units of

agricultural production—State farms, collective farms, and machine and tractor stations—is the result not of the application of technological and economic principles to agricultural production, but of a particular policy of the Soviet authorities (pp. 334 and 336). As a matter of fact the data furnished by Professor Niehaus relating to the growth in recent years of the number of small farms in developed capitalist countries do not refute Marx's theory but substantiate it. The splitting up of small farms and the increase in their numbers is not accompanied by a strengthening of the economic independence of such farms but, on the contrary, by a loss of such independence, by their subjugation to large-scale capitalist production, i.e. it speaks of the relatively high development of capitalism in these countries. After Marx, but still a long time ago, this was shown in respect to Germany itself by Kautsky in his *Agrarian Question*; and in relation to all capitalist countries including the United States and those in Europe it was demonstrated by Lenin in his agrarian studies, the conclusions of which remain unshaken.

With regard to the claim of Professor Niehaus that large agricultural enterprises in the U.S.S.R. are not the result of economic expediency, but of policy, it must be remembered that large enterprises exist not only in the U.S.S.R., but in all capitalist countries as well. That indicates that large enterprises possess certain technological and economic advantages over small enterprises. In this case the distinction between the U.S.S.R. and capitalist countries lies in the fact that in capitalist countries private property in land and in the means of production hinders the change-over to large-scale production throughout agriculture, while at the same time the formation in those countries of large-scale agricultural enterprises is inevitably accompanied by the ruin of small farms. In the U.S.S.R., on the other hand, public ownership of land and the means of production enabled the transition to large-scale production throughout agriculture, creating the conditions necessary to the economic advance of all peasants. Consequently, the principle of economic expediency, if one means by that the advantages of large-scale production over small-scale, is realized in Soviet agriculture to its fullest degree.

But I am willing to forgo the argument with Professor Niehaus on the question whether large agricultural enterprises in the U.S.S.R. are the result of the demands of policy or of economics, if he shares the generally accepted premise of economic science that policy, and in particular economic policy, is but a concentrated form of the demands of economics.

Social ownership of the land and means of production has made

the planning of production not only necessary, but also possible, since it unites the people into a single whole. That is why it is possible in a Soviet society to calculate the needs of society and also its productive resources in advance, which is the main condition for conducting a planned economy.

The planned organization of production has secured for our people a unity of will and a unity of action in the development of the national economy. It makes possible the achievement of the necessary proportional development of the different branches of the economy, their mutual correlation, economy in the expenditure of labour and funds, a full and rational utilization of the country's resources. As a result, anarchy of production and crises have been abolished in the U.S.S.R., unemployment has been eliminated, and full employment guaranteed for all the population able to work. The country's productive forces are steadily expanding and the material and cultural living standard of the working people is steadily rising.

This development of the Soviet planned economy has in a short period of history resulted in a leap from backwardness to progress. It is known that before the Revolution the agriculture of our country was among the most backward. The wooden plough, the scythe, the flail were the chief instruments of labour. In spite of the country's vast land resources, there were only 367.2 million ha. of agricultural land, of which only about 135 million ha. belonged to the working peasants; the rest belonged to the landed nobility, the royal family, and rich farmers (kulaks). Thirty per cent. of all the peasant households had no horses, 34 per cent. had no implements, and 15 per cent. did not sow their own crops. Two-thirds of the peasant households were poor. The village was suffocating from agrarian overpopulation.

On the basis of the plans the small, unproductive individual peasant economy has been switched over to large-scale production; class stratification, the economic ruin of the main mass of the peasantry, and the related problem of agrarian overpopulation have all been eliminated. Agrarian crises are things of the past; the conditions for a rational system of land cultivation have been established, technical reconstruction has been effected. In 1916 mechanical propulsion formed only 0.8 per cent. of the power resources of agriculture, 99.2 per cent. being derived from draught animals. In 1954 the share of mechanical propulsion came to 92 per cent. and that of draught animals to 8 per cent. From 1946 to 1954 alone Soviet agriculture received from industry 1,142,000 tractors (counted on the basis of 15 h.p. units), large numbers of grain combines, and other machines.

This powerful technical equipment is the main source of the development of agricultural production. It made possible the transfer of our economy to a modern scientific and agronomic basis. Primarily as a result of the technical reconstruction of agriculture the total agricultural land area has increased from 367.2 million ha. in pre-revolutionary days to over 600 million ha. Labour productivity has increased several fold. In the period 1926-7 to 1952-3 the marketable output of agriculture increased nearly four times in grain, more than twice in meat (live weight), and four times in milk. The money income of collective farms has increased several times as compared with the income of the peasants in the pre-revolutionary period.

However, the level of production thus attained has lagged behind the needs of the country for the products of land and animal husbandry. This is explained by the fact that the war imposed by fascist Germany inflicted tremendous damage. The invaders destroyed or drove away 7 million horses, 17 million head of cattle, 20 million hogs, 27 million sheep, and 110 million fowl. They ruined many tens of thousands of kolkhozes, sovkhoses, and M.T.S., broke or carried away 137,000 tractors, 49,000 combines, and about 4 million cultivating tools, not counting other machinery. It took several years to make up this loss. In the meantime the rapid growth of the urban population and the rise of the income level of the population as a whole led to an increase in the demand for agricultural products. It became necessary to take measures to provide for the consumption of the entire population in accordance with the scientifically established norms of nutrition. That is why the Government has posed before the country the task of securing a steep rise in the output of all branches of agriculture, of increasing in the next few years the gross yield of grain crops (mainly by the expansion of fodder crops) to 10 million poods, and the output of animal products by from 2 to 2.2 times.

It should be noted that the scheduled plan for the rapid expansion of agriculture is beginning to show good results. Of the 28.3 million ha. of virgin and shallow lands that were to have been brought under cultivation in 1956, over 26 million ha. have been ploughed. Of these, 20 million ha. have been sown, as against 13 million ha. envisaged by the plan for 1955. In 1955 the area sown to summer grain crops increased over 1954 by 21 million ha. As regards farm animals of all categories, during the year ending 1 July 1955, the total head of cows in the country had increased by 6 per cent., and of sheep by 6 per cent. During the nine months from 1 October 1954 to 1 July 1955 the average yield of milk in the collective farms increased by

17 per cent. compared with the same period in 1953-4, and the total amount of milk obtained increased by 28 per cent.

*The Basic Principles and Organization of Agricultural Planning*

*Indicators used in planning agricultural development.* The vital force of the plans for agricultural development is due to the fact that, being an integral part of the unified plan for the development of the national economy, they express the deeply vital interests of the people and are drawn up on strictly scientific principles. As I have already said, the planning of the national economy requires a calculation both of the needs of society and of its productive resources. Therefore an essential condition of the planning of socialist economy is a preliminary study of the growth of society's needs for agricultural products, of the level achieved by society in the productivity of labour, the technical equipment of agriculture, and the mechanization of the processes of production, of the existing distribution of agricultural crops and animal husbandry, and also of the existing relative proportions between different branches of production, for example, between animal husbandry and the fodder base, and so on. At the same time economic planning must be based on advanced experience and the achievements of agricultural science and technique, for the aim of socialist production is the satisfaction of the growing needs of society by means of the uninterrupted growth and improvement of production on the basis of the highest technique. The scientific grounding of plans for the development of agriculture makes them practicable in application. That is why these plans are not forecasts, but *directive plans*, guides to action.

Thus the national economic plan is a scientifically grounded State assignment concerned with the development of the various branches of the national economy and the production of the goods needed by society. In the sphere of agriculture this assignment has at present the following objectives: to reach a level of production that would ensure consumption for the entire population at scientifically established nutritional norms and also a growing supply of raw materials to industry producing articles of popular consumption, and the accumulation of necessary reserves and the creation of adequate surpluses, particularly in grain, for foreign trade. Thus the goal of planning is not only to increase the well-being of the people, but also to further the development of foreign trade, which means so much for the fostering of international economic connexions. Therefore agricultural production must be so organized as to facilitate the attainment of the maximum output with a minimum expenditure of



labour and funds per unit of output. It is also very important to single out in the plan the *leading factor*, that is, the most important branch of agriculture, the development of which is decisive for the successful fulfilment of the plan as a whole. At the present time the production of grain is that leading factor, because it is the basis of all agricultural production. The singling out of a leading factor does not exclude, but rather presupposes, *the complex development* of agriculture as a whole, that is the correlation of agriculture as a whole with industry and of the different branches of agriculture with each other (of land cultivation with animal husbandry, of the increase in the number of farm animals with the growth of the fodder base, and so on).

This correlation is achieved through a *balance-sheet method of planning*, which makes it possible to co-ordinate agricultural output with the requirements of the economy as a whole and to ensure the attainment of correct proportions in the development of different branches of agriculture, a correct distribution among them of material and labour resources, and also to discover unused reserves that can be put to use for the expansion of production. Such balance sheets include the balance sheet of land resources, the balance sheet of grain, cotton, flax, sugar beets, oil seed, potatoes, meat, milk, wool, hides, fodder, fertilizers, labour resources, money incomes of collective farms, capital investments, &c.

Finally, a most important principle in the planning of the socialist national economy is that of *the participation of the masses in planning*, the combination in the planning process of centralized guidance by the State and the creative initiative and self-activity of the working people. Since the main objective of the planning of agricultural production is to secure food supplies for the population and raw material for industry, the State plan for agricultural development, which is subject to confirmation by the Council of Ministers of the U.S.S.R., envisages for collective and State farms assignments relating only to deliveries to the State of field and animal husbandry products, and also relating to the over-all volume of work (in soft tillage) which the M.T.S. can and are obliged to do in aid of the collective farms, according to agreements concluded between them. Taking as their starting-point these assignments and the necessity to provide for their own needs in agricultural products, the sovkhozes and kolkhozes determine (with the participation of the M.T.S.) the size of the areas to be put under crops and the number of farm animals, and of which kinds; also their productivity goals, depending on local conditions.

Each M.T.S., starting from the total amount of work assigned to it in soft tillage, determines jointly with the collective farms it services the amount of each type of work to be done (ploughing, sowing, harvesting, &c.) for each kolkhoz. For the performance of this work the M.T.S. enters into contracts with the collective farms. According to these contracts the M.T.S. undertakes to fulfil specified tasks in a specified period of time and a high level of quality of performance, while the collective farm undertakes to pay for the work in kind (to contribute in kind) at the determined fixed rates. Such a régime of planning excludes excessive centralization and sets patterns in planning and encourages the kolkhoz members and the M.T.S. and sovkhoz workers to develop initiative in raising the yields of farm crops and animal husbandry, in obtaining from every 100 ha. of land the maximum amount of product allowed by prevailing soil, climatic, and other conditions of production.

Plans for the development of agriculture, like plans for the development of the national economy of the U.S.S.R. as a whole, are divided into *perspective* (five-year) and *current* (annual) plans. The leading role is played by the perspective plans, since it is impossible to operate a socialist economy and make large capital investments in the national economy without long-range planning directed toward substantial achievement.

At the present time perspective plans are being drawn up not only for agriculture as a whole, but also for each collective farm separately. The perspective plan for a single collective farm is a part of the overall national plan of development of agriculture and expresses the extent of the collective farm's participation in its fulfilment. Perspective plans help the collective farms to solve more fully and more correctly the basic problems of their communal economy, for instance, problems of specialization and co-ordination of various branches of activity in relation to soil, climatic, and other conditions, questions of soil culture and crop rotation, of construction and utilization of irrigation systems, development of communal animal husbandry and fodder supply bases, questions of mechanization and electrification of production, of garden planting and afforestation, and so on.

The assignments of the perspective plans are carried into effect in the current (annual) plans of agricultural development. Since these latter are current-operation plans, they might include tasks that were not foreseen in the five-year plan, but the main indicators of both plans coincide. The perspective plan for agriculture that is being worked out at the present time can be reduced (in the part relating directly to agricultural production) to the following main sections:

(1) The gross and marketable output of agriculture. (2) Stocking of plant and animal products (by types of production). (3) The material and technical equipment of agriculture and the mechanization of work in State and collective farms. (4) The electrification of production in State and collective farms and the putting into operation of rural hydro-electric stations. (5) Capital investments. (6) Labour and specialized personnel. (7) Plan of agro-technical measures. (8) Plan for introducing the achievements of science and advanced practice.

In addition, the plan for the development of agriculture includes sections on forestry (re-forestation, new planting, creation of protective forest strips) and for construction work connected with water supply.

As one can see from what I said before, one of the most important sections of the State plan for the development of agriculture is that concerning the stocking of agricultural products by the State. In so far as the collective farms are concerned, this is accomplished by compulsory deliveries by collective farms of produce to the State, the State paying for it at fixed delivery prices; by payments in kind by the collective farms for the work done by M.T.S.; by contractual arrangements (mainly concerning technical crops) which are drawn up on conditions advantageous to collective farms, inasmuch as they contain provisions for large bonus additions to the basic price for expanding the quantity and improving the quality of the delivered products, as well as provisions for sale to the collective farms by the State of equipment and consumers' goods at preferential rates; and by the purchase by the State from collective farms of field and animal husbandry produce at prices higher than those established for compulsory deliveries.

It should be noted that in recent years the norms of the compulsory deliveries by the collective farms to the State have been lowered, and State purchases at prices higher than the fixed delivery prices have been expanded, while at the same time both the compulsory delivery prices and the State purchase prices have been raised substantially. As a result payments to collective farms and farmers for produce delivered and sold to the State rose in comparison with 1952 by 12 billion roubles in 1953 and by 25 billion roubles in 1954. As a matter of fact the growth of the real incomes of collective farms and farmers is considerably greater than that, since the raising of prices for agricultural produce took place simultaneously with a systematic lowering of prices on industrial products purchased by collective farms and their members.

The State plan determines not only the goal of agricultural

production—the increasing provision of the population with food and industry with raw materials—but also the means by which this goal is to be reached. Hence another most important part of the State plan is the material and technical equipment of agriculture (with tractors, various other machines, fertilizers, &c.), the introduction of the achievements of science and technology.

The assignments of the State plan in relation to the stocking of agricultural products are worked out for each of the sixteen Union Republics and are transmitted through oblast and district State authorities to State farms, collective farms, and M.T.S. On the basis of these assignments they work out their own plans, those of the kolkhozes being subject to approval by the general meetings of the members.

The plans of the kolkhozes and M.T.S. are pooled together by districts, while the district plans for the development of agriculture combine in the oblast plans, which include also the plans of the sovkhozes. The oblast plans for the development of agriculture combine to form the plans of the Republics, and on the basis of the Republic plans is drawn up the *single unified plan* for the development of agriculture in the whole U.S.S.R. Consequently the process of planning starts in the sovkhozes, kolkhozes, and M.T.S., and progresses from the bottom upward.

The fact that the starting-point is the stocking of agricultural products by the State greatly increases the material interest of the collective farms in the development of agriculture, since the building up of State stocks guarantees the disposal by the collective farms of their marketable produce and, consequently, the growth of their money incomes.

Since the main means of production is the land, particular attention is devoted to achieving the fullest and most correct utilization of it, in particular to correct soil culture and to increasing the productivity of the soil. In this connexion the plans for collective farms and State farms include an elaborate system of measures relating to crop rotation, the application of advanced methods of soil cultivation, the introduction of agro-technique in the cultivation of individual crops, the application of fertilizers, the introduction of selection sowing, increase in the numbers of cattle and in cattle productivity. All these measures show that increasing the yield of agricultural crops and of animal husbandry is the foremost task.

Correct and full utilization of the land depends first of all on the tools of production, that is, it depends on technique. Thanks to collectivization, not a single peasant remains in our country who,

having entered a collective farm, would find himself without land to sow or without the necessary tools of production and, thanks to the creation of the M.T.S., there is not one kolkhoz lacking in the advantages of modern technique. By concentrating the up-to-date equipment in the M.T.S. the Soviet State has made them accessible to all the collective farms and at the same time has created the conditions for the most complete and productive utilization of modern techniques. For this reason the M.T.S. are the industrial and technical foundation of the system and play a decisive role in kolkhoz production. From 1940 to 1954 the total volume of work done on collective farms by the tractors of the M.T.S. more than doubled, while the level of mechanization of basic field work rose in the ploughing of fallow fields from 83.3 per cent. to nearly 100 per cent., in initial ploughing from 71.5 per cent. also to nearly 100 per cent., in the sowing of summer crops from 52.4 per cent. to 88 per cent., and in the harvesting of grain by combines from 42.6 per cent. to 82 per cent.

Dr. Sen in his informative and interesting report has given, on the whole, a correct picture of the achievements of M.T.S. in Uzbekistan in mechanizing collective farm production. But he did use some formulations which were not altogether precise and which might give rise to some misunderstanding on the part of the audience. It would have been possible to interpret Dr. Sen as having said that the Soviet State compels the collective farms to make use of the technical means concentrated in M.T.S. The truth is, however, that the collective farms themselves apply to the M.T.S. since they are vitally interested in such aid; for, under socialism, technique not only augments the productivity of labour, but also lightens labour itself.

At the present time the M.T.S. have been assigned the task of completing the all-round mechanization of field-work—in particular the mechanization of the drying and cleaning of grain on the threshing floors—and also of accomplishing the mechanization of all laborious operations connected with raising potatoes, vegetables, technical crops, and with animal husbandry. Therefore the indicators of utilization of the machines and tractor power and of the extent of mechanization of work occupy a most important place in the plans of the collective farms and M.T.S. Among such indicators one must include the extent of mechanization of field-work by types, mechanization of work in the specialized farm units, work records per tractor and combine, the initial cost of tractor operations, and the like.

In addition to tractor operations, the kolkhoz, M.T.S., and sovkhoz

plans are beginning to place an increasing emphasis on problems connected with the electrification of agriculture. Agriculture in our country did not know electricity before the Revolution. In 1940 we already had more than 10,000 rural electric power stations with a total capacity of 275,000 kilowatts. Since then the equipment of agriculture with electrical energy has increased many times over. In the first four years of the Fifth Five-year Plan alone approximately 500 electric power stations were newly built or enlarged, not counting minor installations. A substantial share of the electrical energy generated by all these plants goes to agriculture. In the Riazan, Sverdlov, and other oblasts the first electrified M.T.S. are now in successful operation.

The development of all branches of agriculture requires an all-round increase in the productivity of labour on the collective farms, since productivity of labour comes first and foremost in the successful fulfilment of economic tasks. In this connexion the kolkhoz plans devote much attention to such indicators as the increase of agricultural production per 100 ha. of land, the lowering of production costs, direct expenditure of labour per centner of product obtained, requirements in labour power of different branches of agriculture, labour resources and their utilization, and production training of collective farmers. It should be noted that during the period 1950-4 three-year agro-technical and zoo-technical courses were annually attended by  $2\frac{1}{2}$  million collective farmers.

Of particularly great importance in the kolkhoz plans are the indicators of the distribution and marketing of the principal types of agricultural produce and the figures for money income. It must be borne in mind that by far the greater part of the product remains in the collective farms, which dispose of it according to their own judgement, by forming common reserve funds (seed, fodder, and other reserves), by selling it to the State or in the open market, and also by paying it out to kolkhoz members and workers of the M.T.S. for their personal consumption, in accordance with the labour expended by them (on the basis of work-days). The practice of advanced collective farms has shown that for such farms it is quite possible to increase the output of field and animal products and on that basis simultaneously to increase the size of the communal reserve funds and also the payments in kind to collective farmers in accordance with work-day earnings.

Of equal importance is the correct distribution of money incomes, which grow every year. From 1940 to 1954 the money income of collective farms, not counting income in kind and from private

auxiliary farm plots, increased from 20·7 billion roubles to 63 billion roubles, that is, more than threefold.

The substantial growth of money income and the liberation of the kolkhozes and their members from expenditure on the purchase and renting of land, as well as on the acquisition of tractors, combines, and other machines (since these are provided by the M.T.S.), have made possible large-scale construction in the kolkhozes of both farm and service buildings (buildings to house farm animals, for grain storage, clubs, crèches, &c.). It is enough to mention that since the war in rural areas 4½ million dwelling-houses have been restored or built, not counting farm and service buildings. At the present time the countryside has hundreds of thousands of establishments for cultural and educational purposes: schools, public libraries, clubs and motion picture auditoriums, kindergartens, stadiums, &c. Many advanced kolkhozes build not only clubs, kindergartens, and crèches, but even sanatoriums and rest homes for their members. Hence building questions are beginning to take on a constantly increasing importance in their plans.

Particular attention is directed to problems connected with raising the material and cultural level of kolkhoz life, since the aim of collective production, as is written in the statutes of the agricultural association, is to create on the basis of collective farming high productivity and better life for the members.

In summary, the kolkhoz plans as a rule include: (1) Development of the different types of agriculture. (2) Development of the different types of animal husbandry. (3) Organization of the fodder supply. (4) Auxiliary production activities. (5) Mechanization and electrification. (6) Utilization of labour reserves and the organization of work. (7) Distribution and marketing of the main types of agricultural produce. (8) Money income and capital investments. (9) Construction of farm and service buildings. (10) Payments in kind and money according to work-days.

The sovkhoz plans contain for the most part the same subdivisions except for the items relating to the distribution of the product (since this goes *in toto* to the State) and to the payments in kind and money for work-days; but they have additional items, dealing, for example, with the wages of workers and employees.

It should be noted that the indicators in the plans that have been mentioned here do not remain unchanged; they are constantly being amended to correspond with the development of production itself and with the new tasks assigned to the kolkhozes, M.T.S., and sovkhozes.

The most vivid index of the results of the planned organization of agricultural production is furnished by the All-Union Agricultural Exhibition. In spite of the raising of achievement requirements for participants over those of 1939-40 in respect of yields of grain crops, potatoes, vegetables, sugar beet, cotton and other crops, milk, and wool, the number of participants in the exhibition in 1954 so far from declining had increased; the number of participating M.T.S. had risen from 295 to 419, of State farms from 699 to 1,306, and of advanced workers in agriculture from 134,000 to 172,500. In 1955 the number of participants rose to 200,000. The Soviet Government shows an unflinching care for the development of agriculture. In 1953 alone the expenditures assigned to agricultural development in the State budget and drawn from other State sources amounted to 52 billion roubles. In 1954 they came to 74.4 billion roubles. This growth is one of the proofs of the peaceful character of Soviet economic development.

Our great scientist Mendeleev, the creator of the periodic table of elements who, besides his other scientific studies, worked on agricultural problems, came to the conclusion that if one were to apply to agriculture not only labour, but also real ingenuity guided by knowledge, one could feed 10 billion people and many more. Advanced agricultural practice in all countries of the world confirms the correctness of this assertion, and tells us that an increase in the well-being of the people is to be sought, not by reducing the numbers of the population, as certain reactionary scientists propose, but by arming it with knowledge and technique, and by raising on that basis the productivity of agricultural labour.

The discussions at this Conference of problems of the economics of agriculture and of its organization, including those of the problem of planning, demonstrate that the collaboration of agricultural economists can be beneficial.

## THE STUDY OF THE ECONOMICS AND ORGANIZATION OF AGRICULTURE IN THE U.S.S.R.

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**A**GRARIAN economists can make a considerable contribution to the stepping up of agricultural production and to the utilization of the results of technical progress for the attainment of higher



living and cultural standards of their peoples. The contents and methods of scientific work on the economics and organization of Soviet agriculture are determined by the specific features and advantages inherent in large-scale socialist farming and the tasks set by the Government. Our agriculture is large-scale and mechanized and comprises collective farms, machine and tractor stations (M.T.S.), and State farms. It is a progressive system based on State (public) ownership and co-operative-kolkhoz ownership of the means of production.

The principal task now facing Soviet agriculture is to attain in the years immediately ahead, on the basis of heavy industry, a gross grain output of not less than 180 million tons annually and a more than doubled animal husbandry output. Agricultural workers, including agrarian economists, are set the important task of attaining greater output per hectare of land with the lowest possible production costs per unit of production.

#### *Organization of Scientific Work in Agricultural Economics*

Science occupies a prominent position in our country where scientific direction of economy and culture is indispensable. Soviet science is strong because of its indissoluble ties with the people and their requirements. Agricultural science, including agricultural economics, has many important problems to solve. It must provide collective farmers and workers in State farms and M.T.S. with new methods of raising labour efficiency and increasing agricultural output. Science has already made considerable contributions. The theories of soil, its origin and evolution, soil fertility and its control, plant nutrition and the use of fertilizers have been elaborated in the classical works of Dokuchaev, Kostychev, Williams, Pryanishnikov, and other eminent scientists. On the basis of the classical works of Timiryazev, Michurin, Ivanov, and other biologists, Soviet scientists are making considerable advances in selection, seed breeding, and animal husbandry. Hundreds of new varieties of wheat, sugar-beet, cotton, sunflower, flax, &c., have been evolved. Scores of highly productive breeds of cattle, horses, sheep, and pigs have been produced and new models of efficient farm machines put into production. Soviet agrarian economists have made a number of valuable suggestions concerning organization and remuneration of labour in collective farms, rational distribution and specialization of agricultural production, introduction of cost-accounting principles, &c. The achievements can be seen at the U.S.S.R. Agricultural Exhibition, which is visited by millions of Soviet people and numerous delegations from abroad.

As far as scientific work in agricultural economics is concerned, I should like to stress that there was no joint scientific effort in this sphere before the Revolution. At present, scientific work in agricultural economics is planned on a nation-wide scale. This makes it possible to concentrate large scientific forces and means on the solution of vital economic problems and to cope with the most complex of them. This year, for example, more than sixty scientific institutions and more than 500 research workers are studying questions of the distribution and specialization of agriculture. Specialized scientific institutes have been set up to study agricultural economics problems. These include the Economics Institute under the U.S.S.R. Academy of Science, the U.S.S.R. Scientific Institute of Agricultural Economics under the U.S.S.R. Ministry of Agriculture and others. Economic departments at institutes of agricultural mechanization, branch institutes (animal husbandry, feeds, &c.) and zonal scientific institutes (Agricultural Institute of Central Black Earth Area, Agricultural Institute of South-East, &c.) are also engaged in this work.

A large number of agricultural research institutes work under the auspices of the U.S.S.R. Ministry of Agriculture. One of them, the Institute of Agricultural Economics, has its branches at collective farms, M.T.S., and State farms. Economics departments at branch and zonal institutes are usually staffed by five or seven research workers. Also engaged in this work are the agricultural economics departments and sections at the Economics Institute under the U.S.S.R. Academy of Science and the agricultural economics departments in the Economics Institutes and the Academies of Science in the Republics. Professors and teachers at the higher educational establishments investigate specific problems in accordance with the scientific plans adopted by these establishments. The scientific work involved in agricultural planning is also undertaken by the Institute of the State Planning Commission of the U.S.S.R.

While the scientific institutions under the U.S.S.R. Academy of Science and the economics faculties of the higher educational establishments work on the theoretical elaboration of major problems, the scientific institutions under the U.S.S.R. Ministry of Agriculture and the U.S.S.R. Ministry of State Farms generalize the advanced methods employed by the foremost workers in socialist agriculture and tackle concrete problems of the economics and organization of production at collective farms, M.T.S., and State farms.

The Central Board of Agricultural Science controls the agricultural economics and organization of the scientific institutes under

the U.S.S.R. Ministry of Agriculture; the scientific institutions under the U.S.S.R. Academy of Science are controlled by the Academy's economics, philosophy, and law departments; the Board of Agricultural Science of the U.S.S.R. Ministry of State Farms controls scientific institutes working under this ministry; scientific institutes under the Higher Education Ministry are run by the Central Board of Agricultural Colleges.

Since there are a large number of institutions working on many diversified problems, great importance is attached to co-ordinating scientific work. Joint conferences of the U.S.S.R. Ministry of Agriculture, the U.S.S.R. Academy of Science, and a number of other Ministries are a means of establishing such co-ordination. Joint sessions of collegiums of the U.S.S.R. Ministry of Agriculture, the U.S.S.R. Ministry of State Farms, the Ministry of Higher Education, and the Presidium of the U.S.S.R. Academy of Science are held to discuss a general plan of scientific work and reports on the work performed.

#### *Major Problems of Research in Agricultural Economics and Organization*

To achieve technical progress in the national economy, and in agriculture in particular, calls for the solution of a number of major problems of agricultural economics. The 1955 topical plan for research comprises a number of these problems whose solution would increase agricultural output in the country, raise labour productivity, and result in higher efficiency of agricultural enterprises and lower production costs. I shall deal only with some of them.

*Problems of distribution and specialization of agriculture* figure in the plans for research of practically all agricultural scientific institutes. The aim of this work is to plan the distribution of agricultural crops and enterprises throughout the country and, in particular, on the virgin and long-fallow lands that are being brought under the plough. The work being done directly at collective farms, State farms, and M.T.S. for drawing up long-range plans, guarantees better and scientifically substantiated distribution and specialization of production. This is harmonized with the development of the other branches of the national economy, due consideration being given to rational specialization and all-round development of scientific economic areas. Much attention is paid to working out such measures as would ensure the practical fulfilment of targets set for gross and marketable outputs.

In *economics and organization of collective-farm production* the chief attention is focused on the solution of the following problems: the proper organization of labour and the introduction of technical rating in the various branches of agriculture in connexion with all-round mechanization; measures for stimulating the material incentives of collective farmers and collective farms for increasing agricultural output; distribution of incomes and laying in and use of indivisible funds at collective farms; cutting down overhead expenditure and production costs; better planning of the development of collective farms.

To give an idea of the problems elaborated, I may mention the problem of the economics of flax-growing collective farms. This is dealt with at the Economics Institute of the U.S.S.R. Academy of Science where the following questions are being examined: (a) the level of development of commonly-owned economy and the state of economics in the collective farms; (b) the degree of the use of land and measures for raising it; (c) the material and production base of collective-farm production and ways and means of introducing all-round mechanization; (d) labour resources, their better use, and increased labour productivity; (e) production costs and ways of lowering them. Particular attention is paid to the utmost development of the commonly-owned economy of collective farms, the most effective combination of agricultural crops and enterprises, all-round mechanization, the proper co-ordination of the public and personal interests of collective farmers, higher incomes of the collective farms and the collective farmers.

In the light of the important role played by the M.T.S. in technical advancement, the problems of the economics and organization of their work occupy a prominent place. Much attention is being paid to better utilization of the M.T.S. machines and to lowering the costs of tractor work; correct employment of the M.T.S. permanent staffs during the year; co-ordination of the work of tractor and field brigades; organization and introduction of cost accounting, differentiated rating of tractor work and fuel expenditure in the M.T.S.'s; improvement of the M.T.S. work in developing commonly-owned animal husbandry and guaranteeing stable fodder supplies in collective farms.

The principle of providing material incentives is a major objective whose consistent application on collective and State farms is of paramount importance for the growth of labour productivity. In this connexion the project, 'Labour Productivity and the System of Material Incentives in U.S.S.R. Agriculture', is predominant in the

activities of the Economics Institute of the U.S.S.R. Academy of Science. It includes production costs in the M.T.S.'s collective and State farms; their calculation and reduction; prices as a means of stimulating agricultural production, analysis of the existing prices of agricultural produce; new planning in agriculture and its role as a stimulus to raise output with due regard to the economic efficiency of the basic enterprises and crops; analysis of the application of the various means of providing material incentives to collective farmers, M.T.S. workers, and other employees; systems of promoting co-operation in industry and agriculture in the sphere of production and trade, finance and credit, &c.

Considerable attention is being devoted to opening virgin and long-fallow lands, for practice shows that these lands can yield an abundance of cheap grain. A number of scientific institutions are engaged on an investigation, 'Problems of Agricultural Economics in the Districts of Cultivation of Virgin and Fallow Lands'. The task here is to assess the economic results of putting the new lands to the plough and to elaborate scientifically substantiated suggestions for increasing the economic efficacy of these lands. Problems of capital investment in the new lands, the provision of man-power, and the material interest of the agricultural workers engaged in developing these lands are being investigated.

The higher departments of agricultural economics and organization of agricultural enterprises carry on research into many vital problems of the M.T.S., collective and State farm economy. The Leningrad Agricultural Institute, for instance, has a study, 'Lower Costs of Milk on State Farms Due to Rational Feeding of Cows', the Chkalov Agricultural Institute, 'Organizational and Economic Value of the Green Conveyor in Grain-Producing State Farms of the South-West Area', the Omsk Agricultural Institute, 'Methods of Investigation and Application of Technological Rating in M.T.S.'s and Collective Farms', the Saratov Institute of Mechanization, 'Group Performance of Combine Harvesters During Harvesting', &c.

The topical plans of the economics sections in branch institutions give particular attention to determining the economic value of agronomical and zoo-technical measures, and those of the mechanization institutions to the economic efficiency of agricultural machines and other equipment.

It follows that scientific work on the economics and organization of agricultural production involves a wide range of problems, the investigations being directed at finding out ways and means to achieve an all-round increase in labour productivity on the basis of

advanced techniques and improved organization of labour, and to obtain the maximum output with the minimum expenditure of labour and money.

*Methods of Work and Research into the Economics and  
Organization of Agriculture*

Our agrarian economists use various methods for investigating their different problems depending on their nature and the individual approach of the scientist. In brief outline the methods are:

- (a) study of the statistical and economic data on the work of advanced, average, and lagging enterprises, or other data;
- (b) superintending the work of M.T.S., collective and State farms according to a special programme;
- (c) systematic observations and recordings conducted during a definite period directly at M.T.S., collective and State farms;
- (d) checking the effectiveness of advanced ways of measuring as, for example, the better organization of the production process in M.T.S., collective and State farms;
- (e) elaboration of concrete conclusions and suggestions.

The study of each problem is carried out in conformity with an appropriate method of research. I cannot in this brief report dwell in detail on all the methods applied, and by way of illustration I shall describe some methods of research on the following two problems only.

A. *Methods of investigation of technical ratings.* As is known, technical rating is a scientific method for studying labour organization, by generalizing and applying advanced experience on the basis of the fulfilment of separate production processes and thus establishing technically substantiated norms. In our country a broad application of technical rating is possible owing to the uninterrupted improvement of M.T.S. machinery and the ever-increasing range of jobs performed by them. This helps to achieve higher productivity of labour and to make it easier.

The content and consecutive stages of technical rating include (a) a preliminary investigation of the labour process and preparatory work (choice of object, plan of investigation); (b) an investigation by stages of the labour process from the point of view of the time spent on the operation with due consideration for material factors (at the place of work). Investigation is conducted by means of chronography and time-keeping. Special observation cards make it possible to study all the norm factors in their unity and inter-

connexion. Three or four shifts (or days) of continuous observation as well as several time-keeping cards are usually essential to study each process. In timing a separate process, each time performed differently, at least ten careful registerings of all the elements of the job are needed; (c) statistical investigation and production analysis of the data furnished by these observations; (d) rational organization of production processes; (e) calculation of time and production and norms and expenditure of materials; (f) control over fulfilment of norms and rational organization of production.

B. *Methods of investigation of rational distribution and specialization of agricultural production.* The problem of distribution and specialization of agricultural production and rational co-ordination of agricultural enterprises in collective and State farms is a component part of the general problem of the complex distribution of productive forces in the country. It is solved in conjunction with other problems, the major attention being paid to the development of grain production.

Investigation of problems of the distribution and specialization of agriculture in various economic districts, republics, territories, and regions is carried out on the basis of the national economy's requirements in foodstuffs, raw materials for industries, and reserve and export stocks of agricultural produce. As a rule each republic or district produces, in conformity with its economic and natural conditions and possibilities, specific products to supply other republics and districts of the country and the State as a whole. In addition, each republic or district must expand the production of those items essential for the local population which are difficult to transport (milk, vegetables, berries, &c.) and other products too so far as possible.

First of all a concrete and detailed analysis is made of the actual distribution and specialization of agricultural production in each republic, territory, region, district, including specialization of agriculture within administrative units of separate areas. Afterwards, the long-range plans drawn up by the collective and State farms themselves are also submitted to analysis and generalization. These plans are important documents permitting better evaluation and determination of the most expedient forms of specialization and distribution of production in the near future. A careful analysis and determination of the trends of development in typical specialized collective farms is of paramount significance in elaborating the plan for the distribution and specialization of agriculture within territories, regions, and republics.

Much attention is being paid to balancing the accounts of production and consumption of all the major items of agriculture in each area and region and also to the balance of land funds, labour, fodder, fertilizers, production costs, and prices of agricultural products.

Owing to the considerable attention which is given to agricultural economic science our scientists are provided with all the conditions necessary for fruitful scientific work.

Agrarian economists contribute largely to the strengthening of the M.T.S., collective and State farm economics, and render assistance to agricultural bodies and managers of agricultural enterprises in solving their important problems. Among these are the correct specialization of enterprises and rational co-ordination of different enterprises; correct labour organization and systems of payment; long-term and current planning; higher efficiency of M.T.S.'s machinery and profitability of State farms. While noting the success achieved by our agricultural economics experts, we believe that much has still to be done to raise their science to a higher level, and thus to help the practical workers successfully to solve the tasks facing them.

Our country attaches much importance to establishing closer economic and cultural relations between nations. Our agricultural delegations have visited Britain, Denmark, Czechoslovakia, and other countries. They all note that there is much to be learnt there. The same opinion has been expressed by the agricultural delegations now in the United States and Canada. We also believe that there is much that is interesting in our country, and the establishment of closer contacts between our agricultural economic experts—in the sense of the exchange of economic literature, scientific plans and methods, visits to scientific institutions working on the economics and organization of agriculture—and direct acquaintance with agricultural undertakings will, undoubtedly, be highly beneficial for our countries.

O. SCHILLER, *Stuttgart-Hohenheim, Germany*

Unless my memory is at fault, the area of the Soviet Union sown to crops is about 150 million ha. and the grassland area (meadows and pastures) about 100 million ha. Would Professor Bolgov please explain the difference between this area of 250 million ha. and the 600 million ha. that he speaks of?

Mr. Krushev has reported that the Soviet agricultural planning system has been changed since March 1955. May we be told what



defects had appeared in the old system and what are the features of the new system which are designed to overcome them?

The experience of several countries in war-time showed that it is very difficult to plan agricultural and food economy effectively. The Soviet Union has very great experience in this field, and it would be most interesting to know how they meet the difficulties. For example, when calculating expected production, what sort of allowance do they make for variable weather conditions? And how do they calculate expected consumption now that ration cards have been abolished and consumers have free choice? Again, the kolhozes are allowed voluntary sales to the State and on the free market (in addition to their obligatory deliveries). How does the State forecast what a kolkhoz will sell voluntarily? And if it is true that the sales to the State are to be fixed in proportion to the obligatory deliveries, does that mean that the sales to the State are no longer voluntary in the same sense that the sales on the free market are?

E. M. H. LLOYD, *London, England*

I am particularly interested in the way in which the Soviet Union handles the adjustment of supply and demand of foodstuffs in times of peace and abundance. Like Dr. Schiller, I have had some experience during two world wars in adjusting demand to supply under conditions of shortage. This involves rationing. It involves getting control of the total supply, whether home produced or imported, and distributing it as equally as possible to the whole population. But what I have never understood is how a monopoly as vast as that which exists in Russia functions when there is any risk of surplus rather than shortage. I think Dr. Schiller referred to a significant passage where Mr. Bolgov mentioned the different ways in which the product of the collective farms is distributed. There is the low price delivery to the State, payments to the mechanical tractor stations, sales to the State at somewhat higher prices, and lastly, I understand, a certain amount of sales on the free market. What free market is there, and how far is it organized? I presume that there is a free market in the sense that at every railway station there are offers of fruits and vegetables, and in every town there are free retail markets to which members of collective farms can bring produce. But to what extent is the surplus farm produce, sold in the free market, treated differently from the produce that the individual members are allowed to sell from their own production? This leads up to my second question: What at present are the regulations which restrict the agricultural activities of the family? According to the rules of

the Soviet system there can be no privately hired labour, either in agriculture or in industry; but I understand that handicrafts are still permitted and that the peasant member of the kolkhoz is allowed to have his own smallholding and to engage in a certain amount of production on his own account. What are the sizes of holding which the individual member can retain for his own use? And what is the limit, if any, of the livestock that he may hold? Does he sell his milk, fruit, and eggs on the open market? I am particularly interested in the answer to this question as I am a somewhat detached critic of the policy of our own farmers' organizations in Britain. They have an ambition to emulate the methods of Soviet Russia in establishing a complete monopoly for the collection and distribution of every egg produced. I believe from my experience of war-time control that that would be quite a difficult job, and I do not believe that our friends in Russia have yet attempted to impose a strict monopoly on the production and distribution of eggs. I believe that they still leave a free market for those who want to produce eggs themselves without employing any hired labour.

G. P. WIBBERLEY, *Wye College, University of London, England*

Professor Bolgov has told us the numbers of farms of different types in Soviet Russia and has also given some estimates of the monetary income of these farms in 1940 and in 1954. Could he take the calculation a little farther and work out from these figures the money income earned per person employed on the collective farms for 1940 and 1954, and give also a comparative figure for industrial workers? Would he suggest what would be the purchasing power of these earnings in terms of pounds sterling?

W. J. THOMAS, *The University, Manchester, England*

I would like to ask Professor Bolgov and Professor Obolensky whether any attempt is made to equalize incomes between kolkhozes. One could imagine that in a country like the Soviet Union where the regional differences must be very great, any change in government policy toward agriculture may well benefit some kolkhozes a good deal more than others. Are there any means of equalizing incentives between one kolkhoz and another, such as differential rates of State deliveries, or differential charges by M.T.S., or differential prices for produce? If so, could they tell us something about the principles on which such differentials are based?

K. OHKAWA, *Tokyo, Japan*

Professors Bolgov and Obolensky have made much use of the term 'labour productivity', which I think represents a most fundamental and important yardstick for measuring technical advance in agriculture whether in socialistic or capitalistic societies. But various meanings are given to this term. For example, gross productivity can be used as a limited indicator. There is also net productivity, which in our terminology excludes payments to the non-agricultural sectors of the economy—and so forth.

I would like to know which concept of labour productivity is used by our Russian friends. Also, could we be given more exact figures for rates of increase in productivity in agriculture for the various products since the base year, 1926-7?

R. A. DUDMAN, *King's College, Newcastle-on-Tyne, England*

Both Professor Bolgov and Professor Obolensky have stressed that the purpose of their planning is to achieve maximum output at minimum cost. I take it that that does not mean simply the maximization of physical output from given physical resources. This would not be much of a problem—at least from the economic point of view. If I am right in thinking that Soviet planning is directed towards the equalization of the marginal returns to the various factors, may we be told how they measure marginal net returns?

N. B. TABLANTE, *Farm Economic Association of the Philippines*

Professor Bolgov mentioned that the standard of living of the Russian people has increased tremendously. How does this compare with other countries of the world? What incentives are given to individual farmers comparable with the profit motive in capitalistic countries? In amending the five-year plan, how much weight is given to opinions of individual farmers?

J. PEDERSEN, *University of Aarhus, Denmark*

I would like to ask our Russian colleagues how many hectares of arable land there are for each adult worker engaged in agriculture.

W. MACKENZIE, *Edmonton, Alberta, Canada*

Professor Obolensky outlined the economic problems which Soviet agricultural economists are dealing with but he did not enlarge upon the methods by which the problems are being attacked. In the United

States of America and other places much time is being devoted to the application of mathematics to economic problems. This research is costly, and it is also very abstract at present. It would be interesting to know if work of this kind is going on in Russia; because if it is to have practical application it seems to me that it will be applied there before anywhere else.

L. A. NAZARIO, *San Juan, Puerto Rico*

According to Mr. Bolgov, there are 117 tractors per government machinery station, and 9,000 such stations in the Soviet Union. This gives a total of one million tractors under direct government control. Probably there is a further number of tractors on the collective farms. Am I correct in thinking that if these one million tractors are for the government farms only, they will be employed on only 4 per cent. of the land? What is the number of tractors on the other types of farm, and how does mechanization on the collective farms compare with mechanization on the government-operated farms?

D. R. DENMAN, *University of Cambridge, England*

I was interested in the following sentence from Professor Bolgov's paper: 'The land has been given to the collective farms in permanent and free tenure.' In Britain the lawyers tell us that land includes the solum or soil, the buildings, and water. In Soviet Russia, is it only the solum that is given to a collective farm, or are the buildings included? If the land is given in permanent and free tenure, does not that imply a free land market? Without a free land market there can be no free tenure. If there is a free land market, what is the price of land and what is the relationship of the net income from the collectives to the capital value of land in the free market?

P. M. SCOLA, *Dept. of Agriculture for Scotland, Edinburgh, Scotland*

We have been given the number of sovkhoses and kolkhozes. Could we also be given some idea of the numbers of persons actively engaged in agriculture within each of these types of organization?

J. P. BHATTACHARJEE, *Agro-economic Research Centre, West Bengal, India*

I would like to raise some questions which are particularly relevant to problems of planning in India. In the first place how are capital resources allocated in Russia as between agriculture and the rest of the economy? Is it entirely on the basis of immediate physical

productivity, or is there a more subtle concept of productivity somewhere in the background? Secondly, how is the product of capital evaluated? In this connexion we can think of measures such as the capital-output ratio; but that itself is a measure which has not yet been completely clarified—at least in the Western countries. Next, how is increasing labour productivity achieved? Is it by capital intensification? Is the ratio of capital to labour increased or decreased at certain stages in this process of planning? Labour productivity, particularly in the initial stages of development, can increase without a simultaneous and corresponding increase in capital intensity. I would like to know how this capital intensification proceeded over time in the Soviet Union. Have there been distinct stages in this process? Further, how is the rate of development of agriculture determined? Is it an arbitrary decision or is there some means of determining the optimum rate of growth?

In connexion with the allocation of resources *within* agriculture, what is the goal of the development of the agricultural sector? Is it maximization of the total agricultural output? If so, how is the composition of this output determined? That leads into questions of pricing and so forth. Finally, I had the feeling, when listening to Professors Obolensky and Bolgov, that tremendous studies on incentives have been conducted of late in the Soviet Union. Does this mean that at the level of the individual agricultural unit—particularly at the kolkhoz level—the aim is to maximize labour income within the limits of a specified production quota? If this is so, what is the counterpart of what the Western world calls profit, and how is this allowed for? Also, what exactly is the rate of interest and the rate of discount on capital assets?

H. NIEHAUS, *Friedrich-Wilhelms University, Bonn, Germany*

Mr. Bolgov has referred to my paper and I must clear up a misunderstanding. I did not say that large units had a detrimental effect. I only said that I could not see any economic necessity for enlarging farms to the point where the advantages of mechanization are nullified by the increased difficulties of organization and supervision. When we hear of units in Russia of a size which are otherwise quite unknown to us, I ask myself what are the reasons for them. In Western countries there is no tendency towards units of such super-dimensions and I suppose that their creation must be due to the political environment in which they have developed.

It was Marx's belief that the large enterprise would swallow the small one in agriculture as in industry—a belief which is under-

standable in view of the fact that at that time the steam plough had just been introduced into agriculture. Marx did not foresee the electric motor or the tractor. Further, it was his belief that the development towards larger units would constitute one of the more important foundations on which the socialist State would be built. According to him it was the large enterprise which was the pace-maker for a socialist form of society. But if we look at Russia now we see that the development took place the other way round. The large unit did not create socialism, but socialism gave birth to the large unit. Thus Marx was correct with regard to the end result in Russia—but for reasons which he did not expect.

J. F. BOOTH, *Economics Division, Marketing Service, Dept. of Agriculture, Ottawa, Canada*

One rough measure of productivity is the proportion of the working population which is engaged in agriculture. In Western countries such as Holland, Denmark, Switzerland, Australia, the United States, and Canada, the proportion of workers engaged in agriculture ranges from 10 to 20 per cent. I wonder if our Soviet friends could give us some indication of the percentage of total workers which is engaged in agricultural pursuits in the Soviet Union.

A. J. POSADA, *Colombia, and Inter-American Statistical Institute, Washington, D.C., U.S.A.*

I was particularly interested in Professor Obolensky's discussion of research methods and would be grateful if he would say a little more on the following points. The first task of research, which is problem solving, is that of defining the problem (or problematic) situation. How do they isolate the problem situation from that mass of confused situations which indicate that there is a problem that needs solution? Once that is done, how do they determine the objectives of the investigation and the analytical processes to be used in finding out how this situation has arisen? And, in view of this, how are the appropriate research techniques selected? How and when do they use statistical, geographical, historical, analogical, case-study, or experimental methods of investigation, or a combination of these? Once they have found answers, through the use of these methods, to the question of how the problem situation has arisen, how are the generalizations obtained which lead to the conclusion upon which remedial policies may be based?

J. R. RAEBURN, *London School of Economics, England*

I should like to get back to this question of incentives and ask, first, whether Professor Obolensky thinks that the economic incentives to labour of all types within the collective farms and the tractor stations are now such that the rates of increase in gross production and in economic efficiency of production are as rapid as they might be? I ask that question because I was very grateful for the opportunity of visiting collective farms and State farms in Russia in 1936; and I have been looking into collective and communal farm problems more recently on behalf of the United Nations. It seems to me that this question of incentives is really more central even than questions of planning and pricing, where there is this pooling of labour for large farms and the payment of it on the basis of calculations of standard days of labour according to technical ratings. I am very much interested to see that in both papers considerable mention was made of the constant striving for good technical ratings and more effective labour incentives.

Secondly, if the incentives are now adequate on the wide plains of the Soviet Union would they be sufficient under the same payment arrangements where production per hectare is much more intensive than in the Soviet Union?

F. BAADE, *Institute of World Economics, Kiel, Germany*

I am extremely grateful to Professor Bolgov for giving us statistics for which agricultural economists in all countries have been waiting for a long time, namely, statistics concerning the development of the markets for meat and for milk since 1927, that is, since the last years before the collectivization of Russian agriculture. I am very glad indeed that he was able to report that production of meat for the market has been doubled during this period, and that the production of milk for the market has increased fourfold. I must confess, however, that I have great difficulty in following his figures. We were all glad, as scientists, when the then Minister of Agriculture, Mr. Kruschev, made public in 1953 for the first time the up-to-date figures for livestock in Russia, and compared numbers of dairy cattle, fat cattle, and pigs in 1953 with those in 1916. But we were worried when we began to calculate the *per caput* production of meat and milk on the basis of these figures, in view of the greatly increased population. Mr. Kruschev also mentioned the milk production per cow which was very low, amounting to only about 1,000 litres. Would Professor Bolgov please explain how it has been possible with the

same number of dairy cattle in 1927 and 1953 to increase milk production fourfold and, if I remember correctly, with smaller numbers of pigs and fat cattle, to double the market production of meat? A possible explanation may be that a decrease in the relative proportion, or even in the absolute proportion, of the rural population in the total population has made a larger amount of meat and milk available for the market. Information about this would appreciably increase our knowledge of the basic facts of the food economy of Russia.

B. C. SWERLING, *Food Research Institute, Stanford University, California, U.S.A.*

Professor Bolgov has stated that one of the present purposes of Soviet planning is to increase the volume of international trade, and we know that imports of foodstuffs into the Soviet Union have been on a substantial scale in the last year or so. What is the explanation of that increase in Soviet trade? Have some kinds of technical changes that have taken place recently in the agriculture of eastern European countries so reduced output—temporarily perhaps—that it has become necessary to resort to supplementary imports of basic foodstuffs? Have Soviet estimates of consumer demand identified a domestic market for animal products which the Soviet Union is prepared to satisfy, in part but more or less continuously, by imports from abroad? Or is the Soviet Union taking advantage of low prices prevailing in world markets for certain commodities, such as sugar, to build up a calorific stockpile? These matters are extremely important to the future of trade between East and West.

A. V. BOLGOV (*in reply*)

If I am asked what is the purpose of increasing the imports of certain agricultural machines to our country, I should say that these imports imply technical changes in agriculture. We follow the technical achievements of West-European and American countries in order to apply them to our agriculture, and the means to this end is, of course, trade. On the other hand I should point out that so far as it concerns basic technical equipment for agriculture, such as tractors, combines, &c., we stand firmly on our own feet, and have done so for a long time.

I am asked also why it is necessary for the Soviet Union to export agricultural produce if she has shortages herself. The answer is that although we do not have all kinds of agricultural products in abundance as yet, we do have sufficient reserves of many of them for sale on the world market. We sell not only agricultural but also industrial



products, and consider the expansion of foreign trade to be one of the more important means for bringing nations together and for strengthening peace.

Someone asks: is not the Soviet Union taking advantage of low prices on the world market to increase her reserves of sugar which is a highly calorific product? I do not quite understand this question, so I will ask another. Does this question mean that the Soviet Union should enter the world market only as a seller and not as a buyer as well? In that case, how would it be possible to further the development of international trade relations?

Professor Baade, with whose scientific conclusions concerning the deficiency of the wrong Malthusian theory we are in complete agreement, has nevertheless made a mistake on his cartogram of the relation between popular education and the application of chemical fertilizers in different countries of the world. According to this cartogram it would seem as though at the present time there were 75 million illiterates in the Soviet Union. I have no idea where these statistics are taken from, but they are wrong. We liquidated illiteracy long ago. At the present time in all rural districts the universal compulsory 7-years education is established and the 10-years one is being introduced. Besides this, agrotechnical and zootechnical education of adults is widespread in all kolkhozes. Professor Baade is in error when he says that the relatively small scale consumption of chemical fertilizers in our country can be explained by a large number of illiterates, which is not the case. The cause of the relatively low level of consumption of chemical fertilizers is that their production has been hitherto insufficient. Now the situation is changing sharply and by 1960 the production of fertilizers in our country will be nearly twice as high as now. We are satisfied that, after our explanation, Prof. Baade admitted his mistake.<sup>1</sup>

As we journeyed to this Conference we well knew that the organization of our agricultural economy was different from that of many of the countries represented here. But it was our desire, in the interest of mutual understanding, to match the scientific information about western European economics with scientific information about our own. If our modest reports have in some measure assisted even one of the participants in the Conference to form a more correct idea about our system we shall be entirely satisfied.

The increase of the agricultural area that Professor Schiller asked about is due to irrigation, forest clearing, reclamation, and other measures of those kinds. He asked too about the changes in tax

<sup>1</sup> The map published on p. 462 has been amended accordingly. Ed.

policy in agriculture during recent years. On this subject we have to distinguish compulsory deliveries of agricultural products to the State by kolkhozes from the agricultural tax imposed on kolkhoz members. The compulsory deliveries are made on an acreage basis, and this has not been changed, but the agricultural taxation of kolkhoz members has been changed. Whereas formerly the agricultural tax had to be paid in accordance with the number of livestock owned by a kolkhoz member and the size of his personal plot sown, it is now based only on the acreage of the personal plot. Every kolkhoz member has to pay tax on each 1/100 ha. in his personal use, irrespective of how it is used. This leads to a better utilization of the personal plots. Professor Schiller's third question was about planning. He mentioned correctly that planning in agriculture is very difficult; but under conditions of socialism it is quite possible. He asked whether it is possible to plan the production of consumer goods. Actually it is possible by investigating not only the conditions of production but also the demand for goods. In our universities there are special courses of instruction in planning. In this connexion I would also answer Mr. Lloyd who made the observation—obviously based on his governmental experiences during war—that the planning of production of consumer goods, in particular agricultural products, is possible only when there is shortage of commodities. But this is not planning of production but a distribution of products. For actual planning it is necessary to plan not only distribution, but also production of goods. He also asked how the land in personal use of kolkhoz members is utilized. The size of the personal plot of land and the number of livestock allowed to be kept in personal use of kolkhoz members are related to the peculiarities of the respective districts. The purpose of this limitation of personal plot and number of livestock in personal use is to stimulate the development of the real basis of welfare of kolkhoz peasants, namely, the common economy of a kolkhoz. Their personal economies are only supplementary and subsidiary.

Mr. Lloyd's other question was whether the kolkhoz peasant can freely dispose of the products received from the kolkhoz or from his personal plot. Yes, he can. He can sell such products wherever he finds it most profitable, be it on the kolkhoz market, or to the State, or to consumer co-operatives. The same applies to the kolkhoz farms themselves. If they have fulfilled their obligations in State deliveries and in payment in kind for the work done by the M.T.S., they can sell the surplus on the market or to the State, as they wish. I should mention a peculiarity which recently appeared in the

kolkhoz market. In many kolkhozes the peasants prefer not to travel to the market themselves but to sell their products through the kolkhozes.

I was asked about the average income of the kolkhozes and how it can be calculated, since prices are changing. As is well known, income can be calculated both on the basis of pre-existing constant prices and on the basis of changing current prices. So long as prices were not falling we calculated the income generally on the basis of 1926-7 prices. The other method is to calculate on the basis of present prices. Since the prices paid by the State for compulsory deliveries and state purchases of agricultural products have recently been considerably raised, the calculation based upon the prices of 1926-7 only would lead to under-estimation of real incomes of kolkhozes. Therefore we use both methods.

Mr. Tablante asks whether it is possible to compare living conditions of different countries. Without considering the different historical and ethnographic conditions, such comparison is not possible.

Professor Pedersen asks how much land in kolkhoz there is per man. Unfortunately I have no average figures for the whole Soviet Union beside me at the moment, but I can say that figures vary in accordance with the acreage at the disposal of the various kolkhozes, with the density of population and with the type of cultivation. One has to bear in mind that the acreage per man does not always give a fair picture of the real size of a farm. Two hectares of cotton, for instance, require more labour for cultivation than three or four hectares of grain.

Mr. Nazario asks whether kolkhozes possess tractors other than those at the disposal of the M.T.S. Formerly they did, but now as a rule they do not. Besides M.T.S., there are also many tractors on State farms (sovkhoses) and other institutions such as agricultural colleges.

Dr. Wibberley asks how many kolkhoz peasants there are in the Soviet Union and what is the average yearly income per kolkhoz peasant in pounds. Unfortunately we do not have with us the population statistics and therefore we cannot here and now estimate the average income of kolkhoz peasants, although in my paper I quoted figures of the general rise of money income in the kolkhozes up to 63 billion roubles in 1954. But I want to draw attention to the fact that the figure of 63 billion roubles total income does not include the incomes in kind of kolkhoz peasants from the common economy or their income from their subsidiary personal economy or earnings from elsewhere outside the kolkhoz. It is only the money income

from the common economy of kolkhozes. Dr. Wibberley also asks how the average income will look if expressed in pounds sterling. Every nation is used to count its incomes in terms of its own currency and the exchange rate of the pound to the rouble is given regularly in the newspaper *Izvestia*.

Mr. Bhattacharjee raised the interesting question of how the national income is distributed in our country between agriculture and other branches of the economy. At this moment I can only indicate the general principles of the distribution of our national income. The main principle is to distribute the resources of the country so as to secure first of all the development of heavy industry which is the fundamental basis of our economy. If heavy industry does not develop, then agriculture cannot obtain the necessary technical equipment and assistance. Then the question was asked, how the productivity of capital is evaluated in our country. We have a different conception of capital from that of the Western world. For us, capital is first of all a social concept, not a material and technical one. Nevertheless we have to and do consider the economic efficiency of capital investments in our national economy. Our scientists are working eagerly at present to calculate the economic efficiency of capital investments especially in connexion with the construction of big hydro-electric generating stations. Next Mr. Bhattacharjee wishes to know the labour input in terms of working time per unit of production. In answering this question I can say that this task is one of the principal tasks in studying the economics of kolkhozes, M.T.S. and our agriculture as a whole.

I apologize to Professor Schiller and other members of the Conference because, for lack of time, I cannot answer all their questions testifying to their deep interest in the economy of the Soviet Union. I was pleased to hear from Professor Niehaus that the polemics in which we have indulged arose through misunderstandings, although I have to note that apparently some of these misunderstandings still remain since they concern such questions of principle as the Marxian theory of development of capitalism in agriculture and the role of large-scale production in the building of socialism.

K. P. OBOLENSKY (*in reply*)

I have been asked to explain the difference between kolkhoz farms and sovkhos farms, and also the mutual help between kolkhoz farms. To the first question I must say that the difference is based on the different forms of property which exist in our country. A sovkhos is a State farm based on State property. A kolkhoz is a co-operative

farm based on co-operative property. Accordingly there is also a difference in management. Whereas in a sovkhoz one man, the director of the sovkhoz, is the leader, in the kolkhoz we have a managerial group elected by a general meeting of kolkhoz members. A general meeting of kolkhoz is the highest body for every member of kolkhoz. Furthermore, the form of payment is different. The workers in a sovkhoz are paid in fixed wages; the members of a kolkhoz in units called working days according to which the income is distributed and advances given during the year. The more a kolkhoz member works, the more units are credited to him and the greater his income. Kolkhoz farms help each other very considerably, but the forms of mutual help are different. For instance, progressive kolkhoz farms help backward farms by communicating to them their experiences through visits or otherwise. There may also be material help on the basis of mutual agreements.

Professor Ohkawa asks how the productivity of labour in kolkhoz farms is measured; and how the gross and the net incomes of kolkhoz farms are computed. We are in agreement, I suppose, that the productivity of labour is measured by the quantity of production received per unit of time. Productivity on the kolkhoz farms at any particular time is determined by the quantity of production at that time divided by the quantity of labour employed. According to our published data the productivity of labour on our kolkhoz and sovkhoz farms is three times higher than before the revolution. But we think that from the standpoint of our people's needs the level of productivity so far achieved is not sufficient. We are making great efforts to achieve a still higher level of productivity, first by systematic development and by the adoption of progressive techniques; secondly, by better organization and better remuneration of labour; thirdly, by better education of our agricultural specialists; and fourthly, by better utilization of the results of research. With regard to gross and net income, gross income is the labour of kolkhoz members reinvested for the kolkhoz production. The net income is that part of gross income which is made by the kolkhoz members and remains for common purposes. The net income is utilized for investment and development of the farm and for social purposes, such as clubs, sports grounds, kindergartens, &c.

Mr. Mackenzie asked about research methods and about the utilization of statistics in economic research. I have already given some general indications about methods of research in my paper. I may add that in economic research we attribute much importance to the investigation of production on the spot in the kolkhoz and

sovkhoz farms because we believe it is there that the fundamental questions of development are decided. In the meantime we also use statistical data and the corresponding economic analyses of them—a method which, as far as we know, is also adopted in the U.S.A. and other countries. We use electronic machines to a great extent.

Mr. Denman asks what is meant by saying the land is given to the kolkhoz farms for permanent and free utilization; whether the land can be sold or leased out; and whether the buildings on the land are also given to the kolkhoz farms for free utilization. The land is State property. There is no right of private ownership of land. It is prohibited to sell or purchase land and also to lease it out. The kolkhoz farms receive a document on the eternal use of land, indicating the exact boundaries of the land. If there are buildings on the State land such land is not given to the kolkhoz.

Professor Baade asks how statistical and geographical data are utilized in our research. I have partly answered this question in my remarks to Mr. Mackenzie. But Professor Baade has raised the important question of how the natural factors are considered in economic research. Only a bad scientist would neglect geographical and natural economic conditions. For example, we advocate the development of diversified agriculture because this gives greater possibilities for the utilization of manpower, for better distribution of cash income, for larger advance payments to kolkhoz members, and so on. But the implications of a diversified agriculture are different in the neighbourhood of Moscow, for instance, from what they are in, say, Uzbekistan. Near Moscow agriculture is based on dairy cattle, animal husbandry, and vegetable growing, whereas in Uzbekistan, where we have favourable conditions for cotton growing, we have a farm economy based on cotton and animal husbandry.

Dr. Raeburn asked about economic incentives in agriculture, and whether these incentives are sufficient as compared with those in other countries where, as he says, productivity is greater. I have already explained how the work is paid for on the kolkhoz farms. Actually this is a piece-work payment, and furthermore there is a supplementary material incentive based upon yields per acre and, in animal husbandry, on the fulfilment of production plans. We think that in addition to these incentives, price policy must play an important role. In 1953 we came to the conclusion that the existing level of delivery prices for a number of agricultural products did not provide a sufficient incentive for the kolkhoz farms to increase production. Therefore it was found necessary to raise the prices.

*Very keen interest in Russian problems and methods was demonstrated at the Conference, and because of the limited time available for discussion, Professor Bolgov and Professor Obolensky kindly offered to give written replies to any outstanding questions which might be submitted to them in writing.*

*In response to this invitation E. M. H. LLOYD asked for information about the extent to which collective farmers individually may hold land and livestock, about the methods of marketing and the determination of prices, and about the extent to which collectives may vary their production policies in face of changing prices. W. MACKENZIE asked for information on methods and techniques used in economic inquiry; EDGAR THOMAS on the equalization of collective farm incomes; J. F. BOOTH and R. A. DUDMAN on the measurement of labour productivity.*

*There is some overlapping between these and earlier questions and answers but in view of the fact that this represents in many ways a unique source of information the text of the answers to these supplementary questions is printed in full. Editor.*

In accordance with the regulations of the agricultural artel, a limited plot of land adjoining each dwelling-house—an orchard or kitchen-garden—is made over from the communal land to each kolkhoz member's family for its personal use. The dimensions of this plot, exclusive of the area occupied by the dwelling-house, may vary from  $\frac{1}{4}$  to  $\frac{1}{2}$  ha., or up to a whole hectare in certain regions, depending on regional conditions. Each kolkhoz family in regions producing cereals, cotton, sugar-beet, flax, hemp, potatoes and other vegetables, tea, and tobacco may have as personal property 1 cow, not more than 2 calves, 1 sow with litter or, if the kolkhoz management finds it necessary, 4 sows with litters, up to 10 sheep and/or she-goats, an unlimited number of fowls and rabbits, and not more than 20 bee-hives. Each kolkhoz family in agricultural regions where there is extensive livestock raising may have as personal property 2 or 3 cows and the same number of calves, 2 or 3 sows with litters, not more than 25 sheep and/or she-goats, an unlimited number of fowls and rabbits, and up to 20 bee-hives. In non-nomadic or semi-nomadic livestock-raising regions, where livestock raising plays a decisive role, each kolkhoz family may have as personal property from 4 to 5 cows and the same number of calves, from 30 to 40 sheep and/or she-goats, 2 or 3 sows and litters, an unlimited number of fowls and rabbits, not more than 20 bee-hives and, in this case, either a horse, or a mare for the preparation

of *Koumys* (fermented mare's milk) or a pair of camels, asses, or mules.

In the Soviet Union trading is practised by the State, the co-operatives, the kolkhozes, and by the peasants themselves. The State and co-operative trade organizations derive their goods from State and co-operative industries and from the State farms and kolkhozes. Kolkhoz produce is disposed of partly through statutory obligatory deliveries and partly through free purchase implemented by the State and co-operatives. By far the greater part of goods from the State and co-operative trade network is sold at fixed State retail prices irrespective of the source from which the stocks derive. In respect of certain items zonal retail prices are operative, i.e. differential prices for each item are in operation in individual regions, zones, or Union republics, where production and transport costs must be taken into account. Within a given zone or territory goods are sold at standard retail prices. There are two possible exceptions to the rule:

(i) Where goods derived from local State and co-operative industries are prepared from raw material made by the producers themselves, the prices of such goods are fixed by the producing organizations in conformity with State retail prices fixed for analogous goods, and may vary slightly from State prices if conditions of production so demand. For purposes of control, the prices in question are subject to registration with the trade directorate of the local Soviets of Working Peoples' Deputies. But if a local industry or co-operative prepares goods from State raw materials, these goods are subject to State retail prices.

(ii) Where a consumers' co-operative sells agricultural produce processed by itself in regions where the given co-operative is active, the prices of such produce are fixed by the organization of the consumers' co-operative, though they must not exceed State retail prices.

With regard to the kolkhoz market, goods are sold by the kolkhozes, the kolkhoz members, and the individual peasants at market prices commensurate with demand and supply. On this market no one has the right to impose administrative measures to fix or influence price-levels. Those who sell the goods, whether kolkhozes, kolkhoz members, or individual peasants, have complete freedom to increase prices and thus take advantage of any increase in demand. They are likewise obliged to reduce sale prices in the event of insufficient demand for market goods. On kolkhoz markets in different regions of the country, and on each individual market, for varying periods, sometimes in the course of a single week, sale prices may fluctuate considerably. Kolkhoz market prices may exceed State retail prices



when there is an insufficient supply of goods; on the other hand they may fall below State prices when demand is insufficiently great.

By virtue of limited demand on local markets, situated far from a railway, the kolkhoz market prices for certain produce (after harvesting) may prove to be below their purchase (wholesale) prices if State and co-operative purchases are substantially less than the supply from kolkhozes and kolkhoz members.

With the aim of developing kolkhoz trade, the State allocates transport, including railway facilities, to the kolkhoz member for the carriage of surplus produce to markets in regions where this surplus may realize higher prices to the benefit of the producers. With the same object in view the consumers' co-operative is given the task of selling surplus kolkhoz produce on a commission basis. The consumers' co-operative takes the surplus off the hands of the kolkhoz on the spot and resells it in the towns, for which service the consumers' co-operative receives commission fees. Trade on a commission basis not only benefits the kolkhozes, but also reduces demands upon the kolkhoz member's working time. This saving is particularly important during periods of intensive field-work.

In drawing up a production plan a kolkhoz must take into consideration all its obligations to the State, as to the volume of agricultural produce which the kolkhoz is obliged to deliver to the State at fixed prices, commensurate with the area of land allotted to the kolkhoz. In all other respects the management and all the kolkhoz members are guided in drawing up their plan by considerations of their own economic advantage which, together with other factors, is determined by prices on the kolkhoz market.

In investigating different economic problems Soviet scientists apply higher mathematics and statistical science on a large scale, thus making possible, or making more accurate, the objective assessment of economic factors from which appropriate conclusions may be drawn. In large-scale research in the field of economics, Soviet scientists likewise utilize calculating machines. In their researches Soviet agricultural economists pay great attention to both theoretical and practical questions affecting the economy and organization of the socialist agricultural system. At the same time, great efforts are made to avoid the divorce of theoretical research from practice and to ensure that practical questions elaborated by scientists are based on profound theoretical investigation. For this reason, plans for scientific research worked out by institutes of science and faculties of higher education are bound up with the practical tasks which face

Soviet land economy. There are some differences, however, in the programmes of certain institutes of science. For example, agricultural economists of the Soviet Academy of Sciences and professors of economics in higher education establishments are set the task of finding theoretical solutions to problems of collective and State farm development; whilst in the case of other institutes of science more effort is concentrated on scientific generalization of experiments carried out by innovators in the field of socialist agriculture, and on scientific treatment of problems arising from the organization and planning of production of kolkhozes, M.T.S., and sovkhoses.

The incomes of kolkhozes and kolkhoz members depend first and foremost on the efforts of the kolkhozes themselves in the correct use of the land put at their disposal. The State helps the kolkhozes to do this by mechanizing productive processes with the aid of the M.T.S. and also by developing irrigation, by draining marshes, by increasing production of mineral fertilizers, &c. For these purposes the State annually assigns considerable funds which permit large-scale capital investment in agriculture. Other factors may influence the size of kolkhoz incomes, such as investment by kolkhozes themselves in production premises, in plant and implements, and in draught cattle and livestock.

The State does not aim at equalizing income between kolkhozes as this would destroy the socialist principle of material incentives to production, and would exert a negative influence on the development of kolkhoz production and, consequently, on the income of the kolkhozes and their members. At the same time, however, the prices at which stock is produced and at which products and raw materials are bought from kolkhozes differ according to agricultural zones and local features, such as the natural fertility of soil or the distance of kolkhozes from produce collection points. In zones of higher harvest yield and smaller labour demand prices are somewhat lower. Kolkhozes are paid an increment above the statutory price in respect of the transport of produce to collection points. The size of the increment varies according to the distance involved. The indicated difference in price means that a part of the supplementary income which accrues to kolkhozes in zones with more favourable local conditions, or to those situated nearer to collection points, is made available to the State. This is known as 'differential rent—category I'.

With regard to the supplementary income of those kolkhozes which carry out a more intensive economy through additional investment of funds (differential rent—category II), this supplementary

income is not appropriated through the price regulation system. What is more, a system of prices paid by the State for purchases and deliveries contributes to the realization of high incomes on kolkhozes with an intensive economy. This result is achieved by the award by the State of bonus increases in respect of certain products (cotton and others). Such bonus increases are payable to kolkhozes, over and above the basic delivery price, in respect of additional quantities of such products as are delivered to the State and which derive from increased harvest yield. This proviso permits the income of a kolkhoz to rise more than production.

Kolkhozes pay for the services of the M.T.S. at fixed rates which vary according to separate agricultural zones depending on local and production conditions. Within each zone one standard rate for the work of M.T.S. is operative.

Tax levies are in no way designed to equalize kolkhoz incomes. All kolkhozes pay income tax at identical rates throughout the appropriate territory. Rates differ slightly according to types of income. For example, kolkhoz income derived from the sale of products under terms of contract is taxed at a different rate from income obtained on the kolkhoz market. Part of the kolkhoz income is entirely exempt from taxation as, for instance, the income derived from products sold under terms of obligatory delivery. On kolkhozes income tax increases proportionately with the kolkhoz income.

The question of increasing labour efficiency in agriculture is of special concern to the Soviet Government and much research carried on by agricultural economists is devoted to this problem. Labour efficiency is measured by the volume of production per unit of expended labour. Marx asserted that 'the amount of labour itself is measured in terms of its duration—working time—whilst working time in its turn is scaled for given periods of time such as an hour, or a day, etc.' (K. Marx, *Kapital*, vol. i, 1954, p. 45). In industry and the building trades labour efficiency is expressed by the indices of production for an average (medium registered) worker over a given period—a month, quarter, or year. In agriculture, labour efficiency is expressed by the indices for a single worker employed in agricultural production, which permits comparisons of rates of increase in labour efficiency as between agriculture and other branches of the national economy. The production for a single worker employed in a particular branch of agriculture likewise measures labour efficiency in that branch. Besides this, the daily output of a single worker is used as a relative index of increase of labour efficiency for particular kinds of

agricultural work. Technical progress in the agricultural economy is having the effect of constantly decreasing the proportion of live labour (actual manpower) whilst that of past-materialized labour (manpower represented by plant, machinery, &c.) increases; at the same time general expenditure of both present and past labour is diminishing per unit of production.