

V. FRESHWATER RESOURCES

Basis for action

27. Freshwater resources are vital for meeting basic needs and inadequate protection of the quality and supply of freshwater resources can set important limits to sustainable development. Many health hazards in developing countries are related to poor water quality and limited water quantity. Because of their small size and particular geological, topographical and climatic conditions, many small island developing States face severe constraints in terms of both the quality and quantity of freshwater. This is particularly the case for low-lying coral-based islands where groundwater supplies are limited and they are protected only by a thin permeable soil. Even where rainfall is abundant, access to clean water has been restricted by lack of adequate storage facilities and effective delivery systems.

28. Inadequate action to safeguard watershed areas and groundwater resources poses a further long term threat, while in urban areas rapid population growth, changes in economic strategies and a growing per capita use of freshwater are significant challenges. In this context, sound long term management strategies for water catchment and storage areas including treatment and distribution of limited water supplies are of particular economic and environmental importance. Such strategies may involve substantial capital investment and ongoing maintenance programmes which may affect the real cost of water. A common threat to the freshwater resources of small island developing States is the contamination of supply by human and livestock waste, industry related pollution and in some cases, pesticides and other agricultural chemicals. All strategies need to take account of possible constraints to water supply from low groundwater recharge in times of drought, salt water intrusion and inundation as a result of climate change and sealevel rise. Such intrusions are made even more likely as a result of over abstraction, particularly during times of extended drought. In this regard due consideration must be paid to the primacy of the need to supply water for sanitation purposes.

29. The Political Statement and Action Programme, adopted at the International Ministerial Conference on Drinking Water and Environmental Sanitation held in the Netherlands in 1994, could serve as one of the important bases for small island developing States in implementing relevant portions of programme area D of Chapter 18 of Agenda 21.

A. National action, policies and measures

- (i) Develop, maintain and protect watershed areas, irrigation systems, distribution networks and appropriate catchment systems and promote effective programmes for water conservation and prevention of water contamination through, inter alia, the development of integrated national water plans, the use of appropriate incentives and regulatory measures, community involvement in management and conservation, forest management and reforestation and investment strategies.
- (ii) Adopt appropriate standards for the management of freshwater resources, and develop and strengthen low-cost monitoring and assessment capabilities, linked to water resource databases, for relevant decision-making tools including forecasting models for water management, planning and utilization.
- (iii) Strengthen procedures to monitor and respond to the impacts of natural and environmental hazards, in particular the impacts of climate change and climate variability, including drought and sea-level rise, on water resources.

(iv) Encourage the development and acquisition of appropriate technology and training for cost-effective sewage disposal, desalination and rainwater collection to provide sufficiently high quality potable freshwater, including opportunities for technology interchange between small island developing States.

(v) Strengthen national capacities to make decisions between competing demands over the allocation of limited water resources.

B. Regional action

(i) Develop and strengthen initiatives for regional cooperation in training and research to assist Governments in the development and implementation of integrated water resource plans, including conservation and rehabilitation of watersheds, protection of groundwater, setting standards for the management of these resources, fostering public awareness and water quality monitoring.

(ii) Provide technical assistance for the assessment and/or development and transfer of appropriate technology for water collection, distribution and protection, in particular, sewage disposal technology.

C. International action

(i) Improve access to environmentally sound and energy efficient technologies for the catchment, production, conservation and delivery of freshwater, including rainwater catchment, water treatment systems and desalination, and foster the exchange of information on water treatment methods.

(ii) Enhance small island developing States' capacity to develop and implement integrated water resource plans, including water resource allocation and management, conservation and rehabilitation of watersheds, protection of groundwater, fostering public awareness and water quality monitoring.

(iii) Assist training and public awareness campaigns to build up an endogenous capacity relating to water management and conservation and appropriate rainwater catchment systems.

(iv) Support the establishment of methodologies aimed at assessing the adverse impact of climate change on freshwater resources and develop appropriate response and mitigation measures.

VI. LAND RESOURCES

Basis for action

30. The small size of most small island developing States, coupled with land tenure systems, soil types, relief and climatic variation, limit the area available for urban settlement, agriculture, mining, commercial forestry, tourism, and other infrastructure, and create intense competition between land use options. Most aspects of environmental management in small island developing States are directly dependent on, or influenced by, the planning and utilization of land resources. This is intimately linked to coastal zone management and protection in small island developing States.

31. For human requirements to be met in a sustainable manner, competing demands for the use of land resources must be resolved, and more effective and efficient ways of using these natural resources developed and adopted. As populations grow in small island developing States, there is a need for resolution of

competing demands, particularly where land is limited and where commercial development of comparatively large tracts of land can result in shifts in small scale and subsistence agriculture to marginal lands.

32. The major long-term land management issue in small island developing States is degradation of the limited land area due to a variety of factors, including overuse because of high population pressure on a limited resource base; deforestation due to unsustainable commercial logging or permanent conversion to agricultural or grazing pursuits; and other episodic events, such as fire. Natural events such as catastrophic cyclones are also major contributors. Land degradation of this kind results in accelerated erosion and resultant decline in fertility and productivity, deterioration in water quality and siltation of rivers, lagoons and reefs. Deforestation is also linked to a decline in the continuity and quality of village water supply, depletion of genetic, wood and non-wood plant resources, and the fading away of traditional forest, lagoon and reef-based subsistence life systems.

33. The search for an improved quality of life, with its increased demands for cash income, has led to greater production of export cash crops, increasing areas of cultivation and more mechanized production systems. In the past, unsustainable agricultural practices in these areas have contributed to deforestation and loss of multiple purpose trees from the rural landscape and agrochemical pollution of soils, freshwater and coastal resources. There is, however, much that can be learned from traditional systems of food production and use of plants to promote sustainable agriculture and land management.

34. The conclusions and recommendations of the Interregional Conference of Small Island Countries on Sustainable Development and Environment in Agriculture, Forestry and Fisheries, Barbados, 7-10 April 1992, contain the consensus position of small islands in the agricultural sector. The Bridgetown Declaration emanating from this ministerial Conference affirmed the determination and commitment of these countries to pursue sustainable development policies which ensure the long-term viability of their agriculture, forestry and fisheries sectors.

A. National action, policies and measures

- (i) Develop and improve national databases and the dissemination of information to relevant groups, especially local communities, youth and women, for land-use planning and management, including estimates of carrying capacity, economic and environmental value of land resources, along with appropriate decision-making tools, such as land/geographic information systems.
- (ii) Prepare and/or review land-use plans in conjunction with agricultural, forestry, mining, tourism, traditional land-use practices and other land-use policies, with a view to formulating comprehensive land-use plans and zoning so as to protect land resources, ensure sustainable and productive land-use and guard against land degradation, pollution and exceeding island carrying capacity.
- (iii) Encourage appropriate forms of land tenure, improved land administration and a greater appreciation of the integrated nature of land development in order to facilitate sustainable land-use.
- (iv) Formulate and enforce laws, regulations and economic pricing and incentives to encourage the sustainable and integrated use, management and conservation of land and its natural resources.

- (v) Support appropriate afforestation and reforestation programmes, with appropriate emphasis on natural regeneration and participation of land owners, to ensure watershed and coastal protection and reduce land degradation.
- (vi) Improve the availability, affordability and environmental quality of shelter in human settlements, in accordance with chapter 7 of Agenda 21.
- (vii) Increase attention to national physical planning in both urban and rural environments, with a focus on training to strengthen physical planning offices, including the use of environmental impact assessments and other decision-making tools.

B. Regional action

- (i) Provide appropriate training and other capacity-building opportunities for small island developing States, including systems for continuous surveillance of the rate and extent of land-use changes and monitoring of adverse environmental effects, to facilitate the implementation of national actions.
- (ii) Collect, synthesize and share relevant information, knowledge and experience among small island developing States on sustainable land-use practices and policies in a structured and systematic way, including issues pertaining to environmental, agricultural, forestry, mining and other land-based sectors, market intelligence information, and assessment of potential interested overseas investors.

C. International action

- (i) Support the improved availability of shelter and the economic and environmental quality of human settlements for small island developing States in accordance with chapter 7 of Agenda 21.
- (ii) Facilitate the development and improvement of national databases and the dissemination of information to relevant groups, especially local communities, youth and women, for land-use planning and management including estimates of carrying capacity, economic and environmental value of land resources, along with appropriate decision-making tools such as land/geographic information systems.
- (iii) Facilitate more effective international and interregional cooperation, coordination, collaboration and technical exchanges in the fields of agriculture, forestry and other land-use, through international and interregional networks and training programmes.

VII. ENERGY RESOURCES

Basis for action

35. Small island developing States are currently heavily dependent on imported petroleum products, largely for transport and electricity generation, energy often accounting for more than 12 per cent of imports. They are also heavily dependent on indigenous biomass fuels for cooking and crop drying.

36. The small island developing States will continue to be heavily dependent on petroleum fuels and biomass both in the short and medium term. However, the current uses of these fuels tend to be highly inefficient. Increased efficiency through appropriate technology and national energy policies and management measures will reap both financial and environmental benefits for small island developing States.

37. Renewable energy resources endowments of small island developing States vary greatly. All have substantial solar resources, which have still not been developed to their full potential. Wind potential is highly variable with location, both within and between countries. Hydroelectric power is a possibility only for some islands. Biomass endowment is common but unequal. Studies of the potential for geothermal, ocean thermal energy conversion and wave energy are continuing.

38. Several constraints to large-scale commercial use of renewable energy resources remain. These include technology development, investment costs, available indigenous skills and management capabilities. Small-scale application for rural electrification has been sporadic. The use of renewable energy resources as substantial commercial fuels by small island developing States is dependent on the development and commercial production of appropriate technologies.

A. National action, policies and measures

- (i) Implement appropriate public education and awareness programmes, including consumer incentives to promote energy conservation.
- (ii) Promote the efficient use of energy and the development of environmentally sound sources of energy and energy efficient technologies, paying special attention to the possibilities of using, where appropriate, economic instruments and incentive structures and the increasing economic possibilities of renewable sources of energy.
- (iii) Establish and/or strengthen, where appropriate, research capabilities in the development and promotion of new and renewable sources of energy, including wind, solar, geothermal, hydroelectric, ocean thermal energy, conversion, wave and biomass.
- (iv) Strengthen research capabilities and develop technologies to encourage the efficient utilization of non-renewable sources of energy.

B. Regional action

- (i) Establish or strengthen research and policy capabilities in the development of new and renewable sources of energy, including wind, solar, geothermal, hydroelectric, wave and biomass.
- (ii) Assist, where appropriate, in the formulation of energy policies, standards and guidelines for the energy sector applicable to small island developing States, and enhance national capacity to effectively plan, manage and monitor their energy sectors.
- (iii) Gather and disseminate information, and promote regional cooperation and technical exchanges between small island developing States on energy-sector issues, including new and renewable sources of energy.

C. International action

- (i) Support the research, development and utilization of renewable sources of energy and related technologies and improve the efficiency of existing technologies and end-use equipment based on conventional energy sources.
- (ii) Formulate and ratify international agreements on energy-sector issues in relation to sustainable development in such areas as carbon emissions and the transportation of petroleum, for example, the use of double-hulled tankers.

- (iii) Develop effective mechanisms for the transfer of energy technology, and establish databases to disseminate information on experience in the use of new and renewable sources of energy as well as on the efficient use of non-renewable energy sources.
- (iv) Encourage international institutions and agencies, including public international financial institutions, to incorporate environmental efficiency and conservation principles into energy-sector-related projects, training and technical assistance and, where appropriate, to provide concessionary financing facilities for energy-sector reforms.
- (v) Develop effective and efficient ways of utilizing, disposing, recycling, and reducing the by-products and waste of energy production.

VIII. TOURISM RESOURCES

Basis for action

39. Tourism has contributed much to the development of small island developing States and, as one of only a few development options for small island developing States, will continue to be very important for their future growth. It could also stimulate the development of other sectors. However, if not properly planned and managed, it could significantly degrade the environment on which it is so dependent. The fragility and interdependence of coastal zones and the unspoilt areas on which eco-tourism depends calls for careful management. One of the special tourist attractions of small island developing States is the distinctiveness of their cultures. The diversity and fragility of their environments are reflected in the diversity and fragility of their cultures. The protection of the former is an important condition for the protection of the latter.

40. Capital investment in tourism, particularly for the necessary infrastructure, is costly. There is usually also great competition for land resources between tourism, agriculture and other land uses. Large increases in tourism and overdevelopment of tourism in particular areas or in whole islands could be environmentally and culturally disruptive and detrimental to other valuable sectors, such as agriculture. It is imperative, therefore, that the development of tourism be carefully planned, particularly in relation to compatible land uses, water management, coastal zone management and the development of parks and protected areas. Tourism, like all forms of development in the coastal zone, needs to be carefully integrated within the existing cultural and environmental constraints and opportunities present within small island developing States. Eco-tourism, linking areas of high ecological value to low-impact tourism, may present important and environmentally sustainable opportunities for tourism development in small island developing States.

A. National action, policies and measures

- (i) Ensure that tourism development and environmental management are mutually supportive.
- (ii) Adopt integrated planning and policies to ensure sustainable tourism development, with particular attention to land-use planning and coastal zone management, requiring environmental impact assessments for all tourism projects; continuous monitoring of the environmental impact of all tourism activities; and the development of guidelines and standards for design and construction taking into account energy and water consumption, the generation and the disposal of wastes and land

degradation, the proper management and protection of eco-tourism attractions, and the carrying capacity of areas for tourism.

- (iii) Identify and develop facilities to meet specific niche markets, particularly in eco-tourism, nature and cultural tourism, and involve local populations in the identification and management of natural protected areas set aside for eco-tourism.
- (iv) Adopt measures to protect the cultural integrity of small island developing States.

B. Regional action

- (i) Ensure that tourism and the environment are mutually supportive in cooperation schemes at the regional level including, where appropriate, harmonization of standards and regulations.
- (ii) Encourage the assessment and development of potential complementarities among small island developing States including the development of packaged options covering several islands and encouraging joint marketing and training programmes.
- (iii) Establish or strengthen regional mechanisms for the exchange of information in the development of a safe and sustainable tourism sector, using, as appropriate, the capacities of regional tourism organizations.

C. International action

- (i) Promote recognition of the value of tourism in small island developing States to the international community as well as the fragility of the resources on which tourism in small island developing States depends and of the need therefore for international support to encourage its sustainable development.
- (ii) Facilitate efforts at the national and regional levels to assess the overall impact of the economic, social and ecological aspects of tourism, to plan sustainable tourism and to develop eco- and cultural tourism.

IX. BIODIVERSITY RESOURCES

Basis for action

41. Small island developing States are renowned for their species diversity and endemism. However, due to the small size, isolation and fragility of island ecosystems, their biological diversity is among the most threatened in the world. Deforestation, coral reef deterioration, habitat degradation and loss and the introduction of certain non-indigenous species are the most significant causes of loss of biodiversity in small island developing States.

42. In the past, there has been a strong emphasis on the collection of more information. In small island developing States where limited and biologically precious resources are being threatened, while lack of sufficient information is often cited as a rationale for inaction, there is often enough information to identify areas requiring in situ conservation. Although more information will be important to develop appropriate management plans, information collection should no longer be a prior condition for in situ conservation projects.

43. The nature of traditional, often communal land and marine resource ownership in many island countries requires community support for the conservation effort. Without this local support and commitment and the

opportunity to integrate sustainable income generation into the conservation effort, even the most highly studied and well planned conservation area will not be sustainable.

44. Some of the most precious biological resources for islanders, environmentally, economically and culturally, are marine and coastal rather than terrestrial. This requires a conservation focus that takes into account customary land and reef tenure systems and practices, which may differ from that usual in the larger developed countries. Other considerations include the adequacy of basic institutional support for conservation efforts (staff, vehicles etc.) and access to financial resources to help start innovative projects.

45. A number of international and regional conventions exist concerning the conservation and sustainable utilization of biological resources and these are expected to provide a sound legal framework of potential benefit to the sustainable development of small island developing States.

A. National action, policies and measures

- (i) Formulate and implement integrated strategies for the conservation and sustainable use of terrestrial and marine biodiversity, in particular, endemic species, including protection from the introduction of certain non-indigenous species and identification of sites of high biological significance for the conservation of biological diversity and/or for eco-tourism and other sustainable development opportunities, such as sustainable agriculture, training and research.
- (ii) Ratify and implement the Convention on Biological Diversity, the Convention on International Trade in Endangered Species of Wild Fauna and Flora and other relevant international and regional conventions.
- (iii) Promote community support for the conservation of biological diversity and the designation of protected areas through concentration on educational strategies that increase awareness of the significance of biodiversity conservation and particularly the fundamental importance of a diverse biological resource base to resource-owning communities.
- (iv) Generate and maintain buffer stocks or gene banks of biogenetic resources for reintroduction into their natural habitat, especially in the case of post-disaster restoration and rehabilitation.
- (v) Develop or continue studies and research on biological resources, their management and their intrinsic socio-economic and cultural value, including biotechnology.
- (vi) Conduct detailed inventories of existing flora, fauna and ecosystems to provide basic data needed for the preservation of biodiversity.
- (vii) Ensure that the ownership of intellectual property rights is adequately and effectively protected. Ensure, subject to national legislation and policies, that technology, knowledge and customary and traditional practices of local and indigenous people, including resource owners and custodians, are adequately and effectively protected and that they thereby benefit directly, on an equitable basis and on mutually agreed terms, from any utilization of such technologies, knowledge and practices or from any technological development directly derived therefrom.
- (viii) Support the involvement of NGOs, women, indigenous people, and other major groups, as well as fishing communities and farmers in the conservation and sustainable use of biodiversity and biotechnology.

B. Regional action

- (i) Encourage countries to give priority to known, existing sites of biological significance while recognizing that there are many important sites whose biological significance remains unknown, and to build up community support for the protection of these areas, including protection from the introduction of non-indigenous species.
- (ii) Promote regional studies of the socio-economic and cultural value of biological resources, including genetic engineering, intellectual property rights, and access to biotechnology, with the participation of existing or strengthened scientific institutions, relevant international agencies and non-governmental organizations.
- (iii) Promote the establishment of regional gene-bank centres for research, seeking the development and introduction of more resistant and productive varieties of species, and provide the appropriate legal and technical procedures for the use of these biological resources.
- (iv) Coordinate information exchange, training and technical assistance in support of national efforts to establish and manage conservation areas and for species conservation, including the identification and use of traditional knowledge and techniques for resource management which assist the conservation of biological resources and diversity.
- (v) Promote and/or strengthen already existing regional scientific institutions which can operate as reference centres for problems related to the conservation and sustainable management of biodiversity.
- (vi) Strengthen the capacity of regional organizations to provide technical support and coordination in the development of inventories of flora, fauna and ecosystems and where feasible to establish regional databases and gene banks.
- (vii) Support the development of adequate and effective legal mechanisms for the protection of intellectual property rights.

C. International action

- (i) Provide improved access to financial and technical resources for the conservation of biological diversity, including funds for basic institutional and logistic support for the conservation and management of biological diversity, with priority to be accorded to terrestrial as well as coastal and marine biodiversity, such as coral reef ecosystems.
- (ii) Improve access to environmentally sound biotechnology, including know-how and delivery mechanisms.
- (iii) Ensure that the activities of relevant international organizations, agencies and programmes of the United Nations as well as relevant non-governmental organizations, are closely coordinated with and supportive of identified regional small island developing States centres or ongoing programmes in the conservation and sustainable use of biodiversity and biotechnology.
- (iv) Make greater use of import restrictions under the Convention on International Trade in Endangered Species of Wild Fauna and Flora on products from endangered species of small island developing States.
- (v) Support national and regional actions for developing inventories of flora, fauna and ecosystems, including training and technical assistance.

- (vi) Support strategies to protect small island developing States from the introduction of non-indigenous species.
- (vii) Promote the full involvement of NGOs, women, indigenous people, other major groups as well as fishing communities and farmers, in the conservation and sustainable use of biodiversity and biotechnology.

X. NATIONAL INSTITUTIONS AND ADMINISTRATIVE CAPACITY

Basis for action

46. To address the environmental resource management priorities essential to the sustainable development of small island developing States, national institutional and administrative arrangements are increasingly embracing the interrelated nature of activities in their limited land area. The integration of environmental considerations into the national decision-making processes is considered to be the single most important step to be taken by small island developing States to ensure that these problems are addressed and that the principles of sustainability guide all future development.

47. Economic imperatives must be evaluated from the perspective of socio-environmental considerations if the natural resource base is to be preserved for the benefit of present and future generations and social and cultural values safeguarded. Economic development must become sustainable development by incorporating environmental and resource management. This requires the adoption of interdisciplinary approaches to both planning and decision-making, and to the extent possible, encouragement of public participation in the process.

48. Formal integration of economic and environmental considerations will necessitate a series of institutional adjustments within government administrations, accompanied by across-the-board strengthening of environmental administrative capacity. This must happen at all levels of government, including at the local level. Many forms of institutional adjustment are conceivable and would be tailored to specific country needs. It is recognized that this process would benefit from public participation.

49. Many countries have prepared environmental strategies and plans which integrate environment and development and these are seen as the first step in a process leading to the wide application of sustainable development principles. For these plans to promote sustainable development, however, they must be utilized for national decision-making, including at all appropriate levels of government, in order that environment and development policy can be carefully integrated.

A. National action, policies and measures

- (i) Strengthen institutional arrangements and administrative capacity, including cross-sectoral/inter-ministerial committees and task forces, to integrate environment and economic policy in national planning and across sectors and ensure capacity to implement Agenda 21 and the decisions of the Global Conference.
- (ii) Develop implementation strategies and schedules, including financing, for both regional and national activities.
- (iii) Establish or strengthen environmental agencies with adequate financial and staff resources.

- (iv) Increase the awareness and involvement of non-governmental organizations, local communities and other major groups in public education, national planning and implementation of sustainable development programmes.
- (v) Improve public education to familiarize local, provincial/State and national bodies with environmental laws already in existence, to facilitate discussion of the value of environmental legislation and standards to local communities and to open wider discussion on more culturally appropriate penalties for contravention of laws and regulations.
- (vi) Develop appropriate national, provincial/State and local environmental regulations which reflect the needs and incorporate the principles of sustainability, create appropriate environmental standards and procedures, and ensure their integration into national planning instruments and development projects at an early stage in the design process, including specific legislation for appropriate environmental impact assessment for both public and private sector development.
- (vii) Give sustainable development task forces or their equivalent official authority and validity to permit their continued meeting as interdisciplinary and communally representative advisory bodies.
- (viii) Provide adequate resources for the enforcement of environmental regulations.
- (ix) Enact domestic legislation required for the implementation of the wide range of international environmental conventions and agreements directly relevant to small island developing States.
- (x) Establish national information nodes on the sustainable development of small island developing States, to encourage, at the international level, the development of a small islands' sustainable development information network to facilitate the exchange of experience among small island developing States.

B. Regional action

- (i) Assist, where appropriate, with the preparation and implementation of national environmental strategies and plans.
- (ii) Provide appropriate research, training and information dissemination to facilitate the mainstreaming of environment in development planning and decision-making and coordination between sectors.

C. International action

- (i) Improve access to financial and technical assistance to strengthen national institutions and administrative and operational capacity.
- (ii) Support the development of a small islands' sustainable development information network to facilitate the exchange of experience among small island developing States.
- (iii) Assist in providing training and capacity-building services to facilitate ratification and implementation of appropriate international instruments.
- (iv) Promote closer cooperation to improve national and international measures to combat illicit drug trafficking and money laundering.