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I. Introduction

For more than two decades the sustainable development of island countries and ecosystems has been a subject of international discussion and negotiation.[1] A high point of this interest was the first United Nations Conference on the Sustainable Development of Small Island Developing States (SIDS) held in 1994. The Conference documented the sustainability issues confronted by small islands worldwide, and established the international political recognition, long sought after by island countries, for the peculiar problems of economic and environmental sustainability which they confront problems that render them particularly vulnerable to the state of the global environment and political economy.

The United Nations Programme of Action on the Sustainable Development of Small Island Developing States[2] is perhaps the most comprehensive statement on the sustainability of island countries. While climate change and sea level rise head the list of priority issues to be addressed, other issues such as economic dependence on a limited natural resource base, vulnerability to natural and environmental disasters, insufficient institutional, administrative and technical capacity, and limited access to financial and technological resources are identified in the Programme of Action.

Sustainability, as popularized by the World Commission on

Environment and Development (1987), and likewise used in the Programme for Action on Sustainable Development for SIDS, seeks a balance between economic growth and environmental protection. Its approach is to promote economic growth while seeking to preserve the natural environment for future generations. Several analysts have articulated the inherent contradictions in this approach, (see, for example, Daly, 1990), and the fact that it perpetuates an economic system based on the commodification of nature (Escobar, 1996; and Byrne and Rich, 1992) and the destruction of nature-society relations (Gare, 1995). Because the conventional ideal of sustainable development retains economic growth as its primary goal and sets out, not to reverse the trend of nature's commodification that results from unlimited growth, but to provide ameliorative measures, the problems of underdevelopment, global inequality and environmental degradation are likely to persist according to these critics.

Island countries are directly and indirectly affected by events occurring on a global scale, be they economic, political or ecological in character. Further, it is beyond the capacity of island states to control or influence these occurrences, the impacts of which must be addressed in the context of global and regional cooperation. Yet the existing framework of international relations and regime formation is one in which national interests and the relative influence of large and wealthy states feature prominently, and still outweigh the goals of global environmental protection. In this context, the fact that islands have little economic or political power to influence factors that directly affect their development is a clear obstacle to their pursuit of sustainability goals. This paper gives an overview of some of the sustainability issues confronted by small island states. The potential impacts of global warming on island sustainability and the efforts islands have made to influence the evolving internation al regime on this issue are examined. The paper concludes with an assessment of the status of the regime with respect to its incorporation of the concerns of island countries, and the possible implications of its policy proposals for the sustainability of islands.

II. Island Uniqueness, Vulnerability and Sustainable Development

A substantial literature has been generated on the peculiar developmental characteristics and constraints of SIDS, including debate

on the question of the uniqueness of small islands. The consensus of opinion is that while all developing countries share several problems, their impacts are more pronounced in the case of small island states, especially very small islands. The combination of economic and ecological constraints, including their vulnerability to outside influences and the limited options and response mechanisms at their disposal, inhibit their sustainable development.

Bloomestein *et al.* (1996) have reviewed the dissenting views on island developmental uniqueness. They cite Srinivasan (1985) as a skeptic who argues that the problems of small islands are not peculiar to the size of their economies, and can be addressed through suitable domestic policy measures. They also cite Farrel (1991) who has argued that small states are generally not poorer or less viable than their small continental counterparts. Using the case of the Caribbean, Farrel attempts to show that the essential problem has little to do with their size, since wealth and economic performance vary substantially among the region's islands even though there is less variability in their physical or economic size. But even skeptics like Srinivasan concede that small islands are disproportionately vulnerable to natural disasters, while Farrel grants that the particular characteristic of smallness may exacerbate the problems of development for SIDS.

The central point to be taken from the debate is not whether islands are unique or whether the problem is small size in itself. Rather, it is sufficient to argue that SIDS are affected by economic and ecological factors that they may share with developing countries generally, but which are more intractable in at least some small and particularly very small island countries (Bloomestein *et al.*, 1996: 388). A summary listing of the developmental characteristics of SIDS that pose special problems for their pursuit of a sustainability agenda is provided in Table 1.

Table 1 Development Characteristics of Small Island Countries

1 Diseconomies of scale due to small population, GDP and natural resource base
2 Comparatively high costs of transportation and communications
3 Open and dependent economies characterized by a high ratio of external transactions to GDP and concentration on a few export commodities and services, which create vulnerability to world economic conditions
4 Weak technological, human resource and financial capacity due to their

small populations
5 Limited public and private savings, leading to dependence on external and concessional aid and an accompanying vulnerability to the international aid system
6 Frequently high levels of monopolistic and oligarchic conditions in production and trade
7 High costs of non-tradable goods and services
8 Skewed population distribution towards the higher and lower age ranges due to high rates of migration
9 Higher costs of secondary and tertiary education leading to low rates of enrollment and loss of trained population to emigration

Source: Adapted from Bloomestein *et al.*, 1996.

A second aspect of island vulnerability relates to their natural and geographical characteristics. Their physical insularity has endowed islands with unique and fragile ecosystems, which often increase demands for environmental management. Indeed, island biodiversity is widely considered a key element in the global agenda to promote diversity. However, island societies can seldom afford the cost of managing their biodiversity on their own. As well, in contrast to continental territories, islands have a high rate of species endemism. These unique species can be endangered by their often low resistance to external influences, a characteristic of island ecosystems. Yet, island societies must increasingly participate in the global economy to survive. Finally, small island countries are particularly at risk to the potential impacts of climate change, a condition that will be addressed more fully in the next section of this paper.

The United Nations Special Session on SIDS (September, 1999), summarized the developmental and ecological concerns of island countries as follows: (a) their economic and ecological fragility and vulnerability to exogenous shocks; (b) the high costs to islands of building new infrastructure to accommodate the globalization of production, distribution and finance; (c) trade liberalization and its potential adverse impacts on island export sectors; (d) the lack of programs and funds to support the transfer of environmentally-sound technologies to islands; and (e) the risk of sea level rise associated with climate change (UN/ECOSOC, 1999).

The interrelatedness of the economic and ecological characteristics for islands is manifested in several areas. Insular natural resources such

as water, vegetation, soil, air, near-shore systems and wildlife, ultimately dictate the capacity of islands to accept and sustain development. Resource productivity is intimately linked to the functions of neighboring ecosystems, such that damage to one ecosystem invariably impacts on other ecosystems for islands to a much greater degree than is the case for continental societies. Natural disasters impose serious constraints on island development, since SIDS tend to be more disaster-prone than their continental counterparts (Briguglio, 1995: 1620).[3] While natural disasters also occur in large countries, when they occur on small islands the damage caused per unit area and cost per capita are typically greater due to the small size of the countries and economies. Economic impacts include devastation of agricultural sectors, setbacks in the tourism industries due to extensive damage to beaches and coastal ecosystems, and disruption of communications services which impact on all sectors, but especially the tourism and international and off shore business sectors-staples of many island economies. The prospect of climate change and a possible increase in the frequency and intensity of storms (IPCC, 1996) means that island vulnerability to natural disasters is likely to grow.

Globalization of production, distribution, and finance has expanded considerably since the 1994 SIDS conference, offering new opportunities to countries with the capacity to capitalize on them. Yet, it has bypassed a number of small island developing states. The UN Commission on Sustainable Development reports that "the inherent handicaps of small island developing states, such as small population, lack of technological sophistication and narrow resource base, pose significant obstacles for competing for foreign direct investment necessary to avail themselves of opportunities offered by the globalization process. Globalization is based on opportunities for cost reduction and economies of scale, which small island developing states cannot offer" (UN/ECOSOC,1999:10).

Recent developments in the area of international trade have proven equally problematic for island countries. While their special circumstances have been repeatedly acknowledged by the rest of the world and tacit commitments were made at the 1994 Barbados Conference to assist islands in the drive for sustainability, the global push for greater trade liberalization may prove to be a major setback for these small economies. The 1994 Programme of Action stressed the need for island countries to achieve sustainable development through enhanced capacities to exploit new trading opportunities in the context of trade liberalization. Such a strategy implies greater competitiveness of current export products, and diversification of goods and services. Yet,

their limited resource base restricts the range of options available to islands and requires that they depend more heavily on international trade than most countries, typically importing a wide range of necessities from energy to food and medical supplies. This reliance on international trade not only drives up the overall cost to island countries for such essentials, but physical factors of climate, soil conditions and proneness to the annual cycle of hurricanes (cyclones/typhoons) restrict the range of export crops that can be developed in response to changing markets.

In the past, small island states have been able to participate in the world market through preferential arrangements including the Generalized System of Preferences negotiated under the GATT, and the trade and aid pact between the European Union and the African, Caribbean and Pacific countries under the Lome Convention. These arrangements have helped sustain small islands by bringing needed foreign exchange and providing guaranteed northern markets for their products. However, the recent World Trade Organization rulings that these arrangements violate free trade agreements (WTO, 2000) now pose a serious threat to island economies. The heavy reliance on imports and the resultant high import bills force islands to concentrate largely on production for export in order to achieve favorable balance of payments conditions. Yet they have negligible control over the prices of the products in which they trade, and limited negotiating capacity in the context of international decision making. For example, with respect to the WTO ruling that the EU banana quota system harmed the economic interests of the U.S. and several Latin American countries (by preventing the sale of their bananas in European markets), Caribbean island countries in particular have argued that this shows an unwillingness on the part of multilateral organizations to respect, represent or consider the needs of vulnerable island developing states. They argue that the ruling ignores the importance of trade preferences to increased national income, job creation, and sustainable market development in SIDS (UN/DPI, 1999). Without a stable economic base, islands will feel increased pressure to exploit their natural resources in order to meet development needs-a strategy that will almost certainly sacrifice sustainability.

Island countries have recently become increasingly aware of the threat of global and regional environmental problems to the long-term capacity of their renewable resources to continue to form the basis of their economic development. Global problems such as climate change and ozone depletion could potentially constrain their already limited development options. This situation is exacerbated by regional problems

such as the transboundary trade and transshipment of hazardous, toxic and nuclear wastes, the dumping of solid waste by cruise ships, and the political and management issues associated with transboundary resources such as straddling fish stocks. The Caribbean Sea is one of the most heavily used routes for the shipment of oil, and islands continuously confront the problem of pollution from the dumping of oily wastes at sea, which affects coastal and marine resources and the tourism and fisheries industries. The more recently initiated transshipment of spent nuclear fuels through the Caribbean region now presents a constant threat and a battle that can only be fought at the international level. As Bloomstein *et al.* have noted with respect to the Caribbean islands, "[i]mpacts of global issues have in common that peoples of the region bear little responsibility [for] their occurrence, have [no] management control over their causes, but bear potentially high risks and costs" (1996: 407).

In sum, SIDS, with their small economies-GDP per capita in the Caribbean ranges from US$154.00 in Haiti to US$11,036 in the Bahamas-lack the resources to deal with these problems while addressing their development issues. Their circumstances require that, for their sustainability, they must be able to influence global politics. Yet, they have little political influence even when grouped as regional entities or as alliances such as the Alliance of Small Island States (AOSIS)[4]. Events surrounding and following the 1992 United Nations Conference on Environment and Development, and in particular the negotiations of the Framework Convention on Climate Change and the subsequent development of the climate change regime, provide a useful and current context within which to examine the place of island states in international environmental and development politics.

III. Climate Change and Island Sustainability

Island countries have high stakes in the risk of global climate change and the international regime that is evolving to address this risk. They are particularly vulnerable to the impacts of climate change, including sea level rise, increased storm activity, and salt water intrusion. As a result, islands have been active in the international discourse and debate on the issue from the outset, and have vigorously urged action that would avoid further risks of climate change by significantly reducing so-called greenhouse gas emissions.[5]

Island Vulnerability to Climate Change

Climate change and sea level rise pose perhaps the greatest potential threat to small islands. The IPCC (1996) has concluded that the mean surface temperatures of the earth have risen between 0.3°C and 0.6°C since the late nineteenth century. Global mean sea level has risen by 10-25 cm over the last 100 years and is projected by the IPCC to rise by13-94 cm under the most climate-sensitive scenarios, and by 20-86 cm using the IS92a scenario[6] by the year 2100 (IPCC, 1996: 364). Taking into account future changes in aerosol amounts under the 1992a scenario, sea levels could rise by 20 cm by the year 2050 (IPCC, 1996: 384). Figure 1 depicts the IPCC IS92 scenarios for projected sea level rise and their impacts on selected coasts and islands worldwide, as well as sea level rise resulting from stabilization of CO_2 emissions at 450 parts per million (ppm).

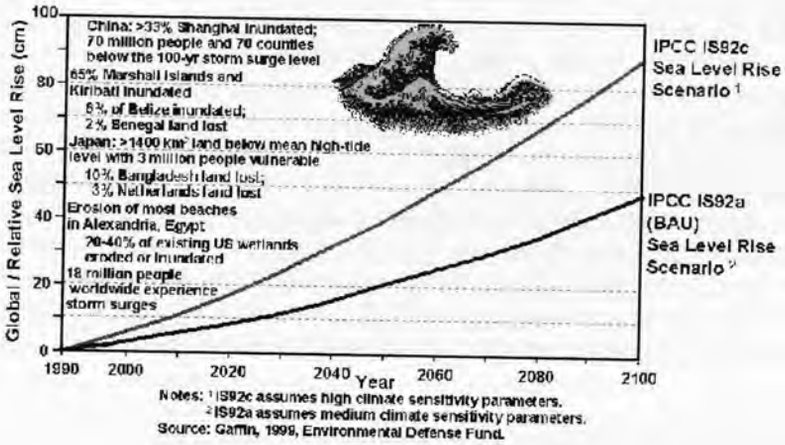

Figure 1 Impacts of Climate Change-Induced Sea Level Rise on Selected Coasts and Islands Worldwide

At a 20 cm rise, 18 million additional people worldwide will experience yearly storm surges, and at an 80 cm rise in sea level, 65% of the Marshall Islands and Kiribati will be inundated. It is estimated that a 100 cm rise in sea level could inundate 70 percent of the land mass of the Seychelles (UN/DPI, 1999). The implications for coastal land loss under

these scenarios are severe.

For islands, coastal land loss or damage raises a host of concerns. Island populations are concentrated along coastal zones. Their tourism industries are typically coastally based, and likewise most of the tourism infrastructure is concentrated in the coastal zone. For example, the majority of Caribbean tourism facilities are concentrated within 800 meters of high water mark (Bloomestein *et al.*, 1996). In Jamaica, 60 percent of tourist accommodation units are less than 15 meters from the high water mark. These factors, along with the coastal concentration of industrial infrastructure, dependence on fisheries and other coastal and marine resources, the potential loss of marine resources that island countries have yet to develop, the potential loss of agricultural land and other impacts related to salt water intrusion, are all likely to have severe economic, social and cultural repercussions for island communities. The looming possibility of more frequent and more intense hurricanes further exacerbates the problem. Table 2 summarizes the impacts that small islands will face as a result of sea level rise, compiled from empirical studies in the literature.

Table 2 Potential Impacts of Climate Change on Small Islands

- Inundation of deltas, estuaries and coastal wetlands
- Destruction of benthic systems, especially sea grass beds
- Loss of productivity of coastal ecosystems
- Flooding in coastal plains
- Increased coastal erosion
- Increased saline intrusion leading to aquifer contamination
- Displacement of traditional fishing sites
- Coral reef deterioration due to thermal stress and SLR
- Damage to coastal infrastructure
- Increased vulnerability of human settlements
- Loss of agricultural land
- Damage to industrial infrastructure

Sources: (1) George Maul, 1989, *Implications of Climatic Changes in the Wider Caribbean Region. Preliminary Conclusions of the Task Team of Experts.* CEP Technical Report No. 3. Caribbean Environment Programme, UNEP: Kingston. (2) Stuart R. Gaffin, 1997, *Impacts of Sea Level Rise on Selected Coasts and Islands.* New York: Environmental Defense Fund.

UN releases from the 1999 Special Session on Small Islands note that there have already been reports of extensive coastal erosion on many islands. The South Pacific Regional Environmental Programme (SPREP), for example, reports that rising sea levels have already swamped several small islets in Kiribati and Tuvalu, destroyed coastal roads and bridges, and caused traditional burial places to collapse into the ocean.

Responding to Climate Change

Two major problems face island countries in their efforts to respond to the climate change phenomenon and adapt to its potential impacts. The first is an economic problem, the second a political one. As to economics, since relocation of physical structures and activities is not an option,[7] islands will need to invest heavily in the construction of coastal defense infrastructure. The IPCC has estimated that, for developing countries in general, such costs could amount to less than 0.5% of their GDP, and for island countries- the Caribbean island countries in particular-some US $1.1 billion will have to be spent on new construction to protect against sea level rise (UN/ECOSOC, 1999:3). While several islands have already responded by establishing specialized coastal zone management agencies and implementing integrated coastal management plans, they still need multilateral financial and technical assistance. The Global Environmental Facility has provided US$12 million to 14 South Pacific States to assist in implementing strategic action programs to conserve and manage coastal and ocean resources in a sustainable manner. In the Caribbean, 11 countries are participating in a US$ 6.3 million GEF-funded regional project to plan for adaptation to climate change, with activities that include sea level and coral reef monitoring, coastal vulnerability and risk assessment, inventory and economic valuation of coastal resources and others. But these amounts pale in comparison to the need for a $1.1 billion protective effort needed. Caribbean SIDS can hardly be expected to invest funds of this magnitude, which represents approximately 7% of their collective GDP.[8]

At the political level, islands are facing an even larger challenge. At the outset, small island states recognized the potential danger to their sustainability, if not survival, posed by global climate change. They recognized that the problem would require international response, that much of their efforts would therefore have to be directed at persuading the international community to take the necessary steps to significantly reduce the level of CO_2 and other greenhouse gas emissions to the atmosphere, and that, since all islands faced a common plight in the case

of global warming, their best strategy would be to adopt a coordinated approach to the negotiation of the proposed Climate Change Convention. Thus, at a Small States Conference on Sea Level Rise held in Male in November 1989, island countries formed the Alliance of Small Island States (AOSIS), with the specific aim of presenting a strong, united position in the pending negotiations. Further, given that their own capacity to reduce their already small share of global emissions would be limited, and in recognition of the historic responsibility of industrialized nations for the increasing atmospheric concentrations of greenhouse gases, the countries issued a Ministerial Declaration[9] calling on industrialized countries to take immediate action to address the problem. The Ministers wrote:

> In view of the fact that the overloading of the atmosphere with greenhouse gases occurred primarily through the actions of the industrialized nations during the past two hundred years, these nations now have a moral obligation to initiate on an urgent basis, international action to stabilize and subsequently reduce emissions of greenhouse gases and to sponsor, as a matter of priority, an urgent worldwide programme of action to combat the serious implications of climate change, global warming and sea level rise.

The island countries also resolved to increase the awareness of the international community to the particular vulnerability of small island states to sea level rise. AOSIS called on the world community to take effective measures to control, limit or reduce the emission of greenhouse gases, and recommended that all coastal and island states take appropriate measures to protect the coastal environment against the adverse impacts of climate change.

The international recognition sought by islands for their vulnerability to climate change was given by the United Nations 1989 General Assembly when it addressed the "possible adverse effects of sea-level rise on islands and coastal areas, particularly low-lying coastal areas"[10] by passing a resolution welcoming the growing international attention the problem was receiving, urging all states to help the countries concerned, and recommending the issue for consideration by the IPCC. The following year representatives of 137 countries and the European Communities adopted a Ministerial Declaration at the Second World Climate Conference (Geneva, November 6-7, 1990), stating that:

> The potentially serious consequences of climate change, including the risk of survival in low-lying and other small island States and in some low-lying coastal, and arid and semi-arid areas of the world, give sufficient reasons to begin by adopting response strategies even in the face of significant uncertainties. (Para. 8).

It further recommended that measures[11] be adopted "to address the particular problems and needs, including funding, of low-lying coastal and small vulnerable island countries, some of whose very existence is placed at risk by the consequences of climate change" (para. 27).

Against this background, AOSIS entered the negotiations on the UN Framework Convention on Climate Change (UNFCCC) with the following negotiating principles:

- *immediate and significant* cuts in the emission by industrialized countries of carbon dioxide and other greenhouse gases;
- a preventative approach based on the *precautionary principle;*
- new and equitable *funding mechanisms,* including institutional arrangements in which the small island states are recognized as a special geo-political grouping;
- the transfer on an equitable basis of appropriate and *environmentally sound technologies,* as well as appropriate and necessary amendments to international property laws;
- recognition of the applicability of the *polluter-pays principle* to the consequences of climate change an consideration of the role of international liability for the consequences of climate change;
- commitment to binding *energy conservation and efficiency* requirements and the development of *renewable energy sources.*

The threat posed to low-lying coastal and island states was an important issue in the treaty negotiations and is reflected in the UNFCCC, which highlights the special needs and concerns of small island countries (Art. 4.8a); consistently refers to the importance of adaptation strategies (e.g., Art. 4.1e); and requires industrialized parties to assist developing country parties that are particularly vulnerable to the adverse effects of climate change in meeting the costs of adaptation to those adverse effects. (Art. 4.4). Islands were the first to ratify the convention, thereby seeking to hasten its entry into force.

These concessions of the Convention, however, fall significantly short of meeting the central criterion for assuring the sustainability of

islands in the face of global warming, namely, *immediate and significant cuts* in the emission by industrialized countries of carbon dioxide and other greenhouse gases. The IPCC (1991 and 1996) has cautioned that a 60% reduction in world CO_2 emissions is necessary in order to avoid adverse consequences of global climate change, a target which provided a clear benchmark for the climate change negotiations. However, the prevailing global political and economic dynamics, along with a deeply entrenched and heavily invested fossil fuel lobby, has so far rendered such targets illusory-targets which also hold the greatest promise for island sustainability in the face of global warming.

Since the Convention's entry into force, several research activities have started in small island states that will provide some of the information necessary for decision making on the policy needed to implement adaptation strategies. Monitoring and data collection are proceeding in the South Pacific through a sea level rise monitoring project funded by Australia. In the Caribbean, the tide gauge monitoring network of the Global Ocean Observing System (GOOS) has been strengthened, and studies have been conducted in islands of both these regions to determine the areas that are most vulnerable to sea level rise. In 1997 the GEF disbursed US$12.42 million to small islands in the South Pacific for adaptation to climate change (UN/DPI, 1999). Significant constraints still remain, however, particularly in the areas of heavy dependence on external funding, anticipated new financial resources that are not forthcoming, dispersed sources of information on sea level rise as well as differing assessment methodologies, lack of personnel and institutional capacity to monitor climate change.

Islands have strongly supported the Kyoto Protocol and discussions are underway as to how they can best utilize the mechanisms it provides. But the Protocol itself represents a major disappointment for islands and reflects their lack of political clout in the international arena. The concept of strength in numbers was of little use for AOSIS, particularly against a strong tide of resistance mounted by wealthy continental nations, to an environmentally significant climate regime. A critical fact is that island countries themselves can make little impact in a global program of CO_2 emissions reduction, since their per capita emissions of CO_2 is small compared to other countries. The average 1996 per capita emissions for 32 island states and territories that are members of the Alliance of Small Island States was 0.9 metric tons of CO_2 equivalent (see ORNL, 1999). By contrast, most developed countries exceed 6 tons of CO_2 per capita, with the U.S. in excess of 19 tons per capita. Given this backdrop, and considring the need for significant cuts in emissions stipulated by the

IPCC, AOSIS submitted a draft protocol to the first Conference of the Parties which would require industrialized country Parties to reduce their emissions of CO_2 by 20% by 2005, and to establish a process for adding targets and timetables for the reduction of emissions of other greenhouse gases (UNFCCC/CP/1995/7: 22). This was based on the Toronto Targets called for at the 1988 meeting of scientific experts and ministers of government, held in Ontario, Canada.

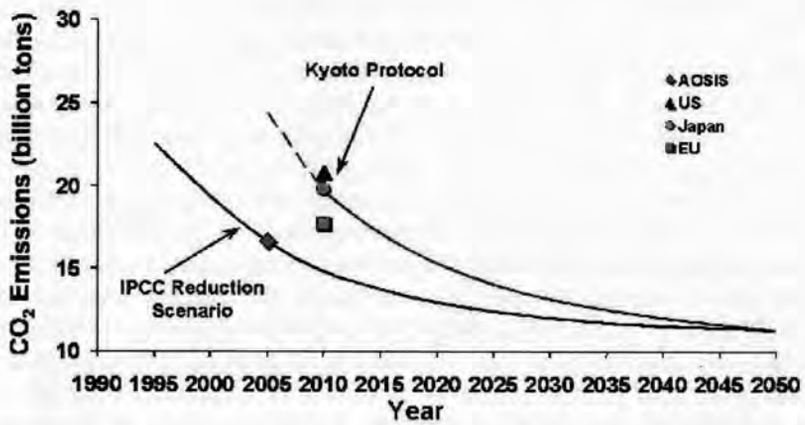

Figure 2 Climate Change Negotiating Positions

The basic approach of the AOSIS draft protocol was to establish legally binding quantified emissions reduction obligations for industrialized countries. It received substantial initial support at COP-1[12] and influenced the decision by the first meeting of the Parties to initiate the Berlin Mandate Process. However, in the especially tense political climate leading up to the COP-3 in December 1997, support for such strong measures waned, with the result that the Kyoto Protocol established a much reduced target of 5% reduction of emissions from the 1990 levels by 2008-2012, (Figure 2). Many have argued that these targets will do little to affect the rate of global climate change. With full compliance, world temperatures would continue to rise by 2.11°C by 2100, just 0.27°C less than the business-as-usual scenario. If developed countries only manage to stabilize their emissions at 1990 levels, global temperatures would rise by 2.15°C by 2100 (Mahsood, 1997). Parry et al.

(1998) suggest that full implementation of the Kyoto targets would reduce warming, but by only 0.05°C by 2050, whereas a 20% reduction in CO_2 emissions (the AOSIS proposal) would reduce global warming by a full 0.1°C by 2050.

Clearly, the Kyoto targets will not ameliorate the problems of island sustainability in the context of global warming. Using the IPCC target of a 60% reduction in CO_2 emissions and biospheric GHG absorptive capacity of between 14 and 17 billion tons per year, Byrne et al. (1998a) have calculated a sustainable emissions rate of 3.3 tons of CO_2 per capita at fixed 1990 population levels. While island countries would fall well within this limit, both in terms of per capita emissions and their equitable share of the biosphere (Figures 3 and 4), it is clear that their greatest challenge is to influence the rest of the world, and in particular the industrialized countries, to return to a sustainable rate. Without concerted action by continental nations on this issue, islands can have no hope of a climate-stable future.

The Evolving Policy Framework: Implications for Small Island Countries

The Kyoto protocol is applauded (e.g., Kerr, 1997) and criticized (e.g., Byrne and Yun, 1999) for its creation of so-called "flexibility mechanisms" for meeting CO_2 reduction targets emissions trading, joint implementation, and the Clean Development Mechanism (CDM). These policies are believed by their advocates to provide least-cost means for meeting the goals set out in the Protocol and are expected to convince the largest emitters (such as the U.S.) to agree to reduce their emissions. Critics argue that the mechanisms will enable the U.S. and others to avoid making serious efforts to lower their greenhouse gas releases by paying other countries to do so instead.

The issue for small island states is particularly important. First, these policies are based on the principle of economic efficiency, which encourages global actions that are focused on countries or sectors with the greatest potential to reduce emissions at least cost. This global least-cost strategy, determined by the use of cost-benefit analysis of policy options among countries, will direct actions on emission trades that are cheap to buyers (principally the wealthy OECD countries) and easily managed in national portfolios. Participation in the Kyoto mechanisms will depend largely on the comparative advantage of states to trade emissions or, in the case of joint implementation and the CDM, to attract foreign investments for environmentally-benign projects. This almost

certainly will favor trades with large, continental nations who have infrastructure and bioresources that are well-suited to embrace the technological and economic strategies of the OECD. By contrast, island states offer very small-scale emi ssions reduction projects, often with special technical and economic needs.

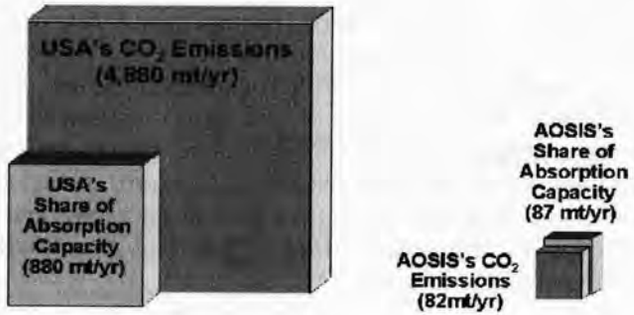

Figure 3 CO_2 Emissions vs. Democratic Share of Biospheric Absorption Capacity

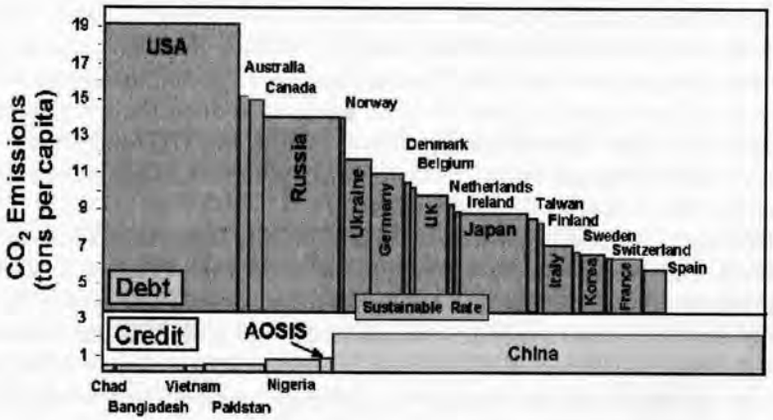

Figure 4 Actual vs. Sustainable CO_2 Emissions per Capita

A second, and perhaps more important concern, is that considerable doubt remains as to the effectiveness of the Kyoto trading regime in achieving concrete reductions in the level of greenhouse gases being released to the atmosphere, the critical factor for island countries. Both emissions trading and joint implementation have been criticized as mechanisms for so-called "hot-air" trading[13] and continuing business as usual with unsustainable technologies, rather than requiring nations to engage in meaningful strategies to realize concrete and long-term reduction in carbon emissions.

With the earth's atmosphere having been placed on the global marketplace, island countries will have to jostle with the rest of the world if they expect not merely to participate, but to negotiate terms of participation that are to their advantage. Specifically, outside of the Global Environmental Facility, these mechanisms may constitute the best pathway to accessing much-needed funds for adaptation to climate change. This is doubly ironic. First, SIDS will be forced to hustle for the opportunity to reduce their emissions cheaply, even though their releases did not cause the problem. Second, SIDS, precisely because their emissions are small, will be unattractive candidates for trading. With regard to the latter, the latest synthesis report on Activities Implemented Jointly (AIJ) already has signaled the existence of a project distribution problem. The report reveals that of a total of 122 projects, funded by 11 investor Parties in 33 host countries (including 22 non-Annex I Parties), two-thirds of the projects are conducted between wealthy OECD countries and Economies in Transition (EITs); 54 projects took place in just 3 EITs, 5 in Africa, and only four AOSIS countries are involved in AIJ activities (Foundation for International Environmental Law, 1999). Thus, in taking the decision to continue the AIJ pilot phase, the Fifth COP requested that "such continuation should address the issue of geographic imbalance, in particular the lack of projects in Africa and small island states" (Decision 13/CP.5).

Island countries must also struggle with the problem of ensuring that the Kyoto measures are used in a manner that is consistent with the objective of reducing GHG emissions. In the case of AIJ, there are still methodological problems regarding the determination of baselines, additionality, and the assessment of benefits and technology transfer. Island countries need to guard against the conclusion of the pilot phase before these problems are resolved, and to ensure that AIJ projects are not transferred to full Joint Implementation (JI) or to Clean Development Mechanism (CDM) projects if they do not fully meet the aim of reducing

emissions. This poses a difficult enforcement problem, technically and politically, on which AOSIS must expend a great deal of energy, even though there is likely to be little financial gain to its members even if monitoring is successful. Essentially, AOSIS is trapped by the need to defend its prime objective of reducing emissions through political negotiations about methods that do not embody the Alliance's goal.

The clearest indicator of the quandary of small islands is the disturbing upward trend in Annex I emissions. The UNFCCC Secretariat has reported, based on national communications from Parties, that GHG emissions (excluding land use change and forestry) increased in 1996 compared to1995 levels for all reporting Parties, and that the increase in emissions for the period 1995-1996 was larger than the average annual increase in emissions over the period 1990-1995. With respect to OECD countries, there was an increase in emissions over the period 1990-1996 with the exception of Germany and the United Kingdom, which reported a decline in emissions over the period. It was also noted that inclusion of the land-use change and forestry (LULUCF) sector does not alter the increasing trend in emissions except for Norway and France (UNFCCC Secretariat, 1999). The overriding concern for SIDS is that OECD countries as a group are likely not to meet their collective targets.

With respect to policies regarding land use and forestry as mechanisms for enhancing sink capacity, island countries need to carefully monitor the rush to decision-making on Kyoto Protocol Articles 3.3 and 3.4, which deal with this subject. The allocation of adequate time for the thorough and in-depth analysis of this category of measures is necessary, considering the uncertainties associated with it. In particular, sinks increases are temporary compared to technology changes that will usually lead to permanent abatements of CO_2 releases. From the perspective of island countries, innovative mitigation projects that reduce emissions, such as renewable energy technologies and energy efficiency, are ultimately preferable to sequestration. By definition, small islands have little ability to expand sink capacity, and technological and economic commitments in this direction can delay much-needed investment in renewable energy and energy efficiency technologies, both of which offer far greater benefits to SIDS and to the global effort to reach a climate-stable future.

In sum, the evolving policy framework itself may represent a significant barrier to island sustainability. The framework is shaped by continental interests who, because of their comparatively lesser vulnerability (especially those of North America, Europe and Australia), can "go slow" (Nordhaus, 1991) and are able to consider adaptation

strategies that are simply not available to small islands. In a reverse of the more typical triage strategy, those at greatest risk are being left to fend for themselves, while continental states weigh the timing of action in their self-interest.

IV. Policy Considerations for Island Countries

The critical question for island countries at this juncture is what can be done to maintain an international focus on long-term climate stability requirements that are key to the successful pursuit by islands of a sustainable development strategy? The fate of entire island nations are at risk and many island communities will be increasingly vulnerable to storm surges and sea level rise if the "go-slow" strategies of the Kyoto Protocol are the only actions industrialized countries are prepared to take. In effect, island nations will be sacrificed for cost-efficiency goals, if more aggressive action is not taken.

It seems clear that the first priority for islands must be to prevent further damage to their members and to lower their future risks from human-induced global climate change. In this vein, a new strategy for AOSIS to consider, that is consistent with these overarching goals, might be to advocate an international policy of penalty assessments on OECD countries until they reach an agreed-upon sustainability condition (such as the 3.3 tons of CO_2 equivalent found in Byrne et al. (1998a)). Given the high level of difficulty involved in reaching international agreements on climate change to date, such a policy would appear infeasible without the support of powerful allies. These may be available in blocs of developing countries now being courted by the OECD countries in hopes of trading for CO_2 reductions for new technology, i.e., China, India, Brazil, South Africa and others. A partnership between these countries and AOSIS may be possible since all have a common interest in spurring OECD countries to significan tly reduce CO_2 emissions. Such a partnership could remove the opportunity for delaying strategies by wealthy nations if assessments were high enough to provide incentives for them to undertake significant investments in new, clean-energy technologies. Assessments collected from the industrialized bloc could be deposited in a Sustainable Development Fund to be used by developing countries to acquire energy-efficient technology and to tap appropriate renewable energy options. Such a Fund would provide far more investment in a sustainable development path than the current Global Environmental Facility.

A second strategy is for island countries to join with others in supporting a global strategy to accelerate recent dematerialization trends in technology development. Such a strategy would encourage a worldwide transition to new technology platforms that rely on zero/low-polluting and zero/low resource-consuming production and processing. Recent advances in computing and communications hold out promise for a different economy-environment-society relationship that uses intelligence, rather than cheap resources, to meet human needs. Island development policies should focus on ways to obtain a share of the new markets and technologies built on greener energy systems and low-materials production and consumption. But the promise of such a future will depend greatly on new policy commitments that embody core commitments to equity and sustainability (Byrne and Lin, 1998). Without commitments to these principles, the new economy will look all-too-familiar.

Three recent analyses envisioned a future that would promote equity and sustainability. One, released by Shell Oil International, has forecasted declines in fossil fuel use by the world economy starting in 2020-2030. Even its business-as-usual "Sustained Growth" scenario, in which world energy consumption is expected to grow steadily, projects renewable energy as supplying nearly all of the growth in energy use after 2020. In its very important "Dematerialization" scenario, Shell recognizes that technology leadership is increasingly in the direction of lighter yet stronger materials (such as fiber optics and light-weight vehicles) and in the substitution of materials altogether with information (e.g., data highways and CAD). Under this scenario, the company sees an obsolescence of heavy industry, replaced by "technology systems requiring a much lower energy input" (Shell, 1996). The company has concluded that the dematerialization trends are inevitable and has begun to rethink its investment strategy.

Shell Oil's world forecast is matched in the U.S. by a 1997 report released by a consortium of energy research organizations headed by the American Council for an Energy-Efficient Economy (ACEEE). It builds upon an earlier study done with the American Gas Association (an umbrella business organization for the American natural gas industry). In its *Energy Innovations* report, ACEEE, et al. also point to technology trends, which are replacing traditional industrial processes with low-energy and low-materials substitutes. In their forecast, the U.S. economy continues to grow at current rates but energy consumption actually *falls* 8% by 2030. The only energy source forecasted to grow in the first half of the next century is renewable energy. Similar to Shell Oil's report, the

analysis by ACEEE, et al. expects almost all sectoral economic growth to occur in the high-technology fields with low materials consumption. If the U.S. follows the technology innovation path laid out in the report, CO_2 emissions are cut in half over 1990 levels by 2030 without harmful economic effects.

At the Kyoto climate change negotiations, a scientific team from Japan's universities and research institutes unveiled a new vision of the national economy consistent with the reports by Shell and ACEEE, et al. Without a change in course in energy and industrial policy, the CASA report expects Japan's CO_2 emissions to increase by 25% in 2010 over 1990 levels. The report then discusses the prospects for diffusing 91 high-efficiency technologies, which are *currently* cost-effective but face market entry and information barriers. When these barriers are removed, the world's already most efficient economy is forecast to decrease its CO_2 emissions by 9% in 2010 (relative to 1990 levels); and it achieves this reduction while *improving* its performance. Echoing the Shell report, the Japanese expert group then considers the impact of industrial restructuring, with the diffusion of the 91 high-efficiency technologies, and concludes that the country's CO_2 emissions can be cut by 21%, again while improving the economy's performance.

These three studies share a common message: the world and national economies are shifting from energy- and materials-intensive development to one where renewable energy and energy efficiency are ascendant in the energy sector and where dematerialization trends in production diminish the demand for natural resources generally. The transition to a global economic base which favors low-polluting and low-energy intensive production and consumption offers island countries perhaps their greatest hope for a sustainable future.

Third, while island countries must continue to find suitable strategies within the context of the Conference of the Parties to the UNFCCC, they should consider non-traditional channels of action, specifically, greater collaboration with civil society efforts to grapple with the problem of climate change. It has already been observed that, due to their already low emissions levels, islands can have little impact on global GHG emissions. In addition, as mentioned previously, islands are already engaged in regional programs for vulnerability assessment and other activities for adaptation to the impacts of climate change. What has not yet been explored is for island countries to join forces with the global environmental movements and the wider civil society's efforts to address sustainable development concerns. International and regional environmental movements have formed that regularly articulate their

dissatisfaction with the agreements in the Kyoto Protocol. These movements- Climate Action Network, Friends of the Earth, Greenpeace International, EarthKind International and others-are active, as well, in international trade and finance debates, the full gamut of environmental issues and initiatives to forge a sustainable and equitable future. Such organizations have the capacity to mobilize resources to advance their cause. Some pertinent questions worth exploring, therefore, are: to what extent have island communities at risk been identified and brought into the broader education, awareness building and lobbying process? Can island communities gain access to resources and information through a strategy of partnership with non-governmental environmental organizations such as these when common objectives exist? What can the politically active and resource endowed sections of global civil society do to raise awareness of the plight of island communities at risk and to put a "human face" on the problem of global warming? In essence, as island countries continue to battle in the international policy arena, can they add political strength to their strategy by drawing on forces traditionally outside the formal process? These questions are worth the consideration of islands as they evaluate next-stage actions in support of an agenda for sustainable development.

V. Conclusion

Island countries face serious challenges in mounting effective strategies to support their own sustainable development. Climate change negotiations provide an important window on the problem. The modest GHG emission reduction targets adopted to date, and the flexibility orientation embraced by the Kyoto Protocol to the UNFCCC, will make it difficult for islands to be effective in efforts to realize a sustainable future. Commitments made in the Convention and the Protocol to the equitable transfer of new and environmentally sound technologies and financial resources are proving difficult to enforce. The fact that islands have modest economies of limited scope compared to many of their continental counterparts renders them unattractive as partners in the emerging market-based policies of the Convention and Protocol. Finally, calls for stronger international commitments to energy conservation and efficiency, and to the development of renewable energy sources, will not be easily sold to an OECD group that is far less vulnerable to the consequences of its unsustainable practices than are islands.

Nonetheless, the role of island countries in the evolving regime must

be to press for adherence to a policy of significant cuts in GHG emissions. They remain the "front-line" states at greatest risk from the negative impacts of climate change. While islands as a group lack the necessary power to influence the development of critical aspects of the climate change regime, SIDS may have important opportunities to partner with key developing countries and civil society movements to demand global actions that can ensure their long-term sustainability. In this vein, AOSIS and other island coalitions might consider strategies to bring to world attention the democratic failure evident in current international environmental negotiations. After all, it is the democratic OECD states that are at the center of the problem, both as the principal source of greenhouse gas emissions and as the most powerful political bloc deciding the level of global risk. By throwing into doubt the efficacy of the policy regime advanced so far, islands can hope to spur movement toward to a genuine democratic result in which aspirations for a sustainable future are available to all communities.

Note

1 Earlier examples include the third session of UNCTAD, 1972, and subsequent meetings on island developing countries in Malta in 1988, 1990 and 1991.

2 The Programme was the official result of the 1994 UN Conference on the Sustainable Development of Small Island Developing States.

3 In developing an index of economic vulnerability, Briguglio (1995) used disaster proneness as a key variable. Using data from the UNDRO for the period 1970-1989, an index of disaster damage as a percentage of GNP was developed for 65 countries. Disasters included droughts, floods, earthquakes, hurricanes, cyclones, storms, typhoons, fire, volcanic eruptions, famine, landslides, accident, power shortages, epidemics and civil strife. The study revealed a ratio of 51.72% for island developing countries and 66.52% for SIDS. Findings for other groups of countries were: all countries with disaster incidence 28.10%; non-island developing countries 20.58%; developing countries 30.35%; and developed countries 5.10%.

4 In the next section, the frustrations of AOSIS in the context of climate change negotiations is discussed.

5 The principal greenhouse gases (GHGs) are: carbon dioxide (CO_2), methane (CH_4), ozone (CO_3), nitrous oxide (N_2O), sulfur dioxide (SO_2) and chlorofluorocarbons (CFCs).

6 The IS92a is the emission scenario most comparable to the IPCC (1990) Scenario A, the so-called business-as-usual scenario.
7 Continental nations can consider the relocation of farm belts and other climate-sensitive economic activities, but islands cannot entertain such a strategy.
8 The collective GDP for 14 AOSIS member countries in 1995 at constant prices (using 1987 as base year), was US$16.02 billion.
9 The Male Declaration on Global Warming and Sea Level Rise (1989) is reprinted in UN document A/C.2/44/7. Annex, and in the Journal of International Law and Policy, Vol. 5 (1990), p. 602.
10 UNGA Resolution 44/206, 22 December 1989.
11 The measures include precautionary and control actions to counter degradation of land, water, genetic and other productive resources by drought, desertification and land degradation; collaboration among observatories of climate, climate change and ecosystems; and increased financial contributions to facilitate these efforts.
12 The First Conference of the Parties (COP-1) to the Framework Convention on Climate Change. The Parties include all signatories to the UNFCCC and UN-recognized observers.
13 Under the Kyoto Protocol, Russia and the Ukraine are permitted to stabilize their emissions at 1990 levels. Because of the significant economic losses experienced by both countries in their transition to market economies, greenhouse gas emissions are 33% below 1990 levels for Russia and 56% for the Ukraine (Byrne *et al.*, 1998b). Thus, both countries can trade increased emissions between now and 2008-2012 to OECD signatories and, in effect, have higher GHG emissions counted as reductions by buying countries.

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