

**NATURE AND THE ECONOMY:
ADDRESSING THE DELICATE BALANCE**
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I: INTRODUCTION: THE ECONOMY-ENVIRONMENT SYMBIOSIS

Currently growing at an average annual rate of 4%, Caribbean countries must considerably increase their economic growth rates in order to ensure economic capacity to provide significantly improved levels of living. Not only must they raise their economic growth trajectories, they must also sustain them.

Sustained economic growth does not result only from the interplay of conventional economic factors of production such as labour, manufactured capital and technology. It is very much dependent on the natural environment. For Caribbean countries, hurricanes and tropical storms of lesser intensity are too frequent reminders of the vulnerability of economic growth to environmental changes.

The Brundtland Commission on Environment and Development: Our Common Future emphasizes the inseparability of “development” and “environment”: “The ‘environment’ is where we live; and ‘development’ is what we all do in attempting to improve our lot within that abode. The two are inseparable.” (Brundtland Commission, 1987).

This inseparability has not been interpreted in the past as a call for environmental sustainability, i.e., maintenance and protection of the environment. More typically, it has been treated as the justification for exploitation and management of environmental resources for accelerated economic growth. The harvesting of forests, the damming of rivers, the mining of minerals are ready examples of natural resource exploitation and management with economic growth objectives.

Now, however, it is widely recognised at the global level that the nature and pace of economic growth can have major detrimental effects on the environment and on the sustainability of economic growth. According to Clive Hamilton, “economic growth is insistently propelling the process of environmental decline” (Hamilton 2004, page 177). Lester Brown, (2001, page 4) warns that the “trends of an increasingly stressed relationship between the economy and the earth’s eco-system are taking a growing

economic toll (and) that at some point in time, this could overwhelm the worldwide forces of progress, leading to economic decline.”

These observations about the relationship between economic growth trends and patterns and the environment are valid. However, it is very important to also realise that the absence of economic growth, especially manifested in extreme poverty, is itself a contributory factor to environmental degradation. The rural poor without access to affordable alternative sources of energy are more likely to harvest trees for firewood and charcoal without considerations of deforestation and soil erosion. The poor in urban and rural areas are more likely to pollute water courses and soils by inappropriate sanitary practices. Biological species conservation through observance of hunting regulations is not likely to be a more compelling objective than the satisfaction of hunger. Economic growth if it alleviates poverty can create socio-economic conditions more favourable to good environmental practices within communities and provide the scope for a more positive symbiosis at the national level.

II. A CARIBBEAN ENVIRONMENTAL SCORECARD

It is appropriate within this context to consider the environmental status of the Caribbean. The United Nations Global Environment Outlook 4 (UNGEO-4, 2007) and the United Nations Economic Commission for Latin America and the Caribbean - The Sustainability of Development in Latin America and the Caribbean (UNECLAC 2001) provide excellent overviews of the situation. Although much of the material deals with Latin America and the Caribbean as a region, it is possible to comment on the Caribbean specifically in several important instances.

Forestry

Latin America and the Caribbean has the greatest plant cover and biodiversity and the largest area of closed forests in the world. (UNECLAC 2001). These forests provide extremely important environmental services such as habitat for many valuable species, production and regulation of freshwater and absorption of carbon dioxide (CO₂).

However, it is the region with the most severe loss of forest cover. UNGEO-4 (2007) reports that 60% global loss between 2000-2005 took place in Latin America even though the region contains only 23% of the world's forest cover. There has also been deforestation in the Caribbean. Jamaica's average annual rate of deforestation between 1990 and 1995 was 7.2% which was the second highest in the world (UNECLAC 2001). The average annual rate of deforestation in St. Lucia was 3.6%. In Haiti, which lost 98% of its original forest cover a long time ago, the average annual rate of deforestation in 1990-1995 was 3.4%. The Bahamas had

an average annual rate of 2.6%. Overall, the average annual rate of deforestation slowed in the Caribbean between 1990-1995 compared with 1981-1990, but in the cases of the Bahamas and Jamaica, it did not.

Deforestation has several possible consequences:

- (i) there is likely to be a reduction in the quantity and quality of water resources;
- (ii) there could be soil erosion;
- (iii) there can be sedimentation of water bodies;
- (iv) biodiversity could be degraded or even lost; and
- (v) the ability of countries to absorb greenhouse gas emissions would be reduced.

Given the fragility of Caribbean ecosystems, these environmental risks should be taken seriously.

Marine and Coastal Systems

The Latin America and Caribbean region has seven highly productive zones (“upwelling zones”) located along 64,000 kilometres of coastline and its 16 million square kilometres (km²) of maritime territory, (UNECLAC 2001). In addition, the mouths of the rivers, notably the Amazon and the Orinoco, form other productive areas. It is estimated that 70% of the species in the system of deltas, lagoons and creeks formed by the rivers are of commercial importance (UNECLAC 2001). Mangrove forests are important parts of the coastal system. They occupy between 40,000 and 60,000 km² in Latin America and the Caribbean. Their value do not derive solely from their production and sustenance of many species. Mangrove forests provide other critical environmental services:

- i. their vegetation protect the coasts from ocean tidal erosion;
- ii. they absorb nutrients deposited by rivers, thereby reducing eutrophication in coastal waters; and
- iii. they restrict the flow of seawater upwards into the river systems and inland water sources. This is especially important for countries below sea level.

In these two latter services, mangrove forest could be viewed as intermediating between fresh water and seawater.

The most important coastal and marine ecosystems in the Caribbean are the coral reefs (UNECLAC 2001). The Meso-American Caribbean Reef along the coasts of Mexico, Belize, Guatemala and Honduras extends more than 700 km² and is the second largest barrier reef globally. The

reefs are highly significant for economic activity and biodiversity. UNECLAC (2001) adjudges that although the Caribbean's coastal and marine ecosystems are in a good state of conservation, 60% of the coral reefs are endangered. UNGEO-4 (2007) reports that an estimated 71% of Caribbean coral reefs are endangered by sediment, marine and land-based sources of pollution and over-fishing.

Pollution of coastal waters is severe. Between 80%-90% of wastewater is discharged into the marine waters of the Caribbean without treatment. The consequence of this is anoxia and eutrophication, both of which harm marine life. Many of the activities that pollute the coastal and marine systems occur very far from the coast.

There are also dangers emanating from climate change. Sea level temperatures have risen significantly as a component of global warming. It has been reported for example, that at 30 metres below sea level, the temperature off the coast of Barbados is 31o C (Leslie 2007). Generally, the warming of the ocean directly affects marine plant and animal communities, altering fish species distribution and stock abundance (UNGEO-4, 2007). "In the tropics, unusually high sea surface water temperatures are becoming increasingly frequent, causing widespread coral bleaching and mortality" (UNGEO-4, 2007, page 125). Newman (2007) reported that in the US Virgin Islands, 92% of coral reefs have bleached and 50% have died. Global warming has increased the frequency and intensity of hurricanes and by so doing increased wave motions to the detriment of coral reefs (Leslie 2007). The rise of CO2 emissions has also increased the acidity of the seas with detrimental effects on coral reefs.

Mangrove swamps have been seriously depleted in the Caribbean. UNECLAC (2001) reports that only 10% of the original area still has forest cover and that more than 25% of the mangrove swamps have been deforested.

Environmental degradation of the marine and coastal systems has reduced the productivity of these systems. In particular, fish stocks have been reduced. Furthermore, biodiversity has been adversely affected by habitat loss in the mangrove swamps and coral reefs.

Beach and Coastal Erosion

Beach and coastal erosion is another environmental problem of serious proportions. Cambers (1997) estimated that 70% of Eastern Caribbean beaches monitored had eroded. Beach erosion is evident in the South East Coast of Barbados where remedial work is in progress and in other areas of the country. Lengthy stretches of the Demerara and Berbice

coasts in Guyana show signs of serious erosion due in part to the disappearance of mangrove swamps. There have also been reports of beach erosion in other Caribbean islands such as the Bahamas. Beach and coastal erosion weakens natural protective barriers against tidal changes. Furthermore, it increases vulnerability to sea level rise caused by global warming. Globally, sea levels rose by 1.8 millimetres per year between 1961 and 2003 and by 3.1 millimetres per year between 1993 and 2003. There is clearly a steeply increasing trend for sea levels. For Caribbean islands and mainland countries with significant proportions of their coast below sea level, this trend is a major danger to population settlements, tourism facilities especially beachfront hotels and many essential economic and physical infrastructures.

Dasgupta et al (2007) engaged in a comparative analysis of the impact of sea level rise on developing countries, including Latin America and the Caribbean. They considered the cases of a 1-metre rise, a 2-metre rise, continuing on to a 5-metre rise. They estimated that the percentage of the total area impacted could vary from 0.34% in the case of a 1-metre rise to 1.24% in the case of a 5-metre rise with the urban impacted area varying from 0.61% to 3.03% of the total urban area. The percentage of the total population impacted could vary from 0.57% to 2.69%. Wetland losses could be significant, anywhere between 1.35% and 6.57% of the total wetlands area. In the Caribbean specifically, the Bahamas total area land loss could vary between 11% and 60% and Belize between 1% and 8%. The urban impact could also be quite substantial in the Bahamas (3%-35%), Guyana (10%-60%), Suriname (3%-36%), and Belize (3%-16%). Among the Caribbean countries, wetlands could be impacted most in the Bahamas (18% - 80%), Belize (30%-68%), Cuba (10%-56%), Jamaica (30%-45%), Mexico (15% -40%), Honduras (5%-30%) and Haiti (2%-25%). However, countries like the Dominican Republic, Suriname, Nicaragua and Guyana could experience significant wetland losses i.e., between 2% and 12%.

Sanitation

Urbanisation in the Caribbean has been rapid and unplanned to a large extent. The urban population of Caribbean Community (CARICOM) countries at 7.7 million persons comprised 64% of total population in 2005 and is expected to reach 71% or 10.5 million persons in 2020. Informal housing settlements have been a concomitant of the rapid urbanisation. The provision of sanitation services has not kept pace with the growing urban population. The World Health Organisation reports in 2004 in 4 of the 14 CARICOM countries, 11%-29% of the urban population did not have access to improved sanitation, with the proportion being as high as 43% in Haiti.

Policy and Approaches

“The challenge for our generation is to reverse these (negative environmental) trends before environmental decline leads to long-term economic decline, as it did for so many earlier civilisations” (Brown 2001, page 4).

The above statement would have potency if it induces an orientation of policy and approaches, which reflect a strong positive view of environmental protection and economic growth. There are several facets of an appropriate policy orientation, which come to mind.

First, it is necessary to pay explicit attention to natural capital in the economic growth process. Orthodox economic approaches place predominant emphasis on human capital and manufactured capital (Barro 1984). It should be recognised that environmental resources are assets, which when properly used, can generate streams of current and future incomes. The sustainable use of natural ecosystems such as forests and tropical reefs can be a source of livelihoods reconciling the conflict often presumed between economic gains and environmental conservation. Eco-tourism, as an industry based on forest and marine resources, is another example of how economic growth can be generated by natural capital. Within the conventional beach tourism and recreation industry, beaches must be considered to be natural capital, the quality of which is instrumental to tourism demand, domestic demand for beach amenities and the values of beachfront properties. These are just a few examples of how the environment as natural capital can be incorporated into the explanation or determination of economic growth.

Second, environmental degradation, resulting in pollution and natural hazards, imposes economic costs through deterioration in public health and loss of human life. Both of these effects reduce the quantity and quality of human capital. There can also be loss of manufactured capital or unintended, prolonged downtimes in the use of installed capacity in the aftermath of floods and hurricanes. Furthermore, agriculture and fisheries production can be compromised by soil degradation, water pollution and habitat loss. The effects of climate change on sea level temperatures, sea level rise, acidity in marine waters, and on wave action can also impact negatively on the productivity of coastal fisheries and inland farms. It is worth noting that Dasgupta et al (2007) identified non-trivial losses of agricultural land occasioned by hypothetical sea level rises of between 1 metre and 5 metres in Latin America and the Caribbean, especially in the Bahamas, Suriname, Jamaica, Guyana and Belize. Just as deterioration in human capital and manufactured capital compromises economic growth, so can environmental degradation.

A third facet of an appropriate orientation of environmental policy is realisation that pursuit of environmental objectives can create new economic opportunities. Hamilton (2004) points to the economic advantages in Germany derived from its early promotion of environmental goals. Eco-tourism is another case of how an industry can be developed on the basis of conservation of biodiversity. For example, Costa Rica has established a very successful tourism industry around its policy of conserving and propagating its tropical forests, fauna and butterfly species. It can be expected as well that as countries attempt to develop alternatives to fossil fuels as part of their environmental programmes, industries integral to those alternative energy sources would emerge and develop. The nascent solar energy industry in Barbados which at present targets household water heating is yet another case of emerging economic opportunities that can be stimulated by environmental concerns.

The overarching significance of the two points made earlier about the environment's positive contributions to economic growth and the point about the negative economic effects of environmental degradation is that unless the economic growth accounting is complete, there is a strong likelihood of over-emphasizing the costs of environmental protection to economic growth and arriving at negative sum outcomes whereas full accounting may lead to positive sum outcomes. The absence of full economic accounting could well lead to failure to pursue environmental goals where they should be pursued.

Environmental Management

An activist approach to environmental management by governments and communities is highly desirable. The agenda for action might be quite extensive but should include the following:

- (a) forestry conservation and reforestation;
- (b) biodiversity conservation and species propagation;
- (c) management of the use of mangrove swamps;
- (d) solid and liquid waste management; and
- (e) urban and rural planning.

In relation to forestry, certification of timber can be a useful component in the management of forests as in the case of the Guyana Iwokrama protected area. Communities can be involved in reforestation programmes as has been done on a volunteer basis in Belize. Among the more important initiatives for biodiversity conservation is the creation of protected areas in which there is controlled usage of environmental resources, protection of species and opportunity for regeneration. UNGEO-4 (2007) reports that areas under protection of terrestrial biodiversity doubled between 1985 and 2006 and now cover about 10.5%

of total territory. Valuable new initiatives are the Meso-America Biological Corridor that extends from southern Mexico to Panama, and the Brazilian pilot project to conserve the Amazon rain forest. Guyana took an early start in 1989 by allocating 1 million acres (371,000 hectares) of tropical forest to an experiment in global biodiversity. The Iwokrama Project in Guyana provides a protected habitat for at least 200 mammals, 420 fish species, 150 species of amphibian and reptiles and more than 500 species of birds. The Asa Wright Nature Centre established in 1967 in Trinidad and Tobago while not having the de jure status of a protected area, has by virtue of private 'not-for-profit' ownership succeeded in conserving an impressive biodiversity of bird species and maintaining a stable segment of the eco-recreational industry. The Centre is located on 1500 acres of mainly forested land.

Governments can become active in the development of coral reefs through construction of artificial reefs, i.e., reefs started with physical building materials and land-based energy supplies rather than through natural accretions. This is a development in train in several countries across the globe, including the Turks and Caicos Islands in the Caribbean. Artificial coral reefs seem to be healthier, more disease resistant and live longer. Their establishment is a means of rebuilding an important form of natural capital. Reef development also helps to regenerate stocks of fish and crustaceans and to preserve and expand beaches (Goreau 2007).

Marine farming can also assist in biodiversity conservation and species propagation. In the Cayman Islands where the meat of sea turtles is consumed, the establishment of a turtle farm has reduced predatory fishing of turtles and provided a means of growing the stock of marine turtles. This is done by allocating some of the farm's output for commercial use and releasing a proportion of live turtles into the open seas. The Turks and Caicos, similarly, has established a conch farm that is an important initiative for the sustainable use of this particular biological species.

In the Caribbean, mangrove swamps have been minimally managed and used marginally as eco-tourism assets. The Caroni swamps in Trinidad and Tobago may be one of the strongest examples of species conservation – the protected status of the Scarlet Ibis whose habitat is those swamps – and emergent eco-tourism, but there have been recent reports about predatory human behaviour and inadequate capacity for enforcing regulations.

Another example, although not on the same scale, and with the same length of experience, is the Graeme Hall Nature Sanctuary in Barbados.

Management of solid and liquid waste needs to be considerably strengthened. The earlier discussions in this paper pointed to the severity

of the risks of pollution of inland water sources and marine waters. Creation of controlled solid waste dumps and the establishment of capacity for more distant discharge into the sea are not sufficient means of dealing with these risks. Greater attention should be paid to recycling and to on-site waste treatment especially by large commercial enterprises, including hotels in the island countries. The example of the Turks and Caicos, which now makes provision for on-site treatment and disposal of waste a condition for new commercial construction, is worthy of attention by other Caribbean countries.

Because many man-made environmental problems and risks derive from the pattern of human settlements, the quality of urban and rural planning is of critical importance to environmental sustainability. Environmental criteria and guidelines should be integral parts of the process of physical planning *ex ante*. But since there is a backlog of already extant informal and formal human settlements for which environmental problems and risks are acute, public policy must address existing environmental imperatives by warranted investments in systems for waste disposal, water supply and soil conservation. In any of these areas, community participation in design and implementation would be valuable.

Environmental Governance

Environmental governance needs to be strengthened. By 'environmental governance' is meant the complex reporting and compliance regulations, capacity and systems for research, knowledge acquisition and public information dissemination, and enforcement of environmental regulations. UNGEO-4 (2007) is of the view that environment governance is weak, and that "biodiversity conservation and effective enforcement of environmental laws remain major challenges to the protection of biological resources." UNECLAC (2001) concludes that certification of timber extraction is "limited and controversial." Part of the reason for weak environmental governance is inadequate knowledge of the current situation and future risks, instanced, for example, by statements to the effect that beach erosion is natural and self-correcting. Another important source of the weaknesses in environmental governance is the relative paucity of human resources allocated to agencies entrusted with the functions of environmental conservation. In the Caribbean, there seems to be scope for capacity building in information and knowledge systems and in human resources, and for updating of environmental laws and regulations in the light of evolving knowledge and situations. It is interesting to note that according to anecdotal evidence, environmental sensitivity seems greater among the school age population than among their elders, and that the young transmit environmental values to their elders. If these two observations are generally valid, they are encouragement for the establishment of environmental education programmes targeted at the

pre-working age population and for accelerated programmes targeted at the post-school population. In effect, one would ensure inter-generational continuity of a commitment to environmental goals and objectives.

Financing Environmental Conservation and Protection

The financing of environmental conservation and protection is a major problem area at national and global levels. Governments in developing countries, frequently experiencing fiscal difficulties in the face of many competing claims for economic growth and social improvement, are seriously challenged to find resources for what seems a more distant and less compelling objective of environmental protection and conservation. Moreover, they are situated in communities in which the needs of the present appear more urgent than the needs of the future. The issue of fiscal resource allocation is indeed a very delicate one in which the environment has tended to come out second-best.

The financing of environmental conservation and protection has been severely compromised by the “free rider” approach of individuals and corporate entities within nations and by countries within the global community. Everyone can enjoy the benefits of many environmental services, especially those of a global nature such as absorption of CO₂ emissions. Exclusion from beneficiary participation is difficult in most cases and impossible in many. Environmental services are in the nature of public goods for which user charges are impossible to levy because of non-excludability and non-rivalrous consumption. Governments as representatives of the public interest accept the financial responsibility.

However, there are doubtless significant private economic interests and considerable private economic gains derived from some environmental services. As a case in point, access to good quality beaches is of central importance to revenue in hotels and other beachfront tourism enterprises and to property values of private residences (See for example, Houston 2002, Pompe and Rinehart 1995). It would not be stretching the point to assert that beaches are the unpurchased natural capital of beachfront service providers and residential property owners. There should be interest in sharing the costs of maintaining or enhancing the value of the natural capital, i.e., beach quality, in such circumstances.

An interesting application of the “free rider” problem has recently surfaced in the global discussions on climate change. Forests provide crucial environmental services as absorbers of CO₂ emissions. The million acres of Iwokrama Rainforest in Guyana alone stores more than 150 million tons of CO₂. The entire global community is a beneficiary of these services. Global financial support for reforestation and afforestation is a clear indication of investment in forest resources for the provision of

environmental services. This approach could be extended to include global financial support for conservation of existing forest resources, i.e., for the maintenance of this form of environmental capital. The call for such action has come from His Excellency Bharrat Jagdeo, President of Guyana at the Commonwealth Finance Ministers Meeting in Georgetown, Guyana on 15 October 2007 and again at the Commonwealth Heads of Government Meeting in Kampala, Uganda in November 2007. The advisability of treating comprehensively with conservation and reforestation stems from the perverse incentive to migrate deforestation activities from areas where there are rewards for ceasing deforestation to areas where there are no rewards because of the absence of deforestation. In effect, if bad behaviour is rewarded and good behaviour is not, there is a perverse incentive to behave badly.

III. CONCLUSION

Achieving balance between the environment and economic growth is no longer a choice; it is a necessity. It is an endeavour in which all must be involved: individuals of all generations; enterprises; governments; and the global community as a whole. The reconciliation of economic growth and the environment must be truly viewed as a shared responsibility.

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