

CHAPTER 5

ENVIRONMENT

5.1 BASIC FEATURES

5.1.1 It is important at this early stage to enunciate the "environmental philosophies" on which Guyana's social and economic development will be based:

- (i) environmental considerations should underpin all aspects of development, whether physical or social;
- (ii) where there are threats of serious or irreversible damage, the absence of scientific certainty will not be used as a reason for postponing the formulation and implementation of measures to prevent environmental degradation;
- (iii) environmental protection is a matter of human survival. Each generation owes it to the next to act responsibly and to ensure that no irreversible damage is done to the environment. No generation has the right to leave future generations with a more limited choice than that which it inherited. Indeed, the current generation has an obligation to expand the range of such choices, and to improve the quality of the environment;
- (iv) ultimately, the success of a development strategy will depend on the extent to which it integrates, conceptually and operationally, environmental and developmental imperatives;
- (v) life on earth depends, in the final analysis, on the support provided by the physical environment. This means that to maintain life the integrity of the ecosystem must be preserved. In other words, the capacity to accommodate changes in natural conditions and in the processes which sustain it cannot be exceeded without causing it to collapse, or to lose its identity, with unpredictable consequences; and
- (vi) sustainability is not merely a question of ethics. There are limits to the extent to which natural systems can be utilised. Beyond these limits their performance becomes impaired. Indeed, they may even be destroyed. Moreover, environmental systems are complex and unpredictable. We do not, therefore, always fully understand and appreciate their dynamics. Accordingly, we must, wherever such knowledge is not available, restrict our activities.

5.1.2 For several reasons Guyana is especially vulnerable to environmental pressures. First, more than 75 percent of the country's land area is covered by forests, many of the ecosystems of which are inherently fragile, and therefore liable to react adversely to interventions which alter their ecological balance. Second, about 90 percent of the country's population lives on a narrow coastal belt which is not only too small in area for them, but which lies below sea level. As a result the space in which they exist is not only cramped and infelicitous, and therefore prone to a large number of specifically environmental problems, it is continuously threatened by inundations from the Atlantic Ocean and the rivers which bring with them the difficulties caused by flooding, the deposition of silt, erosion and so on. Third, almost the entire economy is dependent upon coastal agriculture, and upon the exploitation of the country's forest wealth and minerals. This means that the *ordinary* economic activity of the *ordinary* Guyanese constitutes a continuous threat to the environment. And fourth, Guyana is a poor country. Its citizens might therefore not only find it difficult to resist the temptation to over-exploit its natural resources but also not to repair any damage which might occur as a result of such over-exploitation. It follows, therefore, that it is imperative that an effective environmental strategy be formulated and implemented as soon as possible.

5.1.3 In general environmental problems in Guyana can be divided into two categories: *resource degradation* and *resource contamination*.

5.1.4 Some examples of resource degradation, which are experienced in our country, include: overfishing leading to the depletion of stocks, especially of breeding stocks of commercial species; the deforestation of mangrove swamps, resulting in the loss of habitats for juveniles of important marine species, and an increase in the danger of flooding in coastal areas; the over-harvesting of inland forests with a consequential loss of habitats and a reduction of species diversity; and soil erosion, with the attendant diminution of the water-holding capacity of watersheds, thus rendering the affected area susceptible to episodes of flooding and siltation.

5.1.5 The most common examples of resource contamination are associated in Guyana with water pollution from mercury, cyanide and other chemical wastes through mining; untreated human and animal wastes; and agricultural and industrial wastes. However, air pollution is also a public health concern, particularly in areas such as Linden, where suspended mineral particulates have been implicated in certain human respiratory disorders.

5.1.6 In the light of these problems, it must again be stressed that a National Development Strategy must be predicated on the basic principle that Guyana's development must not threaten the integrity of the environment. While it is acknowledged that no development can take place without the alteration of some aspect of the natural environment, such impacts must be restricted to the absolute minimum. In other words, the approach to development must be based on the *prevention* of environmental degradation, rather than on the application of remedial measures of doubtful efficacy, after the damage has already been done. It follows, therefore, that the environmental costs of development projects must at all times be factored into their overall economic analysis.

5.1.7 The environmental problems in the coastal zone in Guyana are intimately linked to activities associated with human settlement and, as has been indicated, with specific effects that are related to population concentration and economic activity. These include waste generation – solid, liquid, gaseous, chemical, heat, etc.; flooding from the increased runoff caused by the replacement of natural vegetation by built structures; and coastal erosion aggravated by various types of engineered structures and by activities such as sand-mining.

#### 5.1.8 Agriculture

5.1.8.1 Our agricultural practices also adversely affect the environment in several ways. For example, the intensive cultivation of our main crops requires the use of fertilisers, the excess of which is carried by runoff or by leaching into waterways. The resultant nutrient enrichment of the waters induces an intense growth of aquatic vegetation which in turn blocks and fouls the water courses, and changes their ecology. In addition, chemical pesticides are utilised to control pests. Inevitably, these percolate or are washed into streams where they may directly destroy aquatic life, or enter the food chain through the process of bioaccumulation, causing either the extermination or the decline of wildlife.

#### 5.1.9 Manufacturing

5.1.9.1 It has also been noted that even the relatively small incidence of industrial activity in Guyana sometimes results in air pollution caused by the burning of fuel and wastes, and from fugitive dust; in water and soil pollution resulting from the release of chemically contaminated effluent; in noise pollution; and in thermal pollution caused by cooling water in industrial plant.

#### 5.1.10 Fisheries

5.I.10.1 Our marine fishery resources also have been threatened by commercial fishermen who, in recent decades, have intensified their efforts in order to satisfy export markets. In addition, shrimp trawling, with its attendant dumping of by-catch, has progressively altered the species composition of inshore marine fauna.

5.I.10.2 Furthermore, fish farming in the littoral zone has been accompanied by the clearing of mangrove stands, thus exposing the affected areas to erosion by wave and tidal forces, and destroying habitats for breeding and juvenile stocks.

#### 5.I.11 Mining

5.I.11.1 It is in the bauxite and gold mining industries, however, that the greatest signs of environmental degradation are to be found. Bauxite mine clearing involves the removal of forest cover to allow stripping to be carried out. This represents a direct destruction of portions of the ecosystem, the major casualties being elements of fauna and flora. Thereafter, the overburden is removed, or stripped. This process creates huge craters which eventually become receptacles of stagnant water. With the subsequent removal of the bauxite ore in the mining process, these pits are considerably deepened. The sediment released in these operations is transported in run-off and causes the siltation of streams and rivers. This, in turn, affects the drainage system in the mining area, with various ecological consequences.

5.I.11.2 In the process of drying and calcining the bauxite, the ore is heated to remove moisture and to effect a limited degree of chemical transformation. Very frequently, these processes result in the escape of fugitive dust from the kilns, accidental oil spillages, and the release of bauxite tailings.

5.I.11.3 Mechanical methods of different scales and levels of sophistication are currently employed in most gold mining operations. The largest operator, Omai Gold Mines Limited (OGML), uses a process of electrolytic recovery from a cyanide "solution" prepared from crushed rock and saprolite. Another widely used process in gold mining is that which utilises the so-called missile dredge, a diverless suction dredge, which operates mainly along river banks for varying depths, often penetrating considerable distances in accordance with the distribution of the deposits.

And finally, a land-based method of gold recovery which essentially achieves the same results as dredge mining by using a powerful water jet to create a slurry from which the gold particles are recovered in a manner analogous to that employed in dredge mining.

5.I.11.4 In all of these operations, the preparatory phase involves the removal of vegetation cover and topsoil to permit access to the deposits or the gold-bearing rocks. This represents both a direct loss of biodiversity and a destruction of habitats, the cumulative impacts of which could be very significant.

5.I.11.5 In addition, waste material from the treatment of mined material – comminuted rock or residual sand/gravel – is discarded on the land or in rivers, with largely unknown consequences for the ecosystem or environmental services. Of immense ecological significance, also, is the fouling of streams by colloidal clay suspensions produced by "de-sliming" of deposits in preparation for final recovery of the metal. The more obvious effects of this fouling are the prevention of the growth of aquatic plants as a result of light exclusion, leading to the "death" of streams; the fouling of fish gills causing death by asphyxiation; the smothering of the eggs of aquatic animals, further depopulating streams; and the displacement of human communities due to the loss of domestic water supplies from streams, and of fish and wildlife.

5.I.11.6 Final gold recovery involves chemical treatment – amalgamation with mercury and subsequent separation by heat in the case of dredge – and "land" – mining, and "dissolving" in cyanide solution followed by electrolytic separation. In both cases, chemical pollution of the environment occurs, with serious and diverse long-term consequences. In the amalgamation procedure, mercury almost invariably escapes into the environment, polluting soil and water, and eventually entering the food chain and accumulating in human and

other animal tissues. The cyanide recovery process involves the planned release of spent cyanide solution into the Omai and Essequibo Rivers.

#### 5.I.12 Wildlife

5.I.12.1 The lucrateness of the trade in wildlife has led to a "mining" mentality in relation to this natural resource; and attempts to regulate the activity are often fiercely resisted by exporters who enlist the aid of the exploited trappers who plead the possible loss of their livelihoods if the trade is curtailed. What is generally overlooked in this ongoing debate is the critical ecological role of wildlife in their natural environment. This includes functions such as the stabilisation of natural populations, the pollination of flowers, and the dispersal of fruits and other propagules.

#### 5.I.13 Biodiversity

5.I.13.1 In recognition of the significance of its biodiversity assets, Guyana signed the UN Convention on Biological Diversity during the Earth Summit of 1992. This Convention commits signatories to adopt regulations to conserve their biological resources. However, to this date Guyana has taken few effective steps to protect its biodiversity.

#### 5.I.14 Kaieteur National Park

5.I.14.1 Kaieteur National Park was established in 1929 by the Kaieteur National Park Act. It is widely regarded as Guyana's "jewel in the crown" and boasts a spectacular waterfall, rare species of plants, and is the only known site in the world of the "golden frog" (*Colestethys beebi*).

5.I.14.2 The park is currently served by no more than two wardens who lack radio communications. As a result, their effectiveness is limited. Moreover, the park is not adequately maintained and is being damaged by vehicular traffic, the inappropriate cutting of vegetation and, to a lesser extent, the deposition of litter from tourists. Of serious concern is the existence of a sizeable community at Menzies Landing where various shops and houses have been erected and where residents are causing damage to the fragile park environment. Illegal timber and mining operations are also having a detrimental impact.

#### 5.I.15 Environmental Administration and Management

5.I.15.1 Guyana's environmental policy is formulated and implemented by an Environmental Protection Agency (EPA) which was established by an Act of Parliament. The EPA has an extensive list of functions and responsibilities. These include the effective management of the natural environment so as to ensure the conservation, protection, and sustainable use of its natural resources; the coordination of the environmental management activities of all persons, organisations and agencies; establishing and coordinating institutional linkages and playing a coordinating role in the preparation and implementation of environmental cross-sectoral programmes; the coordination of coastal zone management; the sustainable use of biological diversity, a national parks and protected areas system and a wildlife protection management programme; the prevention and control of pollution; the undertaking of environmental impact assessments; and advising on general environmental policy and the impact of development.

5.I.15.2 The EPA also has certain statutory duties, among which are to produce physical accounts of Guyana's natural capital; to carry out surveys and obtain baseline information on natural resources; to make these surveys and information available to members of the public; to provide annually general information on the state of the environment; and to maintain registers of information available to the general public showing all environmental impact assessments carried out, environmental authorisation granted or cancelled, prosecutions brought etc.

5.I.15.3 The EPA suffers from a lack of financial and human resources at various levels. As a consequence, it has been unable to carry out its mandate as effectively as it might.

5.I.15.4 There is also an Environmental Assessment Board, the functions of which include conducting public hearings into all environmental impact assessments and studies, as well as appeals from the EPA. The Board has recently been provided with detailed rules which should enable it to undertake its tasks more effectively, and should also ensure consistency in its approach towards all developers and investors.

5.I.15.5 And finally, in the environmental protection hierarchy, is the Environmental Tribunal. This is a superior court of record and has power to hear appeals against the refusal, cancellation or suspension of environmental authorisations; the conditions contained in permits or licences; and enforcement or prohibition notices.

## 5.II ISSUES AND CONSTRAINTS

In this section of the chapter a number of environmental issues, and environmental constraints to the development of Guyana, are raised. These are valid, and are highlighted to draw attention to the possible adverse effects of over-enthusiastic approaches to our development. It must be emphasized, however, that all developmental activities will be subject to intensive environmental assessments and studies.

### 5.II.1 Agriculture

5.II.1.1 Soils in the Intermediate Savannas are generally sandy and fragile. They are expected, therefore, to be nutrient-poor as a result of leaching. The pursuit of agriculture in these areas will have therefore to take into account two major constraints: the possible alteration of the physical structure of the soil as a result of tilling, thus rendering it more susceptible to erosion; and possible limitations on the use of fertilisers because of leaching, thus inflating costs and promoting the contamination of streams and groundwater from run-off and leachates.

5.II.1.2 It should be noted, however, that intensive land-utilisation surveys, and detailed soil analyses, have already been made of these Savannas. These have indicated that there are many areas in which the soils are either brown sands or brown loamy sands that are capable of producing certain types of crops, e.g. pineapples, peanuts and various types of tree crops. In addition, the area is eminently suitable for many kinds of agroforestry.

### 5.II.2 Road Building

5.II.2.1 The construction of roads in connection with hinterland development in Guyana will inevitably open up vast areas of our country to a variety of other activities, with environmental implications: the possible displacement and destruction of wildlife; an influx of settlers, with the further possible destruction of habitats, and the generation of waste and pollution; and an increase in the scale of hunting and the exploitation of wildlife. It will therefore be necessary, in the implementation of the transportation strategy of this NDS, to ensure that, in undertaking the legally required environmental impact assessments, these very critical matters be taken into account.

5.II.2.2 As has been stressed earlier in this document, transportation is a basic requirement for our development since it facilitates trade and the movement of goods and people both within Guyana and between Guyana and other countries. However, any transportation system must be environmentally sustainable or the short-term benefits of increased trade will be outweighed by the long-term damage to our

country's natural resources, and by the negative impact on the health of our citizens. These costs must be taken into account both from the beginning and throughout each stage of the design process.

### 5.II.3 Forests

5.II.3.1 The Dry Evergreen Forest which occupies the white sand belt behind the coastal plain in the eastern part of the country is easily accessible from the major population centres along the coast, and has therefore been subjected to intense exploitation over the years. Indeed, in some areas these forests have already been cleared, or are being threatened by over-logging. It should also be noted that the soil conditions in these forests do not encourage natural regeneration, especially in the face of constant disturbance.

5.II.3.2 In contrast, extensive areas of forest in the Northwest District of Guyana are characterised by swampy conditions. Such ecosystems also are somewhat fragile. It is important, therefore, that logging practices in such forests, as indeed in all our forests, accord with their productive and regenerative capacity.

5.II.3.3 An economically and socially significant recent development in the Northwest District is the establishment of the heart of palm industry, based on a non-timber forest product the manicole palm, *Euterpe edulis*, which mainly inhabits riverain swamps. Care should be taken to ensure that the population of this species does not decline from over-harvesting; that there is no mortality or loss of vigour of the residual shoots in harvested clumps; and that there is no decline in fruit yield as a source of food for birds and animals. It should not be overlooked, however, that experiments which have been conducted on the regeneration of this species in other parts of South America, particularly in Brazil and Bolivia, have revealed not only that the species can be naturally regenerated, but also that artificially regenerated plantations can be established.

### 5.II.4 Mining

5.II.4.1 Responsible development requires good environmental stewardship in all mining activities, from exploration and processing to decommissioning and reclamation. Environmental concerns must therefore be integrated in the decision-making process if Guyana is to achieve optimum economic benefits from its mineral sources.

5.II.4.2 It is recognised that in Guyana the mineral wealth of the country must be exploited, if it is to be able to attain the rates of economic growth that have been posited in this document. However, this exploitation must be properly regulated. Standards which are set too vaguely, in order to encourage development through mining, may create large and lasting environmental damage in return for a type of economic development which is merely transitory and limited.

### 5.II.5 Transportation

5.II.5.1 Any future road building programme must be subjected to a proper environmental impact assessment which takes into account all negative environmental effects.

5.II.5.2 We face a future of increased congestion and pollution unless the true costs of motor vehicular traffic is passed on directly to road users, rather than to society as a whole. Road charges, tolls, parking fees, increased vehicle licence fees and weight charges for heavy duty lorries should be imposed, and a proportion of the revenue so obtained allocated to the provision of alternative transportation, such as public transportation and proper paths for cycling and walking thereby enabling citizens to choose their method of transport.

5.II.5.3 Guyana has the opportunity to develop an integrated and environmentally sustainable transport network drawing on the lessons learned in other countries, without paying the price of their mistakes. The transportation system must be designed to benefit not only the car-owning elite but also the majority who do not own a vehicle and are forced to rely on an unsafe public transportation system.

#### 5.II.6 Iwokrama

5.II.6.1 The Iwokrama Rain Forest Centre was established by law in 1996, on the basis of an undertaking given by the President of Guyana at the Commonwealth Heads of Government Conference in Malaysia in 1990, to devote a significant proportion of Guyana's tropical rain forest to research on a number of topics. The Centre is now an autonomous International agency that is located in our country. The Centre is planning to embark on an extensive bio-prospecting exercise with an initial funding of US\$1.2m from the European Union. Under the Iwokrama legislation all discoveries belong to the Centre, although Guyana has the right to use such discoveries. However, the benefits to the people of Guyana from Iwokrama's bio-prospecting exercises in Guyana's forests are not sufficiently clear. In addition, the apparent absence of an adequate institutional and legal framework and the reliance on contractual mechanisms for a great proportion of its work, make it difficult to ensure that Iwokrama will itself be able to obtain full benefits from biological discoveries or to protect Guyana's biological resources against acts of bio-piracy.

#### 5.II.7 Protected Areas

5.II.7.1 A national protected areas system is unlikely to succeed unless there is commitment from all citizens and unless benefits flow to Guyanese nationals. It is therefore essential that the current perception of most Guyanese that a national protected areas system means that development cannot take place in all protected areas, must be corrected. It is essential that our citizens realise that there are different categories of protected areas, ranging from strict protection reserves to parks in which some natural resource exploitation (such as mining or forestry) may be allowed.

#### 5.II.8 Institutions

5.II.8.1 The key to successful development is the wise use of resources rather than the continuation of unrestrained exploitation of our natural wealth. In order to achieve this objective, Guyana must establish an efficient and effective system for the management (including conservation and exploitation) of natural resources and the environment. The multiplicity of institutions, agencies, committees and other entities dealing with natural resources and the environment should be reduced and the current system rationalised.

5.II.8.2 In addition, a further shift in thinking is needed if our natural resources and environment are to be used wisely for development to benefit the nation as a whole. There needs to be greater consultation, more transparent decision-making and greater accountability by Government. Decisions by technical agencies should not only be made on scientific and technical grounds but must be transparent so that they may be seen to be free of political interference.

5.II.8.3 In the long-term the EPA should be removed from the influence of the Office of the President which should retain an adviser on Science, Technology and the Environment.

5.II.8.4 A new ministry should be created which would include the EPA, the new Guyana Lands and Surveys Commission, the board responsible for the Kaieteur National Park, and any other agency or unit which is responsible for environmental protection. Agencies which have a dual role in respect of environmental protection and resource utilization (e.g. tourism, agriculture, mining, forestry) would remain with their subject ministries but would have their environmental protection functions transferred to the EPA.

5.II.8.5 The conflict between the protection of the environment and the use of natural resources for development is an ongoing and at times difficult one. By putting in place adequate processes, by holding Government accountable and by ensuring that citizens have access to information, we may be able to improve the quality of our decisions. It is our responsibility not to foreclose the options of the next generation.

### 5.III OBJECTIVES

5.III.1 Guyana's principal environmental policy objectives are:

- to enhance the quality of life of the country's inhabitants by utilising its natural resources while neither degrading nor contaminating them;
- to ensure that the natural resource base for economic growth continues to be available in the future; and
- to intensify and widen the dimensions of our living standards through the conservation of unique habitats, natural treasures, biodiversity and our cultural heritage.

5.III.2 To these ends, in the area of *resource contamination*, priority will be given to reducing the incidence of those problems that affect public health; and in the area of *resource degradation*, priority will be given to the sustainable management of those renewable resources that provide the critical foundation for our current and long-term economic development, in particular, fisheries, forests, soils and water supplies.

### 5.IV THE STRATEGY

5.IV.1 The provisions of the Environmental Protection Act will be rigorously enforced by the Environmental Protection Agency.

5.IV.2 Programmes and projects that are aimed at promoting public awareness and environmental education will be systematically pursued among broad sections of the population, but particularly with persons involved in developmental activity.

5.IV.3 Moreover, community participation will be vital in our efforts to manage many vulnerable ecosystems and to conserve the resources of protected areas. The relevant local communities will therefore be involved at both the design and implementation stages, in order to increase the chances of success for the strategy. The EPA will take the lead in organising and informing community members about these undertakings, in collaboration with the Ministries of Works, Communications and Regional Development. However, in the final analysis, considerable responsibility for the management of the programme at the local level will be devolved to the communities.

5.IV.4 Rural communities which participate in the management and protection of biosphere reserves will be compensated through a foundation that will reward their effective participation by means of local infrastructural projects that have been agreed upon by the communities.

5.IV.5 The EPA will set, monitor and enforce standards for air emissions, effluent discharge, and noise levels for industries; ensure strict compliance with environmental management plans; conduct regular environmental audits; and promote, in collaboration with industry, the training of adequate numbers of technicians to monitor the nation's adherence to legal environmental standards.

5.IV.6 The successful identification, evaluation, mitigation and management of the causes and impact of coastal degradation will depend on the availability of baseline data and adequate monitoring and regulation by appropriate institutions designed for integrated, cross-sectoral management. Because many of these coastal-related issues are complex, the EPA will establish a special unit to identify problems as early as possible and make recommendations for their management. Such problems include sea-defence breaches, damage to drainage and irrigation structures, and the need to recharge coastal aquifers.

5.IV.7 In general, the EPA will strictly enforce conservation measures that have been prescribed in this NDS, in respect of forestry, fisheries, mining and agriculture.

5.IV.8 In particular, development policies for the wallaba forests will take into account the vulnerability of that environment in relation to charcoal burning, sand mining, and logging for timber and timber products.

5.IV.9 Operations in the coastal mangrove areas will be carefully monitored, and felling in these ecosystems absolutely banned.

5.IV.10 Moreover, the specific environmental problems that are associated with the exploitation of manicole palm, which have already been described, will be addressed.

5.IV.11 The conservation of any forest, but particularly tropical high-forests, benefits the world at large. However, the conservation of Guyana's forest is especially important since this country is only one of thirteen with extensive areas of rainforest. Moreover, "the Guyana Shield", of which Guyana's forests are a part, is a unique and endangered region that stretches from Amapa in North-East Brazil, through French Guiana, Surinam, Guyana, Venezuela and Colombia until it reaches the Andes. Indeed, the region is known to contain tremendous and largely endemic biological diversity. Although there is no comprehensive listing of its medicinal plant species, Amerindian customs and practices indicate that as much as 10 percent of the plant species that are found in our forests may have medicinal properties. The forest also provides a habitat for wildlife and is of international significance for scientific and tropical forestry research. Furthermore, Guyana's forests make an essential contribution to the hydrological balance and climatic stability both of the immediate region and the rest of the world.

5.IV.12 Given the fiscal constraints which the country faces in its quest for economic improvement, and the fact that the conservation of our forest ecosystem brings benefits not only to Guyana but also to the entire world, mechanisms will be put in place to finance the non-timber uses of the forests. Put in another way, a scheme will be devised and implemented to compensate Guyana for any decision it makes not to exploit its forests for the production of timber and timber products. A special foundation, which may be known tentatively as the Guyana Rainforest Foundation, that will mobilise funding from international NGOs, corporations, and bilateral governmental donors, will be established. This foundation will set up an endowment fund to receive donations and will apply the earnings from the endowment to the payment of royalties and fees which will compensate the people of Guyana for the opportunity costs that will be incurred from not utilising a proportion of their forest resources. These fees and payments will be assessed to cover and will include the loss of taxes and royalties, job opportunities, technological advancement and industrial processes, among other things.

5.IV.13 The proposed Guyana Rainforest Foundation will also seek to promote ecotourism, the medicinal uses of the forest, and other income-generating activities which do not entail the felling of trees for

commercial purposes. It will also promote international agreements on carbon offset (for industrial pollution in developed countries), as another source of compensation to Guyana for setting aside part of its natural resource base.

5.IV.14 Mining companies which operate in Guyana, will, at a minimum, be required by law to:–

(i) recognise environmental management as a high priority, notably during the licensing process and through the development and implementation of environmental management plans. These will include early and comprehensive environmental impact assessments, pollution control and other preventive and mitigative measures, monitoring and auditing activities, and emergency response procedures;

(ii) adopt best practices to minimise environmental degradation;

(iii) adopt environmentally sound technologies in all phases of mining activity and increase the emphasis on the transfer of technologies which lessen adverse environmental impacts, including those from small-scale mining operations; and

(iv) encourage long-term mining investment by establishing clear environmental standards with stable and predictable environmental criteria and procedures.

5.IV.15 The backfilling of excavations and the re-vegetation of sites (under the supervision of GFC personnel) as mining operations proceed will be mandatory.

5.IV.16 Run-off from dewatering activities in the mines will be channeled initially into settling ponds and not directly into rivers and creeks.

5.IV.17 Maximum allowable dust emission levels will be established and enforced by the EPA.

5.IV.18 Operating mining entities will be legally required to equip themselves with the necessary equipment and tools to deal effectively with accidental spillages.

5.IV.19 The replacement of top soil in mined-out areas will be an essential part of site restoration.

5.IV.20 Methods of mining that are feasible and least destructive to the environment will be enforced by the mining authority.

5.IV.21 Regulations on the handling of waste will be established, and waste disposal practices monitored for compliance.

5.IV.22 Alternatives to the use of highly toxic materials in the recovery process will be introduced. In the interim, the storage, usage and eventual disposal of these materials will be carefully managed and scrupulously monitored to avoid serious damage to the environment.

5.IV.23 In regard to wildlife – the existing environmental regulations will be replaced by new legislation which reflects international best practices and establishes a comprehensive system for the management, use and conservation of wildlife and the protection of biodiversity.

5.IV.24 A new wildlife authority will be established by statute, and procedures will be put in place to enable it to meet modern standards of accountability, transparency and good governance.

5.IV.25 Wildlife trading will be rigorously controlled in accordance with the requirements of CITES.

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- 5.IV.26 The provisions in the Forestry Bill in respect of wildlife, will be deleted, and wildlife dealt with under one comprehensive system.
- 5.IV.27 Community-based wildlife management programmes will be established.
- 5.IV.28 In regard to transport, a safety programme will be established; and standards for cleaner fuels to eliminate lead and sulfur emissions will be introduced.
- 5.IV.29 The impact of transport programmes and projects on the country's natural resources, and on safety, will be regularly monitored.
- 5.IV.30 The design and evaluation of transport projects will take into account the effects on non-motorized transport.
- 5.IV.31 Road-user charges that reflect externalities (road damage, air and noise pollution, congestion, and safety) will be put in place and enforced.
- 5.IV.32 The greater use of non-motorized transport will be encouraged, by providing improved physical facilities for non-motorists. The following steps will be taken:– the speed limit will be enforced; separate lanes for cyclists on existing main roads will be constructed; additional pavements for pedestrians will be put in place; and motor vehicle traffic will be excluded from the centre of Georgetown, except for specific times for commercial deliveries.
- 5.IV.33 All new roads will be built with separate lanes for cyclists and animal drawn carts away from motor vehicles; and all will have pavements for pedestrians.
- 5.IV.34 As a matter of urgency emission standards will be set for all vehicles. However, because vehicles which meet acceptable emission standards tend to be more expensive, the Government will encourage the purchase of such vehicles by reducing the taxes on their importation. The target date for the complete transfer to such systems is 2005.
- 5.IV.35 The current practice of importing reconditioned vehicles into Guyana will be phased out by 2005.
- 5.IV.36 Standards will also be established to restrict noise pollution, i.e. to reduce the maximum levels of noise.
- 5.IV.37 A feasibility study on the re-introduction of railways will be undertaken.
- 5.IV.38 The draft forest legislation will be revisited and new legislation which establishes a comprehensive framework for the development of the forestry sector on the basis of environmental sustainability and economic benefits will be produced. The new Act will ensure that the GFC meets modern standards of transparency and accountability and is suitably empowered to undertake its functions.
- 5.IV.39 The community at Menzies Landing will be transferred to another suitable site and the area rehabilitated and restored.
- 5.IV.40 All timber and mining operations within the Kaieteur National Park area will be stopped. Mining operations in close proximity to the park area will be carried out in such a way as to prevent damage to the park environment.

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5.IV.41 The amendment to the Kaieteur National Park Act which recognises and protects the existing rights of Amerindians will be brought into effect.

5.IV.42 No bio-prospecting will be permitted in Guyana until and unless there is in place an adequate legal and institutional framework. Such a framework will be developed in consultation with stakeholders.

5.IV.43 Amerindian intellectual property will be recognised and protected by law. The sharing of traditional knowledge should take place only on the basis of informed consent and a fair share of the benefits for the communities.

5.IV.44 Guyana will accede to the following:–

- the Ramsar Convention of Wetlands of international significance;
- the London Guideline for the exchange of information on chemicals in international trade;
- the Cartagena Convention on the marine environment in the Wider Caribbean Region; and
- the Kingston Protocol on Specially Protected Areas and Wildlife (SPAW).

5.IV.45 The establishment of a National Protected Area System will begin in the year 2000.

5.IV.46 The Guyana Lands and Surveys Commission Act will be thoroughly amended to establish a proper national land use planning system.

5.IV.47 The Land Use Planning Unit which is currently in existence will be disbanded and its resources transferred to the new Commission.

5.IV.48 The following existing bills will be reviewed and amended to achieve consistency with the national commitment to development which is environmentally sound:–

- the Guyana Biosphere Reserve Bill, authorising the establishment and management of biosphere reserves in Guyana;
- the Conservation and Wildlife Bill, providing for the establishment of wildlife sanctuaries and the protection of listed wild animals and birds;

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- the Forestry Bill and the Guyana Forestry Commission Bill;
- the Drainage and Irrigation Bill; and
- the Civil Aviation Bill.

5.IV.49 In addition, a thorough review of the existing legislation relating to natural resources and the environment will be undertaken with a view to its harmonisation and rationalisation in keeping with national priorities. This should result in a comprehensive legal framework for the management of the environment and natural resources.

5.IV.50 The following are areas in which legislative changes will be made:–

- the consolidation and revision of existing legislation in the various sectors, incorporating new environmental protection provisions; and
- the preparation of consequential amendments to related legislation.

5.IV.51 The EPA will be institutionally strengthened through the provision of additional financial and human resources.

5.IV.52 The environmental regulatory functions of all the sectoral agencies will be transferred to the EPA.

5.IV.53 The EPA will regularly monitor all operations which affect the environment and will prosecute for breaches of the Environmental Protection Act.

5.IV.54 The forest policy functions of the GNRA will be transferred to the GFC.

5.IV.55 The mining policy functions of the GNRA will be transferred to the GG&MC.

5.IV.56 The GNRA will be dissolved. The rationale for its existence is difficult to comprehend. Its functions in relation to macro-policy is best exercised by the EPA, while its sectoral policy functions should be devolved back to the sectoral agencies.

5.IV.57 The EPA will be removed from the influence of the Office of the President, which should retain an adviser on Science, Technology and the Environment. The EPA will then become a semi-independent agency.

5.IV.58 A new Environmental Protection Commission will be established. This will include the EPA and all other agencies that are responsible for environmental protection.

5.IV.59 The EPA will assume the entire responsibility for ensuring that its policies and strategies are implemented, particularly in the areas of forestry and mining. To this end the duties now assigned to the GFC and the GG and MG, in the specific area of environmental monitoring, will be taken over by the EPA.

5.IV.60 The conflict between protection of the environment and the use of natural resources for development is an ongoing one which at times it is difficult to resolve. By putting in place adequate processes, by holding Government accountable, and by ensuring that citizens have access to information, we may be able to improve the quality of our decisions. It is our responsibility not to foreclose the options of the next generation.