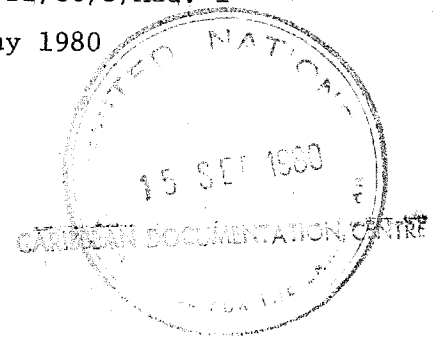


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ENERGY AND NATURAL RESOURCES IN THE
 CARIBBEAN IN THE 1980's



UNITED NATIONS

ECONOMIC COMMISSION FOR LATIN AMERICA Office for the Caribbean

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A Brief Contribution to the Discussion on the Third Development Decade

INTRODUCTION

Overall economic growth in the Caribbean during the decade of the 1970's can be characterized as negligible, despite the existence of an international development strategy, the attainment of political independence of several countries, during the late 1960's and the 1970's, and the proclamations of a New International Economic Order. For several countries, after allowance for price increases, growth in output of goods and services was negligible, some experienced a reasonable rate of growth and for some others there was stagnation and even decline.

Most of the countries experiencing relatively better economic growth rates during the 1970's (and these are few) are those with some degree of energy self-sufficiency, including Trinidad and Tobago, Dominican Republic and Barbados.

Main focus of economic development plans still is the rate of growth in the macro-economic aggregates, although in the more recent period the findings of the more humanistic disciplines seem to be gaining more credence. Belatedly, welfare considerations such as quality of life and basic needs are being given more attention.

However, as the decade comes to an end all Caribbean countries face inflated energy (and other) costs and unfavourable terms of trade. Chronic balance of payments deficits are common, the debt to GDP ratios are rapidly increasing, and so is unemployment in many countries. While it is true that population growth rates in almost all countries have declined considerably, the annual additions to these young populations are still increasing. The implications for physical and social infra-structure and for employment are too obvious to mention. It seems clear that in order not only to spur economic development but also to avoid social turmoil new approaches are needed.

THE RESOURCES SITUATION

Viewed as a whole the CDCC area does not appear very badly off in quantum of resources. However, the distribution of resources, both human and natural, is badly skewed. Some countries are extremely small and have high population densities, while others are sparsely populated. In some instances countries are endowed with large quantities of certain resources while others have none, and yet the deficient countries do not benefit from the plenty elsewhere in the region. In fact, in some cases even trade must be conducted through third countries.

It is necessary for a broader concept of economic resources to be accepted, and this ought to be an area of attention in the 1980's. The sum total of resources comprises the eco-system and it is this totality that requires attention. Included here are land, air and water and their products or constituents such as minerals, vegetation, animals as well as natural elements such as sun and wind. Also included are various human processes and the resultants of these activities including both "final products" and "wastes". Another idea that needs popularizing is the depleting nature of many resources.

Energy Resources

Energy resources in the region consists primarily of hydro-carbons, charcoal and firewood and hydroelectricity. There is some geothermal potential as well as solar and wind energy potential. Considerable potential also exists for the use of the biomass and in human and animal waste.

Widespread use of charcoal and firewood has resulted in deforestation and even desertification in some countries so that the quantum of forestry resources has been declining. Additionally, there have been erosion and other environmental effects in many places as the tree cover has been removed.

Of the hydrocarbons, coal is virtually non-existent while crude petroleum and natural gas, so far, is known to exist in very few of the countries. While petroleum extraction is limited to few countries, several countries have refineries and two interesting situations result. First, the region exports most of its production of crude but imports even larger

quantities than it produces. Second, petroleum refining capacity is several times higher than sub-regional consumption. Active exploration for crude is going on in several countries and plans exist for further exploration.

Hydro-power is limited to some larger countries of the region, though a few small islands also utilize micro hydro-power systems for generating electricity. Potential exists in both the larger and some smaller countries and additional development is likely in view of the high cost of petroleum.

Non-conventional energy resources exist in the form of solar and wind power, in geothermal energy and in biogas latent in vegetation and all kinds of wastes. Solar and wind energy resources are being tapped but the extent is yet only minimal and in low energy uses. The solar and wind regimes are still imperfectly known. Geothermal potential considered inadequate at shallow depths has still to be explored adequately. The state of knowledge of the biogas potential is much the same as for the other forms of non-conventional energy sources.^{1/}

Three points stand out from the above: The extreme reliance on petroleum as an energy source; the importance of extra-subregional influences on energy resources and the relative lack of attention to non-petroleum energy sources.

Other Natural Resources

There are of course a number of other natural resources in the area. For the purpose of this brief discussion we will adopt the following grouping: Relatively Abundant: Land, sea, wind and sun (in non-energy uses) and bauxite; and Relatively Scarce: Minerals (excluding bauxite) but especially precious and metallic minerals and fresh water (non-energy uses).

Total land area of the region is some 600,000 km² and with a population of approximately 25 million gives an average density of around 40 per km² (or 104 per sq. ml) which is relatively low.

^{1/} For a fuller discussion of energy resources see: Preliminary Draft Paper on Energy Resources in CDCC Member Countries (CEPAL/CARIB 79/3) (currently being revised)

In 1975 land use was distributed as follows: Forested 62 percent; cropland 3 percent; other arable land 7 percent; other 18 percent^{2/}. Other included beaches, recreation parks, urban settlements roads and highways etc. Needless to say there are many competing uses for land.

All Caribbean countries have shorelines and most are islands, thus access to the sea and coast line area is easy. Coastal areas serve as beaches and recreation areas as well as the habitat of edible marine products. Here again there are competing uses evident. Wind and sun complement the sea in their use as a recreation resource and are combined in the Caribbean to create favourable climatic conditions for tropical vegetation. Bauxite exists in several Caribbean countries and is available in large commercial quantities in at least five countries.

Of the relatively scarce natural resources, so far as is known presently, large quantities of commercially exploitable minerals are not known to exist. This is especially true of the precious and metallic minerals. Here however comprehensive exploration could change the picture.

Fresh water is another relatively scarce resource especially in some of the smaller islands (but also in some larger ones). This results from a number of causes, from absence of rainfall and rivers to the mountainous nature of the terrain being in close proximity to the sea and to pollution of existing supply.

For many countries the stock of natural resources including energy resources is not very large, it would seem, therefore that concerted effort at resource "winning" and protection will be very necessary for the 1980's

^{2/}: Agricultural Statistics, 1978; UN ECLA Office for the Caribbean (CEPAL/CARIB 78/8)

FOUR IMPORTANT AREAS OF CONCERN FOR THE 1980's

In the context of energy and natural resources four of the most important areas of urgent concern for the Caribbean are: Ownership, conservation, technology, and tastes and consumption patterns. Ownership is important because within ownership resides the decision-making function. Thus, for example, use of resources and disposition of rewards are determined by the owners in their own interest. Conservation of resources is important in the face of the relative scarcity of resources and manifest the exercise of moral responsibility to future generations. Technology is an important agent of development. In the form of equipment or skill it is itself a product to be used in generating further production. Thus local development, production and use of technology can have a multiplier effect on overall production. Existing patterns of tastes and consumption are agreed by many to be largely inappropriate to Caribbean resource type and quantity and the imported version not only drains financial resources but diminishes the development potential.

Ownership

Much of the resources (energy and minerals) in a significant part of the Caribbean is still owned by interests outside of the region. In the context of attempting to secure increased welfare of all its peoples, those responsible for government must make conscious policy decisions regarding ownership.

In the first place there is the question of sovereignty. Is the popular will to be subject to the individual corporate will, instead of the reverse? Where the corporate is not only body but sole as in "Corporation Sole"^{3/} the popular will can at least be reflected. However, there still are cases, some enshrined in legal enactments, most dating from the pre-independence period, where the popular will is now held at bay and foreign corporate will reigns supreme.

^{3/}: A legal person in Trinidad and Tobago in which is vested the ownership of several government enterprises.

Decisions concerning use of resources have to be directly related to development and not merely as incidental to entrepreneurship. Resource use must be maximized in both its social and economic contexts. In the hands of foreigners decisions may be incompatible with the national interests and the gains from resource use may be unfairly distributed. It seems clear that decisions will have to be taken by many countries concerning localization and/or participation, whether government or public, and regarding management and the sharing of the rewards.

Conservation

Conservation includes preservation/protection of the resources and lengthening of their life span but also included are activities which directly create useable resources. Conservation is extremely important in the context of the Caribbean in view of the resource situation as explained above and as well because of the depleting nature of so many natural resources. As the population grows the pressure on resources increases and there is need to extend the life of wasting assets for use by future generations.

It will be quite obvious to Caribbean peoples that the pattern of development and living styles in many areas have resulted in environmental problems. It is equally true that environmental degradation has been allowed to persist through neglect causing irreparable depletion of resources in some instances.

Soil erosion and pollution of rivers, streams, lakes and coastal waters by chemicals are very prevalent and their pernicious effects have taken considerable toll.

Soil erosion in the Caribbean results from burning as a means of clearing land for cultivation, denuding forest cover, sometimes for use as energy material or in the lumber industry, and otherwise removing vegetation haphazardly. Poor horticultural practices are also a major cause of soil erosion.

Protection from industrial and environmental pollution is a major necessity. Pollution of rivers, lakes, coastal wetlands, beaches and fishing beds is intensifying. This is affecting drinking water sources, reducing marine life and eroding the livelihood of fishermen capable only of fishing in near-shore areas. Tourism is also being affected by oil spills and seepages.

In the 1980's development planning must seriously incorporate an environmental dimension to preserve natural resources and support life in the future. Also, governments will have to look very carefully at current use patterns to see that activities are natural resource efficient.

Relevant Technology

This may be defined as the means or activities by which goods and services are produced using one's own resources to suit one's own particular circumstances. The rationale behind the idea of relevant or appropriate technology is to develop means of production related to resource base and regional or national needs. It is necessary also to break the pattern (and save the costs) of technological dependency.

The particular geographical location, historical development of the Caribbean and the mobility of its peoples are responsible for the present type and level of technology. It has been questioned as to whether the type of technology in existence is relevant to resource endowment, and social needs of the Caribbean. Large-scale imported technology, small domestic markets, difficulty in penetrating foreign markets etc., have led to a one-shift system in industry, employment of relatively few and relatively high fixed costs per unit of output. Yet economic development is not so wide-spread nor income so high as to provide basic services to all the people in most countries.

In the field of energy, wind power and mini-hydropower plants are compatible with the resource endowment of the Caribbean. Indeed, wind power was used in earlier times in many Caribbean countries but was phased out as large expensive electricity generators using petroleum were brought in from metropolitan countries to utilize cheap oil. Perhaps wind energy can never be developed on as large a scale as conventional thermal electricity, but wouldn't it have been interesting if wind technology had been developed in the Caribbean over the last forty years? Caribbean countries are now on the threshold of having to purchase wind technology from the same metropolitan countries from whom the large electricity generating units were purchased in the first place.

The concern for the 1980's is that this historical pattern should

not be repeated.

Consumption Patterns

There is a persistent conflict between the type and level of resources and the pattern of consumption in the sub-region. These patterns have become entrenched and are reinforced by the "style" of development.

Present consumption patterns, and more critically, the levels "aspired to" by the current have-nots are those of the metropolises and are reinforced continuously by contiguity, legacy of history, media, tourism etc. These patterns are at variance with the resource level, and are partly encouraged by mal-distribution of income and accentuate conspicuous consumption. The problem exists because of the inability of the resource base to support the bulk of the population in a fashion similar to the metropolises and because the conspicuous consumption of a few is juxtaposed against a background of poverty of many.

During the Third Development Decade correspondence between resource endowment and patterns of resource use and consumption must be encouraged.

SUMMARY AND STRATEGY CONSIDERATIONS

The economic growth rate of Caribbean countries during the 1970's was low except in the case of those countries who were in a position to provide an important share of their own energy needs. Economic independence, development planning efforts, changes in political leadership etc., did not seem to make significant difference. As the decade comes to an end inflation is rampant, balance of payment problems are burdening most countries and there is a considerable amount of social unrest. Alongside all this the pattern of production employed in the quest for economic growth has resulted in degradation of the eco-systems some of which are irreparable. All of this occurred while the population was still growing at a fairly high (if declining) rate.

Some of these developments are directly traceable to the pattern of ownership much of which is non-indigenous and in these cases the bulk of benefits have flowed overseas. Problems have also arisen from the pattern of consumption resulting from acquired tastes which are not based on local resources. The dilemma arises from the internalization of these tastes and

their acceptance as norms for the population at large when the resource base and purchasing power available cannot possibly support the level of this implied demand.

The type of technology in use is frequently inappropriate to resources thus large amounts of foreign inputs are required and potential local inputs remain unemployed or under-employed. Output, to a large extent, is produced to cater for acquired tastes.

The rapid depletion of resources, mal-distribution of income, tastes and consumption patterns incompatible with the type and level of resources, balance of payments crises, rapid inflation, unemployment and social unrest demand new approaches in the 1980's.

Strategy Considerations

Strategy considerations are discussed under four headings below:

- a) The Caribbean peoples should live within the capacities of their natural and financial resources.
- b) Creation of a "reverse demonstration effect" is necessary because of its own inherent worth and also to support (a).
- c) Development of appropriate institutions.
- d) Ensuring effective regional cooperation.

(a) Living within the capacities of natural and financial resources

A considerable number of ideas are included within this heading; few only will be mentioned and very briefly at that. First, there is the need for a relatively equal distribution of the products resulting from use of the resources so that a minimum quantum of the needs of all people are satisfied. Second, is the necessity to develop a larger degree of national self-reliance. Among these pre-requisites must be also the desire to increase the volume and quality of the stock of resources, and to use existing resources more efficiently. More concretely, vastly increased attention needs to be given to conservation techniques, to developing non-conventional sources of energy and non-traditional edible and inedible agricultural crops, to developing indigenous (appropriate) technology and to modifying tastes if new resources are to be developed.

A few considerations on energy and natural resources are appropriate here. While it is difficult to increase the quantum of land, reafforestation and sound horticultural practices would increase vegetation, aid in controlling soil erosion, provide jobs, increase indigenous raw materials for industry etc. In the same way proper hydro-development including rural mini-hydro plants, could increase water supplies for household and agriculture, provide electric power and help reduce the pressure on the balance of payments (at least in the medium to long run). Development of non-conventional sources of energy also fits into this pattern. A big advantage accrues in these connections because of the opportunities to develop and utilize indigenous technology and local materials, avoiding using imported materials which themselves embody significant amounts of expensive energy.

Making more efficient use of resources as a means of preservation or effecting economies need no elaboration. In the Caribbean, inefficient use of resources is linked partly to dependence on imported goods and to patterns of consumption. Thus it seems we subscribe to financing "planned obsolescence" instead of planning preservation and recycling of used or worn material. Serviceable goods are discarded and so are recyclable wastes, more often than not degrading the environment in the process. These expensive patterns of behaviour are firmly ingrained but effective counter-measures must be instituted in the 1980's in the interest of survival.

(b) The reverse demonstration effect is the opposite of the imported behaviour patterns (referred to above) which include the inappropriate tastes and habits inculcated into the Caribbean through contacts including constant exposure to publicity media. In the light of resource constraints and unequal economic power so only a few can afford the imported styles and the social conflicts already evident, consumption (and production) should be oriented to local resources.

It must be realized that this is a long term effort of necessity, and would obviously meet with much resistance; therefore considerable patience, persistence and political will is necessary. It would seem however that a suitable catalyst exists, namely: The rapid rise in energy costs during the last few years and the chronic balance of payments situation. This catalyst should stimulate efforts to develop domestic technology, to utilize

domestic sources of energy, to grow, prepare, preserve etc., more domestic agricultural crops. Furthermore, these crops will have to be utilized - consumed as foodstuff or as raw materials for industry including handicraft. Bearing in mind the high costs of energy why not return to architectural designs that utilize local raw materials and sun and wind for energy use, for heating, cooling etc.

The role and function of the media would be very central to increasing awareness of the problems and the attempts to modify tastes and patterns. A considerable effort is needed in this connection.

(c) Development of appropriate institutions. The necessity for developing new and/or more appropriate institutional frameworks is implied in much of what has been said so far in this section, as well as in the immediately preceding section. This is certainly true with respect to indigenous technology, to conservation and to reversing the "demonstration effect". Such development requires as a pre-requisite recognition of the problems and exercising the political will.

Many Caribbean countries attaining independence during the second half of the 20th century, inherited a number of institutions which were virtual transplants from metropolitan countries. Institutions should be appropriate to needs, to objectives and to the modes chosen to achieve the objectives. New countries, new crises and new needs require new or at least greatly modified institutions.

Prime examples of "venerable" institutions which exert major influence on the societies and whose roles require reformation in order to become more relevant to the situation of newly independent countries are the Civil Service, trade unions and traditional primary and secondary educational institutions. If the new needs after independence are related to the mass of newly enfranchised people, and the objectives are for their social and economic betterment (that is to say development) then these institutions transported directly from the "mother country"

would need to be drastically changed in orientation and structure to meet the needs.

The capacity to develop must be increased. It is not enough to attach a planning unit or foreign ministry to the pre-existing governmental structure. The Civil Service must be structured to perform a developmental role, to provide services and infrastructure not just to follow the traditional rules and maintain the status-quo. Individual trade unions must be reconstituted in light of the realization that fighting only for the immediate financial gains of members and "lifelong" leaders is self-defeating. The struggle instead should be for increasing national production and for more equitable distribution of gains to the local population. Educational institutions must not only provide academic training for the elite to assure them professions and status-maintaining jobs, but should contribute to development objectives by providing training in relevant skills so that intelligence is applied to "technical work", and to agriculture and other productive activities. The irony of a "brain-drain" existing side by side with recruitment of foreign technical expertise in various occupations is too well known to warrant more than passing mention.

New political status, new crises etc., sometimes require the creation of new institutions. Three "new" needs will be mentioned here for illustration:

- (i) appropriate planning machinery
- (ii) research institutions
- (iii) centralized energy organization.

An urgent need is for appropriate planning machinery and not only to decide how to spend the next set of revenue appropriations. If development is for all the people then the institutional frame-work must provide for consultation. Civil servants cannot continue to plan in "splendid isolation". Such isolation has resulted in planned crops that are not grown, loan funds that are not borrowed, fiscal incentives that are not taken up, market buildings that are unused and additions to the ranks of the unemployed and disillusioned.

Research institutions by and large would fall into the category of the relatively new in the Caribbean. It should therefore be easier to develop these more appropriately, both as to structure and to work activity. In the context of the foregoing discussion, technology, communications media, development of new products utilizing local raw materials are all relevant. In this era of scarce foreign exchange reserves and large balance of payments deficits research into product development, marketing etc., would contribute to localization of tastes as well as to improving the payments position. It would seem also that a considerable amount of social research is necessary to fully understand the indigenous cultures in order to attain the maximum acceptance and achieve the development objectives.

Related also to research is the need for energy institutions. This fact is clearly apparent since even today, six years after the first major shock of the "energy crisis", several Caribbean countries have no central body responsible for energy policy formulation and direction. Conservation of energy is vital yet the institutional machinery has not emerged to implement this most urgent need. Similarly, research into renewable sources of energy has hardly begun.

(d) Regional cooperation needs to be extended and intensified. Detailed explanation of benefits which can be gained is not necessary here. It is sufficient to say that the sum total of benefits which can accrue to individual members of a group acting in consort in a range of activities is frequently greater than the total benefits, if members pursue individual courses of action. In other words, benefits of economies of scale become available with joint action. If a significant level of regional cooperation could be achieved in the two areas of energy and natural resources, economic development would be enhanced in the 1980's. Subjects such as resource conservation, development of non-conventional sources of energy, formulation of energy policy, preservation of the ecology, etc., are new areas of concern in the Caribbean. Consequently, a start can be made immediately at the regional level and not conflict too greatly with long entrenched national interests.

There is a further rationale which underlies the energy scenario and gives additional justification for cooperation. Any activity in the areas of new and renewable sources of energy which could lead to utilization of these alternative sources would tend towards reducing the demand for petroleum and to this extent exercise a limiting effect on future price rises.

Obvious areas of cooperation include:

- i) Exchange of information, reports and other documentation, and data on institutional structures and their functions etc. In this context the ECLA Caribbean Documentation Centre is poised to play an important role.
- ii) Sharing of expertise, experience and training facilities etc. It is evident that savings in costs can be achieved here since fewer facilities could be used more extensively. Additionally, facilities could be owned and operated jointly, a step which would "deepen" the cooperation effort.
- iii) Research projects, testing of equipment, adaptation of equipment etc., could be done jointly, also effecting economies in the process. In both (ii) and (iii) above the CDCC first principle of self-reliance could be operative. Multilateral and bi-lateral agencies could channel funds into such activities, many of which could conceivably fit TCDC criteria.
- iv) Joint ownership of production, training, laboratory facilities etc. These need not be large-scale. The primary benefit would be to "deepen" cooperation and increase the areas of contact among Caribbean nationals. A catalyzing agency or process is required in this connection.

Clearly, there are many other areas of strategy considerations not covered, since of necessity, the paper is a brief one. It is hoped that the ideas brought together here will help to focus attention, and to induce action on certain major problems as the Caribbean enter the decade of the 1980's.