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TERMINAL REPORT

SPECIAL ASSISTANCE TO LAND-LOCKED AND ISLAND DEVELOPING COUNTRIES[1/],

Project Findings and Recommendations

by

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I. Background of the Project

The land-locked and island developing countries present a set of problems which require special measures if they are to attain an acceptable level of economic development and achieve the maximum possible increase in their industrial production within the target set for the developing world.

The lack of territorial access to the sea, compounded by remoteness and isolation from the world market and heavy dependence on external transportation, appears to pose a major hinderance to the economic development of these countries.

Considering the disadvantages of the adverse geographical situation of the land-locked and island developing countries - particularly with regard to their additional transportation and transit costs - and recalling the General Assembly Resolution on the Programme of Action on the Establishment of New Economic Order, the Second General Conference of UNIDO held in Lima called for special aid to be rendered to the land-locked and island developing countries, many of which are classified as least developed among developing countries. The Lima Declaration and Plan of Action recommends (para.69, items i and j) that special measures be taken in order to establish and develop adequate means of transport and communication, and to increase the import and export capabilities of these countries in an attempt to help them offset the disadvantages arising from their adverse geographical situation.

In order to fulfil the above recommendations, UNIDO proposed the development of a special technical assistance programme for the two groups of countries, aiming at, inter-alia, the identification of specific problems hampering their industrial development, and the preparation of adequate technical assistance proposals which would fit in with their particular national development plans and their particular geographical conditions. To implement this project, a consultant was required to:

1) visit a selected number of land-locked and island developing countries in order to study their industrial development plans and meet top-level experts and key persons directly involved in the machinery of industrial planning and development, with a view to identifying the specific problems facing the industrial development of these countries;

2) review relevant recommendations of UN Agencies and organizations related to the development of the manufacturing sector in these countries with a view to following-up and incorporating such recommendations in the proposed UNIDO special programme of technical assistance;

3) identify appropriate industrial production opportunities suited for re-allocation of selected industrial capacities available in industrialized countries;

4) assist UNIDO, based on direct discussions with the governments' officials and the background information available at UNIDO Headquarters, in formulating a special programme of technical assistance which would be suitable for the majority of these countries;

5) prepare a final report reflecting recommendations and the most appropriate ways and means of assistance suited to the particular conditions of these countries.

II. Findings

In accordance with the terms of reference the author visited, from 15 October 1976 to 15 February 1977, a selected number of land-locked and island developing countries in Asia and the Pacific, Africa and Latin America (Mongolia, Fiji, Madagascar, Mauritius, Zambia, Trinidad and Tobago, Barbados and Bolivia) as well as ECLA (Economic Commission for Latin America) in Mexico and ICAO (International Civil Aviation Organization) in Montreal. The purpose of the missions was to meet with top-level government officials and experts in order to exchange views and obtain on the spot the first-hand information on the needs, priorities, policies and strategies of their national economic development with a view to assisting UNIDO in formulating an appropriate programme of technical assistance for the land-locked and island developing countries.

Based on these discussions, as well as the relevant documentations which were reviewed during the mission, the author could identify specific problems which seem to have negative impacts on the industrial development of these countries. These problems, which are valid for all countries visited by the author, may be encountered by ways and means which are indicated under Chapter III and the subsequent Chapter IV.

To expose the nature and the magnitude of difficulties impeding the industrialization process in these countries, and to propose appropriate measures to encounter their specific bottlenecks, it is necessary to classify the problems in two groups:

- problems emanating exclusively from adverse geographical situation
- problems originating from prevailing economic status.

While the second category of problems apply to a large extent to all developing countries, they seem to be more serious in the land-locked and island developing countries due to their remoteness and isolation.

This report is intended to deal more in detail with recommendations and proposals on how to encounter the problems hampering the industrial development of the land-locked and island developing countries. Therefore the existing problems have been indicated briefly, only in order to facilitate the orientation and justification of the recommendations and proposals. Since all problems are common within the group of land-locked and

island developing countries, no reference has been made to a particular country unless the problem is of a particular nature. In such cases, relevant examples have been offered. The author has also made use of his experiences gained during his missions in 1976 to Afghanistan, Bangladesh, Nepal and Laos.

A: Specific problems emanating from adverse geographical situation:

1. Land-locked developing countries:

a) Longer transportation distance: The distances between production and/or market areas in the land-locked countries and a sea-port they are using are much bigger than in other developing countries with an access to the sea. Among the land-locked developing countries visited, only Bolivia has relatively short hauls to ports. The remaining countries all have considerable distances to cover before their products can reach ports and so enter world markets. The existence of such long distances forces the land-locked developing countries to use the transloading services which are both time consuming and costly. The additional costs which are thus imposed on exports and imports have to be borne alone by the land-locked developing countries because:

i. their export commodities (agricultural raw materials, intermediates, minerals etc.) are relatively price elastic and are therefore priced at world markets;

ii. their import products (pharmaceuticals, foodstuffs, petroleum products, cement, machinery and spare parts, coal, iron and steel etc.) are relatively price inelastic and are generally priced at the manufacturing points or, in the case of petroleum products, at various basing points.

Therefore, the land-locked developing countries have less flexibility to charge their additional costs on their export or import prices. With the relatively high transportation costs, the land-locked developing countries can enter only a limited number of world markets and have thus less opportunity to develop their export industries.

b) Transiting problems: The land-locked developing countries do need to transit another national territory to reach international channels of trade. Due to the border crossing formalities, transloading, warehousing at the port and all other operations involved, unnecessary delays are caused in running and servicing the trains, customs inspections, control of transit documents, etc. and a number of transit countries are faced with management

problems as well as insufficient storage facilities in the ports. The above restrictions and procedures are not only causing delays in commodity flow with negative effects on the manufacturing sector and export industries, but also additional costs with regard to handling, transshipment, storage and insurance of the transit commodities to the land-locked countries. While it is difficult to quantify, without specific investigations, these costs imposed by various forms of restrictions on the trade of the land-locked countries, it seems worthy to mention the following forms of restrictions being practiced against land-locked developing countries:

i. Non-favourable treatment;
ii. Non-recognition of any special status for the land-locked developing countries;
iii. Future political and economic uncertainties.

An example of the first category is the higher rate of transit cost charged on imports and exports of Laos. Another example is the delay in transloading import goods destinated for Bolivia in ports of the coastal countries, caused by lengthy procedures of inspection by customs, control of documents, and the like.

As a result of these lengthy formalities, the imported goods have to be stored in the port causing unnecessary storage and handling costs. Furthermore, the production sector frequently suffers from insufficient supply of vital spare parts due to the above delays. Another example can be seen in the case of Nepal regarding the export of jute. Here again customs formalities cause from time to time delays on the frontier. As a result of this the timing connexion of the rail transport and ship arrival is disturbed i.e. by the time the train loaded with export goods arrives at the port the scheduled ship has already left, and the goods will have to be stored, for which the Government of Nepal has to pay additional storage and insurance costs. While such additional costs in some cases can be normal and inadvertent, they may, however, in some cases be interpreted as harassment.

The second type of restrictions can be illustrated by the lack of adequate facilities, such as reserved port storage areas, warehousing etc., in the ports for the land-locked and island developing countries. Non-recognition is, however, a general type of restriction and can

cover many types of arrangements which may cause more delays and high costs of freight for the land-locked developing countries. Vehicle taxes that are not on a reciprocal basis provide an example for the above statement.

The third category of restrictions has apparently resulted from the political and economic uncertainties. In this case no problem exists with regard to the flow of commodities and trade. If, however, the political situation between the land-locked and contiguous countries changes in future the flow of commodities would be interrupted and the foreign trade would consequently undergo further deterioration. For the same reason Zambia, using Beira for its copper export, attempted to reorient its trade, since Rhodesia demanded from Zambia political and economic commitments.

As can be seen from the examples the land-locked developing countries have to pay additional costs than those of the coastal countries prior to (in the case of exports) or after the ocean shipping (in the case of imports) which adversely affects the speed of their industrial development.

2. Island developing countries:

Generally speaking the problems of island developing countries are less accentuated than those of the land-locked developing countries in as much as there is a free and unhindered access to the world markets. When analyzing, however, the problems of the island developing countries, one should make a distinction between various islands from at least two viewpoints - size and remoteness.

(a) Size: There are large (medium) sized islands (i.e. Indonesia, Sri Lanka, Papua-New Guinea, Madagascar, Cuba, Haiti, Jamaica etc.) and small sized islands (Fiji, Solomon Islands, Samoa, Tonga, Trinidad and Tobago, Mauritius etc.).

(b) Location: There are again two groups of islands -

i. islands which are located in the vicinity of the major continent and the markets (Caribbean Islands, Sri Lanka, etc.) or a group of islands forming a national and economic entity (Indonesia, Philippines);

ii. islands which are remote and far away from the usual trade routes (Mauritius, Maldives, Fiji and other islands in the Pacific etc.).

The problems of small islands, often scattered over a large area, are obviously more complicated and worth mentioning. They are summarized as follows:

a) Overseas ship transport: Overseas ship transport is the major problem of all island developing countries. The major constraints are the following:

i. In many cases remoteness to major ship trading routes with the consequence of a very low frequency of ships calling at their ports and thus causing a low rate of export-import flow;

ii. Due to the small volume of incoming and outgoing cargo, preferential rates (as used in the case of large cargo volumes) cannot be obtained, which contributes to increased charges on transport;

iii. Another consequence is the fact that often remote islands are the last leg of shipping routes. As a result of this situation and due to the unloading of goods at intermediate harbours a surplus cargo space is usually left which can not be economically utilized by that island. This leads not only to additional shipping costs but also disproportion between incoming and outgoing cargo and poorly balanced ship trarsportation;

iv. Loading and unloading costs are extremely high due to the non-existence of mechanical loading installations in most ports of island developing countries.

b) Inter-island ship transport (where applicable): Inter-island ship transport in island developing countries consisting of many scattered small islands (Fiji, for example) is suffering from insufficient quantity and often inadequate capacity of the boats available for this kind of transport. With a more efficient inter-island shipping fleet, the volume of the inter-island trade could easily be increased.

River and lake water transport within the land-locked developing countries has not been fully utilized.

B: Problems originating mainly from prevailing economic status:

These problems are caused to a large extent by the general status of economic development of the land-locked and island developing countries and consequently impose, on their side, heavy burdens on economic as well as

industrial development. They become, however, more complicated in view of the special geographical situation of this group of countries.

1. Inadequate transport facilities:

The transportation networks in many land-locked and island developing countries visited by the author have not organically developed. The present status of their transportation network has been reached in a relatively short period of time while the transportation system in the industrial countries has been developed simultaneously and steadily together with other sectors of their economy throughout the centuries.

a) Rail transport: Rail transport in the previous colonies has been inherited from the colonial time when other criteria have been prevailing. In most cases the railway transportation systems are antiquated and insufficient to cope with present transport volumes. The topographical situation of these countries does not frequently allow adjustments and significant expansion and improvement of the existing rail tracks. Inadequate management has further contributed to the inadequacy of the existing transportation systems. As a result of this, substantial delays take place in the turnover of the rolling stock.

Another problem is that in most cases the exports from these countries are bulky raw materials or intermediates (mineral products, sugar, timber) whereas the volume of imported commodities is rather reduced - machinery, equipment, spare parts and consumer goods.

Internal rail transport has been encountered only in large islands such as Madagascar. The main constraint is, however, the permanent overloading of the capacity at the rail line Tamatave (port) to Tananarive (capital) and the rather antiquated condition of the track and rolling stock. Transport facilities along the coast (roads and railways) are insufficient. There are railways only within the land.

This pattern of transportation system contributes per se to the imbalance of rail traffic and subsequently additional transportation costs.

b) Road transport: The road transport, as an alternative to the rail transport, suffers also in most of the subject land-locked and island developing countries from an insufficient road network and by insufficient maintenance and repairs, so that in most cases the roads are in a desolate state. The road-building, maintenance and repair machinery is often broken

down for minor repairs only and they remain therefore underutilized. Consequently the road network is permanently deteriorating. This situation of course contributes to a major usage and wear of the automobiles of all categories and to the worsening of the road transport situation in general. There is frequently not enough trained personnel available to perform the necessary road repair and maintenance work.

Apart from the main road network, in many cases there are no sufficient feeder roads to ensure an optimal distribution of the road traffic.

Internal road transport in small sized islands (Mauritius, Barbados) presents no major problems due to their relatively short distances and small territorial size.

c) Air transport: Air transport may in many cases be a suitable alternative for other types of transport. In most of the countries visited there is a national airline, which is usually quite well equipped and staffed for the task of internal domestic air transport. Only a few principle airports, however, are equipped for night flights and for a heavier type of aircraft. As a result of this, the existing capacity for passengers and cargo is underutilized. In many cases there are no adequate feeder roads to the countryside airstrips which would permit a regular and easy flow of basic commodities, mainly food-stuffs, and consequently inhibit the transport of such commodities from abundant areas to areas where they are lacking.

International air transport is in most cases limited to a pool cooperation with another big international airline. This is valid for passenger air transport. The air cargo possibilities are not yet fully utilized.

The inadequate physical infrastructure, caused by the general economic situation, forces the land-locked and island developing countries to absorb additional costs should they develop their export industries and establish further production opportunities.

2. Insufficient institutional infrastructure:

a) Lack of adequate information: Both groups of countries are located far away from the world trade markets as well as from the sources of technology.

i. To a large extent, due to their remoteness from the world markets they are constantly experiencing setbacks in foreign trade. Besides the high transportation costs on export and

import commodities which they have to pay, they are lacking, due to their remoteness, adequate information on marketing and marketing research, sufficient economic intelligence, designing and packaging of products, adequate machinery on quality control, advertising and sales promotion with product specification and presentation. The availability of this information is particularly important in determining the pricing policy for their own exports and/or in identifying the most advantageous sources for imports of raw materials, machinery and equipment and consumer goods. The lack of this information forces the remote land-locked and island developing countries to pay high prices for their import products and obtain lower prices for export commodities.

ii. A consequence of the considerable distance of land-locked and island developing countries from the countries of origin of modern technology, expertise and know-how is the very reduced possibility of selecting an appropriate technology for the development of the country. Often inadequate or obsolete technologies are introduced or modern technologies are transferred at exhorbitant costs and exaggerated conditions of payment of licence fees or royalties. Another problem is the difficulty of absorbing, maintaining and further developing such technology.

b) Inadequate management and technical training: Lack of sufficient management and technical personnel is one of the major constraints of industrial and economic development in most land-locked and island developing countries. This observation is valid for any developing country, but for a remote and isolated land-locked and island developing country the consequences are by far more serious on the public and private or mixed public-private sectors. These consequences are improper planning, low production and low productivity, low quality of products, high cost of production, inadequate training at all levels, need for import of commodities which could easily be produced locally, and insufficient exports with consequently decreased earnings of foreign currency.

c) Inadequate machinery for industrial planning: The results of inadequate management and insufficient technical training are often institutional shortcomings affecting adversely the industrial development of the

land-locked and island developing countries.

The development plans cannot be implemented often due to the difficulties facing the government machinery.

3. Under-utilization of indigenous resources:

In many land-locked and island developing countries - except Mongolia, from the general point of view, and in the sugar exporting countries so far as the cultivation of sugar cane is concerned - the agricultural development has been neglected for various reasons.

Most of the land-locked and island developing countries visited are almost entirely based on an agricultural economy and in most cases on a mono-economy (sugar-cane). Diversification of agriculture is apparently impeded by :

i. non-availability of cultivable land; either the size of the countries is small or the arable land is fully utilized for cultivation of mono-crop;

ii. scarcity of agricultural labourers (in spite of relatively high rate of unemployment);in Trinidad and Tobago the rate of unemployment amounts to 18% and yet several coffee plantations had to close down due to the lack of interest in working in agricultural sector;

iii. lack of expertise and experience for agricultural diversification and planning;

iv. insufficient incentives for diversifying and growing various types of agricultural products caused by the pricing policy of some governments.

As a result of this situation the indigenous resources are not economically utilized. Large quantities of agricultural products and food-stuffs are being imported at high foreign exchange costs, while the majority of farmers have to live at subsistence level. In the island developing countries there is a great potential for deep sea off-shore fishing and fish processing industry. As a consequence of this, not only are the valuable

resources wasted but unnecessary costs are imposed on these countries by importing greater quantities of food-stuffs, which affect the balance of payments negatively. Examples are Fiji, where large quantities of fish are imported or lettuce flown in from New Zealand, or Trinidad and Tobago, where canned orange juice is being imported, just to mention a few examples from many.

The lack of agricultural diversification does not only affect the living standard of the farmers and cause high costs on the balance of payments, as explained, but it also hinders the development of the agro-based industries, since the industry having an interconnexion with agricultural development, is a buyer of agricultural products.

4. Inadequate international co-operation:

The tight economic and linguistic linkage of some land-locked and island developing countries with former colonial powers often precludes to a large extent contacts and economic co-operation with other areas, particularly with regard to foreign trade, foreign technologies, licencing arrangements, services of expatriate management and the like. As a result of this, the land-locked and island developing countries are bound to a limited number of international trade and technology markets and can not always benefit from economic advantages which may arise from competitive markets.

C: Summary of problems

The problems of land-locked and island developing countries can be summarized as follows:

1. Inadequate internal and external transport leading to increased cost for imported and exported goods, delays in delivery, reduction of competitiveness at world markets, etc.
2. Insufficient information having negative impacts on development policy making, pricing, product quality and design, marketing, and technology, expertise and know-how transfer.
3. Insufficient training resulting in inadequate management at all levels, lack of managerial and technical expertise and skills, low productivity, low quality of products and poor marketing.

4. Administrative shortcomings which handicaps the satisfactory implementation of industrial plans and economic development.

5. Lack of diversification in agriculture which consequently impedes the development of agro-based industries.

6. Under-utilization of indigenous resources resulting in increased imports and thus affecting the balance of payments.

7. Inadequate international co-operation.

III. Recommendations

These recommendations are made on the basis of problems and shortcomings identified in Chapter II. The recommendations are, however, briefly explained, since Chapter IV, covering the list of projects, gives details regarding the technical, financial and implementation of the projects recommended. All these projects have been discussed with the government authorities concerned during the author's mission to the subject countries and they are therefore principally acceptable to the governments indicated on each project data sheet.

The main idea behind these recommendations is to ensure the minimization of additional transportation and transit costs which the land-locked and island developing countries have to pay for their import of intermediate goods and export of industrial products. This aim can be achieved by improving the existing facilities as well as developing new manufacturing opportunities involving minimum transportation costs. In other words, the special technical assistance to be rendered should not only include the improvement of existing establishments, but also the development of appropriate technology, oriented to the particular conditions of these countries, better maintenance and efficient management. For this reason the recommendations should deal separately with means and ways for the improvement of existing transport facilities and development of new manufacturing opportunities.

A: Improvement of the existing transport facilities:

1. Transiting:

The land-locked countries are highly dependent upon their neighbouring countries with an access to the sea. They are therefore subject to the arbitrary actions of the contiguous countries, which leads to imposing additional costs on the land-locked developing countries.

In the long run the land-locked developing countries may consider securing alternative trading routes and means of transportation with a view to minimizing dependence and to affect the maximization of transportation rates and services. To find alternatives, however, they need excessive investments in capital intensive projects. To find a solution in the short term, it seems therefore inevitable to secure the economic benefits of these countries through international bilateral and/or regional agreements in an

attempt to achieve improvements in the areas of rate fixing, transiting formalities, transloading, warehousing, storage, licensing and taxation. These improvements would obviously reduce the additional costs which the land-locked developing countries are currently paying for their exports and imports. It is also imperative that the international transit rights of the land-locked and island developing countries be secured on international levels so that these countries can ensure the stability of their foreign trade.

2. Efficient utilization of the existing transportation networks:

As a medium-range solution the land-locked developing countries need to survey their own transportation facilities with a view to determining how they can improve a given transport system. As far as the transportation from coast to inland is concerned, cost criteria have indicated that a minimal number of ports be used in order to achieve increased density of traffic and cost minimization. This measure, which apparently leads to more dependence and is counter to the more normal pattern of attempting to secure alternatives, as mentioned above, would appear rational only if the economic benefits (reduced rates, service guarantees etc.) were in part to accrue to the land-locked countries, and if simultaneously they were not to be assuming risk. If the cost benefits are not reflected in prices of transit, then there is no compensation for this risk. To the transiting country there are benefits - the income from transited traffic, and the contribution made to higher density and more efficient transportation for the transiting country. Such a benefit would, however, only accrue where the transportation system of the transiting country is underutilized.

3. Development of regional transportation system:

Where there is a minimal transportation system or a system not being used to full capacity in a contiguous country with an access to the sea, and economies of scale require a level of transportation investment which the transiting country cannot perform efficiently alone, a regional transportation system should be developed (in the same way as Tanzania-Zambia railway). This will integrate neighbouring land-locked developing countries into a system to achieve economies of scale. The ensuing increase of traffic through both types of countries would reduce transport costs and increase margins on the vulnerable demand elastic export commodities of these countries and also reduce the cost of their imports.

4. Extension of feeder routes:

The creation of transport arteries is needed to provide the land-locked developing countries with access to world markets for their products.

The development of subject arteries will enable the land-locked countries to export those products which have often been blocked from export to contiguous countries (due to their competitiveness with the latter's domestic market) to the world markets. Other products of the land-locked developing countries which are not similar to those of their contiguous counterparts, might then be exported without barrier to contiguous countries. As an example, a large deposit of manganese ore has been discovered in Upper Volta, but at a considerable distance from the present transportation facilities. An extension of the Abidjan-Niger Railroad to Upper Volta would enable the country to export manganese through Abidjan to the world markets. In addition to manganese, there is the potential for a cement plant in Upper Volta, a commodity which is now being imported. If the cement were produced in Upper Volta and exported as a result of an extension of the railroad, the imbalance of rail traffic on the Upper Volta-Abidjan line would be economically utilized (at present the Abidjan-Upper Volta line is more heavily utilized than Upper Volta-Abidjan). The advantage to Upper Volta is obvious. It has resources and the development of these two projects would contribute to their utilization. The Ivory Coast would have an alternative source of cement as well as the revenue from the added transit traffic. The greater utilization of the rail could also result in lower costs.

Various UN agencies, particularly UNOTC, UNCTAD, ICAO and the World Bank, are rendering their technical and financial assistance to the land-looked developing countries in helping them to improve, expand and modernize their transportation system. It is recommended, however, that UNIDO intensify their assistance in the fields of local assembly or production of rolling stock, containers, pellets and moving equipment, establishment of maintenance and repair workshops, and an extensive training programme for the technical personnel involved in the operation of the transport systems. For improvement of the internal water transport (where applicable) and inter-island ship transport, UNIDO should assist in the construction of boat-building, wooden bridges, cold storage and warehousing.

For island developing countries assistance in ship-building, mechanical loading facilities and containerization is needed. For improving the deep sea fishery development and fish processing industry in the island developing countries, assistance should be rendered in the field of appropriate fishing boats, canning, freezing and packaging machinery and equipment.

UNIDO assistance in the above sectors may be provided upon the official request of the Governments and the appropriate information on their needs and requirements.

B: Development of new institutional and manufacturing establishments:

1. Strengthening of institutional infrastructure:

The low performance in foreign trade in all, but particularly in remote land-locked and island developing countries is, to a large extent, due to the lack of reliable information and services to the industries utilizing imported raw materials or manufacturing for export purposes. It is difficult to sell the best products without appropriate knowledge on presentation and marketing.

Assistance is badly needed in product development and adaptation (design, packaging, quality control and standardization), marketing and transport sectors.

It is recommended that UNIDO assists these countries in:

a) Establishment of industrial information services centre: The Centre will provide all information and services mentioned above (for details see project No.6). Once adequate information is produced by the industrial information services, it could be circulated to all counterparts concerned in other land-locked and island developing countries through which the co-operation among developing countries can be stimulated.

b) Preparation of a manual on sources of appropriate technologies: The manual will contain the following points:-

i. Brief description of the process and technology applied by those sources;

ii. Detailed description of their processes and plants;

iii. General information on economic considerations (production cost, investment cost, financing, raw materials, marketing);

iv. List of potential partners for supplying turn-key plants;

v. List of potential suppliers of machinery and equipment;

vi. Information on potential licensors or partners interested in co-operation (technical, commercial, joint ventures, etc.);

vii. Examples of sucoessful implementation in other developing countries;

viii. Information on possibilities of establishing pilot and demonstration plants with UNIDO assistance;

ix. Possibilities of in-plant-training with UNIDO assistance.

Such a manual, sent to the competent authorities of the land-locked and island developing countries, possibly in co-operation with the industrial services centre to be established, would provide them with a compendium of reliable and updated data and information enabling them to make decisions more easily on development and implementation of industrial projects.

c) Provision of adequate information on foreign trade markets: The land-locked and island developing countries should be provided on a regular basis with:

i. world market prices for all raw materials, intermediate products, machinery, equipment and spare parts to be exported or imported by those countries;

ii. information on cooperations, joint ventures, redeployment, assembly or regional export.

The above information can be provided in close collaboration with UNCTAD, ITC, ICAO and FAO etc. and possibly in co-operation with the industrial services centre proposed above. Once the appropriate machinery and the prerequisites are made available the land-locked and island developing countries would be in a better position to economize the procurement of raw materials and intermediates as well as to obtain better prices for their exports and thus improve the status of their foreign trade.

2. Training:

Any transfer of technology may fail to serve the island and land-locked developing countries if the user is incapable of maintaining and improving the technology transferred. Therefore, particular attention should be given to the continuous upgrading of the technological standard of these countries.

This can be achieved by organizing training courses and establishing training units at management and technical levels.

a) Management training: This is particularly applicable with regard to the public and parastatal sector, where top management is often selected not merely according to their professional qualifications. The result is low production, low productivity and poor quality of products which leads to high production costs and poor access to world markets. It is recommended that UNIDO encourages and assists in undertaking field surveys of the public sector or parastatal industries in these countries to identify the main shortcomings and bottlenecks from the managerial point of view. UNIDO should then organize intensive management training courses, necessarily combined with in-plant-training, to provide the trainees with the absolutely necessary industrial experience. The in-plant-training, however, should preferably be undertaken in developing countries of a similar socio-economic structure, wherever possible, to confront the trainees with all the problems and difficulties which may be encountered during industrial production under adverse conditions in a developing country.

b) Technical training: Along with the extensive training of the management, training facilities should be made available for technical personnel at all levels in order to train them as trainers for their own teohnical personnel in the home country. The establishment of specialized industrial training units in the country itself would appear to be an ideal tool for that purpose. Such units would not only serve as mere training units for technical personnel, they would also contribute to the development of suitable indigenous technologioal standards of the country (for details see project No.9).

c) Training of skilled artisanal labour: Goods made by hand in developed countries are becoming increasingly scarce and expensive. Some of the land-looked and island developing countries produce some of these goods, but on a small, fragmented scale. Large orders from buyers abroad oan almost never be met. Handicrafts contribute very little to economies of land-locked and island developing countries. These products can be developed and improved if these ocuntries could fully utilize, by training, their most valuable resources, namely skilled, low cost labour, as they have been in Bangui, to assemble watches and clocks from components imported duty-free from Europe. Southeast Asia, notably Singapore, is an outstanding

example of the use of labour to produce cameras and electronic instruments at low cost. A valuable basis for such a development is given in some of the land-locked and island developing countries by the ILO-implemented vocational training or industrial training centres (Madagascar, Mauritius, Zambia). They could be used as a starting point for an industrial production utilizing the machinery and equipment already existing there.

It is recommended that UNIDO develops follow-up projects based on existing ILO-vocational training centres in the form of electric/electronic and mechanic/metalworking development centres which could assemble and produce equipment and machinery locally, such as, for example:

- water purification equipment (water filters and sterilizers)
- agricultural tools and equipment (sprayers for liquid fertilizers and pesticides, tools for extraction of oleoresin from living pine trees)
- electric and electronic apparatus (control instruments, electro-medical apparatus)
- telecommunications equipment (radar parabolic antennas, etc.) (for details see project No.10)

Some countries do have trained artisanal labour skilled in the transformation of textile materials, leather, wood or metal into valuable products. Due to the lack of an appropriate development strategy, however, skilled labour is underutilized. Mali, for instance, with thousands of skilled weavers, exports much of its wool and cotton in a raw state, while the weavers remain unemployed. The establishment of transformation industries based on indigenous raw materials will absorb the potential labour force.

3. Industrial planning and development:

a) Strengthening of appropriate machinery: Most of the ministries responsible for industrial planning and development are rather new and not yet fully experienced in undertaking the planning, formulation and implementation tasks of industrial development.

It is recommended therefore that UNIDO assists in providing the services of Industrial Advisers to the ministries concerned (for details see project No.8). The Industrial Adviser will also have to inform the governments concerned of all possibilities of UNIDO assistance in the field of industry, since it is not sufficiently known in many cases.

b) Industrial production: The industrial development in land-locked and island developing countries should be more encouraged in the export oriented sector. They may specialize in the production of high quality small-volume goods which will lead to reduced transportation costs and high revenues in foreign currencies. The following products may be named as examples:

- pharmaceutical products and intermediates (see project no.5)
- electric and electronic components, equipment and apparatus
- high fashion products (knitwear, embroidery, hand-woven cotton and/or silk garments, embroidery "petit point", and the like)
- high quality leather products (fashion handbags, shoes, belts, etc.)
- high quality handicrafts
- specialized technical articles

The above products permit the economical use of air transport, and makes it possible to link geographically separated areas more easily with the main markets.

4. Agro-based industries:

While agricultural development of the land-locked and island developing countries is mainly the responsibility of FAO, the improvement of productivity in agriculture can be assisted by UNIDO through the development of fertilizers (see project No.1). Besides this, the industrial processing of agricultural products remains within the domain of UNIDO. In this sector UNIDO can render assistance in the following areas:

a) Horticulture: While Zambia is already engaged in growing horticultural products, Mauritius, Madagascar and Fiji have the potential for growing and then exporting horticultural goods.

Western Europe is a major importer of these goods. Principle imports - pineapples, strawberries, melons, mangoes, avocadoes, green beans, sweet peppers, asparagus, eggplant - amounted to 205.000 tons in the winter of 1975/76. Africa, south of the Sahara, exported 105.000 tons of this total.

Horticultural exports can bring foreign exchange, create new employment and improve national nutrition as fruits and vegetables not exported are consumed locally.

UNIDO assistance can be seen in the field of vegetables and fruit processing - concentration, dehydration, canning - (for details see project No.11). It is recommendable that UNIDO prepares a standard manual containing the technology of vegetable and fruit processing. A similar manual may be elaborated for a mobile demonstration pilot unit. The manual prepared will provide the governments concerned and the UNIDO experts with technological background information, on the basis of which they will take decisions on the size and technology of the plants to be established.

A similar approach should also be made for spices.

In the case of these land-locked and island developing countries where the arable land is limited (Mauritius) or the labour is scarce (Trinidad and Tobago. Barbados) or climatical conditions are adverse (Mongolia), UNIDO could render assistance in the establishment of plants for the industrial production of green fodder, vegetables and fruits on a continuous basis (for details see project No.17).

b) Cut flowers: The market for cut flowers in Europe is enormous. In 1976, at wholesale prices, the cut flower market in Western Europe totalled US $ 1.500 million (100%) out of which $ 1.455 million (or 97%) were produced in Europe and $ 45 million (or 3%) were imported. Imports from non-African countries amounted to $ 41.7 million (93%), from Africa $ 3.3 million (7%) (Kenya $ 2.3 million (5%) and Ivory Coast $ 1 million (2%)). Europe's share of total cut flower production (97%) has made it almost self-sufficient but, owing to higher energy and labour costs which have made glass-house production less profitable, Europe is turning more to imports to satisfy its demand. By 1980, flower imports are expected to treble, to US $ 135 million, and this is an excellent opportunity to many land-locked and island developing countries.

Land-locked and island developing countries, having a suitable climate and soil for flower cultivation, can utilize this opportunity. Transportation is not a major problem and does not cause additional costs. The imbalance of incoming and outgoing air cargo (the import of spare parts, essential consumer electric and electronic goods etc. is far exceeding the exports) can be utilised by exporting flowers, in the unutilized cargo space, to the major markets in Europe.

It is recommended therefore that UNIDO prepares a study on small mobile flaked ice units and simple light insulated transport containers for cooled transport of cut flowers.

c) Production of food-stuffs (meat): Meat from land-locked and island developing countries, particularly beef, has a high future potential for export earnings. Until now, sanitation, traditional attitudes, difficulties of collection and distribution and inadequate marketing have kept exports small. Promising developments are multi- and bilateral projects to eliminate cattle diseases, improve the strain and commercialize the product. Actual or potential exporting countries visited by the author are Mongolia and Madagascar. Some other countries such as Botswana, Burundi, Chad, Lesotho, Mali, Rwanda and Swaziland have also the same potential.

Future exports may be improved under the Lomé Convention quotas. This might be particularly interesting for Madagascar, which already exports substantial quantities of meat to the Federal Republic of Germany.

It is recommended that UNIDO assist these countries in developing a cold storage system using air ozonizers and sterilizers in the cold storage chambers to save substantial cold generating energy and improve the overall efficiency of the storage. The air sterilizing and ozonizing equipment as well as insulating panels could easily be produced locally.

In the case of island developing countries with a great potential for deep-sea off-shore fishing and fish industry, UNIDO may render assistance in improving their fish processing industry (for details see project No.13).

The establishment of slaughterhouses for hygienically processing and slaughtering the animals is another area which should be promoted by UNIDO. All this will not only boost the export but also improve the nourishment status in the countries themselves. The production of food-stuffs (meat) would stimulate the establishment of other industrial production facilities (e.g. animal feed production, tanneries and leather products and other by-products).

A co-operation between FAO, ICAO and UNIDO will be needed for the further expansion in this sector.

5. Expansion of international contacts:

Many land-locked and island developing countries are maintaining economic ties mainly with their former colonial powers. To enable a broader vision of international co-operation it is recommended that UNIDO organizes meetings and seminars to foster contacts with various developed countries and thus enable the land-locked and island developing countries to make use of

the former know-how and assistance in the field of industry. It is also suggested that international contacts and co-operation be initiated and improved on a regional basis to discuss financing and the implementation of various industrial projects. This could also be a meeting platform for contacts with bilateral aid organizations or with firms abroad which are interested in supplying complete turn key plants, including technical management, for a limited period of time against compensation with part of the production of the plant. Such a barter transaction could be for example the supply of horizontal casting plants by industrial firms in developed countries to plants in Trinidad and Tobago, vegetables and fruit processing plants to Mauritius, Barbados, Trinidad and Tobago, Zambia and the like. The advantages of such a barter transaction for the land-locked and island developing countries are that:-

- the plant is established in the country without a need for foreign exchange and lengthy negotiations regarding financing;
- there is continuous technical co-operation with the suppliers of the plants;
- their export markets are guaranteed automatically by the suppliers with no additional cost for export promotion.

C: Co-operation with international organizations (multilateral, bilateral, etc.):

The implementation of technical co-operation programmes to the land-locked and island developing countries can be met successfully with a co-ordinated co-operative effort of other organizations and institutions concerned with industrial development:

1. UNIDO-Financial Institutions: The financing of smaller and medium size industrial development projects is a great problem for the land-locked and island developing countries. This is also true for financing joint ventures or industrial redeployment, where often potential partners from developed countries are not willing to take the necessary financial risks and commitments. For this reason, co-operation with IBRD and financing institutions of the World Bank Group, as well as with other financing organizations such as the Asian Development Bank, African Development Bank, etc. may contribute to some extent to the solution of the financial problems of industrialization endeavours.

The instrument of credit loan insurance, similar to the suppliers credit insurance, has so far not been used for the implementation of industrial development projects in land-locked and island developing countries. This instrument offers a wide range of quite interesting possibilities at a relatively low cost and it would certainly stimulate the interest of potential parnters from developed countries for industrial redeployment, joint ventures and technical and commercial co-operation, and foster the overall industrial development as a whole. It is recommended that UNIDO elaborates a model for financing industrial development projects in land-locked and island developing countries, covered by a corresponding credit or loan insurance to cover the financial risks of potential partners from developed countries. This would be particularly useful for such countries where bilateral agreements to protect foreign investment have so far not been put into operation.

2. UNIDO-Governmental and Non-Governmental Organizations: This will be of great advantage to many land-locked and island developing countries. The experience of several similar co-operations in Laos, for example (Austrian Technical Aid to Laos, with UNIDO contribution), has shown that there is a fair chance of obtaining funds from bilateral aid donor sources when a simple, well justified and logically presented project is submitted for financing. Examples of similar projects - bilateral aid with UNIDO technical assistance - suitable for implementation in some land-locked and island developing countries would be:

(a) Potable water supply to rural and urban areas - Bolivia, Madagascar, Mauritius, Zambia

(b) Oral Rehydration Salts production - Bolivia, Madagascar, Mauritius, Zambia

(c) Sprayers for application of liquid fertilizers and pesticides - Bolivia, Madagascar, Mauritius, Trinidad and Tobago, Zambia

(d) Organic bio-fertilizer - Barbados, Bolivia, Fiji, Madagascar, Mauritius, Mongolia, Trinidad and Tobago, Zambia.

a) UNIDO-EEC: The European Economic Community is extending and increasing its activities in many land-locked and island developing countries. Regional offices are being established (Fiji) and feasibility studies undertaken (Trinidad and Tobago, fertilizer). It is recommended to establish a close co-operation with the EEC, particularly in view of the increased export possibilities of land-locked and island developing countries under the

Lomé Convention to European markets. This is particularly important to sugar exporting developing countries.

b) UNIDO-Research Centres: It is recommended that a close co-operation be established with the centres for economic and social studies in developing countries, such as the Centre for Economic and Social Studies of the Third World in San Jeronimo, Mexico. This organization, which was founded in 1976, is conceived as a documentation and information centre for the Third World. Inspired by humanitarian values, but based on scientific understanding of social processes, the CESSTW is a centre of documentary information and for the exchange of experience. A co-operation between UNIDO and centres similar to the CESSTW, especially in exchanging information, requests for projects and training, would contribute substantially to a reciprocal broadening of activities in the field of industrial development, and UNIDO should therefore establish close contacts with them.

c) UNIDO-Chambers of Commerce: Many national chambers of commerce in developed countries are interested in fostering industrial redeployment and other activities of their members in land-locked and island developing countries.

There are many small and medium size industrial enterprises in developed countries who have developed quite interesting products and maintain often a large export business to many parts of the world. These enterprises are ideal partners for technical or commercial co-operation, joint ventures or industrial redeployment in land-locked and island developing countries. Often they do need advice to overcome their present or future difficulties resulting from increasing cost of labour, high transportation costs, high fiscal burdens and the like. UNIDO should co-operate with such enterprises through the national chambers of commerce to provide them with the necessary background information relating to the general and particular conditions and situation in land-locked and island developing countries as potential partners.

d) UNIDO-Joint Centres: The activities of UNIDO Joint Centres and programmes with other countries should be increased and extended in order to provide more technical assistance to the land-locked and island developing countries in the particular field of specialization of that institution.

D: Co-operation with UN Organizations:

The co-operation between UNIDO and other UN agencies could be sought

in the following areas:-

1. UNIDO-ILO: In some of the land-locked and island developing countries (Zambia, Mauritius) there are ILO-implemented vocational training centres which could be used as a starting point for an industrial production utilizing the machinery and equipment already existing there. It is recommended that UNIDO develops follow-up projects - in close co-operation with ILO - based on existing ILO-vocational training centres which could also serve as specialized industrial training units combining training with small scale production, development of prototypes and further technological development (for details see project No.9). Likewise ILO could use UNIDO's small-scale industries centres and services in these countries for their complementary activities.

2. UNIDO-UNCTAD: For all industrialization projects there is a need for efficient marketing. This is particularly true also for existing projects and situations where excessive prices are being paid for imported capital and consumer goods and insufficient prices obtained for exported commodities. As examples could be mentioned exports of molasses from Fiji, Mauritius and Madagascar at prices by far under the world market prices or the very high cost of imported consumer goods, spare parts and equipment to Fiji, Madagascar and Zambia with the consequence of an extremely high cost of living in these countries. It is recommended that UNIDO cooperates with UNCTAD in a complementary manner to increase and improve the productivity and quality of export oriented industries to optimize the commercial, marketing and pricing situation. UNIDO should seek close cooperation with UNCTAD on any approach which may be oriented to the above-mentioned aims.

3. UNIDO-UNICEF: UNICEF is importing to many land-locked & island developing countries machinery, equipment and materials for which often technical expertise for assembly, start-up and running-in periods are required. This is a particularly interesting field for UNIDO assistance, including training in operating, maintenance and repairs, in book printing machinery (Laos) for example. Other UNICEF imported products, like writing pads, chalk, construction elements for housing (Laos) and the like could easily be produced locally. This simple intermediate technology could be implemented with UNIDO assistance. The same applies to the substitution of some simple drugs presently being imported by UNICEF to many land-locked and island developing countries (Oral Rehydration Salts - Laos, Nepal, Bangladesh), which could easily be produced locally, using UNIDO assistance. Such a co-operation between UNIDO and UNICEF has been successfully implemented in Laos and Nepal where now Oral

Rehydration Salts are being produced. This example could be implemented in many other land-locked and island developing countries (for details see project No. 3). Another example of a close co-operation is the field of UNICEF rural water supply schemes where UNIDO technical assistance will be needed. The co-operation between UNIDO and UNICEF in Laos has resulted in the local manufacture of water purification equipment. Similar projects could also be implemented in many land-locked and island developing countries (for details see project No. 2). UNICEF has mentioned the envisaged co-operation with UNIDO in the field of water purification in the "Report on the Water Workshop held in Dacca 25th May to 1st June 1976", October 1976, pages 79 and 80, which has been distributed to all UNICEF Water Sections.*)

4. UNIDO-WHO: A co-operation between these two organizations can be seen in the implementation of potable water supplies for rural and urban areas. UNIDO assistance in this particular field would contribute to local assembly and manufacture of water purification equipment (for details see project No. 2). In many land-locked and island developing countries the WHO representatives have shown great interest in such a co-operation (Madagascar, Mauritius, Zambia, Bolivia, Trinidad and Tobago). In the field of development and expansion of the pharmaceutical industry (for details see project Nos. 3 and 5), particularly for simple drug production and sanitation, in many land-locked and island developing countries a co-operation with WHO will be necessary in order to identify the respective production programmes, production capacities, testing and further developments.

5. UNIDO-FAO: A co-operation with FAO will be necessary in the fields of irrigation systems, local manufacture of agricultural tools, machinery and equipment, preparation of organic bio-fertilizers (for details see project No. 1), industrial processing of vegetables, fruits and wood, local production

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*) UNIDO activities in the field of potable water supply programmes for rural and urban areas suggested in this report (for details see project No. 2) are of particular importance to the land-locked and island developing countries in view of the conclusions and recommendations made at the United Nations Water Conference 1977 in Argentina. UNIDO assistance in implementing this particular programme would be a practical approach, a viable solution and a significant contribution to the success of the UN Water Conference 1977. It is recommended to circulate the basic background information to the government officials participating at that conference to acquaint them with the existing possibilities for UNIDO assistance in this particular field.

of animal fodder and fertilizers and pesticides production. UNIDO-FAO co-operation will be needed in Zambia, where it is intended to establish a pilot plant for the production of animal feed (by mixing molasses + urea + vitamins + additives) as a partial substitute for the protein requirements of ruminants. The FAO may undertake the practical evaluation of the various formulations to optimize beef production.

6. UNIDO-UNESCO: Co-operation in higher technical training in specialized training units, implemented by UNESCO, is recommendable. Such a UNIDO-UNESCO co-operation has been envisaged, for example, in Laos where the project LAO/74/001 "educational planning" envisages the establishment of pilot training/production communities (chemical industries) with the idea to be transformed by UNESCO at a later stage into a technical college, engineering school, etc. A similar project could be implemented in Nepal at the Institute for Applied Science and Technology at the University of Kathmandu, at the Bangladesh Council for Scientific and Industrial Research in Dacca or at the University of South Pacific in Suva, Fiji. Co-operation between UNIDO, UNESCO and ILO is also necessary to assist these countries in a co-ordinated and integrated manner with a view to relating the educational system and training programme to the needs of industrial development in these countries.

7. UNIDO-IAEA: Co-operation in the field of appropriate technology development would be useful for geological prospection and explorations. Tools, equipment and machinery could be produced locally with UNIDO assistance. Such a co-operation would also facilitate small-scale mining.

8. UNIDO-ICAO: Co-operation with ICAO will be required for the implementation of those projects in land-locked and island developing countries where export oriented industries will need the contribution of civil aviation for solving transport problems. UNIDO should consider and follow-up the recommendations of ICAO already made by their missions to a number of African countries. In forthcoming ICAO studies on potential contribution of civil aviation to economies in Asia and Latin America UNIDO should provide all the necessary supporting background information and documentation and field experts with the ICAO missions in order to examine on the spot the interconnexion of export oriented industry with air transport of exported commodities.

9. UNIDO-IMCO: Co-operation with the Inter-governmental Maritime Consultation Organization in the development of regional maritime transport (Fiji), containerization (Madagascar, Mauritius), establishment of mechanized loading and unloading facilities (Fiji, Mauritius, Madagascar), stores, warehousing and cold storage (Fiji, Mauritius, Madagascar, Trinidad and Tobago, Barbados),

maintenance and repairs as well as shipbuilding (in all island developing countries) would be most useful and recommendable.

E: Regional Co-operation:

Regional co-operation is needed, particularly in the case of island developing countries with the mainland. Examples of such regional co-operation would be the regional shipping line or a regional airline in the South Pacific to optimize sea and air transport in the South Pacific area with improvements of trade with Australia, New Zealand, USA and Canada. A regional co-operation will be needed also in the case of the Caribbean islands and the mainland countries such as Venezuela, Mexico and the United States. Regional co-operation between Madagascar, Reunion, Mauritius, Comoro Islands, Seychelles, etc. would improve the trade with India and East Africa. The regional co-operation can not be limited to transportation and trade. A close co-operation in the field of technology and training, industrial information and industrial planning is of utmost importance to achieve an accelerated industrial development of the island developing countries.

Another example of regional co-operation of islands with the mainland is also in the Caribbean where the Caribbean Community and Common Market CARICOM and the East Caribbean Common Market ECCM are promoting industrial development, assisted by the Caribbean Development Bank in Barbados and the Caribbean Investment Corporation in St. Lucia. The Investment Corporation is an institution to assist in the identification and the establishment of industries in the Lesser Developed Countries in CARICOM (Antigua, Dominica, Grenada, Montserrat, St. Christopher, Nevis and Anguilla, St. Lucia and St. Vincent). The Corporation is financed jointly by the private sector and the member governments. The Caribbean Development Bank functions in many areas of importance to the development of the region as a whole, for example, in the formulation of regional agricultural programmes and small-scale industries.

Much of the funds which the Bank provides is in the form of soft loans to the Lesser Developed Countries of CARICOM for specific projects.

A co-operation between UNIDO and the above-mentioned organizations would be beneficial to an accelerated industrial development in that area. Possible UNIDO assistance would be in the field of small-scale industries, food processing, fish processing, free port zones, industrial training and industrial information services.

The role of the UNIDO/Economic Commissions, Joint Industry Divisions, in studying and developing regional co-operation projects is extremely important.

F: Co-operation among developing countries:

A close co-operation among developing countries is indispensable for their industrial development. In the course of the Intergovernmental Expert Group Meeting on Industrialization of the Least Developed Countries organized by UNIDO in November 1976, the representatives of the LDCs have proposed and agreed upon several recommendations on the improvement and development of co-operation among developing countries in exchanging expertise, know-how, transfer of technology etc. Such a co-operation among developing countries, including land-locked and island developing countries, can contribute to the implementation of ind strial projects without additional license fees, royalties etc. which are currently being paid for adoption of the technology from developed countries. Examples of such a co-operation among developing countries would be the transfer of yam processing technology from Barbados to Fiji or the industrial utilization of processes developed at the Bangladesh Council for Scientific and Industrial Research (citronella extraction and processing for Nepal, for example). Another example would be in the field of training: Fiji, for example, is interested in placing trainees in sugar technology abroad. For this purpose a training in Mauritius at the Sugar Research Institute is recommended. Bolivia is interested in additional training in standardization in India and trainees for food processing from Barbados could be sent to various developing countries, where such processing plants are operating. Fiji is interested in an oil refinery which could easily be implemented with Mexican co-operation (PEMEX). UNIDO has already taken appoopriate actions to boost the CDC Programme. A number of projects, particularly in Asia and the Pacific, are being implemented.

UNIDO has undertaken recently a study to investigate the existing production facilities and also the needs for industries in many developing countries. It is recommended that this general survey be revised with a view to selecting a few projects suitable for implementation in land-locked and island developing countries with a co-operation among developing countries and with UNIDO technical assistance in introducing and managing the projects in question. A rapid implementation of a few selected projects would serve as a model for similar actions in other land-locked and island developing countries and prove to be a working example of a co-operation among developing countries in general. Such an example of implementation would also overcome the existing reservations and doubts in several developing countries which often do prefer a co-operation with a highly developed country, which is often not always to their advantage.

G: Conclusion:

The land-locked and island developing countries, due to their adverse geographical situation, are faced with far deeper and more complicated problems which have seriously hampered their industrial development. To offset these particular problems they need a long-term technical assistance leading to practical solutions. The main objectives of such a programme should be to concentrate on finding ways and means to minimize the additional transportation and transit costs which they have to bear due to their remote positions and isolation from world markets.

Such a programme of technical assistance should ensure the promotion of an integrated industrialization process based on the countries' potential and geographic particularities with a view to achieving the highest degree of interaction between industry and other sectors on the one hand, and industrial production facilities and internal and external markets on the other.

The above target can be achieved both by improving the existing transit facilities or by developing new institutional and manufacturing opportunities leading to minimum costs. In other words, the special technical assistance to be rendered should not only include the improvement of existing establishments, but also the development of appropriate technology, better maintenance, efficient management and adequate training.

The recommendations included in this report are prepared on the basis of the author's findings and oriented to development of adequate means of transportation and communications as well as measures to increase the export capabilities and to assist in developing the import substitute industries in these countries. These recommendations cover a range of technical co-operation proposed to be rendered to the land-locked and island developing countries in the fields of:-

- local assembly of road building machinery, maintenance and repair, storage, warehousing and transloading;
- better utilization of indigenous resources with a view to boosting export industries and developing import substitution industries;
- additional information on produce development, marketing as well as on appropriate technology to be applied;
- technical and management training including in-plant-training and fellowships;

- establishment and strengthening of institutional infrastructure in the land-locked and island developing countries.

These recommendations may form a starting point for launching a long-term programme of technical assistance which will then contribute to and assist the land-locked and island developing countries in offsetting the disadvantages arising from their adverse geographical situation.

IV. Proposed Projects identified for UNIDO Consideration

The following projects have been identified as being of interest in various discussions with Government officials of the land-locked and island developing countries visited. The Governments concerned are interested in obtaining additional UNIDO assistance for implementation.

Several of the projects identified are inter-related and inter-connected, as shown in the schematic diagram.

A. PREPARATION OF ORGANIC BIO-FERTILIZER

Countries interested: BARBADOS, BOLIVIA, FIJI, MADAGASCAR, MAURITIUS, MONGOLIA, TRINIDAD & TOBAGO, ZAMBIA

This project includes the local manufacture of mobile and portable sprayers for liquid fertilizers and pesticides.

Its implementation could be also linked with the Project: ELECTRICAL/ELECTRONIC and MECHANICAL/METALWORKING DEVELOPMENT CENTRE.

B. MANUFACTURE OF WATER STERILIZERS FOR POTABLE WATER SUPPLY

Countries interested: BOLIVIA, MADAGASCAR, MAURITIUS, ZAMBIA

This project should be linked with the project:

PREPARATION OF ORAL REHYDRATION SALTS

Countries interested: BOLIVIA, MADAGASCAR, ZAMBIA

The implementation of the project MANUFACTURE OF WATER STERILIZERS FOR POTABLE WATER SUPPLY could be also linked with the Project: ELECTRICAL/ELECTRONIC and MECHANICAL/METALWORKING DEVELOPMENT CENTRE.

C. EXTRACTION OF OLEORESIN FROM LIVING PINE TREES

Countries interested: BOLIVIA, FIJI, MADAGSCAR, MONGOLIA, ZAMBIA

The implementation of this project, so far as the extraction tools and simple processing equipment is concerned, could be also linked with the Project: ELECTRICAL/ELECTRONIC and MECHANICAL/METALWORKING DEVELOPMENT CENTRE.

D. ELECTRICAL/ELECTRONIC and MECHANICAL/METALWORKING DEVELOPMENT CENTRE

Countries interested: BOLIVIA, MADAGASCAR, MAURITIUS, ZAMBIA

The implementation of this project could be also linked with the Projects:

1. Equipment and sprayers for preparation of organic bio-fertilizer,
2. Manufacture of water sterilizers for potable water supply,
3. Tools and equipment for extraction of oleoresin from living pine trees.

E. MULTIPURPOSE PILOT PLANT (SPECIALIZED INDUSTRIAL TRAINING UNIT)

The project MULTIPURPOSE PILOT PLANT (SPECIALIZED INDUSTRIAL TRAINING UNIT) has been requested by the Government of BOLIVIA for own technology development by Y.P.F.B.,*) Petrochemical Division. The Governments of FIJI (University of the South Pacific), MADAGASCAR, MONGOLIA and TRINIDAD & TOBAGO have expressed their interest in a more general way.

The project in question could also be combined with the project ELECTRIC/ELECTRONIC and MECHANICAL/METALWORKING DEVELOPMENT CENTRE mantioned previously in this report.

One of the many possibilities of such a multipurpose pilot plant is shown in the schematic diagram.

F. INDUSTRIAL ADVISER

Countries: BARBADOS, BOLIVIA, FIJI, MADAGASCAR, TRINIDAD & TOBAGO, ZAMBIA

G. INDUSTRIAL ADVISER TO THE DEVELOPMENT BANK

Countries: BARBADOS, FIJI, MADAGASCAR, MAURITIUS, TRINIDAD & TOBAGO, ZAMBIA

H. INDUSTRIAL INFORMATION SERVICES

Countries: BOLIVIA, FIJI, MADAGASCAR, MAURITIUS, MONGOLIA, TRINIDAD & TOBAGO

I. PHARMACEUTICAL INDUSTRY

Countries: BOLIVIA, FIJI, MONGOLIA, ZAMBIA

J. AGRO-BASED INDUSTRIES

Countries: BARBADOS, BOLIVIA, FIJI, MADAGASCAR, MAURITIUS, MONGOLIA, TRINIDAD & TOBAGO, ZAMBIA

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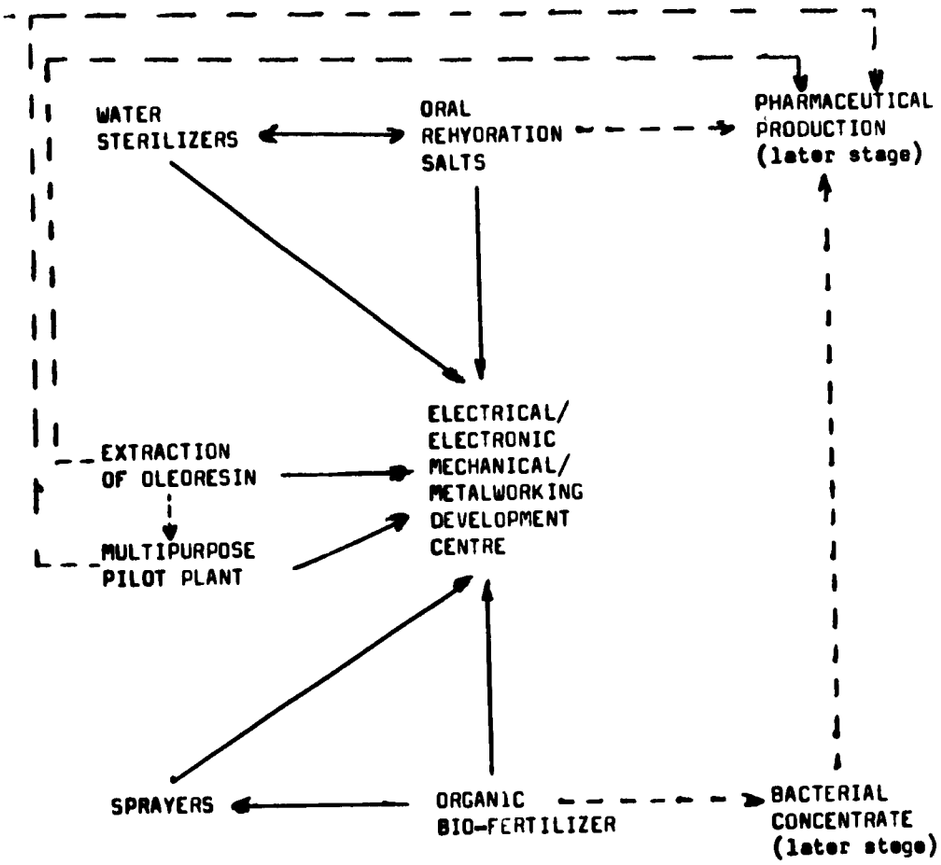
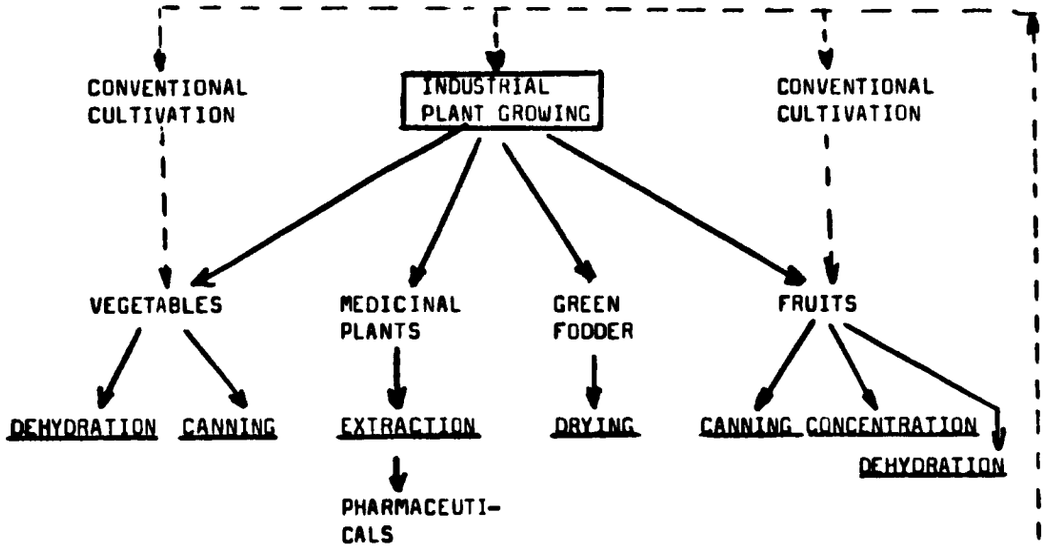
*) Yacimientos Petroliferos Fiscales Bolivianos (State Petroleum Company of Bolivia)

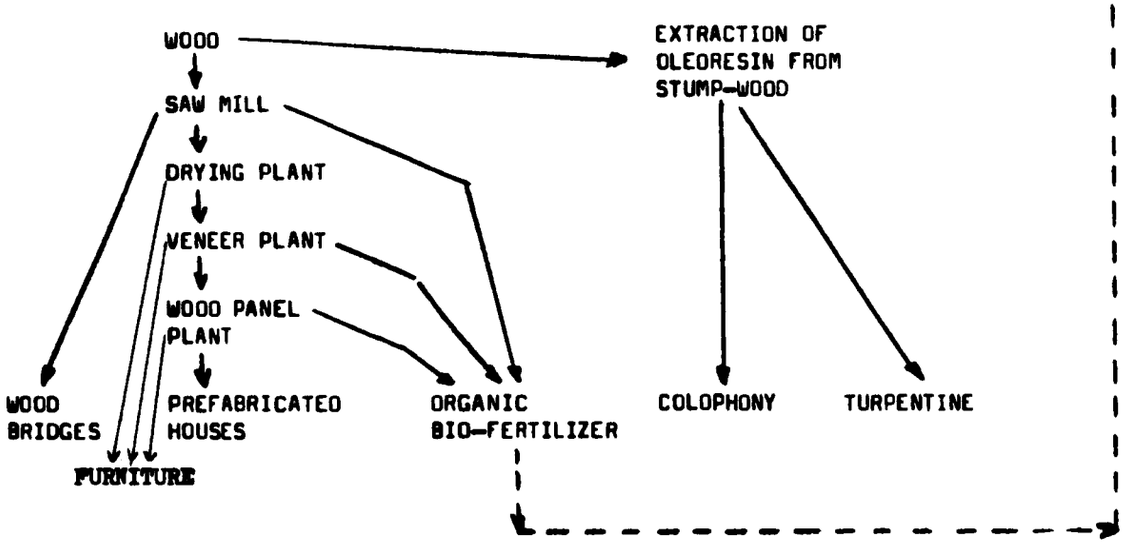

WATER STERILIZERS
ORAL REHYDRATION SALTS
PHARMACEUTICAL PRODUCTION (later stage)
ELECTRICAL/ ELECTRONIC MECHANICAL/ METALWORKING DEVELOPMENT CENTRE
EXTRACTION OF OLEORESIN
MULTIPURPOSE PILOT PLANT
SPRAYERS
ORGANIC BIO-FERTILIZER
BACTERIAL CONCENTRATE (later stage)

AGRO-BASED INDUSTRIES

1. VEGETABLES & FRUITS PROCESSING



2. WOOD PROCESSING



3. FISHERY DEVELOPMENT

COLD STORES (On-shore)

COLD STORES (On-board)

MOBILE and STATIONARY FLAKED ICE PLANTS

AIR STERILIZERS & OZONIZERS FOR COLD STORES

FISH PROCESSING (Canning, freezing, packing, etc.)

SUMMARY OF ESTIMATED COSTS US $		(for each country)	(all countries)
A.	Organic bio-fertilizer	10.000	80.000
B1.	Water sterilizers	11.000	44.000
B2.	Oral Rehydration Salts	12.000	36.000
C.	Extraction of oleoresin	9.000	45.000
D.	Electrical/Electronic and Mechanical/Metalworking Development Centre	30.000	120.000
E.	Multipurpose Pilot Plant	98.000	490.000
F.	Industrial Adviser	100.000	600.000
G.	Industrial Adviser to the Development Bank	100.000	600.000
H.	Industrial Information Services	60.000	360.000
I.	Pharmaceutical industry	25.000	100.000
J.	Agro-based Industry		
	- Vegetables & Fruits Processing	35.000	210.000
	- Wood processing	35.000	140.000
	- Fishery industry	35.000	140.000
	- Starch & Glucose	50.000	250.000
	- Furfurol	50.000	150.000
	- Animal fodder	40.000	280.000
	- Industrial plants growing	8.500	25.500
	- Processing of molasses	8.500	59.500

The projects identified have been calculated as minimum programmes with the shortest possible duration - consequently requiring a great effort and personal involvement of all concerned - and the smallest equipment and material component. Especially the training projects could be substantially extended (multipurpose pilot plant, electric/electronic and mechanic/metal-working development centre) to large scale projects, they could also be conceived as regional projects.

The overall cost estimate for the enlarged and extended projects would be about US $ 5.0 million.

AGRO-BASED INDUSTRIES

The following agro-based industries have been identified as being of interest to several land-locked and island developing countries visited by the author. The Governments concerned are interested in obtaining additional UNIDO assistance.

The projects identified are summarized as follows:

1. VEGETABLES AND FRUITS PROCESSING

   Countries: BOLIVIA, BARBADOS, FIJI, MADAGASCAR, TRINIDAD & TOBAGO, ZAMBIA (see the drawing on p.33)

2. WOOD PROCESSING

   Countries: BOLIVIA, MONGOLIA, TRINIDAD & TOBAGO, ZAMBIA (see the drawing on page 37

3. FISHERY DEVELOPMENT

   Countries: BARBADOS, FIJI, MADAGASCAR, MAURITIUS, TRINIDAD & TOBAGO

4. STARCH AND GLUCOSE

   Countries: BOLIVIA, FIJI, MADAGASCAR, ZAMBIA, TRINIDAD & TOBAGO

5. FURFURAL

   Countries: BOLIVIA , FIJI, ZAMBIA

6. ANIMAL FODDER

   Countries: BARBADOS, BOLIVIA, MONGOLIA, TRINIDAD & TOBAGO, ZAMBIA , MADAGASCAR, MAURITIUS

7. INDUSTRIAL PLANTS GROWING

   Countries: BARBADOS, MAURITIUS, MONGOLIA

8. PROCESSING OF MOLASSES

   Countries: BARBADOS, BOLIVIA, FIJI, MADAGASCAR, MAURITIUS, ZAMBIA, TRINIDAD & TOBAGO

The Governments concerned have expressed their interest in implementing the above mentioned projects and they expect to be provided with basic technical and economic information (description of process and plant, consumption data, preliminary cost estimate, potential partners, possibility of barter: turn-key plant against product, etc.).

PROJECT NO.1

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BARBADOS, BOLIVIA, FIJI, MADAGASCAR, MAURITIUS, MONGOLIA, TRINIDAD & TOBAGO, ZAMBIA

Sector: Chemical Industries

1. TITLE OF THE PROJECT:

Preparation of organic bio-fertilizer from agricultural and forest waste, including equipment and sprayers.

2. OBJECTIVES OF THE PROJECT:

To assist the Government in developing local preparation of organic bio-fertilizer as well as in manufacturing agricultural sprayers (mobile and portable) for the application of liquid fertilizers and pesticides.

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the contry's needs for organic bio-fertilizer;

(b) Review the existing availability of organic raw materials suitable for composting;

(c) Prepare an experimental quantity of organic bio-fertilizer from locally available raw materials;

(d) Organize field trials, including direct composting on the fields and foliage fertilizing;

(e) Design and engineer equipment large scale industrial production of organic bio-fertilizer;

(f) Design and engineer equipment for application of liquid fertilizers and pesticides (mobile and portable sprayers);

(g) Organize the local assembly and manufacture of prototypes of equipment for application of liquid fertilizers and pesticides;

(h) Elaborate a detailed technical documentation;

(i) Conduct a marketing study on the prospects for the export of organic bio-fertilizer to neighbouring countries;

(j) Identify the needs for assistance in implementing local production of the bacterial concentrate needed for the preparation of the organic bio-fertilizer.

4. BACKGROUND INFORMATION:

Organic bio-fertilizer can be prepared with advantage from agricultural and forest waste (straw, sugar cane filter cake, bagasse, bark, twigs, saw dust, shavings, and also from municipal garbage) by an aerobic degradation process using a particular bacterial concentrate as starting material.

All land-locked and island developing countries dispose of sufficient waste as raw material for the local preparation of organic bio-fertilizer.

The introduction of an organic bio-fertilizer would save foreign exchange for chemical fertilizer imports. Its application by the farmers is also not requiring lenghty soil analysis procedures. The texture of the soil is also considerably improved by the humus-organic bio-fertilizer. Increases in the yield can be also anticipated.

The basic idea of the project is to introduce the local preparation of the organic bio-fertilizer by using initially imported bacterial concentrate and to organize the local production of the bacterial concentrate itself at a later stage.

The direct application of the liquid product requires the use of mobile and portable sprayers and the projects envisages the local manufacture of suitable prototypes.

The Governments of BARBADOS, BOLIVIA, FIJI, MADAGSCAR, MAURITIUS, MONGOLIA, TRINIDAD & TOBAGO and ZAMBIA have expressed their interest in implementing the local preparation of organic bio-fertilizer and sprayers and will consequently need additional UNIDO assistance.

5. ESTIMATED COST: (for each country)

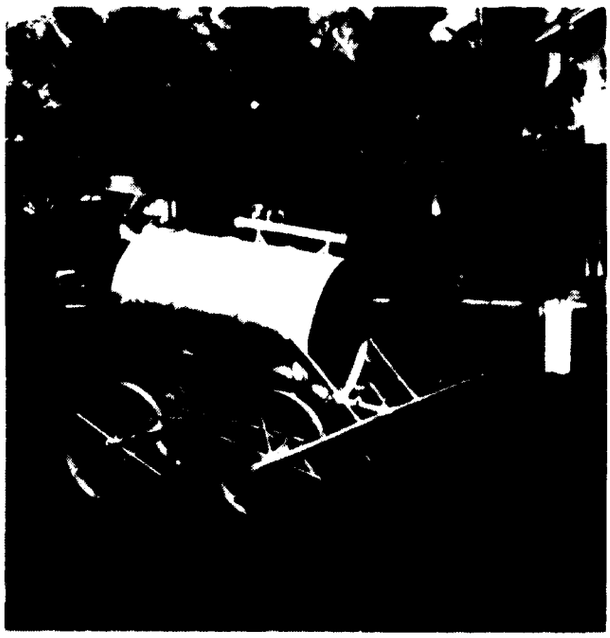
(a) Expert	2 m/m	US $ 8.000
(b) Material		
Bacterial concentrate		800
Nozzles, pump, etc.		700
(c) Miscellaneous		500
(d) TOTAL (for each country)		US $ 10.000
(e) TOTAL (for 8 countries)		US $ 80.000

Preparation of organic bio-fertilizer

Implemented by the author in Laos (LAO/76/003)

MOBILE SPRAYER FOR LIQUID FERTILIZERS AND PESTICIDES

Implemented by the author in Laos (LAO/76/003)



PROJECT NO.2

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BOLIVIA, MADAGASCAR, MAURITIUS, ZAMBIA

Sector: Chemical Industries

1. TITLE OF THE PROJECT:

Manufacture of water sterilizers for potable water supply.

2. OBJECTIVES OF THE PROJECT:

To assist the Government in developing local assembly and manufacture of water purification equipment for potable water supply in rural and urban areas.

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the country's needs for various types and sizes of water sterilizers;
(b) Design and engineer prototypes of water sterilizers based on the method of ultraviolet-ozone treatement of raw filtered water;
(c) Procure equipment components for various types and sizes of water sterilizers;
(d) Organize and supervise the local assembly of prototypes and initial series, including local manufacture of casings;
(e) Elaborate a detailed technical documentation;
(f) Organize field demonstrations;
(g) Train the local counterpart's personnel;
(h) Work out details of technical assistance needs of the entire water purification sector, including water filters, with particular emphasis on the manufacture of complete water purification units;
(i) Make recommendations regarding further development of this sector;
(j) Conduct a marketing study on the prospects for export of water sterilizers to neighbouring countries.

4. BACKGROUND INFORMATION:

One of the most important causes of death in acute gastro-intestinal diseases in infants and young children is the dehydration caused by intense diarrhoea and vomiting, symptoms very similar to those of cholera. The gastro-intestinal diseases, very common and frequent in tropical climates,

are caused by the use of nonpurified water which also contributes heavily to cholera-like diseases in adults.

A simple and inexpensive, yet highly reliable method of preparation of an excellent quality potable water is a combined ultraviolet and ozone treatment of bacteriologically impure raw waters (mechanically filtered). This method, due to the very low consumption of electric power (8 W for 500 lit/h and 30 W for 5,000 lit/h respectively), is of particular importance to developing countries, as it enables an increased utilization of sterile potable water even under adverse operating conditions, in hardly accessible or remoted areas and in localities not disposing of mains.

The cost of uv-sterilizers of conventional manufacture (US $ 450 - 500 per 1 water sterilizer of 500 lit/h) is prohibitive for a widespread use in developing countries. However, a new advanced design makes it possible, that a water sterilizer with a design capacity of 500 lit/h can be locally manufactured at a cost under US $ 50 per piece.

The advantages of of uv-ozone water sterilizers are savings in foreign exchange for costly and complicated chlorination equipment requiring permanent maintenance and also savings in foreign exchange for costly imports of chemicals.

The implementation of the local manufacture of water purification equipment will improve the overall health situation of the country. It will also serve as "prime mover" for further development of additional water purification equipment (filters, pumps, piping, fittings, etc.).

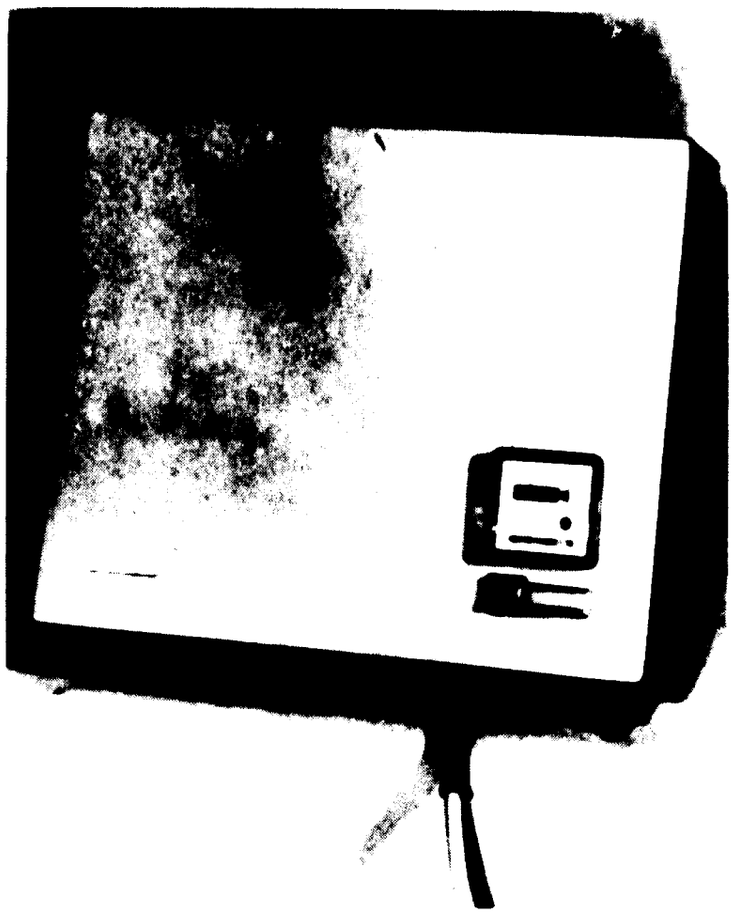
The project in question could be combined with the local production of Oral Rehydration Salts (O.R.S.) and with the local manufacture of hand water pumps based on a small iron foundry.

The Governments of BOLIVIA, MADAGASCAR, MAURITIUS and ZAMBIA have expressed their interest in implementing the local assembly and manufacture of water sterilizers and will consequently need additional UNIDO assistance.

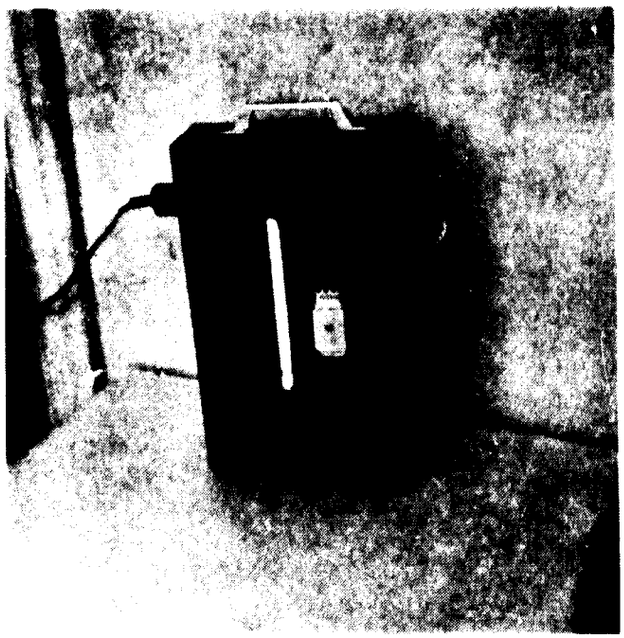
5. <u>ESTIMATED COSTS</u> (for each country)

(a)	Expert 2 m/m	US $ 8.000
(b)	Material and equipment for local assembly of prototypes	2.000
(c)	Miscellaneous	1.000
(d)	TOTAL (for each country)	$ 11.000
(e)	TOTAL (for 4 countries)	$ 44.000

STERILUX AQUASAN Water sterilizers 2.000 - 5.000 l/h
(development and design U.F. Joklik)
Foreseen for local assembly in Madagascar, Mauritius and Zambia



Ultraviolet water sterilizers (500 lit/h)



Implemented by the author in Laos (LAO/76/003)

Implemented by the author in Nepal (RP/RAS/76/002)

Combined water filter and water sterilizer developed and designed by U.F. Joklik (the only apparatus available at the world market of that kind, commercially manufactured in Italy, Austria and Mexico)

PROJECT NO.3

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BOLIVIA, MADAGASCAR, ZAMBIA

Sector: Chemical Industry

1. TITLE OF THE PROJECT:

Production of Oral Rehydration Salts (O.R.S.)

2. OBJECTIVES OF THE PROJECT:

To assist the Government in developing the local production of Oral Rehydration Salts (O.R.S.).

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the country's needs for Oral Rehydration Salts for the forthcoming 5 years;
(b) Conduct a marketing study on the prospects for the export of O.R S. to neighbouring countries;
(c) Organize and supervise local production of oral rehydration salts;
(d) Prepare a starile room facility for the preparation of oral rehydration salts;
(e) Procure machinery and equipment components for local assembly to ensure pilot plant operation;
(f) Procure raw materials necessary for an initial preparatory period of 6 months;
(g) Train the local counterpart's personnal;
(h) Work out technical details of technical assistance needs for the expansion of the project in question;
(i) Make recommendations regarding utilization of existing equipment and machinary for product diversification.

4. BACKGROUND INFORMATION:

One of the most important causes of death in acute gastro-intestinal diseases in infants and young children is the dehydration caused by intense diarrhoea and vomiting, symptoms very similar to those of cholera.

But a simple treatment to restore the lost fluids and essential body salts is to be found by mixing the contents of "ORALYTE", distributed by UNICEF (Code 15-611-00) and containing oral rehydration salts with one litre of potable water and giving it to a child over a 24-hour period. Treatment of dehydration is imperative to avoid dehydration by itself to kill the child, which happens too frequently in tropical climates or when children are already in a precarious state of health or nutrition. UNICEF imports to various developing countries Oral Rehydration Salts, in packs of 28 g each, costing US $ 0.15 per piece. The cost of Oral Rehydration Salts of equal quality, made locally, is estimated to be under US $ 0.10 per piece, e.g. pack of 28 g each.

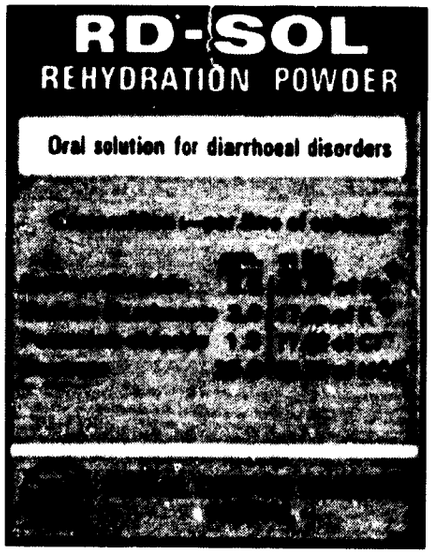
The project in question will serve not only to improve the general health situation of the country, it will also serve as "prime mover" for the future development of the pharmaceutical industry.

The project should be advantageously combined with the project of local assembly and manufacture of water purification equipment, as a permanent success of the project is ensured only under the condition of steadily available potable water in a quality corresponding to W.H.O.-standards.

The Governments of BOLIVIA, MADAGASCAR and ZAMBIA have expressed their interest in implementing the local production of Oral Rehydration Salts and will consequantly need additional UNIDO assistance.

5. ESTIMATED COST: (for each country)

(a) Expert	2 m/m	US $ 8.000
(b) Equipment		2.000
(c) Material (6months)		1.000
(d) Miscellaneous		1.000
(e) TOTAL (for each country)		US $ 12.000
(f) TOTAL (for 3 countries)		US $ 36.000



Oral Rehydration Salts Package
prepared by Royal Drugs Limited
Kathmandu - Nepal
Large scale production machinery for
1,000,000 packages per year being
supplied by UNICEF
(Ref. O.F.Joklik, recommandations
in report submitted in May 1976).

PROJECT NO.4

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BOLIVIA, FIJI, MADAGASCAR, MONGOLIA, ZAMBIA

Sector: Chemical Industry

1. TITLE OF THE PROJECT:

Extraction of Oleoresin from Living Pine Trees with subsequent Processing to Colophony and Turpentine Oil.

2. OBJECTIVES OF THE PROJECT:

To assist the Government in extracting oleoresin from living pine trees with subsequent processing to colophony, turpentine oil and derivatives.

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the local availability of raw material (inventory of pine trees);
(b) Conduct a marketing study on the prospects for the export of colophony, turpentine oil and derivatives;
(c) Organize field trials with the scope to obtain representative samples of at least 100 living pine trees to quantify yield and composition of oleoresin;
(d) Analyse the representative samples;
(e) Design and engineer a pilot plant for the processing of experimental quantities of oleoresin to colophony and turpentine oil;
(f) Procure additional information on an industrial processing plant for the identified production capacity;
(g) Examine the possibility of technical and commercial co-operation, joint venture, and the like;
(h) Elaborate a detailed technical documentation;
(i) Train the local counterpart's personnel.

4. BACKGROUND INFORMATION:

Oleoresin, extracted in a simple way from living pine trees, is an important raw material for the production of colophony and turpentine oil which in turn serve as valuable intermediates for processing to chemicals, pharmaceuticals, paper sizing, etc., with an interesting export potential to many countries.

In many land-locked and island developing countries there are either pine forests development schemes for the pulp and paper industry under way, or large afforestation programmes under implementation. Both serve as a basis for extraction of oleoresin from living pine trees with subsequent processing.

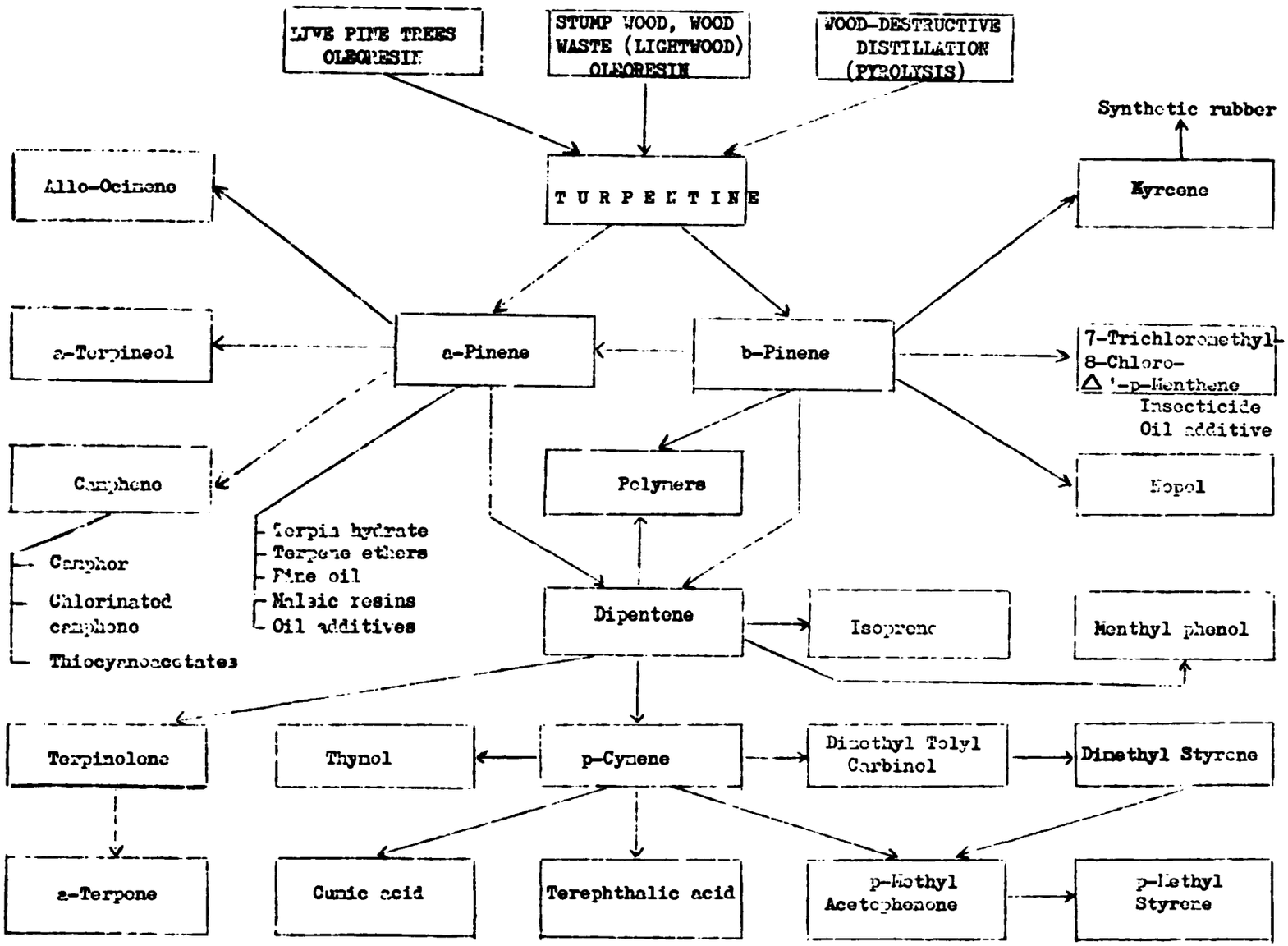
The project in question has also an important social aspect, inasmuch it can can be used for rural settlement and being quite labour intensive; female workers could collect oleoresin from living pine trees early in the morning and then be occuppied in handicrafts at home (hand-loom cotton weaving,etc.).

The implamentation could also serve as a "prime mover" industry for further industrial development (processing of derivatives).

The Governments of BOLIVIA, FIJI, MADAGASCAR, MONGOLIA and ZAMBIA have expressed their interest in implementing the local extraction of oleoresins from living pine trees with subsequent processing to colophony and turpentine oil and will consequently need additional UNIDO assistance.

5. ESTIMATED COST: (for each country)

(a) Expert	2 m/m	US $ 8.000
(b) Sampling		500
(c) Miscellaneous		500
(d) TOTAL (for each country)		US $ 9.000
(e) TOTAL (for 5 countries)		US $ 45.000


LIVE PINE TREES OLEORESIN
STUMP WOOD, WOOD WASTE (LIGHTWOOD) OLEORESIN
WOOD-DESTRUCTIVE DISTILLATION (PYROLYSIS)
TURPENTINE
Synthetic rubber
Allo-Ocimene
Myrcene
a-Terpineol
a-Pinene
b-Pinene
7-Trichloromethyl-8-Chloro-Δ'-p-Menthene
Insecticide
Oil additive
Camphene
Polymers
Nopol
Terpin hydrate
Terpene ethers
Pine oil
Maleic resins
Oil additives
Camphor
Chlorinated camphene
Thiocyanoacetates
Dipentene
Isoprene
Menthyl phenol
Terpinolene
Thymol
p-Cymene
Dimethyl Tolyl Carbinol
Dimethyl Styrene
a-Terpone
Cumic acid
Terephthalic acid
p-Methyl Acetophenone
p-Methyl Styrene

PROJECT NO.5

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BOLIVIA, FIJI, MONGOLIA, ZAMBIA

Sector: Chemical Industry

1. TITLE OF THE PROJECT:

Development of Pharmaceutical Industry

2. OBJECTIVES OF THE PROJECT:

To assist the Government in develop a national pharmaceutical industry based on indigenous raw materials and/or cooperation with a pharmaceutical industry from a developed country.

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the local availability of raw materials suitable for development of pharmaceutical industry;
(b) Undertake a marketing study on the prospects of local sales;
(c) Undertake a marketing study on the prospects for the export of pharmaceuticals to neighbouring countries;
(d) Identify the pharmaceutical products suitable for local production;
(e) Select the production technologies, processes and make recommendations for transfer of technology, expertise and know-how;
(f) Establish contacts with pharmaceutical firms in developed countries for potential joint ventures, licensing, technical and commercial cooperation;
(g) Organize a documentation and information centre for pharmaceuticals;
(h) Train the local counterpart's personnel;
(i) Make recommendations regarding the needs for assistance for further development and implementation.

4. BACKGROUND INFORMATION:

Many land-locked and island developing countries dispose of adequate raw materials suitable for processing to pharmaceutical products like MONGOLIA (animals for serum production and blood derivatives), BOLIVIA, FIJI and ZAMBIA (medicinal plants). On the other hand, substantial imports of pharmaceutical products require additional foreign exchange, which is particularly felt in countries not having sufficient foreign exchange reserves (BOLIVIA, ZAMBIA).

A local pharmaceutical production will easen the foreign exchange situation and improve the general health situation of the country. The best viable way for the development of a local pharmaceutical industry is a cooperation with a small or medium sized pharmaceutical industry in developed countries (multinationals will have no interest or intention to engage themselves in small developing countries). Technical and commercial cooperation, joint ventures or industrial redemployment are possible solutions. Interested parties in Germany, Austria and Italy are to hand.

For economic reasons it is recommended to combine the pharmaceutical production with local production of basic cosmetics and toilet articles.

The Governments of BOLIVIA, FIJI, MONGOLIA and ZAMBIA have expressed their interest in implementing a local pharmaceutical industry.

The projects identified can be summarized as follows:

(a) BOLIVIA: General development of pharmaceutical industry - antibiotics, vitamins, extraction of alcaloids;

(b) FIJI: Local production of pharmaceutical products(to substitute imports) by a local association of a pharmacists cooperative;

(c) MONGOLIA: Antibiotics, blood derivatives, serum (tetanus);

(d) ZAMBIA: General development of pharmaceutical industry - antibiotics, sulfonamides, vitamins, medicinal plants extraction.

ESTIMATED COST: (for each country)

(a) Expert	6 m/m	US $	24.000
(b) Miscellaneous			1.000
(c) TOTAL (for each country)		US $	25.000
(d) TOTAL (for 4 countries)		US $	100.000

PROJECT NO.6

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BOLIVIA, FIJI, MADAGASCAR, MAURITIUS, MONGOLIA, TRINIDAD & TOBAGO

Sector: Institutional Infrastructure

1. TITLE OF THE PROJECT:

Industrial Information Services Centre

2. OBJECTIVES OF THE PROJECT:

To assist the Government in organizing a centre for Industrial Information Services as a basis for development planning and implementation.

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Organize an Industrial Information Services Centre at the Ministry competent for industrial development;

(b) Review the existing documentation and identify the basic needs for establishing a well organized industrial documentation centre;

(c) Procure the necessary documentation, patents, literature, market reviews, technical documentation, etc.;

(d) Review the existing development plans and identify the projects to be implemented in the forthcoming 5 years;

(e) Work out details for the projects identified to obtain as much specialized information as possible on technology, processes, contractors, supply of equipment, machinery and materials, marketing, packaging, standardization, metrology, quality control, etc.

(f) Work out details of additional needs for the documentation centre in order to ensure its permanent supply with the necessary informations and documentation;

(g) Make recommendations regarding further development of the documentation centre;

(h) Train the local counterpart's personnel;

(i) Elaborate a simple indexing and reference system.

4. BACKGROUND INFORMATION:

A reliable detailed information is the basis for any sound decision in industriel planning and development. In most of the land-locked and island developing countries a well organized information and documentation system is lacking. Industrial Information Services are indispensable and the Governments have realized that they need as much detailed information as possible. This is mainly an organizatory problem, insofar as much valueble information is scattered around in various offices (UNDP, Ministries, Bilateral aid Agencies, etc.). The main objective of the project would be,therefore, a review of all existing documentation, a reorganization, completion and continuous supply of information.

The Governments of BOLIVIA, FIJI, MADAGASCAR, MAURITIUS, MONGOLIA and TRINIDAD & TOBAGO have expressed their interest in esteblishing and implementing an efficient Industrial Information Services Centre and they will need consequently additional UNIDO assistance.

5. ESTIMATED COST: (for each country)

(a) Expert	12 m/m	US $ 48.000
(b) Documentation		10.000
(c) Miscellaneous		2.000
(d) TOTAL (for each country)		US $ 60.000
(e) TOTAL (fot 6 countries)		US $360.000

PROJECT NO.7

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BARBADOS, FIJI, MADAGASCAR, MAURITIUS, TRINIDAD & TOBAGO and ZAMBIA

Sector: Institutional Infrastructure

1. PROJECT OF THE PROJECT:

Industrial Adviser to the Development Bank

2. OBJECTIVES OF THE PROJECT:

To assist the Government in providing the Development Bank with the necessary technical expertise for evaluation, selection and preparation of industrial development projects.

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assist in planning, establishing and running a small Management and Technical Advisory Service within the Bank's Planning and Promotion Department. The clients to be advised will be small and medium scale farmers and industrialists as well as large parastatal companies.

(b) Provide management assistance: over-all management advice (diagnosis of the operational and financial position of enterprises, etc.); financial management and control (information on sources of financing, advice on book-keeping, cost accounting and control, budgeting, cash flow analysis, etc.); marketing assistance (market study and research, advice on sales channels, distribution methods, pricing policies, etc.); personnal management advice;

(c) Provide technical counselling assistance: advising on availability and suitability of technology, techniques, processes and methods of production, maintenance and repair, etc., advising on availability and suitability of materials, machinary and equipment, plant layout, etc.; advising on inventory control, cost reduction, etc.; advising on general housekeeping, working conditions, etc.

(d) Conduct marketing studies on the prospects for exports of intermediates and finished products and also for best suitable imports of raw materials needed for processing and/or re-exportation;

(e) Organize a documentation centre with all relavent information and documentation required;

(f) Work out a portofolio of standard industrial projects to be submitted to local and foreign investors with particular emphasis on utilization of indigenous raw materials, import substitution, potential exports and the like;

(g) Review and complete, where necessary, investment promotion laws and incentives for local and foreign investors.

4. BACKGROUND INFORMATION:

In many land-locked and island developing countries the Development Banks are the promotors of industrial development. Being staffed with economists and finance experts, they have, however, difficulties in assessment, evaluation, selection and implementation of technical projects. They need therefore an allround expert for project preparation.

The Governments of BARBADOS, FIJI, MADAGASCAR, MAURITIUS, and TRINIDAD & TOBAGO and ZAMBIA have realized the importance and necessity of such a project and have expressed their interest in its implementation for which they will need additional UNIDO assistance.

5. ESTIMATED COST: (for each country)

(a) Expert	24 m/m	$	96.000
(b) Miscellaneous			4.000
(c) TOTAL (for each country)		$	100.000
(d) TOTAL (for 6 countries)		$	600.000

PROJECT NO.8

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BARBADOS, BOLIVIA, FIJI, MADAGASCAR, TRINIDAD & TOBAGO, ZAMBIA

Sector: Industrial Planning

1. TITLE OF THE PROJECT:

Industrial Adviser

2. OBJECTIVES OF THE PROJECT:

To assist the Government in industrial planning and development in all sectors of the manufacturing industry.

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the situation in the entire manufacturing industry sector and identify the needs for assistance;

(b) Review the existing development plans and work programmes and identify the needs for further assistance;

(c) Work out details of technical assistance needs of the entire manufacturing industry sector with particular emphasis on import substitution, export promotion and utilization of indigenous resources;

(d) Assess the forthcoming needs for human resources to cope with the industrial development programmes;

(e) Conduct a marketing study on the prospects for exports;

(f) Investigate the possibilities of joint ventures, technical and commercial cooperation, licensing, transfer of technology and know-how, development of indigenous technology, expertise and know how and make recommendations for implementation;

(g) Make recommendations regarding full utilization of indigenous natural and human resources, existing industrial production capacities, etc.;

(h) Achieve a desirable degree of co-ordination with other Government departments, particularly in respect to efforts aimed at expanding operational activities in the industrial field.

(i) Provide the Government with proposals and suggestions which may lead to improvements in the delivery of UNIDO's assistance in the field of industrial development;

(j) Train the local counterpart's personnel;

(k) To inform the Government of all possibilities of UNIDO assistance in the field of industry, since this is not sufficiently known in many cases.

4. BACKGROUND INFORMATION:

Industriel planning, development and implementation in many land-locked and island developing countries suffers from lack of coordination, insufficient experience of the Government officials concerned, and inadequate management. Industriel development matters - being a relatively new and young field of activities - have so far received not always the same support and assistance as traditional matters of agriculture, health or education.

The Industriel Adviser, working within the Government's department competent for industriel development as a whole, should improve the efficiency of industriel planning, development and implementation services. He should act, in a way, as the counterpart of the UNIDO Senior Industrial Field Adviser, with the emphasis on assistance to the Government's department concerned.

Cooperation with other UN agencies (ICAO, ILO, UNCTAD, UNICEF, WHO, etc.) and with multilateral and bilateral aid organizations is another field of activities for the Industriel Adviser.

The Governments of BARBADOS, BOLIVIA, FIJI, MADAGASCAR, TRINIDAD & TOBAGO and ZAMBIA have realized the importance and necessity of the project in question and have expressed their interest in its implementation, for which they will need additional UNIDO assistance.

5. ESTIMATED COST: (for each country)

(a) Expert	24 m/m	US $ 96.000
(b) Miscellaneous (project travel,etc.)		4.000
(c) TOTAL (for each country)		US $ 100.000
(d) TOTAL (for 6 countries)		US $ 600.000

PROJECT NO.9

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BOLIVIA, FIJI, MADAGASCAR, MONGOLIA, TRINIDAD & TOBAGO

Sector: Industrial Training

1. TITLE OF THE PROJECT:

Multipurpose Pilot Plant (Specialized Industrial Training Unit).

2. OBJECTIVES OF THE PROJECT:

To assist the Government in developing own technology, expertise and know-how by implementing a multipurpose pilot plant (Specialized Industrial Training Unit) including local production of catalysts used in the processes involved.

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Design and engineer a multipurpose pilot plant for the production of
- phthalic anhydride
- plasticizers (phthalates)
- synthetic resins (alkyds, polyesters)
- phthalimide
- phenol-formaldehyde and urea-formaldehyde resins;

(b) Organize and supervise the local manufacture of the pilot plant and procure the foreign components, material and equipment needed;

(c) Instruct and train the local counterpart's personnel during the design, engineering, manufacture, assembly, start-up and running-in periods;

(d) Design and engineer a pilot plant for the local production of catalysts needed for the processes involved;

(e) Organize and supervise the local manufacture of the catalyst pilot plant and procure the foreign components, material and equipment needed;

(f) Elaborate a detailed technical documentation on
- technology
- processes
- patent situation
- literature
- potential contractors
- potential suppliers of equipment and machinery
- marketing

(g) Design and engineer industrial plants in identified production capacities;

(h) Elaborate a detailed technical documentation on catalysts and their production;

(i) Conduct a marketing study on the prospects for the export of products and catalysts;

(j) Work out details of technical assistance needs of the implementation of industrial plants;

(k) Make recommendations regarding further expansion possibilities in these and related fields.

4. BACKGROUND INFORMATION:

Several land-locked and island developing countries are interested in developing own technology, expertise and know-how for the production of plasticizers, synthetic resins and other intermediates.

A multipurpose pilot plant, conceived as a Specialized Industrial Training Unit, is very suitable for own technology development, development of adequate control equipment, testing of raw materials, production of samples for sales promotion and for the training of local technical personnel.

The local production of catalysts needed in the processes involved makes the developing country independent from the foreign catalyst supplier's.

The multipurpose pilot plant serves also as a valuable tool for the design, engineering and manufacture of the industrial scale commercial plant.

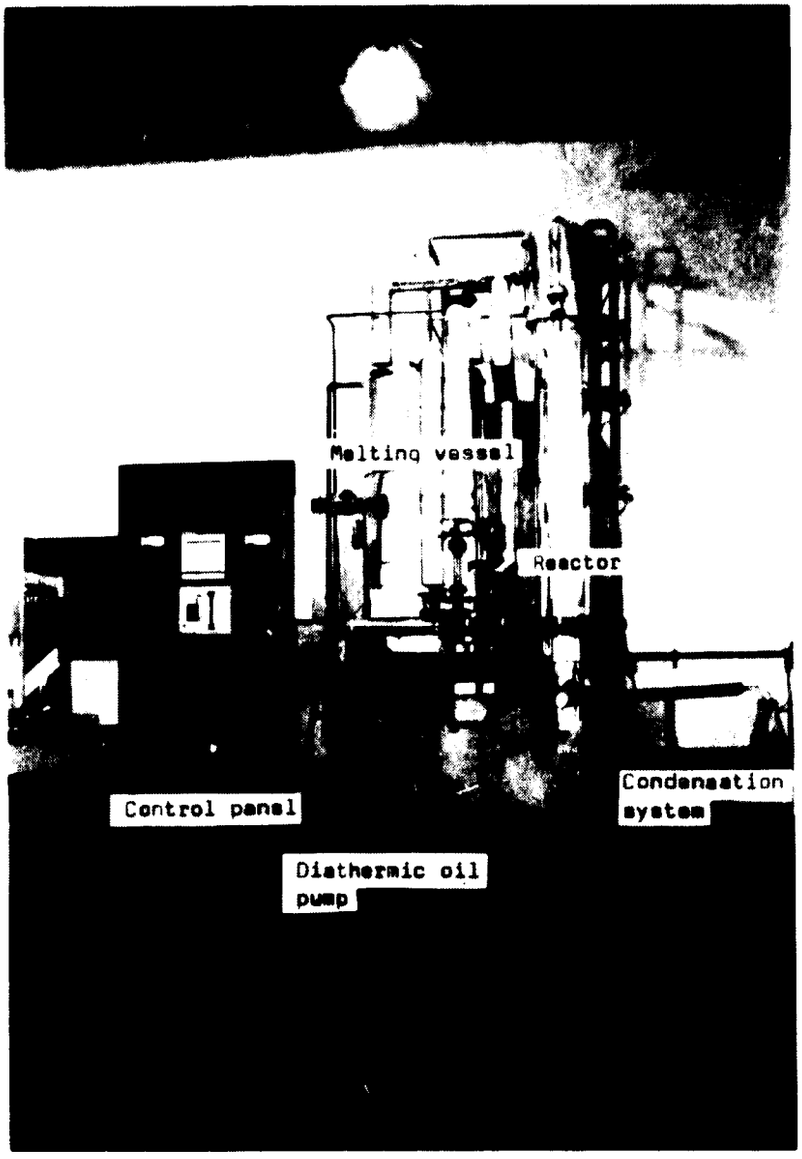
The implementation of the project in question serves as "prime mover" for further industrial development in this and related fields.

The Governments of BOLIVIA, FIJI, MADAGASCAR, MONGOLIA and TRINIDAD & TOBAGO have expressed their interest in implementing the project in question and will therefore need additional UNIDO assistance.

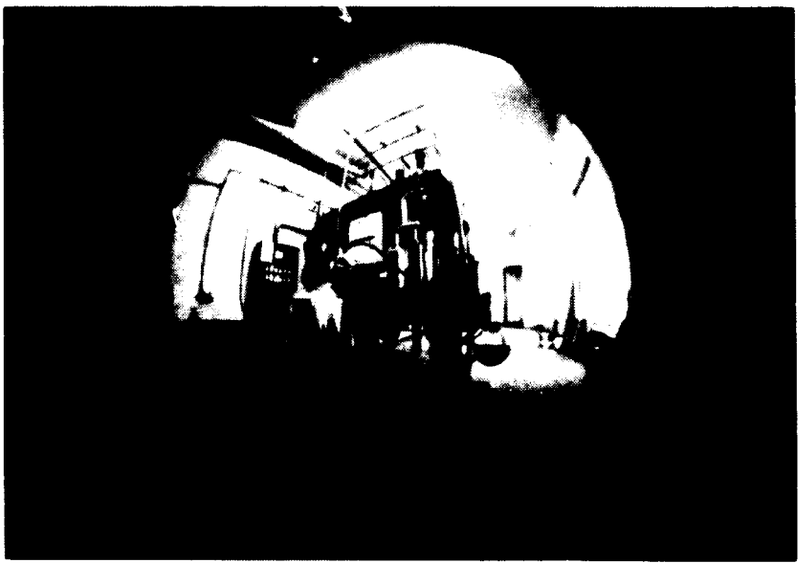
5. ESTIMATED COST: (for each country)

(a) Expert	12 m/m	US $ 48.000
(b) Equipment		48.000
(c) Literature & patents		1.000
(d) Miscellaneous		1.000
(e) TOTAL	(for each country)	US $ 98.000
(f) TOTAL	(for 5 countries	US $490.000

Multipurpose pilot plant with diathermic oil heating:

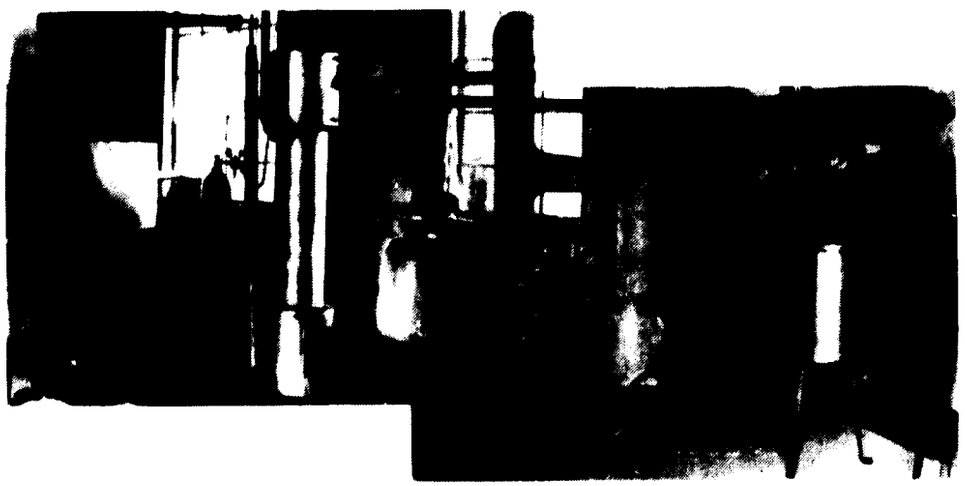


Multipurpose pilot plant with electric heating:

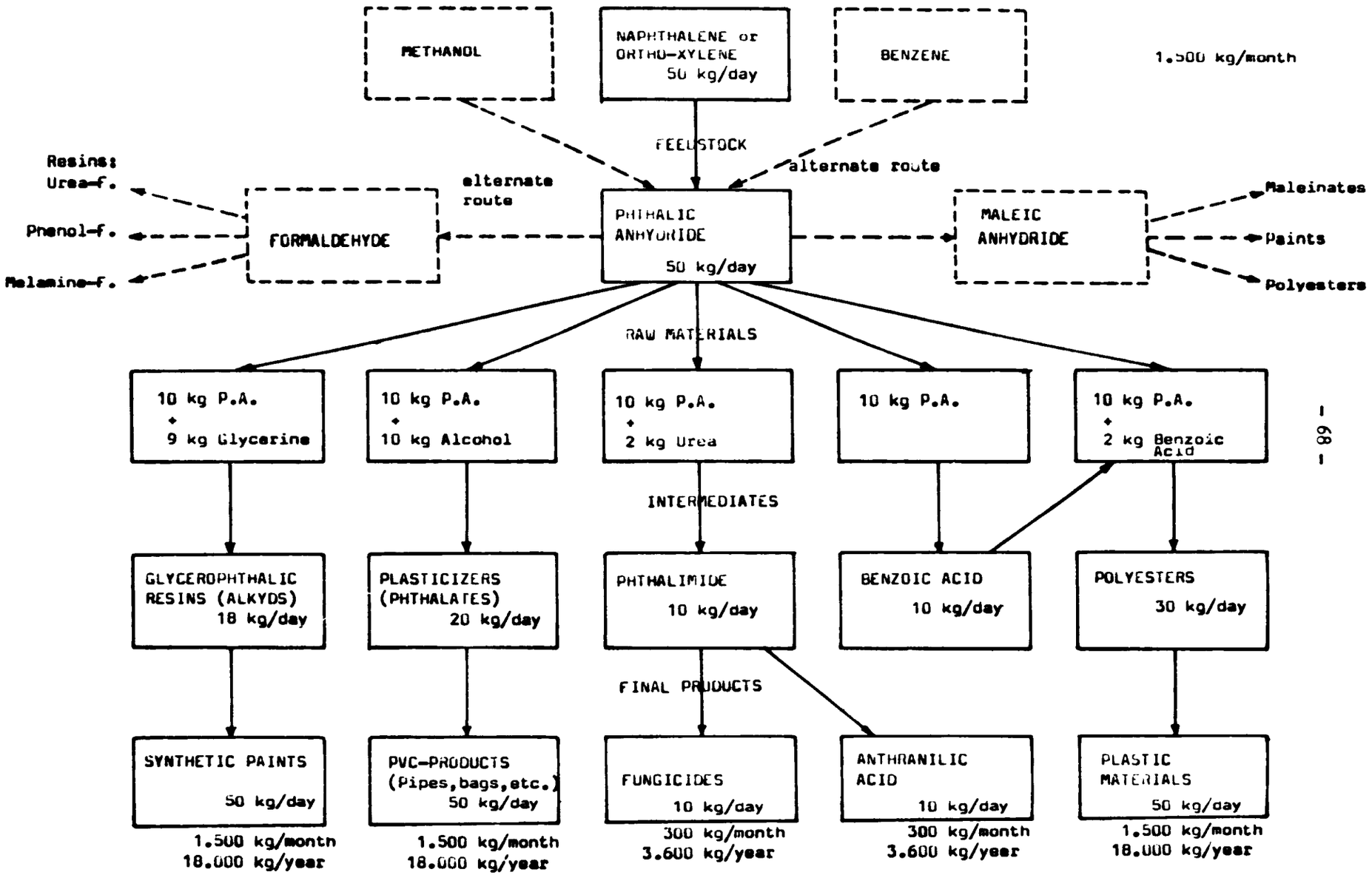


Multipurpose pilot plants for catalytic air oxidation of hydrocarbons

Oil filter
Air filter
Air preheater
Melting vessel
Vaporizer
Reactor
Sublimation chamber



Sublimation chamber
Reactor
Melting vessel
Air preheater
Air filter


METHANOL
NAPHTHALENE or ORTHO-XYLENE 50 kg/day
BENZENE
1.500 kg/month
FEEDSTOCK
alternate route
Resins: Urea-f.
Phenol-f.
Melamine-f.
FORMALDEHYDE
elternate route
PHTHALIC ANHYDRIDE 50 kg/day
MALEIC ANHYDRIDE
Maleinates
Paints
Polyesters
RAW MATERIALS
10 kg P.A. + 9 kg Glycerine
10 kg P.A. + 10 kg Alcohol
10 kg P.A. + 2 kg Urea
10 kg P.A.
10 kg P.A. + 2 kg Benzoic Acid
INTERMEDIATES
GLYCEROPHTHALIC RESINS (ALKYDS) 18 kg/day
PLASTICIZERS (PHTHALATES) 20 kg/day
PHTHALIMIDE 10 kg/day
BENZOIC ACID 10 kg/day
POLYESTERS 30 kg/day
FINAL PRODUCTS
SYNTHETIC PAINTS 50 kg/day
PVC-PRODUCTS (Pipes,bags,etc.) 50 kg/day
FUNGICIDES 10 kg/day
ANTHRANILIC ACID 10 kg/day
PLASTIC MATERIALS 50 kg/day
1.500 kg/month 18.000 kg/year
1.500 kg/month 18.000 kg/year
300 kg/month 3.600 kg/year
300 kg/month 3.600 kg/year
1.500 kg/month 18.000 kg/year

PROJECT NO.10

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BOLIVIA, MADAGSCAR, MAURITIUS, ZAMBIA

Sector: Engineering Industries

1. TITLE OF THE PROJECT:

Electrical/Electronic and Mechanical/Metalworking Development Centre.

2. OBJECTIVES OF THE PROJECT:

To assist the Governments in developing their own technology, expertise and know-how by implementing an Electrical/Electronic and Mechanical/Metal-working Development Centre, based on existing I.L.O. vocational training or industrial trade training centres and other existing (bilateral) training facilities.

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the situation in the existing vocational training or industrial trade training centres and identify the possibilities in production of prototypes and small series suitable either for direct sale or for cession to the local manufacturing industry to enable them to initiate a commercial scale industrial production;

(b) Identify the type of equipment to be developed as commercial prototypes;

(c) Design and engineer the prototypes identified;

(d) Organize and supervise the production of the prototypes identified;

(e) Prepare a detailed technical documentation;

(f) Train the local counterpart's personnel;

(g) Review the existing facilities and work programmes and identify the needs for assistance for further development and expansion;

(h) Conduct a marketing study on the prospects for the exports to neighbouring countries;

(i) Make recommendations regarding full utilization of the existing facilities in view of developing own technology, expertise and know-how.

4. BACKGROUND INFORMATION:

In many land-locked and island developing countries there is a vocational training centre disposing of sufficient modern equipment for electrical and mechanical work. Most of these institutions have been implemented by I.L.O. or by bilateral agreements. The existing equipment is often underutilized and it could easily be used for a small scale production of equipment such as

- water purifiers
- agricultural tools and machinary (sprayers, etc.)
- electromedical equipment and apparatus
- pilot plants for utilization of indigenous raw materials
- control equipment
- telecommunication equipment
- development of commercial prototypes for the local industry
- general maintenance and repair work.

The Governments of BOLIVIA, MADAGASCAR, MAURITIUS and ZAMBIA have expressed their interest in implementing the project in question, and will consequently need additional UNIDO assistance.

The Government of MADAGASCAR has already submitted a request to UNDP Office for onward transmittal to UNIDO. The enclosed Project Document is self-explanatory and illustrates the project in detail. This may serve as an example for similar requests by other interested Governments.

5. ESTIMATED COST: (for each country)

(a) Expert	6 m/m	US $ 24.000
(b) Equipment		5.000
(c) Miscellaneous		1.000
(d) TOTAL (for each country)		US $ 30.000
(e) TOTAL (for 4 countries)		US $ 120.000

SOME EXAMPLES OF APPARATUS AND EQUIPMENT SUGGESTED FOR SMALL SCALE PRODUCTION AT THE ELECTRICAL/ELECTRONIC AND MECHANICAL/METALWORKING DEVELOPMENT CENTRE

(know-how, expertise, design and engineering available free, without payment of licence fees or royalties)

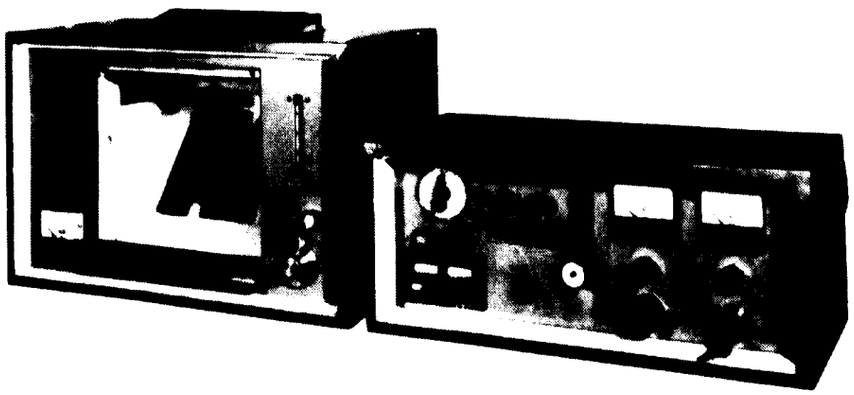
MEDICORAL Monitor of vital body functions
(developed and designed by G.F. Boklik)
foreseen for local assembly in Madagascar, Mauritius and Zambia

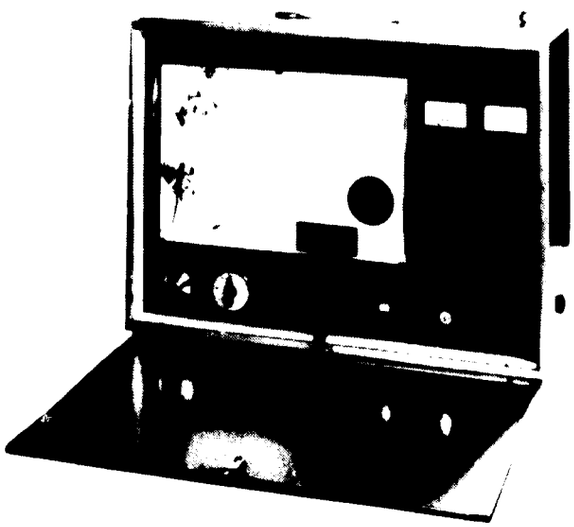
Automatic blood pressure and heart activity measurement with fluidic control

HAEMOXYMAT Blood oxygenator

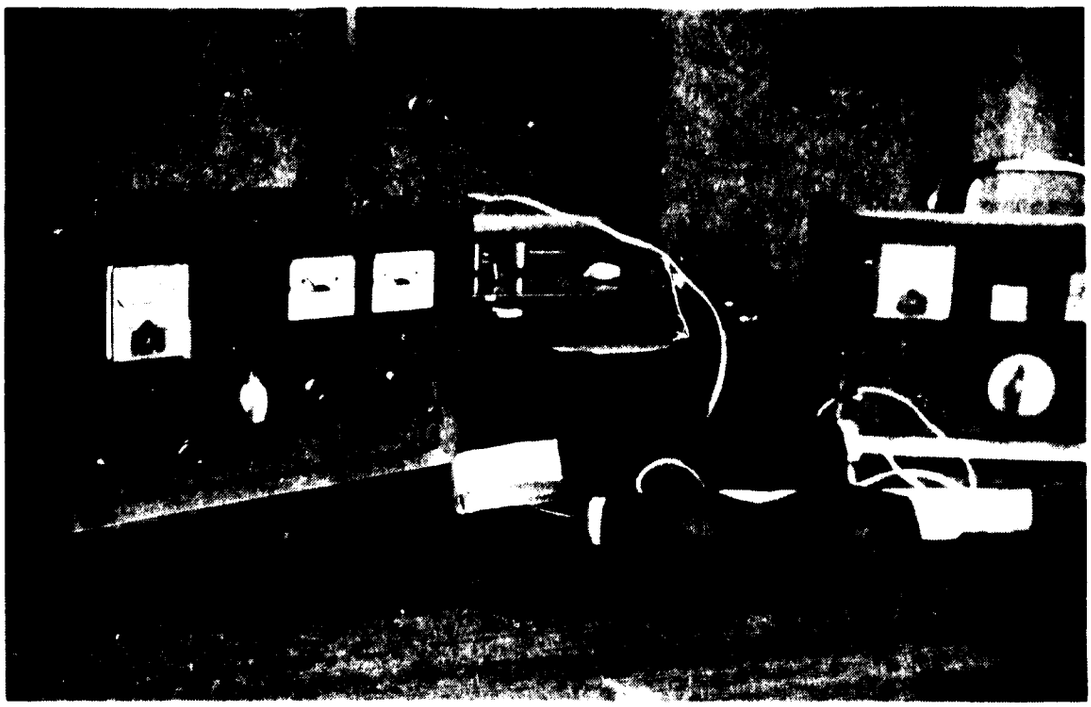
(developed and designed by U.F. Woklik, Austrian Patent 259752, French Patent 1 481 491)

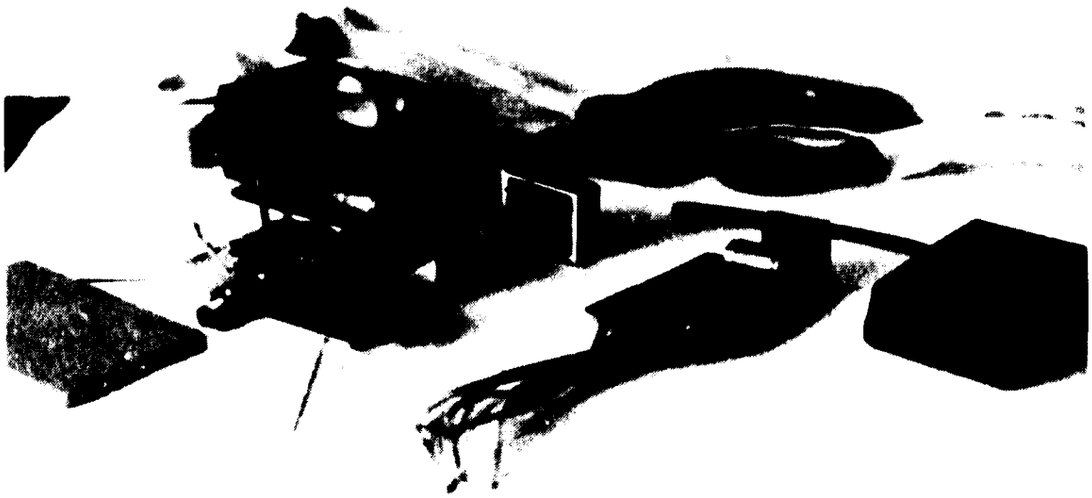
Foreseen for local assembly in Madagascar, Mauritius and Zambia





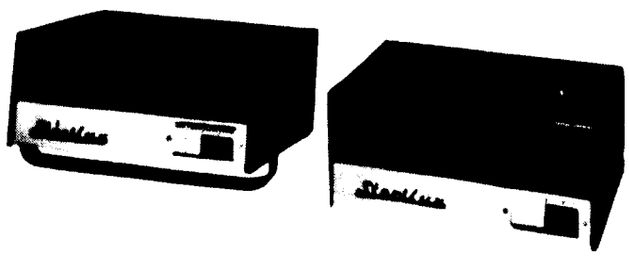
NEUROTAKT Electrotherapeutic sleep apparatus
(developed and designed by L.F. Joklik)
foreseen for local assembly in Madagascar, Mauritius and Zambia



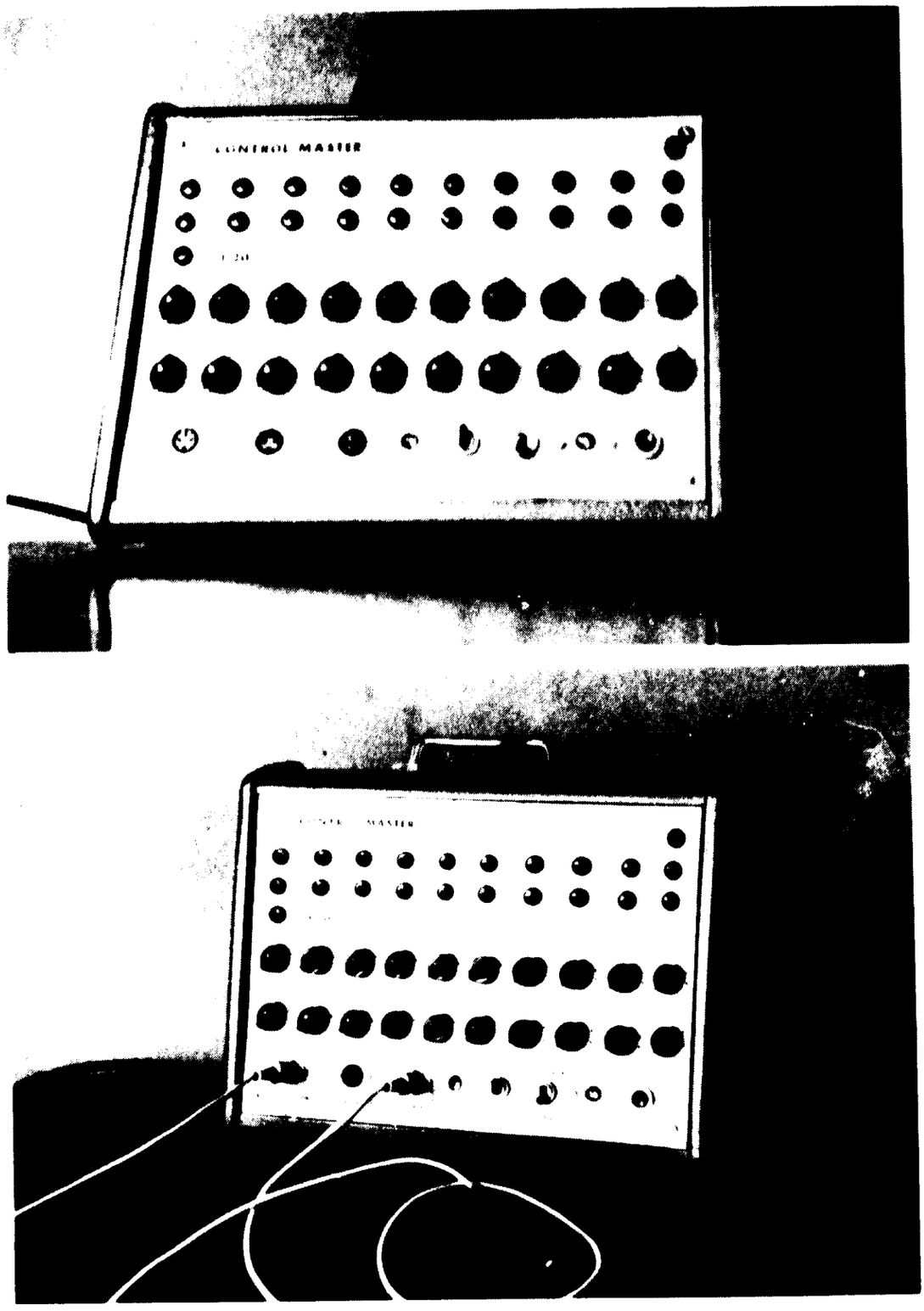


Pocket oxygen shower for astmatics
(developed and designed by U.F. Joklik)
Foreseen for local assembly in Madagscar, Mauritius and Zambia

STERILUX Air sterilizer for hospitels, clinics, doctors,
public premisses, etc., also for cold stores (meat & fish)
(developed and designed by O.F. Joklik)
Foreseen for local assembly in Madagscar, Mauritius end Zambia



CONTROL-MASTER and TIME-MASTER. Electronic process control equipment.
Developed by O.F. Joklik



PROJECT NO.11

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-Locked and Island Developing Countries

Countries: BOLIVIA, BARBADOS, FIJI, MADAGASCAR, TRINIDAD & TOBAGO, ZAMBIA

Sector: Agro-based Industry

1. TITLE OF THE PROJECT:

Development of Vegetables and Fruits Processing Industries

2. OBJECTIVES OF THE PROJECT:

To assist the Government in developing vegetables and fruits processing industries based on indigenous raw materials and for import substitution as well as for potential exports.

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the local availability of vegetables and fruits suitable for processing;
(b) Undertake a marketing study on the prospect of local sales and import substitution;
(c) Undertake a marketing study on the prospects for the exports to neighbouring countries and other markets;
(d) Identify the quality and quantity of vegetables and fruits to be processed locally;
(e) Select and recommend suitable processing technologies for the processing plants;
(f) Establish contacts with suppliers of complete turn-key plants for vegetables and fruits processing on a barter basis for products originating from the plant supplied (dehydrated vegetables or fruits, fruit nectar, etc.);
(g) Train the local counterpart's personnel;
(h) Make recommendations regarding the needs for assistance for further development and implementation;
(i) Make recommendations regarding the needs for assistance for establishment of a pilot project for vegetables and fruits processing ;
(j) Organize adequate training abroad of the local counterpart's personnel.

4. BACKGROUND INFORMATION:

In many land-locked and island developing countries the local processing of vegetables and fruits has hardly commenced. Yet large amounts of processed vegetables and fruits are being imported to these countries, requiring huge amounts of foreign exchange, and thus deterioriating the balance of payments.

These countries need technical assistance for the development of their food industry - vegetables and fruits processing (dehydration, concentration, canning, etc.) - including food technology, quality control, packing and packages design.

The Governments of BOLIVIA, BARBADOS, FIJI, MADAGASCAR, TRINIDAD & TOBAGO and ZAMBIA have expressed their interest in developing this sector of agro-based industry for which they need additional UNIDO assistance for implementation.

Of particular interest will be the envisaged cooperation with plant suppliers agreable to supply a turn-key processing plant on a barter basis against payment with products originating from the processing plant.

5. ESTIMATED COST: (for each country)

(a) Expert	6 m/m	US $	24.000
(b) Miscellaneous			1.000
(c) Training			10.000
(d) TOTAL (for each country)		US $	35.000
(e) TOTAL (for 6 countries)		US $	210.000

PROJECT NO.12

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BOLIVIA, MONGOLIA, TRINIDAD & TOBAGO, ZAMBIA

Sector: Agro-based Industry

1. TITLE OF THE PROJECT:

Development of the wood processing industry

2. OBJECTIVES OF THE PROJECT:

To assist the Government in developing the wood processing industry based on local raw materials, including export promotion.

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the local availability of raw materials suitable for the development of the wood processing industry;

(b) Undertake a marketing study on the prospect of local sales of processed wood products in general;

(c) Undertake a marketing study on the prospects for exports;

(d) Identify the quality and quantity of wood and wood products to be processed:

- sawn timber
- dried wood (incl. impregnation)
- veneer
- wood panels
- prefabricated houses
- wood bridges
- wood residues (for composting to organic bio-fertilizer)
- stump wood for extraction of resin
- furniture

(e) Select and recommed suitable processing technologies for the processing plants;

(f) Establish contacts with suppliers of complete turn-key plants for wood processing on a barter basis for products originating from the plant supplied;

(g) Establish contacts with potential licensors, partners in joint ventures, technical and commercial cooperation, design and marketing for exports;

(h) Train the local counterpart's personnel;

(i) Organize adequate in-plant-training abroad for the local counterpart's personnel;

(j) Make recommendations regarding the needs for assistance for establishment of a pilot project in the identified sectors of wood processing;

(k) Make recommendations regarding the needs for assistance for further development, implementation and expansion, including quality control, design and marketing (where necessary).

4. BACKGROUND INFORMATION:

In many land-locked and island developing countries the rich wood resources in forests are still largely underutilized. Wood is one of the nature's raw materials permanently available as a source for industrial processing to a wide variety of products, some of them having excellent export potential.

The Governments of BOLIVIA, MONGOLIA, TRINIDAD and TOBAGO and ZAMBIA have expressed thier interest in developing further their wood processing industry for which they will need additional UNIDO assistance for implementation.

5. ESTIMATED COST: (for each country)

(a) Expert	6 m/m	US $	24.000
(b) Miscellaneous			1.000
(c) Training			10.000
(d) TOTAL (for each country)		US $	35.000
(e) TOTAL (for 4 countries)		US $	140.000

PROJECT NO.13

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BARBADOS, FIJI, MADAGASCAR, MAURITIUS, TRINIDAD & TOBAGO

Sector: Agro-based Industry

1. TITLE OF THE PROJECT:

Development of Fishery Industry

2. OBJECTIVES OF THE PROJECT:

To assist the Government in developing the fisheries and fish processing industry (import substitution and export promotion).

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the local availability of in-shore and off-shore fish suitable for processing;

(b) Undertake a marketing study on the prospect for local sales and import substitution;

(c) Undertake a marketing study on the prospects for the exports of processed fish products;

(d) Identify the needs for suitable fish processing plants and their production capacities;

(e) Select and recommend suitable processing technologies for the fish processing plants;

(f) Establish contacts with suppliers of complete fish processing plants on a barter basis for products originating from the plant supplied;

(g) Train the local counterpart's personnel;

(h) Organize adequate training (in-plant-training) of the counterpart's personnel abroad;

(i) Make recommendations regarding the needs for assistance for improving the fishing techniques (in-shore and off-shore -deep sea fishing);

(j) Make recommendations regarding the needs for assistance for quality control, packing, package design and marketing;

(k) Make recommendations regarding the needs for assistance for further development, implementation and expansion of cold storage

- on-shore stores
- on-shore transport by road and rail
- on-board cold storage
- stationary and mobile flaked ice machines and plants
- air sterilization in cold stores in general

(1) Make recommendations regarding the needs for assistance for further development, implementation and expansion of the fishery industry.

4. BACKGROUND INFORMATION:

The fishery industry in many island developing countries is heavily underdeveloped and needs special assistance for further development and expansion. This is particularly true in such island developing countries which are importing large quantities of fish products from abroad.

The development of the fishery industry in island developing countries is closely linked with the development of the fishing techniques, improvement and modernization of the fishing fleet, cold storage and transport.

Air transport for some specialties (craw-fish, lobster, shrimps etc.) will facilitate exports and earn foreign exchange.

The Governments of BARBADOS, FIJI, MADAGASCAR, MAURITIUS and TRINIDAD & TOBAGO have expressed their interest in developing their fishery industry for which they will need additional UNIDO assistance.

5. ESTIMATED COST: (for each country)

(a) Expert	6 m/m	US $	24.000
(b) Miscellaneous			1.000
(c) Training			10.000
(d) TOTAL (for each country)		US $	35.000
(e) TOTAL (for 4 countries)		US $	140.000

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BOLIVIA, FIJI, MADAGASCAR, ZAMBIA, TRINIDAD & TOBAGO

Sector: Agro-based Industry

1. TITLE OF THE PROJECT:

Production of Starch and Glucose

2. OBJECTIVES OF THE PROJECT:

To assist the Government in developing starch and glucose production (including derivatives) based on indigenous raw materials (maize, cassava, etc.).

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the local availability of raw materials suitable for starch and glucose production;
(b) Undertake a marketing study on the prospect of local sales and import substitution;
(c) Undertake a marketing study on the prospects for the exports to the neighbouring countries and to other markets;
(d) Identify the production capacity of local starch and glucose plants;
(e) Select and recommend suitable processing technologies for these plants;
(f) Elaborate a detailed technical documentation;
(g) Design and engineer a pilot plant for starch and glucose production;
(h) Establish contacts with suppliers of complete turn-key plants for starch and glucose production on a barter basis for products obtained from the plant supplied;
(i) Train the local counterpart's personnel;
(j) Make recommendations regarding the needs for assistance for the establishment of a pilot project for starch and glucose production;
(k) Make recommendations regarding the needs for assistance for further development and implementation.

4. BACKGROUND INFORMATION:

Many land-locked and island developing countries dispose of a raw material basis - maize, cassava, etc. - suitable for the local production of starch and glucose and their derivatives. Such an agro-based industry, permanently disposing of natural raw materials, will substitute imports and in some cases will have also an export potential.

Of particular advantage would be the cooperation with partners interested in purchasing cristalline glucose, a raw material of considerable interest to the pharmaceutical industry.

The Governments of BOLIVIA, FIJI, MADAGASCAR, ZAMBIA, and TRINIDAD & TOBAGO have expressed their interest in developing this particular sector of the agro-based industry for which they will need additional UNIDO assistance for implementation.

5. ESTIMATED COST: (for each country)

(a) Expert	6 m/m	US $ 24.000
(b) Miscellaneous		1.000
(c) Pilot plant		25.000
(d) TOTAL (for each country)		US $ 50.000
(e) TOTAL (for 5 countries)		US $ 250.000

PROJECT NO.15

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BOLIVIA, FIJI, ZAMBIA

Sector: Agro-based Industry

1. TITLE OF THE PROJECT:

Production of Furfural and Derivatives from agricultural waste.

2. OBJECTIVES OF THE PROJECT:

To assist the Government in developing the local production of furfural and derivatives (furane chemistry) based on indigenous agricultural waste (maize or rice straw, corn-cobs, ect.).

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the local availability of raw materials suitable for production of furfural;
(b) Undertake a marketing study on the prospect of local sales and import substitution;
(c) Undertake a marketing study on the prospects for the exports to the neighbouring countries and to other markets;
(d) Identify the production capacity of the furfural plant;
(e) Select and recommend suitable processing technologies;
(f) Elaborate a detailed technical documentation;
(g) Design and engineer a pilot plant for furfural production;
(h) Procure the equipment, machinery and components of the pilot plant and supervise their local assembly, erection, start-up and running-in;
(i) Train the local counterpart's personnel;
(j) Organize the in-plant-training if the local counterpart's personnel abroad;
(k) Establish contacts with suppliers of complete turn-key plants for furfural production on a barter basis for product obtained from the plant supplied;
(l) Establish contacts with potential investors or parties interested in joint ventures or technical and/or commercial cooperation;
(m) Make recommendations regarding the needs for assistance for further development and implementation.

4. BACKGROUND INFORMATION:

Many land-locked and island developing countries dispose of sufficient agricultural waste (straw etc.) suitable for processing to furfural and derivatives as valuable chemical intermediates with continuously growing demand at world markets.

Of particular advantage would be the cooperation with partners interested in joint ventures and a technical and commercial cooperation for further expansion (furfural derivatives: furfuryl alcohol, tetrahydrofurane, etc.).

The Governments of BOLIVIA, FIJI and ZAMBIA have expressed their interest in developing the local furfural production for which they will need additional UNIDO assistance.

5. ESTIMATED COST: (for each country)

(a) Expert	6 m/m	US $	24.000
(b) Miscellaneous			1.000
(c) Pilot plant			20.000
(d) Training			5.000
(e) TOTAL (for each country)		US $	50.000
(f) TOTAL (for 3 countries)		US $	150.000

PROJECT NO.16

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BOLIVIA, BARBADOS, MADAGASCAR, MAURITIUS, MONGOLIA, TRINIDAD & TOBAGO, ZAMBIA

Sector: Agro-based Industry

1. TITLE OF THE PROJECT:

Production of Animal Fodder

2. OBJECTIVES OF THE PROJECT:

To assist the Government in developing animal fodder plants to increase meat production.

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the local availability of raw materials suitable for the preparation of animal fodder;
(b) Undertake a marketing study on the prospect for local sales and import substitution;
(c) Undertake a marketing study on the prospects for the exports to neighbouring countries;
(d) Identify the production capacity of animal fodder plants;
(e) Select and recommend suitable processing technologies;
(f) Design and engineer a pilot plant for local trial purposes;
(g) Procure the components, equipment and machinery for the pilot plant and organize its local assembly, erection, start-up and running-in;
(h) Organize field trials in cooperation with FAO;
(i) Establish contacts with potential suppliers of machinery and equipment and also of complete plants on a turn-key basis;
(j) Train the local counterpart's personnel;
(k) Make recommendations regarding the needs for assistance for further development and implementation;
(l) Make recommendations regarding the needed assistance for further expansion, including local production of vitamins and additives.

4. BACKGROUND INFORMATION:

Many land-locked and island developing countries are confronted with the necessity of meat imports. Stockfeed is being also imported. The implementation and expansion of animal fodder plants for increased meat production, particularly beef, will substitute imports, improve the foreign trade balance and balance of payments and make eventually possible the exportation of beef.

Advanced animal fodder plants, utilizing locally available raw materials such as molasses (with addition of urea, vitamins and other additives) will contribute substantially to an increased meat production.

The Governments of BOLIVIA, BARBADOS, MADAGASCAR, MAURITIUS, MONGOLIA, TRINIDAD & TOBAGO and ZAMBIA have expressed their interest in developing the animal fodder production for which they will need additional UNIDO assistance for implementation.

5. ESTIMATED COST: (for each count y)

(a) Expert	4 m/m	US $	16.000
(b) Miscellaneous			1.000
(c) Pilot plant			23.000
(d) TOTAL (for each country)		US $	40.000
(e) TOTAL (for 7 countries)		US $	280.000

PROJECT NO.17

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BARBADOS, MAURITIUS, MONGOLIA

Sector: Agro-based Industry

1. TITLE OF THE PROJECT:

Industrial plant growing

2. OBJECTIVES OF THE PROJECT:

To assist the Government in developing an industrial continuous plant production (vegetables, fruits, green fodder, medicinal plants, tree saplings, etc.).

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the local needs for continuous industrial plant production;

(b) Undertake a marketing study on the prospect for local sales and import substitution;

(c) Undertake a marketing study on the prospects for the exports to the neighbouring countries and to other markets;

(d) Undertake a feasibility study for local industrial continuous plant production for the qualities and quantities identified;

(e) Select and recommend suitable processing technologies and plant suppliers;

(f) Elaborate a detailed technical documentation;

(g) Make recommendations regarding the needs for assistence to implement a pilot project ;

(h) Make recommendations regarding the needs for assistance for further development and implementation.

4. BACKGROUND INFORMATION:

In several land-locked and island developing countries there is an insufficient domestic supply of vegetables, fruits, green fodder etc. To reduce imports and eventually to promote exports of various specialties, the continuous industrial growing of plants would be the appropriate solution for countries where either climatic or labour conditions or non-availability of land are obstacles to conventional agricultural cultivation.

Grown in an inert substrata by the hydroponic method, crops produced industrially can be harvested all the year round in any desired quantity regardless of climate or latitude. Incorporating the use of programme-controlled conveyor production, this is a truly industrialized plant production system in which crops can mature quickly, production costs can be calculated in advance and plants can be grown in areas where their cultivation would be impossible by conventional methods.
Every type of plant: seedlings, saplings, herbs, vegetables, madicinal plants, greed fodder, flowers, ornamental plants, fruit. Such an industrial plant requires a minimum supply of heat and power, water, labour (highly mechanized and automated conveyor belt production) fertilizer and nearly no pesticides. Plant production linas can ba erected close to consumer centres thanks to their low ground area requirements, their clean mode of operation and their structural capability. This eliminates marketing, transport, storage, preservation and packing costs. A combination with a vegetables or fruits processing plant would be of advantage.

The Governments of BARBADOS, MAURITIUS and MONGOLIA have expressed their interest in implementing the industrial continuous plant production for which they will need additional UNIDO assistance.

5. ESTIMATED COST: (for each country)

(a) Expert	2 m/m	US $ 8.000
(b) Miscallaneous		500
(c) TOTAL (for each country)		US $ 8.500
(d) TOTAL (for 3 countries)		US $ 25.500

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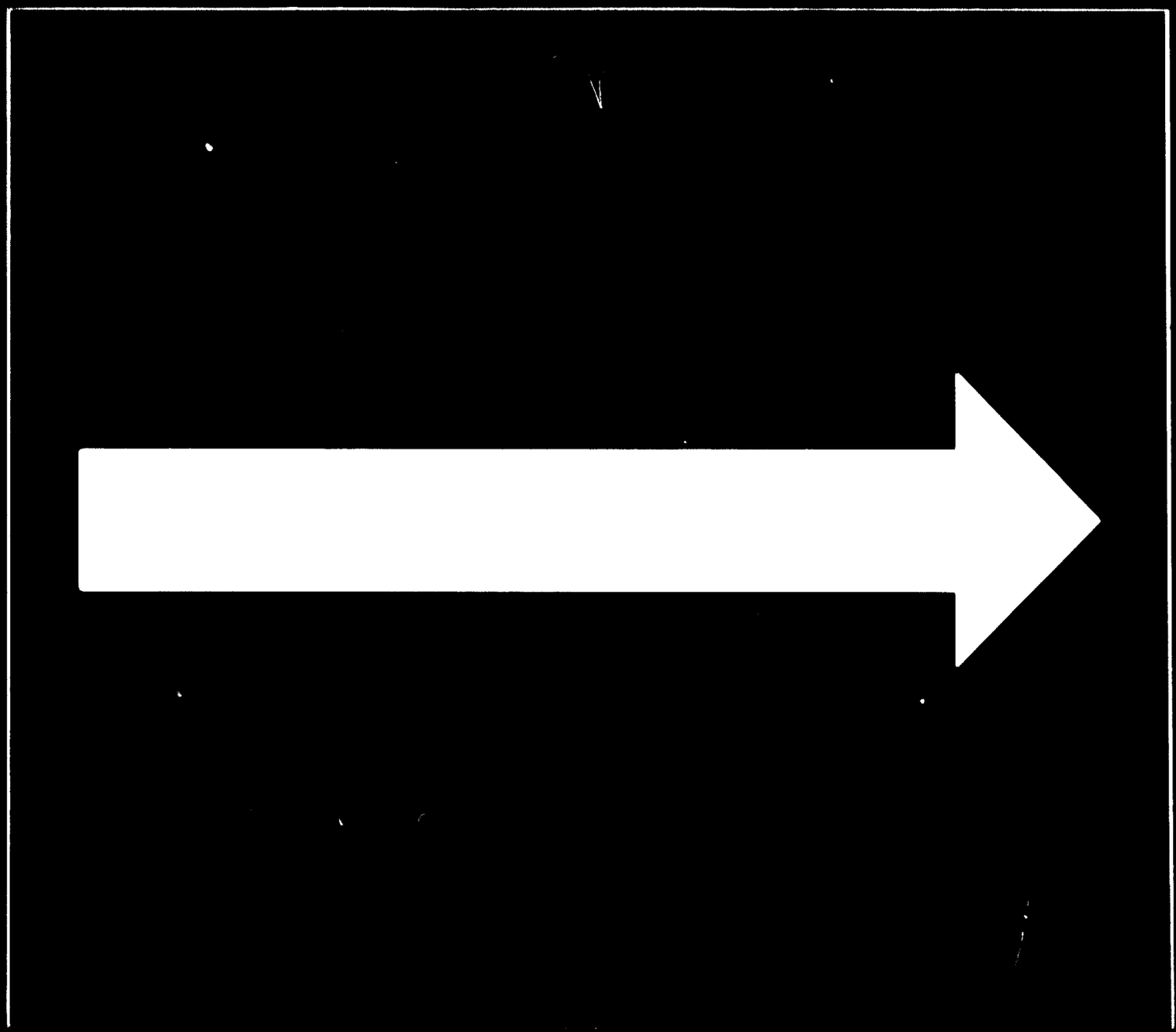

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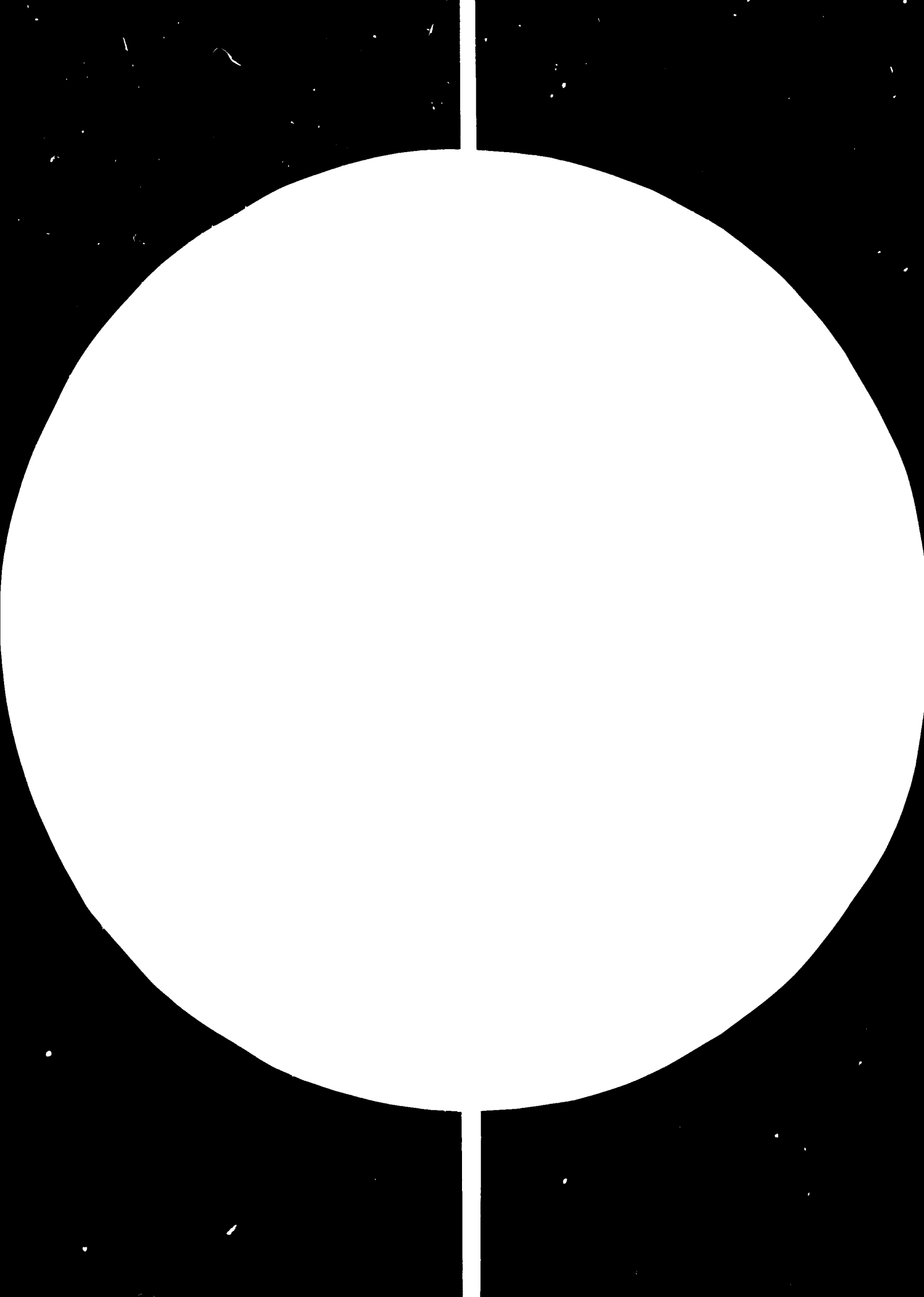
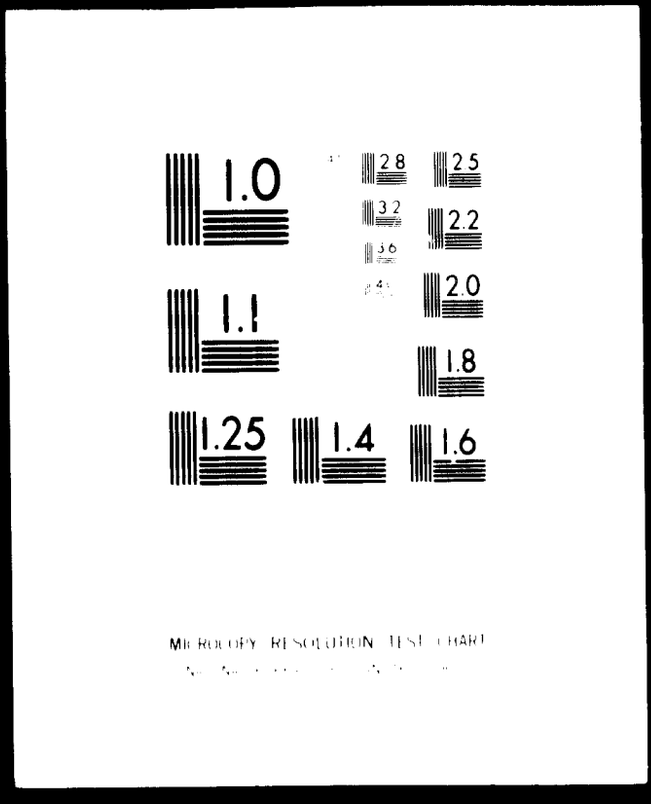




PROJECT NO.18

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project Proposal for the Land-locked and Island Developing Countries

Countries: BARBADOS, BOLIVIA, FIJI, MADAGASCAR, MAURITIUS, TRINIDAD & TOBAGO, ZAMBIA

Sector: Agro-based Industry

1. TITLE OF PROJECT:

Utilization of molasses

2. OBJECTIVES OF THE PROJECT:

To assist the Government in developing profitable utilization of molasses.

3. DESCRIPTION OF THE PROJECT:

The expert will be required to -

(a) Assess the local availability of molesses suitable for processing;
(b) Undertake a marketing study on the prospect for local sales and import substitution for processed products;
(c) Undertake a marketing study on the prospects for the exports to the neighbouring countries and other markets;
(d) Undertake a feasibility study for local processing of molasses for the products, quantities and qualities identified;
(e) Select and recommend suitable processing technologies and plant suppliers;
(f) Establish contacts with potential suppliers of machinery, equipment and plants;
(g) Elaborate a detailed technical documentation;
(h) Make recommendations regarding the needs for assistance for further development and implemantation.

4. BACKGROUND INFORMATION:

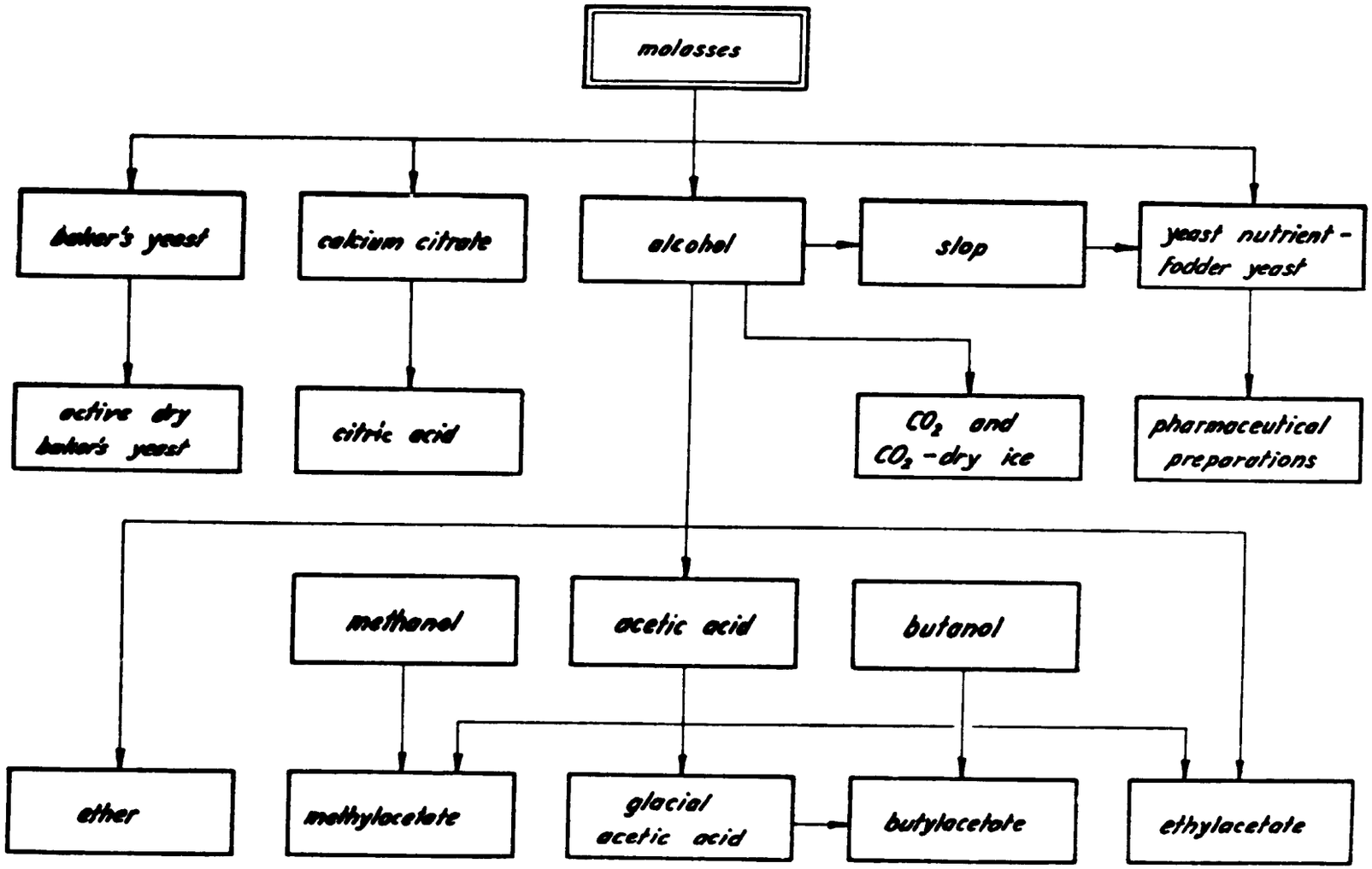
Many land-locked and island developing countries cultivate sugar cane and produce cane sugar. In only few countries molasses - a by-product in cane sugar production - are being processed and profitably utilized. Molasses are an ideal natural raw material suitable for processing to a wide variety of products, such as baker's yeast, citric acid, fodder yeast, potassium fertilizer, ethanol, acetic acid, ethyl acetate, n-butyl alcohol, 2-ethyl hexanol, acetaldehyde, n-butyl acetate, ethylene, 1,3-butadiene, etc. which in turn serve as valuable intermediates for many industrial processes and plants.

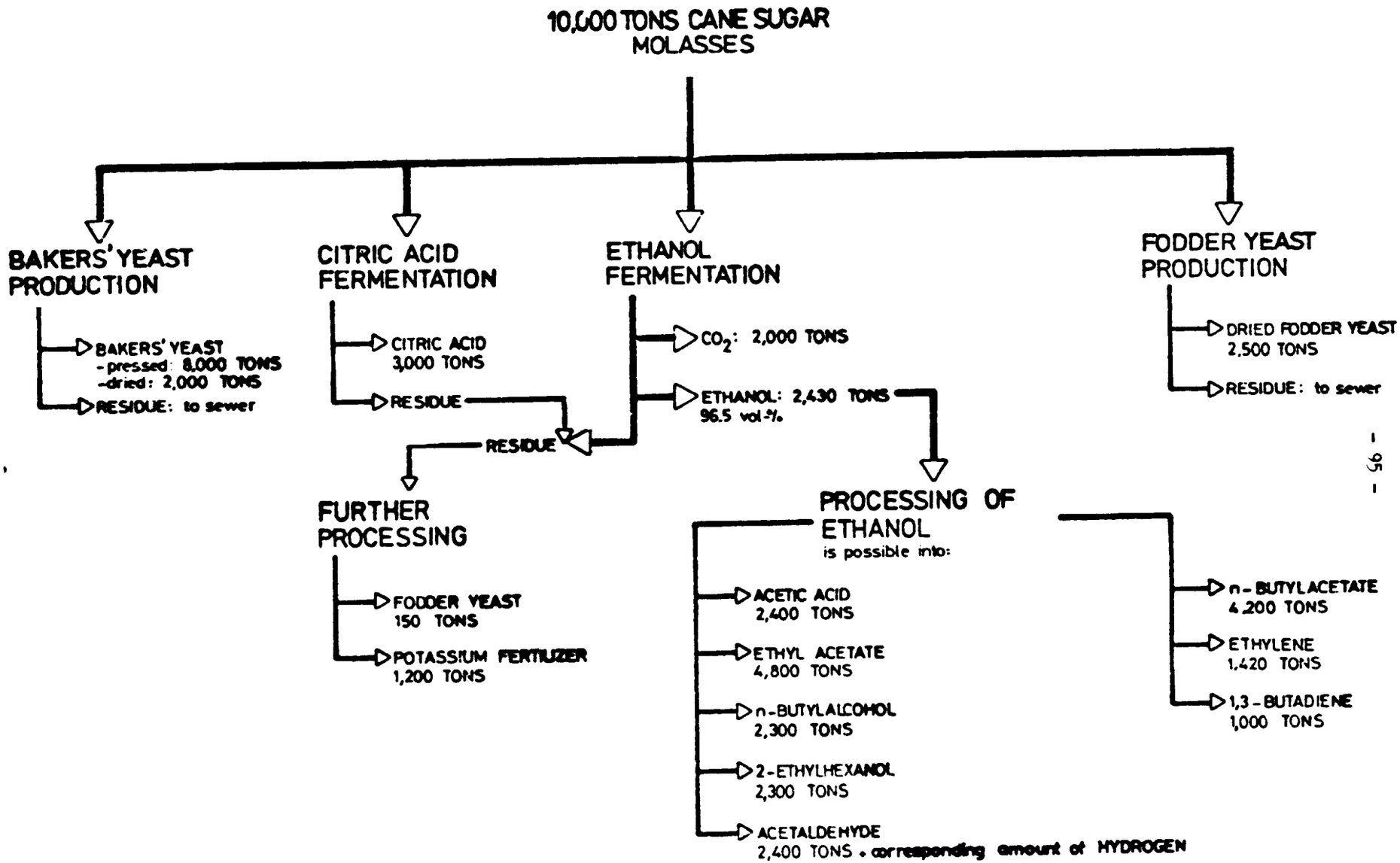
The Governments of BARBADOS, BOLIVIA, FIJI, MADAGASCAR, MAURITIUS, TRINIDAD & TOBAGO and ZAMBIA have expressed their interest in a profitable utilization of molasses for which they will need additional UNIDO assistance for implementation.

5. ESTIMATED COST:(for each country)

(a) Expert	2 m/m	US $	8.000
(b) Miscellaneoze			500
(c) TOTAL (for each country)		US $	8.500
(d) TOTAL (for 7 countriee)		US $	59.500

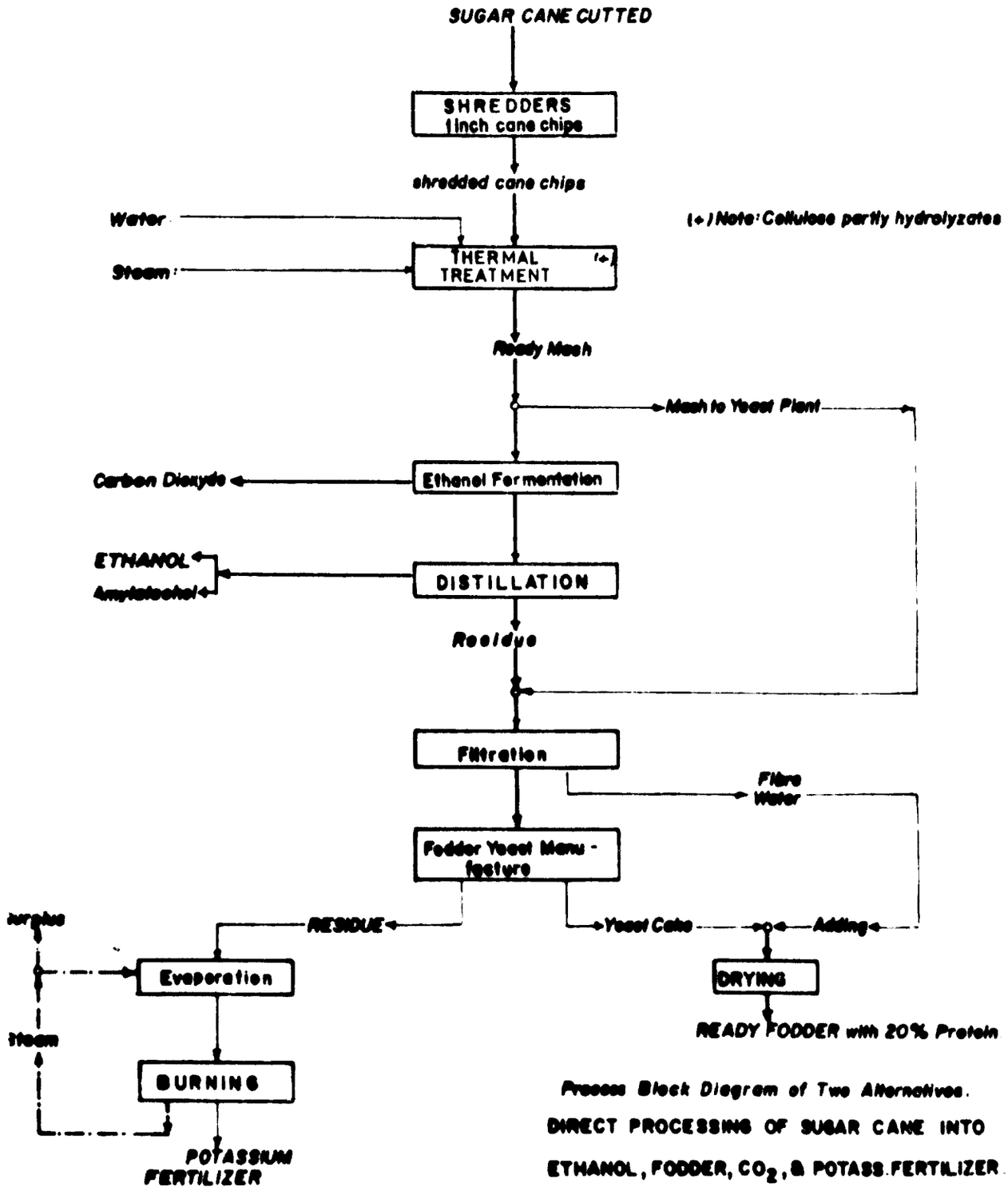
Utilization of molasses by fermentation




10,000 TONS CANE SUGAR
MOLASSES
BAKERS' YEAST PRODUCTION
BAKERS' YEAST
-pressed: 8,000 TONS
-dried: 2,000 TONS
RESIDUE: to sewer
CITRIC ACID FERMENTATION
CITRIC ACID
3,000 TONS
RESIDUE
ETHANOL FERMENTATION
CO_2: 2,000 TONS
ETHANOL: 2,430 TONS
96.5 vol-%
RESIDUE
FODDER YEAST PRODUCTION
DRIED FODDER YEAST
2,500 TONS
RESIDUE: to sewer
FURTHER PROCESSING
FODDER YEAST
150 TONS
POTASSIUM FERTILIZER
1,200 TONS
PROCESSING OF ETHANOL
is possible into:
ACETIC ACID
2,400 TONS
ETHYL ACETATE
4,800 TONS
n-BUTYLALCOHOL
2,300 TONS
2-ETHYLHEXANOL
2,300 TONS
ACETALDEHYDE
2,400 TONS + corresponding amount of HYDROGEN
n-BUTYLACETATE
4,200 TONS
ETHYLENE
1,420 TONS
1,3-BUTADIENE
1,000 TONS

ALTERNATIVE 1

SUGAR CANE PROCESSING BY THERMAL-TREATMENT



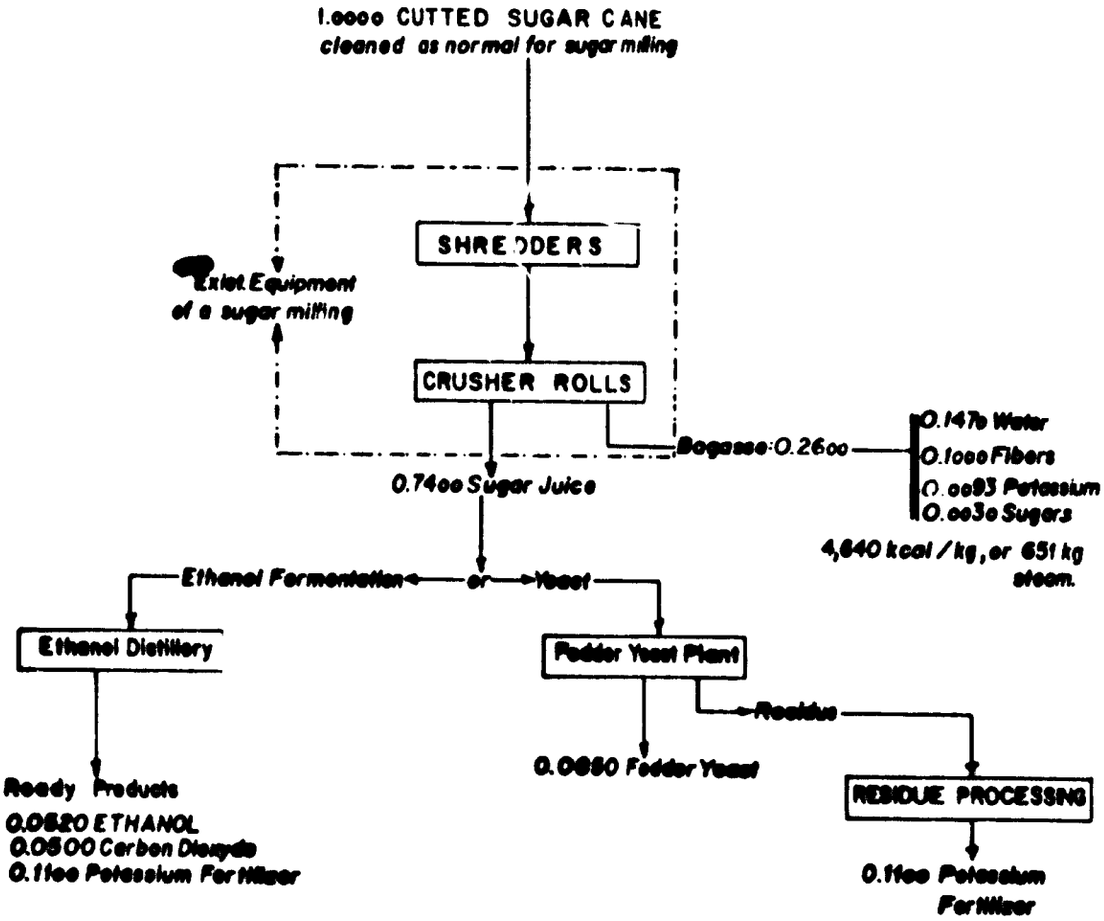
Process Block Diagram of Two Alternatives.

DIRECT PROCESSING OF SUGAR CANE INTO ETHANOL, FODDER, CO_2, & POTASS. FERTILIZER

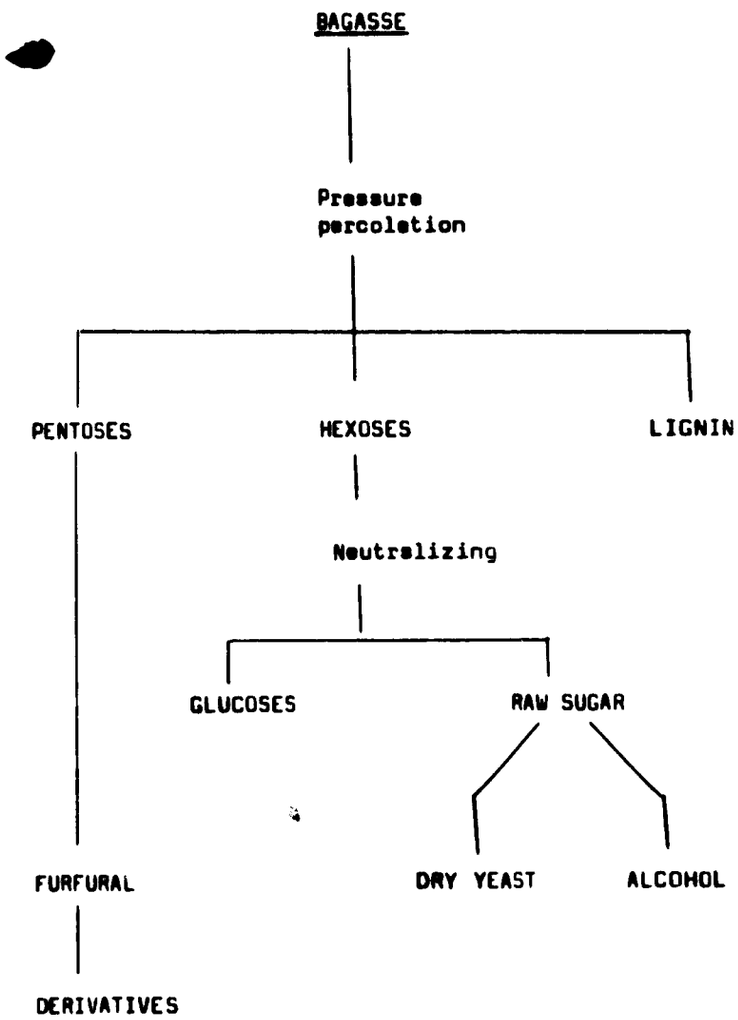
ALTERNATIVE: 2

SUGAR CANE PROCESSING THROUGH SUGAR MILL CRUSHERS

Note: All numbers in metric ton



PROCESSING OF BAGASSE



IN-PLANT-TRAINING AND FELLOWSHIPS

Some of the Governments have expressed their interest in fellowships and in-plant-training with UNIDO assistance.

BARBADOS Free port zone, Food processing, (Hotel planning and financing)*, Saw mill technology, Deiry technology.

BOLIVIA Standardization training in India (follow-up).

FIJI (Agricultural cooperatives)** Food technology and processing, Sugar technology, Fishery technology.

MADAGASCAR Language training (English).

TRINIDAD & TOBAGO Food processing and Technology, Fish processing and Technology, Fish market, Food Quality Control, Fishery technology, Leather tannery.

ZAMBIA Air cargo equipment management, handling, maintenance

COOPERATION WITH OTHER DEVELOPING COUNTRIES

There are several projects which could be implemented through a cooperation between developing countries without the need for payment of licences, know-how and costly equipment in developed countries. Expamples are the processing of yams in FIJI based on experience already gained in BARBADOS, the processing of cintronella in FIJI based on processes developed by the BCSIR Bangladesh Council for Scientific and Industrial Research, processing of ginger in FIJI and TRINIDAD & TOBAGO, etc.

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* In co-operation with OTC

** In co-operation with FAO

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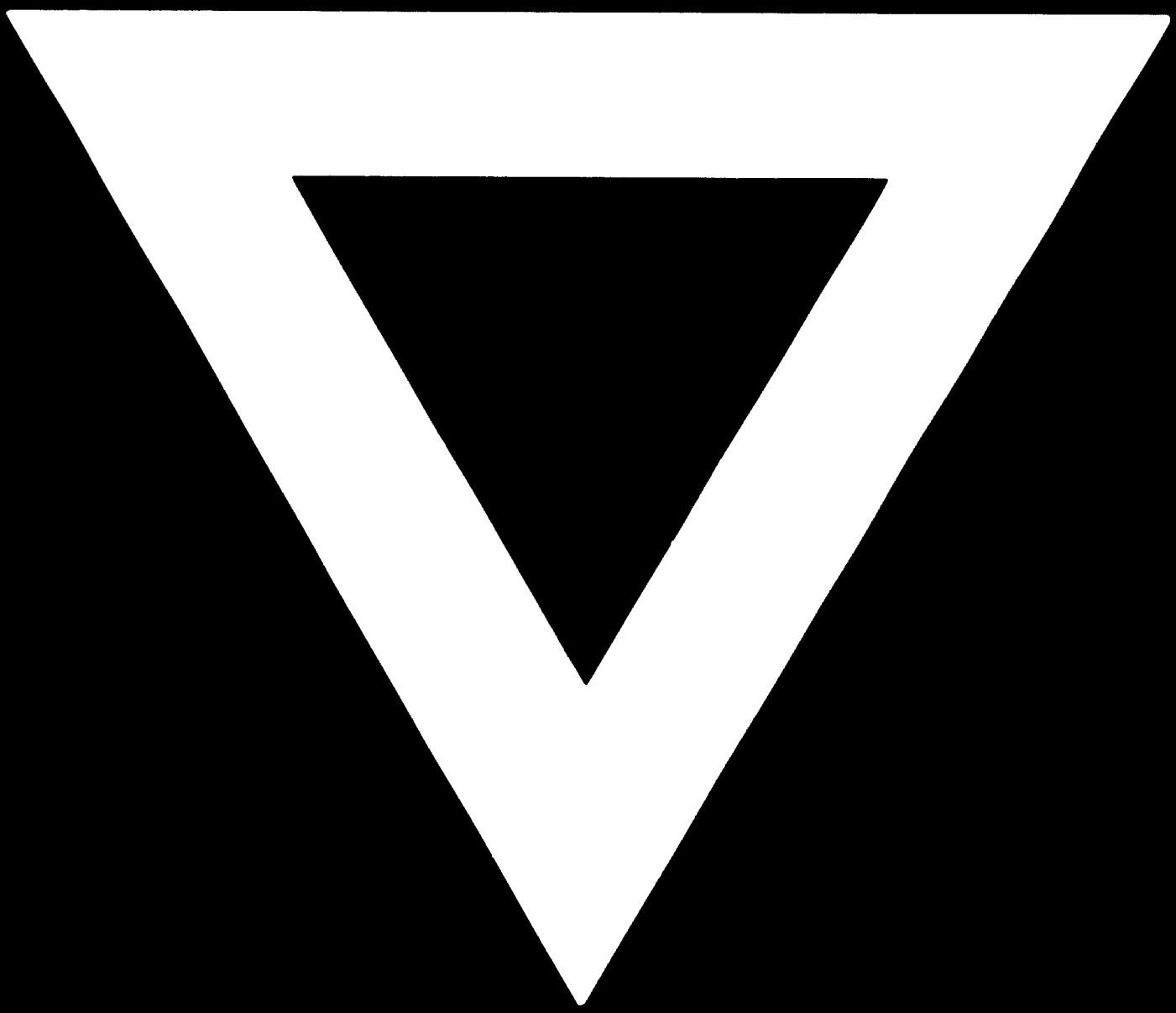

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