SECTION I

Evaluation of the Role of Expanded Domestic Processing in the Development Process

A variety of policy proposals and options have been put forward in recent years with respect to the role of primary commodities in the development process. This has been due to a number of factors which include a perceived failure of trade to act as agent of dynamic internal economic change; the many problems encountered with the level and stability of primary export revenues; the terms of trade of exporters of primary commodities; the fact that during the United Nations First Development Decade (1960-70) the position of LDCs generally worsened vis-a-vis the advanced economies, and in some respects even absolutely ;(1) an increasing pursuance of economic nationalism and emphasis on self-reliance. All these elements culminated in collective action at an international level, aiming at the establishment of a New International Economic Order. (2)

Among the proposals advocated are strengthened national sovereignty with respect to domestic national resources, measures to improve and stabilise export earnings (e.g. the UNCTAD Integrated Commodity Programme) and an expansion of domestic processing of local raw materials. Possible gains to accrue to LDCs are higher export earnings and greater stability in prices and earnings, greater unit value added, increased earnings from associated domestic sales, greater control of markets, domestic integration and linkages via indirect investment, the transfer and development of technology and indigenous skills, generation of employment opportunities - a considerable range of desiderata sufficient to focus attention on the processing potential. All the above accord with the declared international aim of restructuring world output, industry and trade in favour of LDCs which at present represent only about 7% of world industrial production. In particular, the Lima Declaration aims at a more even distribution between the developing and developed nations and states: the present share of LDCs"... should be increased to the maximum possible extent and as far as possible to at least 25% of total [industrial] world production by the year 2000." (3)

It is important to note that this is not a projection but rather the minimum acceptable level. One may furthermore emphasise 'the striking modesty of this proposal': for even on the extreme assumption that world industrial production remained static, this would mean a reduction of less than 20% in industrial output of the DCs spread over 25 years - not much more than that which was lost in the 1973-75 depression; and it would still mean per capita industrial production in LDCs at a level only one-sixth of that in the industrial countries. (4) This is not to say that this will be easy or even possible, implying under realistic assumptions a necessary growth rate for LDCs of 11.3% per annum (far higher than the International Development Strategy rate of 8%). However, it has been suggested (5) that subject to certain conditions this could quite plausibly be achieved as a result of export-led industrial growth.

The realisation of the 25% target has fundamental implications for the world pattern of production and trade; necessarily there are consequences for an expansion of processing capacities in LDCs. In 1964 the first UN Conference on Trade and Development was held with the aim of moving towards a more satisfactory international division of labour and emphasis was laid explicitly upon the importance of an expansion of domestic processing of natural resources, partly with the aim of diversifying the LDCs' export base. A dozen years later, the fourth UNCTAD conference in 1976 which proposed an Integrated Programme for Commodities, included as one of five major elements "... the expansion of processing in developing countries."(6) This statement is reiterated by many international organisations, including the UN 'Programme of Action on N.I.E.O.', UNIDO, OECD and FAO:"... particular emphasis should be given to projects that increase industrial capacity and add to the value of local production by processing products in the country of origin."(7)

Despite all such declarations and intentions the present situation is still one where primary commodities account for approximately 75% of LDCs' export earnings although in fact this only represents 40% of world trade in primary goods.(8) And while a certain restructuring of LDC exports in favour of processed and manufactured products has occurred their overall share in world production and trade has been declining.(9) Manufactures and processed goods are playing an increasingly important role in world trade and the share of LDCs in this trade is only about 18%. Moreover, this trade is heavily concentrated among a few medium-income NDCs (newly developing countries). Thus LDCs remain heavily dependent on their raw material exports and the need to diversify is all too evident.(10)

Processing, a type of industrialisation - indeed a "resource-based industrialisation strategy"(11) - forms the main step between the extraction production of natural resources and their final consumption. It therefore provides the natural link between the essential role that primary commodities now play in the majority of LDC economies, and the essential role that industrialisation must hold in the future.

Industrialisation is a key element in the development process; it holds possibilities of diversifying production for domestic and trade purposes, providing employment, and furthermore leads to "... new patterns of parity and mutuality of interdependence."(12) An evaluation of the role of industrialisation per se is outside the scope of this report but it must be emphasised that an assessment of an expansion of domestic processing in the 'development process' must necessarily be undertaken in the light of the objectives of such a process: the 'goals' of the development strategy provide the criteria against which an evaluation must be made.

Throughout this report the underlying concern is with the extent to which an expansion of processing might play a positive role in the overwhelming need to alleviate poverty, provide employment opportunities, improve the distribution of incomes, increase both national income and government revenues and lessen the dependence of LDCs in the present world economic order.

Our assessment concerns itself with the added value that LDCs may obtain by processing their own raw material supplies domestically; the linkage effects - both in the narrower sense of induced investment and wider sense of employment opportunities generated and the transference and development of technology, and further with the resulting satisfaction of 'basic needs' and links between agriculture and industry, and particularly, additional opportunities for rural development.

LDCs face a number of constraints in attempting to undertake processing domestically. Many of these constraints are identical with more general obstacles to other types of industrialisation and indeed 'development', for example chronic lack of capital and foreign exchange. Here we naturally are more concerned with the obstacles that more specifically confront domestic processing industries in their attempts to establish themselves, develop or expand.

The implications of 'resource-based' industrialisation strategies are manifold and the appropriateness of such strategies will depend upon many factors. These include the institutional factors which determine the ability to absorb and invest the surplus generated in primary commodity production as well as the value added in processing; the role played by foreign investments and by international institutions; the nature of the resource, size of reserves, whether renewable/non-renewable; the dependence of the economy for foreign exchange on the raw material exports and so on. All these factors determine the scope for and the possible gains from such a resource-based strategy.

The focus of such a strategy of resource-based industrialisation may be on the utilisation and processing of domestic resources for home consumption and local markets, or rather towards an 'export-oriented' strategy. It could also, more rarely, be based on the processing of imported materials for re-export as processed goods or semi-manufactures, e.g. export processing zones. It is the basic aim of any strategy to create an integrated and diversified production base, which in turn fully utilises domestic resources and is responsive to domestic or external demand and needs. However all LDCs are necessarily part of the global economy, forming an interdependent system where both advanced and poor countries possess essential resources and have (or wish to develop) processing facilities.

The feasibility of industrialisation geared totally toward self-sufficiency is somewhat unrealistic, particularly for smaller and poorer countries. On the other hand, not only is the international system in a state of crisis but also the situation is one of unequal bargaining strengths, manifest in the low share of LDCs in world trade, particularly manufactures. The choices between relative self-sufficiency and relative international integration will determine action in the realm of processing.

Manufacturing and processing is playing an increasingly important role in world trade and almost all the raw materials produced in the world undergo some degree of transformation, that is to say 'processing' within the producing country. Estimates based on input-output analysis, for agricultural production, show this may be as much as for example 81% in Japan but ranging down to 50-60% in many other countries.(13) The degree naturally varies among commodities, a fairly large proportion of food being consumed raw or with very little processing; only about 30% of fishery production is consumed fresh and 50% of forestry production processed - the rest almost entirely being consumed as fuel.

Classification of processing techniques and operations is fairly straightforward, (14) particularly in the case of food processing industries which are more homogeneous in the sense that all products have the same end use; processing of perishable foods is mostly for preservation; preservation techniques are similar over the whole range of commodities. Non-food processed products have a variety of end uses and almost all require a high degree of processing, which in most cases follows a definite sequence of operations. The basic processes encountered for minerals are smelting to remove impurities, refining and semi-fabricating operations.

Whilst classification of processing 'operations' is fairly straightforward, classifying 'processed' products is definitely not; there is an urgent need for a standard definition; treating different definitions as interchangeable can have serious and misleading consequences.(15) Presently there is no clear operational definition to establish whether a commodity belongs in the 'primary', 'semi-processed', 'processed', 'manufactured' or 'semi-manufactured' category. The UN Classification(16) states quite simply that "... if a commodity is <u>not</u> defined as primary, then it is classified as processed", thereby ignoring <u>any</u> distinction between 'processed' and 'manufactured' commodities.

The Standard International Trade Classification (Rev 2) divides all goods entering world trade into ten sectors and the most commonly used short-cut or 'proxy' definition is that sections SITC (0-4) represent primary commodities and sections SITC (5-8) represent manufactures. This means that all processed foods, including beverages, tobacco and oils and fats, are classified as 'primary products' and conversely no distinction is made between processed and manufactured non-food products.

There are a number of generally accepted conventions which apply, whereby for example rubber processed to smoked sheet counts as a primary product whilst rubber footwear counts as a manufacture.

Given the lack of an authoritative definition, we would adopt for the range of selected significant raw materials definitions for their 'primary' and 'processed' state, (17) deriving mainly from various UNCTAD, FAO and OECD works combined with a general commonsense or intuitive approach. As soon as a raw material undergoes any degree of fabrication at all, this product would be termed 'processed' and the commodity considered to be no longer in its primary state. At the other end, as long as the single raw material represents a major input to the fabricating operation this would be called 'processing' but when this is no longer the case, the activity would be considered as 'manufacturing' and the product as 'manufactured'. Generally, for non-food commodities this corresponds to SITC Section 2, being treated as 'raw materials' and SITC Section 6 (minus Division 69 'metal manufacture') as 'processed' goods. For example, in the leather, fur etc. industry we would have:

Basic (Primary)	- SITC Div 21	- Hides, skins and furskins (raw).	
Processed	- SITC Div 61	- Leather, tanned and dressed furskins and leather 'manufactures', e.g. parts of footwear.	
Manufactures	- SITC Group 851	- Footwear	and others
	848.1	- Leather clothing	
	848.3	- Fur clothing	
	831	- Leather travel goods	

On the basis of classifications similar to these distinctions we find that generally the export market share of LDCs in processed commodities, as compared with primary commodities, declines sharply.(18) A typical situation being that of cocoa, where LDCs held (1973) a 100% share of the cocoa bean market, but only a 48.3% share in cocoa powder, paste and butter, and none of the market in chocolate. Another example is bauxite: LDCs account for nearly 80% of the export market for the raw ore, but have only a 5.2% share in the aluminium market and none at all in aluminium plate.

In these eleven commodity groups, LDCs accounted for 62.5% of raw material exports in 1970 (in 1974 almost the same proportion, 61.2%); in value terms this was US $15 billion out of a total of $24 billion. However, for processed forms, the LDCs' share was 15.7% in 1970 (US $2.5 billion out of $16.3 billion) and 20.8% in 1974.(19) Therefore four-fifths of all export trade in processed forms was in the hands of the developed countries.

The value of the raw materials at export represents a fraction, often a very small fraction, of the final value when the products are finally retailed; there is thus a large potential of added value to be obtained by LDCs if more 'processing' were undertaken domestically. Although probably not all the export market is available to LDCs for various reasons,(20) if LDCs had processed all their raw materials before export and therefore obtained the same share of the processed market as of the primary market (i.e. 62% instead of 16%) this would have given them an extra US$ 7.5 billion at 1970 prices - an increase in export earnings of 43%.

Therefore "... LDCs have an interest in carrying food processing as far as possible in order to maximise the value added in their agricultural exports."(21) This is also true for non-food agricultural products and especially for minerals, where the value added at successive stages of processing can be particularly large.(22)

This value added by domestically processing raw materials can mean substantial increases in export revenues and/or also savings of foreign exchange where previously imported processed goods can now be domestically supplied. LDCs often have to re-import their own raw materials in processed form, at great expense and loss of foreign exchange. However, not all the increase in value added will necessarily be a foreign exchange gain; for "... the burden in terms of relative foreign exchange outflows as a result of additional import-content cost (e.g. for machinery, chemicals, fuel and technical know-how) ..."(23) can be substantial.

Furthermore when the processing industry is controlled by foreign enterprises who provide and import all the capital-goods and other inputs, and supply all management and skilled labour, there will probably be a large 'leakage' of much of the additional export-income out of the economy and the benefits to the domestic economy may be minimal. This is likely to be the case in a highly capital-intensive industry which may generate few employment opportunities, reinforce the 'enclave' economy and worsen the pattern of income distribution.(24)

Despite these possible constraints on the contribution of the value added to the domestic economy, it appears to be the case that raw material processing industries make a proportionately larger contribution to value-added (and employment) in LDCs than in the industrialised countries.(25)

The opportunities that may be generated by an expansion of domestic processing can be further extended from the value-added component to the possible 'induced investment' in industries supplying inputs to the raw material processing industry and those using the processed good as an input. These types of multiplier effects are known as 'forward' and 'backward' linkages.(26) Forward integration by downstream processing is itself a forward linkage, and when raw material processing capacity makes the domestic production of other inputs viable, and stimulates the production of intermediate products, these are termed 'backward linkages'. These linkages refer explicitly to the direct (input-output) effects of establishing processing industries but can also be extended to 'final demand linkages', 'horizontal linkages' - i.e. investment in complementary goods, and 'negative linkages' where there are displacement effects. The additional employment in processing leads to higher incomes which in turn create multiplier effects when they are spent - another form of indirect demand linkage.

The extent of the linkage effects depends on a multitude of factors and not least on the nature of the raw material itself. For non-agricultural natural resources there is considerable potential for a high degree of linkages "...since some of the processes use considerable intermediate materials they establish permissive conditions for the stimulation of supply industries, as well as creating additional national value added ...".(27) Bauxite, for example, is one of the major industrial inputs and has potential to become the focus of an industrialisation strategy;(28) aluminium processing is likely to induce many intersectoral linkages such as the establishment of a capital goods and engineering sector and a variety of complementary industries both for domestic consumption and for export. Tin (29) is another example, with forward integration into smelting and pewter manufacture and backward linkage into timber, iron-castings, coal production, gravel pumping, local processing of petroleum products, etc.

However, the majority of mineral processing industries face the formidable obstacle presented by foreign investment which means " ... the possibility of utilising the resource as a basis of backward and forward linkage within the national economy is restricted by its already existing use as a basis of backward and forward linkages within the corporate economy."(30) Whilst foreign investment in LDCs is by no means confined only to non-agricultural resources, it is suggested that the actual opportunities for national linkage effects in LDCs may be " ... greatest in the case of agricultural processing and textiles."(31) Rubber, for example,(32) provides linkages into the 'off-estate' processing sector, rubber wood processing and the manufacture of rubber goods; backward linkages to agricultural chemical production, in particular fertilizers. Palm oil processing provides opportunities for further refining, kernel processing and soap manufacture; fertilizer production and improved local transport facilities may also be stimulated by way of backward linkages. Forestry industries provide a valuable base to an economy: sawmilling activities stimulate joinery, wood packaging, furniture production, and paper and board processing industries can lead to a number of conversion industries, like paper-bag manufacture, stationery, boxes and cartons.

Industries established using by-products or waste products can be of major importance; they are sometimes described as 'sideways linkages'. For example, wood residues can be made into fibre-board, particle board and pulp manufacture. Animal-feed industries similarly are based on a variety of by-products: whey, from milk processing industries; milling by-products; molasses, from sugar refining; (33) bone meal and so on. Other residues may be used for glues, fertilizers, etc. In some cases by-products actually provide an energy source; e.g. bagasse - by-product from the sugar industry - is primarily used as a factory fuel. There is potential for a number of by-products from the tropical fruit processing industries.(34) Thus for a whole range of raw materials, the establishment or expansion of domestic processing industries, can have wide-ranging linkage effects.

This narrow interpretation of linkages, i.e. generating new capital formation, can be broadened to include wider implications, in particular, the 'employment multiplier' and the consequences on technology transfer, as they relate specifically to processing industries. While the non-agricultural processing industries are typically capital-intensive, the later stages of processing - beyond smelting and refining - become more labour-intensive.(35) Furthermore, even where the process itself is capital-intensive, the production of other inputs through backward linkages may create substantial employment opportunities, and forward integration into transport, packaging and other related activities may likewise be significantly labour-intensive.

A striking example of processing linkages is evident in the banana industry; this is a commodity which ostensibly undergoes the very minimum of processing and yet over half the labour force employed by the banana exporting companies is engaged in 'processing' activities, like transport and boxing.(36)

Food processing is generally assumed to require an especially large labour force: "the development of the food processing industry, whether for domestic consumption or for export is a highly promising source of increased employment."(37) There are nonetheless considerable differences, even within the food sector, of capital/labour ratios. Vegetable oil processing, for example, is highly capital-intensive, as are most rubber and paper processing industries.

When the primary material production is on a seasonal basis, the establishment of processing industries provides opportunities for continuing employment throughout the year. Processing industries may also be expected to increase the demand for and hence production of the raw material, which itself may be a highly labour-intensive activity. The fish processing industry in Peru made possible, and stimulated to a significant degree, the employment of fishermen. Naturally, the greater the direct linkage effects, the greater the possibilities for employment creation.

These linkages may also act as an inducement and incentive for the development of local indigenous technology. The greater the participation of LDCs in downstream processing, the more likely they are to overcome the handicaps presented by the 'whole package' nature of much technology transfer. When only very rudimentary processing is undertaken by LDCs there is little incentive to adapt the technology to more specific local requirements and it is easier simply to use what is available.

Hirschman (38) argues however that the very nature of raw material processing industries suggests a very big "technological jump" from the technologies required to produce primary products, to the processing techniques necessary at the next stages: "... milling, refining and other processing industries are usually 'technological strangers'" to the initial primary production and extraction stages.(39)

In some cases the very nature of the raw material necessitates that at least some basic processing operations are carried out immediately, and so must be integrated with the production stage. The technological characteristics of sugar cane, for example, require that it be crushed as soon as possible after cutting in order to maximise the sugar yield. When banana producers, in the early sixties, switched to a more delicate variety, this necessitated transporting the fruit without bruising, and not 'on the stem' as had previously been the case. Bananas have since been shipped in cardboard cartons, which as well as being easier to load and unload and requiring less space, have also had considerable employment effects via packaging and pulp and paper production.

Hirschman argues that in the two above examples it was only because of compelling technological characteristics that these forward linkages occurred and suggests that the less processing required the better from the point of view of integrating processing with primary production, because of the usually large 'technological gap' between primary production and processing which creates a difficult barrier between the primary producer and the processor. Conversely, where a great deal of processing is necessary, it it more likely that the integration of processing operations with primary production, since they are so 'technologically alien', will present insuperable difficulties. The issue of constraints to the transfer and adaptation of technology required by processing industries is considered further in Section III.

'Location theory' is a useful form of analysis to assess more specifically the costs and benefits that might accrue to LDCs from locating processing industries domestically. Certain cost advantages may obtain for both local processors and foreign investors by locating a raw material processing industry at source; to the extent that LDCs and foreign investors have different objectives, naturally not all factors are relevant, or they may carry a different weight, thus possibly shifting the balance of locational choice.

Competitive advantage due to prevailing factor endowments may determine location, for example cheap labour and abundant raw material supplies. However, for transnational enterprises these factor endowments are not 'fixed', and many foreign investors can take advantage of quite different factor endowments than those at the disposal of the domestic processor.

The most important cost factor that both local and foreign investors must take account of, when producing for an export market, are transport costs. For some commodities, these costs are prohibitive to transporting in an unprocessed form and dictate that a certain amount of processing must be carried out domestically. For both tin and copper ore, the metal content is less than 1%, and for most other minerals transport costs form a substantial part of total costs. Furthermore "... most agricultural products either lose weight or bulk in processing so they can be transported more cheaply after they have been processed, or they are perishable and can more easily be transported in processed form."(40) The weight of the banana stalk, for example, accounts for 15% of the weight of the bunch, and when logs are processed there is a 30-40% residue. Costs of transporting may vary with the stage of fabrication, and for some commodities it may be easier to transport them in raw, unprocessed form, e.g. grains. Some processed goods may encounter transport problems regarding damp, heat, odour, etc., which necessitate specific types of transportation, like ventilated or refrigerated carriers.

Processing industries which are energy-intensive, like aluminium smelting, where energy costs are more than 50% of total production costs - and similarly high for copper, zinc and nickel processing industries - may be situated in LDCs if relatively cheap energy supplies are available. Environmental costs are another possible determining factor in locating processing industries in LDCs: "anti-pollution measures in developed countries might provide a stimulus to increase processing of raw materials in LDCs before export to developed countries."(41) (This question is considered in a separate appendix.)

Raw material processing industries are of fundamental importance to LDCs when they cater - as is often the case - for the 'basic needs' of shelter, clothing and most especially food. Processing industries make a direct contribution to increased food consumption; it is argued that the 'principal aim' of expanding production and trade in processed agricultural products "... is without doubt, that of meeting food requirements more satisfactorily."(42) Processing both transforms agricultural commodities into consumption goods and prevents wastage by preservation, thereby increasing the food supply;

already "... processed foods provide over two-thirds of mankind's total calorie and protein intake."(43)

Catering to meet the needs of the domestic market is usually the basis for the development of food processing industries. However, most raw material processing industries experience economies of scale and with only small populations, capacities are underutilised and production for the export market is necessary. Where small-scale processing is viable, this should be encouraged and fully utilised, particularly developing local products especially adapted to local conditions. Even within the food processing sector the importance of scale economies varies considerably.(44) Generally non-agricultural processing industries experience larger economies of scale; indeed one benefit that LDCs may gain from downstream processing in such industries is to lessen the exploitation of monopsony gains that accrue to buyers in the concentrated unprocessed mineral market. In the copper market, there are only a dozen independent copper smelters.

The importance of economies of scale should not be exaggerated and there has been a trend towards the development of small-scale equipment for use in processing industries, particularly agricultural processing. Light semi-portable sawmills; small oil expellers,hydraulic presses, sisal decorticators; canning equipment; rice, grain and sugar cane milling equipment, provide just some examples. This means a great deal more flexibility for in many cases processing plant can be expanded simply by the addition of further small units. In many instances there is a significant degree of technical flexibility and the capital/labour ratio is not fixed. In the food 'preparation' stage of many food catering industries for example, capital and labour are fairly interchangeable; functions such as weighing, cleaning, grading, slicing can be satisfactorily performed manually.

However, large markets are essential where there are considerable economies of scale; the vegetable oil, rubber and paper processing industries produce on a scale normally far in excess of domestic market requirements in the smaller LDCs. Therefore production for the export market is essential and this has been a major stimulus to development of various regional integration schemes between LDCs.

Domestic processing industries have a major part to play in the development process of many developing countries. Paradoxically it is often better to approach industrialisation through the primary role of agriculture,(45) thereby emphasising the essential link between the agricultural and industrial sectors. The interdependence of these sectors is manifest in the many interrelationships: agriculture usually has an essential role as a major provider of foreign exchange, with which to import capital goods and other inputs for the industrial sector; the agricultural sector provides a market for consumption goods and industrial products which are inputs into agricultural production; agriculture supplies the raw materials with which the processing industries may develop and in turn stimulate further production.

Processing industries can, and should, play a central role in rural development.(46) Rural areas in most LDCs account for 55-85% of total population and the agricultural sector employs 40-70% of the total labour force. But, with fast-growing populations, agriculture does not provide an employment absorption rate to meet this growth, and the need to develop other rural employment opportunities is vital. At present, in India for example, only 10% of the rural workforce is engaged in non-farm activities and it is estimated that this must expand to 30% to absorb additional labour.(47)

The need to develop rural industries which use rural resources, cater for rural needs and use rural manpower, is all too evident; agro-based industries, and other resource-based industries, directly involve processing activities. While some processing industries must be located in urban areas because of scale, infrastructure and technical requirements, a variety of technical and economic possibilities exist with regard to the scale of rural processing industries. A milk plant, for example, may be one large dairy farm complete with its own processing facility, or conversely milk can be collected from a number of small farms and delivered to a common processing unit.

TABLE 1.1 International Trade by Commodity Groups, 1972

(percentages)

	Composition of world exports	Composition of exports from industrial areas	Composition of exports from developing areas	Share of developing areas in total world exports
Primary Products				
Food	14.3	11.8	22.9	28.8
Raw Materials	5.6	4.1	8.6	27.7
Ores and Minerals	2.5	1.7	4.5	32.0
Fuel	10.4	3.4	38.6	66.9
Total Primary Products	32.8	21.0	74.5	40.9
Manufactures				
Non-ferrous Metals	2.8	2.4	3.5	22.7
Iron and Steel	4.8	5.7	0.9	3.4
Chemicals	7.1	8.8	1.9	4.9
Engineering Products	24.6	29.6	4.1	3.0
Road Motor Vehicles	7.7	10.3	0.1	0.3
Textiles and Clothing	6.4	6.4	7.2	20.2
Other Manufactures	11.9	13.9	6.2	9.3
Total Manufactures	65.3	77.2	23.9	6.6
TOTAL EXPORTS	100.0	100.0	100.0	18.0

Notes:

(1) All figures from GATT (1974, Table G).

(2) Australasia and South Africa are included in world totals, but not elsewhere.

SOURCE: J.T. Thoburn, Primary Commodity Exports and Economic Development, p.4.

TABLE 1.2 Dependence of Developing Countries on Export of Primary Commodities 1970-72 Average

Commodity	Dependence as percentage of total merchandise export earnings More than 66%	50 to 66%	33 to 49%	20 to 32%	10 to 20%
Bananas		Panama	Ecuador Guadeloupe Honduras Martinique	Costa Rica Cape Verde Tonga	
Bauxite				Jamaica Surinam Somalia	Guyana Haiti
Beef			Uruguay		Argentina Nicaragua Paraguay Chad
Cocoa	Equatorial Guinea Sao Tome/Principe	Ghana	Togo	Cameroon	Benin Ivory Coast Nigeria
Coffee	Burundi Rwanda	Colombia Ethiopia	El Salvador Guatemala Haiti Ivory Coast Yemen Arab Republic	Brazil Costa Rica Angola Cameroon Central African Republic Equatorial Guinea Kenya Malagasy	Ecuador Honduras Nicaragua Guinea Tanzania Togo Papua New Guinea
Copper	Chile Zaire Zambia	Namibia		Peru	Philippines
Copra	Seychelles Tonga		Comoros		
Cotton		Chad Sudan	Egypt Upper Volta Syria	Nicaragua Central African Republic Mali Uganda Yemen Arab Republic	Philippines El Salvador Guatemala Benin Mozambique Swaziland Afghanistan
Fishmeal				Peru	
Groundnuts Groundnut oil	Gambia		Niger		Mali
Iron ore	Liberia Mauritania			Swaziland	Sierra Leone
Jute			Bangladesh		
Lead				Namibia	
Maize					Argentina Thailand
Manganese ore				Gabon	
Phosphate rock	Spanish Sahara		Togo		Morocco Jordan
Rice	Nepal	Kampuchea	Burma		Thailand
Rubber				Malaysia	Liberia Indonesia Kampuchea Sri Lanka
Sugar	Cuba Mauritius	Dominican Republic Guadeloupe Fiji	Barbados	Belize Guyana	Jamaica Mozambique Philippines
Tea		Sri Lanka			Kenya Malawi Bangladesh
Tobacco			Malawi		
Timber non-conifer	Laos	Congo		Gabon Ivory Coast Burma Philippines	Paraguay Indonesia Malaysia
Tin		Bolivia			Rwanda Malaysia
Wheat					Lesotho
Wool				Uruguay	Lesotho
Zinc					Niger

Note: The percentage dependence is approximate for the reason that the coverage excludes a number of commodities significant in the exports of some countries. For example, the exclusion of diamonds overstates Namibia's dependence on copper: the exclusion of cloves and cashewnuts distorts the dependence percentages of Tanzania. The definition of dependence as a proportion of total merchandise exports also conceals some distortions. Re-exports from coastal countries to landlocked countries tend to reduce the dependence of coastal countries. This is particularly true in cases where some coastal countries with refineries import crude and re-export petroleum products to neighbouring countries.

SOURCE: IBRD EC/166.
L.N. Rangarajan, Commodity Conflict.

TABLE 1.3 Main Categories of Food Processing

Commodity group	Extraction of edible component	Conversion to more edible form	Conversion to new products	Preservation	Meeting consumer demand
Less Perishable Crops	Sugar milling; oilseed crushing	Milling of grains and pulses; treatment of starchy roots; tea and coffee processing	Bakery, confectionery and pasta making; manufacture of fermented soy products; brewing, distilling		More refined milling, juice extraction, prepared foods and mixes convenience packaging
Perishable Crops			Wine making; jam making	Drying, smoking, canning, freezing, etc. of fruit, vegetables, milk, meat, fish	
Livestock Products	Slaughtering, flaying and cutting		Butter and cheese making		
Fish					

TABLE 1.4 Main Processes Undergone By Non-food Agricultural Products

Commodity group	Main processes
Apparel fibres	Cotton ginning, wool scouring, silk reeling; spinning, weaving, production of piece goods, clothing
Nonapparel fibres	Retting and decortication of jute and hard fibres; production of sacking, hessian, cordage, matting, carpets
Rubber	Coagulation, milling, smoking, vulcanization, etc.; manufacture of tyres and other rubber products
Hides and skins	Curing, tanning; production of shoes and other leather goods
Technical and essential oils	Oil extraction; manufacture of soap,. paint, etc.
Tobacco	Curing, fermentation; manufacture of tobacco products
Fish	Production of fishmeal, fish oil, glue, etc.
Forest products	Sawmilling; manufacture of veneer and plywood, fibreboard and particle board; production of pulp, paper and paperboard; manufacture of construction materials, containers, furniture, etc.

SOURCE: FAO, "Agriculture and Industrialization", reprinted from The State of Food and Agriculture 1966.

TABLE 1.5 Export Market for Raw Materials and Processed Forms for Selected Commodities 1970 and 1973

(Value - million US$)

		Export market in 1970			Export market in 1973		
		Total market	Developing countries		Total market	Developing countries	
			Value	Share %		Value	Share %
1.	Sugar, raw and refined						
	Raw sugar	1913	1726	90.2	3327	2843	85.5
	Refined sugar	374	120	32.1	921	196	21.3
2.	Green coffee and soluble coffee						
	Green coffee	3082	2993	100.0	4332	4111	100.0
	Soluble coffee	123	23	18.7	271	109	40.1
3.	Cocoa beans, cocoa products and chocolate						
	Cocoa beans	862	853	100.0	945	931	100.0
	Cocoa powder, paste, butter	279	129	46.2	424	206	48.5
	Chocolate	277	0	0.0	478	0	0.0
4.	Tobacco, unmanufactured and manufactured						
	Unmanufactured tobacco	1147	409	36.0	1667	681	41.0
	Tobacco manufactures	654	83	13.0	1976	217	11.0
5.	Oilseeds, vegetable oils and processed oils						
	Oil seeds	2796	1303	46.5	5428	3397	37.5
	Vegetable oils	1389	686	49.4	2452	1239	50.5
	Processed oils, margarine	274	35	12.7	498	58	11.6
6.	Hides and skins, leather and footwear						
	Hides and skins, leather	1408	364	26.0	2836	648	22.8
	Footwear	1641	159	9.7	2770	411	14.8
7.	Natural and synthetic rubber and rubber tyres						
	Natural rubber	1127	1127	100.0	1910	1910	100.0
	Synthetic rubber	573	0	0.0	885	0	0.0
	All rubber	1700	1127	66.3	2795	1910	68.3
	Rubber tyres	1981	neg	0.0	2095	neg	0.0
8.	Wood, veneers and plywood, wood manufactures						
	Wood, rough and shaped	3589	1127	31.4	7716	2363	30.6
	Veneers and plyboard (631)	947	248	26.0	2139	646	30.0
	Wood manufactures (632)	432	29	7.0	916	115	12.5
	631 and 632	1379	277	20.0	3055	761	20.8
9.	Raw cotton, cotton yarn, cotton fabrics and clothing						
	Raw cotton	2111	1660	79.0	3493	2425	69.5
	Cotton yarn	331	182	54.9	822	561	68.2
	Cotton fabrics woven	1436	474	33.0	2766	997	36.0
	Clothing	5106	1136	22.0	9821	2989	30.5
10.	Copper, and copper wirebars, tubes and pipes						
	Copper ores and metal	4111	2887	70.2	5157	3749	72.6
	Copper wirebars, tubes, pipes	775	0	0.0	729	0	0.0
11.	Bauxite, aluminium and aluminium products						
	Bauxite	230	206	89.6	213	168	78.9
	Aluminium	2160	116	5.4	3044	159	5.2
	Aluminium plate, sheet, strips	412	0	0.0	660	0	0.0

Note: Re-exports ignored.

SOURCE: L.N. Rangarajan, Commodity Conflict : UN Yearbook of International Trade Statistics, GATT.

TABLE 1.6 Exports of Selected Commodities in Processed and Unprocessed Form, 1970

	SITC No.	Shares of Developed	Shares of Developing	Proportions for Developed	Proportions for Developing
1. MEAT					
Fresh and frozen meat	011	80.4	19.6	82.2	76.8
Meat preparations	013	74.6	25.4	17.8	32.2
2. FISH					
Fresh and frozen fish	031	73.5	26.5	70.7	84.6
Fish preparations	032	86.3	13.7	29.3	15.4
3. FRUIT					
Fresh fruit	051	57.5	42.5	69.8	83.3
Preserved fruit	053	74.5	25.5	30.2	16.7
4. VEGETABLES					
Fresh vegetables	054	70.7	29.3	68.9	84.6
Preserved vegetables	055	85.8	14.2	31.1	15.4
5. COCOA					
Cocoa beans	072.1	0.9	99.1	1.9	88.1
Cocoa powder	072.2	79.8	20.2	33.6	11.3
Chocolate	073	97.9	2.1	64.5	0.6
6. LEATHER					
Hides and skins	211	70.8	29.2	47.3	51.0
Leather	611	70.5	29.5	42.4	46.4
Leather manufactures	612	91.2	8.8	10.3	2.6
7. GROUND NUTS					
Groundnuts	222.1	19.6	80.4	63.0	58.7
Groundnut oil	421.4	17.0	83.0	37.0	41.3
8. COPRA					
Copra	221.2	0.0	100.0	0.4	50.2
Coconut oil	422.3	10.9	89.1	99.6	49.8
9. PALM KERNEL					
Palm kernel	221.3	0.1	99.9	0.4	64.6
Palm kernel oil	422.4	26.9	73.1	99.6	35.4
10. RUBBER					
Natural rubber	231	29.0	71.0	67.2	99.4
Rubber products	621	97.2	2.8	32.8	0.6
11. WOOD					
Wood in the rough	242	45.3	54.7	27.2	71.8
Wood, shaped	243	84.9	15.1	72.8	28.2
12. PULP AND PAPER					
Pulpwood	251	98.1	1.9	32.7	36.6
Paper and paperboard	641	99.0	1.0	57.2	35.6
Articles of paper	642	95.6	4.4	10.1	27.8
13. TOBACCO					
Tobacco unmanufactured	121	69.8	30.2	56.4	79.4
Tobacco manufactured	122	87.3	12.7	43.6	20.6
14. COTTON					
Cotton	263	23.5	76.5	34.1	77.3
Cotton fabrics, woven	652	67.0	33.0	65.9	22.7
15. JUTE					
Jute	264	4.0	96.0	14.6	37.9
Jute fabrics, woven	6534	13.0	87.0	85.4	62.1
16. WHEAT					
Wheat unmilled	041	95.0	5.0	88.6	83.7
Wheat, meal or flour	046	72.6	7.4	11.4	16.3
17. IRON					
Iron ore	281	53.9	46.1	20.2	79.1
Pig-iron	671	87.0	13.0	11.7	8.0
Iron steel, primary forms	672	96.8	3.2	22.2	3.4
Iron steel, shapes	673	95.7	4.3	45.9	9.5
18. COPPER					
Copper ores	28311	30.4	69.6	7.0	8.4
Copper unrefined	68211	14.0	86.0	4.7	15.3
Copper refined	68212	37.9	62.1	88.3	76.3
19. PETROLEUM					
Crude petroleum	331	5.3	94.7	17.5	78.3
Petroleum products	332	48.9	51.1	82.5	21.7
20. ALUMINIUM					
Bauxite	2833	8.2	91.8	2.8	85.0
Aluminium unwrought	6841	94.6	5.4	97.2	15.0
21. ZINC					
Zinc ores, concentrates	2835	75.8	24.2	44.9	51.7
Zinc alloys, unwrought	6861	80.5	19.5	55.1	48.3

SOURCE: B. Ohlin ed., The International Allocation of Economic Activity.

TABLE 1.7 Capital and Labour Input Relationships in Mineral Processing Industries

	Direct and indirect requirements per million dollars of final output		
	Capital, mill. dollars	Labour, man-years	Capital/Labour ratio
Mining			
Iron ore	3.2	212	0.015
Copper	3.2	198	0.016
Lead and Zinc	2.6	230	0.011
Bauxite	2.7	221	0.012
Metal mineral processing			
Steel works and rolling mills	2.8	180	0.016
Copper and lead smelting and refining	2.4	121	0.020
Zinc smelting and refining	2.4	166	0.014
Aluminium smelting and refining	3.3	144	0.023
Metal fabricating			
Iron and steel forgings	2.0	180	0.011
Copper rolling and drawing	2.4	155	0.015
Aluminium rolling and drawing	2.2	178	0.012
Structural metal products	1.7	184	0.099
Fabricated wire products	2.0	165	0.012
Tubes and foils	2.0	207	0.010
Fabricated pipe	1.7	176	0.010

SOURCE: M. Radetzki, "Where should Developing Countries' minerals be processed?", World Development 1977 'Reprint Series' 76 - I.I.E.S.

TABLE 1.8 Distribution of the Total Company Labour Force by Category, Selected Banana Divisions, Average 1974 - 1976 [a]

- No. of persons -

Category	Bananera (Guatemala)	Armuelles (Panama)	Bocas del Toro (Panama)	Average	
				No. of persons	Percentage Distribution
1. Farms	1,926	2,397	2,047	2,123	48.9
2. Boxing Stations	1,004	875	1,089	989	22.8
3. Transportation	115	98	141	118	2.7
4. Wharf	244	277	366	296	6.8
5. Eng. & Maint. [b]	424	468	575	489	11.3
6. Services [c]	158	92	170	140	3.2
7. Management	198	192	164	185	4.3
TOTAL	4,069	4,399	4,552	4,340	100.0

a One month in each year; Guatemala 1973 - 1975.

b Engineering, construction, electric plant and maintenance.

c Security, parks, sanitation and medical services.

SOURCE: Banana Development Company of Guatemala - BANDEGUA (Del Monte)
Chiriqui Land Company (United Brands).
Data obtained in field visits to banana divisions - December 17th 1975 (Bananera), February 8th - 12th 1977 (Armuelles and Bocas del Toro).

Frank Ellis, "The role of labour in the technology of banana production", Mimeo. IDS, June 1978.

TABLE 1.9 The Estimated Nutritional Importance of Processed Food Intake [1]

	CALORIES		PROTEINS	
	Fresh	Processed	Fresh	Processed
	Percent		Percent	
Cereals	12.0	40.5	9.1	38.3
Wheat and wheat flour	2.0	16.7	2.2	18.2
Rice	7.0	12.4	4.0	9.0
Maize	2.0	4.2	1.9	3.6
Other cereals	1.0	7.2	1.0	7.5
Fruits, vegetables and oilseeds	14.7	2.8	17.6	3.0
Roots and tubers	7.1	0.8	3.8	0.5
Pulses, nuts and oilseeds	4.1	1.0	9.5	2.5
Vegetables	1.5	-	3.4	-
Fruits	2.0	-	0.9	-
Sugar and sugar products	1.0	7.9	-	0.2
Foods of animal origin	1.9	11.8	5.5	26.1
Meat	-	7.2	-	14.1
Eggs	0.7	0.1	1.8	0.3
Fish	0.2	0.6	1.5	3.1
Milk and dairy products (excl. butter)	1.0	3.9	2.2	8.6
Fats and oils (incl. butter)	1.0	7.4	-	0.2
Vegetable oils	-	5.3	-	-
Animal fats (incl. butter)	1.0	2.1	-	0.2
TOTAL	30.6	69.4	32.2	67.8

1 Processed foods in this table are broadly defined, i.e. they include fresh, chilled and frozen meat, grains milled in plants, sugar made in factories and pulses processed in commercial enterprises.

SOURCE: FAO Working Paper "Patterns and Trends of Trade in Processed Foods, Feedstuffs and Beverages during the 1960s".

TABLE 1.10 Mexico: Capital Intensities and Productivities for Firms by Size in Three Food Subsectors, 1970

Subsectors	Size (L) (Number of employees)	FK/L	TK/L	O/L	Highest to lowest FK/L	Highest to lowest TK/L
		(000 pesos, 1960)			(Ratios)	
Fruits and vegetables	1-25	88.2	140.0	34.6		
	26-100	33.6	73.5	32.1		
	101-350	25.8	69.5	34.6	11.3	7.0
	351-500	22.5	45.7	17.2		
	501-750	28.1	80.9	34.2		
	over 750	7.8	20.1	9.9		
Biscuits and pasta	1-25	31.1	39.6	21.8		
	26-75	50.8	67.9	25.4		
	76-175	43.9	66.9	38.7	1.6	1.6
	176-250	42.5	66.8	50.3		
	251-500	38.6	46.1	31.4		
	over 500	45.9	51.9	40.5		
Vegetable oils and fats	1-15	72.1	101.3	40.3		
	16-100	111.8	190.9	79.4		
	101-175	93.5	328.2	123.8	1.8	3.1
	176-350	87.1	186.6	91.5		
	351-500	77.3	188.1	85.8		
	over 500	59.3	100.4	30.7		

Note: L = Labour.
FK = Fixed capital.
TK = Total capital (fixed and working capital).
O = Value added.
W = Wages.

SOURCE: K. Unger, Research Student, IDS.

TABLE 1.11 Mexico: Capital Intensities and Productivities in Food Manufactures, Three Subsectors in Food Manufactures and Total Manufactures, 1960 and 1970 (000 pesos, 1960)

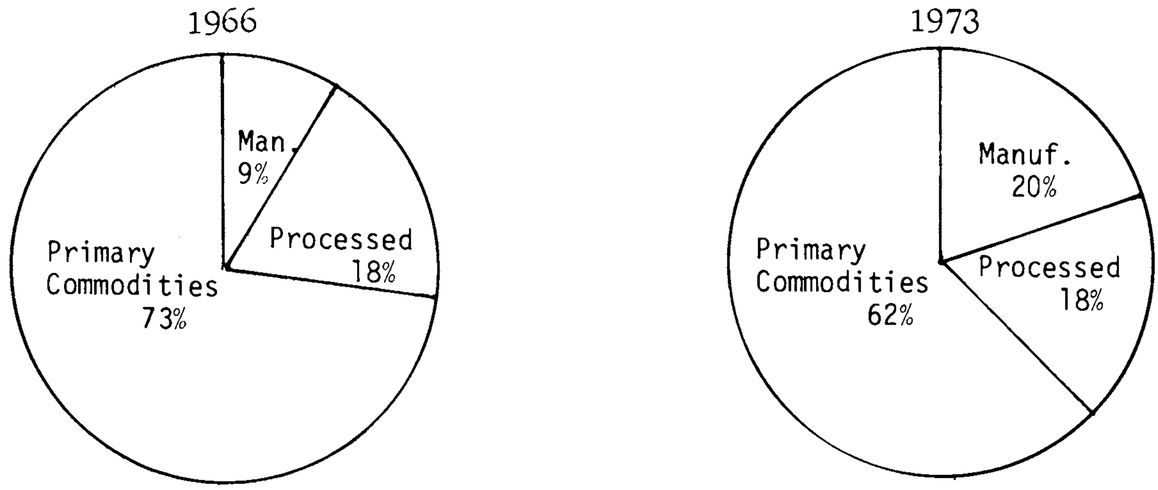
Subsectors		FK/L	O/L	TK/L	O/TK	W/O
Food manufactures	1960	15.6	14.6	45.5	0.30	0.45
	1970	41.2	31.7	62.0	0.51	0.34
Fruits and vegetables	1960	15.7	19.4	57.6	0.33	0.50
	1970	20.8	23.7	51.9	0.45	0.41
Biscuits and pasta	1960	22.2	15.8	51.9	0.30	0.63
	1970	43.8	36.6	53.5	0.68	0.50
Vegetable oils and fats	1960	45.7	19.2	184.7	0.10	0.68
	1970	86.4	82.0	194.8	0.42	0.22
Total manufactures	1960	25.7	15.8	51.4	0.30	0.59
	1970	53.7	41.1	78.4	0.52	0.40

Note: L = Labour.
FK = Fixed capital.
TK = Total capital (fixed and working capital).
O = Value added.
W = Wages.

SOURCE: K. Unger, Research Student, IDS.

FIGURE 1

Composition of LDC exports to DMEC's



Total value = $16.3 b

Total value = $32.9 b

Share of developing country exports in DMEC imports - by value & %

	1966		1973	
Primary Commodities	- 50%	(11.8 b $)	43%	(20.3 b $)
Processed "	- 21%	(3.0 b $)	17%	(5.8 b $)
Manufactures	- 13%	(1.5 b $)	19%	(6.7 b $)
Total	- 33%	(16.3 b $)	28%	(32.9 b $)

SOURCE: UNCTAD 'An Integrated Programme for Commodities' TD/B/C.1/166/Supp.5.

NB. Data based on a selected group of primary commodities and products processed from them.

Footnotes

1. Hans Singer and Javed Ansari, Rich and Poor Countries, p.17.

2. United Nations, General Assembly, Resolutions.

3. UNIDO, Lima Declaration and Plan of Action on Industrial Development and Co-operation, p.5 para.28.

4. H.W. Singer, 'Reflections on the Lima (25%) Target', pp.2-4.

5. Ibid., p.8.

6. UNCTAD, An integrated programme for commodities: trade measures to expand processing of primary commodities in developing countries (TD/B/C.1/166/Supp.5).

7. FAO, The Role of International Agro-Industry in a New International Economic Order, p.3.

   For other examples of 'international'statements see also: Action Programme adopted by the Ministerial Conference of Developing Countries on Raw Materials, Dakar Feb. '75; OECD Resolutions in Bulletin of the European Communities No.5 1975.

8. See Table 1.1.

9. See Fig. 1.

10. See Table 1.2.

11. M. Roemer, Resource-based Industrialisation in the Developing Countries, p. (i).

12. UNDP, Development Issue Paper 6, p.1.

13. FAO, Agriculture and Industrialisation, p.5.

14. See Tables 1.3 and 1.4.

15. World Bank, Staff Working Paper No. 225.

16. UN, Classification by Broad Economic Categories, p. (viii) para. 13.

17. See Appendix I: List of selected 'processed' raw materials.

18. See Tables 1.5 and 1.6.

19. L.N. Rangarajan, Commodity Conflict, p.147.

20. Ibid.

21. FAO, The Patterns and Trends of Trade in Processed Foods, Feedstuffs and Beverages during the 1960s, p.9.

22. United Nations Centre on Transnational Corporations, Transnational Corporations and the Processing of Raw Materials, Footnote 4:

> "According to one rough estimate final consumers pay over US$200 billion excluding taxes, for the major primary exports (consumed in a more processed form) of developing countries (excluding oil exports), while the latter receive just /our italics/ US$30 billion. (Source: M. Ul Haq The Third World and the I.E.O.' Turkeyen Lectures 1975). A more specfic estimate is presented by Girvan for bauxite. Four to five tons of bauxite worth between US$40 to US$80 will yield one ton of primary aluminium metal worth US$700-800, which in turn will yield semi-fabricated products worth between US$1000-1500. (Source: N. Girvan, Corporate Imperialism: Conflict and Expropriation. White Plains, New York: M.E. Sharpe, 1976 p.101)."

23. G. Sarkar, 'Tea: Some Policy Issues', p.22.

24. N. Girvan, Multinational Corporations and Dependent Underdevelopment in Mineral-Export Economies; and J.T. Thoburn, Primary Commodity Exports and Economic Development, p.39.

25. FAO, Agriculture and Industrialisation, pp.13-14; and UNIDO, Draft World-Wide Study on Agro-Industries: 1975-2000, pp.20-21.

26. A.O. Hirschman, The Strategy of Economic Development.

27. Girvan, Multinational Corporations, p.514.

28. L. Kaounides, Research Proposal, pp.13-16.

29. Thoburn, Primary Commodity Exports; especially Ch.5.

30. Girvan, Multinational Corporations, pp.521-522.

31. FAO, Agriculture and Industrialisation, p.10.

32. Thoburn, Primary Commodity Exports, Ch.6 for Rubber and Palm Oil linkages, and also Ch.7.

33. UNIDO, Possibilities for the further processing of sugar industry by-products.

34. OECD, Tropical Fruit Processing Industry.

35. M. Radetzki, "Where should Developing Countries' Minerals be processed?", p.333 and Footnote 3; and also see Table 1.7.

36. Frank Ellis, "The role of labour in the technology of banana production", mimeo. IDS, June 1978; see also Table 1.8.

37. OECD, Processed Agricultural Products and Agricultural Adjustment, p.11.

38. A.O. Hirschman, "A Generalized Linkage Approach to Development", pp. 77-80.

39. Ibid., p.78.

40. FAO, Agriculture and Industrialisation, p.8.

41. Development and Environment, Founex Report, UNCTAD Secretariat contribution, p.197.

42. OECD, Processed Agricultural Products and Agricultural Adjustment, p.5.

43. FAO, The Patterns and Trends of Trade in Processed Foods, p.12; see also Table 1.9.

44. See Tables 1.10 and 1.11.

45. Singer, "Reflections on Lima Target", p.18.

46. UNIDO, Basic Issues, Macro Policies and Components of a Programme of Development, Chs. II and III.

47. Ibid., p.5 Footnote 6.