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SUGGESTIONS FOR AGRICULTURAL PLANNING IN DEVELOPING COUNTRIES,  
PARTICULARLY IN AFRICA

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PARTICULARLY IN AFRICA

1. There are several reasons why the establishment of economic unions and multinational agricultural planning activities are absolutely necessary, primarily for countries with a small area but for other countries as well.

(i) The human and material resources of small countries are often insufficient to allow for a satisfactory increase in per capita income.

(ii) Consequently such countries will experience the need for subsidies from other countries and from international organizations.

(iii) Agricultural activities should be planned and distributed among a number of countries according to their soil and climatic conditions, the circumstances governing their economies and transport, thus making it possible for industrial development to take place through the establishment of integrated industries in the various countries. The general plan should make a careful allocation of the various food crops among the different countries. It is only in this way that the best advantage from different types of climate can be ensured. A regional institute for agricultural development might be entrusted with these tasks.

(iv) According to the various types of crops, ordinary warehouses, fixed and mobile cold storage equipment should be established in carefully selected areas as a means of contributing towards the stabilization of production and prices.

(v) In this regard it will be necessary to establish Customs unions, including the co-ordination of economic regulations,

the standardization of legislation and data collection,  
the unification of the communication system and the  
stabilization of price levels which will ensure full  
employment in the member States of the union. Not  
infrequently one comes across complementary types of  
production which facilitate the establishment of common  
markets. An attempt must also be made to avoid autarchic  
systems which are not economical and have often to be  
protected by Customs barriers. A Customs union will  
also facilitate the regular collection of all types of  
information relating to local markets, prices, demand,  
soils, climatic conditions, land tenure, the distribution  
of arable land etc., and the establishment of institutions  
to promote exports and the tourist trade.

- (vi) An economic union also leads to planning and therefore  
to the co-ordination of economic and physical research,  
to the exchange of information on the results of research,  
thus avoiding duplication. It also conduces to the  
preparation of plans which take account of the results  
of research and experiences in other countries.
- (vii) Co-ordination among neighbouring countries is also  
indispensable for disease control, including animal  
and plant diseases, the control of pests, soil protection  
as well as the protection of nature (flora and fauna).
- (viii) Economic unions facilitate the co-ordination of technical  
and economic assistance programmes of the industrialized  
countries and the international organizations, such as  
the United Nations Development Programme (UNDP) and the  
United Nations Food and Agricultural Organization (FAO).

2. It is obvious that unless a number of countries are grouped to-  
gether in economic unions, certain ill-considered and even totally wrong  
investments are bound to occur.

3. Another basic feature of agricultural planning is the organization of an agricultural statistical service with the help of the local authorities. Thus it is necessary to organize not only the collection of statistical data regarding crops, but also to make periodical inventories of the types of soil available, the crops for which they can be used, of water and meteorological data, of data on products, income, employment, coefficients of capital, labour productivity, price indices, income and price elasticities of demand, costs, internal and external markets. It is also necessary to make cadastral surveys of property and to register persons, co-operatives and other societies, machinery and implements, stocks, etc. Agricultural statistics and inventories are also necessary for the analysis of industrial potential, for industrial planning in general and showing the relation between the rural population and arable land and the skills possessed by the rural population.

4. About nine main objectives of agricultural planning can be distinguished:

- (i) The increase of the level of living of the rural population (e.g. taking as a target the level achieved by a certain group, e.g. the members of co-operatives in Mozambique).<sup>1/</sup>
- (ii) Expansion in the production of goods for export.
- (iii) Production of goods to substitute imports.
- (iv) The diversification of production, also in order to alleviate disparities between different regions.
- (v) The reduction of production costs and the increase of productivity and income from agriculture.

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<sup>1/</sup> Cf. Ralph von Gersdorff: "Endeavour and Achievement of Co-operatives in Mozambique", in: The Indian Journal of Economics, No. 156, Allahabad, July 1959, and in Review of International Co-operation, International Co-operative Alliance, London, W.1., April 1960.

- (vi) The creation of employment for young people in accordance with the growth rate of population.
- (vii) The increase in food production for the rural and the urban population which almost everywhere have a very high growth rate.
- (viii) The increase in the production of raw materials for national industries, particularly the expanding ones and those with good prospects of development (growth industries).
- (ix) The disengagement and freeing of staff for transfer to other sectors.

5. The planners and the ministers have the difficult task of allocating priorities by weighing and striking a balance between these objectives.

A few considerations may be mentioned in this respect.

6. Agricultural goods for export have always been subjected to violent price fluctuations on the world market, in most cases, and by trend, the tendency being for prices to drop rather than rise. The demand for these goods is rather inelastic, that is to say, a drop in price because of a growth in production does not result in an increase in demand to an equal or even appreciable extent.

7. Present efforts towards price stabilization of export raw materials, at reasonable and profitable levels for the developing countries, do not tend either to encourage an increase in the production of these materials over and above the fairly slow increase that can be predicted for these materials because of the world population growth.

8. The United Nations Economic Commission for Europe (ECE) estimated<sup>1/</sup> that the increases in imports by the Western European countries of

<sup>1/</sup> Quoted by H. Priebe and F. Michel in their article "Problems of Agricultural Trade with the Developing Countries" in "Aid to the Developing Countries seen from a different standpoint" (German text), Baden-Baden: Verlag A. Lutzeyer, 1963, p.104.

agricultural products from the developing countries will not rise above the following amounts (in billions of American dollars):

	From 1959	to 1980
Food products	4.13	5.75
Other agricultural primary products	1.66	2.40

9. Therefore, there is every reason to plan very cautiously and carefully the agricultural production growth, adjusting it well to the projections of internal and external demand, the future needs of individual households and existing industries and those that are being planned, particularly industries which consume large quantities of agricultural products like the food industry, the textile industry, etc. It is also clear that all the countries should participate as far as possible in the efforts to stabilize prices and the allocation and distribution of the production of raw materials.

10. The production of goods for import substitution is one of the great objectives of the planners since the domestic demand of a given country is well known and large sums of foreign currency can be saved for the purchase of capital goods. A limiting factor in the process of import substitution is climate, the difficulties of getting across new ideas to the rural population and of acquiring the machinery necessary for certain crops which as yet are not known. In a number of countries, the first thing to be done is to plan an extension of agricultural research and to establish a more closely knit network of experimental stations.

11. The planners should also include in the agricultural plan a system of agricultural diversification to solve the ever-present problem of intensive concentration on a restricted number of products. It will be important to determine the types of agricultural crops whose cultivation should be introduced or extended.

12. Planners are faced with the inescapable duty of making a careful study of the possibilities of reducing production costs. The means of achieving this objective are usually a better organization of

research and popularizing the results of that research. There are also various forms of organization which may be used, such as agrarian reform, rural community development, the institution of a network of pilot and demonstration farms, the establishment of co-operatives, savings banks and agricultural credit (a system of supervised credit in combination with technical assistance to debtors, i.e. beneficiaries), centres for rural development, multi-disciplinary teams, rural animators and agricultural extension workers, networks of cold storage installations and of ordinary warehouses, etc. But it must never be forgotten that any conversion to new modes and the application of new techniques must be accompanied by a change in mentality.

13. Agrarian reform, a necessity in practically all the developing countries, should also include the establishment of farms for young agriculturists who cannot be employed on other farms, in towns or abroad. Nevertheless, these farms should at least be capable of supplying the necessary minimum for the livelihood of agriculturists who are out of work or under-employed. It is also desirable that they produce goods for the local market, substituting products imported from other regions and/or from abroad.

14. Production costs are considerably reduced by mechanized agriculture and once mechanization is introduced, work must be found for the agriculturists and agricultural labourers displaced by the machines. They can be absorbed only if industrialization is moving forward successfully, if the mining activities and the services are expanding, and/or if there are cultivable lands in countries which still have sufficient land, either virgin or abandoned, that can be cleared or ameliorated.

15. It will almost invariably be necessary to make a careful plan of agricultural production to satisfy the ever-growing demand for foodstuffs in the towns. The probable development of the structure of this demand must be projected in order to see how far it justifies the local production of certain goods and services, for instance, market gardening, horticulture, and the planting of fruit trees around the towns, and also the establishment of processing industries not only for local

and national consumption, but also for exports (for instance Brussels and Berlin before World War II, where sewage water was used as fertilizer for horticulture).

16. The planners should also bear in mind the fact that practically every investment in industry, mining and services also requires investments for the increase of supplies and/or the production of agricultural and/or non-agricultural raw materials. Investment in agriculture is therefore not an independent variable but actually depends on investment in the other sectors, such as industry and services. There must be a clear knowledge of what is required and planned in these sectors, if the future production of agriculture is to be properly planned, which, in turn, often requires an expansion in industrial production like the production of fertilizer, agricultural implements and machinery.

17. At the same time, an increase in agricultural production requires considerable investments in infrastructure like transport (railways and roads, especially feeder roads, with the necessary equipment, ports, etc.), normal warehouse and cold storage accommodation, electrification, irrigation, veterinary services, research and information stations, technical assistance, etc. These investments should be related to the income which will accrue from an increase in agricultural production.

18. In over-populated countries, labour productivity in agriculture may not increase as quickly as it can in industry. Gradually the relative importance of agriculture will diminish as it has in the economically developed countries. This means that although the quantities of food-stuffs and raw materials derived from agriculture should increase (just as the perhaps unavoidable increase in the migration of labour from agriculture to industry and the services) in order to supply industry, mining and the services, these three last-mentioned sectors seem to be destined to increase more rapidly. On the other hand, in under-populated countries (for instance in Africa and South America) labour productivity may be increased more quickly in agriculture through mechanization, etc. (see para. 14).

19. In small over-populated countries which attain a very high level of agricultural production like Denmark, Holland, Switzerland and Japan, maximum yields must be got from the unit of land, even without arriving at the minimum cost. Even so, a very high degree of industrialization was inevitable and indispensable in those countries which gave their human resources the maximum degree of valorization through a carefully planned system of education. In the case of Switzerland and Denmark this happened even in spite of a lack of natural resources.

20. In most cases the order and choice of objectives for agricultural planning can be laid down as follows:

- (i) Production to substitute imports and diversification of production for this purpose.
- (ii) Reduction of production costs.
- (iii) Expansion of the production of goods for export.

21. There are several policies, ways and means of achieving these objectives, namely:

- (i) Agrarian reforms (including subsidies and agricultural credit).
- (ii) More efficient organization of production (regional plans, community development, the establishment of co-operatives, of agricultural societies, of associations of peasants, of marketing societies and boards, of a network of agricultural enterprises and industries for processing agricultural raw materials, both model and pilot ones, of research stations, of centres for agricultural extension work and technical assistance, etc.).
- (iii) Education and training of the rural population in general and of agricultural staff at all levels in particular.
- (iv) Financial measures.

- (v) Fiscal measures.
- (vi) Building up infrastructure.
- (vii) Other economic measures, as e.g. price, marketing, Customs, foreign exchange, storage policies, etc.

22. We cannot obviously discuss all these measures here but would like briefly to mention a few of the more important ones.

23. There is no doubt that most of the developing countries require agrarian reform in order to stave off social unrest and all that it implies in the loss of human lives and materials. Agrarian reform is therefore the solid basis upon which any improvement and further development of agriculture and industry should rest. The population should enjoy a sense of security in order to work the land without being subjected to a system of land tenure based on work which does not encourage any increase in productivity as certain systems which encourage excessive indebtedness and exaggerated rates of interest. The co-operative organization should be used extensively in the framework of an agrarian reform. At the same time it will be necessary to choose the most economical method for extending farms and types of crops to be recommended in order to guarantee full employment for the agricultural worker's family and an income which is above the minimum subsistence level. No sub-division should be made in the case of farms which are large enough to be economic (including large ones) and which are thus already being worked to advantage. In Bolivia, for instance, there has been too much sub-division and the result has been a diminution rather than an increase in agricultural production after the introduction of agrarian reform.

24. To achieve this objective, it may be necessary for the government to provide agriculturists with an initial subsidy, by placing at their disposal lands which are immediately cultivable (that is to say which do not need to be cleared, drained, initially irrigated, etc.), the necessary houses and equipment, technical assistance services, as well

as credit, marketing, storage, transport, educational, public health and social security services.

25. The organization of agrarian reform by the government is of particular importance. The control of land distribution, the choice of families to occupy cleared land and the above-mentioned services should be under the direction of the same authority (with a well-qualified staff at its disposal), including especially the network of agricultural credit and local savings banks and mobile credit and savings establishments. However, too rigid legislation on the details of agrarian reform is not to be recommended, because the need will often arise to modify certain measures in order to adapt them to a new situation.

26. Certain countries have succession laws which result in an excessive sub-division of land. In such cases, the only remedy is to introduce new legislation which will supply a sufficiently limiting restraint on sub-division. In pre-World War II Germany, for instance, the eldest son inherited the whole farm. If he had brothers he had to pay a sufficiently reasonable compensation to each of them.

27. In the case of compensation to be paid to owners of land who have voluntarily given land or have been obliged by new legislation to part with land (previously insufficiently worked) in favour of the authority instituting agrarian reform, for land distribution, a number of good experiences have been made with payment by way of bonds repayable after 15 years. These bonds should be easily negotiable on the stock exchange with the assistance of the central, regional and development banks, as well as in other countries, so that they may be exchanged for bearer shares of industrial and other enterprises. In this way, unproductive capital can be converted into capital for productive enterprises, as a means of achieving the above-mentioned objectives. On the other hand, the use of the sales results from these bonds, and of the sinking fund income, for luxury expenditures should be curbed.

28. Some rural organizations and institutions have already been mentioned which should be well planned and which can serve as means to reach the above-mentioned objectives. Here it may suffice to emphasize the importance of regional planning which should in the first place comprise all the measures for agricultural development and the establishment of co-operatives. It will be necessary to introduce a whole system of intensive and permanent education to change the too individualistic mentality of the people and to develop a mentality for voluntary co-operation, which should lead to the establishment of co-operatives. These (first a network of model and demonstration co-operatives) have the great advantage in that they may assist agriculturists not only in obtaining credits and in realizing production (technical assistance, renting and/or common use of machines, the purchase of goods like selected seeds, chemical fertilizers, insecticides, etc.), but also in introducing booking or improving existing accountancy, in the marketing, transport, storage, etc., of their products, through the construction of mills, processing plants, the establishment of handicraft workshops, schools, local and mobile libraries, conference rooms, etc., with due regard to the individual agricultural worker's or peasant's property and due care for his equitable share in the benefits from the collective enterprises. In this way many middlemen can be got rid of and the income of peasants raised by the profits which were made by these middlemen. It is often preferable to establish multi-purpose co-operatives than single-purpose ones, in order to overcome the difficulties of securing qualified staff who has an excellent knowledge of local conditions and needs, and also to provide enough work for the staff throughout the whole year. In many countries agrarian reform is one of the most important conditions for expanding the co-operative movement.

29. Another condition is often the organization of community development which paves the way for the establishment of co-operatives with the setting-up of community centres and pilot rural community development units. A start is usually made with socio-economic surveys, including inventories of soils, products, yields per hectare and other economic

and social data upon which planning and action is based, and it is primarily the local authorities, the voluntary and official rural animators, the agricultural extension workers, agricultural societies, all the schools, and the multi-disciplinary planning teams whose work results in changing peoples' minds and making them amenable to mutual co-operation and the modernization of agricultural techniques, including planning. It has always been found possible to fire the zeal and spark off the initiative of the rural population with agricultural contests, prize incentives for outstanding results, the exhibition of agricultural products and handicraft work at shows and local and mobile cinemas which also show films on modern forms of civil endeavour which are often contrary to the ruling traditions, the successes of the co-operative movement, and the modern techniques of agriculture (including the selection of livestock, the avoidance of devastation of vegetation caused by goats, soil reclamation and conservation, the avoidance of waste, reafforestation, the establishment of tree nurseries, of systems of agricultural information, including those which operate well in the developed countries, e.g. in Holland, Denmark, and France, and voluntary community work, etc.). In these programmes there should always be some inclusion also of films explaining what good agricultural planning can achieve.

30. Help in the matter of marketing of agricultural produce is also extremely important. Agriculturists must be educated to co-operate effectively with the local authorities, the statistical services, the planning officials, the multi-disciplinary teams, the rural animators, extension workers, etc., in order to acquire a sound knowledge of production, of causes of harvest fluctuations, of the number of totally unemployed, underemployed and persons out of work in between seasons. On the basis of these and other facts the planners can make their projections. The results of their studies on local, national and foreign demand, and other information of a commercial nature on national and foreign markets and the regulations governing them, must be placed at the disposal of the agriculturists through their organizations, in order to facilitate their calculations. However, in view of the very

limited means at the disposal of agriculturists for the sale of their products, machinery for regulating the marketing of agricultural products is inescapable. This is always tied to a certain policy governing agricultural prices. This regulation, which can be secured through organizations of agriculturists themselves or government organizations, for example co-operatives, marketing boards or corporations in Africa, is designed primarily to guarantee to the rural worker a stable income, well above his minimum subsistence level. Since such organizations can accumulate considerable funds when world prices are fairly high and also through subsidies and commodity agreements (Commonwealth Sugar Agreement, etc.), they can help to finance infrastructure works, studies of national and foreign markets, publicity campaigns, the control of quality, storage (silos, cold storage equipment chains), transport, national fairs and exhibitions and participation in foreign fairs, conferences and international agreements for the stabilization of agricultural prices. Often it is the government which organizes or helps in the establishment of an export fund and unions of exporters of agricultural products.

31. In order to secure finance for subsidies in general and the subsidies necessary for agrarian reform in particular, as well as for other government expenditure in connexion with the establishment of infrastructure, the organization of rural development and the staffing of it, the funds for rural credit (often necessarily subsidized for small credits), etc., it is necessary to plan and reform carefully the direct and indirect taxation of agriculturists.

32. The importance of fiscal policy as an instrument of planning is very great.<sup>1/</sup> Here we shall only mention a few of the fiscal measures that may be taken in rural areas:

- (i) Additional taxes on cultivable land not yet put under cultivation.

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<sup>1/</sup> Cf. Ralph von Gersdorff: "Capital Formation by Fiscal Measures in the Portuguese Territories", in: Public Finance/Finances Publiques, The Hague, No.1, Vol. XV, 1960, and "Public Finance in Angola", in Finanzarchiv, Tuebingen, West Germany, No.3, Vol. XX, 1960.

- (ii) Exemption from tax for persons ploughing back capital and for expenditures for market studies and publicity.
- (iii) "Labour tax" payable in money or labour, for instance, for the execution of public works.
- (iv) An anti-cyclical income tax based on compulsory agricultural accounting, subject to scrutiny by the income tax department (fairly high rates of tax when the prices of agricultural products are high, and low rates of tax or tax exemption and subsidies when prices are very low and no longer permit a reasonable income).
- (v) Tax exemption for co-operative and other agricultural organizations as well as for national and foreign pioneer enterprises.

33. As regards financial measures, the great importance attaching to agricultural credit, when well organized as a condition for the success of agrarian reform, has already been indicated. This credit should be well controlled by the authorities, notably agricultural extension services and/or private organizations (like the A.B.C.A.R. in Brazil) in collaboration with the commercial banks and agricultural credit funds. In Brazil the banks have gained very good experience with this system.<sup>1/</sup>

34. Once again mention must be made of the co-operative movement. Credit co-operatives with illimited liability and savings co-operatives have in many countries proved to be of great assistance to agriculturists in that they are quite capable of satisfying their credit needs and

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<sup>1/</sup> Cf. Ralph von Gersdorff: Saving, Credit and Insurance in Brazil, their Contribution to Economic Development, Government Printing Office, Barbados, West Indies, 1962, Chapter: Agricultural Credit Problems, p.48 et seq., and "Agricultural Credit Problems in Brazil" in "Inter-American Economic Affairs", No. 1, Washington, D.C., 1961.

freeing them from excessive indebtedness, from loans which are too expensive and granted for too short terms.<sup>1/</sup>

35. Increase in savings can be achieved also through a fairly close network of local savings banks and mobile savings banks. Self-financing, which is the most important source of capital formation, should be encouraged, and should essentially be granted tax exemption.<sup>2/</sup>

36. It is fairly difficult to introduce agricultural insurance and social insurance in the rural areas. The first type of insurance normally requires subsidies in the initial stages. It should be conducted preferably by associations of private non-life insurance companies. Otherwise the government should set up an agricultural insurance corporation.

37. Social insurance for the rural population has been almost always the last thing governments have established. Nevertheless it must be clearly recognized that the portion of the population also has the right to be protected by this type of insurance. It should be used to accumulate funds which can be invested in productive enterprises. In Africa good experience has been made with the setting up of provident funds and peasant societies. Agriculturists who have secured produce for a given market are in some places obliged to become members of these societies and to pay their contributions together with the personal tax. With the sum realized from these contributions, it has been

1/ Cf. same author: "The National Co-operative Bank and the Co-operatives in Brazil" in Year Book of Agricultural Co-operation, 1961, Plunkett Foundation for Co-operative Studies, London, W.C.1., and Basil Blackwell, Oxford, 1962.

2/ Cf. R.v. Gersdorff: Measures to Promote Private Saving in Portugal and Portuguese Africa, Polygraphischer Verlag A.G. Zuerich, Switzerland, 1958, and "Money, Credit and Saving in Angola", in Brazilian Bank Review, No. 337, Vol. XXIX, Rio de Janeiro, January 1960.

possible to finance not only insurance benefits but also credits, technical and marketing assistance.<sup>1/</sup>

38. Once again we should like to emphasize the decisive importance of training the whole of the rural population in general and the official and private agricultural staff in particular. This training is necessary for agrarian reform and the planning of agriculture in general. It is planned according to the existing and planned main crops, the types of animal husbandry used, the existing and future forestry economy and projections of national and foreign demand for agricultural products. As there are a considerable number of vacant posts for well-qualified agronomists in the developing countries, it is fairly certain that those persons who fail to find employment in the national agricultural organizations in the developed countries will find it in the "Third World". It is essential to carry this training also to illiterate adults. Vocational agricultural training should be compulsory for young people in all rural schools and their courses should comprise invariably instruction on the conditions of social and economic progress, agricultural accounting, planning in general, and agricultural planning in particular. After the normal course of study, the young people (boys and girls) who wish to remain in the rural areas should have the opportunity of training in specialized apprenticeship centres for agriculture, horticulture, floriculture, animal husbandry and the dairy industry, bee-keeping, silviculture and agricultural mechanics. For the girls agricultural domestic training centres should be set up, and the teaching given there should be very carefully adapted to the existing needs. Agricultural high schools should train young people who would like, after a period of practical training in agricultural enterprises, to become foremen of works, agricultural technicians

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1/ Cf. same author: Economic Problems of Portuguese Africa, E. and W. Giesecking, Bielefeld, W. Germany, 1962, p. 99 et seq., "Insurance in Portuguese Africa," in German Insurance Review, Cologne, Sept. 1959, and Planning and Financial Institutions in Developing Countries, Economic Planning Unit, Govt. H.Q., Barbados, West Indies, 1962.

or managers of the crops in large enterprises. The best pupils should be encouraged to take courses in engineering schools or universities which have an agricultural faculty. It is worth giving reasonable subsidies to youth movements which aim at the vocational training of youth in the rural areas: setting up 4 H clubs, holding contests and competitions, exhibitions, planting trees, providing incentives for reafforestation in general, etc.

39. Maximum encouragement should also be given to the rapid vocational training of adults (including civil servants in the ministries of agriculture) in the form of refresher courses, specialized training, adaptation to new techniques and professions allied to agriculture, not only by associating them with the work of multi-disciplinary planning teams, rural animators, rural development and agricultural extension workers but also with the accelerated installation of a close-knit network of promotion centres. These centres may belong also to the private sector, co-operatives, associations and clubs of agriculturists, etc. The centres authorized or recognized by the ministry of agriculture should receive assistance from that ministry so far as operation and equipment are concerned. Quite a few private and official bilateral assistance organizations in the developed countries prefer to give technical assistance in the form of free school equipment and supplies, since the students who use such equipment now may well demand and buy it or recommend to buy it later when they become new customers.

40. As agriculturists should be compensated for loss of time and income during their training period in a promotion centre, the government should pay trainees allowances which, according to the case, may extend from the reimbursement of travel and other expenses up to the granting of the minimum agricultural wage guaranteed by the government.

41. As in France, these centres should aim at an essentially practical result. The purpose is to help the trainee to become better adapted to new agricultural techniques. The activity sectors of these centres should be fairly varied, embracing the conditions for social and economic progress and agricultural planning, as well as agricultural

accounting (these courses should be compulsory), the different crops, the use and maintenance of agricultural machinery, animal husbandry and the art of animal feeding (cattle, pig, sheep raising, artificial insemination; etc.), arboriculture, especially the planting of fruit and other trees, horticulture, market gardening, and the cultivation of vines, the training of agricultural extension workers, of monitors for rural families, of female instructors who will teach domestic science in rural areas, and advisers on domestic science training in rural areas (weaving, knitting, sewing, hygiene, domestic economy, nutrition, medical care, etc.) and the training of midwives and assistant midwives for rural areas, etc.

42. Although training and agricultural promotion are extremely important, the planners have to consider also the building of the other sectors of infrastructure in order to realize the above-mentioned objectives. Here are some means of achieving them: reafforestation, irrigation and the supply of good drinking water based on the inventory of types and quantities of water available, veterinary services, research and information stations, access routes to villages, towns and areas not as yet developed, feeder roads to the main highways, towns planning and other urban services for small towns and large villages, rural electrification, postal, telecommunications and public health services, etc.

43. The cost of a rural development plan should not be underestimated. It should be well calculated, taking into consideration national and foreign demand for agricultural products and the social objectives of agricultural planning. In particular, a calculation as accurate as possible, should be made of total national demand, the provision of supplies for the rural and urban population and the demand of the national industry, using past figures, projections and the other sectoral plans (industry, services, etc.). The projections should take account of the levels of nutrition (which are too low in most of the developing countries, and should be raised to reasonable levels through education, increased production, and a policy of adequate prices), and

also of the fact that as the levels of income rise, the pattern of demand also changes. The consumption of simple food products tends to register an increase at first and then diminishes, while the consumption of more refined food products increases steadily, fed by an expanding food industry. In this industry, for instance in the case of abattoirs, it is often difficult to procure a sufficient amount of raw materials of the required qualities and an attempt has to be made to organize a system of assistance to agriculturists so that they can increase production and improve quality. An example to follow in this respect is the SADIA pig abattoir at Concordia (Santa Catarina, Brazil), a private company, which gives subsidies to the local association of agriculturists in the form of technical assistance supplied by agronomists and veterinarians, equipment, vaccines, seeds, insecticides, fertilizers, research stations and livestock breeding stations, etc.

44. Presumably because of considerable and irregular fluctuations in harvests and the world prices for agricultural products, agriculture has been neglected by the theoreticians who specialize in mathematical methods of planning, as compared for instance with industries, transport and energy. They recommend, however, to construct a model for agriculture also, but never for this sector alone, always in conjunction with other sectors and at least with industry, because industry in fact mostly depends to a large extent on agriculture. It has been found that the neglect of agricultural development often leads to bottlenecks. Rapid industrial development without any improvement in agricultural productivity may lead to obstacles in the way of future development through lack of raw materials and food which in turn may cause prices and salaries to go up or lead to a deterioration in the balance of payments position (a falling off in exportable surpluses). Over-investment in industry and neglecting to develop agriculture has resulted in a lack of foreign currency in a number of countries, with the result that it has been observed that only 50 per cent, or even less of the production capacities of some industries can be exploited. In such circumstances the planners have to take a decision regarding priorities to be recommended to the

ministers: improving the use of the capacities of existing factories, and slowing down the rate at which new industrial enterprises are established, or allowing agriculture to fall into line with the tempo of industrial development. In countries where agriculture has been neglected or where in fact it offers stiff resistance to technical and institutional changes, a pronounced increase in productivity per agricultural worker is a prerequisite for any industrial revolution. This has compelled quite a number of governments to increase investment in agriculture. One of the factors limiting industrial expansion is the possible growth of agricultural productivity (another is the provision of capital which depends on savings). It is therefore important that the planners should strike a balance between the demand for and supply of agricultural products. It is only when industry can export in order to finance its imports that the inadequate supply of national agricultural and other raw materials and of food can be redressed by imports.

45. In general, under-populated countries will give priority to investments in agriculture, whereas over-populated countries tend to give priority to investments in industry.

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