

## *Book Review*

UNIDO. *Industrial Processing of Natural Resources*. New York: United Nations. 1981. viii + 78pp. US \$ 5.00. [United Nations Publication Sales No. E. 81. II. B.1]

The book under review is a concise but fairly in-depth study of the prospects for export diversification from the Less Developed Countries (henceforth labelled as LDCs) particularly to Developed Countries (henceforth labelled as DCs). Given the multiple problems faced by the LDCs in exporting to the DCs – protectionist policies with regards to manufactured exports, volatility of prices obtained for raw material exports, etc. – the study analyses the potential for following an intermediate route. The important issues in the export of semi-processed and wholly processed raw materials are discussed. These issues range from the problems and potentials for the location of processing facilities in the LDCs to the formulation of appropriate policies to encourage an export of processed goods rather than raw materials. Such policies will be useful both in solving the balance-of-payments problems of the LDCs and in attaining the goal of the Lima Declaration and Plan of Action on Industrial Development and Co-operation, that called for 25 percent of world industrial production to be located in the LDCs by the year 2000.

The first chapter of the book explains the concept of “resource-based industrialization” with the help of various examples and indicators. The concept of processing chains and processing stages is defined at the very outset. This concept is a formalization of the vertical interdependence of (manufacturing) industry seen in an Input-Output Table framework. It refers to the combination of multiple inputs into one or more final outputs. In almost all manufacturing activity, a set of inputs in the form of raw materials, semi-processed goods, manufactured inputs, etc., goes through a variety of transformations before the assembly of a complex product for final use by consumers. Prominent among these transformations are the processing of, say, some mineral ores, the transformation of these worked minerals into tubes, pipes, sheets and plates of various types, and the use of these materials as inputs into some finished product.

It is noted that in each of these processing stages considerable value added is generated independently of the value added generated in the previous or following stages. In addition, with very few exceptions, it is seen that the material loses bulk after transformation, thereby improving the ratio of value to bulk. Rubber is one of the few materials that gain both weight and volume when made into tyres; in most other cases, the opposite is true. Thus, the processing stage results in a product that is both easier and cheaper to transport than the raw material from which the finished good is manufactured. Similarly, the cost of location of some primary processing facilities is lower than the cost of an industry to manufacture complex finished products. These factors point to the utility of setting up primary processing facilities in the LDCs, especially in view of the protectionist policies of the DCs regarding manufactured exports from the LDCs.

The first chapter also analyses in detail the current trade, both between the LDCs and the DCs and among the developed economies themselves. The picture obtained from a variety of indexes is fairly uniform: exports from the LDCs are mainly in the form of raw materials and semi-processed goods while exports from the DCs are predominantly composed of finished products. While there are some variations from this standard pattern – the exports of leather and furs from the LDCs are mainly finished products – these are exceptions rather than the rule. Since the period of the analysis there has been some improvement in this situation, however. The share, in total LDC exports, of the exports of relatively unprocessed goods has fallen from 69.9 percent in 1968 to 61.5 percent in 1976. Similarly, the share of complex finished products in total LDC exports has risen from 15.3 percent to 27.6 percent during the 1968–76 period. However, there is considerable scope for an increase in the exports of manufactured goods from the LDCs.

The second chapter of the book is a survey of the theoretical determinants of the location of processing facilities. The important factors influencing a location decision are classified under three main headings: input availability, conditions of processing which also include the technology used to process raw materials, and the characteristics of the output produced. In the final part of this chapter the relevance of each of these factors for specific commodities, such as aluminium, copper, iron and steel, tin and nickel, is discussed. The analysis touches upon the current position and prospects for the future for many commodities. It is noted that while, in most cases, a substantial part of total world reserves is located in the LDCs, a major part of the processing and production facilities is located elsewhere.

The comparative-advantage doctrine is used to discuss the extent to which input availability influences the location of processing facilities in the LDCs. The conventional implications from this type of doctrine, supporting the case for the location of labour-intensive industries in the LDCs, is not strongly supported by the results. Firstly, it is noted that labour costs are always less important than raw material costs and capital costs in various processing industries. Secondly, it is

observed that labour coefficients are consistently lower in nations that possess a higher level of GNP per capita than in the relatively poor countries. Capital coefficients are not seen to be decreasing (or increasing) with variations in the GNP. The technical conditions of production, thus, do not support the case for relatively labour-intensive production in the LDCs and relatively capital-intensive production in the DCs.

Of far greater importance than comparative-cost doctrine are the stages of technology, external economies and economies of scale in production. For most mineral-processing activities, the smallest size of plants is fairly large, not only entailing large investments but also resulting in substantial secondary outputs. Indeed, in most cases, the processing facility can only efficiently compete with other industries if a large fraction of the bye-products produced from primary processing is also used and secondary outputs produced. These tertiary requirements of processing facilities tend to discriminate against locations in the LDCs as the financial outlays required to set up large-scale industrial complexes are likely to be beyond their reach. However, other external economies generated are likely to favour locations outside the developed economies. The public attitude towards pollution and waste disposal is one of such factors.

Another factor of importance in the choice of location is the problem of market access for primary products and bye-products. Prominent issues among those discussed under market access are transport costs, the actual scope of transport of materials over long distances, and the problems that may arise due to oligopolistic markets. In some cases, the fact that transport costs are high may be a deterrent against locations in the LDCs. Large quantities of, say, sulphuric acid, which is the major output of sulphur-processing industry and is a dangerous material, can not be transported easily. The location of many industries that process raw materials near user industries is explained by the fact that the complementary inputs required for further processing are not available elsewhere. The effect of imperfect market arrangements is also quite substantial because of the involvement of one or a few transnational corporations in mineral extraction and processing activities. Tariff and non-tariff barriers to potential new processors in the LDCs are also seen to create market access problems. The fact that tariff barriers are marginally higher on goods traded between the LDCs and the DCs than on goods mostly traded among the DCs themselves is also an obstacle for the producers in the LDCs.

This analysis also brings out factors that favour the location of processing industries in the LDCs. Some recent developments, especially in metal casting, which have reduced the minimum efficient scale of plants are likely to increase the possibilities of locating processing facilities in the LDCs. On balance, however, in the present situation it is to be expected that, on account of low capital costs in the DCs, these economies provide better location points for large-scale raw material processing.

The third and fourth chapters deal with the applicability of these theoretical considerations to the real-world policy making and project evaluation. "Academic economists" or civil servants, who are assigned the task of evolving guidelines for policy making, will be interested in factors that determine the economic viability of any activity, market imperfections and policy constraints that might act as disincentives for certain type of investments, and in the physical constraints faced by entrepreneurs contemplating any investment. The economic viability of any project depends upon input availability, the presence of complementary products, infrastructure facilities, the technical conditions of production, and the market mechanism. The presence of adequate demand for output is also a factor governing feasibility. However, the entrepreneur's own decision to invest depends upon the rate of return on any single activity at different locations, the rates of return on different activities at any one location or any combination of the two. This decision also depends upon a host of other issues as well. Again, the real world is characterised by information gaps that may lead various individuals to arrive at different conclusions.

Given that policy-makers have a reasonably complete picture of the nature and characteristics of each establishment, a number of policy measures can be taken to ensure the setting up of beneficial processing facilities at the desired locations. The first step prescribed is for the government to try and overcome information gaps both through the collection of information and through its propagation by means of publicity campaigns and an exchange of views between the government and business community. Tax and subsidy schemes and exchange rate variations can be used to encourage processing for exports as opposed to export in the form of raw materials. Bilateral trade and market-sharing agreements can be used to improve access to segments of the foreign market. Finally, direct controls can be used to prevent unnecessary industries from being established if these (indirect) incentives are not seen to be effective in channelling resources towards so optimum investments.

The debate on policy measures should ideally cover the issues of complementarity of incentives, and also the extent to which various policies may conflict with each other. Thus, for instance, import-substitution policies will, by raising input prices, also tend to discourage the setting up of local processing facilities. Similarly, policies towards foreign ownership of investments and anti-monopoly regulations can discourage investment in any form. Thus, the policy package designed should also be checked for its internal consistency before it is applied to induce the setting up of raw-material-processing facilities or for export promotion.

The book is, as already mentioned, a fairly in-depth study of the prospects for export diversification through the export of processed raw materials from the LDCs. In fact, the slimness of the volume is deceptive as the book carries a very valuable information content. The various arguments are amply supported by examples from different countries. The exposition is fluent and provides easy reading. The book can be used as a guideline by the policy-maker as well as by the academic economist to brush up his knowledge of the literature on industrial location analysis.

Despite the obvious utility of the book, two comments on the book are warranted. First, the material covered in Chapters II and III overlaps to a certain degree. Chapter II is a fairly comprehensive survey of the factors that are important in the decision to locate an industry in any area. In the following chapter, while the title is "A framework for Analysing the Location of Processing Activities", the discussion again concentrates on enumerating the factors that are important in "location" decisions. Chapter III, therefore, seems to be, at best, an extension (if not partly an overlapping) of the analysis in Chapter II. Ideally, Chapter III should provide evaluation criteria and judgement possibilities derived from the theoretical discussion of the earlier chapter. In any case, at some point in the book some sort of project evaluation and location-choice criteria should have been derived and/or discussed to make the analysis complete. While providing very useful insights into the framework in which location decisions are made, the study is not specific enough about how location points are (or should be) arrived at.

The discussion on complementary inputs and products is seen to employ a partial-equilibrium framework. At present, it is possible, by use of multi-regional input-output tables, to identify not only the important intersectoral linkages but also the origin and destination of each product. Thus, the extent to which a decision to locate in one area has implications for other regions (through the regional multiplier) can be quantified quite precisely by using readily available techniques. The proposed policy package should thus have recommended that the differential effect of any location decision on all regions be analysed, as simple cost-benefit analysis may not account for all the benefits and costs from a project. An abstraction from general-equilibrium analysis is also seen from the fact that the discussion on the need for complementary inputs does not touch upon the issue of labour and capital availability. While labour may be treated as freely available to some extent, the actual limitations on labour migration that are now well acknowledged in regional analysis may lead one to treat such an assumption with suspicion.

These two points are probably best mentioned in the context of extensions of the analysis contained in the book. As it stands, the volume is a very good addition to the literature on regional analysis. Its utility is enormous for both policy-makers, who are to decide on industrial location patterns, and economists, who want to have a quick but thorough look at the various facets of the literature on the prospects for industrial processing and export of raw materials from the LDCs.

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