



**TOGETHER**  
*for a sustainable future*

## OCCASION

This publication has been made available to the public on the occasion of the 50<sup>th</sup> anniversary of the United Nations Industrial Development Organisation.



**TOGETHER**  
*for a sustainable future*

## DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

## FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

## CONTACT

Please contact [publications@unido.org](mailto:publications@unido.org) for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at [www.unido.org](http://www.unido.org)



05347



United Nations Industrial Development Organization

Instr.  
E/CONF.82

ID/WP.1/1/1

18 March 1974

ORIGINAL: ENGLISH

International Consultation on  
Agro-Industrial Development

Novi Sad, Yugoslavia, 13-18 May, 1974

SUPPLY OF RAW MATERIALS IN VARIOUS  
AGRO-INDUSTRIAL SYSTEMS<sup>1/</sup>

Hans Kordik\*

\* Austrian Society for Agricultural and Forestry Policies, Vienna, Austria.

<sup>1/</sup> The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the Secretariat of UNIDO. This document has been reproduced without formal editing.

We regret that some of the pages in the microfiche copy of this report may not be up to the proper legibility standards, even though the best possible copy was used for preparing the master fiche.

## CONTENTS

Chapter	Page
Introduction .....	1
<b>I The Basic Factors</b>	
A The Human Factor .....	1
B The Natural Resources .....	2
C Land Tenure .....	3
D Present Land-use .....	5
<b>II Various Approaches in Organizing Agriculture</b>	
A Smallholder Schemes .....	6
B Integrated Schemes .....	12
C Large Exploitations .....	16
<b>III Supporting Services</b>	
A Planning .....	17
B Research .....	17
C Extension .....	18
D Credit .....	19
E Input Supplies .....	19
F Infrastructure .....	20
<b>IV Incentives and Returns .....</b>	<b>20</b>
<b>Tables .....</b>	<b>22, 23</b>
<b>References .....</b>	<b>24</b>

## Introduction

About half of the world population are still employed in the agricultural sector. While the percentage of the rural population has been constantly declining in industrialized countries, farmers account for 60 - 95 % of the total population in developing countries (see Table 1).

Agriculture has also remained the major contributor to the GNP of developing nations and usually supplies most of their exports (see Table 2). Despite the agricultural sector's importance to the economy of these countries, its prospects of growth and consequently its contribution to overall development appear to be limited. Absence or insignificance of local markets combined with slow growing demand for food and agricultural raw materials in industrialized countries continuously hampers the urgently needed rapid development of the Third World's agricultural sector.

Prices of agricultural commodities, although showing a temporary boom during their year to year fluctuations, have remained at low average levels over the past two decades. Costs of investment goods, however, show continuous increases. Therefore, industrialization has become imperative for developing countries should they still be aiming at improving the lot of their population. Establishment of processing industries dealing with locally produced agricultural commodities is rightfully receiving priority.

Successful operation of industries based on locally produced raw materials requires a well organized agriculture. Raw materials of sufficient quantities and of standard qualities should be supplied preferably all year round or at least through extended periods of the year to maximize utilization of installed industrial capacities. Required products have to be purchased at prices acceptable to producers and processors. The paper presented tries to outline various basic requirements and alternatives to be applied in the framework of agro-industrial projects.

### I. The Basic Factors

#### A The Human Factor

Failures in agricultural development are frequently traceable to inadequate knowledge or insufficient appreciation of the relevance of

all socio-economic factors that determine the proper approach to the farmers and their responses and receptivity to change (1).

Consideration has to be given to distribution and density of population in relation to natural resources and prevailing methods of land utilization. The relative scarcity of land and labour must also be known in order to determine whether efforts ought to concentrate on maximizing returns to one or the other factors of production. The seasonal labour requirements and rate of labour utilization inherent in the existing system of farming may vitally condition the feasibility of introducing innovations which demand more labour or involve changes in the seasonal distribution of labour.

The pattern of settlement, whether in the form of villages or dispersed farm homesteads may have important implications for extension work and general administration as well as supplies to processing plants. Residents committed to village life may respond to intensify agriculture on the comparatively limited land near villages even though overall population density is low in relationship to land.

Many developing regions are characterized by considerable migration of labour not only between rural areas and towns, but from one agricultural area to another. In areas where opportunities for profitable agriculture are available and are being exploited, the rate at which they can be developed may be initially determined by the ability to attract labour migrants from less favored regions. In any event labour migration may have important implications for the development of agriculture, in the case of certain integrated agro-industrial projects labour migration will be essential.

Levels of education and extent of knowledge and experience of agricultural techniques require extensive evaluation before project implementation. Careful examination has to be carried out of the rural population's capabilities to accept and absorb new practices and methods in agricultural production. It has been demonstrated in many instances that introduction of too many innovations at the same time has resulted in farmers rejecting new production lines completely.

#### B The Natural Resources

The anticipated performance of the planned agricultural sector has to be seen against the background of the natural resources which determine success

or failure of a contemplated project.

Climatic conditions are of the greatest importance to agricultural production. Although certain unfavorable climatic aspects can be improved through additional investments it should be borne in mind that increased costs might render the project uneconomic or less competitive. Adequate rainfall will save costly irrigation works, absence of frost will lead to savings in regard to protective measures. Other climatic factors such as winds and hurricanes, hail, temperatures and sunshine duration have a bearing on certain cultivation and ought to be considered prior to project implementation.

It seems obvious that the topography of a chosen project site has to be favourable to planned production. It is evident that only flat or slightly sloping land lends itself to mechanized cultivation. Perennial tree cultivation, however, has been successfully established on hill sides, if consideration had been given to erosion control.

Topography plays an important role also in considering transport possibilities of farm products to factory sites. There are several agricultural commodities (tea, fruit of the oil palm) which require processing within hours after harvesting to obtain good quality products. Furthermore unfavorable topography near or around projected plant sites will require additional investments in infrastructure and thereby also lower expected project benefits.

Adequate consideration has to be given to a projects' pedological aspects. Especially when new land is to be brought under cultivation, detailed soil surveys will be necessary to eliminate infertile or low potential soils. Existing agricultural production is not a reliable indicator of a given lands' potential. It should be noted that certain agricultural crops require different conditions in regard to soil texture, acidity, humus content and basic nutrients as well as trace elements.

### C Land Tenure

The optimum size of farm units will depend on the planned production, i.e. expected prices of products compared with anticipated costs. The optimum size for ranching units supplying cattle to meat packing industries might be 10,000 ha as compared to 1 ha units of truck farmers producing vegetables for canning industries. In general, large units offer advantages as

well as disadvantages and the same applies to small farm production (2).

Large units offer the following advantages:

- they are flexible in combining the important production factors land, labour and capital. Farm organization, irrigation, mechanization, buildings, stocking rates etc. can be easily adjusted to prevailing prices and latest technical developments;
- they are flexible in regard to production timing. Scope and volume of production can be easily adjusted to changing situations. Adaption to national development plans and targets seems easier. The adaption ability results in a fair elasticity in regard to supply and demand;
- combination of different soils, topographic conditions etc. within a large unit permits better utilization of the labour force and existing machinery;
- it seems easier to introduce new methods and techniques on large units;
- obtaining credit is also facilitated and so is organization of product supplies to processing plants;
- concentration of population as opposed to scattered small holder settlements will permit savings in establishing the necessary social infrastructures.

The advantages of a small farm are:

- availability of family labour which will work regardless of official - frequently unrealistic - minimum wages
- more flexibility in regard to working hours;
- more consideration is given to quality of work on the own farm, than working just as a hired farm worker.

During the initial phases of integrating subsistence agriculture in the cash economy, large units, especially oriented towards plantation crops, can become of utmost importance to rapid development.

During the stage of progressing industrialization (40 - 60 % rural population) family sized farm units will gain in importance. These units might have access to existing social infrastructures, technical know-how and markets.



Still prevailing "under - employment" would make them to relatively cheap producers.

**Continuing rural exodus,** i.e. declining rural population will result in competition between agriculture and the other sectors of the economy and consequently more attractive incomes outside agriculture. The large units will again gain in importance.

The large units will always be superior to small farms when

- production of input requirements, i.e. seeds, tree nurseries, pedigree stock etc. is concerned.
- large quantities of **highly perishable** products have to be transported to processing plants, i.e. sugarcane.
- **labour** could be more economically substituted by capital, i.e. dry-farming.
- land could be used only extensively, i.e. ranching.

Existing land tenure systems, also play a major role in obtaining necessary investment credits. A great many developing countries do not know individual land titles. Farmers till their land only on a use-fruct basis, thereby being unable to offer their holdings as a collateral for credit operations. As long as production could be sold only to planned agro-industrial plants, the land tenure system is of secondary importance. In case of ready markets for farm products - milk, grains, etc. - land tenure systems to be implemented in integrated agro-industrial projects become important.

Difficulties are likely to arise in projects aiming at supplying meat packing or dairy industries, if agricultural production is to be centred on pasture land. In many areas pastures are considered communal property. Investments in watering points, fencing and pasture improvement to guarantee supplies of good quality products to processing industries could be only supported if the land tenure problem could be settled.

#### D Present Land-use

Existing cropping patterns serve not only as indicators of specific areas' agricultural potential, but also indicate basic subsistence

requirements. Since virtually all farms in developing countries are self-sufficient units, producing all requirements for their subsistence, attention has to be paid to **securing continuous food supplies.**

Even in areas where commercial crops have been successfully introduced and considerable money has been earned from them for some time, production for the market still tends to be limited by the importance attached to basic subsistence crops. Usually cropping patterns and acreage are geared to farm labor available during peak **labour** requirements, leaving the farmer and his family for **most of the year underemployed.**

Introduction of cash crops or expansion of market production has only good prospects if combined with efforts to reduce labor inputs in subsistence production. Introduction of higher yielding varieties, resistant against pests and diseases and mechanization are likely to set free labor and land which could then be used for cash crop production.

## II. Various Approaches in Organizing Agriculture

### A. Smallholder Schemes

Political and social considerations may tend to emphasize smallholder production in supplying agro-industrial complexes. **Various** schemes based on smallholders have been successfully implemented and have proven that even a large number of small farmers can guarantee continuous supplies of good quality products.

a) The **Yerya** Tea Development Authority (KTDA) dates back to first experiments with smallholder tea growing in Nyeri District in 1950. KTDA, as a commercial undertaking was to assume responsibility for all services a smallholder engaged in tea growing cannot supply himself. The commercial aspect of KTDA was that all services have to be paid for by the grower and that no subsidies flow into the project. The basic procedure is as follows:

Areas suitable for tea demarcated and farmers may apply for planting licenses and loans. Tea is planted according to KTDA rules supervised by officers and instructors of KTDA's staff. The growers deliver

leaf to buying centres, where after inspection, it is purchased by KTDA. These centres are located not farther than 1.5 miles from field sites. From the buying centers, tea leaves are immediately transported to the factories for processing. Before payment to growers KTDA automatically recovers cesses for its services and due loan repayments.

KTDA is responsible for:

- Distribution of planting material for vegetative propagation and plantings by growers;
- supervision and inspection of field cultivation and maintenance of plantations;
- training of growers during field days and by demonstration plots;
- administration of the credit scheme;
- issue of licenses, maintenance of records;
- liaison with the Government for construction and maintenance of tea-roads;
- inspection, purchase and transport of green leaf;
- liaison with factory units for leaf processing;
- cash pay-outs to growers;
- planning and negotiation of finance for field and factory development.

In 1969 KTDA has delivered leaf to twelve factories, six of which are privately owned. Tea plantings are still expanded under World Bank loans and should reach about 25.000 ha by the end of 1973.

The success of the KTDA scheme, a project based on production contracts has been accomplished because of:

- no major competition from other cash crops in tea growing areas;
- the price system is organized in such way that the grower has adequate incentives.

- from the beginning KTDA aimed at low average tea acreage per grower in order to employ family labour at low opportunity cost;
- KTDA was made an autonomous agency, thus enabling it to attract qualified management and staff, because of salaries paid were higher than those of comparable Government ranks;
- close cooperation between tea industry and KTDA representatives;
- from the outset unrealistically low financial charges to farmers were avoided by covering all costs through collected cesses;
- efficient training and instruction of tea growers through high density extension services;
- adequate provision of funds to cover all credit requirements.

b.) The Tanzania Tobacco Scheme is based on the production of blue-cured tobacco by smallholders. The East African Tobacco Company (EATCO), a subsidiary of the British American Tobacco Company (BAT) has a monopoly on whole-sale buying of tobacco in Tanzania. The tobacco schemes are not uniformly organized and therefore permit comparison between "licence" and "tenant" farmer schemes.

In Urambo, selected applicants were settled in areas belonging to the Tanganyika Agricultural Corporation (TAC). Originally, smallholders had to pass through a "tobacco school" with production on individual plots located in larger tobacco blocks. Tenants had to fulfil certain conditions. They had to clear land assigned to them, raise buildings, dig wells, etc. Credit was granted for inputs and seasonal labour.

The possibility of advance was an inherent part of the scheme. Successful tenants of small plots could become tenants of a medium farm with 60 - 80 ha of land and 4 - 8 ha tobacco. Skilled farmers could even become tenants of 160 - 240 ha farms with more than 8 ha tobacco.

In Tumbi, the EATCo introduced cultivation of flue-cured tobacco into existing subsistence holdings on a licence basis. Interested farmers can receive permits for the cultivation of small tobacco plots. The sale is guaranteed by EATCo. The licence gives EATCo the right to advise farmers to carry out field controls and, under certain circumstances, to give directions as far as cultivation and processing of tobacco are concerned.

Establishment of tenants on individual holdings in areas made accessible by roads and owned by a settlement agency, facilitated cultivation control and implementation of proper technology. Productivity per acre and per hour of work was higher than in the "licence" scheme. It was also possible to introduce permanent farming systems. Although cultivators proved to be more dependent on field staff, fewer supervisors were needed. As far as holdings are of large size and credit is available for hired labor, there is still scope for expansion of acreage as well as productivity improvements.

On the other hand, settlement schemes require high initial investments, especially in infrastructure. Therefore, they cannot expand as rapidly as licence projects. In the long run closely supervised production suffers from tensions between tenants and field staff. Consequently it can only be imposed where the scheme management is afforded complete political support.

In Tumbi tobacco fields of established, licenced farmers are supervised, and the pertinent services are organized. Consequently, capital investments in the project are relatively low. As far as qualified extension staff is available a substantial production volume may be achieved within a few years. Production is capable of adjusting to the labour capacity of the farmer's family, the producer's knowledge and the productivity of the land. There are less social and other problems between farmers and project officers.

On the other hand it proved difficult to introduce proper technology regarding tobacco cultivation and processing. Farmers at Tumbi and small-holders at Urambo manage their farms under similar conditions. In both locations supervisory staff have the same technical qualifications.

However, returns per acre and quality of tobacco in Tumbi are inferior to Urambo. Reasons are that:

- the enforcing power of extension staff is weaker in the licence scheme;
- **licensed** farmers are not pre-selected according to aptitude. Furthermore they remain in a traditional village setting with its handicaps for individual effort. The demonstration effect of better farmers is usually weak.
- the large number of small scattered fields are difficult to supervise. In Urambo each square mile produces 5.3 tons, in Tumbi only 0.61 tons of tobacco.
- credit supervision requires unproportionally much time of personnel, since farmers' reliability is low and the number of licences taken out is fluctuating widely.

In general it can be said that the scheme's farmers tend to neglect crop husbandry. The discrepancy between yields in **licensed** smallholdings and large farms remains considerable. The primary danger is that lower prices for tobacco might result in returns falling to levels of local food-crops, thereby weakening the incentive to produce tobacco. To improve the efficiency of the extension service, it has to obtain enforcement powers such as the right to withdraw granted tobacco growing licences.

c) The "block farming" approach also practised in tobacco production as well as for other crops combines advantages of large scale farming and smallholder schemes. Individual farmers cultivate their own plots within large blocks of land, which shift across suitable areas of a project region within a crop rotation, ordered by the project management. Blockfarming makes it easy to use efficiently implements and tractors, thus permitting - if land is not in short supply - expansion of production. Pest and disease control is greatly facilitated and permits even economic employment of aerial spraying. Exact deadlines can be fixed for each field operation. Control and supervision is rendered appreciably easier, and less supervisory personnel is needed. Technical advances may be introduced without difficulty.

On the other hand, initial investments in block farming are higher than in "licensed" or "tenant" schemes. Costs of land clearing or preparation, which are usually carried out by smallholders in other schemes, must be defrayed by the project authority. A further disadvantage of blockfarming is the lack of flexibility. Mistakes on the part of the project authority have a stronger and more immediate impact. Cultivation cannot be adjusted to labour capacity or to enterprising initiatives of individual farmers. The economic attitude of participating farmers corresponds more to that of paid labourers of large estates than to that of active smallholders. At any rate, block-farming can be recommended only in areas of uniform land, as well as ample capital resources and where the main concern is to introduce unskilled participants rapidly to modern technology.

d) The success of the "cooperative farm" in Israel has caused numerous experiments in collective farming in many developing countries. In theory cooperative farming seems to be the answer to organizing efficient agricultural production. Apparently they offer:

- all advantages of large scale farming;
- members work for their own interest;
- income distribution is on an equal basis;
- members obtain a higher degree of economic security.

Unfortunately the cooperative farming system has not been proven in practice, except in very few instances. Either it has tended to become more and more a "state farm" as one extreme or a "corporation farm" with cooperative members as shareholders as the other extreme.

There are several reasons for the poor results of cooperative farms:

- the problem of accumulating capital. Members of cooperatives are usually not prepared to accept low incomes to permit capital growth of their cooperative. On their own farms, however, spending for consumer goods are likely to be deferred if investments for the farm are planned;

- the problems of low **labour** productivity. Management is usually elected by the members who might resent raising of working hours or demands of working quality. Therefore management interested in reelection tends to be lenient, this the more so when levels of mechanization are low;
- the problems of just wages for different work. Working positions have to be graded, requiring additional administrative costs and creating dissatisfaction. In many cases quality and not quantity of work are decisive, but difficult to measure;
- the problem of introducing modernization. Members might be opposed to certain new methods or machinery if it might result in momentary reduction of working positions or reduced incomes due to anticipated investment costs.
- the problem of hired **labour**. Intensification and specialization of production might require additional labor. Members may oppose an increase in membership or the employment of hired labor.

New approaches to cooperative farming which have to be tested are the "ujamaa system" in Tanzania or the "champs collectives" in Mali. The purpose of both systems is to make better use of ample fallow land and utilize large scale underemployment of the rural population. The schemes, however, tend to be a symbiosis of the cooperative with the block farming system, showing the advantages and disadvantages of both.

#### B. Integrated Schemes.

a) The "nucleus plantation" first tested in Malaysia is gaining in importance, especially for plantation crops, hitherto the monopoly of large scale private estates. Some nucleus plantations may produce up to 2/3 of their processing plant requirements (raw materials) on their own estate. Deliveries of surrounding small farms are considered as supplementary and as welcome additional production permitting better utilization of installed capacities. Another form of the nucleus plantation scheme is to regard their own production only supplementary to deliveries from smallholders. Their own production is to guarantee **continuous** supplies of the processing facilities whenever fluctuations in factory deliveries might occur.



The advantages of the nucleus plantation scheme might be summarized as follows:

- provision of extension to participating farmers. Modern cultivation techniques can be easily **conveyed** through the plantation's own staff without losing much time through excessive travel distances. Extension staff can be paid according to qualification and would be independent from Government interference. The plantation proves to be an ideal demonstration plot for **convincing farmers of the need to introduce new methods;**
- establishment of research facilities. Promotion of research, especially **adaptation of research results to local conditions;**
- supply of inputs. The plantations are in a position to supply quality planting materials and seeds as well as equipment and other inputs. Bulk purchases of pesticides and fertilizer may be beneficial to farmers because of possibly lower prices. **Credit for inputs could be more easily organized;**
- undertake necessary investments in infrastructure. Construction of access roads, railroads or port facilities would fall under the responsibility of the plantation. The expansion of the social infrastructure (schools, dispensaries, shops) is more likely to be initiated;
- solution of marketing problems;

Organization of deliveries to processing plants could be undertaken by the plantation, a cooperative, or a governmental entity.

Establishment of nucleus plantations, despite apparent advantages is not always possible. The major problems of the system are:

- fluctuations in deliveries. Processing plants have to rely on continuous and timely supplies. Price fluctuations tend to be parallel to deliveries, especially of annual crops, making them less interesting for production under the nucleus plantation scheme. Possibilities of product sales outside the contract system may also cause delivery disruptions.
- transport difficulties in regard to bulky, perishable products. Deliveries from smallholder farms can only function well if fields are near factory sites

and if harvesting can be organized on a jointly agreed basis (cooperatives, contracting services etc.);

- the price : quality question. Farmers are inclined to consider offered prices as too low and quality standards required as too high. A solution to this problem, which inevitably causes political interference, might be the establishment of an autonomous purchasing organization, which could more easily introduce quality standards and have a better position in price negotiations.

b) The "outgrower schemes" show many similarities with the nucleus plantation approach, the **difference being a looser** connection with processing enterprises. Upon request farmers may benefit from extension services and credit facilities provided for by the industrial estates, thereby entering some form of licenced production.

The scheme is also similar to **licensed** smallholder production except for processing industries dealing directly, without the intermediary of a cooperative or autonomous agency, with the farmer.

The system is only recommendable in the case of outgrower deliveries serving as supplementary production for extra utilization of processing capacities. Deliveries to factories are difficult to organize and may result in unmanageable quantities supplied during short periods.

Another negative aspect of the scheme could be increasing pressure on agro-industrial estates to expand outgrower production even at the cost of limiting their own output, thus jeopardizing continuity and quality of raw material production.

c) The "ranching association" is an integrated approach to cope with problems of animal production. Meat processing plants have, like other industries, a major interest in a steady supply of good quality raw materials - slaughter animals. Up to now livestock ~~has~~ been purchased at local markets or ~~has~~ been raised on company owned ranches. Political pressures to integrate nomadic herdsmen into the cash economy has led to a **new** approach, the ranching association.

The main problems encountered in efficient livestock production were:

- pastures of low productivity generally considered as communal grazing land;
- inadequate water supplies;
- insufficient animal nutrition during the dry season;
- insufficient disease control;
- high calf mortality;
- overaged herds of unproductive breeds;
- low take-off rates of poor quality animals.

The new system aims at establishing viable ranches, fenced off preventing grazing by outsiders, to provide a livelihood for several families. Waterholes, pasture improvements and provision of fodder for the dry season combined with veterinary services largely improve productivity.

Integration with the agro-industrial complex is twofold. The company ranch serves two purposes: (i) the production of young stock of higher-yielding, improved breeds and (ii) finishing animals purchased from the associations.

Production and up-breeding of young animals does not only supply farmers with stock of improved productivity, but also makes a valuable contribution to reducing calf mortality.

Possibilities of finishing (fattening) cattle on company feeding lots permits relatively faster turnover of animals, thus contributing to a gradual improvement of herd composition. It would also introduce payment on a quality basis, the first step towards a more rational livestock economy. It could be expected that quality payments would greatly improve incentives for production increases.

Company feeding lots could also serve as holding grounds permitting balanced supplies to packing facilities.

On the negative side of the system are the high low, medium and short term capital requirements. A major obstacle are the traditional views on communal

grazing rights requiring far-reaching interventions in long established land rights.

### C. Large Exploitations.

a) There has been adequate experience with "state farming", but results have not always been encouraging. Results will usually depend largely on the quality of management, the degree of commitment of **the workers, the types of crops and the methods of cultivation** employed. There may be a better chance of success with plantation crops which can benefit from economies of scale and the integration of production and processing facilities such as in the case of oil palms and sugar cane.

In most cases state farming is subject to serious weaknesses that are conducive to failures. If undertaken on a significant scale, they generally encounter shortages of managerial and technical skills which can be relieved only at the expense of efficiency. Often their zeal for "modernization" is indiscriminating. Excessive resort to mechanization is a case in point. Lack of sufficient cost consciousness may result in excessive outlays for both investment and **labour**. State farms are usually under considerable pressure to employ more **labour** and to pay minimum wages which frequently exceed productivity levels. While state plantations may have certain theoretical advantages owing to the scale of operations, such benefits are in practice often more than compensated by the high cost of establishing crops and the high proportion of fixed to total operating costs.

Under collective farming the responsibility for operations is often so diffused as to be virtually non-existent. At best only a few learn to assume responsibility and make decisions. Acute management problems are more likely to contribute to output fluctuations, thus jeopardizing continuous supplies. Furthermore, unsatisfactory financial positions of state farms might easily lead to demands for unrealistic price increases on the side of the Government.

b) The "joint ventures", companies of private and Government ownership are more likely to overcome the problems inherent in state farms. If the private partner in a joint venture happens to be a multinational corporation with international distribution of produced goods, adequate leverage concerning management decisions should be possible, even under minority participation. On the other hand pressures regarding employment of additional labor and higher wages will also be encountered.

The "private" plantation or ranch, although probably the economic solution by agro-industrial investors, is unlikely to have a renaissance. Political and social structures in developing countries make it imperative to provide work for large numbers of un- or underemployed, as well as prevent or reduce land ownership of foreigners.

### III. Supporting Services

Independently of the structural model chosen for implementation of agro-industrial projects, provisions have to be made to maximize investments in agriculture through supporting services.

#### A. Planning.

Poor timing of Government initiated development measures and projects has been a frequent cause of failure. If the timing of development measures is to be improved, a number of steps must be taken. Development plans must be tailored to the specific problems found in specific areas. This is essential if farmers are to appreciate the relevance of proposed measures to their particular needs. For areas where development has slowed down or where little or no development has taken place it will become especially important to identify the factors that have prevented the emergence of additional opportunities.

Planning will be required to focus on questions like applied research, staffing and approaches of the extension services, input supply, provision of agricultural credit, additional infrastructure and last but not least proper use of by-products expected from the agro-industrial complex.

Once detailed plans for development within an agro-industrial project have been adopted, the coordination of all Government and private agencies at all levels is absolutely essential to their implementation. Producers and policies governing taxation and prices, financing, education and training, land tenure etc. must all be geared to the achievement of the goals that have been set.

#### B. Research.

Research stations in developing countries have undoubtedly done much useful work, particularly in devising improved varieties of commercial crops and

techniques for raising their yields. However, the gap between research stations and farmers has often been excessive because there has not been enough applied research and testing of results through pilot extension schemes.

Research in the framework of agro-industrial projects would have to accomplish two tasks. First a research team would have to test recommended varieties which would be <sup>eventually</sup> processed. It would be necessary to determine their production performance as well as their requirements in regard to cultivation techniques, fertilization and disease resistance under local conditions. Secondly research would have to concentrate also on improving subsistence production.

The importance of including subsistence crop research in an agro-industrial project becomes apparent when considering the competitive position of cash crops to be introduced. A competitive position not only in regard to finding suitable land on small farms, but also in time and labour requirements as well as capital outlay for inputs.

#### C. Extension.

In a number of cases efforts to improve farming have failed simply because agricultural extension services have not had programs of substantive content. Before farmers can be taught, there must often be a better understanding of the rationale of existing farming methods and of the problems the farmers perceive in adopting proposed recommendations for improvements.

The need of conveying new methods to farmers has been recognized. Experience has shown that a minimum density of one extension worker per 50 farmers seems to be effective during the initial two to three years after project implementation. Efficiency of the service is greatly enhanced if demonstration plots are made part of their responsibility. Adequate mobility of the service in case of scattered outgrower schemes is imperative. Supervision and constant training of extension workers has to become part of the extension programs.

Quality of the service will depend on salaries offered. The establishment of autonomous project extension services would permit deviations from official Government pay schedules. Furthermore it would free the service from budgetary allocations or reductions as well as from politically motivated transfers of personnel.

#### D. Credit

Credit will be necessary to support and not to replace the efforts which participating farmers can make to save and work. It follows from this that credit should be extended **only** to cover outlays which are significant in relation to their resource and thus, presumably, cannot be financed out of any efforts or savings he could be expected to make. Depending on the circumstances, this may have practical implications for different types of loans.

The "crop establishment" loan will be required by small farmers who need assistance to emerge from **subsistence** farming. Crop-establishment loans may also be given to settlers on new farms. To avoid any abuse of credits payment of cash should be kept to a minimum in favor of credit in kind.

Short-term loans to cover the cost of recurring seasonal production needs such as fertilizers, pesticides etc. appear justified to encourage and facilitate the more general use of such supplies, always provided that their application is profitable to farmers. Credit is often necessary to finance implements and machinery or other investment outlays. However, a cautious approach in regard to financing machinery is recommended. Since small farmers cannot make full use of tractors or other machinery, cooperative acquisition and ownership may need to be encouraged.

Credit is usually most effectively administered by special, **autonomous Government** institutions, with the extension service discharging the essential functions of assessing the farmers' capabilities of using credit effectively and ensuring that it is actually employed for the purposes specified.

#### E. Input Supplies.

Arrangements have to be made for the timely and adequate supply of inputs. While provision of fertilizer and pesticides may require only timely administrative arrangements combined with the strategic location of supply points, special arrangements might be necessary for seeds or planting materials. Farms or land of large estates have to be selected for seed propagation and nurseries and close supervision of these has to be introduced.

In the case of tractors or agricultural machinery being used by participating farmers sparepart supplies have to be organized. To facilitate maintenance of equipment mobile service stations could be organized.

Experience shows that cooperatives can be a vital means of evoking among farmers a sense of participation and responsibility - in supplying requisites of production, in administering credit and in collecting, grading and transporting agricultural products to processing plants. However, cooperatives which are managed by the members are likely to develop only in areas that have experienced considerable development and have at least some reservoir of educated people capable of managing this kind of diversified enterprise. In many cases where qualified management cannot be secured it would be preferable to have the agro-industrial enterprise also handle aspects of input supplies.

#### F. Infrastructure.

It is generally acknowledged that the transport problem has to be solved before establishment of an industrial complex. An adequate road system, rail roads and ports are considered necessary to **safe-guard** evacuation of finished products as well as supplies of **auxiliary** materials. However, less consideration is usually accorded to agricultural roads which would permit timely transport to the processing plants. Good roads would not only permit transportation of good quality products but would also make a valuable contribution to substantial cost reductions.

Provisions for infrastructure would also involve construction of on-farm evacuation roads where bulky crops ( sugar cane) has to be transported during adverse weather conditions.

Other investments in infrastructure could involve construction of supply and collecting stations at strategic locations. Establishment of phytosanitary posts especially in **the case of block farming and dipping facilities for ranching** associations have to be considered part of an integrated agro-industrial project.

Consideration has to be given to improving the social infrastructure, i. e. schools, dispensaries, hospitals etc. in case of schemes which involve settlement of farmers or which would require immigration of farm labor.

#### IV. Incentives and Returns

Agricultural projects in the past have often failed because incentives have been inadequate from the standpoint of the farmer. The profitability of proposed innovations, particularly in terms of alternative uses of the farmers' labour and land, has often been uncertain or insufficient.



It has to be recognized that a prominent characteristic of agriculture in developing countries is its continued emphasis on **subsistence** farming. In many countries as much as 70 percent of the land and 60 percent of the **labour** are devoted to subsistence production. Even where cash cropping has been introduced on an considerable scale, farmers still tend to insist on food self-sufficiency.

Subsistence often entails the comparatively inefficient use of land for production of food when such land could much better be devoted to cash crops. Provision of improved varieties of food crops combined with advice on better production methods for staple food should improve the competitive position of cash crop production.

Introduction of new cash crops requiring substantial investments or purchases of production requisites will be only accepted by farmers if adequate returns on their "financial risks" are to be expected. Experience shows that the less cash crop production had been introduced on an farm, the more benefits have to be offered to promote transition from subsistence to cash economy. The cost:benefit ratio in these cases should be at least 1:3 as compared to ratios of 1:1,1 which are considered interesting by farmers in devel countries.

The amount of incentive required is likely to be in proportion to the degree of change in established methods, habits and modes of living that are involved. In some respects, therefore, the success of agricultural development depends and will continue to depend on the priority the farmer, expected to participate in a project, gives to more production.

Table 1

Rural Population as Percentage of Total Population  
( 1965 )

Albania	59
Greece	54
Mexico	52
Haiti	80
Nicaragua	58
Bolivia	63
Afghanistan	84
India	70
Indonesia	67
Pakistan	74
Burundi	95
Chad	95
Congo	72
Ghana	60
Ivory Coast	80
Kenya	84
Nigeria	79
Tunisia	60
Zambia	81

Source: FAO, Production Yearbook 1971

Table 2

Agricultural Exports as Percentage of Total Exports  
( 1970 )

Greece	51.3
Portugal	21.0
Spain	36.0
Mexico	65.2
Nicaragua	79.9
Panama	74.7
Argentina	84.8
Brazil	72.7
Columbia	74.3
India	35.7
Pakistan	56.0
Chad	97.0
Ghana	77.4
Ivory Coast	62.8
Kenya	56.9
Nigeria	36.5
Tunisia	32.1

Source: FAO, Trade Yearbook 1971

R E F E R E N C E S

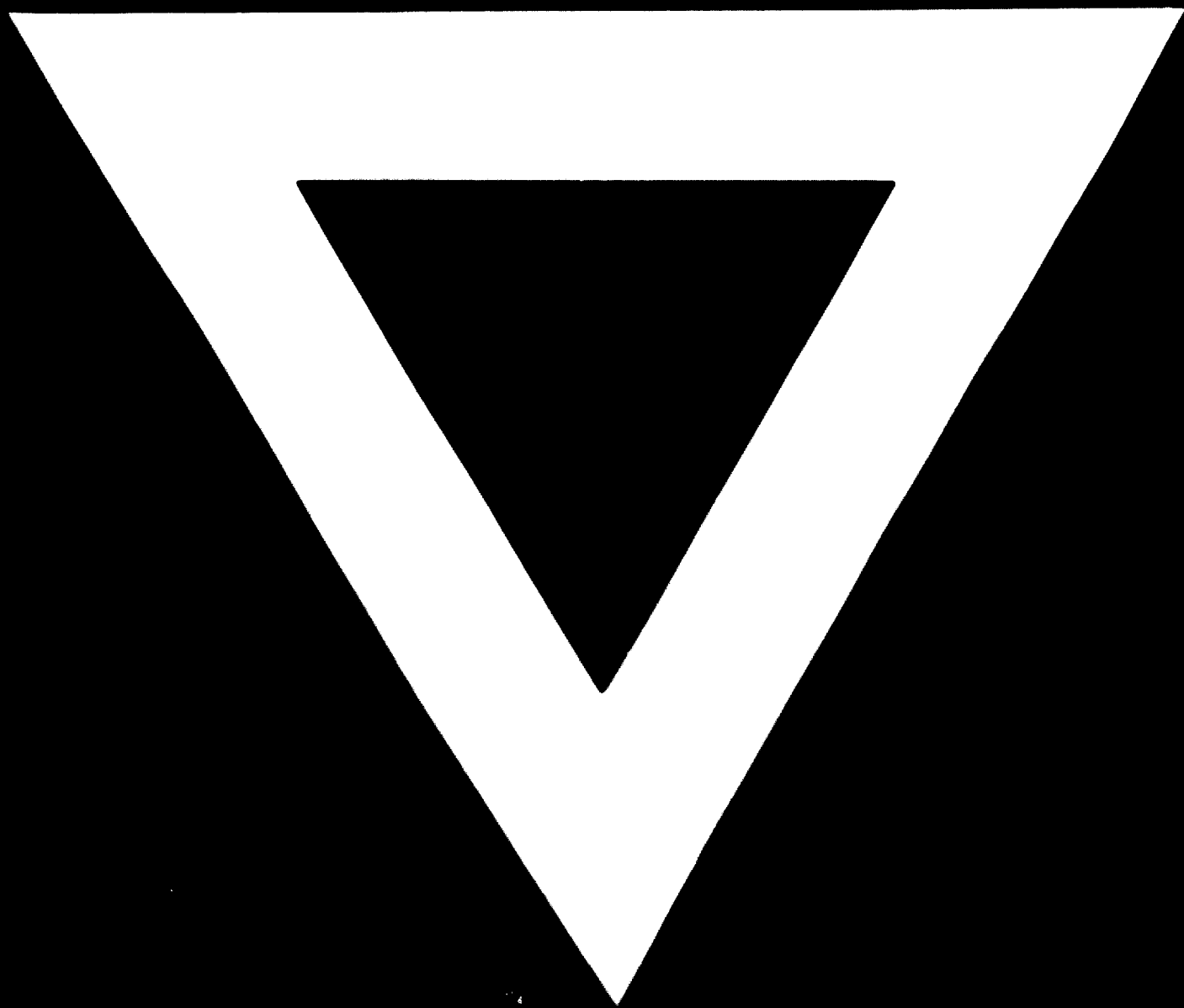
- (1) de Wilde, John C. et al.

Experiences with Agricultural Development in Tropical Africa. Volume I.  
Baltimore, Maryland. Published for the International Bank for Reconstruction  
and Development by the Johns Hopkins Press; 1967

- (2) Ruthenberg, Hans

Landwirtschaftliche Entwicklungspolitik  
Frankfurt/Main; Zeitschrift für Ausländische Landwirtschaft, DIG-Verlag 1972





**7 4.09.13**