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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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THE ROLE OF AGRO-INDUSTRIES IN THE INDUSTRIALIZATION OF DEVELOPING COUNTRIES [1]

by

M.M. Aref
Agro-Industries Section

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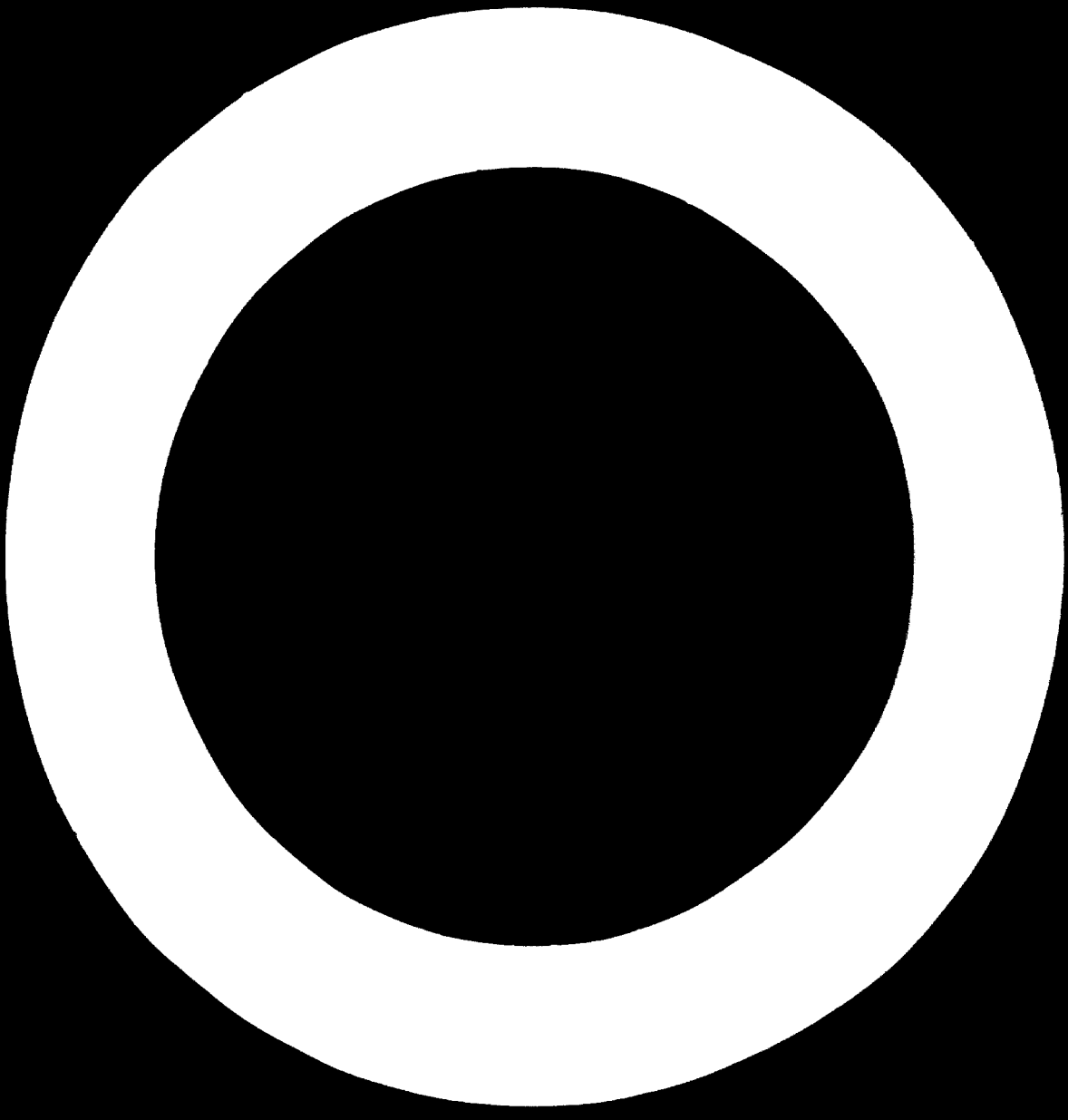


I. INTRODUCTION

1) Agriculture is the predominant sector in the economic structure of most developing countries and has been regarded by many as a base from which to launch the process of industrialization and rapid economic growth. The current food crisis, however, has exposed the invalidity of such introspection and it is now realized that neither industry nor agriculture can proceed very far without parallel and balanced development of the other. Growth of agricultural output is usually a critical determinant of the rate at which industrialization can proceed. Conversely, insufficient industrial support for agriculture and lack of manufacturing facilities to process agricultural output represent a major constraint to output and productivity in agriculture. In other words, the interdependence of industry and agriculture is represented by the commodity flows between the two sectors, either in the form of industrial support of agriculture (fertilizers, pesticides, agricultural machinery, tools, implements, etc.) or industrial processing of agricultural raw materials (food processing and non-food processing). It is this last aspect of industry/agriculture interdependence which is the purview of this paper.

2) Industries using raw materials in the form of renewable resources from farms, grassland, forests, and the sea may be classified into food processing and non-food processing industries. The former include processing of wheat, rice, barley, pulses, oil-seeds, maize, sorghum, sugar, meat and dairy products, fruit and vegetables, coffee, cocoa, tea, fish, etc.

3) Food-processing industries increase the quantity and quality of food through reduction of waste, preservation of perishable products, and utilization of by-products for animal husbandry and in this way satisfy a larger final demand for food from a given unit of land and other resources. That is of particular value in the current world food situation.

4) Non-food industries mainly satisfy human needs for clothing and shelter and produce such commodities as natural fibres, cotton, jute, wool, kenaf, coir and allied fibres for the textile industry, as well as rubber, wood and wood products, paper products, and leather and leather goods. Almost all of the non-food agricultural raw materials lend themselves to a higher degree of processing than food raw materials and thus the proportion of value added in this type of processing tends to be higher than in food processing. Another feature is that non-food industries are facing competition from synthetics and from man-made fibres used in combination with natural raw materials.

5) Processed food and non-food agricultural products generally exhibit lower price elasticities than agricultural raw materials, since quality and marketing considerations tend to reduce the relative importance of price as a demand factor. Processed agricultural products therefore exhibit greater price stability than agricultural raw materials and producing them allows developing countries to obtain greater value added than exporting the corresponding raw materials. Their production also catalyzes farmers' participation in commercial markets and in this way contributes to transforming subsistence agriculture into commercialized agriculture.

6) In spite of wide variations in the pattern of development it does appear that industries using raw materials from agriculture possess the following characteristics that make them especially suitable for developing countries:

a) High labour intensity;
b) Many employment linkages;
c) Modest capital and skill requirements;
d) Prospects for rural development;
e) Prospects for export-led growth.

They can thus perform an important function in stimulating production, productivity and diversification in the primary sector and can be strategic elements in the process of development. Many of these resource-based industries have proved to be pioneer industries in developing countries, as they were in industrialized countries several generations ago.

7) It would, therefore, seem evident that these industries can be the genesis of development in many countries if the concept of development is defined by the gradual increase in social welfare through a fuller realization of human individual potential, social progress, technological advance and economic betterment.

8) A precondition to fuller realization of human individual potential is an adequate supply of food, clothing and housing. This is closely linked to the industrial processing of raw materials from agriculture.

9) Social progress implies greater justice in exchange relations between agriculture, industries and marketing services. It also involves greater justice in distribution of national income, relations between the individual citizens and society and concern for future generations. All these aspects of social progress can be greatly influenced in most developing countries by industrial processing of agricultural raw materials. In addition, processing of certain agricultural raw materials in their country of production instead of abroad in developed countries would result in greater justice on an international scale.

10) Technological advance, the third major development area is also closely related to industrial processing of agricultural raw materials through the application of post-harvest technology. Given adequate attention, considerable quantitative and qualitative losses of agricultural produce can be avoided by proper storage, milling facilities, utilization of by-products, manufacturing, packaging and transport services. All these activities can be undertaken on a small or medium scale and they tend to be capital-saving and labour absorbing. They usually have an industry multiplier effect through the production of necessary containers and packages such as fibre and paper bags, wooden crates, tin and plastic containers, etc.; activities which in turn stimulate the engineering and construction industries as well as various services so that a wide process of income and employment generation is initiated.

11) It is obvious from the above that industrial processing of agricultural raw materials can ultimately lead to economic betterment. Even simple processing involves the production of equipment such as crushers for sugar cane, meat- and fish-drying apparatus, rice milling equipment, grain-grading machines and various types of related implements. This is usually followed by a long chain of industrial activities of increasing complexity which provide backward and forward linkages with other industries and services. In this way, new employment opportunities and sources of income are generated and economic betterment is achieved.

12) Agricultural processing industries can serve also as catalysts for numerous kinds of agricultural activities. Thus, in many countries grain production was stimulated by the development of transport and storage terminal facilities, fruit and vegetable farms were expanded around co-operative grading and packing sheds and processing plants, and poultry farms multiplied around feed-stock compounding plants, hatcheries and poultry processing plants. Such integrated agricultural development schemes linked with processing enterprises have been the most important promoters of farmer participation in commercial markets. Agricultural processing industries seem to help motivate farmers to expand and undertake new activities. They provide the farmers with regular outlets, access to reasonable credit, training and proper technical assistance. Hence, this type of development appears to be of special importance to countries in need of a transition from subsistence to commercial farming.

II. THE INTEGRATED AGRO-INDUSTRIAL POLICY APPROACH

13) The integrated agro-industrial approach involves the vertical integration of the whole production process of food, or other agriculture-based consumer goods, from the field to the final consumer. Vertical integration means that all stages of the process and their planning are managed, or perhaps owned, by a single market-oriented authority having an industrial approach and applying a policy suited to market demands. Such an authority would have profitability as the only acceptable criterion for success and would endeavour to produce and process acceptable products using an industrial approach that would improve agricultural performance.

14) Such an approach catalyzes its own growth through the reinvestment of profits partly in enlarging its own capabilities, and partly in direct and indirect reconstruction of the rural area in which it is applied. It evokes a chain reaction of socio-economic development including road building, improvement of water supplies, housing, credit facilities, as well as training, educational and even cultural activities. Its chances for diversification of industrial activities would be quite substantial.

15) The structure of an integrated agro-industrial complex will include certain groups of activities which are fundamental to a unified industrial process. These groups will include:

15.1. Production of basic crops and collection or catch of raw materials;
This group of activities includes the complete range of large-scale agricultural operations involved in the production of crops specifically grown for processing. There are various forms of industrial production, in particular where the catching of fish or game, the picking of wild fruits, berries, vegetables and the like are concerned.

15.2. Pre-processing, transport and storing of basic crops, catches and pre-processed products;
This group of activities includes harvesting, cropping operations, cold storage, sorting, grading, drying, washing, dehydrating, chopping or other forms of pre-processing raw materials with the aim of presenting them in

a cleaner or more concentrated form for further industrial processing.

15.3. A basic food-processing industry adjacent to the production of raw materials;

This group of operations includes the basic, primary food-processing industries such as: the production of sugar, fruit and vegetable preserves, vegetable oil, oil cakes; the production of flour for the purpose of processing basic, individual food commodities and to separate by-products needed elsewhere. This group of primary food industries is closely associated with the production of raw materials.

15.4. Production of animal feedstuffs for up-to-date animal husbandry;

This group of activities in the consecutive flow of operations is the industrial production of animal feedstuffs, on which an up-to-date, successful animal husbandry of the industrial ranching type is based. The producer of animal feedstuffs is the most important entrepreneur of today in the establishment of profitable meat, egg, milk and wool production.

15.5. Production of animal proteins using industrial ranching methods;

This group of operations consists of industrialized animal husbandry based on the fattening or feeding of a large number of animals in "animal protein factories", which are often located very near the markets or adjacent to processing facilities (slaughter-houses, meat-processing plants, dairies, etc.) creating a logical combination of the animal feedstuff factory, industrial cattle farm, processing facilities and marketing facilities.

15.6. Food production for direct consumption;

This group of activities is the fast-growing, secondary food processing industries supplied directly with raw materials from the first, second, third and fifth groups. The materials are combined into a rich assortment of ready-made foods that can be distributed directly to, or consumed by, the individual purchaser. This is accomplished by developing labour-saving engineering techniques for manufacturing products of high nutritional value.

15.7. Distribution and marketing activities;

This group of operations consists of all the technical and commercial facilities (cold storage, cold transport facilities, catering services, restaurant and department store chains, etc.) necessary for the regular supply of food products to the domestic and export markets.

16) Integration of all these groups of operations is not always necessary; sometimes a group can be eliminated or can be replaced by co-operative operations. Sometimes it is not feasible to implement all the operations at once but only gradually. Some lines of food products can be developed successfully also as small-scale, individual operations. However, it is clear that whenever integrated food processing is feasible it should be preferred to all other production methods, especially in developing countries.

17) Through this approach the industrialization of rural areas can be programmed and implemented under the leadership of industry, rather than of agriculture, since industry is usually more capable of applying objective criteria to all operations. In this way the benefits associated with the application of industrial technology to the agricultural sectors of developing countries can be achieved.

18) It is evident that an agro-industrial complex would be able to find sources of finance that would allow it to advance to the collaborating farmer the necessary inputs he would need to increase his production. Its impact on the up-grading of local skills at all levels cannot be over-emphasized.

III. EXAMPLES OF POSSIBLE AGRO-INDUSTRIAL COMPLEXES

19) Uganda: A schematic presentation of a food-processing complex based on the existing industries in Uganda (a least developed and land-locked country) is shown in Annex I. The urea factory and tannery are envisaged as future additions to the complex, but serve to illustrate the potential multiplier effect of the approach. Other possible future additions would be a milk-products factory, an animal-glue plant, a leather manufactury, a margarine factory, a candy factory, cold-storage, etc.

20) Upper-Volta: Also a land-locked LDC, Upper-Volta would greatly benefit from the proposed approach which is presented in Annex II. Since most of the industries presented in Annex II are not yet in existence, a gradual built-up of the proposed complex over a period of ten years would be advisable.

21) Sri-Lanka: An island country, seems to offer at its present stage of development, and due to the economic constraints it is currently facing, a prototype for the application of an approach that would satisfy a larger final demand for food from a given unit of land and for other resources. Annex III is a schematic presentation of a proposed integrated food-industries complex as informally envisaged by the Ministry of Agriculture and Lands, Sri Lanka, in collaboration with UNIDO.

IV. APPLICATION OF THE APPROACH BY THE UN SYSTEM

22) It would seem that the first step for the application of this approach to developing countries through the UN system would be a joint consultation between the three most involved organs, namely UNDP, UNIDO and FAO. It is envisaged that such a joint consultation would result in a further refinement of the approach, and the identification of a few countries at different stages of development for its implementation.

23) A first step in the implementation would be to field joint UNDP/UNIDO/FAO missions to the countries concerned for a period of four to six months to determine the feasibility of introducing the approach. Each mission may be composed of an economist, a food-processing engineer and an agronomist and may have the following as its terms of reference:

23.1. Identify existing industries which could be incorporated in a food industries complex;

23.2. Determine the number of farmers, area of farms and present and potential amounts of food material to be included in the complex;

23.3. Determine the capacity and condition of existing machinery, transportation facilities, water supplies, etc.;

23.4. Investigate the availability of technical and managerial man-power and identify areas where training is required;

23.5. Propose an administrative structure for the operation and management of the complex giving an estimate of the costs involved;

23.6. Determine the cost of any improvements or additions to existing buildings and machinery as required.

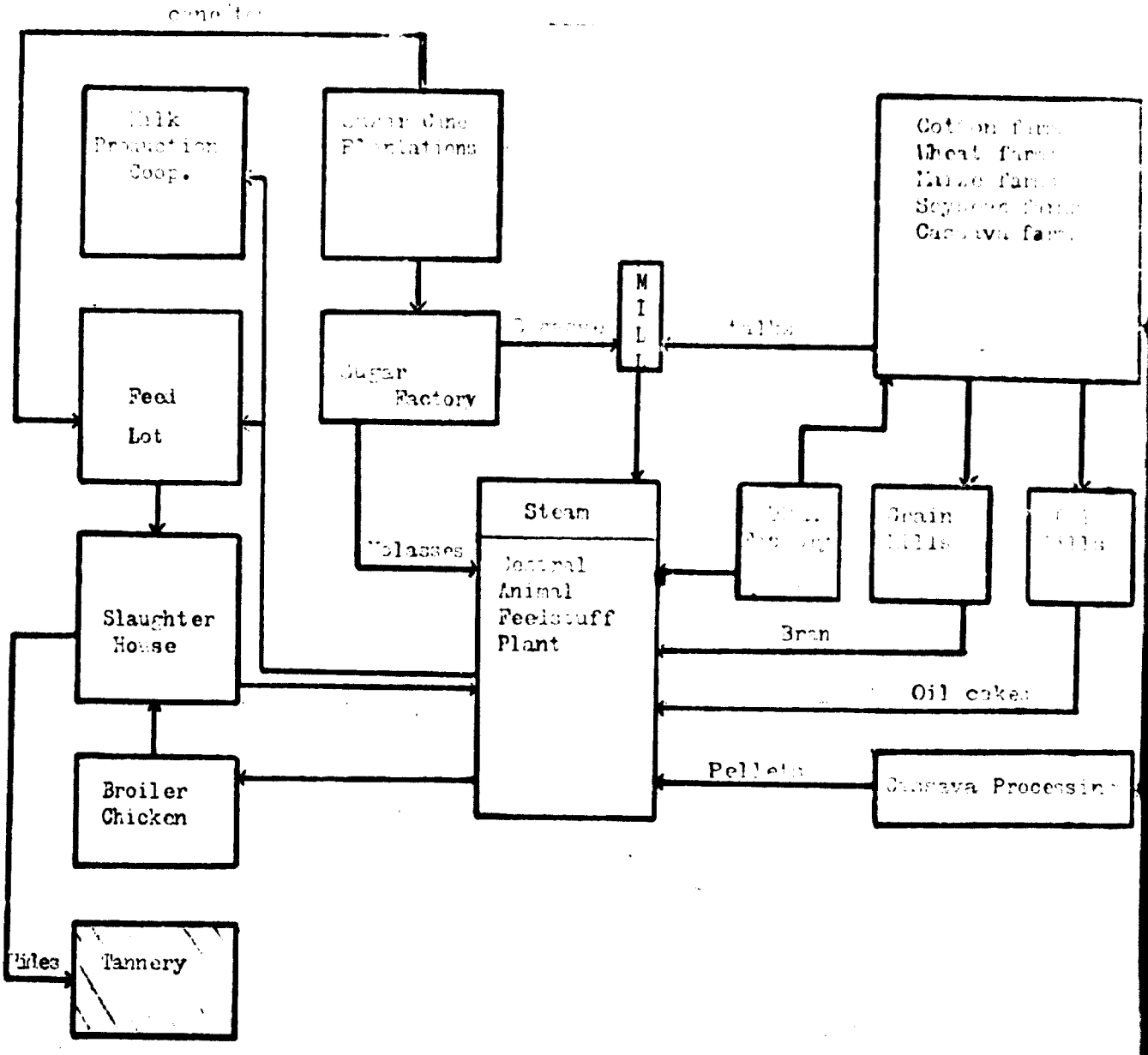
References

1) Industrial Development Survey. Special issue for the Second General Conference of UNIDO. ID/CONF.3/2 UNITED NATIONS, New York, 1974;

2) The Inter-relationship between Industry and Agriculture in the Process of Development. Second General Conference of UNIDO. ID/CONF.3/15, 14 January 1975;

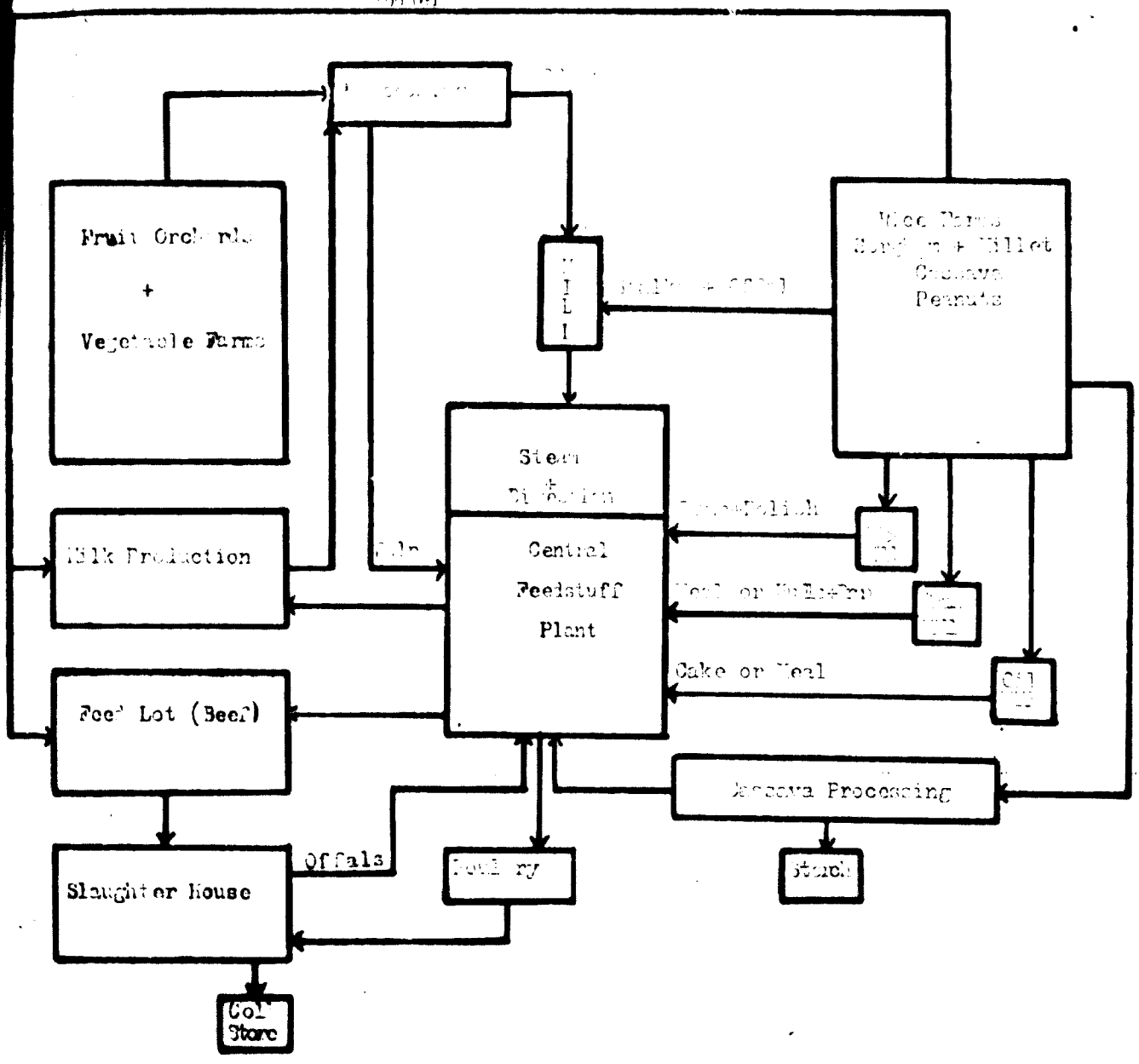
3) The Lima Declaration and Plan of Action. Report of the Second General Conference of the United Nations Industrial Development Organization. ID/CONF.3/31, 9 May 1975;

4) Integrated Food Processing in Yugoslavia. Report of Seminar and digest of technical papers. Novi Sad, Yugoslavia, 4-28 November, 1968. ID/48, UNITED NATIONS, New York, 1970.


Milk Production Coop.
Sugar Cane Plantations
Cotton farm
Wheat farm
Maize farm
Soybean farm
Cassava farm
M I L L
Feed Lot
Sugar Factory
Steam
Animal Feedstuff Plant
Grain Mills
Slaughter House
Molasses
Bran
Oil cakes
Broiler Chicken
Pellets
Cassava Processing
Hides
Tannery

ANNEX II

Proposed Plan for a Multi-[illegible] Volta



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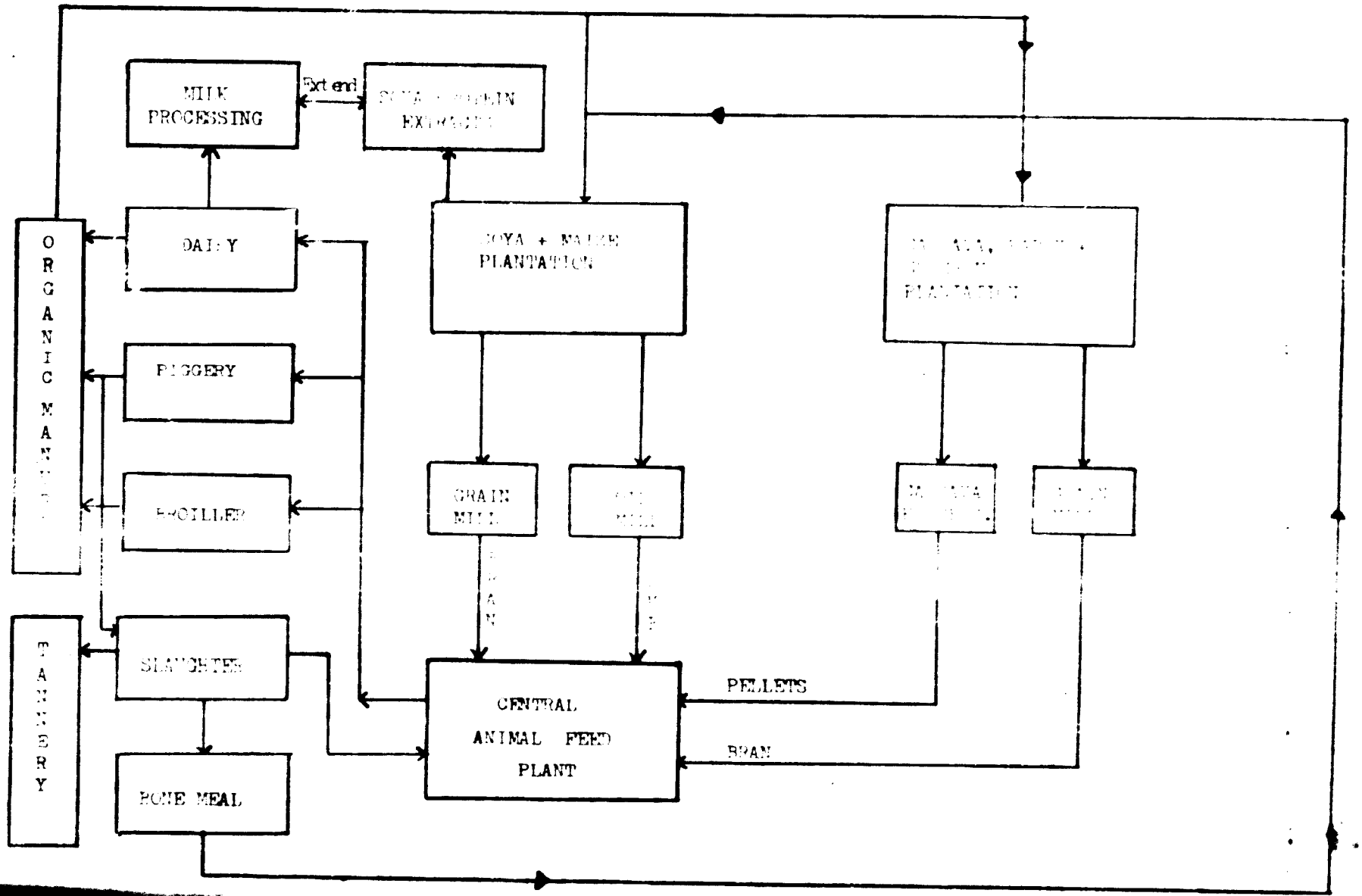
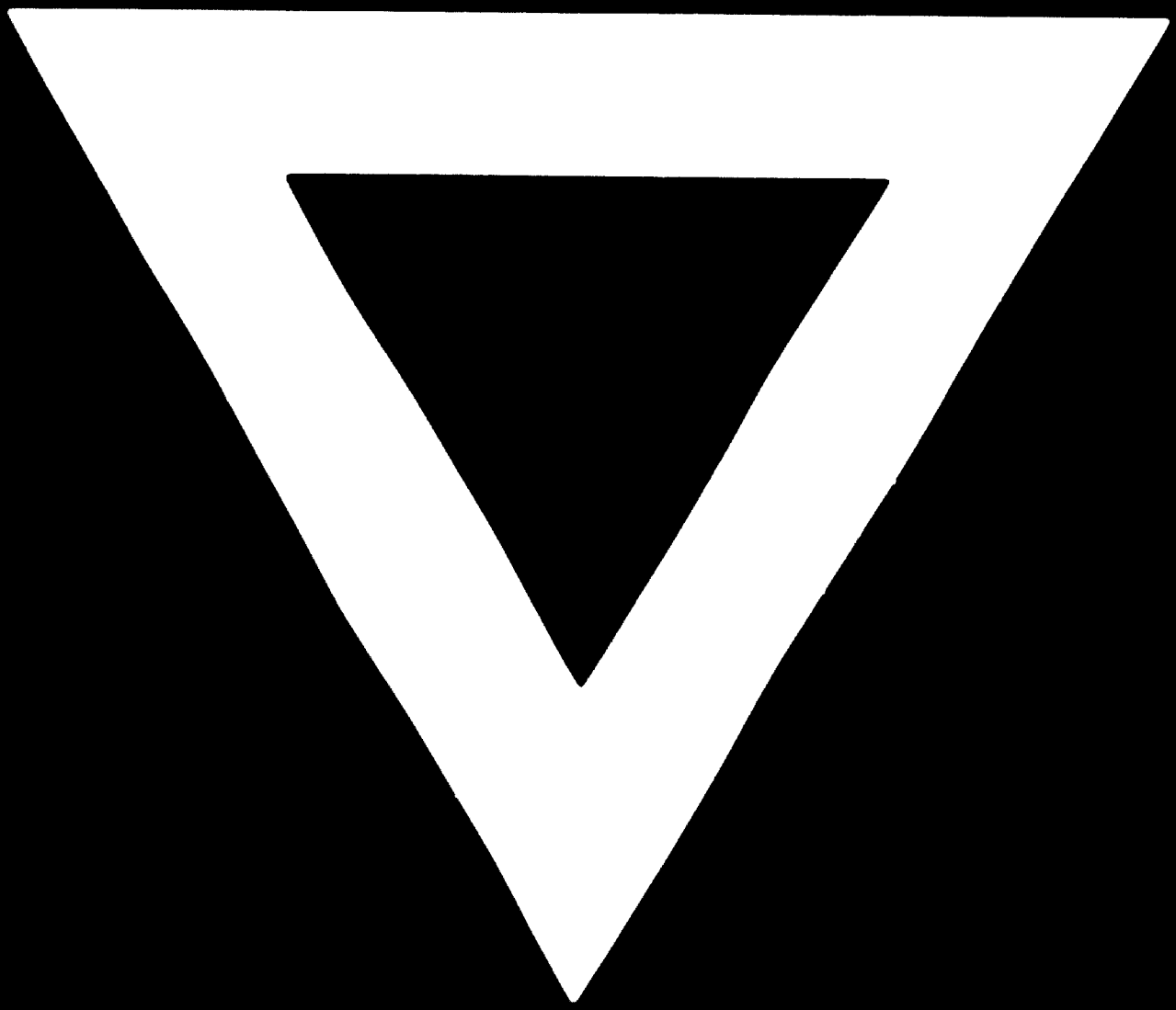
ANNEX III

PROPOSED INTEGRATED FOOD-INDUSTRIES COMPLEX, SRI - LANKA





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