

BUILDING
A NEW
**SOUTH
AFRICA**

ENVIRONMENT,
RECONSTRUCTION,
AND DEVELOPMENT

FOREWORD BY
NELSON MANDELA

From 1991 to 1995, Canada's International Development Research Centre — in partnership with the African National Congress, the Congress of South African Trade Unions, and the South African National Civic Organisation — conducted a series of missions in South Africa to assist that country in its transition to democracy. The reports of these missions — earlier ones with an analysis of their impact — are presented together for the first time as four volumes in the series entitled *Building a New South Africa*.

Volume 1. Economic Policy

Volume 2. Urban Policy

Volume 3. Science and Technology Policy

Volume 4. Environment, Reconstruction, and Development

BUILDING A NEW SOUTH AFRICA

Volume 4

Environment, Reconstruction, and Development

a report from the
International Mission on Environmental Policy

with a foreword by **Nelson R. Mandela**

edited by **Anne V. Whyte**

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Environmental concerns can unite South Africa, going beyond racial, political, and economic barriers. In addition to the crisis in education, housing, employment, and a host of other problems, the new democracy will be left with apartheid's environmental legacy.

— Nelson R. Mandela, 15 August 1993

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Members of the International Mission on Environmental Policy with South African President Nelson R. Mandela.

FOREWORD

The state of our environment is fragile and needs every citizen's involvement to protect it. Our Constitution is one of the few in the world that gives its people the right to a clean and healthy environment.

At my inauguration, I stressed the link between our soil and a personal sense of renewal. Our soil, along with all our natural resources, is a precious asset that we cannot squander.

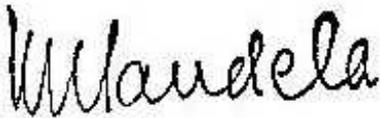
Our people are bound up with the future of the land. Our national renewal depends upon the way we treat our land, our water, our sources of energy, and the air we breathe.

The end of apartheid closed a shabby and divisive chapter in the history of our country. As we go into the future together, we need to be united in building a sustainable basis for the use of our resources.

We need to ensure that there is development to meet the basic needs of our people, but that development should be mindful of our fragile resources. So we must promote development that takes into account our reconstruction needs now as well as leaving our children and their children a share of our precious resources.

This report looks at ways in which we as South Africans can achieve sustainable development. It proposes policy directions that move away from the unbridled squandering of our resources at all costs. It advocates sound use of the environment and better measures for environmental protection.

I commend it to all South Africans to use as a basis for discussion and devising a way forward. Let us use these ideas to ensure that our reconstruction and development go ahead in harmony with our environment. Let us restore our country in a way that satisfies our descendants as well as ourselves.

A handwritten signature in black ink that reads "Mandela". The signature is written in a cursive, flowing style with a large initial 'M'.

Nelson R. Mandela

September 1995



Mission Leader Anne V. Whyte presents the Mission's initial report to President Mandela.

PREFACE

The International Mission on Environmental Policy began in late 1993. It has an impressive alliance behind it, consisting of the African National Congress (ANC), the Congress of South African Trade Unions (COSATU), the South African Communist Party (SACP), and the South African National Civic Organisation (SANCO), with support from Canada's International Development Research Centre (IDRC). The original terms of reference were to review and give recommendations on environmental programs and policies, but it soon became apparent to Mission members that, for many people in South Africa, the real issues are more fundamental: what kind of economic development would the new South Africa pursue and could sustainable development be a part of nation-building?

We had been warned that "environment" was only a white, middle-class issue, often synonymous with national parks, big game, and nature conservation. We did not find this to be true. Whether sitting under the stars with the tiny kwaDapha community in Kosi Bay, in the community hall at Merebank, in a trade union office, or with a citizens' group in Soweto, we heard that South Africans share a love and pride in their natural environment and care deeply about passing that inheritance to their children.

We were impressed with the understanding that ordinary people had of the environmental debt that accrues from a profligate use of natural resources and accumulating waste. Workers explained to us their concerns about the double burden on their health from poor working conditions in the factory and poor environmental conditions in their neighbourhood. Impoverished fisherfolk talked about overfishing and declining fish stocks. Women worried about poor sanitary conditions in the urban areas. Industrial managers criticized past mistakes and looked to better practice in the future. Environmental quality and deteriorating natural resources are common concerns.

Why then is this report needed? There are at least two reasons. First, there is a tendency to blame the past, and particularly apartheid, for the environmental problems of today. Certainly, apartheid has left a huge environmental debt that the new South Africa must eventually repay; but unless safeguards are built in, new economic and social

programs can also create significant environmental costs. One important message of this report, therefore, is to ensure that reconstruction and development in South Africa has a sustainable foundation, which means integrating environment into development and paying attention to the environmental bottom line.

Second, even though many South Africans sense the importance of environmental quality for their personal well-being and at a local level, this does not always translate into an understanding of the scale and urgency of the problem at the national level. This report seeks to provide that national perspective. It argues that, in many aspects of environmental sustainability, what is needed is a national policy framework supported by national institutions and networks.

We saw little evidence that those who make the key economic decisions in government and business are sufficiently convinced that environmental costs should be included in their accounts — not tomorrow, but today. Perhaps they feel that there is still time, that the environmental safety net can still support further strain from pollution and degradation without causing a crisis. For many parts of the country, the Mission believes that such confidence is misplaced. A measure of our success will be how seriously this report is taken by the national and provincial ministers responsible for economic programs such as planning, trade, housing, transportation, and other development portfolios, and by the chief executive officers, directors, and shareholders of South African corporations and enterprises.

The Mission process began in a conventional way, with the preparation of expert background papers. The Mission members, from different parts of South Africa, India, Kenya, Malaysia, Uganda, Zimbabwe, and Canada, then gathered together in February 1994 to undertake a series of fact-finding tours and to listen to what experts and ordinary people had to tell us about South Africa's environment.

The process changed all of us. We listened and saw; we debated among ourselves; we worked together; and we arrived at a common understanding. This report is a consensus document; no mean achievement for a group as diverse as the Mission team and for issues so scientifically complex and so profoundly rooted in values. We did not always agree with the views that we heard or with each other. But we did agree on principles and the main questions needing attention, and we shared a sense of urgency.

The Mission and this report are part of a larger process of policy formulation and awareness building in South Africa. There have been many consultations and workshops organized by others, which have fed into the Mission's work. This report was the key background document for a national consultative conference convened in Johannesburg by the Minister for Environmental Affairs and Tourism in August 1995. This consultation brought together representatives from trade unions, industry, national government departments, non-governmental organizations, religious groups, and other areas, as well as provincial officials and elected members of Parliament. From the conference, a White Paper on Environmental Policy is being developed, which will become a key document for charting South Africa's sustainable and equitable future.

As leader of the Mission, I thank all those who took part in this year-long consultative process. Our hope is that this report will be read widely in South Africa and will serve to focus attention on the critical role that environmental sustainability must play in nation-building and economic development. Our message to those who have questioned whether the country can afford sound environmental policy at this time of reconstruction and development is simply that South Africa cannot afford *not* to implement an environmental policy for sustainable and equitable development.

Anne V. Whyte

Mission Leader

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ACKNOWLEDGMENTS

The Mission that led to this report depended on the vision and dedication of many people. First, I would like to thank the Mission members (listed in Appendix A), who worked hard and with inspiration, and who never allowed any setback to deter them from meeting people across the country and transforming the many messages that we heard into a framework for national environmental policy. I would also like to thank the sponsoring organizations: the African National Congress (ANC), the Congress of South African Trade Unions (COSATU), the South African Communist Party (SACP), and the South African National Civic Organisation (SANCO). Their political and logistical support was essential to our ability to meet with so many groups around the country, and their commitment to study the results gave the Mission added purpose.

The Mission was a highly participatory process that benefited from the input of many people. These include the authors of the background papers (see Appendix B); the several hundred people with whom we met and discussed the issues on our fact-finding tours (see Appendix C); and the many people who provided written feedback on an earlier version of the report and contributed significantly to its improvement.

IDRC provided not only financial resources but also organizational support from its Johannesburg office and from its Ottawa headquarters. I would particularly like to thank IDRC's regional representative in Johannesburg, Marc Van Ameringen, for his never-failing enthusiasm, and Gillian Addison, who acted as the anchor for the Mission in the Johannesburg office. In Ottawa, IDRC staff who contributed to the production of the report included David Brooks, Robert Moher, Ida St-Martin, and Brenda Lee Wilson.

Finally, the Mission thanks those people in South Africa who will carry this vision of a sustainable environmental future forward and who have already shown their commitment to this goal. First and foremost among these is President Nelson Mandela, who met with the Mission and received its first report. The Minister for Environment and Tourism, Darwie de Villiers, and the Deputy Minister, Bantu Holomisa, have taken up the challenge and are convening a national consultation to discuss how to translate the Mission's findings into national policy.

Others key supporters of the Mission in the new South African government include Derek Hanekom, Minister of Land Affairs; Kader Asmal, Minister of Water Affairs and Forestry; the RDP Ministry; the Department of Agriculture; and the Department of Mineral and Energy Affairs.

A special word of thanks is due to the members of the private sector and civil society who, in their individual capacity as well as on behalf of their organizations, have contributed generously both of their time and their expertise. Without their enthusiasm and willingness to take up the challenges contained in the final report, the Mission's recommendations can never be realized.

The Mission gratefully acknowledges the support of all the people and organizations mentioned. We hope that this report does justice to your contributions.

Anne V. Whyte
Mission Leader

EXECUTIVE SUMMARY

The International Mission on Environmental Policy is an expert mission sponsored by the African National Congress (ANC), the Congress of South African Trade Unions (COSATU), the South African Communist Party (SACP), and the South African National Civic Organisation (SANCO), with the support of Canada's International Development Research Centre (IDRC). Composed of 6 international and 10 South African members, the Mission was charged to identify policy priorities and to give recommendations to the new South African government on environmental policy, paying special attention to integrating environmental sustainability into the Reconstruction and Development Programme (RDP). The Mission worked between January and December 1994 and visited many parts of the country in two rounds of fact-finding visits and interviews (February and September 1994).

Main Messages

The Mission's main messages to the new government are that reconstruction and development in South Africa will not be economically sustainable unless the environmental "bottom line" is written clearly into economic and social policy, and that current structures and processes in government and civil society are inadequate for the task. Some immediate action is needed to strengthen environmental policy and to integrate it into mainstream economic thinking and development planning if the tradition of neglect is not to continue, with negative repercussions for the health and economic well-being of the people of South Africa.

The natural environment is the source of renewable and nonrenewable natural resources on which South Africa's prosperity has depended in the past and will continue to depend in the future. Natural processes cleanse the air, water, and soil polluted by industrial activity and human settlements. The environmental toll of apartheid has created a huge environmental deficit. The declining soil fertility, contaminated surface water, disappearing fisheries, and widespread air pollution will cost South Africans dearly over the next decades in terms of health effects, lost productivity, and clean-up costs. It is vital that additional environmental costs not be added to the national environmental debt by reconstruction programs that ignore environmental safeguards. Environmental costs can be deferred for a while, but they ultimately have to be paid, usually in economic losses and human suffering. The environmental costs owed by society are almost always paid by those least able to do so — the poor. In this way, environmental degradation is a visible expression of social inequity.

South Africans need to find a new and shared vision of their national future in which environmental justice and pride in their natural patrimony is central to how they go about their daily lives as members of society, workers, and consumers. The environment also suffers from a perception that it is a white, middle-class issue focused on nature conservation, that it is not relevant to the urgent needs of the country for development and social justice. The Mission urges the government to take environmental security seriously as a development priority.

What we have seen around the country of the current state of South Africa's natural resources convinces us that environmental security is a very real threat to the economic prosperity of the country. We believe that environmental security for all South Africans is possible, but that it will require political will and broad public support. It will also require "champions" in government, business and industry, the labour movement, and civil society¹ who will work to promote environmental sustainability as an essential component to programs such as job creation, better housing, worker safety, and international trade and competitiveness.

¹ In South Africa, "civil society" refers to all activities and institutions that are not regulated by the formal political system, including informal associations, nongovernmental organizations, and individual or group action.

Environmental quality is one of the fundamental rights of citizens as laid down in the Constitution. This is a major achievement and one that needs to be built on in future constitutional and legislative reforms. Mission members were impressed by the positive attitudes toward change and partnership that we found almost everywhere we visited. South Africans of all races and all economic levels share a love of their natural environment. They also share a common environmental fate. Love of nature and concern about their children's environmental inheritance crosses racial and economic differences. In this way, nature conservation and sound environmental policy can be powerful forces for reconciliation and nation-building.

We met people of diverse backgrounds who saw common cause in halting the destruction of South Africa's natural resource wealth. It is this experience that gives the Mission hope that environment, reconstruction, and development will be adopted by all South Africans as the only way ahead for achieving development that is equitable and sustainable.

Strengthening Environmental Management

The Mission was charged to examine environmental policy with respect to the use and management of land, air, and water resources. It has been necessary, therefore, to review the extent to which practices that preserve, or improve, the quality and quantity of natural resources are part of the management of key economic sectors such as agriculture, forestry, mining, and industry. Indeed, it is fair to say that most decisions affecting the environment take place outside of organizations that have primarily an environmental mandate. The key to sustainable environmental policy, therefore, is to convince those who make key decisions in both the public and private sectors to include environmental goals and environmental accounts in their objectives and targets and in their cost-benefit analyses. This includes the key economic portfolios in the ministries of Finance, Reconstruction and Development, and Economic Planning, as well as the chief executive officers of major corporations, labour union negotiators, and commercial farmers. Economic and social decisions have environmental

consequences; it is increasingly urgent that we understand what they are, who is bearing the costs, and over how long a term.

This report focuses on *policy instruments for environmental sustainability*, particularly those needed in national, provincial, and local governments. These policy instruments will only work if government, the private sector, organized labour, and civil society can work together to evolve a set of new relationships. The old methods of secrecy and confrontation, command and control, will not work. Sound environmental management requires trust and more open information; it needs partnership, participatory decision-making, and an ability to rise above sectoral or local interests for the common good. It needs good data and scientific information as well as well-trained people at all levels. Some important choices have to be made in the short term to ensure that the Reconstruction and Development Programme does not lead to significant environmental damage, and financial resources for training, research, and monitoring need to be built into the national development priorities.

The Mission recommends that the national government should develop a coherent national policy framework for natural resources management and should work in partnership with provincial governments, local authorities, the private sector, the labour movement, and civil society to implement that policy. Without specific processes or institutions in place, environmental considerations are overlooked. The environment needs an advocacy process and champions to ensure that development policies are consistent with environmental sustainability and people's environmental rights. The Mission is of the view that government machinery for environmental management should be overhauled to increase its effectiveness and to achieve a more integrated approach, to reduce conflicts of interest, and to ensure that decisions are based on the best available information. We heard, and considered, proposals from inside and outside government for restructuring public administration to improve environmental management.

The Mission has three major recommendations for strengthening the national system for environmental management:

- **Commissioner for the Environment:** *The Mission recommends* that a Commissioner for the Environment be appointed to act as an advocate for the environment, with the authority to carry out investigations into alleged infringements of the environmental

rights of South African citizens, including those involving government bodies and departments. The Commissioner would report annually to Parliament and would be independent of other departments, although other departments could be called upon for technical support.

- **Forums on Environment and Development:** *The Mission recommends* that advisory bodies be established at national, provincial, and local levels to provide input from civil society to the government about the wider issues of environmental policy and sustainable development, and specifically on the priorities and means for integrating environmental considerations into the Reconstruction and Development Programme. These advisory bodies should be composed of representatives of key constituencies, including business and industry, labour, nongovernmental organizations (NGOs), and community-based organizations. They can provide forums in which new policy can be discussed and negotiated in the initial stages, and can facilitate the development of new legislation and regulations in a participatory process. They are not seen as technical groups, but are task oriented and should be able to call on technical support from their constituencies where necessary. These advisory bodies are most effective when they are more than a “talk-shop” and are tasked to deliver a product, such as an environmental plan for the Reconstruction and Development Programme.
- **Environmental Monitoring and Extension Agency:** *The Mission recommends* that the existing monitoring and enforcement functions that are currently scattered over many government departments be consolidated into an Environmental Monitoring and Extension Agency (EMEA), which reports to the Minister for the Environment. These would include the responsibilities for regulating air quality, soil quality and conservation, water quality, and waste management, including mining and hazardous waste. The establishment of an Environmental Monitoring and Extension Agency will require reformulation of legislation to consolidate regulatory authority in one new agency, and will need a new approach to regulation based on inputs from the environment and development forums.

To send a clear signal to industry and others that the new South Africa will not be a dumping ground for polluting industries, the new agency should take the lead in developing a consensus-building process for environmental management and clean production that brings industry, labour, and civil society structures together to establish targets and plans for continuously improving the environmental performance of all sectors. The new agency will also need strong links with the research community, and should be involved in education and extension work as well as regulation and monitoring.

A new kind of environmental officer is needed with basic training in air, water, and soil conservation, and an ability to work with communities and schools to further environmental awareness. These field officers will need the support of more specialized professionals within the agency and within other government departments, including occupational health and safety experts, and will need to work closely with provincial and local authorities.

The Mission further recommends that the current restructuring of central government departments should explicitly address the need to have an integrated and consistent approach to natural resources and environmental management across government, and that environmental expertise be attached to the office of the minister for the Reconstruction and Development Programme. There is also a need for a review of all legislation concerned with natural resources and environmental quality, both to reflect the new divisions of responsibilities among national, provincial, and local governments and to ensure consistency across legislation and with the new Constitution. The issue of access to information and *locus standi* will also need early government attention if civil society is to be empowered to act in its own environmental self-interest. The strengthening of processes, such as access to information, will facilitate the new partnership among government, the private sector, organized labour, and civil society.

For each economic sector and natural resource examined by the Mission with respect to environmental sustainability, the report provides a short synopsis of the situation, a summary of the institutional framework, the key policy issues relating to the environment that require government attention, and recommendations.

Land Resources

Key issues facing the government are poverty and overpopulation in the rural areas, especially in the former homelands, which are now to be integrated into the new provinces; old conflicts surrounding the current unequal distribution of land and new conflicts over the land-redistribution process; questions of tenure and unequal access to natural resources; loss of productive land to expanding urban areas; and deterioration of soil resources through erosion, desertification, and acidification.

- *The Mission recommends* that the land-redistribution policy and program should include consideration of the environmental quality and sustainable use of land, and that systems of tenure for redistributed land should include incentives for good land management. Government should use both economic and legal instruments to ensure that land as a resource is protected from further degradation.

Water Resources

Water is scarce in South Africa, and water resources are seen as a key limiting factor to future development. Key policy issues for the environment are reallocation of water among production sectors; the management of rising demands for water, especially with respect to the rate of abstraction from natural systems; the need to provide domestic water to millions of poor households; and problems of water quality and pollution control in both rural and urban areas.

- *The Mission recommends* that an integrated national framework strategy, based on ecological sustainability as well as social equity, be developed for the management of water resources, and that this strategy be promoted and implemented in partnership with the provincial governments and water users. The rate of withdrawal of water from natural systems, and the input of pollutants and human sanitation waste, should not be allowed to rise such that ecosystem processes and biodiversity are significantly damaged. Government should examine a restructured system of levies and

tariffs for water that better reflects its true cost and would encourage conservation and recycling.

Energy Resources

South Africa's dependence on coal for energy and its history of subsidizing energy costs have led to energy-intensive industrial development, the widespread use of coal as well as fuelwood for domestic energy, and consequent major negative effects on environmental quality. Key policy issues affecting the environment are the lack of access to clean, affordable, and environmentally friendly energy among poor rural and urban households, where two thirds of the population lives in homes without electricity; the inefficiency of commercial energy use, which is encouraged by low energy prices throughout the formal economy; overreliance on the environmentally harmful use of coal in power generation, industry, and lower income households; and the environmental impacts of the large energy-sector investments that were made in the recent past to increase national energy self-sufficiency and security.

- *The Mission recommends* that, within the framework of the Reconstruction and Development Programme, a national program be established for developing and promoting alternative clean energy options for both domestic users and small enterprises, together with appropriate economic incentives for their development and adoption. Full environmental cost accounting for energy in all sectors of the economy, including the national accounts, should be developed and implemented to internalize the environmental costs of production and waste management into the prices of goods and services. A national program for low-smoke coal production should be "fast tracked" and, for the longer term, studies are needed on the optimum mix of power sources to meet future demands for electricity, liquid fuels, and home heating. Government should show leadership in making its own operations more energy efficient.

Urban Environment

The major urban environmental policy issues are also social problems: a lack of basic services leads to very poor environmental quality — especially severe air pollution, industrial pollution, hazardous waste dumps, overcrowding, homelessness, and poor-quality housing — a lack of green space, inadequate public transportation systems, and the loss of productive land. Apartheid and economic inequities created a siege mentality in town planning in the richer suburbs.

- *The Mission recommends* that the transitional councils and the local structures for the Reconstruction and Development Programme be supported by national and provincial governments to develop urban-renewal plans based on sound environmental management; demand management for water, land, and energy; and recycling of resources and waste. National guidelines for urban planning and housing standards should incorporate environmental performance, including energy efficiency, and a visionary “sustainable cities” program should be promoted that includes citizen education and participation.

Coastal Zones

Environmental impacts in the coastal zone include water pollution from municipal sewage, storm water drains, runoff containing fertilizer and pesticide residues, oil spills, industrial effluents, and discharges of solid and liquid wastes. Most marine pollution comes from land-based sources, and this stress is increasing with the rapid growth in urban coastal populations and industries. The coastal zone is not so much managed as it is exploited. Not only fisheries but other economic activities and human health are now also at risk.

- *The Mission recommends* that an integrated and comprehensive coastal zone management policy be put in place with legal force to require conflicting resource demands to be assessed in terms of their economic, social, and environmental costs and benefits. This should include the conservation of coastal resources and areas of outstanding importance, and the integration of coastal zone

management with policies for managing river estuaries and floodplains.

Mining Sector

Mining is the backbone of the South African economy, but it has led to a number of serious environmental costs, many of which have not been internalized into the price of products but have been borne by workers, local communities, and the environment. The key policy issues facing the new government are a review of the licencing process and regulations in general with respect to environmental impacts; the environmental impact of many new small and medium-size mining enterprises that are likely to be established; and concern over abandoned mines and mine tailings affecting environmental quality and safety.

- *The Mission recommends* that some proportion of the revenue from active mines be paid into a special fund for environmental rehabilitation, perhaps as part of a more general levy for worker benefits to be paid when a mine is closed. As a condition of granting licences to operate a mine, an independent assessment of environmental and social impacts should be required under a strengthened integrated environmental management process, which should replace the current environmental management program reports. A survey of abandoned mines should be undertaken to ascertain environmental risks and to assign priorities for environmental rehabilitation. Safe practices with respect to environmental management, as practiced by leaders in the industry, should be developed into a national code of conduct to improve the performance of poorly managed mines.

Industry

The industrial sector, especially the manufacturing industries, will be key to expanding South Africa's economy. Today, the industrial sector is heavily concentrated on mineral beneficiation and chemical processes. It is energy intensive, and the sector as a whole has major negative impacts on environmental quality. Another contributing factor is that the capital stock in manufacturing is generally old and tends

to be more polluting. Key policy issues for the sector that will have implications for the environment include the issue of self-regulation versus government regulation for emission standards, and the relationship between national and provincial governments in setting environmental standards and regulations. Concerns have been raised about possible different standards in different provinces and how this would affect the location of polluting industries. Another general policy issue is the degree of linkage between occupational health and safety standards and regulatory systems and the regulation of environmental quality. This has implications not only for the standards and the overall level of risk to which workers and their families are exposed but also for the organizational capacity of civil society to push for better environmental standards in industry.

- *The Mission recommends* that a number of initiatives be taken to improve the environmental performance of industry. One is to increase the capacity of government to monitor emissions and to regulate industry through the establishment of a new integrated agency for environmental monitoring and extension. Another is to encourage continuous improvement of industry's environmental performance by working with the leading corporations to bring the poor performers up to acceptable practices and standards. Industry groups, such as the Industrial Environmental Forum and the Business Council for Sustainable Development, can work with government to create a climate within industry that encourages cleaner production, environmental audits and performance reports, the internalization of environmental costs in product price, and, in general, a more open attitude toward the "greening" of industry.
- *The Mission further recommends* that each industrial sector be asked to prepare an environmental plan with targets for improved performance in consultation with government and trade unions. A new clearinghouse and liaison agency is proposed, to work as a partnership between industry and government, to provide information on cleaner production, including technology, production and management processes, economic incentives, and investment patterns and opportunities.

Waste Management

The underlying environmental policy issue in waste management is how to change the long-standing pattern of low input costs, which encourages the wasteful use of resources (including energy), leading to high waste production. Decades of economic development and industrial growth have proceeded without due regard for the environment's capacity to absorb waste, leading to polluted air, water, and soil. There is a major clean-up task ahead to deal with past problems at all levels, from hazardous waste to municipal sanitation. There is also a need for a new comprehensive and effective waste-management policy that should be based on internalizing environmental costs into production costs and promoting the concept that prevention is better than cure.

- *The Mission recommends* that a national integrated waste-management strategy be developed under the authority of a single omnibus act that brings together the currently scattered legislation covering waste management and pollution control from different sources. The current “best practical means” approach to regulation should be replaced with a “best practical environmental option” approach, which explicitly includes environmental criteria. There is a particular urgency with respect to hazardous waste, and the Mission recommends that a new approach be adopted in which all waste streams coming from a site and entering land, air, and water systems be monitored and regulated in an integrated manner based on “cradle-to-grave-to-cradle” systems approaches. This would avoid some of the diversion of pollution streams among air, water, and soil systems that currently occurs.
- *The Mission further recommends* that the importation of toxic waste should be discontinued on environmental grounds, particularly given the inadequate environmental regulatory systems in place. With respect to domestic and municipal wastes, the Mission recommends that a national strategy aimed at raising public awareness and participation, and including economic incentives for small entrepreneurs, should be undertaken to increase the proportion of recycling in the economy. In general, the Mission believes that a more open, transparent, and participatory approach to waste management will bring about improvements for the environment and human health.

Agriculture

Key agricultural policy issues affecting the environment include the need to minimize any negative environmental impacts of land redistribution — especially with respect to the capacity of redistributed holdings to provide a reasonable family income without causing environmental deterioration — and the current level of overcrowding on agricultural land in the former homelands, which has already led to desertification and soil loss. In commercial farming areas, policy issues relate to the environmental impact of agricultural chemicals, including hazardous pesticides that are restricted in other countries; the pollution of storm water runoff; and the need to provide extension and education services relating to sustainable agriculture and environmental conservation to a large number of small-scale farmers who have not been effectively reached before.

- *The Mission recommends* that agricultural policy should encourage sustainable production both through a program of agricultural extension linked to research and through economic instruments that support sustainable crops and practices and discourage unsustainable ones. This will mean reformulating some of the current subsidies and pricing structures for water, agrochemicals, and crops. Improved environmental monitoring of agricultural runoff and a major research and action program on soil conservation are recommended. Rangelands should also be targeted for early government attention, and a new sustainable rangeland management policy based on research and a clear picture of the current situation is needed.

Forestry

The forestry sector presents two different policy issues related to environment. The first is the combined effect on biodiversity and water resources of the reduction in indigenous forests and the spread of commercial forestry. The second is the unsustainable harvesting of forest resources for fuelwood, particularly in the former homelands.

- *The Mission recommends* that a national framework strategy be developed for the forest sector that integrates environmental,

social, and economic objectives and incorporates principles of local community involvement. It is also recommended that the current forest permit system be reviewed and that a voluntary code of conduct or “forest charter” be developed with all forest companies and timber farmers to include principles and practices for environmental sustainability.

Marine Fisheries

The key environmental issues in fisheries policy are that fish stocks are declining and the allocation of fish quotas has disenfranchised small-scale and artisanal fisheries enterprises. Fish stocks have been managed by a combination of limits on access to fish resources (number of quotas) and limits on catch size (total allowable catch). These have tended to increase pressure on fish resources by being set too high.

- *The Mission recommends* that the current system of resource allocation be restructured to ensure more equitable and sustainable harvesting of fish stocks through more conservative national quotas; greater security of tenure for individual, corporate, and communal quota holders; and more effective policing of waters to deter poaching and other illegal operations. The restructuring process should proceed in a participatory manner, building on mechanisms such as the Fishing Forum. Particular attention should be paid to supporting sustainable small-scale traditional and artisanal fisheries — including local cooperatives for processing and marketing — through reserving a proportion of national quotas for certain inshore fish species for local fishing communities. Fisheries research needs strengthening in the area of social and economic policies.

Nature Conservation

The primary function of protected areas is to conserve ecosystems and biodiversity, but nature conservation also plays a key role in environmental education and tourism. One key policy issue is the resolution of land claims against park authorities; this must balance the rights of the individual against the larger public interests of biodiversity, nature

conservation, and national patrimony. A second issue involves ensuring greater access to parks for all South Africans. A third issue involves the relationship between parks and local communities in terms of economic development and sustainable environmental management. Within protected areas, nature conservation policy will need to focus on how to achieve environmental objectives in terms of nature conservation and meeting the increasing demand (and human impact) associated with tourism.

- *The Mission recommends* that the conservation objectives of the protected areas would be better served if all types of parks and reserves were brought together under one legislative roof within the framework of a national conservation strategy that links protected areas with conservation efforts outside the park system, including conservation and green space in urban areas. As ecological systems are continuous across park boundaries, environmental policy would be best served if cooperation were improved between park authorities and local communities outside the park perimeter, both for the management of resources, such as wildlife and water, and for the integration of scientific and traditional indigenous knowledge into conservation and management practices. A portion of the funds generated by parks and reserves from tourism should be channeled to nature conservation and education goals.

Human Resource Development

A major, if not the major, constraint on the implementation of many of the Mission's recommendations is the lack of adequately trained South Africans at all levels of expertise. Environmental studies and natural sciences curricula need strengthening in schools and in many tertiary institutions. There is a need for environmental specialists in industry, government, the labour movement, and civil society structures if environmental policy is to be integrated into the reconstruction and development programs; but there is a danger that environmental training will lose out as a priority area given the urgent need for basic adult literacy programs.

- *The Mission recommends* that environmental awareness and education be part of every child's formal education and that, at the tertiary level, revised curricula emphasize a more holistic and interdisciplinary approach, with improved technical courses and training opportunities in environmental sciences and engineering. Workplace and on-the-job training should be developed with industry support. All environmental education programs should be gender sensitive and should take into account the constraints facing women in South Africa as full participants in education initiatives. Communities should be encouraged to become involved in local environmental planning and monitoring. Strategic research on environmental management and natural resources should be given priority.

International Linkages

South Africa has recently emerged from a period of international isolation, trade sanctions, and militarization. In the rush to enter new international markets and trade agreements, the environmental consequences of development and overseas investment may all too easily be overlooked. The Reconstruction and Development Programme is predicated on renewed foreign aid, loans, and direct investment in the national economy. However, such programs have, in the name of fiscal discipline, increased environmental degradation linked to poverty in other African countries. Key environmental policy issues, therefore, are not simply the signing of particular international environmental conventions, but rather the whole approach to development, investment, aid, and trade, both within the Southern Africa region and more broadly within global institutions such as the World Trade Organization (WTO) and the International Monetary Fund (IMF). Sustainable development principles and national capacity to undertake independent analyses and assessments of proposed projects are key tools for building environmentally sustainable international linkages.

- *The Mission recommends* that South Africa should work in international forums to ensure that trade agreements do not negatively affect the environment and should take a leadership role in environmental issues internationally. The government should work with other countries in the region to achieve a harmonized

environmental management strategy, and trade and environment policies. Serious consideration should be given to the redirection of military production and scientific expertise to advance South African leadership in areas such as cleaner production practices, alternative energy sources, and technology assessment. A number of environmental agreements should be signed or ratified by the government, including the Bamako Convention, which prohibits the import of hazardous wastes into Africa.

Implementation of Mission Recommendations

The Mission formally completes its work with the publication of this report, but the Mission process continues through wide dissemination of the report and follow-up to its recommendations through the national Consultative Conference on National Environmental Policy held in August 1995. At this forum, representatives of national, provincial, and municipal governments, business, industry, labour, and civil society, including NGOs, collectively identified the direction and priorities for government policy, to be developed as a government White Paper. The Mission's findings are also being disseminated in a popular version of the report, written in plain language for use in civil society structures and in schools.

Part I

Introduction



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Chapter 1

ENVIRONMENT AND RECONSTRUCTION

When the new democratic South African government was elected in April 1994, it had before it not only the enormous environmental toll of apartheid, but also the challenge to mount a national program of “fast track” reconstruction and development, without causing further damage to the environment and natural resource base of the economy. Some wonder whether this is possible, given the short time frames and limited financial resources available to undo decades of social injustice and environmental damage. There are also concerns that the environment will be seen as a brake on development and, given the hard choices ahead, could come out again as the loser. The key challenge to this Mission is to convince the economic and social planners of the new South Africa that the environment, as provider of natural resources and ultimate absorber of all waste, underwrites the viability of economic growth and social redistribution. Environmental costs will be translated into economic and social losses, and within our lifetimes, if they are relegated again to the “back burner.” The environmental debt owed by society as a whole is always paid most by those least able to do so — the poor. In this way, environmental degradation is a visible expression on the land of the oppression of the majority by the minority.

Apartheid policies robbed from the people of South Africa the ability to exercise effective control over the use of natural resources. The policies of successive previous governments ensured that there was a skewed distribution of access to natural resources favouring the white minority. Under apartheid, economic development was not guided by

concern for the sustainability of the natural resource base, but went full steam ahead without regard for the effect on human health or the environment. That inheritance can be seen in the degraded homelands, in the toxic mine tailings and waste dump sites, in the pollution in the streams draining the sugar plantations, and hanging in the air above industrial communities, such as Merebank.

The policies of segregation and control of people's movements ensured that black people were crowded into the former homelands with no alternative but to draw resources unsustainably from their environment in their fight for survival. Deforestation, soil erosion, and overpopulation all became products of the homeland policies. Under the interim constitution, the homelands have become integrated into the new provinces. This means that the new provincial governments have inherited the mammoth task of restoring the viability of the natural resource base to support the economic and social development of these devastated areas.

The democratic government led by President Nelson Mandela has set development priorities and targets for the new South Africa. Even though the environment has not been separately identified as a development priority, its proper management and, in many areas, its rehabilitation are prerequisites for sustained economic growth and the achievement of an improved quality of life for the poor majority. Environmental policy needs to be considered both in its own right and as an integral component of other policies. Some of the key policy goals for the new government are in the areas of job creation, women's rights, housing, nutrition, and economic development, including trade. To have any chance of succeeding over the next decade, these policies need to be environmentally sound.

Jobs — All jobs, even those in the tertiary and service sectors, ultimately depend on natural resources. Food production in the future means using soils and water more wisely; mining needs vast amounts of water; so do forests and cash crops such as sugar cane. New jobs can be created in areas such as tourism, waste management, and more competitive industries. All of these new jobs depend on ensuring that natural resources are no longer wasted, but are properly managed through sound environmental policies for the benefit of all South Africans.

Women's rights — Women are the key guardians of family health. In rural areas, it is mainly women who walk long distances and carry heavy loads to ensure that their families have fuel and water. When money is scarce, it is usually women who eat less. Women have more work and less protection in terms of access to land and property than men. Environmental degradation means greater poverty and fewer rights for women: when streams become choked with pollution or dry up, or soils become eroded, it affects poor women first and most. Sound environmental policies translate into greater equality for women.

Housing — Housing is the number one priority, and housing policies can be developed that minimize environmental costs. For example, new housing developments should avoid, wherever possible, good agricultural land that can be better used to grow crops. Where possible, opportunities can be made for people to have gardens and to grow some of their own food. In the past, houses have been designed without due consideration of how much it costs to heat them. Future housing policies should be designed to help people build houses that they can afford to heat and that will not create high levels of air pollution. No one should have to live near industries that emit high levels of air pollution or near unhealthy waste dumps, and no one should be exposed to dangerous materials.

Health and safety — Many South Africans suffer from poor health because the air in their homes and townships is polluted, and because they do not have access to clean water in their homes and schools. Women, in particular, suffer from health problems related to long hours of carrying wood and water to their homes, especially in rural areas. Workers in industry and agriculture suffer from health problems related to pollution and unsafe working conditions. In addition, workers and their families are often exposed to air pollution at home. Many workers suffer from this double burden of exposure to pollution both at work and at home.

Food security — Agriculture has become increasingly dependent on chemical fertilizers and pesticides. In addition to being expensive and adding to the cost of food, these chemicals threaten the long-term sustainability of soils and can endanger the health of agricultural workers and rural dwellers. Soils are being acidified through the buildup of

these agrochemicals and through acid rain resulting from the burning of coal in industries and homes, thereby reducing agricultural productivity. In the longer term, dependence on a few crop species for staple foods weakens food security. Pests become resistant to chemicals and developing new pest-resistant varieties depends on maintaining biodiversity. Therefore, preserving the diversity of plant and animal species in their natural habitats must be an integral strategy for agricultural policy.

Trade and competitiveness — The rules of international trade are changing. No longer will countries be able to export goods that have been produced at huge environmental costs, as South Africa has done in the past. Goods that could be sold on world markets at artificially low prices, because producers did not adequately protect the health of workers nor include the real environmental costs of natural resource use, will likely be penalized under new rules being developed in international trade agreements. The environmental and health costs of producing goods have always been present, but in the past they were placed on the backs of workers and poor people instead of being passed on to consumers as part of the product or service price. The principle of “the polluter should pay” lies at the heart of the new rules for making industries competitive and able to export goods. To create wealth for the new South Africa through increased trade, cleaner technologies and processes will become mandatory in mines and industries.

Investment in development — South Africa needs international investment to create more jobs and to boost its economy. Today’s investors are looking to invest in industries that are not polluting the environment by using the best available “clean technologies.” Increasingly, it is being recognized that environmentally sound industries are also more efficient in terms of production costs because they waste less. These same industries also have the best health and safety records for their workers, as well as good labour relations. Sound environmental policies do not reduce job opportunities and economic prosperity; they can increase them.

Green space — Everyone has the right to enjoy nature and the peace and beauty of green space. The environment is not just about national

parks, even though the preservation of wildlife and natural habitats is important. It is also about the quality of life in townships and cities; the shade of trees, space for children to play, and a place for old people to sit and remember; and “parks for people” and gardens where people can grow things and create beauty around them. Urban green space also has an important ecological function in its own right and should be an integral part of national environmental policy.

Nature conservation — South Africa has some of the greatest nature conservation areas in the world and an extensive system of national, provincial, and municipal parks. This system could be extended further to cover other important ecosystems that remain unprotected. Yet the system has been unpopular because of past forced removals and exclusion of communities from the benefits of wildlife management. When properly managed, nature conservation has been shown to produce sound economic and social benefits. Parks can provide people with jobs and opportunities to sell locally produced foods and crafts. Rural inhabitants can also create their own lodges and other facilities, thereby benefiting from the growth of ecotourism. But these communities also need to be integrated into the sustainable management of protected areas to redress past alienation and revalidate the importance of nature conservation for all.

Investing in the future — For too long, under apartheid, South Africans have been living off their children’s futures in terms of the environment and the stock of natural resources that they will leave for them to inherit. South Africa needs to reverse this wasting of future potential and begin to live again within its environmental means. Economic development can be directed toward using only the interest of the country’s environmental wealth and not the capital itself. This means that, *inter alia*, policies are urgently needed that will stop the current rate of soil acidification and erosion, the silting up of estuaries, commercial overfishing, and industrial pollution. Rethinking future development paths will mean rethinking resource use in the national interest. Good environmental policies are both an investment in the future of the country’s children as well as a key mechanism for sharing environmental wealth more equitably today.

The Mission Process

This publication is the report of a Mission sponsored by the African National Congress (ANC), the Congress of South African Trade Unions (COSATU), the South African Communist Party (SACP), and the South African National Civic Organisation (SANCO), with the support of Canada's International Development Research Centre (IDRC). The Mission consisted of 12 full-time members: 6 South Africans and 6 international members from Canada, India, Kenya, Malaysia, Uganda, and Zimbabwe. In addition, the Mission had the support of three South African members who participated on a part-time basis and three trainees. Members of the Mission and brief biographies are presented in Appendix A.

The Mission process consisted of six parts:

1. Preparation of background papers on a number of key issues by South African authors. These are listed in Appendix B.
2. On-site visits and meetings attended by the Mission team in many parts of South Africa in February 1994. A list of the organizations and individuals consulted during the Mission is presented in Appendix C.
3. Writing a draft report and discussion of the Mission's findings based on a series of Mission meetings held in South Africa between February and June 1994.
4. "Reporting-back" meetings with South African individuals and groups who have an interest or "stake" in the recommendations and their implementation, some of whom were unable to attend the first round of meetings in February 1994. These "stakeholders" include national and provincial government ministers and officials, municipal leaders, business leaders and industry management, trade unions, NGOs, environmental scientists, and civic organizations. These reporting-back meetings took place in September 1994.
5. Distribution of the draft report to stakeholders within South Africa, along with an invitation for written comments. As much as possible, the comments received have been taken into account in the final report of the Mission.

- Revision of the report by Mission members and editing by the Mission leader between January and August 1995. The resulting report is a consensus document.

The Mission's role was advisory to the democratic movement in the months before the first democratic elections in South Africa in April 1994. The draft report, which was widely circulated a few months after the elections, was intended to be a useful source of recommendations and ideas on policy directions for the new national and provincial governments; for NGOs, industry, and labour groups concerned with environmental issues; and for civil society as a whole. In this, the report is seen as playing a role, but the report is only one part of a larger Mission process to stimulate environmental policy discussion within South Africa and the entry of new ideas and experience from other parts of the world. If the overall Mission process can act as a catalyst for focusing more attention on environmental concerns and better integration of environmental considerations into all policy, the Mission will have more than served its purpose.

Terms of Reference

The Mission's terms of reference, agreed between IDRC and the ANC–COSATU–SACP–SANCO alliance, were by design broad and general, with the understanding that the Mission process would allow more specific objectives to be identified.

1. To review and give recommendations for the future on the following:
 - ◆ Policies and programs of South African institutions (public and private) relating to the environment;
 - ◆ Existing arrangements for the formulation of policies within the South African government that focus on the environment but deal with the broad context of other sectors;
 - ◆ The extent to which environmental priorities have been incorporated by the South African government and other institutions into policies and programs at the sectoral level (such as economic, urban, agricultural policy) and in the subsectors (such as housing, water and sanitation, electrification);

- Provisions for public access to information on environmental policies and programs;
- The current system for financing environmental programs in South Africa and the priorities being pursued by that financing;
- Existing legislation and constitutional provisions relating to the environment and the effectiveness of that legislation; and
- The relationship between the policies and programs being pursued by the South African government and the private sector in the area of the environment and those being followed by other countries in the region, on the continent, and in the broader international community (such as South African compliance with international conventions in areas such as climatic change and biodiversity; recognition of the implications of international economic and environmental linkages such as through environmental conditionalities imposed by international trade agreements).
- To assess broadly the extent to which current policies and programs being pursued by South African institutions in the area of the environment meet the needs of women and workers, and to indicate where changes in policy direction, structure, or financing will be required in the future to address those needs. Specifically, the following were addressed:
 - Human resource development in relation to environmental issues; and
 - Existing environmental education arrangements, both formal and nonformal.

Chapter 2

ENVIRONMENTAL POLICY IN THE NEW SOUTH AFRICA

Policy documents emerging from the ANC, COSATU, SACP, and SANCO prior to the 1994 elections have addressed the issues of environment and sustainable development to varying degrees. This process represents a major step forward and reflects the progress on the part of the democratic movement toward constructing a new model for development in South Africa.

In the past, resistance to apartheid policies of the South African government left little space to reflect on alternative paths for social, economic, and political development beyond agreement that such future development must be shaped within a context defined by democracy, nonracialism, and nonsexism. When such reflections did take place, the issue of environment was low on the agenda. This can be explained, in part, by the legacy of apartheid, where those in power expressed more concern with nature conservation and the preservation of wildlife than with the poverty and oppression being experienced by the majority of the population. Indeed, for many black South Africans, issues surrounding the environment and sustainability have a very negative connotation, given that they have often been used as justification by past South African governments to forcibly remove people from their land. The low level of priority accorded to the environmental basis for economic development can also be attributed to the isolation experienced by South Africa as a result of international sanctions. Perhaps this was most clearly evident from the minimal involvement of South Africa in the formal and informal meetings surrounding the United Nations Conference on Environment and Development (UNCED) in June 1992.

The election of a new government in 1994 meant that new policies were put in place and a new set of international relationships emerged as development objectives became redirected toward alleviating poverty, creating jobs, and meeting the basic needs of the majority of South Africans. Within this new context, it is necessary to define clear policy objectives in the area of environmental quality and the use of natural resources. Furthermore, given the history of environment as a “white” issue in South Africa, it is important that the Mission’s report makes explicit the links between environment and development, and that it shows how development priorities are rooted in environmental policy if they are to be sustained in the medium to long term. The Mission also sees as being critical that communities and NGOs working on the relationship between the environment and development be directly involved in discussions of future policy directions for sustainable development.

Environmental Rights

The interim Constitution provides a powerful safeguard in shaping future economic and social development in an environmentally sustainable way: it lays down among the fundamental rights of citizens that “every person shall have the right to an environment that is not detrimental to his or her health or well-being” and that “every person shall have the right of access to all information held by the state or any of its organs at any level of government insofar as such information is required for the protection or exercise of any of his or her rights.”

These rights are to be overseen by a Human Rights Commission appointed by the President and reporting to Parliament through the President. The new Constitution thus envisages a recourse for citizens to challenge new projects as well as ongoing situations that they believe reduce their environmental rights. Integral to the vision of the new Constitution is that ordinary citizens in South Africa will play a significant role in ensuring their own well-being and safety both at home and in the workplace. In addition, communities are to be empowered to manage their own community environment and natural resources to meet their own basic needs and priorities.

These two fundamental rights represent a major advance in terms of environmental rights, and should not be underestimated. But as the

process of developing the new Constitution matures, could not an even more far-reaching and visionary goal be set for South Africa? This goal would be nation-building and national security based on sustainable use of natural resources for all present and future South Africans. Such a goal will require leaders with vision and people united by a common purpose, who can go beyond the mere words of “sustainable development” to develop economic and social policies that recognize the true costs of environmental resources and services in all national accounts and in all business balance sheets (see box, p. 14: “Sustainable Development”).

The starting point is the new Constitution. The fundamental right to environmental quality can be considerably strengthened to include the notion of “duty of care” and environmental responsibility, as well as a stronger statement about the quality of the environment to which all South Africans have a right.

The government may also want to consider a specific environmental bill of rights and responsibilities, which would provide a legal framework for ensuring that economic and social development are based on environmental sustainability. There are some precedents for such legislation in other countries. Some define environmental rights between the state and its citizens; others view environmental rights and responsibilities as being owed by all persons and institutions to one another.

Environment and the Reconstruction and Development Programme

There are major demands for environmental resources and services implicit in the Reconstruction and Development Programme (RDP), which is the development blueprint for the new South Africa. In this report, the Mission aims to make explicit the interdependence of the successful implementation of the RDP on environmental sustainability. In its own words, “The basic principles of the RDP are that it is a coherent programme, that it builds a nation, that it is people-driven, that it provides peace and security for all, that it links reconstruction and development, and that it democratizes the state and society. This approach has not been attempted in South Africa and is a fundamental

Sustainable Development

A term given international prominence by the 1987 report of the World Commission on Environment and Development (known generally as the “Brundtland Commission”), the Commission defined sustainable development as “meeting the needs of the present without compromising the ability of future generations to meet their own need.” (WCED 1987). The approach implies that economic growth is essential to bring about a better future for all peoples. However, sustainable development also requires agreement about how growth can occur in a sustainable and equitable manner. In the Commission’s words, “sustainable development requires meeting the basic needs of all and extending to all the opportunity to fulfill their aspirations for a better life.” The term, as defined by the Brundtland Commission, recognizes the need for economic growth to pay for environmental sustainability and more equitable social policies.

Whether the world can have continued economic growth and ecological sustainability is the key question. The concern of some environmentalists is that the concept of sustainable development provides a smoke screen of environmental respectability for a process of continuing unsustainable economic growth. Another major concern is that sustainable development does not adequately address the problem of overconsumption in industrialized societies, which is driven in large part by the inherent need of market-based economies to consume material goods.

“Sustainable economic growth” is another commonly used term that is less well defined but embodies the notion that economic development can continue indefinitely where it is based on the exploitation of renewable resources and causes insufficient environmental damage for this to pose an eventual limit. Whether these conditions exist in today’s economies is questionable.

The concept of sustainable development has attracted attention and debate since 1987. Some would argue that it subsumes incompatible assumptions about economic growth, population growth, long-term environmental sustainability, and greater social justice or equity, and implies that these can be balanced. Sometimes it is referred to as sustainable and equitable development to place greater emphasis on the distributional and equity aspects of sustainability.

break with apartheid practices. This imposes major new challenges in how to implement such a programme” (the major demands on the environment, in terms of the supply of natural resources and the ability of natural ecosystems to remove or absorb waste, implicit in the RDP are presented in the box on p. 16: “Goals of the RDP”).

Each of these policy initiatives will require an additional allocation of natural resources, particularly land, water, and energy, and each will require environmental “services” such as dilution, transformation, or removal of pollution and waste products. The ability of the natural environment to perform these functions is limited and already stressed by previous mismanagement under apartheid. Successful implementation of the RDP, even in the short to medium term, depends on the incorporation of sustainable environmental criteria into economic and social planning.

The Mission cannot stress this enough; what we have seen for ourselves and have heard from South African experts has convinced us that the environmental room to manoeuvre has already been largely used up. But rather than seeing this as a brake on economic growth, the new South Africa can turn it to its advantage and become an aggressively and proactive “green” economy.

There are clear signals in the RDP that this greening of South Africa is integral to the implementation of economic and social goals (for example, the emphasis on small-scale sustainable agriculture that is both labour intensive and oriented toward basic foods and the requirement for new mining to incorporate rehabilitation costs and to undergo environmental impact assessments). The ANC has committed itself to integrated environment and development policies in its policy document *Ready to Govern*. But there are also some major gaps, such as no mention of clean technologies or a proactive “green” trade policy. Also, the RDP does not deal with the major challenge of reducing pollution and environmental health threats from existing mines and industries, which may lead to major health problems and their consequent health care costs for many South Africans. Nor does the RDP indicate how difficult questions, such as determining priorities among competing demands for scarce resources, such as water, will be handled. These are issues that will be raised later in this report.

Goals of the RDP

Meeting basic needs

- **Housing:** Finding appropriate land for houses for all.
- **Water:** Providing every South African with accessible water and sanitation.
- **Energy:** An accelerated electrification program.
- **Transport:** Improved and affordable public transportation.

Natural resources: Equitable access.

- **Environment:** Safe and healthy living and working environments.
- **Nutrition:** Security from hunger within 3 years for every South African.

Building the economy

- **Economic growth:** Establish a dynamic, integrated economy capable of providing higher incomes, reducing excessive dependence on imports, and competing in foreign markets.
- **Wealth generation:** Develop industries and services that use local resources and meet local needs.
- **Rural development:** Transfer land from the large farm sector to small-scale sustainable agriculture.
- **Urban sector:** Redress imbalances in infrastructure, transportation, housing, and basic services, and provide opportunities for employment near where people live.
- **Industrial expansion:** Raise capacity utilization of existing plants and expand to periurban and rural areas.
- **Mining and chemical industries:** Expand their competitive advantage internationally; encourage small-scale mining.
- **Small and micro-enterprises:** Introduce supportive measures to expand the sector, including lifting restrictions on zoning and licencing regulations.
- **Trade:** Develop policies to promote exports, reduce tariffs on imports, and restructure trade patterns within the Southern African region.
- **Agriculture:** Restructure the sector to increase the ownership base and encourage small-scale farming oriented to meeting basic food needs, while further developing the commercial sector and increasing agricultural employment.
- **Fisheries:** Improve access to marine resources for impoverished coastal communities and enhance the potential for inland fisheries through fish farming.
- **Forestry:** Improve the efficiency of state-owned commercial forests and impose a value-added tax to timber exports.
- **Tourism:** expand tourism and integrate it into local development programs.

National versus Provincial Functions: the Federal Debate

Schedule 6 of the interim Constitution grants certain competencies to the provincial legislatures. Environment is one of these competencies, although the interim Constitution provides overriding powers to the national government in section 126 (3):

A law passed by a provincial legislature in terms of this Constitution shall prevail over an Act of Parliament which deals with a matter referred to in subsection (1) or (2) except insofar as

- (a) the Act of Parliament deals with a matter that cannot be regulated effectively by provincial legislation;
- (b) the Act of Parliament deals with a matter that, to be performed effectively, requires it to be regulated or coordinated by uniform norms or standards that apply generally throughout the Republic;
- (c) the Act of Parliament is necessary to set minimum standards across the nation for the rendering of public services;
- (d) the Act of Parliament is necessary for the maintenance of economic unity, the protection of the environment, the promotion of inter-provincial commerce, the protection of the common market in respect of the mobility of goods, services, capital or labour, or the maintenance of national security; or
- (e) the provincial law materially prejudices the economic, health or security interests of another province of the country as a whole, or impedes the implementation of national economic policies.

Under the previous dispensation, there was a single national Department of Environmental Affairs (DEA). The interim Constitution has resulted in the establishment of nine new provincial departments of environment, as well as the continuation of the national DEA. Although there has been considerable debate about the specific functions of the provincial and national departments,² the question of whether the environment should be managed at the national or the

² It seems to be widely accepted that, in general, the national Department of Environmental Affairs and Tourism will be responsible for setting minimum norms and standards and for developing national policy on the environment, whereas the provincial departments will be responsible for developing appropriate management tools, implementing and enforcing legislation, and developing their own legislation and policy where necessary — where such policy and legislation increases the minimum norms and standards and does not contradict the national policy. However, the practice will have to be worked out over a period of time.

provincial level has not been as energetically debated. This debate is clearly needed as there are certain pros and cons with respect to the environment being a provincial competency that need to be elucidated and understood.

In general, the Mission believes that environmental management should take place at the most appropriate local level of administration so that affected communities, organizations, and individuals have access to the decision-making process. Local government is crucial in the successful implementation and enforcement of environmental management strategies. Thus, an integrated and mutually agreeable relationship between the three tiers of government is necessary to achieve optimum decisions and outcomes. Some local governments, such as the Johannesburg City Council and the Central Wits Metropolitan Chamber, have already done some work toward developing local environmental management policies and programs. Such initiatives need to be encouraged and supported by provincial departments of environment.

However, this management needs to take place within the context of a national environmental strategy. Environmental processes do not stop at provincial boundaries, particularly as the boundaries of the nine new provinces are based on politics rather than ecology. Thus, national coordination of development and environmental management across provincial boundaries is crucial for long-term sustainable development in South Africa.

Although it is the function of the national DEA to set minimum norms and standards for environmental management, there is still a concern that the provinces will each set their own environmental standards and regulations. Even though it is accepted that provinces should set norms and standards that are appropriate to their particular conditions, some national body needs to ensure that such fragmentation does not lead to overstressing the South African environment in the longer run and at the national level. One concern is that provinces should not be allowed to set norms and standards that will have negative impacts on other provinces. Another concern is that certain provinces, to encourage investment and to attract polluting industries to their provinces, should not lower their environmental standards to levels that are unacceptable in the national interest.

Furthermore, and perhaps most importantly, the allocation of environment as a provincial competency will mitigate against

strengthening the national Department of Environmental Affairs and Tourism (DEAT) into a more senior department, with sufficient authority to require other departments to curb activities that negatively impact on South Africa's natural resources (see Chapter 3). Financial, legal, and human resources are more likely to be put into the provincial departments of environment. Two of the problems facing environmental management in South Africa in the past have been the lack of a champion for the environment and the junior status of the national DEA. One result of allocating environment as a provincial responsibility is that it will be difficult for the national DEA to intervene with any influence in the policy and implementation practices of other departments at the national level in working toward a program of sustainable development for the country as a whole.

The Mission encourages further debate on these issues and notes that there is considerable merit in the suggestion that environment should be a national competency, managed through a national department with provincial branches, in the same manner as the Department of Water Affairs and Forestry (DWAF). This would enable an integrated, national strategy for environmental management, while still allowing for the implementation of policy and decision-making at a level accessible to local communities. Clearly, assigning environment as a Schedule 6 competency is not accepted as the best solution by many knowledgeable individuals and organizations. The potential shortcomings of such a choice should be seriously analyzed by people concerned with sustainable development in South Africa.

Sustainable Development or Environmental Protection?

The Mission heard from many South Africans that this historic time in the democratic process is also a time of choice about future development paths: either a turnaround toward environmentally sustainable development or simply more equitable economic growth, which is nonetheless environmentally destructive and thus unfair for future South Africans. The Mission sees as an important challenge for itself providing advice to the new South African government on how to develop an environmental policy and environmental management system that will facilitate that choice, whenever it presents itself, at the

Guiding Principles for Environmental Policy

1. Promote reconstruction and development that is environmentally sustainable and maintain the integrity of South Africa's ecosystems, which support all life systems.
2. Facilitate integrated natural resource management and avoid a fragmented approach.
3. Alleviate poverty.
4. Reduce inequities, particularly access to natural resources.
5. Underwrite the fundamental right to an environment that is not deleterious to one's health or well-being.
6. Reduce violence and conflict over environmental resources.
7. Create jobs, or at least do not reduce employment opportunities.
8. Increase the competitiveness and trade of South Africa.
9. Encourage investment in South Africa's future.
10. Base environmental policy on the participation of civil society and all stakeholders.

local, provincial, or national level. In developing our recommendations, we were influenced by a number of broad social goals, which we came to see as guiding principles against which any environmental policy or management proposal should be judged. The question to be posed is whether it represents a "win-win-win" solution; that is, it has the potential to achieve environmental, social, and economic goals, or at least an acceptable trade-off between them (see box above: "Guiding Principles for Environmental Policy").

The need to reverse past abuses of the environment and injustices to the majority of South Africans, while implementing the new RDP, requires a national environmental management system that has four important dimensions:

- A national vision for natural resource planning, so that, even though different provinces have different endowments of natural resources, these do not become regionally entrenched to create rich and poor provinces;

- An integrated management system for decision-making at local, provincial, and national levels that devolves decisions to the lowest appropriate level within a national framework;
- An effective process for empowering civil society to participate in decision-making generally, and specifically in environmental and natural resources planning and management; and
- A holistic framework for multi-resource planning and allocation as a basis for integrated land-use planning within areas such as coastal zones.

Chapter 3

TOWARD A NATIONAL ENVIRONMENTAL MANAGEMENT STRATEGY

The new South African government has inherited a set of administrative structures and relationships, together with laws, guidelines, and procedures, that have until now formed the basis for managing the environment. As in most countries, new issues have led to incremental additions to institutions and regulations so that the resulting environmental policy is less a system than a compendium of objectives, organizational structures, and practices. In the case of South Africa, more than in most countries, the fragmentation of management has been exacerbated by deep inequities built into the old institutional and legal fabric of environmental policy and etched into the landscape. The existing institutions and procedures will need a major review and reformulation. This is recognized in the Reconstruction and Development Programme (RDP) as a necessary precondition for implementing the new government's policy.

One of the issues raised by the RDP, and the changed priorities for development that it embodies, is that the situation of the new South Africa is closer to that of a developing country or emerging economy, whereas many of the governmental institutions that have been inherited were modeled on those of industrialized, "First World" countries. The solutions to South Africa's environmental problems must be affordable within the context of the RDP priorities and the financial realities of the new government. Solutions that rely too heavily on top-down government control are outmoded in the current international political climate of greater emphasis on partnerships between

government and business, greater public participation, and greater decentralization of government responsibilities. Thus, the financial and democratic aspects of environmental management are critical to any strategy that is proposed.

The particular problems inherent in current environmental policy and management have received attention in a major report of the President's Council (1991) entitled *A National Environmental Management System*, as well as in a number of other governmental and non-governmental analyses. The Mission has had the benefit of these earlier, written examinations of the problems and has also heard, first hand, from both proponents and critics of the current system, and from those who are within and outside the current administration. We found surprising consensus on the diagnosis of the major problems that require solutions, but not surprisingly, less consensus on ways to solve them.

Major Problems Identified in the Current Management System

Fragmentation of policy — One of the most difficult aspects of environmental policy is that it cannot be effectively demarcated to its own domain. It touches on all other areas of policy and public administration, whether agriculture, trade, energy, or industry, because each of these sectors uses environmental resources and services to achieve its own objectives. Without a coherent environmental policy to allocate these environmental goods and services to each sector according to overall national economic and social goals, each sector is likely to overuse them. The environmental resources of a country are, in effect, a parallel budget to that of the financial resources, and need similar supervision and care.

In South Africa, the degree of fragmentation is very high: almost every central government department is involved in some aspect of environmental administration, and both resource allocation and pollution control are subdivided between different legislation and different departments. In addition, environmental management is a joint responsibility of the central and provincial governments, and certain aspects are under the jurisdiction of local authorities. In effect, no one is managing the parallel national budget of environmental goods and

services. It is as though, in the economic sphere, the different departments were all free to manage their own budgets with no overall control from Treasury or the Ministry of Finance. The resulting overspending and deficits that would ensue are essentially what is happening to the environmental “treasury” in South Africa today.

Conflict of interest — A number of the government departments responsible for enforcing compliance with environmental regulations are also charged with promoting the activities that they are supposed to regulate. This poses a potential conflict of interest in carrying out their mandates. Included among these departments are the Department of Agriculture and the Department of Water Affairs and Forestry.

Ineffective enforcement — One of the most frequently cited problems with current environmental management is that of ineffective enforcement of the legislation in place. The fines specified in legislation, such as those for failing to undertake rehabilitation of mines, are cited as being ludicrously low and not acting as a deterrent. The department responsible has rarely brought any offender to court, preferring to “work with” the offender to remedy the problem rather than to charge them. The capacity of the government body responsible for monitoring for infringements of environmental legislation is generally inadequate. There are, for example, only seven air pollution control officers for the whole country and only nine soil conservation officers.

Under the law, all national government departments are one legal entity so that one government department cannot sue another. In particular, the Department of Environmental Affairs and Tourism cannot sue other departments for damage to the environment. These factors combine to allow mining, industry, agriculture, and fishing interests to exploit environmental resources without effective government surveillance. Environmental regulation is essentially “self-regulation” by the private sector and by government enterprises. This is not to say that self-regulation and “responsible-care” initiatives in the private sector do not have an important role to play in environmental management, but they need to be guided by a national environmental policy framework and regulatory bodies that are able to monitor and bring sanctions against offending individual enterprises or organizations.

Lack of adequate accountability — Although it is not always the case, the Mission was informed of a number of instances where the public tried unsuccessfully over considerable periods of time to obtain information about pollution levels from industry, such as in Merebank in KwaZulu-Natal. This situation mirrors that of workers in mining and industry, who have sought data relevant to the pollution levels they face. In many cases, it appears that the government body responsible does not have the relevant information, but relies on that obtained, and owned, by the industrial and corporate sectors. Environmental groups, civic organizations, and trade unions are actively seeking such health-related environmental data, and their actions reveal a general situation of inadequate accountability to the public throughout the environmental management system.

Scarcity of trained human resources — The Mission was informed by many people that there are too few trained professional and technical personnel involved in the public administration of the environment. There are critical shortages of trained technical staff in key areas, such as the inspectorates, as well as professional staff in the departments. The current unsatisfactory situation has several aspects. Firstly, there is the problem of racial and gender imbalances in professional and technical staff in the public sector that was built into the apartheid system of recruitment and education. Indeed, in our meetings with senior personnel of central government departments, the Mission met with white men almost entirely. Secondly, the few trained people available are not attracted to the public sector, with uncompetitive salaries being cited as one reason. The loss of talented people to the private sector was also cited as a problem by several government officials. Thirdly, the training and education system needs overhauling to provide appropriate tertiary programs in universities and technikons.

Overcentralization — Fragmentation of responsibility among government departments coexists with excessive centralization of authority at the central level of government, with large numbers of civil servants based in Pretoria. Although it was recognized that environmental management is often more effective when administered at a more local level, the current government structure is neither very decentralized to the provinces, nor has it delegated much authority to other levels of decision-making. Where responsibility for monitoring has been delegated to local authorities, without the transfer of

adequate financing, access to information, and trained personnel, it can be seen as an abrogation, rather than a delegation, of responsibility. The Mission recognizes that this situation is changing as provincial authorities for the environment become better organized; the resource issue, however, is likely to remain a problem for some time.

Lack of public participation — Environmental legislation and enforcement have largely been put in place during a period when there was little public involvement or interest in the process. With the recent growth in environmental awareness and consumer concern, inadequacies in the system are being brought to the fore, and South Africa is witnessing a growing number of environmental issues, such as the mining controversy at St Lucia and Thor Chemicals' importation of mercury-contaminated waste for recycling. Key issues for public participation are now part of the public debate, including the right of the public and workers to know and the legal standing of people and organizations acting "in the public interest" rather than as an interested and affected party within the context of particular acts. The reliance of the current environmental management system on voluntary codes of conduct and guidelines rather than on mandated regulations and controls is also being questioned in the context of the public interest.

In the old political order, most people were left outside. South African people in general and black people in particular were not part of decision-making and policy-formulation processes. This was underpinned by laws of apartheid aimed at denying communities their rights to health, housing, water, sanitation, and a clean environment. The absence of a people-centred approach, paralleled by the lack of democratic and accountable institutions, made it possible for local authorities, other governing agencies, homeland administrators, industrialists, planners, and policymakers operating within the framework of Grand Apartheid to conduct their activities with impunity.

In the past, when the government and the private sector were confronted with the question of community involvement, counter arguments have tended to suggest that such a process is slow moving, cumbersome, and very expensive. Some would claim that this attitude underscores that there has been little or no regard for the role or rights of communities as key elements in civil society. Communities have commonly been denied access to information. Until now, they have played little or no role in primary health and environmental

monitoring. These problems are exacerbated in the case of remote rural communities, which account for a large fraction of South Africa's poor. In the nature of things, they are scattered and isolated, poorly serviced, and lacking in terms of information or political access.

There was little or no attention paid to the role of women in South African society. Women should be centrally involved in decision-making about services and the environment. However, there are barriers of a traditionally patriarchal society and strong cultural barriers that have to be overcome. Much of the burden placed on women must be relieved so that they can find time for personal development and development of the family unit. Rural women spend long hours searching for wood and carrying water, to the detriment of their health. In addition, women shoulder the responsibility for family health care, household hygiene, and food preparation. Therefore, they are key to the reconstruction and development of the country.

Sustainable development requires not just community participation but also community management of development. The reasons for this are appealing. It creatively addresses the inadequate resources of government agencies (human, material, and financial resources). In addition, community management promotes democracy and empowerment, offering the prospect of communities taking increasing initiatives in their own economic and social development.

Partnerships among community, labour, and NGO sectors constitute a powerful and resourceful power base. The media must also play a responsible part in society and promote community-based development and environmental projects. Affirmation of the people-centred approach makes practical sense and underlines a political point of great importance — that democracy works better, that people feel they are part of policy processes, and, therefore, that people will be committed to the successful implementation of the approach.

A weak “champion” for the environment — The Mission sensed that a number of the problems cited above in the current management of environmental resources added up to what was an inadequate voice for the environment in a world of competing private interests to consume the environmental wealth of South Africa, from the perspective of both natural resources and waste management. One view that we heard frequently was that a strong Department of Environment was needed, perhaps modeled on the Environmental Protection Agency

(EPA) of the United States. Generally, people told us that South Africa needed an environmental management system that “had teeth.”

The current Department of Environmental Affairs and Tourism has weak legislative authority, exercising little executive power, and lacks an adequate complement of professional and technical staff to carry out its mandate. It is highly reliant on the cooperation of other departments and the private sector, whose mandates are not the stewardship of the environmental wealth of the country. Without a strong champion, national environmental security is at risk from shorter term and more sectoral interests, and there is a danger of neglecting the importance of the “Precautionary Principle” in pursuing economic and social goals (see box, p. 29: “The Precautionary Principle”).

Does South Africa need an environmental protection agency? This was a question debated at many of the Mission’s meetings. The EPA in the United States has been a world leader in championing the cause of environmental protection against the actions of major players such as industry, agriculture, transportation, energy, and mining. Every country could benefit from a powerful advocate for environmental sustainability that is supported by far-reaching legislation, has large budgetary and staff resources, and has political clout. The challenge for most countries, including South Africa, is how to obtain the benefits of an environmental protection agency without the associated costs. The costs are not only financial: the US EPA has recognized that confrontation and a “big-stick” approach can be less effective than encouraging potential polluters to take responsibility for their own actions, and this, combined with reduced resources for the US EPA, has led to stronger emphasis on a partnership approach.

The Mission believes that, in the short term, the new South African government could put in place the essential elements of an environmental protection agency system without trying to convert the Department of Environmental Affairs and Tourism into such an agency. In the longer term, a stronger agency bringing together some parts of the existing national government departments, especially those responsible for environmental monitoring, may be better able to play the catalytic role necessary to move South Africa from “end-of-the-pipe” environmental control toward pollution prevention based on the Precautionary Principle, which is fundamental to sustainable development.

The Precautionary Principle

Coined at the Bergen Conference in Norway (1990), which was designed to follow up on the World Commission on Environment and Development, the Precautionary Principle, as the name suggests, advocates the need to act on possible environmental threats even when lacking conclusive scientific evidence (such as with climatic change). If an activity or substance clearly carries a significant risk of environmental damage, it should either not proceed or not be used, or should be adopted only at the minimum essential level and with maximum practicable safeguards (for example, screening of potentially hazardous substances before their introduction on the market).

In the “**Polluter Pays Principle**,” the cost of pollution should not be borne by society and the environment at large, but by the individual, group, or company producing the pollution. Consequently, market prices should reflect the full cost of environmental damage arising from pollution, or more accurately the full cost of preventing such damage. In the international arena, the Polluter Pays Principle requires states to pay damages for failing to take all appropriate action to protect other states from the harmful effects of transboundary pollution. For example, under the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal, the Polluter Pays Principle is applied for waste generation, treatment, and disposal. Waste generators, treaters, or users must take responsibility for the cost of avoiding environmental damage as a result of their activities and for the cost of repairing any current or future environmental degradation.

The Polluter Pays Principle was first invoked in international law in the Trail Smelter Arbitration between the United States and Canada from 1928 to 1941. The tribunal decided that Canada had to pay the United States for damages resulting from the smelting operation and to abate the pollution. Ever since, the principle has played a major role in national law and regional and international conventions relating to environmental issues.

It is important to recognize that an environmental protection agency, or strong central agency for the environment, cannot be effective alone. In addition to local and provincial bodies, other elements at the national level necessary for a central environmental agency to be effective include good environmental legislation, an independent

enforcement capability, cabinet-level status and (or) high political access, public accountability, and public support, all underpinned by a strong research program. Perhaps less well recognized is that much of the successful track record of the US EPA was based on the strength of its in-house economic analyses, which could demonstrate the economic benefits of environmental protection. Today, the US EPA has adopted a similarly innovative approach in exploring financial incentives to encourage investment in environmental quality.

The Mission, therefore, focuses attention on the need to develop an effective system in South Africa for environmental management, keeping in view the necessary components of good legislation, independent enforcement, public and stakeholder involvement, research, and political commitment. Another key element is a strong link between the environmental management system and the national systems for finance and planning.

Recommendations

Commissioner for the Environment

- *The Mission recommends* that a national Commissioner for the Environment be appointed to act as an advocate for the environment, with the authority to carry out investigations into alleged infringements of the environmental rights of South African citizens, including those involving government bodies and departments.

The office of the environmental commissioner would play the role of “environmental ombudsman.” The challenge would be to keep the office small and able to respond effectively to the public without getting bogged down with a huge caseload. The office should be independent of other government departments, highly responsive, and visible. It should be able to call on the technical resources of government departments and bodies such as the Council of Scientific and Industrial Research (CSIR). It should report to the President and, through that office, annually to Parliament so that it can table public reports on its activities and major findings. There are a number of models using this innovative approach to environmental rights, but most are new and experimental. One option would be to put the

environmental commissioner's office within the Office of the Public Protector. This would be simpler administratively, but might reduce the visibility of the function.

Forums on Environment and Development

- *The Mission recommends* that advisory bodies be established at national, provincial, and local levels to provide input from civil society to the government about the wider issues of environmental policy and sustainable development, and specifically on the priorities and means for integrating environmental considerations into the RDP.

These advisory bodies would bring experts and stakeholders from key sectors in the economy together with labour, public interest groups, and civil society. Their role would be to provide advice to the President on environmental policy within the larger national policy debates and to identify priorities for research and action. A key function would be to support governments with longer term policy advice and input into priority setting. The Mission does not see these forums as technical groups or as becoming involved in day-to-day environmental management and routine problem solving. The model is more that of the Canadian Roundtables, which are multistakeholder bodies seeking to develop consensus by bringing everyone around the table. This model does not limit them to being "talk-shops." They can be task oriented and produce reports and commentaries or organize workshops. Subsidies to civil society groups to enable them to play an effective role in the forums may be necessary.

Environmental Monitoring and Extension Agency

- *The Mission recommends* that the existing monitoring, enforcement, and extension sections of several government departments be consolidated into a new agency for environmental monitoring and extension that reports to the Minister for the Environment.

This might include, *inter alia*, resource conservation inspectors and agricultural extension officers of the Department of Agriculture; provincial nature conservation officers and sea fisheries inspectors; government mining engineer inspectors from the Department of Mineral and Energy Affairs; air pollution inspectors from the

Department of Environmental Affairs and Tourism; and water pollution inspectors and foresters from the Department of Water Affairs and Forestry. We would further recommend that there be close links between the proposed Environmental Monitoring and Extension Agency (EMEA) and the agencies responsible for occupational health (currently the Department of Labour) and nuclear safety (Department of Health and the Council for Nuclear Safety), but that these groups would continue to operate under their existing mandates.

The EMEA that the Mission envisages is not a replication of the US Environmental Protection Agency, but something more far-reaching and novel in scope. It would encompass not only the technical tasks currently undertaken by the various inspectorates but also public education and environmental extension services. The South African situation of limited numbers of qualified technical personnel, many people living in isolated rural areas, and an emerging strong civil society movement provides an opportunity to build a new kind of environmental agency based on environmental education and local involvement; partnership with the private sector; and the most advanced concepts and techniques for assessing environmental quality, valuing natural resources, and establishing environmental quality standards.

Such an EMEA would need legislative force, independence from undue influence, well-trained personnel, and a strong presence in the provinces and at the local level. It would depend heavily for its effectiveness on its ability to collaborate with local and provincial inspectors, such as forest rangers, building inspectors, local planning officials, and medical officers of health. It would also need the support of the public and community leaders as it would need to enrol their active involvement as the “eyes and ears” for the environment, to act as the first level of environmental observers, to report where there are problems, and to carry out simple tests and make standardized observations. To achieve this public support, any agency would need to be seen as acting first and foremost in the interests of the environment and the environmental rights of the public.

The EMEA would also need the confidence of the private sector and other government departments with whom it must work to encourage self-regulation and responsible care and, where necessary, to ensure compliance with environmental regulations. It is important that environmental agents at all levels be well trained, and that their training be regularly upgraded so that high standards and strong morale are

maintained. This probably means building the new agency from the bottom up; that is, creating a new cadre of local or community environmental agents who can act as the first response team and extension workers, thereby allowing the scarcer, more highly trained technical personnel to focus their attention on situations that warrant their skills. The general, technical level of environmental inspector will need to be drawn from civil society in all parts of the country, and new training programs established.

In addition to having strong regulatory powers, the new agency should take the lead in developing a consensus-building process for environmental management and cleaner production that brings industry, labour, and civil society structures together to establish targets and plans for continuously improving the environmental performance of all sectors, including government. The new agency should also develop strong links with the research community and with technical groups in other line departments. One important link will be between the Office of the President (which houses the Ministry for Reconstruction and Development) and the new agency to ensure that environmental considerations are integral to RDP implementation.

The Mission proposes the following:

- A highly decentralized corps of basic level agents, working closely with local communities, the private sector, and government, who can call upon a smaller group of highly skilled and specialized inspectors when necessary, thus avoiding unnecessary duplication of effort while increasing the “cover” of the agency in the field;
- A technically competent, highly motivated group of environmental inspectors, with sufficient resources to effectively oversee compliance with the law, and the breadth of vision and public confidence to encourage environmental protection that goes beyond compliance toward innovation in the public interest;
- An integrated view of environmental protection that rises above sectoral or single-resource issues; and
- Sufficient independence from other bodies that it can make tough decisions when necessary and be seen to be so doing.

The Mission has received many comments on this proposal, some of which are supportive and some of which see problems in trying to bring different groups of inspectors together under one roof. Others

fear that the idea will be too expensive or too top-down in regulating industry. In reviewing the recommendation, the Mission wishes to emphasize more clearly two key aspects of the proposed new agency: a partnership approach with industry and public education and involvement. In essence, the Mission sees the EMEA as being both a monitoring and regulatory agency and an environmental extension service to natural resource users and landowners.

Environmental law reform

- *The Mission recommends* that, early in the administration of a new government, a group of competent individuals be mandated to undertake a comprehensive review of environmental legislation.

Among their tasks, the group would review legislation in light of the new Constitution, particularly the fundamental right to an environment that is not detrimental to one's health or well-being, and the right of access to information required for the protection or exercise of one's rights. This important new approach to human rights and the environment is likely to lead to systemic changes in the legal provisions for access to information and the legal standing of communities and groups, such as environmental NGOs, and civil society in pursuing cases of infringement on environmental quality. The issue of *locus standi* will need to be reviewed, both for the rights of the public to take legal action and for the rights of different governmental bodies to have recourse against one another.

Any review of environmental legislation will also need to consider changes necessary to respond to the new division of responsibilities among central, provincial, and local government bodies. Other proposed reforms that need examination are a general move away from voluntary compliance toward mandatory, legislated regulations; and the need for greater consistency among laws with respect to procedures and penalties. At present, provisions dealing with environmental quality and natural resources are scattered throughout the current legislation and it will be a major task to bring them together for review. International experience would be useful in carrying out this important task.

A more far-reaching approach to regulatory review would be to give guidelines, or even requirements, to all government departments and the private sector to provide natural resource accounts and

environmental performance. These should include data about reports on their use of natural resources and environmental services, and the outcomes in terms of environmental quality. Environmental reporting is becoming more common among larger private enterprises, either as a component of their annual reports or as a separate environmental performance report. National state-of-environment reports are also made, but are of varying quality and usefulness. The United Nations, the United Nations Environment Programme (UNEP), and the World Bank are working together to develop alternative national income accounting systems that would include natural resource expenditures, and a number of countries are moving their systems of national accounts to include environmental costs and benefits (see box below: “Environmental and Natural Resource Accounting”).

Environmental and Natural Resource Accounting

Environmental and natural resource accounting is a system of national or business accounting in which environmental assets are not considered to be free and abundant but rather scarce economic assets. The broad goal is to help people and nations conduct economic activities in an environmentally sound manner by reflecting and accounting for the true cost of economic activity.

Environmental and natural resource accounting takes into consideration the cost, in terms of the impact on land, air, and water, resulting from a production process. Environmental costs are analyzed not only during production but for the entire life cycle of the product. This is also known as the cradle-to-grave, or cradle-to-cradle, approach. For example, over the years 1971 to 1984, the gross domestic product (GDP) for Indonesia increased at a rate of 7.1 percent; but, if resource depletion were calculated in and given a dollar value, the average annual increase in GDP would be more in the area of 4 percent (Repetto et al. 1989).

Work has been under way at the international level to develop an alternative national income accounting system since 1982. Current efforts are being coordinated by the United Nations Statistical Division, in cooperation with UNEP and the World Bank. At the national level, several countries, including Norway, France, Italy, Australia, Canada, and the United States, are developing proposed amendments to their system of national accounts to internalize environmental, and in some cases social, externalities into their calculations of gross national product (GNP) and other economic indicators.

Environmental assessment and review process

- *The Mission recommends* that there be a stronger environmental assessment and review process, including social impact assessment, with mandatory environmental impact assessments within the framework of the existing integrated environmental management (IEM) procedure.

This should build on the current IEM procedure, which was developed by the Department of Environmental Affairs and Tourism following a recommendation made in 1989 by the Council for the Environment. The IEM procedure is a series of guidelines designed to supplement and complement existing requirements rather than to replace them. The Mission recommends that the guidelines be reviewed and strengthened within the context of the overall reform of environmental legislation recommended above. A strong and competent office for environmental assessment and review, with legislative “teeth” and a competent professional staff, will be needed, both in the interests of environmental protection and in the interests of a stable regulatory environment for the private sector. This function could be carried out within the Department of Environmental Affairs and Tourism or, as in some countries, as a separate agency.

Better integrated environmental administration

- *The Mission recommends* that the government machinery for environmental management be overhauled to increase effectiveness and promote a more integrated approach, to reduce conflicts of interest, and to ensure that decisions are based on the best available information.

The Mission heard many proposals for restructuring central government departments, with a view to increasing efficiency by reducing the number of national government departments; promoting a more integrated approach to environmental management by amalgamating divisions within and among departments; and creating a stronger voice for environment by either strengthening the current Department of Environmental Affairs and Tourism or creating an independent environmental agency (frequently called “the EPA option”).

We recommend that the number of departments responsible for different components of environmental management be reduced in the

interests of efficiency and effectiveness. The Mission hesitates to specify what form the restructuring should take for two reasons. First, it would require a more detailed examination of current departmental strengths and political priorities than we were able to make and, although we had the benefit of the detailed recommendations made by the President's Council in 1991, we felt that the current circumstances warrant a review of all previous proposals.

Second, the Mission is of the view that there is no ideal government structure for environmental management, as witness the frequent changes made to combine and redivide departmental mandates, not only in South Africa but in most other countries, in the search for an "ideal" solution. Our recommendations, therefore, focus more on getting the processes right than on the specifics of the structure. Our experience suggests that if the processes are right, they will overcome a less than "perfect" organizational structure; but, if the processes are weak, no structure, however good, can make up for deficiencies in the process.

By process, we mean such things as the production of, and access to, adequate information for decision-making at all levels, and appropriate relationships among government and other key stakeholders, especially the private sector and parastatals, organized labour, public interest groups, and civil society, within a participatory democracy. These relationships include the minimization of conflicts of interest and the existence of appropriate checks and balances. Indeed, some of the alleged problems with recent changes to departments, which were intended to improve efficiency and increase integration, relate to concerns about conflicts of interest in resource allocation. These are process issues best dealt with by building checks and balances into the overall environmental management system.

One restructuring proposal presented to the Mission suggests that South Africa examine the model of a Department of Natural Resources, which would bring together the management of water, air, and land resources, such as is being developed in Uganda. Another proposal suggests that the portfolio of Environmental Affairs should also include planning so that environmental concerns can be incorporated into macroplanning decisions at an early stage. There are also problems associated with establishing departments with mandates that are too broad (so-called "super-ministries"), which sometimes include competing interests. In a combined Planning and Environment

Department, planning might take precedence over environment. In an ideal world, there would be a Department for Sustainable Development in which all relevant issues would be integrated; in a less than ideal world, this integration must be achieved by strengthening information flow and collaboration among all government departments and across national, provincial, and local administrations.

A strengthened Department of Environment

- *The Mission recommends* that the Department of Environment be able to require other departments to consult with the Minister for the Environment before any action is taken that will affect the environment and natural resources.

Whether or not the Mission's recommendation to establish a new agency for environmental monitoring and extension is accepted, we recommend that the existing Department of Environmental Affairs and Tourism (DEAT) be strengthened. Currently, the onus is on DEAT to consult with other departments, rather than the other way around. The Mission recommends, at a minimum, that legislative reform require other departments whose actions affect the environment to consult with the Minister for Environmental Affairs and Tourism before any such action is taken. Currently, DEAT plays a key coordinating and consultative role, but has virtually no power to act in the interests of the environment against other departments, and even less to act against the private sector. To enable DEAT to become the government champion for the environment will require more than changes to the Department alone; it will require a significant change in attitude across government bodies, both national and provincial, to achieve integrated environmental management. Part of this desirable attitudinal change relates to a greater willingness on the part of government officials to accept input from civil society through a broadly based consultation process.

The Department also needs an infusion of new professional and technical staff as it is seriously understaffed for the job at hand. This will necessitate an increase in its budget relative to other departments.

Part II

Basic Resources for National Development



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Chapter 4

LAND

Situation Synopsis

Land, and the manipulation of access to land resources, has been the key area of political conflict in South Africa. Although there is an urgent need to resolve political disputes around land through its restitution and redistribution, the key issue for the future is sustainability of the land resource base of South Africa — that is, prevention of further degradation of land and soil quality. There is no doubt that the future wealth and health of the country is dependent on how its most important natural resource base is cared for by today's generation of South Africans.

The history of land management has been characterized during both the colonial period and the more recent apartheid period by the alienation of land from the majority of the South Africa people. Approximately 86 percent of the land was, and still is, owned by a small, white minority, with the majority of the people being forced onto 14 percent of the land. The management of land in South Africa is also characterized by a system of strongly protected private ownership, including mineral rights, and by the concentration of large sections of land in the hands of corporate owners. In 1988, 30 percent of the commercial farmers owned 84 percent of the commercial farming land (McKenzie 1994).

Existing tenure systems have favoured the white minority, particularly white men, and, to a much lesser extent, black men. Women, although the major agricultural producers, have had little access to land. In urban areas, women, particularly black, working-class women,

have similarly had little access to ownership of land. Farm workers have had no security in relation to their homes and have often been thrown off the land at the whim of the white farmer.

A shortage of land as a result of apartheid legislation, such as the 1913 *Land Act*, exacerbated by a lack of access to extension services, credit, and markets, has caused low agricultural outputs by many black farmers. It has also resulted in overgrazing, erosion, and the loss of topsoil, leading to impoverishment, health and nutrition problems, and unsustainable political conditions. Furthermore, the problem of landlessness has forced rural people onto marginal land in an attempt to survive. This has caused severe degradation of such land.

Landlessness, and the resulting overcrowding and overgrazing, as well as inappropriate farming methods on commercial farms, has given rise to severe land degradation and soil erosion. In general, South African soil is poor and easily eroded, so it is very sensitive to mismanagement. Acidification is the second most important cause of degradation of arable land. There is a severe risk of increased land degradation if certain preventative measures do not accompany rural restructuring and land redistribution. However, a lack of data on the extent and rate of land degradation makes assessment of the severity of the problem, and decisions on appropriate remedial measures, extremely difficult.

Land use in South Africa is broadly divided into urban space, agricultural production, nonagricultural use, nature conservation, and forestry (Figure 1). The total land area of South Africa is about 122 million hectares. About 80 to 85 percent of the surface area is devoted to agriculture, and about 1.5 million households are dependent on agricultural production for their family income. Estimates suggest that some 20 000 hectares of arable land are lost to urbanization each year (World Bank 1994).

There is now strong evidence to indicate that South African soils are deteriorating rapidly as a result of poor management practices and a lack of adequate monitoring and enforcement. The most serious threats to land resources are erosion, compaction, acidification, salinization, and infestation by weeds and pathogens. South African soils are by nature fragile, and human activity has had a great impact on the nature of this fragility and can cause irreparable damage to limited and valuable soils, especially agricultural soils. Indeed, the annual loss of soil is acknowledged to be extremely high: "This may well be the

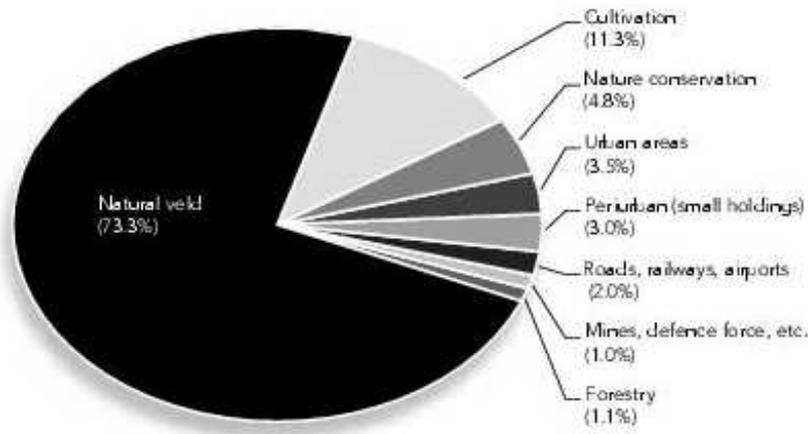


Figure 1. Land use (percentage of total) in South Africa.

greatest environmental problem facing South Africa, yet the South African population appears to be most complacent about it” (Verster 1992).

Estimates indicate that about 13.5 percent of the surface area of South Africa is suitable for crop production (in predominantly white-owned areas). Of this area, approximately 4 million hectares, or 3 percent, is considered to be high potential agricultural land. Nonarable land dominates most of the western and interior parts of the country, where the annual rainfall is below 500 millimetres. The two main types of land use in these drier areas are commercial animal production (about 69 million hectares) and “ecosystems services,” including water supply, biodiversity conservation, tourism, and recreation (11 million hectares). Half of this land is managed by the state and the other half by private individuals and corporations.

Around 67 percent of the total cost associated with soil degradation occurs as a result of soil erosion. South Africa has lost some 400 million tonnes of top soil each year for the last decade. Irrigation is causing salinization of croplands. Over 70 percent of these costs are borne not by the farmer but by the public at large. Research undertaken by the Development Bank of South Africa (DBSA) has shown that the cost of rehabilitation and amelioration of degraded soils is so high that it exceeds the current land value.

In the former homelands, conditions are much more serious because they are characterized by poor land, politically enforced overpopulation (by 1985, roughly 14 million people were living in the homelands, which accounted for only 13 percent of the country), and poverty. It was largely by political design, in the creation of homelands, that blacks were generally given land that had poor soil quality, with low and erratic rainfall. Five of the homelands registered population densities of 0.1 arable hectares per person; in the former Natal and Cape provinces, however, it averaged 2.5 hectares per person. This overcrowding and natural degradation processes have reduced significantly the productive potential of the land (see box, pp. 45–46: “Former Homelands”).

Institutional Framework

Most land tenure in South Africa falls into three broad categories: private and company freehold title on most commercial farms; common property regimes in the homelands; and state-owned land, especially some forestland, nature conservation areas, and a relatively small area of trust and public lands.

Currently, freehold tenure confers extraordinary property rights on the titleholders. Their rights extend over the natural resources and the people living on the land, as well as the minerals under the surface. Current tenure patterns are associated with poor land-management and land-use practices, encouraged by a government policy framework of subsidies and incentive schemes that has led to overexploitation of valuable natural resources, particularly in the agricultural sector. The interim Constitution enshrines individual property rights under the individual rights clause, and some argue that, in fact, this clause makes it difficult for land reform to take place rapidly and effectively.

In some homelands, the tribal system has largely lost its legitimacy because most homelands chieftains were seen to be an extension of the former South Africa. Therefore, traditional communal land-management systems have now become open-access areas because of the breakdown of usufructuary rights. Women in rural areas constitute 80 percent of the population, but under customary law they have never had access to land and the right to participate in decisions on the use

Former Homelands

As a result of the *Land Acts* of 1913 and 1936, the most productive agricultural land in South Africa was reserved for whites. Blacks were prevented from land ownership in 87 percent of the country. But after 1948, apartheid's divide-and-rule tactics went even further. The remaining 13 percent of the country allocated to black ownership was further divided into unviable patches allocated to specific ethnic groups endorsed by Pretoria. These ethnic territories were reconceived as the "homelands" of most black people. Black people were allocated limited rights there in exchange for their loss of rights in the remaining 87 percent of the country. For the 4 out of 10 "homelands" whose puppet leaders accepted a spurious independence, recognized only by the apartheid government, the entire ethnic group was deprived of its South African citizenship.

The former homelands generally lack both natural resources and trained human resources. They are characterized by poverty and overpopulation. The land question is at the heart of most ecological problems experienced in these areas: for example, in Qwaqwa it is reported that the population density approaches 300 people per square kilometre. In Ciskei, it is about 100 people per square kilometre. In contrast, rural areas outside the "homelands" support population densities of between 2 and 11 people per square kilometre. The major source of income for the people in the homelands is the gold and other mines located elsewhere in South Africa, where they work as migrant labourers. Their main activities within the former homelands are animal rearing and maize cultivation.

Farming in the former homelands relies heavily on the use of fertilizers and pesticides. Under the previous government, farmers in these areas had limited or no agricultural extension services, so cultivated fields were abandoned after a few years when their fertility declined as a result of soil erosion and soil toxicity, the latter because of overuse of chemicals to enhance productivity in the short term.

Rearing of cattle, sheep, and goats is based on commonland grazing, with an open-access tenure system. Increasing livestock populations have led to overgrazing of pastures and consequent soil erosion and desertification. Livestock, particularly numbers of animals, is an important symbol of wealth, especially for men, and this has exacerbated the size of herds. Cattle are also used as draft animals in the fields.

Soil erosion is a common feature in the homelands. Given the limited amount of land at the disposal of the people in the homelands, soil erosion clearly robs them of more useful land.

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Inadequate investment in water supply and sanitation in the homelands has led to reliance on polluted water in rivers. To a certain extent, this problem is responsible for the high incidence of illness in rural areas of the homelands. During droughts, the former homelands suffer more from acute water shortages than do other parts of the country.

The reduction in the labour force as a result of retrenchment in the mining industry, as well as increased mechanization on white farms, has resulted in the increased population density in the former homelands, especially over the last 5 to 10 years. As a result, people have been forced to go back home. These pressures on land result in poverty, enforced high population density, a lack of resources, and a lack of investment in land management to counter land degradation.

It is clear that the new democratic government has inherited a legacy of generally bad land management in the homelands. This will prove difficult to overcome. But, as more land becomes available, along with reduced pressures from human and animal population numbers and better education and support services for the people, the social and environmental situations there will improve.

of natural resources. It is not known to what extent existing customary law will change to accommodate the needs of women.

Currently, the management of land resources is spread over several ministries, each carrying out their jurisdictions as mandated by their specific acts. The most obvious deficiency in the existing institutional framework is the lack of an integrated land-use strategy, and one based on protection of the natural environment. The current legal system, which is based on land as an economic good, needs to be able to incorporate environmental sustainability and a “duty of care” into the formulation of laws surrounding the ownership and use of natural resources. Although integrated environmental management requires environmental impact studies to be conducted before any land can be developed, it does not have sufficient teeth to stop development if it is initiated by another ministry. The Mission has been told that most land-use planning has been top-down in nature and has often adversely affected poorer communities.

Policy Issues for Government

Major conflicts surround the unequal distribution of land that resulted from apartheid policies designed to separate whites and blacks. These are embedded in all land-use patterns, including urban land use, nature conservation, agriculture, and forestry. Much of this was achieved through the forced removal of black people from land to which they had cultural and social ties. The new government has committed itself to redressing land claims and the demands for land through a restitution and redistribution program. The ANC has committed itself to distribute 30 percent of the land over 5 years through its land reform program. Such a major reversal of past trends will certainly engender public and private conflicts, and it is important that, in all the debate, the primacy of land sustainability and continued productivity does not get lost.

A second major conflictual issue involves the whole area of tenure patterns, and access to natural resources, as currently embodied in customary and statutory laws. The land-use patterns that developed under apartheid are intrinsically linked with patterns of ownership and distribution. Some 80 percent of agricultural production comes from 25 percent of the farms in the country. It will be one of the major tasks of the new government to change patterns of land ownership so that they reflect the needs of the majority while continuing to be productive. Furthermore, the issue of tenure rights for women needs to be addressed.

The integration of former homelands into the new provinces will be difficult to manage. The former homelands are burdened with a degraded environment that will require considerable investment to restore them to a productive state.

Conflicts can be anticipated between rural and urban populations and authorities. The need of expanding urban populations for land will impinge on the interests of nearby rural populations, and decisions will be needed that take into account the overall context of the land resources of the country.

One of the first issues that must be addressed, therefore, is the redistribution of land. The new government, led by the ANC, is already committed to this process. It is essential that not only current ownership and rental value but also the underlying environmental sustainability of the land be considered when land is redistributed. In the

future, the environmental impact of all forms of land use should be reviewed, and practices leading to land degradation should be legislated against, with economic incentives being made available to those who maintain or upgrade the natural resources on or in their land. Already, much of the agricultural land is severely degraded. Therefore, proper land management is critical to any attempt toward sustainable development for South Africa.

Legislation controlling the management of land comes under the authority of several departments. Improved collaboration among departments such as Environmental Affairs and Tourism, Water Affairs and Forestry, Land Affairs, and Agriculture in the development of an integrated land-use management strategy, as well as rationalization of the legislation for which they are jointly responsible, is important for the long-term sustainable management of land resources. Collaboration will also need to be strengthened between national and provincial departments and local authorities and town planners.

- Land reform must accompany an environmentally sustainable land-use strategy. For this to happen, the state must provide the necessary assistance by ensuring that the appropriate infrastructure, such as markets, access to finance, social amenities, and other opportunities that allow the poor to meet their basic needs, is in place. Land degradation, while associated with poor management and poor land-use practices, is also strongly linked to the presence of poverty.
- There is a need for a coherent and coordinated land-use strategy at national, provincial, and local levels. The national government should set policy guidelines and must ensure that provincial legislation for land management is in line with national interests. Security of land tenure can be one of the keys to better land management; however, this will only come with an overall policy framework at the national and provincial levels that provides incentives to conserve and protect valuable land resources.
- Integrated land-use management must be accompanied by a participatory approach to all development projects.
- Future policy must protect the environment while treating farmers and other land users, whether private or communal, as custodians of the land.

- The issue of tenure rights for women needs to be addressed as a matter of urgency. The Mission has heard two sets of opinions on whether or not women have access to land under communal land tenure systems.
- The residential rights of farm workers need to be reviewed and guarantees established.

Recommendations

1. The legal framework that governs ownership and access to natural resources should incorporate as its central focus the environmentally sustainable use of land. The legal framework for land redistribution should place public interest above private interest, and should incorporate criteria for environmental constraint and optimal land use. Systems of tenure for redistributed land should include incentives for good land management and, where appropriate, restrictions to ensure the duty of the owner or lessee.
2. An extensive land-use pattern data bank, especially from the former homelands, should be compiled where such data are most deficient.
3. Government should use both economic and legal instruments to ensure that land as a resource is protected from further degradation. All high-potential arable land should be identified and reserved for agricultural use. The current Key Soil Conservation Works Programme, aimed at saving badly eroded areas, should be reinforced.
4. Integrated environmental management procedures should be incorporated into all land-use planning, and interdepartmental structures should be established to enable integrated land-use planning with national, provincial, and local governments.
5. Research should be undertaken to determine the extent, rate, and causes of land degradation in South Africa to establish the most appropriate and cost-effective remedial measures, including changes to current agricultural practices. Of particular concern is land use along rivers, which increases erosion and siltation rates.

- Research, possibly through pilot studies, should be carried out on land reform and land tenure arrangements, including the role played by chiefs and *indunas* (spiritual leaders) in land allocation. The experiences of other African countries carrying out land reform should also be reviewed. The role of particular tenure arrangements in promoting sustainable development is an issue of concern; among those arrangements that should be examined are communal, household, and individual forms of tenure and the whole relationship of customary law with regard to land tenure.
- Public awareness of the issues surrounding land redistribution and the need to sustain land resources and land productivity should be part of a major popular environmental education initiative. SOS or “save our soils” needs to become part of every South African’s vocabulary, and should become the focus of a major popular education campaign to promote conservation.

Chapter 5

WATER

Situation Synopsis

Water is scarce in South Africa. Management of water resources in the national interest, therefore, is a key policy issue for underwriting future economic and social development. South Africa has an average annual rainfall of about 500 millimetres. Except for the eastern and southern coastal areas, most of the interior and western parts of the country are arid or semi-arid. Sixty-five percent of the land area receives less than 500 millimetres of rain per year, and about 20 percent receives less than 200 millimetres per year. Potential evapotranspiration is well above the annual rainfall over most of the country, so surface runoff is reduced through high evaporation losses. Groundwater supplies are very limited, so rivers are the most important sources of water. The loss of water through evaporation (especially behind dams) and highly variable stream discharge rates reduce the reliability of surface water supplies. South Africa has a cyclical rainfall pattern that can result in very low rainfall for several years in a row; in addition, water availability varies greatly in different parts of the country. It has been calculated that South Africa is already using two thirds of the approximately 33 000 million cubic metres of surface water available annually. For these reasons, South Africa has been developing agreements over water transfers with neighbouring countries such as Lesotho and Swaziland, and has been considering nonconventional sources of water such as desalination and importing icebergs.

Demand for water is increasing rapidly for irrigation, municipal and domestic uses, forestry, industry, mining, power generation, and

nature conservation. As demand for water in each of these sectors increases, the proportion of water available for the environment, especially the recharge necessary for maintaining the ecosystems of lakes and estuaries, is reduced (Figure 2). There is already concern that the amount of water necessary for the natural flushing of estuaries has been underestimated, and that too little water has been allocated to sustain the natural environment. To meet the Reconstruction and Development Programme goal of accessible water and sanitation for all

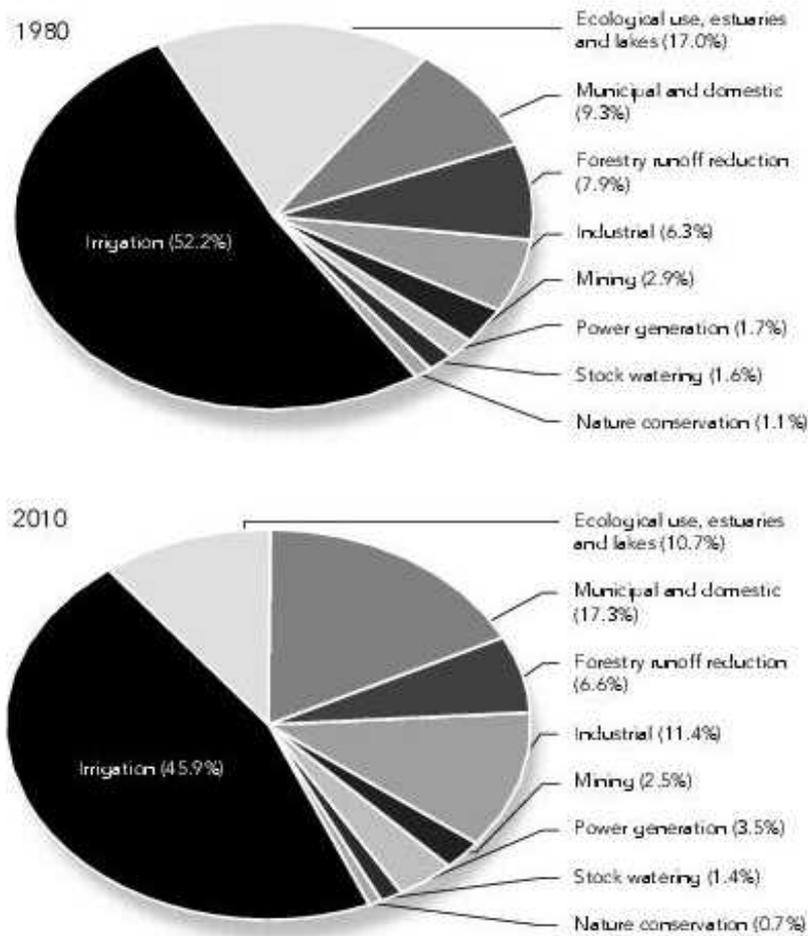


Figure 2. Proportional water demand by sector in South Africa: 1980 and 2010 (estimate).

South Africans, the demand for domestic and municipal water will increase over the next decade.

Irrigation is by far the major end user of water, with private farmers currently accounting for about 59 percent of irrigation water consumption compared with 22 percent under the control of irrigation boards and 19 percent under government schemes. However, there is little metering or control, so these figures are estimates only. For the country as a whole, livestock rearing uses little water, but it is also concentrated in the more arid parts of the country. Power generation and mining are also minor consumers of water on a national scale, but locally they can have a major impact on water demand and thus need to reduce consumption wherever possible. Industry, power generators, and mines are developing ways to reduce and reuse water, and have achieved significant savings. The area of greatest water demand is Gauteng Province, with its large industrial urban population and lack of major water sources.

Forestry is a major user of water, and one that is controversial. It does not require infrastructure to use water and is a major export earner for South Africa. It is also important in reducing erosion in mountain catchments and in consolidating coastal sand dunes. Forestry area has been controlled through a permit system since 1972, which allows assessment of the impact of planned forest development on water availability for other users in the catchment. Compared with agriculture, it is said that forestry is a more efficient user of water in terms of its contribution to GNP per cubic metre of water consumed. However, the projected increase in forest area needed to meet South Africa's demand for fibre, board, and paper by the end of the century means that some hard choices will have to be made in allocating future water resources.

It is estimated that about 13 percent of the total demand for water should be allocated to the environment to sustain the natural processes and structures of South Africa's ecosystems. This is about 10 times the amount considered necessary for nature conservation in 1970 (South Africa Commission of Enquiry into Water Matters). Increasing removal of water from streams, especially during peak flows, has changed their regimes, while more effluent from municipalities, agriculture, and industry has increased the concentration of contaminants in the reduced volumes of stream water. The combination of a reduced quantity and poorer quality of water is affecting natural river systems.

Estuaries are of particular concern, and have received public attention over the case of St Lucia (see box, pp. 55–56: “St Lucia: A Case Study of Conflict over Land Use”). Estuaries are rich marine environments that depend on a careful balance between freshwater inflow and sea water. Conservation areas, currently numbering about 300 public and private parks with a total area of 3.5 million hectares, also need water to maintain their ecosystems, for game and for visitors. A policy of more conservation areas will require that more water be allocated to them.

Institutional Framework

The institutional and legal framework for water management is complex. Originally, water supplies were provided by private water companies that evolved into public utilities in which key consumers had a major influence. Irrigation demand played a large role in early water policy, and irrigation boards were established as early as 1877. State subsidies to municipalities for domestic water supplies and to private irrigation schemes were started in the 1930s, but it was not until the *Water Act* of 1956 that the state obtained major control over water and could develop a national water policy. The difficulty remains that water rights are essentially private, based on riparian rights, and that state control, except in special areas, is over that water in excess of existing users’ rights. The Department of Water Affairs and Forestry (DWAF) has, over the years, developed a national water strategy and has achieved a reputation for technical excellence. The 1970 Commission of Enquiry into Water Matters recommended that longer term and more holistic water planning were needed and that the issue of water allocation among competing uses in the national interest was critical. The Commission felt that more collaboration between departments and more accountability to Parliament for future policy and water schemes would be beneficial.

The DWAF has responsibility for broad national policy, but implementation of that policy rests with regional management within the DWAF. These regions are not the same as the regions in the National Physical Development Plan, so local-level objectives in the two national policies have to be compromised to accommodate differences in national planning regions. Below the regional level is the town or

St Lucia: A Case Study of Conflict over Land Use

Africa's largest estuary has been the site of a bitter struggle over the past 4 years. Located in the northeast corner of South Africa, near the border with Mozambique, at the ecological transition between tropical and temperate belts, the St Lucia wetland area comprises an estuary, a string of lakes, and wildlife reserves, and is the outflow point of a number of Natal's rivers. For almost a century, its wildlife areas have been managed by the Natal Parks Board. The complex of terrestrial, estuarine, and marine systems includes rare mangrove forests, turtle-breeding areas, tropical forest systems, and coral reefs.

In the past, there have been a number of assaults on the area, such as its conversion to a missile-testing range in the 1960s and the alienation of part of the Eastern Shores to state-owned forest plantations of exotic species. During the course of these encroachments, indigenous communities were forcibly removed from their lands and placed under the leadership of other traditional leaders not of their own choosing.

It is the same area, the Eastern Shores, that has recently come under the public spotlight. Some years ago, prospecting rights were granted by the state to Richards Bay Minerals, a company half owned by Rio Tinto Zinc and half owned by local mining conglomerate Genmin. The company aims to mine the dunes, which are rich in titanium, a mineral used, among other things, as a substitute for lead in paint. Richards Bay Minerals, which has a similar enterprise in the port of Richards Bay, to the south of St Lucia, is aiming to corner 25 percent of the world's titanium market share. In anticipation of this, it has constructed a titanium smelting plant at Richards Bay.

Since the system of integrated environmental management was first introduced in South Africa, it has become obligatory for an enterprise seeking to initiate a new mining development to commission an environmental impact assessment (EIA).

The St Lucia EIA process, organized by Environmental Management Services of the parastatal Council of Scientific and Industrial Research, attempted to evaluate the development options for the Eastern Shores area. It offered two options: mining together with ecotourism, an option favoured by Richards Bay Minerals, and an ecotourism-only option, favoured by the Natal Parks Board. The EIA commissioned a series of expert technical studies on St Lucia ecosystems on the potential impact of the mining process, and on the prospects for rehabilitation.

The process identified over 40 "interested and affected parties" (including the US Embassy and the Atomic Energy Corporation of South Africa Ltd), but ignored the local communities affected, which were consulted in only a very cursory way toward the end of the process. It

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turned out that the very land that might be mined was part of the traditional lands of the community that had been removed in the 1970s. Substantial differences of opinion within the National Union of Mineworkers and the ANC prevented clear-cut interventions by these key players. Whereas ANC economists favoured the mining option, President Nelson Mandela was one of 40 000 signatories who favoured protecting the dunes.

Instead of waiting for the new government to reach a decision, the process was rushed to ensure that the final decision would be made by the De Klerk cabinet. Limited periods were established for the acceptance of evidence, and the hearings of the selected review panel were conducted late in 1993. The panel's decision came on 10 December in favour of the ecotourism-only option. Environmentalists, who had considered the entire EIA process biased in favour of the mining option, were amazed and delighted. Before leaving office, the De Klerk cabinet failed to give its verdict, despite an earlier promise by the Minister for Mineral and Energy Affairs to uphold the decision of the review panel.

In evaluating the evidence, the panel felt that mining would impair the unique "sense of place" that St Lucia provides. It felt that mining would only commence after the year 2000 and last for a period of 17 years, with an extra period required for rehabilitation of the area. Ecotourism, on the other hand, could commence much sooner and be more sustainable. The Natal Parks Board, in view of a history of low wages for local people and past failure to defend communities against relocation, could not implement the ecotourism option single-handedly, but would need to form part of a consortium that included the affected communities and the private sector.

Clearly, the major weakness of the EIA process was its legitimacy in the eyes of local communities. Virtually excluded from the process until the final stages, local communities, Natal Parks Board workers, and trade unionists all expressed a preference for the mining option. New land dispensations might also mean that the displaced community may possess title to the affected land. Even if the process is reopened by the new government, the dilemmas still remain. Do the displaced communities have a right to resettle their land or will they have to be content with other land as compensation? Do local people have the right to unilaterally invite mining companies to St Lucia? Do the mine workers have a decisive say in the issue? Will promises of jobs in ecotourism materialize? Will the attempts to declare St Lucia a world heritage site be impeded if mining goes ahead on the dunes?

Many of the issues remain on the table now that the Government of National Unity has taken power. It will need to pay attention to a considerable lobby of conservationists dedicated to ensuring that the area is protected from further industrial incursions and to widen the scope of participation.

metropolitan administrative level. Local concerns and priorities are usually most influential at the regional and local levels, although DWAF regions are based on natural drainage basins as the planning unit.

Policy Issues for Government

Meeting basic needs — The divisive policies of apartheid were prominent in the water sector. While 4 million black people in urban areas lack access to clean water, white households water their lawns and white farmers use cheap irrigation water to excess. For many black rural households, their only access to adequate water is through a shared standpipe some distance away. The lack of adequate water supplies, combined with the pollution of surface water and in some cases groundwater supplies, has resulted in higher rates of child mortality and morbidity among the nonwhite population in both urban and rural South Africa (Figure 3). The first policy issue for a new government, therefore, is meeting basic needs for water.

Allocation — A second issue is the allocation of water among competing sectors, such as agriculture and industry. The environment will also need to compete for scarce water resources to sustain ecological

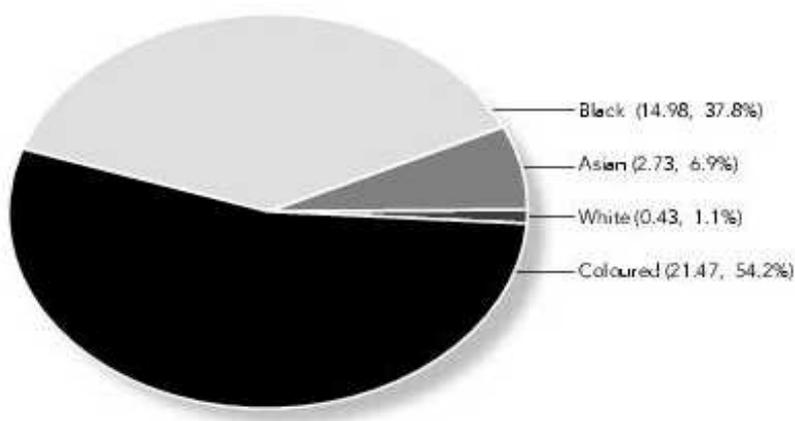


Figure 3. Child mortality rates (per thousand births and percentage of total) in South Africa as a result of diarrhea, averaged over 1980–1985 (from Yach et al. 1989).

functions and provide basic environmental “services,” such as more regular water supplies and water pollution treatment through natural purification of wastewater. In this regard, special mention should be made of wetlands, which are critical to water quality and reuse and are under great pressure from urban and industrial development and pollution loads that exceed their capacity.

Managing water demand — Rising demand to meet the basic needs of the current black population and provide for future domestic and industrial demands requires that attention be turned immediately toward water conservation and reuse, and particularly the effective use of economic instruments such as water pricing. Water prices to current major users are generally too low, although for poor households prices are too high and need to be subsidized. Water prices need to include not only the cost of the engineered infrastructure and operational cost but also the cost of maintaining ecological systems that enable water to be reused and water bodies to be recharged.

Water quality and pollution control — Concern over deteriorating water quality has led the DWAF to approach water pollution control using receiving water quality objectives (RWQO) for nonhazardous pollutants combined with pollution prevention for hazardous substances. This is an improvement over the former uniform standards based on technological and economic feasibility, but the problem of major pollution of streams and water bodies remains, and a more aggressive policy against polluters and enforced statutory requirements to clean up pollution sites is something the new government needs to consider.

Although specific institutional structures and legislation exist to protect and enhance the quality of the environment in general and water bodies, including wetlands, in particular, responsibility for implementation could still be better coordinated among national departments, especially among the Department of Water Affairs and Forestry, the Department of Environmental Affairs and Tourism, and the Department of Health, each of which have specific responsibilities for water. Regional governments and local authorities also need to be involved in implementing a coherent and long-term national strategy. This requires a more effective partnership among levels of government and between government and users.

Recommendations

1. An integrated national strategy should be developed for the protection of water resources, including wetlands, based on the Precautionary Principle of minimizing pollution of natural water sources. Integrated water resources management of issues such as wetland drainage, water supply, soil erosion, forestry, fisheries, and environmental quality protection, which are currently administered separately, should be adopted and promoted. The protection of wetlands is fundamental to the sustainable management of water resources. The capacity of wetland ecosystems to clean and maintain the quality of water bodies should be taken into account in setting the quality standard and volume limits for effluent entering watercourses.
2. The National Water Resources Action Plan should be reviewed and restructured to establish a harmonized and appropriate institutional and legal framework throughout South Africa, with water quality standards and management guidelines for different users based on ecological sustainability.
3. Existing national, regional, and local legislation governing resource utilization and environmental protection should be reviewed and amended to take into consideration the needs and aspirations of all South Africans. Implementation mechanisms should be streamlined, clearly spelling out the responsibilities of each of the implementing agencies.
4. The drainage basin should be the basic unit for planning, developing, and harvesting water resources. Priority should be focused on watershed management to control, conserve, and regulate the water balance in the catchment regions and watercourses.
5. Local capacities for user- and community-based management and maintenance of water resources should be developed and should include women, especially with respect to the prevention of environmental degradation and pollution around water points and water sources in general. A community-based approach to sustainable water resource and wetland management through community mobilization and education is recommended to draw

public attention to the need for, and benefit of, a national water strategy. User communities should be involved in policies regarding wetland protection, utilization, and conservation and should participate in policing catchment areas, monitoring enforcement of regulatory legislation, and monitoring unacceptable levels of effluent discharge into water bodies.

- The use and development of sanitation technology adapted to conditions existing in informal settlements and in rural South Africa should be a priority of the government as it relates to both human health and environmental protection.
- The capacity to measure and continuously assess and monitor the quality and quantity of water resources should be strengthened at all levels: national, regional, community, and individual user. It is essential to ensure that water withdrawal does not increase at a rate that could adversely affect the ecosystems and biodiversity of wetlands.
- All major water and wetland conservation, development, and management projects and projects involving wetland drainage should be subjected to the integrated environmental management process, including an evaluation of the economic and social costs and benefits of protecting watershed forests, wetlands, and other key ecosystems during the economic analysis of such water projects.
- Water policy at all levels of government should be concerned with environmental sustainability and the need to regulate withdrawal from streams, wetlands, and groundwater so that ecological processes are maintained. In particular, wetlands need to be better protected so that water levels in streams do not fall below the minimum threshold necessary to support, sustain, and conserve the integrity of wetland ecosystems.
- The government should examine a restructured system of levies and tariffs for water that better reflects its true cost and encourages more conservation and recycling.

Chapter 6

ENERGY

Situation Synopsis

Energy and the environment are closely linked. Energy accounts for a large portion of air pollution through its use in the domestic, transport, industry, and power sectors. It is also a major source of greenhouse gases and (sulfuric) acid rain through fossil fuels (especially coal). Thus, energy policy has a major effect on environmental quality.

South Africa's energy-use patterns reflect the dualistic structure of its economy, society, and polity. Largely as a result of its history of apartheid, South Africa has great inequities with respect to access to electricity. Electricity is also underpriced for certain industrial users, which creates distortion in the economy and considerable problems for the environment. The developed sectors of the economy and society — the mines, larger scale industry, commerce, transportation, commercial agriculture, and wealthier residential sectors — have enjoyed abundant, convenient, and cheap commercial energy. The economy is centred around the closely integrated “mineral–energy industrial complex” for domestic consumption as well as for export.

Reliance on mineral, energy, and other heavy resource-based industries, as well as on coal for the production of electricity and liquid fuels, on the one hand, and consistently low energy prices, particularly for coal and electricity, on the other hand, has contributed to the comparatively high energy requirements associated with economic activity. The country's proportion of total primary commercial energy consumption to GDP is twice that of the United States, four times that

of Japan, and only surpassed in the case of oil-exporting and certain centrally planned countries. In contrast to western industrial countries where, following the 1973 and 1979 oil price shocks, energy consumption growth became decoupled from economic growth, South Africa's energy consumption has not fallen, not even when energy conversion losses are deducted.

This suggests a lack of technological advancement in the country in terms of exploiting new internationally available energy-saving technologies. It is perhaps not surprising given that energy has remained cheap and that the country, until recently, was isolated from the rest of the world as a result of apartheid-related international sanctions. These sanctions, in particular the oil embargo that began in 1973, also put a premium on the country's energy security and strengthened the political will to achieve energy self-sufficiency. This resulted in ambitious programs to produce liquid fuels from coal and gas and to generate nuclear power.

In stark contrast to the "developed country" of South Africa, the poor rural and urban households in the townships and (former) homelands that make up the "developing country" part of South Africa generally suffer from a lack of access to convenient and affordable energy services, being dependent on inferior, expensive, and (or) unhealthy fuels. Two thirds of all South Africans — approximately 24 million people — live in homes without electricity, even though there is large overcapacity in the country's power-generation system. The majority of rural dwellers and a good number of urban families — an estimated 17 million people in total — rely exclusively on fuelwood for cooking and heating. This situation is not dissimilar to other African countries.

Widespread reliance on fuelwood contributes to severe deforestation in the former homelands and around urban centres, which in turn imposes heavy social costs on rural and peri-urban families, particularly women, in terms of the increased time necessary to collect fuelwood. Furthermore, shrinking tree and deadwood stocks are forcing more and more families to purchase at least part of their fuelwood, which places additional pressure on their already strained household budgets and leads to further impoverishment. Where sufficient fuelwood cannot be acquired, less food, less nutritious food, or less cooked food is consumed, with obvious implications on human health and livelihood. Fuelwood use in often poorly ventilated homes also presents a great health hazard. The smoke emitted during cooking or

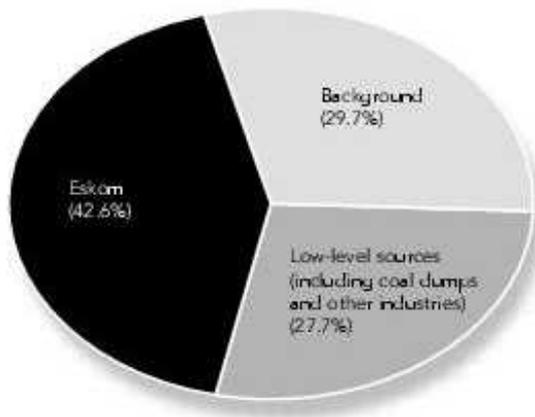
heating increases the chance and severity of respiratory disease. The use of coal in urban homes for heating also results in hazardous levels of indoor air pollution.

South Africa's fuel supply mix is dominated by coal; some 82 percent of primary energy comes from coal. The remaining energy supply comes from oil (10 percent), biomass (6 percent), and nuclear power (1 percent). Hydroelectricity accounts for only 0.2 percent (Petrie et al. 1992). Available coal reserves are vast, the fifth largest after those of the United States, the former Soviet Union, China, and India. The extreme dependence on coal is partly due to very low coal production costs and prices. It is also a response to the oil embargo — which began in 1973 with Iraq, Qatar, and Saudi Arabia and intensified after 1979 when Iran also refused to ship oil to South Africa — because coal promised energy self-sufficiency. About one quarter of the coal — low-ash coal — is exported; this generates 10 percent of total mineral export earnings and makes the country the third largest coal exporter. Roughly half of the remaining coal is used for power generation, and one quarter is consumed for synthetic oil production by the South African Coal, Oil and Gas Corporation (SASOL). Energy consumption, including that consumed within lower income urban homes, accounts for some 20 percent.

Profligate coal production and use gives rise to a number of serious environmental problems. Wide stretches of land are affected by strip mining, coal discards, and mines. A large amount of waste is created through beneficiation to improve coal quality. These discards have a high sulfur content (1–7.8 percent) and high ash values (24–63 percent), so the waste material is almost unmarketable and stockpiles grow at a rate of 40 to 50 million tonnes per year. The burning of these coal dumps contributes to acid precipitation in the Eastern Transvaal Highveld (ETH). Indeed, coal-based power generation in stations that do not have sulfur-removing scrubbers, added to heavy industry, which is concentrated in the ETH close to the main coalfields (12 very large coal power stations, each up to 4 gigawatts, produce 80 percent of the country's electricity), combine to produce acid precipitation that is damaging local ecosystems (Figure 4).

Local climatic conditions, especially the regular occurrence of inversion layers, and the fact that the ETH has more than 50 percent of the country's high-potential land and 50 percent of the forest resources, and contributes up to 25 percent of surface water resources, make the

Eastern Transvaal Highveld



Soweto

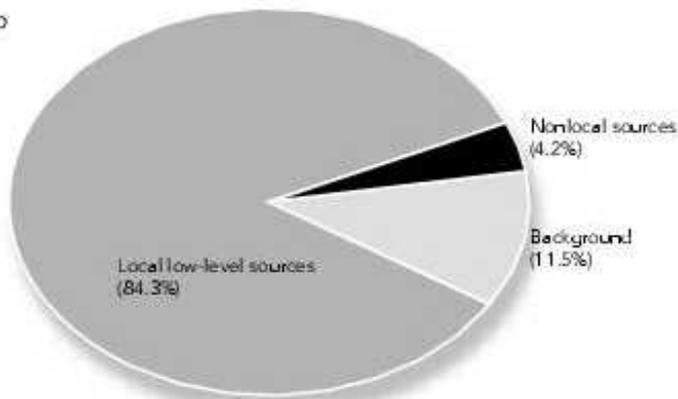


Figure 4. Proportional contribution of different sources to sulfur dioxide pollution in the Eastern Transvaal Highveld and in Soweto (data supplied by Eskom).

area an unsuitable location for coal plants and industry as the opportunity costs and the potential, if not actual, environmental costs are high.

The SASOL plants are reported to have even greater environmental impacts than coal power stations of the same size. Aside from producing acid rain, they are profligate water users (five barrels of water per barrel of oil) and produce a variety of toxic petrochemical wastes.

Since the commissioning of its facilities at Secunda, SASOL has spent some 600 million rand³ on environmental projects, including projects on the recovery and reuse of waste streams, the development and testing of low-smoke fuels, research on industrial water use and reuse, and the toxicity and biodegradability of its products.

As in other countries, South Africa's transportation sector has been responsible for a good part of commercial energy consumption and is highly dependent on liquid fuels. Much more than elsewhere, however, private road transportation has been completely dominant and has benefited almost exclusively the white minority at the expense of adequate public transportation that could have provided affordable transportation opportunities for the black majority. Although, as has been pointed out to the Mission, some provision for public transportation has been made since the 1950s, and especially since 1980 with increased bus and rail subsidies, the desire of the former government to restrict and control the movement of blacks meant that for many blacks the main mode of transport consisted of minibuses and vans organized by the mines and other companies to ferry black labour between their homes and workplaces. In the future, urban transportation will require urgent attention to curb escalating private vehicle use, with its negative impact on air pollution and urban form.

Industrial electricity supply — South Africa's current industrial profile is particularly energy intensive and many companies rely on cheap energy to establish or enhance their competitive position. According to electricity supplier Eskom, local tariffs for high-load industrial users are among the lowest in the world at 6 cents per kilowatt hour compared with 22 cents in Japan and 30 cents in Germany. This source of competitive advantage is being actively encouraged by the Industrial Development Corporation (IDC) and Eskom, both of which are state controlled. An example of this is the recent cooperation among Eskom, the IDC, and Gencor over the expansion of Alusaf, Gencor's aluminum smelter at Richards Bay. In this case, Eskom agreed to peg the price of Alusaf's electricity supply to the international price of aluminum. Given the importance of the price of electricity in the cost structure of aluminum, this ensures that Alusaf will remain viable even when the price of the commodity is very low.

³ In July 1995, 3.6 South African rand = 1 United States dollar.

Accepting that energy is an important component of South Africa’s industrial strategy and that the country should pursue its competitive advantages to the fullest, the full cost of coal-based electricity generation has not been incorporated into the current low price of electricity. A particular cost that is currently excluded is that of the sulfur emissions from Eskom’s coal-based power generators (Figure 5). Existing power stations are not fitted with the appropriate “scrubbers” and sulfur and nitrogen oxides, therefore, are not being removed from power station emissions. The Mission was informed that Eskom considers it too expensive to fit them retroactively.

This presents a paradox. On the one hand, Eskom encourages industry to compete on the basis of cheap electricity, and has said that it will reduce the price of electricity by 20 percent over the next 5 years (Brown 1993). On the other hand, Eskom claims that there is insufficient money to fit protective technology. This indicates that industrial electricity is almost certainly underpriced when full human health and environmental costs are taken into account. If a decision is made not to fit scrubbers, it is reasonable to ask who will bear the subsequent costs to human health and the environment.

South Africa has the advantage of coal that is abundant and geologically easy to extract (flat and shallow coal seams), as well as economies of scale, including large mines, on-site power stations, dedicated rail transportation, and loading facilities for export. These

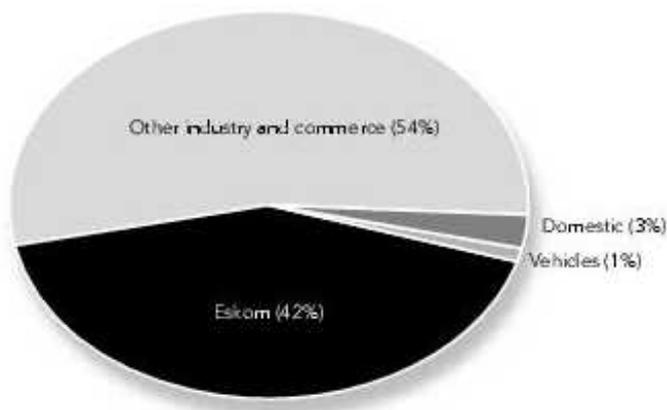


Figure 5. Proportional sulfur emissions by sector in South Africa (data supplied by Eskom).

factors enable the basic energy price to be very competitive. Given these advantages of low production costs, it does not seem to be in the longer term interests of the South African economy to compete internationally on the basis of even lower energy prices, which carry with them costs to human health and to the environment. It is also not in the country's interests to allow companies to externalize their costs if the public is then forced to bear those costs. It should also be of concern that the low price and apparent oversupply of electricity to industry encourages a wasteful attitude toward this resource. In countries where industry pays higher prices for its energy supply, there has been greater effort to limit energy use. Although global competition and international trade arrangements may eventually bring pressure to bear on environmental standards in energy generation and energy use, it is unlikely that these pressures will be sufficient to bring about "full-cost pricing" for energy in the short term. There is a need, therefore, for action to be taken by both the private sector and the government to increase energy efficiency.

Institutional Framework

Two full-size oil-from-coal plants (SASOL II and III), scale-ups from an existing smaller plant, were built and commenced operation in 1980 and 1983, respectively. Africa's first and only 1930-megawatt nuclear power station (two units) was commissioned in the mid-1980s (Koeberg station). The country has also built other nuclear fuel cycle facilities: uranium conversion and enrichment plants (at Valindaba), a fuel-fabrication facility (at Pelindaba), and a disposal site for low- and medium-level nuclear waste (Vaalputs). Finally, the Mossgas corporation was established in 1987 to undertake the production of liquid petroleum fuels from offshore natural gas near the south coast.

Of domestically consumed coal, 94 percent is used by three industries: Eskom, SASOL, and Iscor. Eskom is the highest consumer of coal (67.5 percent is used in 18 power stations that produced 28 233 megawatts of electricity in 1988). This is over 85 percent of Eskom's total generating capacity. Eskom has excess capacity (although peak demands are close to generating capacity) and is currently still expanding production so that there will be an expected excess capacity of 12 700 megawatts by the year 2001. However, about 7 gigawatts of this

excess capacity will be used for the RDP household electrification program, and demand in general is expected to increase sharply by the year 2000. SASOL consumes over 40 million tonnes of coal per year (1989 data), which is considerably more than the 22.4 million tonnes it was consuming in 1982. Iscor consumes about 6 million tonnes a year. Thus, coal production is targeted at very few primary consumers.

Some of the environmental concerns reported to the Mission about energy use are already receiving attention. For example, Eskom is addressing concerns about energy efficiency. It is developing consumer incentives to reduce energy use; it sponsors an “energy effective design awards” program; it carries out internal energy audits and encourages the independent generation of power by organizations with efficient generation processes; and it has led a pioneering initiative on water utilization involving zero liquid effluent discharge and dry cooling. The Department of Mineral and Energy Affairs has reported to us that a low-smoke coal program, guided by a broadly based advisory committee, is aimed at eradicating smoky fuel by the year 2000; and that the accelerated household electrification program will reach 500 000 new houses a year until the year 2000. In rural areas, a biomass initiative is targeted at regenerating degraded lands.

Policy Issues for Government

The objective of future energy strategies should be to address, on a priority basis, the main energy–environment problems faced today:

- The widespread lack of access to clean, convenient, affordable, and environmentally friendly energy services among poor urban and rural households;
- Inefficient commercial energy use throughout the formal economy, which is encouraged by low energy prices;
- Overreliance on the environmentally harmful use of coal in power generation, industry, and lower income households; and
- The economic and environmental implications of large energy sector investments that were made in the recent past to increase national energy self-sufficiency and security.

These priorities are largely recognized in the RDP. The specific issues that follow either underline or complement areas highlighted in the RDP.

Access to service — It is imperative to redress past inequities in access to energy services on social justice, human rights, environmental, and longer term economic grounds. A number of options are available to improve the situation for poor households, social institutions such as schools and hospitals, and future small-scale black farms and rural businesses. These include extending the power grid to all hospitals and schools and to as many poorer urban and rural households as possible, as well as to small farms and businesses; reducing the use of dirty coal in urban homes by using cleaner coal, solar water heating, improved thermal building designs, and more efficient fuel in combination with improved equipment; increasing the supply of fuelwood in rural and peri-urban areas through social forestry programs; improving access to paraffin and liquefied petroleum gas as substitutes for fuelwood; and promoting solar technologies in remote areas for applications such as photovoltaic for lighting and pumping water in homes, on small farms, and for rural businesses.

Options for financing programs to improve access to energy services include building cross-subsidies into electricity tariffs; removing subsidies from large-scale liquid fuels and power projects to free up funds for social energy investments; and allowing or mandating the power utility (Eskom) to invest in the electricity demand side by providing loans for electricity-efficient household appliances and small-scale industrial equipment (a kilowatt-hour saved may require less of an investment by Eskom than an additional kilowatt-hour supplied).

Efficiency of energy use — The most effective way to raise the efficiency of commercial energy use in industry, commerce, and affluent households is through the price mechanism. This may come about as energy companies internalize and pass on to consumers the social and environmental costs that were previously externalized: for example, if or when Eskom is required to internalize some or all of the environmental costs in the price of supplied power (fuller cost accounting) or as coal companies are forced by union demands to pay higher wages to their workers. Reducing state subsidies to SASOL, Mossgas, Eskom (Koeberg), and the Atomic Energy Corporation (nuclear fuel cycle) would have a similar effect. On top of these mechanisms, explicit fuel

taxes may also be considered. However, the inflationary effect of these measures would need to be carefully examined, and there is the real concern that higher costs would also be passed on to poor consumers unless special provisions were made to protect them.

Reliance on coal — Most of the country's coal is used in power production, with severe environmental costs that at the moment are not passed on to the consumer but are largely borne by local populations and wider (even global) society in terms of pollution effects (acid rain and greenhouse effects). South Africa has 0.7 percent of the world's population, but is responsible for 2 percent of global greenhouse gas emissions. Per-capita greenhouse gas emissions of white South Africans are estimated to be approximately double the per-capita emissions of the average US citizen.

Because of the large existing surplus capacity, there is no immediate need to increase generating capacity. Environmental effects, such as acid rain (whose impact on local ecosystems is largely unknown), may be reduced through the installation of sulfur-removing stack scrubbers in existing coal power plants. A decision on this option will require careful consideration of economic and environmental costs and trade-offs. In the longer term, as new power plants are needed, different supply options, with the most up-to-date environmentally friendly technology (coal, nuclear, regional hydro, regional gas, and greater efficiency in the use of electricity), must be carefully weighed to determine the most appropriate power supply sources and energy mix.

The use and pollution effects of coal in urban households may be reduced through fuel substitution (such as low-smoke coal or solar energy), improved housing designs (better thermal designs to reduce heating requirements; better ventilation to reduce the effects of coal smoke), and improved stoves.

Past investments — Major past energy sector investments, such as SASOL, Koeberg, and other nuclear fuel cycle facilities, and Moss gas are a legacy of apartheid. These investments were made partly on the grounds of national security and benefited mainly the white minority. Their economic benefits and environmental impacts are both uncertain. Because of legislation mandating secrecy about energy sector information (such as the *Petroleum Products Act* of 1977), there are large gaps in the information needed to conduct a thorough economic assessment of SASOL. Cited liquid fuel production costs vary between

18 (DMEA 1994) and 75 US dollars per barrel of crude oil equivalent (Durning 1990). Part of this variance may be explained by whether the sunk cost of plant and equipment was taken into account.

This range of costs vis-à-vis the relatively low price of imported crude oil (currently less than 18 US dollars per barrel), the enormous environmental impacts of synfuel plants, and the lifting of the oil embargo, taken together, make it economically and environmentally attractive to consider returning to the importation of oil.

Gas is also an energy option from coal-bed methane. Moss gas has not yet produced any gas and is widely regarded as uneconomic. It is also generally recognized that the 6 percent of South Africa's electricity coming from Koeberg is by far the most expensive source, particularly when the whole nuclear fuel cycle is taken into account. Furthermore, Koeberg's safety and environmental performance records requires clarification. But the investments have already been made, and conclusions about future options have to take this into account. Investments into uranium conversion, enrichment, and fuel-fabrication facilities were made with a view toward a rapidly expanding civilian nuclear power program, as well as nuclear weapons capability. Both rationales have become obsolete.

Alternative energy sources — The whole area of alternative and renewable energy options needs further examination. For example, wind energy is gaining more attention internationally, and countries such as India have invested in large wind generators. Studies indicate that South Africa has regions where wind energy may be a viable alternative. Alternative energy development can be encouraged through legislation and tax concessions (for example, in India, a tax concession enables private companies and local authorities to deduct the cost of a wind turbine generator against tax within one fiscal year). In the United Kingdom, a levy imposed on nuclear and fossil-fuel power stations is used to fund alternative energy projects. Many of these small-scale alternative energy sources can be managed by local authorities. Rural communities can be involved in the planting and management of woodlots for fuelwood with some government support and extension services.

Recommendations

A number of the Mission's recommendations concur with policies expressed in the RDP. Overall, the recommendations are fully consistent with the thrust of the RDP section on "energy and electrification."

1. The crash electrification program proposed in the RDP (section 2.7.7) to electrify all schools and hospitals and to double the number of households with access to electricity should be implemented as soon as possible. Consideration should be given to linking this program with a unified national tariff structure that cross-subsidizes the cost of new connections and the use of electricity in poorer households (as proposed in the RDP); the continuation of techniques to prepay for electricity used by poorer households (to avoid defaulting on the settling of bills); and the provision of concessional loans (possibly through Eskom) for energy-efficient household equipment and appliances.
2. Integrated supply and use options for improving access to clean, convenient, and affordable energy services for poorer urban and rural households, farms, and businesses should be examined, prioritized, promoted, and implemented. This includes elements such as social forestry, woodlands management, agroforestry, passive thermal housing design, solar technologies (photovoltaic for lighting, radio, television, pumping, appliances, solar collectors for heating water, and passive solar heating), fuel substitution from fuelwood to paraffin and regular to low-smoke coal, more efficient fuel use, and improved stoves and energy-efficient equipment.
3. Given the large proportion of households using coal as the principal fuel for space heating and cooking, at considerable risk to their health, a national program to produce and supply low-smoke coal should be initiated as proposed in the RDP to reduce the environmental and health impacts associated with the use of coal. In the initial stages of the program, emphasis should be placed on testing and refining the technology to ensure good economic and environmental performance.

- Explicit and implicit state financial subsidies to fuel production and conversion operations in the energy sector should be reduced, as much as possible, to improve the efficient use of energy.
- Full environmental cost accounting in all sectors of the economy should be promoted through economic incentives to ensure that the environmental costs of economic activities are reflected, as much as possible, in the price of goods and services and passed on to the final consumer.
- A thorough study should be undertaken of the financial, economic, social, and environmental impacts of emissions from Eskom's existing coal-fired power plants, particularly those in the Eastern Transvaal Highveld. In particular, Eskom and the Department of Mineral and Energy Affairs should investigate using available technologies to address particulate and sulfur emissions. The Mission was informed by Eskom, however, that the cost of retrofitting is prohibitive. If so, other technologies should be identified and used to reduce emissions. All new coal power plants that may be built in the future should be fitted with sulfur- and particulate-removal equipment.
- An in-depth study of the optimum mix of power supply sources to meet projected demands for electricity should be carried out to provide a sound basis for investment–divestment decisions, also in relation to the Koeberg nuclear power plant. In this study, consideration should be given to at least the following power supply options: coal (conventional and clean), nuclear, hydro (largely from other countries in the region, including rehabilitation of Cabora Bassa), natural gas (largely from other countries in the region), and improvements in the efficient use of electricity throughout the economy.
- The performance, economic viability, and environmental impact of SASOL and Mossgas should be investigated with a view to identifying alternative options for meeting future demands for liquid fuels in South Africa. Integrated energy pricing methodologies should be used to determine the optimal mix of fuel sources to meet liquid fuel needs. Importing more oil is an obvious option that should be actively considered. Given the high environmental cost of coal, kerosene and liquefied petroleum gas (imported or

made from imported oil) should be made available for domestic cooking, and they should be priced accordingly. In the transportation sector, gasoline and diesel fuel (imported or refined from imported oil), if not taxed excessively, are likely to be superior options to using synfuels.

- It was difficult for the Mission to make recommendations on future energy use in the transportation sector because data on past liquid fuel use have been kept secret. A study should be commissioned to assess current energy consumption patterns and possible future needs for the transportation sector.
- An independent inquiry into the environmental and safety performance and operational experience to date of the Koeberg nuclear plant should be undertaken. The results of this inquiry, as well as the findings of the in-depth study of the optimum mix of power supply sources (recommendation 7), should serve as a basis for deciding what to do with the Koeberg plant.
- As the strategic national security rationale for developing complete nuclear fuel cycle capability has been overtaken by changing realities, any justification for maintaining the nuclear fuel cycle facilities must now be based on economic grounds. Estimates of the net economic benefit or cost of keeping the facilities operational versus decommissioning them suggest closure and decommissioning as the best course of action. An in-depth assessment should be undertaken, however, before any such decision is taken. In the case of closure, the technological capability and know-how, as well as the human resources built up, should continue to be utilized by redirecting them to other sectors and applications, such as renewable energy technologies. The mandate and structure of the Atomic Energy Corporation should be re-examined.
- Existing energy balance tables for the South African economy are incomplete because liquid fuel data have been kept secret to date. Fully updated national-level energy balance tables, and preferably regional- and local-level tables as well, should be prepared for energy planning purposes.
- An accelerated research program on renewable energy should be undertaken, particularly on solar and wind energy, and woodlots for biomass, and advances made elsewhere in the world should be

examined and tested for suitability in the South African environment.

- As governments are generally the largest consumers of goods and services whose production processes impact on the environment, both national and provincial governments should play an important leadership role through their commitment to the efficient use of energy (through such initiatives as the use of fuel-efficient vehicles).

Part III

Critical Zones



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Chapter 7

THE URBAN ENVIRONMENT

Situation Synopsis

The urban environmental crisis is currently severe, and seems set to get worse unless decisive action is taken soon. The major environmental problems in urban areas stem from a high level of urbanization, increasing levels of poverty, and the lack of any urban development, national urbanization, or land identification policies. This, combined with a lack of integration of environmental concerns into urban planning, has led to the existing crisis.

South African cities are a particular heritage of apartheid, with dual standards for black and white areas. Until recently, there has been a lack of vision, environmental expertise, and a holistic, nonracial approach to planning and managing the urban environment in a sustainable manner. As a result, black communities have suffered disproportionately: they are the victims of industrial pollution, are located close to toxic waste dumps, are subjected to dense settlement patterns with no green space, and have little access to adequate public transportation. The cost of former apartheid planning has impacted most severely on the black working class, particularly women, who are responsible for the health and welfare of their families.

The major urban environmental problems are also social problems. Apartheid planning has led to overcrowding of inner city flats and township areas; a lack of housing and basic services, such as water and sanitation; distorted land-use patterns; massive economic and environmental costs; social inequalities; and public sector inefficiencies.

Poverty, land dispossession, overcrowded conditions on allocated land, low agricultural productivity, and drought have all forced people from the rural areas to the cities in the hope of finding a better life. However, the former apartheid state's refusal to accept and plan for this process has left cities unprepared for the influx, and people have often been forced into informal settlements in a situation of severe deprivation with little or no services.

South African cities are growing at an enormous rate (on the order of 3 to 5 percent per year). According to the Urban Foundation, the number of people living in cities in South Africa is expected to grow from around 11 million in 1990 to 23.6 million in 2010. Of these people, 13.4 million will be living in Gauteng Province and 4.5 million in Durban. Within a decade, 75 percent of the urban population will be residing in the five major metropolitan centres (Johannesburg, Durban, Cape Town, Pretoria, and Port Elizabeth). These metropolitan areas will contain huge concentrations of impoverished people, consume large quantities of nonrenewable resources, and produce large quantities of waste.

The environmental impact of urban development also takes place at a distance. For example:

- Coal-fired power stations supply electricity to urban areas, but cause air pollution and acid rain in Eastern Transvaal, Angola, and Mozambique;
- Nuclear waste from Koeberg, which supplies electricity to Cape Town, is deposited in the facility at Vaalputs, located in the rural North Cape; and
- People living in the Lesotho mountains are affected by the Lesotho Highlands Water Project, which is designed to provide water to the former Pretoria–Witwatersrand–Vereenignig (PWV) region (now Guateng Province).

Furthermore, without adequate urban planning, as cities expand onto nearby good agricultural land, agriculture gets pushed onto more marginal land, exacerbating soil erosion and leading to greater use of inputs, such as chemicals, and increased irrigation.

Cities depend on a fragile and limited ecological resource base. Yet South African urban systems, rather than looking at methods of conserving or recycling resources, forage ever farther afield. In other

words, they depend on a linear rather than a circular resource consumption pattern. A circular resource consumption pattern would include recycling, reduced consumption of nonrenewable resources, and productive activities such as urban agriculture, which can help move cities toward being food producers as well as food consumers. If cities recycle and conserve resources, such as electricity, land, and water, an added benefit would be the positive environmental impact this would have on rural areas.

Institutional Framework

Urban planning, regulated by a cascade of legislation from the national to the local level, allowed different standards for services according to race, and for the provision of inferior services in black areas. Monitoring standards come under the control of local authorities, but in many cases urban developments in black areas took place without proper monitoring, allowing for substandard services. The iniquitous *Less Formal Township Establishment Act* allows for the legal bypassing of minimum standards applied in historically white areas.

There have been very few environmental policies drafted by local governments to guide holistic town planning within their areas of jurisdiction. Historically, the boundaries of the local government's jurisdiction were defined by racial laws and not by logical town planning procedures. As a result, only areas that contributed rates and taxes were serviced by the local government. Communities that were denied municipal franchise were frequently the victims of environmental problems and yet had no resources through which to address them.

In the past, the main environmental focus of local governments was on issues such as air pollution, waste management, and the establishment of green recreational areas, although structures such as the larger metropolitan councils have focused in a much more progressive fashion on the issue of environmental management and environmental health at the local level.

Under the *Local Government Transition Act*, nonracial, transitional local or metropolitan councils, incorporating, historically, both black and white areas, have replaced the existing local authorities. These councils will be responsible for land-use and transport planning and

for management of the urbanization process. In the case of metropolitan councils, they will be responsible for the environment as well.

Under the Agreement on Services and Tariffs, the new councils must commence with programs to restore existing services, improve maintenance procedures, and plan for the upgrading and extension of services. The implications of these recent changes are that, within the foreseeable future, the state of services and environmental health in black townships should begin to improve.

In June 1992, Agenda 21 was adopted by the Earth Summit (UNCED) in Rio. Chapter 28 outlines a special mandate to local governments to establish a "local Agenda 21" by 1996 based on a process of consultation and consensus building with their populations. Some South African cities, such as Johannesburg and Cape Town, are already working toward this goal.

The local Agenda 21 mandate suggests that local authorities should learn from local, civic, community, business, industrial, and labour organizations to acquire the information needed to formulate the best strategies. This process of consultation should increase household awareness of sustainable development issues, foster capacity building at a community level, and allow for the development of the most appropriate strategies for that city.

Elections for a democratic, nonracial local government will take place in November 1995. Local government will be responsible for the installation and maintenance of infrastructure and services and for zoning and land-use decisions in urban areas. As such, it will be the function of the local or metropolitan government to implement and monitor many of the recommendations made in this chapter. Once local government structures are in place, this is an ideal opportunity to ensure that environmental issues are incorporated into local government procedures. In this regard, all local government decisions related to such issues as the provision of services and urban development should be taken in accordance with integrated environmental management procedures. It is also recommended that an environmental subcommittee be set up within all local and metropolitan councils to ensure that

- Environmental concerns are dealt with during the interim phase; and

- Appropriate structures and procedures are set up in future local government structures to take environmental concerns into account.

A new local government environmental policy is an important opportunity to ensure that an integrated holistic planning process is interwoven among all local government departments.

Policy Issues for Government

Overcrowding and homelessness — There is a severe shortage of affordable housing for poor households. This impacts most severely on households headed by women, which are among the poorest of urban households (30 to 40 percent of households are headed by women in some urban areas). The Reconstruction and Development Programme commits the ANC-led Government of National Unity to the construction of 3 million houses within the next 5 years. This is a matter of priority in dealing with environmental issues in urban areas. However, it is important that in the drive to create mass housing, the social and environmental impacts of construction methods, materials, and designs are taken into account. The planning and design of low-income housing developments should incorporate integrated environmental management procedures.

In black townships, uncontrolled densification has occurred through backyard shack development, and high population densities in houses and shacks have resulted from the housing shortage. For example, Alexandra township, near Sandton, has up to 160 accommodation units, primarily shacks, per hectare. Overcrowding is also occurring in previously “white” areas, such as Hillbrow, where services, such as sewerage, are becoming overstressed.

As a result of the housing shortage and the desire to live as a family, hostels designed for men only are being inhabited by families and women as well, resulting in overcrowding, a lack of privacy, and other associated problems.

Overcrowding leads, among other things, to an increase in violence and crime, and the breakdown of services. Often, the violence affects women and children most severely, with an increase in sexual assaults as a result of a lack of privacy and proper facilities. Such

attacks are exacerbated by a lack of proper street lighting in the townships, making the streets extremely dangerous at night, especially for women. The breakdown in services, such as the provision of clean water and sanitation, also impacts most severely on women, who are responsible for maintaining the health of the family.

Poorly constructed housing — Many low-income houses are poorly ventilated, often without chimneys, leading to dangerous levels of indoor air pollution when coal is used for cooking and space heating. Many township houses have been built with materials that can pose risks to human health, such as asbestos (when it is poorly maintained or damaged) or radioactive mine dump sand. Poor construction has produced houses that are cracked and susceptible to damp conditions. This is a form of environmental racism that impacts most severely on those with limited access to health services and must be avoided in future housing developments.

Another issue is that South African houses are designed with little or no concern for energy efficiency, resulting in large domestic consumption of fuel and in health concerns for those who cannot afford fuel. The use of wood and coal indoors causes a high level of respiratory disease among township children.

Urban sprawl, habitat destruction, and settlements in unsuitable areas — White suburban areas have some of the lowest density housing in the world, and black low-income areas have been developed mainly through site-and-service schemes (or informal settlements and land invasions) on the periphery of urban areas, all of which leads to horizontal development and urban sprawl. This has caused the loss of agricultural and ecologically important land, and inefficiencies in the provision of services, with concomitant increases in social and environmental costs, for example, through increased commuting time to and from work and increased distances to provide and maintain basic services.

This has also resulted in habitat destruction and damage to biodiversity. For example, in the southwestern Cape, urban areas are encroaching severely on the fynbos, an ecosystem of unparalleled biodiversity. This is impairing future tourism potential, while threatening the stability of the remaining natural ecosystems.

Unplanned urban expansion and urban sprawl have also resulted in settlement in unsuitable areas, such as river valleys, which are

vulnerable to flooding, or on prime agricultural land. Communities such as Bekkersdal, Westonaria, Venterspostat, and Carletonville, in the Northwest Province, have been developed in an area underlain by dolomite, which is prone to sinkholes. Crossroads, near Cape Town, has been developed above an important aquifer, causing dampness within and flooding of houses during the wet season. Development of the area may also have polluted the aquifer, making it unusable for domestic consumption in the future. Development of low-lying land for black, coloured, and Indian housing has been relatively common in South Africa, resulting in regular flooding in these communities.

Land degradation and erosion — Many black townships have untarred roads that, when combined with inadequate storm water and drainage services, lead to soil erosion problems. This is exacerbated where building has taken place on unsuitable land, such as steep slopes or land with easily eroded soil. The buildup of uncollected rubbish in black townships results in floods and channeling of water, which increases the erosion of roads and soil.

Construction methods used by developers in low-cost housing projects have also added to land degradation. Often an area of land zoned for low-cost housing is cleared of all vegetation and graded flat before construction begins. This results in the loss of topsoil and vegetation, and an increase in erosion. It also creates an inhospitable and unhealthy environment for residents, with increased levels of dust in the air.

Urban air pollution — Urban air is polluted both inside and outside homes, particularly those of poor people. Areas not declared smoke-free zones are facing air quality conditions similar to those documented in Europe during the 1950s.

The main sources of urban air pollution include industrial processes, automobiles, and the use of coal and wood as domestic fuel. Areas in South Africa with the worst air pollution include Merebank (Durban) (see box, pp. 86–87: “Merebank: A Case of Unplanned Urban Development”), Cape Town, Vaal Triangle (Terblanche et al. 1992), Soweto, and other African townships in Gauteng Province. The reliance for transportation on vehicles that use fossil fuel contributes considerably to pollution levels in urban areas, and poses a particular health risk because petrol still contains high levels of lead.

Merebank: A Case of Unplanned Urban Development

The Merebank area is sad testimony of the effects of poor planning, which allowed polluting industrial development and residential development to occur side by side. Merebank, an Indian residential township of about 50 000 people, may more aptly be described as an island surrounded by a sea of polluting industries. It is located 16 kilometres south of Durban, Natal. The residential area finds itself on the doorstep of industry in every direction. There are two giant oil refineries on either side, a massive paper mill, a chromium processing plant, an airport, and a multitude of chemical processing industries. Some industries have embarked on large-scale expansion programs and are physically creeping into the community hinterland. Many houses border the factories directly, and some families live only 20 metres from an oil refinery.

Environmental problems include noise from industry and aircraft; an atmosphere loaded with combustible emissions and sulfur dioxide; contamination of the local land, river, and ocean; heavy-duty industrial traffic flow; and general neglect of the area. The atmospheric pollution crisis is aggravated during the winter months when the polluted valley is subjected to temperature inversions, thereby forcing the pollution closer to the ground.

For almost three decades, very little attention was paid to the residents' well-being. Industrialists conducted their operations with impunity. They have presented themselves as untouchable elites charged with technical superiority and unchallengeable power, and argued that the burden of proof lay with the residents. The community's efforts to obtain information and to advocate change have been met with resistance from both the companies and the local authorities. Community activists reported that when they approached local authorities to find out exactly what is being emitted into the air, they were told that such information was confidential. As a result, members of the community and workers in the factories have no clear idea of the dangers that they face as a result of local industry. For decades the local residents have complained, but to no avail.

Recent surveys conducted in the area reveal a high incidence of chest-related ailments that can be related to the high levels of sulfur dioxide and other chemical contaminants in the atmosphere. A study among children in the Merebank area showed that they were 10 times more likely to develop respiratory problems than children outside the area. Recently, there has been a spate of industrial

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disasters in the neighbourhood, including a bromine gas leak, oil tank explosions, worker injuries, and industrial traffic accidents. As if to underscore the dangers that the Mission witnessed, the day after we visited Merebank a large section of the community had to be evacuated following a bromine gas leak.

The local civic organization, the Merewent Ratepayers' Association (MRA), has now established an Environmental Project Unit (EPU). The EPU has been able to bring local industries and local authorities to the table to discuss sound environmental management. The EPU aims to persuade industries to conform to acceptable environmental, health, and safety standards and to generate environmental awareness in the community. It is currently playing an important role in environmental policy formulation at local, regional, and national levels. The EPU management and the council of the MRA want Merebank to be declared a special area and are calling for a full environmental impact assessment to be conducted to establish an acceptable coexistence between industry and the community and to determine maximum permissible levels of pollutants.

A large proportion of the South African population relies on coal for cooking and heating and is potentially at risk from high levels of indoor pollution. The use of coal for cooking and heating is also a major cause of outdoor air pollution in urban areas. Recent studies have found that exposure to particulate matter in South Africa is several times higher than health guidelines allow (Terblanche et al. 1993). This exposure has been directly associated with a high incidence of respiratory illness, which is the second highest cause of infant mortality in South Africa.

Indoor pollution problems are further exacerbated by poor urban planning with respect to the location of residential areas and health facilities. For example, in the city of Port Elizabeth, the Empilweni Chest Hospital, in the community of New Brighton, is downwind of the General Tyre, Eveready, and Novaboard factories. As a result, prevailing winds carry air pollution from these factories to the hospital.

The critical task of achieving reduced levels of urban air pollution will be addressed in part by electrification and, in the longer term, by the development of cleaner energy sources and improved energy efficiency. Air pollution monitoring and control efforts in South Africa

have not, to date, been focused on personal exposure, even though this is the most accurate indicator of risks to public health. Furthermore, control of air pollution outside factory premises falls under the Department of Environmental Affairs and Tourism, whereas inside the factory gates it falls under the Department of Labour. Many local authorities do not have the technical capacity to monitor air pollution within their areas.

Urban waste disposal — South African municipal authorities do not offer incentives to households or industry to recycle waste; instead, it is simply “disposed of.” Several problems arise from this approach to waste. The first is that most solid waste ends up in landfill sites. These sites are often located close to black residential areas, and many are poorly managed and controlled. Poor people, particularly black women, scavenge on the sites without fully understanding the dangers of doing so. And, according to a Council of Scientific and Industrial Research study, contamination of groundwater is occurring, or is likely to occur, at several sites (CSIR 1992). Children also play on unprotected dumps. These landfill sites also require large tracts of land in or near urban areas, which are then rendered useless for any other function. The lack of control or monitoring of landfill sites has meant that industrial waste is dumped on domestic waste disposal sites.

Furthermore, inadequate measures to control and enforce safe disposal of waste have meant that industrial waste (both hazardous and nonhazardous) has been illegally dumped in urban areas, posing severe health risks to affected communities.

There is no separation of industrial and sewage waste, and no recycling of the organic matter in sewage. For those households that have waterborne sewerage, large amounts of water are used to flush the system, and this water is generally not recycled, but simply disposed of with the sewage. Refuse collection services in black residential areas are not adequate, causing serious health hazards.

Urban water management — South Africa is an arid country, and could face water shortages sufficient to restrict its economic growth. Four million people in urban areas lack access to clean water. For many households, their only access to purified water is through a shared standpipe. Water must be fetched, sometimes over long distances, in buckets or other containers. Sometimes containers that have originally been used for toxic substances are used for water, causing

health hazards. The collection of water also requires extra time and energy from black, working-class women, who are already, in many cases, taking part in both the reproductive and productive sectors of society. The lack of clean water for households increases the potential for waterborne and other diseases. While some households in urban areas have no clean running water, other households use extremely large amounts of water, often to maintain exotic gardens.

The inverse side of the water supply issue involves the pollution of natural water systems, especially rivers and streams running through urban areas, from industrial effluent, dumping of refuse, and excrement from overcrowded informal settlements that have no sewerage services. Near East London, borehole water in Dimbaza has been found to have a high nitrous oxide content as a result of industrial dumping in the area.

Urban green space — There is a severe lack of green space in black townships, resulting in a lack of recreation areas and a shortage of vegetation to perform environmental “services” such as filtering air and water, and providing habitats for birds and insects.

In historically white areas, streets, parks, and suburban gardens are planted with predominantly exotic plants that often require large quantities of water during the dry months and contribute little or nothing to the preservation of South African flora or the provision of habitats for indigenous fauna. However, the planting of indigenous species, referred to as a “naturalization process,” has been started in some of Durban’s townships and suburbs.

In some of South Africa’s largest cities, projects for developing “islands of vegetation in the concrete sea of urban development” are under way. The most developed of these is in Durban (D-MOSS). The main goals of this project are to “add to the quality of life by establishing market gardens, street trees and fruit-producing trees, to promote Durban as a desirable place to work and live in, to make Durban a holiday destination, to protect endangered species and the habitats, and to meet human health and social needs.” However, MOSS (metropolitan open space) programs do not address the needs of the predominantly black working class or marginalized sectors of the urban population.

Elsewhere, public open space is currently being sold by local authorities in an attempt to boost their finances, reducing further the

success of attempts to green the cities. Local authorities need to better tap the enthusiasm of communities to live in a better urban environment by improving basic services such as road maintenance, refuse collection, and keeping unused open spaces clean and safe.

Urban agriculture — Urban open–green space programs have tended to focus on the notion of conserving natural areas for recreation and education, as well as for their contribution to storm-water management and necessary ecological systems, rather than using urban open space in a productive manner.

Urban and peri-urban agriculture can bring several benefits to the urban landscape. It can provide a means of survival or contribute to the household budget in cases of extreme poverty and shortage of food, as well as provide green space in the urban boundaries. As the majority of urban cultivators are women, urban agriculture can help to alleviate the worst poverty experienced by black, working-class women. Furthermore, there is considerable potential for recycling organic waste into urban agricultural projects. There are several existing projects centred around urban agriculture, including a project in Elsies River, Abelimi Besikhaya in Cape Town, several food gardens in Johannesburg, and various permaculture projects.

However, the lack of extension services to urban agriculturalists and the lack of water make this activity difficult to maintain. Furthermore, local bylaws frequently do not encourage this type of activity. It is important that peri-urban agriculture not be used as justification by privileged groups to prevent informal settlements or low-cost housing developments from being established near them.

Urban transportation — There are no national standards in place for environmental impact assessments or rehabilitation regarding transportation. Each provincial administration has in-house standards. As a result of poor public transportation systems, the majority of people are compelled to rely on private cars or taxis for transport. Many of these vehicles are old and poorly maintained, resulting in high emission levels. All petrol-driven vehicles still use leaded petrol in South Africa (this will be phased out beginning in 1996). Urban transportation requires the immediate attention of the government with respect to its social and environmental impact.

An integrated approach — As stated in the Reconstruction and Development Programme, “a national development and urbanization strategy is required to manage the distributional effects of a rapidly growing and urbanizing population and to address the problems caused by past distortions of the apartheid system.” There are some general principles that should guide all urban environmental policy. The concept of sustainable urban management should underpin all aspects of urban environmental policy. There must be adequate scope for community participation in the determination of local environmental issues. There is a need for local environmental policies to be integrated with other sectoral policies such as housing, water, sanitation, electrification, and transportation. Urban environmental policy requires an integrated approach that includes the following:

- Biophysical environment;
- Natural resources and ecosystems;
- Cultural resources;
- Landscape and townscape;
- Socioeconomic and demographic concerns, including poverty and environmental health;
- Housing and services;
- Water, air, noise, and waste pollution;
- Urban form;
- Land-use patterns, development, and planning;
- Traffic and infrastructure;
- Urban open space and protected areas;
- Food security and urban agriculture;
- Urban decay and revival; and
- Environmental education.

In many developing countries, city planners are moving away from models of control and prohibition toward models of facilitation and working with local communities in an attempt to address the urban crisis. In South Africa, such work has been carried out predominantly

by civic organizations and NGOs at a project-specific level or as a result of community struggles against local authorities. In the future, mechanisms and policies must be developed to ensure that an integrated approach is followed at all levels of government, particularly at regional and local levels.

Recommendations

Urban planning

1. Environmental concerns should be integrated into the urban planning process in accordance with integrated environmental management procedures.
2. Studies should be conducted to identify the environmentally appropriate use of land so that development of arable or important conservation areas is avoided wherever possible.
3. Local government planners and officials should be trained so that environmental criteria are integrated into all planning decisions.
4. Incentives and models should be developed to encourage the participation of communities, industry, and others in the development of sustainable and healthy cities.
5. The roles of various authorities should be clarified, including those of the RDP offices, local authorities, and Metropolitan Councils.

Local Agenda 21

6. A national program for the development of “local Agenda 21” programs should be initiated involving and supported by departments of local government and environment and by local authorities.

Air pollution

7. Urban air pollution severely affects the health of urban populations, especially children and older people, and should be addressed immediately. This includes issues related to electrification, the reduction of industrial emissions, the introduction of effi-

cient public transportation systems, adequate enforcement of legislation, the provision of adequate health services, and the surfacing of roads.

Water management

8. Programs to reduce domestic demands for water, through education and economic incentives, should be established as integral components of schemes to develop urban water supplies. Differential pricing should be introduced to ensure that the poor can afford water and that heavy users, such as industry and wealthy households, are required to adopt water conservation measures.

9. Monitoring of urban natural water systems should be improved, and the Polluter Pays Principle should be applied to industries that exceed legal emission levels with respect to disposing of waste into river systems or wetlands.

10. Communities should be educated about water pollution and become involved in local monitoring, including being informed about the correct authorities to whom to report suspected problems.

11. Water management systems should be defined according to catchment boundaries, not political boundaries. This will require provincial and local authorities to work together through a catchment area to manage the water system in the most efficient and environmentally sensitive manner possible. The impact of urban water use on rural areas and river systems should be taken into account in the management of water use.

Waste management

12. Municipalities should be required to create mechanisms and offer incentives (such as recycling credits) to facilitate and encourage the recycling of wastes, including separation of wastes at source at both the household and the industrial level. This should also include the separation of toxic waste at the household level.

Land

13. Environmental considerations should be taken into account in the future identification of land for urban development, including land available for urban infill within city limits. Particular attention is needed for land areas that may be hazardous to people's health or are ecologically sensitive and important.
14. Agricultural extension services should be made available to urban agriculturalists and food gardeners.
15. Productive and passive open spaces should be interlinked in an integrated approach to green space in urban areas.
16. Research should be carried out on the potential of urban agriculture and the possibilities of food market decentralization, including examining international experience.

Design and construction of houses

17. The use of hazardous materials in the construction of houses, including low-cost housing, should be banned. National standards for construction using asbestos and other materials are needed.
18. Guidelines for the design of energy-efficient houses should be established, and all future houses (including low-cost houses) should be designed for better energy efficiency. Houses should also be designed to conserve water. The use of rainwater tanks and water conservation should be encouraged by local authorities through a system of legislation and economic incentives.
19. Local authorities should be empowered and trained to ensure that construction methods used within their jurisdictions cause minimal damage to the environment, and, where necessary, developers should be required to rehabilitate degraded land.

Transportation

20. Public transportation systems that service urban and rural areas should be established. These systems should be designed to minimize environmental impacts. The use of public transportation systems should be encouraged through legislation and economic incentives.

21. Environmental impact assessments should be required by law for all major transportation infrastructure developments.

22. Unleaded petrol should be made available for use and priced to encourage its adoption over leaded petrol.

Research

23. Further research should be carried on the concepts of “eco-cities,” and the recycling and circular use of resources. International experience should be investigated and applied to the South African situation.

24. Further research should be conducted on issues related to sustainable development in the urban context, including such issues as land-use planning and water and waste management.

25. The environmental implications of urban densification should be researched further.

Chapter 8

COASTAL ZONES

Situation Synopsis

South Africa is endowed with a particularly rich coastal zone — the interface between land and sea. The 3 000 kilometre coastline, from the semi-arid northwest bordering Namibia to the subtropical areas adjacent to Mozambique, exhibits a great diversity of ecosystems; mineral and fish resources; scenic, recreational, historic, cultural, scientific, and educational sites; and socioeconomic realities.

In recent years, rapid development along the coast has exerted increasing pressure on the fragile resource base on both the landward and the seaward sides. Environmental impacts include degradation of coastal land, estuaries, and coastal wetlands; marine pollution; and fish stock depletion. Development pressure has led to increasing competition for coastal resources and greater inequity in terms of access to and control over these resources.

Coastal populations have been growing at the relatively fast rate of about 2.3 percent per year, especially in the major coastal urban centres. This recent acceleration in coastal urban populations results partly from the end of the apartheid era of restricted access to key coastal resources and infrastructure. Aside from progressive urbanization and expansion of informal settlements, as well as industrialization in coastal zones, tourism has also been expanding significantly.

Coastal waters are increasingly being polluted. Discharges of industrial effluents and municipal sewage; discharge from storm water drains; runoff or seepage containing fertilizer and pesticide residues; oil spills; operational discharges of solid waste, sewage, and oil; ballast

water discharges; and effluent from the recently established mariculture industry collectively and individually present a real threat to coastal water quality, particularly in bays and other semienclosed or sheltered waters where dispersion and dilution are low.

More than three quarters of marine pollution comes from land-based sources. Specifically, an estimated 800 million litres per day of industrial and municipal effluents enter the sea through over 60 pipelines. Concern over the impact of these effluents has triggered public campaigns in several recent pipeline projects. In some cases, for example, False Bay recreational area and Saldanha site, abnormally high levels of contaminated water have been observed. Offshore accidents involving oil tankers have occurred regularly; hence, oil spills are a constant risk because of heavy sea traffic and adverse weather conditions. Between 1965 and 1981, 491 shipping accidents were registered, 128 of which involved tankers.

The shallow waters on the seaward side of the coastline are generally very productive, diverse, and ecologically vital habitats, especially the estuaries, accounting for a significant part of commercial fish production, such as rock lobster. The total annual fish catch, most of it from pelagic and demersal fisheries (such as anchovy and pilchard, and hake, respectively), amounts to about 500 000 tonnes. This makes South Africa a medium-sized fishing country. Wholesale earnings from processed fish products on the west coast — the centre of the fishing industry — contribute some 1.5 percent to regional GDP. Large commercial fishing companies, both national and foreign, account for the lion's share of the catch. Independent small-scale and community fisheries have declined. A large number of recreational fishermen (an order of magnitude greater in number than employees in the fishing industry) add to the pressure on fish resources.

Overall, coastal zone management is generally considered to have proceeded in an uncoordinated and exploitative fashion. However, since the early 1980s, there has been growing awareness among specialists and policymakers of the great economic and ecological potential of the coastal zone and of the need for a more systematic and sustainable approach (see Sowman 1993).

There is a need for commonly agreed upon and comprehensive definitions of “coastal zone” and “coastal zone management” in South Africa. No such definitions seem to exist, either formally in legislation or informally. Useful elements of a definition for “coastal zone” have

been provided through recent efforts by the Council for the Environment (1989, 1991) in its (as yet unfinished) study and recommendations for a policy on coastal zone management and by the former Cape and Natal provincial administrations. These definitions focus on ecological interactions between land and sea and on the definition of seaward and landward boundaries, respectively. The Council for the Environment policy study also advances a useful definition of coastal zone management (“the effective conservation and utilization of the coast as a dynamic ecosystem at the interface between land and sea”) as well as principles and objectives. The latter, however, are silent on socioeconomic and political issues such as improved access to coastal resources and public participation in planning and decision-making.

Policy Issues for Government

Planning and coastal zone management — The coastal zone is under increasing development pressure and a variety of planning approaches are being implemented in the absence of an integrated comprehensive strategy. These include coastal land-use plans, town planning, regional development plans, and national plans, as well as sectoral plans carried out by particular government departments such as transport and environment. These different planning efforts are not always consistent with a comprehensive coastal zone management policy and often pay insufficient, if any, attention to environmental considerations. Furthermore, these planning efforts do not recognize the coastal zone as a distinctive area.

Legal and institutional instruments — Currently, South Africa does not have a legislative requirement for a formal environmental impact assessment of particular development projects, let alone development policies, programs, and plans. This presents a particular problem for the coastal zone because of its ecological sensitivity and the development pressure it is under. The government will need to consider the legal and institutional instruments required to ensure integrated environmental management of the whole coastal zone. Some of the elements are already in place, such as principles for coastal zone management, guidelines for coastal land use, coastal structure plans,

and water quality criteria for the coastal zone, but the statutory requirement and political commitment are missing.

Resolving resource conflicts — The coastal zone is a complex system that is being subjected to multiple and often conflicting resource demands. Government can expect future conflicts in the coastal zone that will need resolution. Current examples of resource use conflicts include small-scale communal fishing activities versus commercial diamond “fishing” in the shallow beach waters of parts of the west coast (see box, pp. 100–101: “Ebenhaeser Fishing Community: Where Have the Fish Gone?”) and sand dune mining versus ecotourism (such as in St Lucia; see Chapter 5). Current mechanisms for resolving resource conflicts and looking for cooperative solutions are inadequate and often inequitable. There is a need to develop and fully apply participatory mechanisms that give weaker players a measure of protection and legal recourse.

Conservation — Conservation of natural resources will continue to be a policy issue in the coastal zone. To date, efforts related to coastal zone management have largely focused on the conservation of particular species and, to a lesser extent, on integrated ecosystems (whose holistic nature is not reflected in existing legislation). South Africa has developed an international reputation in the establishment and scientific management of protected areas. A number of coastal conservation areas have been set up, including national parks, provincial nature reserves, marine reserves, private nature reserves, lake areas, forest nature reserves, wilderness areas, nature areas, and islands (23.3 percent of the country’s coastline falls within such conservation areas).

However, a number of shortcomings in the conservation approach need to be addressed. First, the conservation areas do not extend below the high-water mark on the seaward side of the coast, and certain unique, near-virgin areas have not been protected. Second, and more importantly, socioeconomic aspects related to the characteristics, perspectives, priorities, and needs of local populations have largely been ignored. Finally, and most importantly, there has been little, if any, public participation in the identification of areas to be protected, as well as their establishment and operation, nor have financial returns accruing from the operation of nature reserves been sufficiently shared with local people.

Ebenhaeser Fishing Community: Where Have the Fish Gone?

The sea mist had lifted by the time the Mission reached the settlement of Ebenhaeser, the southernmost of the Namaqualand “reserves” set aside for indigenous people in the last century. These reserves were originally established as mission stations to protect inhabitants from white encroachment, and today are run by the community through elected management councils. At Olifantsdrif, a collection of higgledy-piggledy cottages on a picturesque bend in the beautiful blue Olifants River, the Mission met with members of the Ebenhaeser community, including their fishing committee.

It was explained how the community subsists on fish that inhabit the cool nutrient-rich Benguela current and enter the river at its estuary. Licences to fish the river are issued by the Cape Nature Conservation office in Vanrhynsdorp, over 65 kilometres away. These licences allow individuals to fish along a 10 or 30 metre stretch of the river. Mrs Africa, secretary of the fishing committee, explained that it was the committee’s job to allocate licences. Since the end of 1993, however, no licences have been issued by the Cape Nature Conservation office, and people are becoming desperate.

Fisherfolk explained how severely pressures on the river have grown. In part, this is because many of them were recently declared redundant and were laid off from the nearby crayfish factory at Doringbaai without sufficient severance pay. Lacking other livelihoods, they sought licences to fish the river.

These extra applications made existing licence holders nervous. For the past 4 years, fish have failed to swim into the community’s nets in large numbers. At best, licence holders obtain sufficient fish for their family tables, but there is nothing left over to sell at the market.

Oom Dawid, a community leader, explained that the fish stock had become depleted for two reasons. One was the arrival of diamond boats, which parked at the mouth of the river and used vacuum suction to draw alluvial diamonds from the seabed. The noise and lights of these boats repelled the fish, so few entered the estuary. The second problem was the burgeoning seal population, which had grown out of control because culling was no longer encouraged. Seals swim upriver and break the community’s nets in search of fish. New nets can cost from 500 rand for 10 metres, a sum few in the community have at their disposal.

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Thus, seals and diamond boats are factors in the destruction of the community's livelihood. The authorities have been alerted to the problem of the diamond boats, but there has been no compensation — not even through the Diamond Fund that was established and is run by the Small Business Development Corporation. At the same time, community members do not fish in the estuary for fear of arrest and confiscation of their equipment.

The community discussed their problems openly with the Mission. At the end of the meeting, Mrs Africa approached Mission members: "Please don't forget our plight," she implored, "people here are poor, and you have opened up a ray of hope for this community to move away from its poverty."

Sadly, we reiterated that the Mission's task was not to resolve problems, but to make policy recommendations to the new government. Nevertheless, the Mission's visit raised expectations. It underlined how the new government will need to pay serious attention to longstanding local problems such as conflicts over resources. Through the Reconstruction and Development Programme, it must attempt to meet the needs of communities such as Ebenhaeser. Only then will the fish return in large numbers to the waters of Olifantsdrif.

Property rights — In comparison with species and ecosystems, very little has been done to protect recreational, scenic, historic, cultural, scientific and educational sites and resources in the coastal zone. It is not clear to what extent these sites and resources, which might be regarded as common heritage, are freely accessible to the general public. In other words, there is a need to survey and clarify existing property rights with respect to these resources and to maintain or promote state ownership to ensure universal access.

Law enforcement and coordination — Various legislative provisions exist to control the utilization of coastal zone resources outside protected areas: *Sea Fisheries Act* of 1988; Natal Parks, Game and Fish Preservation Ordinance of 1947 and the Natal Fisheries Licensing Board Regulations, as well as similar ordinances for the former Cape Province; *Conservation of Agricultural Resources Act* 43 of 1983; *Lake Areas Development Act* 39 of 1975; *Mountain Catchment Areas Act* 63 of 1970; *Water Act* 54 of 1956; and *Forest Act* 122 of 1984. However, the effectiveness of these legislative provisions is hampered by a lack of

enforcement capability (funds, personnel, equipment, etc.) as well as a lack of coordination among the government departments in charge of administering the legislation. Problems of insufficient law enforcement and coordination also apply to protected area legislation.

Water Act 54 of 1956 regulates the discharge of industrial and municipal effluent into the sea. All effluent discharge must meet “general standards” or, in the case of discharge into sensitive water systems, “special standards.” A more recent approach takes into account the site-specific capacity of receiving water to dilute pollution to an acceptable level (receiving water quality objectives approach). However, there are problems of enforcement in terms of difficulties associated with collecting evidence and weak penalties. Regulation of storm water also leaves something to be desired as far as the implementation of statutory laws is concerned.

Research — There is a relatively strong tradition within the country of scientific research into ecological aspects of coastal resource conservation. However, socioeconomic and political dimensions have largely been ignored, and little attention has been focused on human– environment interactions and participatory research approaches. There is a need to involve stakeholders and affected groups in defining the problem and, as far as possible, in the research process. In general, research should be more problem oriented and socially relevant, and more effort is needed to address the problems faced by disadvantaged populations.

Tourism — Tourism is a coastal zone resource of growing economic importance. Given the pressures on coastal ecosystems, there are advantages in promoting tourism that is as environmentally friendly as possible. This refers to minimizing tourism infrastructure, such as roads and hotels, and educating tourists to respect and care for the coastal environment.

Recommendations

1. The coastal zone should be recognized as a distinctive geographic entity. A comprehensive yet operational definition, including a careful demarcation, of the “coastal zone” should be developed as part of a comprehensive and integrated policy framework for

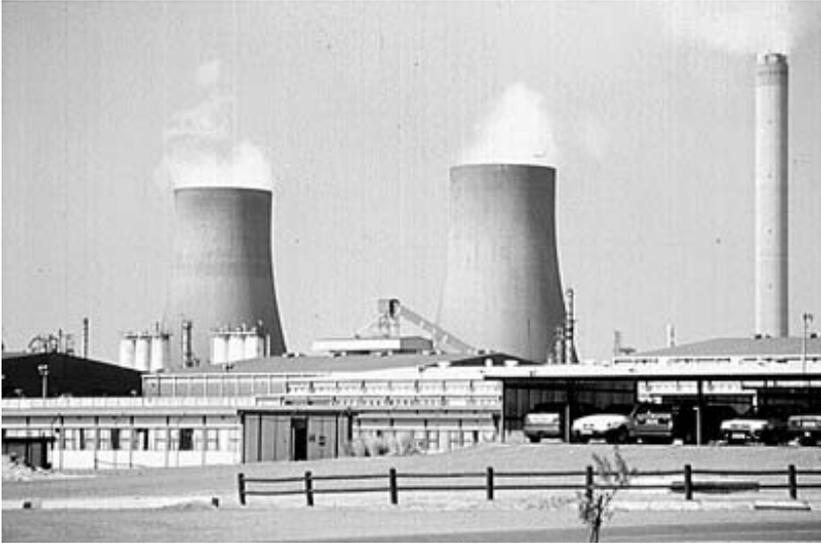
coastal zone management. Overall policy for the coastal zone should be a national responsibility with the participation of the relevant provincial and local governments.

- Management of the coastal zone around South Africa should be integrated with proper management of all river estuaries and all coastal mangrove, swamp, and other delicate ecosystems. Estuarine zones are key sources of pollution resulting from illegal and uncontrolled industrial discharges, informal settlements, and farming practices in river valleys.
- The new coastal zone management policy should be inspired by the following principles and objectives: regard the coastal zone as common heritage, accessible to all; maintain state ownership of, or control over, coastal zone resources to the greatest extent possible (currently, 60 percent of coastal land and nearly all coastal resources below the high-water mark are owned by the state); and make development in the coastal zone both equitable and sustainable (compatible with the sharing of benefits among the largest number of people possible, as well as with safeguarding and conserving the diversity of available sites and resources).
- The new coastal zone management policy framework should be developed in a participatory fashion, building upon studies such as the Council for the Environment coastal zone management policy study and upon mechanisms such as the current planning initiative toward a coastal zone management policy sponsored by the Department of Environmental Affairs and Tourism.
- In the interim, while the policy approach is being developed, no public (state or municipal) coastal zone land should be divested from state control and strict control should be exercised, as much as possible, over the use of private and public land.
- A comprehensive study, using appropriate models, should be undertaken to determine the effect of various land-use patterns upstream on the water quality of specific estuaries and the overall effect of these land-use patterns on the coastal zone.
- Environmental education on, and increased awareness of, the precious and fragile nature of the coastal zone should be directed at schoolchildren, the general public, and tourists.

- All existing diverse pieces of legislation pertaining to or impinging upon coastal zone management should be integrated into a unified and distinct coastal zone management act. Likewise, administrative responsibility for implementing coastal zone management laws and regulations should be streamlined and subsumed under one division within the Department of Environmental Affairs and Tourism or, if further study is indicated, within a lead (parastatal) agency linked to the Department.
- All development projects within the coastal zone should be subjected to an environmental impact assessment within the context of integrated environmental management guidelines, with full participation of all stakeholder groups as well as the general public. Land-use planning procedures and environmental conservation strategies in the coastal zone should be streamlined and integrated using integrated environmental management procedures.
- Preventive approaches rather than end-of-pipe “solutions” (such as effluent treatment or, even worse, dispersion and dilution of pollutants in receiving water) should be used, as much as possible, to limit or reduce marine pollution originating largely from land-based sources.
- Pollution control should be made more effective through new or more appropriate regulations and better enforcement of existing regulations using an integrated approach. All pollution control regulations and mechanisms should be administered by the Department of Environmental Affairs and Tourism.
- Tourism in the coastal zone should be environmentally friendly. Possibilities of ecotourism should be promoted. Where tourism competes with development projects, complementary approaches should be explored.

Part IV

Key Development Sectors



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Chapter 9

MINING

Situation Synopsis

Mineral exploitation and processing are the backbone of the South African economy (Figure 6). Since late in the last century, mining and beneficiation of a variety of minerals, in particular gold, have been the driving force behind economic development, particularly in the Witwatersrand area. Current mineral sales amount to some 37 billion rand, as much as three quarters of which comes from exports. The remainder — domestic sales — contributes about 12 percent to the GDP of the country. Mineral export sales in 1990 made up approximately half of total export revenue.

Gold has been by far the most significant mineral for South Africa, with total sales of 18.8 billion rand (1990). The country is the largest gold producer in the world (about 600 tonnes annually), with gold accounting for as much as 65 percent of the value of mineral exports. In the past few years, gold sales revenues and profits have declined as a result of lower average ore grades, increased production costs, and lower international gold prices. Approximately 150 000 workers have been laid off as a result. Even though the mining industry is in recession, it is still providing some 700 000 jobs, approximately half of them in gold production alone.

Next after gold, in terms of revenue volume, is coal, with total production of 185 million tonnes (25 percent for export) and total sales of 7.7 billion rand (45 percent from export) in 1990. Aside from generating 10 percent of export earnings, coal is the predominant fuel used in South Africa (see Chapter 6), and the coal sector provides

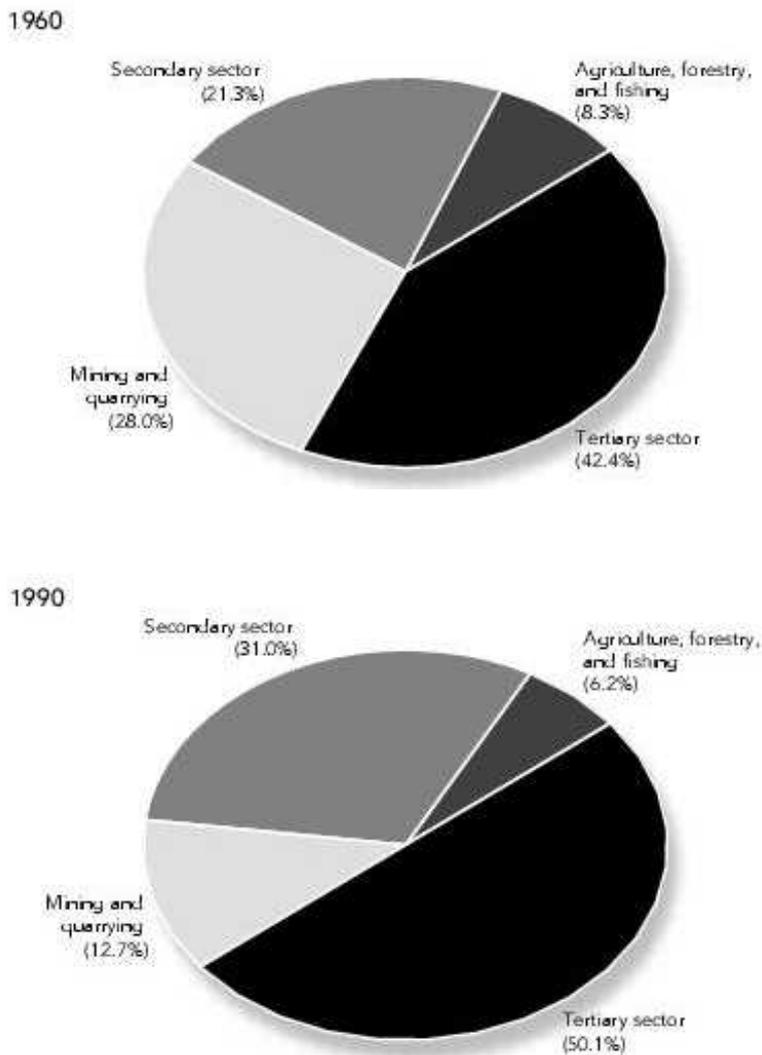


Figure 6. Proportional contribution to gross domestic product by sector: 1960 and 1990

some 90 000 jobs. Both of these facts underscore the economic and social importance of coal to South Africa. The country is also the largest producer of vanadium, chrome ore, ferrochromium, aluminosilicate, and manganese.

Mining operations give rise to a number of serious environmental effects, but they tend to be local impacts on land and water quality,

whereas mineral processing can affect a much larger area, especially through air pollution. In addition to dust, gold mining generates large volumes of slime containing finely crushed rock and liquid residues that contain sulfuric acid. Slime dams easily erode and are a source of severe water and dust pollution. A major accident took place in February 1994 in Merriespruit and involved the rupture of a slimes dam operated by Harmony Gold Mine (then a Rand Gold subsidiary), which caused a huge mudslide that resulted in a considerable number of casualties.⁴ In Witwatersrand, the deep aquifer linked to the gold fields is highly saline and is discharged to surface evaporation ponds. Dewatering of the mines over 40 years has brought about 5 000 tonnes of sodium chloride to the surface (Wells et al. 1992). Seepage from the evaporation ponds seems to be less of a problem than overflows into streams. In the eastern Witwatersrand area, gold mine wastewater contains sulfuric acid, iron, and manganese and is pumped directly into the Klip and Elsberg rivers. This discharge adds some 60 to 150 tonnes of salt per day to the Vaal barrage.

South Africa was the third largest producer of asbestos until 1985 and remains the fourth largest exporter (Goosen 1994). Asbestos occurs in small localized areas in the northwestern Cape Province. It is an extremely hazardous substance that causes asbestosis, mesothelioma, and lung cancer. All of these diseases have latency periods of over 20 years, so that, without adequate records of the health of asbestos mine workers and nearby community residents, it is not possible to assign cause and effect. Asbestos fibres from mine dumps are the major cause of environmental problems, through air pollution and the polluted water draining from dumps.

Since the early 1980s, the asbestos industry has implemented state-of-the-art control measures that have reduced occupational exposure to asbestos to below national legal limits. A Safety and Health Programme, jointly run by management and workers, is in place. Work is now under way to stabilize the surface of dumps and to divert stream water from them. However, the adverse health effects of earlier asbestos mining will stay with workers and their families for decades.

Coal mining also causes severe environmental impacts, which in turn can affect mine employees and nearby communities. The location

⁴ A May 1995 accident at Vaal Reefs gold mine resulted in over 100 deaths. In South Africa, fatal mining accidents are all too common.

of major coal deposits poses considerable problems for water quality: most occur in the upper parts of major river systems, such as the Vaal, Olifants, Usutu, Komati, Pongola, and Tugela rivers. Sulfuric acid drainage leads to groundwater pollution. In addition, the high ash content of the coal requires separation, which generates large volumes of slurry that are discarded over large areas. Coal dumps also burn over long periods and cause air pollution.

Institutional Framework

South Africa has accepted private ownership of mineral rights and left the exploitation of minerals to the private sector. Ninety percent of all minerals are held privately. No other country in the world, except for the United States, has given so many mineral rights to the private sector. Virtually all mining and mineral production in the country, including coal, is controlled by six major mining corporations — the “energy–mineral industrial complex.” Under the apartheid regime, a migrant labour system, drawing significantly on workers from neighbouring countries, was developed with the objective of keeping workers’ rights and labour costs at a minimum. Cheap and abundant labour has been key to the success of the mining industry.

The mining houses, organized mostly in the Chamber of Mines, have traditionally had a very collegial relationship with the authorities on the question of environmental management of mines, which has attracted criticism from labour and environmental groups. They argue that this collegial relationship, combined with inadequate legislation, has led to lower mining costs but higher risks for workers and for the environment. Recently, the situation has improved considerably with both new legislation and voluntary initiatives taken by the mining industry to rehabilitate mines and improve the environmental assessment process.

The *Minerals Act* (No. 50 of 1991) established legislation to provide for the health and safety of mine workers and to regulate orderly utilization and rehabilitation of the land surface during and after prospecting and mining operations. With the 1993 amendment of the *Minerals Act* of 1991, each new mine must prepare an Environmental Management Programme Report (EMPR) for approval by the government. EMPRs cover environmental impacts of a mine during its life to

the point where a closure certificate is issued by the government. EMPRs must specify provisions for environmental management during the construction, operational, decommissioning, and aftercare phases. They set out timetables and the extent of financial commitments to cover each phase of management. Each project submits a single document that is meant to satisfy all government departments from Agriculture to Water Affairs and Forestry. EMPRs are intended to simplify and standardize the stringent reporting and monitoring procedures governing environmental management of individual mining enterprises.

Although the EMPR is a major improvement on the earlier situation, the procedure is still the object of considerable criticism. One criticism is that mining companies draw up their own EMPRs and prescribe their own solutions for management of adverse ecological impacts. They also determine the level of finance to be set aside for rehabilitation and closure. Furthermore, the company can identify some of this information as being confidential so that the public cannot scrutinize it. Another criticism is that the regional director of the Department of Mineral and Energy Affairs can exempt the applicant for prospecting or mining rights from the obligation to submit an EMPR. The main reason EMPRs are considered to be inferior to environmental impact assessments (see box, p. 112: "Environmental Impact Assessment") is that they do not address the question of whether the decision to mine is an appropriate environmental choice. It is contended by critics of the EMPR process that there is no real investigation of the problem or the alternatives, nor is there a legal requirement to allow for public involvement.

Proponents of the EMPR point out that before any mining operations can proceed, all holders of a prospecting permit or mining authorization are required not only to submit an EMPR but also to consult with any departments charged with administering regulations relating to environmental quality, as well as with all other interested and affected parties. According to the Chamber of Mines, an aide-mémoire, containing guidelines and a checklist, is used to prepare the EMPR in accordance with integrated environmental management procedures. Supporters of the current EMPR, including the Department of Mineral and Energy Affairs, argue that it does involve full impact assessment and public consultation and is not inferior to an environmental impact

Environmental Impact Assessment

An environmental impact assessment (EIA) is “an activity designed to identify and predict the impact of an action on the biogeophysical environment and mankind’s health and well-being, and to interpret and communicate information about the impacts” (Munn 1979). First introduced in the United States under the *National Environmental Policy Act* of 1970, EIAs range from brief statements to extremely detailed, multivolume reports requiring detailed data collection and analysis. It should be noted that EIAs are generally not concerned with the long-term cumulative effects of an action, yet these may ultimately lead to the collapse of an ecosystem.

In 1992, the Organisation for Economic Co-operation and Development’s (OECD) Development Assistance Committee produced *Good Practices for Environmental Impact Assessment of Developing Projects*, which identifies the type of projects that should undergo an EIA and provides details on basic requirements, procedures, screening processes, the investigation of issues, involvement of institutions and groups, reporting, external reviews, and monitoring and auditing. EIAs can also include a social impact assessment, which addresses issues affecting the public’s quality of life (for example, jobs, disruption of cultural values, loss of ancestral lands, and relocation of populations).

“Best available techniques not entailing excessive costs” (BATNEEC) refers to the use of the best technology available on the market for a given industrial process, unless its application would make the plant uneconomic or uncompetitive with other producers. This approach has been developed in the United Kingdom. The US equivalent would be “best available control technology” (BACT), used specifically for air pollution control under the *Clean Air Act*. “Best practical technology” (BPT) refers to any of the categories of technology-based effluent limitations related to the *Clean Waters Act* in the United States. Application of the “best practical environmental option” (BPEO) requires the chosen pollution abatement response to focus on cleaner or low-waste technologies and on eliminating or minimizing the production of waste at source rather than on treating the wastes produced. End-of-pipe technologies are acceptable only when no practical cleaner technology exists.

assessment. Both sides agree that a shortage of inspectors to monitor compliance is a problem, and that self-monitoring and spot checks are necessary.

Policy Issues for Government

The Minerals Act — The new environmental legislation contained in the *Minerals Act* of 1991, together with the 1993 amendment, is a significant improvement over past legislation, but the implementation and legislative force of the EMPR remains a contentious issue between the mining industry and its environmental and labour critics. This is clearly an issue that the government should eventually review to see where current provisions can be reasonably strengthened and brought in line with integrated environmental management provisions in general. The issues of the independence of the assessment, the close relationships between the regulators and the regulated, and whether the Department of Mineral and Energy Affairs, which has tended to promote mining, can also regulate the legislation effectively are all related policy questions.

- Abandoned mines and mine tailings do not seem to be covered by the *Minerals Act* or any other environmental legislation.
- In spite of the *Minerals Act*, the government, represented by the Minister of Minerals and Energy Affairs, cannot legally prevent exploitation of a mineral deposit once a prospector with private ownership rights has discovered the resource. All the Minister can do is impose conditions on how the deposit is to be exploited.

Entrepreneurship — Mining is dominated by large companies. There is a need to look into opportunities for small and medium-sized mining enterprises to get involved in the mining and minerals sector for reasons of equity and employment generation. According to the Department of Mineral and Energy Affairs, lower value mineral products, such as sand, stone quarrying, and brick-making (construction materials), currently provide the best opportunity for small and medium-sized mining enterprises, but more systematic information may be needed to identify other opportunities. An increase in smaller enterprises in the mining sector will also require that they be given the means and access to information to conduct their operations in the

safest and most environmentally benign manner. Small, frequently undercapitalized operations often lack the resources to take adequate environmental measures, and their entry into the sector in large numbers may increase environmental problems associated with mining. One means of support could be an information clearinghouse specifically directed at small entrepreneurs to help them in their efforts toward cleaner production (see recommendation 6 in Chapter 10).

Industry uncertainty — The need for more stringent environmental regulations and their enforcement comes at a time when the mining industry, particularly gold mining, is going through a crisis and large numbers of jobs are on the line. There is concern that further jobs not be lost as a result of environmental regulations. International pressures related to new environmental and trade regimes may force mining companies to adopt higher environmental standards if they wish to continue to export, but the reverse could occur if marginal pollution costs are equalized around the world.

Economic diversification — The great wealth from mining has benefited a small minority in South Africa. Mineral resources are nonrenewable, mines will be closed sooner or later, and the government will need to consider what provisions should be made to help retrenched miners find alternative employment and how to help mining communities transform their economic base. Regional planning will be important to help attract new economic activities to old mining areas.

Recommendations

1. Given the severe environmental problems that have occurred in association with the mining sector, granting further private mineral rights and the question of access to land for mining development should be reconsidered until better measures to protect the environment are enacted. This is consistent with the Reconstruction and Development Programme's proposal to convert all mineral rights to state ownership. When mineral rights become state owned, granting longer term mining licences will allow greater control over environmental protection and occupational health, as well as distribution of the benefits. An independent Mineral Rights Commission consisting of representatives

from all of the different stakeholder groups, including the mining industry, the union, and the government, has been proposed to recommend criteria and mechanisms to convert private property rights to state licences for later application by the government.

- Mineral resources are nonrenewable and will be depleted over time, both at an aggregate level and in specific places being mined. Therefore, some proportion of the revenue should be collected by the state through a suitable tax or levy and deposited in a special state fund to finance environmental rehabilitation as well as other areas such as severance payments and training retraining for retrenched mine workers, related health and safety costs accruing to mine workers, and investments in the development of renewable substitutes (materials and natural resources).
- As a precondition for granting licences for mining operations, an independent review of environmental and social impacts should be undertaken.
- There should be fully integrated monitoring of the Environmental Management Programme report by the Department of Environmental Affairs and Tourism over the lifetime of the plant until the closure certificate is approved by the department. Where appropriate, the department should have the power to recommend suspension or cancellation of authorization to operate the mine.
- A survey of unowned abandoned mines should be undertaken to ascertain priorities for rehabilitation.
- Existing mine tailing sites and technology should be examined to establish safe practices with respect to environmental and other aspects of mine management.
- The government should establish and promote, in partnership with leaders in the mining industry, a “responsible entrepreneurship” program to promote efficient use of resources, waste minimization, and environmental care.

Chapter 10

INDUSTRY

Situation Synopsis

South Africa's industrial sector concentrates heavily on mineral beneficiation and chemical processes, activities that have major impacts on the environment. In addition, South African industry is particularly energy intensive, with many companies relying at least partially on cheap energy for their competitive position. The combination of mineral beneficiation, chemical processes, and energy intensity adds up to a significant environmental impact. As a result, environmental management is especially important.

Another important feature of South Africa's industrial profile is that the capital stock in manufacturing is generally quite old. As a result, environmental protection features that are associated with newer industrial equipment are often absent. Efforts need to be made to ensure that as investment in new capital equipment is made, environmental features are incorporated.

The industrial sector as a whole, and the manufacturing sector in particular, has a critical role to play in the development of the economy (see Figure 6). It is likely that a program of reconstruction and development will require an expanding industrial base. Manufacturing will be a key source of tax revenue, foreign exchange, jobs, and human resource development. This implies that the environmental impact will have to be managed as an integral part of fairly rapid industrial growth. Although all industrial growth implies environmental impact, it is hoped that in the process of industrial expansion, South Africa will be able to "leapfrog" using the experience of other countries to avoid some of the environmental pitfalls that have been associated with

traditional industrial growth. To do this, South Africa will need to integrate careful environmental management into the process of formulating and implementing its industrial strategy.

Some environmental problems that flow from industry's impact on the environment can probably only be addressed in the longer term, whereas others will need immediate attention. Given that most South African industries currently have substantial excess capacity, however, it may be dangerous to simply wait for new investment in capital goods before addressing environmental concerns. Thus, the impact of existing equipment will have to be examined and addressed in most industries.

Institutional Framework

The Mission has been informed that South African legal requirements set stringent environmental standards for industry. However, there is little capacity within the state to ensure that these standards are met. This is partly a result of the highly fragmented nature of the legislation and government inspection services. Government lacks sufficient inspection capacity; hence, there have been few prosecutions for breaches of environmental standards. As a result, legal requirements bear little relationship to the practices of many organizations. In the words of one industrialist consulted by the Mission: "The truth is that even though there are strict legislative requirements, industry can pollute with impunity. The solution is not to have stricter requirements but to involve industry in a partnership for environmental protection." The weakness of the current regulatory structure must be addressed immediately. At the same time, however, parties must work together to develop effective partnerships to improve environmental performance.

The balance of responsibility between national and provincial institutions also has important implications for industry's environmental performance. There is a real danger that unless strong national standards are set, different provinces will have different standards for industrial emissions and environmental quality. This could lead to a situation where polluting industries are encouraged to relocate to the areas with the lowest environmental protection. Companies that have facilities in different parts of the country would also have to deal with a variety of provincial requirements. Even where national standards are

set, different provinces have unequal capacity to enforce the standards. This too presents potential dangers. For these reasons, it is important to encourage provincial governments to agree on the greatest possible uniformity in setting and implementing environmental standards throughout the country.

Policy Issues for Government

Extent of industry regulation — A key policy issue with regard to industry's impact on the environment is the extent to which industry should be regulated. A number of companies told the Mission that they prefer a self-regulated approach. Unions and community organizations, however, expressed concern about the potential for abuse in a self-regulated approach. The feeling of the Mission is that a degree of self-regulation is imperative, if only because no government or agency can duplicate the knowledge and information that exist in a given company. At the same time, however, unconstrained self-regulation can lead to a situation where poor environmental management goes unchecked until an accident or disaster occurs. The role of public authorities, therefore, must be to set and enforce minimum standards and to ensure that all companies meet these standards. It is accepted that most enterprises are managed responsibly, and that the leaders of any sector generally surpass government standards. The issue is to ensure that those companies that fail to meet the standards will be brought into line and, if necessary, provided with assistance. This will ensure that environmental and health damage, such as the situation that occurred at Thor Chemicals, does not go unchecked (see box, pp. 119–120: "Thor Chemicals: Return to Sender!").

Regulation alone is an inadequate basis for managing industry's environmental impact. We met a number of companies that are taking the lead in improving environmental performance, and we recognize that improvements will come largely from within companies themselves. Such improvements will be driven to some extent by market forces and the benefits associated with decreased waste and more efficient use of resources. However, government and organized labour can play a positive role by entering into partnership arrangements with industry to facilitate improved environmental management. Trade unions can play a positive role in this regard by ensuring that

Thor Chemicals: Return to Sender!

On 21 February 1994, outside the Thor Chemicals plant, a group of protesters wave banners against the importation of mercury waste. Inside the plant, the managing director, Stephen van der Vyver, escorts the Mission around the mercury reprocessing plant and three warehouses of toxic waste. The warehouses are piled high with 10 000 to 15 000 drums of waste imported mainly from Borden Chemicals and Plastics and Calgon Corporation in the United States. Some are from Thor Chemicals, UK, and others are from Singapore and Indonesia. Most drums are filled with activated carbon pellets containing approximately 5 percent mercuric oxide. Others are full of mercury sludge or liquid. Some barrels are leaking, rusting, or upended and spilling their contents. They have been stored here for up to 10 years. Outside the warehouses is a holding dam containing 2 500 tonnes of sludge with up to 5 percent mercury.

The Thor Chemicals story has become one of the best-known environmental issues in recent South African history. Thor Chemicals entered into agreements with a number of its overseas customers to take back mercury waste for reprocessing in South Africa to be competitive in the international chemical market, particularly in the United States, where mercury waste is banned from landfill sites and is very difficult and expensive to get rid of.

A rotary kiln incinerator was built and trial runs were started in December 1992. Under the *Air Pollution Control Act* of 1965, the Department of National Health then acted as the regulatory authority empowered to issue a registration certificate for the reprocessing plant. This was never obtained by Thor Chemicals, so they continued intermittent trials, reportedly without a provisional registration certificate for construction and without adequate independent environmental monitoring.

Research in the United States has shown that it is virtually impossible to prevent the escape of vaporized mercury from incinerators through the stack and into the atmosphere. When mercury is burned with chlorine, as is the case at Thor Chemicals, the gas may remain in the atmosphere for up to 2 months, or until rain washes it back to the ground, and dioxins may be formed. There is also the issue of waste ash resulting from the incineration process. According to the Department of Water Affairs and Forestry, this should be disposed of at a toxic waste landfill; however, verbal consent has reportedly been given to Thor Chemicals to put the waste ash on an unlicensed site within the plant's premises.

(cont'd)

There is concern about contamination of the soil and groundwater and that mercury is entering the local food chain. In response to these concerns, Thor Chemicals has dammed the Mgcweni River where it drains their site and is pumping the contaminated water back onto its property. The water then is returned to the ground.

The Attorney General of Natal ordered further investigation into Thor Chemicals. Its three top managers were reportedly charged with culpable homicide, fraud, and 42 other counts in connection with the company's mercury operations. They were found not guilty of the more serious charges and reportedly received fines on some counts.

What is the best solution at this point? Thor Chemicals has asked that it be allowed to incinerate all waste currently on site and has promised that no more mercury waste will be imported. Another possibility is that all barrels and sludge be disposed of at a toxic waste landfill site. A third option, and one favoured by environmental groups such as Earthlife Africa, is that the waste be returned to the country of origin. This would cost Thor Chemicals money and would require negotiation by the government. There are international precedents for this approach. For example, public pressure in Germany forced the German government to pay for the repatriation of pesticide wastes exported by the former West Germany to eastern Europe. Meanwhile, the latest shipment of toxic waste from Borden Chemicals and Plastics in the United States was turned back at Durban Harbour on 18 February 1994.

An independent inquiry is underway to look into environmental concerns as well as concerns over workers' health. This, together with a policy of "return to sender" for the toxic waste, would seem to be appropriate in this highly charged situation.

environmental and health problems experienced by their members are addressed. Industry's environmental performance, therefore, must be addressed through a mix of tools that rely on a combination of legal enforcement and regulatory tools and on a partnership approach among government, industry, and trade unions. This enables leaders in industry to set performance standards for their respective sectors and for the public to be reassured that government has the tools in place to identify and prosecute offending companies. The chemical companies' "responsible care" program is a good example of this approach in operation.

Health and safety — Industry's impact on the environment is closely linked to worker health and safety. In many instances, the same

processes that damage the physical environment also affect workers' health. Despite this, management of the environment and of workers' health and safety is legally and institutionally separate. There are different sets of laws governing the two, separate government departments, and, often, separate management structures. Health and safety management seems heavily biased toward the management of industrial accidents rather than the prevention of occupational diseases. There is inadequate information on occupational disease and simultaneous damage to workers' health and the physical environment. Thor Chemicals, however, is a tragic illustration of the way in which inadequate management can lead to the death of workers and to severe environmental damage. This suggests that legislative, regulatory, and management processes should be changed to deal with safety, health, and the environment in a more integrated manner. Further research is needed in this area.

Trade unions have a key role to play in demonstrating and managing linkages among health, safety, and the environment. South African trade unions are increasingly taking up health, safety, and environmental issues, especially in the chemical industry, where some of the worst effects have been felt. Trade union representatives consulted by the Mission made a range of suggestions about ways to improve health and safety, and about consolidating linkages among health, safety, and environmental management. In particular, they suggested providing workers with environmental training to increase their capacity to recognize dangers in the workplace and to take appropriate action. For workers to intervene effectively, they also need to be given the rights and powers to summon inspectors and compel management to take action. These ideas are further reflected in our recommendations. Trade unionists also acknowledged that inadequate attention has been focused on health, safety, and environmental problems on the part of the labour movement. This is partly a result of inadequate technical capacity to intervene effectively at the shop-floor level. This is an area in which additional international support would be most useful.

Industrial pollution often damages the health of neighbouring communities, as witnessed by the Mission. In some instances, this is a result of inappropriate siting of industrial areas. The Merebank industrial area outside Durban is an important example of the environmental racism that was practiced by apartheid authorities (see box, pp. 86–87: “Merebank”). The siting of a large residential area next

to heavy industries demonstrates authorities' scant concern for community health. There is now evidence of respiratory damage among children in the area that residents believe is linked to industrial emissions. Attempts by community organizations to gain access to information about the emissions have met with resistance from both the companies and local authorities. Community organizations are now working with a number of industrial companies in the Merebank area and have reached agreement with the Mondi paper mill to divert traffic and reduce noise. Access to information, however, remains a problem. The right of access to information is now provided in the new Constitution and this should create an opportunity for residents of Merebank and other areas to challenge the levels of pollution in the environment. However, this will raise policy issues, including whether such communities will be compensated and whether the communities or the industries should be moved.

The siting of industry is not the only problem, however. Even in areas where there is greater distance between industry and neighbouring communities, there is the potential for industrial processes to damage the health of communities. Community activists told the Mission that it is often difficult to prove that community health problems are directly related to industrial emissions. In the absence of such proof, it is difficult to ensure that action will be taken or compensation awarded. The Mission believes that this is an area that deserves more attention from companies and public authorities. This may be an area where only limited improvements can be brought about by improved regulations. A process of negotiation and partnership among companies, trade unions, community organizations, and public authorities to find appropriate solutions will likely be more successful in the long run.

The cases of Merebank and Thor Chemicals raise a number of policy issues with regard to the impact of industry on both occupational and environmental health. The first is that workers and communities have a key role to play in managing the environment. Both groups need to be given the tools and the opportunity to intervene in the management of the environment and to influence decision-making. This process could be based on six principles:

- The right to information;
- The right to be informed of danger;

- The right to participate in decision-making;
- The right to refuse dangerous work;
- The right to appropriate education and training; and
- The right to compensation.

Currently, the legislative framework does not enshrine these rights, although it may be possible to institutionalize them on the basis of provisions in the new Constitution. To be effective participants in securing better environmental quality, local groups and workers need more environmental and health education.

Environmental reporting — According to a survey conducted at the University of Pretoria, only 30 out of a total of 165 companies discussed environmental issues in their company reports in 1992. Of these, none mentioned any negative environmental aspects associated with their activities and only two referred to independently conducted environmental audits. Although 24 companies set environmental goals, only 2 set measurable standards against which to assess their progress. Many companies included their environmental performance under “social responsibility,” with few regarding environmental performance as a key aspect of their competitive or strategic position. Given the poor environmental performance of many companies in South Africa, especially in the mining, chemical, and heavy industry areas, and experience elsewhere that environmental reporting does sensitize company senior executives and shareholders to environmental issues, this is an area where the government could probably take action fairly easily.

Recommendations

1. The output of air emissions, effluent, and solid waste is related to the production process itself, as is worker safety. Monitoring and regulating these outputs, therefore, should be integrated under a single authority. One way to do this would be to have an industrial inspectorate decentralized to each province. Such a body would be responsible for monitoring every aspect of industry’s impact on the environment, including emissions, effluent, waste disposal, handling of hazardous waste, and worker health and safety. This would require a multidisciplinary group of inspectors with the

authority and motivation to take firm action against offenders. This could only be achieved in the context of clear national standards. To achieve this, legislation and national government structures would have to be amended (see also the proposal for a national environmental monitoring and extension agency presented in Chapter 3).

- South African companies should be required by law to integrate environmental considerations into their planning processes and to conduct environmental impact assessments. However, the Mission is cognizant of the difficulties associated with achieving this in the short term. Therefore, it is recommended that a target date be set for the inclusion of integrated environmental assessment or similar procedures into company practices. In the meantime, programs could be put in place to facilitate such action. Current legislation allows the Minister of Environmental Affairs and Tourism to order an environmental impact assessment. However, there are no regulations on what sort of project should be targeted. The Department of Environmental Affairs and Tourism has developed a set of guidelines for integrated environmental management in industry. Further guidelines need to be developed to facilitate environmental impact assessments in priority areas. Criteria for identifying such areas are needed. One possibility would be to link state support (for example, in the form of government loans) to impact assessments. In implementing environmental impact assessments, government and industry representatives need to be conscious of the delicate balance between improving environmental performance and ensuring that South Africa is able to develop as fully as possible.
- The Mission recommends that the system of health and safety management be restructured to allow greater integration among health, safety, and environmental management. Whereas the strengths of the current system should be retained, national and company processes should be widened to allow for a broader approach. To achieve this, we propose the following specific measures:
 1. Current health and safety representatives in companies should become health, safety, and environment representatives and should be given the necessary training and power to identify and address health, safety, and environmental dangers at

work. All workers should be given broad training in health, safety, and environmental matters and should be able to alert management and public authorities to dangers. Health, safety, and environment representatives should have the power to summon government inspectors to their plant if they feel that their concerns are not being addressed.

- Wherever possible, inspectors should be able to communicate with workers in their own language. One way to achieve this would be to train former workers to become inspectors. When inspections take place, workers and managers should receive a report.
- Compensation for workers and communities whose health has been damaged by inadequate environmental management must be investigated by the departments of labour, health, and trade and industry. In particular, the possibility of extending the workman's compensation scheme should be investigated.
- A national tripartite committee should be set up, possibly under the National Economic Development and Labour Council (NEDLAC), to look at overhauling the system of health, safety, and environmental management.
- It is recommended that environmental auditing reporting be required for companies in South Africa as is now being done in several countries. The obligation to report would put pressure on companies to consider their environmental impact more carefully and to account for their activities. Reporting requirements must include measured environmental performance and a degree of independent assessment.
- In addition to general measures for improving environmental performance, each industrial sector should be encouraged to prepare an environmental plan in consultation with government departments and trade unions, and, where appropriate, nongovernmental and community-based organizations. Such plans have been used successfully in the Netherlands and other countries. Sectoral environmental plans could take the form of

1. An initial study to identify the most urgent environmental and related health and safety problems in the industry in consultation with government departments and trade unions;

- An agreed upon 3-year plan to address these problems, with specified commitments from industrial bodies, companies, unions, and relevant government departments; and
- Ongoing joint monitoring of whether the plan is being achieved and reporting to interested and affected parties.

The emphasis of such a process would be to create a partnership among business, government, trade unions, and community groups to improve environmental performance across the board in a given industry. This process has the potential not only to improve environmental protection but also to contribute to improved efficiency and competitiveness in South African companies.

An agency would have to be identified to manage this process. One possibility would be to organize this task under NEDLAC. The process could be started on a pilot basis as early as 1995.

- Another way in which the government can play an active role in facilitating improvements in industry's environmental performance is to establish a national Office for Clean Production. This would be a public agency, working in partnership with industry, that would aim to identify and implement technological changes that would improve environmental management. Its mandate would be to assess existing technologies and encourage the adoption of cleaner technology by assisting industry to identify or develop such technology and to use it successfully. The agency could conduct research and development work in partnership with industry, universities, the Council of Scientific and Industrial Research, and specialized companies such as Mintek. Such an agency would need to link with the Regional Centre for Clean Production that has recently been established by the United Nations Industrial Development Organization (UNIDO) and UNEP in Harare. This office could also facilitate a range of economic incentives to improve the environmental performance of industry and mining, such as tax concessions that could be granted for investment in clean technology research and implementation.

Chapter 11

WASTE MANAGEMENT

Situation Synopsis

In South Africa, waste production is relatively high because the country has relied on mining and related power production for much of its economic development and has generally encouraged wasteful use of natural resources and raw materials by keeping the prices of these inputs extremely low through subsidies. In stark contrast to the extent of the problem, policies and regulatory systems to control, or even prevent, waste and pollution have often been weak, fragmented, and ineffective.

The waste problem did not catch the attention of the government or the public until recently. Public concern about the importation of toxic waste was instrumental in propelling the waste issue into the limelight, especially in the case of mercury recovery from imported waste by the Thor Chemicals plant in Pietermaritzburg, when it was revealed that workers' health was affected and there was serious contamination of the local environment. Cessation of operations was announced while the Mission was visiting the plant. In another case, a proposal for a toxic waste incinerator, to be located on the Cape coast and, like the Thor Chemicals plant, to be fed largely with imported waste to earn foreign exchange, rallied effective opposition and was never built.

National economies generate large quantities of different types of hazardous emissions, effluents, and solid wastes. A wide variety of sources of such "negative resources" can be found in different sectors and at different levels of human activity. In addition, certain waste

types, in particular toxic waste, may be imported or exported, and there are often other forms of transboundary flows of pollutants and waste (such as the movement of polluted air or water across national borders). Different waste types and forms are disposed of in different ways, ranging from dedicated engineered waste disposal facilities to dilution in the natural environment (air or water).

Industrial establishments are important point sources of waste (in gaseous, liquid, or solid form). Waste output types and intensities and their potential health hazards vary depending on the particular kinds of industrial processes used. Where industries are clustered into “industrial parks” or form even larger conglomerations spread over extended areas, wastes can add up to quantities capable of posing significant health risks to large populations. Target groups at particular risk from exposure to industrial wastes include nearby homes and communities and the industrial workers themselves.

Other sectors responsible for large waste output include transportation, agriculture, and domestic households. Transportation accounts for a share of urban air pollution. High-intensity agricultural production uses different kinds of agrochemicals (such as fertilizers and pesticides) that end up in either surface water or groundwater. Households generate sewage, a variety of different types of more or less biodegradable solid waste ranging from organic residues to plastic packing material, and indoor air pollutants associated with cooking and water space heating, particularly in lower income households that use smoky fuels.

A first comprehensive attempt to assess the waste and pollution problem and examine options for improved management was completed with the publication of two reports prepared by the Council of Scientific and Industrial Research (CSIR 1991, 1992). The first study addressed the question of waste management and pollution control in general; the second study was devoted to hazardous waste in particular. According to these studies, solid waste streams amount to between 340 and 480 million tonnes annually. Major sources of solid waste and their estimated contributions are summarized in Table 1 and in Figure 7. Of these wastes, hazardous wastes are estimated to be about 1.9 million tonnes per year, or less than 1 percent of the total.⁵ However, their

⁵ CSIR (1992) groups all waste streams into five hazard classes, of which the top three are taken to represent “hazardous waste.”

Table 1. Sources and amounts of solid waste (millions of tonnes per year).

Source	Amount
Mining tailings (including coal discard)	240–380
Pulverized coal ash from power generation ^a	20
Chemical, metal, metallurgical, and other manufacturing industries	20
Urban (municipal) waste	15
Other ^b	40–55
Total	335–490

Source: CSIR (1991, executive summary; 1992, vol. 1, table 31, p. 51).

^a According to CSIR (1991), one large-scale coal power plant block (such as Lethabo) produces as much fly ash as the whole of France.

^b Agriculture and forestry, 20; sewage sludge, 12; and domestic and trade refuse, 8–15.

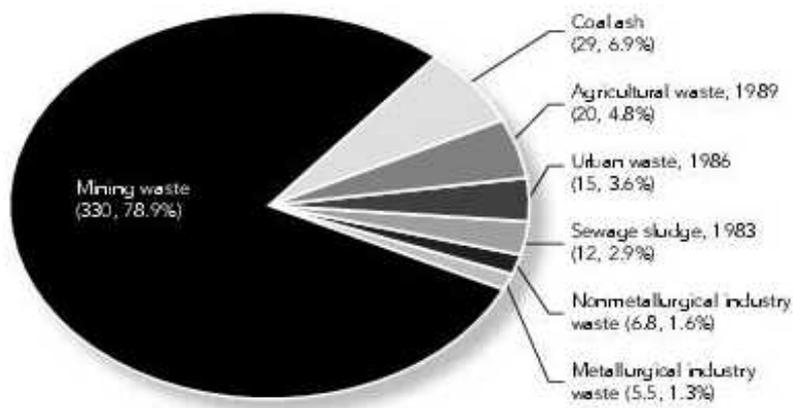


Figure 7. Distribution of solid waste stream (millions of tonnes per year and percentage of total) in South Africa, 1991.

toxicity is such that these wastes require particularly careful treatment and disposal.

Aside from solid waste, emissions to the atmosphere add up to about 147 million tonnes annually.⁶ Over 1.2 million tonnes of effluents are discharged to estuarine, freshwater, and marine environments annually.⁷

⁶ This is dominated by carbon dioxide (at 145 million tonnes), followed by sulfur dioxide (at 1.2 million tonnes) (CSIR 1991).

⁷ Freshwater, 0.78 tonnes; estuaries, 0.0225 tonnes; marine offshore, 0.196 tonnes; marine surf zone, 0.053 tonnes; storm water runoff, 0.195 tonnes (CSIR 1991).

Regional distribution of the waste generated is largely determined by the location of the country's mining and power industries, the main sources of waste. These industries are concentrated particularly in the Eastern Transvaal Highveld area, where high pollution levels are exacerbated by poor dispersion of pollutants because of the frequent occurrence of inversion layers. Smaller high-concentration industrial sites include the Merebank area in Natal, where pollution levels were witnessed firsthand by the Mission. As the Merebank case also shows clearly, it is almost always the poorer people who live close to polluting factories and, hence, suffer the greatest health consequences. Such environmental apartheid is also revealed in the declaration of smoke-free zones in urban areas (and associated successes in reducing pollution levels) since 1965, which, until the democratic elections, was restricted to white districts.

In contrast to white urban areas, the townships are generally very polluted, waste collection services do not function properly, and there seems to be a lack of environmental awareness or interest in cleaning up the environment among many poor township dwellers. This became abundantly clear at meetings the Mission held with environmental activists in Cape Town and elsewhere in the Western Cape (this applies to both rural and urban areas). Reasons for the higher level of pollution include a lack of proper sanitary facilities and practices and the use of coal and wood for cooking and heating purposes. Efficient and properly ventilated stoves using chimneys are too expensive, and smokeless fuel is not yet accessible (see Chapter 6). The use of coal and wood also contributes to outdoor urban pollution in the townships.

Consumer behaviour and associated waste generation is another area where South Africa's dualistic structure becomes apparent. Unlike the black majority, consumerism and overconsumption among the white minority has resembled that of affluent societies in industrialized countries. However, in South Africa, consumer product industries seem to have lagged behind recent worldwide trends to reduce waste through recycling and reusing materials, greater durability of consumer goods, and more emphasis on maintenance and repair. Thus, there is considerable room for improvement.

Institutional Framework

Today, responsibility for regulating industry's emissions, effluent, solid waste, and hazardous waste is governed by a myriad of separate laws pertaining to various aspects of their environmental impact. The fragmented legislative framework results in a splintering of responsibility for environmental management. Responsibility for regulating and monitoring the industrial impact is divided among various national government departments (Table 2).

This structure creates a number of difficulties. First, a particular factory or enterprise is faced with a plethora of laws and regulations governing different aspects of the production process and is responsible to a large number of different government authorities. This makes it difficult for an enterprise to establish an integrated and ongoing process of environmental management. Second, fragmentation of authority constrains the effectiveness of state inspectorates. Given that the responsibility for monitoring falls under individual departments, each department has a separate set of inspectors who monitor a closely defined set of regulations. A number of national departmental officials

Table 2. Fragmented responsibilities for administering waste management.

Requiring regulation	Government department responsible
Air pollution	Environmental Affairs and Tourism
Domestic and nonhazardous industrial wastes	Local authorities
Hazardous waste landfills	Water Affairs and Forestry
Transportation of hazardous substances	Health
Soil quality (including the use of pesticides)	Agriculture
Marine pollution	Environmental Affairs and Tourism (pollution control) Transportation (pollution prevention and prosecution of offenders)
Radioactive fuel cycle	Council for Nuclear Safety
Other radioactive materials	Health
Water pollution	Water Affairs and Forestry Health
Mining waste	Mineral and Energy Affairs
Noise pollution	Local government
Occupational health and workplace safety	Labour
Waste on roads	Provincial administrations

whom we interviewed pointed out that fragmentation of monitoring results in a situation where each department's inspectors have the authority to monitor only one aspect of complex and interrelated environmental problems.

A large number of separate pieces of legislation exist that regulate, directly or indirectly, waste and pollution management. Likewise, environmental laws and regulations are administered by a host of different government departments at different levels. Although there is one comprehensive act controlling pollution (*Atmospheric Pollution Act 45/1965*), as many as 37 different national statutes impinge upon land-related waste generation, and although the *Water Act* governs pollution in all freshwater systems, mining and agricultural industries have different statutes and different government departments looking after waste and pollution. As well, often there do not seem to be any clear environmental quality standards against which industrial operations are measured (for example, there are no ambient air standards).

There are important areas of waste management for which legislation either does not exist or is not enforced. For example, only 12 percent of the 182 landfill sites in the country where solid and liquid wastes are disposed of were licenced. Furthermore, in a survey conducted by CSIR, half of the landfill sites were found to have control problems, and, for a good number of them (nearly half), there was little information about the health, safety, and environmental status of the sites. Such a disjointed, fragmented, and poorly defined and enforced legal and administrative system is a recipe for a lack of coordination, overlap, and ineffectiveness. This is exacerbated by a tendency for departments to define their areas of work very strictly and to create bureaucratic boundaries where no environmental boundaries exist.

This situation is compounded by a shortage of inspectors in each department. For example, there are only eight enforcement officers monitoring compliance with the *Atmospheric Pollution Prevention Act* across the country. None of these officers (formerly based at the Department of National Health and Population Development and now within the Department of Environmental Affairs and Tourism) is a lawyer, whereas the Department of Water Affairs and Forestry has 10 lawyers involved in the implementation of the *Water Act*. A number of departmental officials stressed that, given recent budget cuts, they were unable to employ the number of inspectors they needed to

monitor even their own limited areas in a comprehensive manner. This point was also raised by a number of companies and NGOs that we visited. It was also pointed out that, if more comprehensive inspection is to be implemented, effort and resources will need to be invested in training sufficient numbers of skilled and motivated inspectors.

A good example of these problems is provided by the case of Thor Chemicals (see box pp. 119–120: “Thor Chemicals”). During the time that Thor was processing toxic chemicals, management was interacting with a number of different government departments. Although the various problems at Thor Chemicals were the result of a single process, different departments made separate, and at times contradictory, interventions. The former Department of National Health and Population Development (now the Department of Health) was responsible for issuing permits for the importation of the mercury substance, the Department of Water Affairs and Forestry for the disposal and storage of the mercury waste, and the Department of Labour (formerly Manpower) for the effect on workers’ health. Even given the legislative powers enjoyed by these departments, they reported that they were unable to prevent the extensive environmental damage (including mercury buildup in the Mgcweni River), illness (28 percent of the work force are reported to have suffered mercury poisoning), and loss of human life that occurred.

There are three other concerns related to the issue of inspection and regulation. First, although a number of parties assured us that the legislation with regard to limits and disposal of various categories of waste is sufficient, the Mission was unable to establish exactly how various limits are set, and how rigorous they are in relation to international standards. Of particular concern is the lack of legislation governing the disposal of hazardous substances. Second, the Mission obtained little information about how various pollution limits are tested, and what monitoring is done routinely. Third, the Mission heard allegations that penalties for breaking environmental regulations are too low, and that it is cheaper for companies to pay fines than to reduce emissions. Obviously, further investigation is needed.

It is also of concern to the Mission that in discussions with the Department of Trade and Industry there appeared to be a lack of concern over or involvement in the relationship between industrial development and its impact on the environment. In our meeting with the Department, officials insisted that they “have nothing to do with the

environment” and that they “deal with the developmental aspects of industry, not the environmental aspects.” Unless a more holistic and integrated approach is taken, environmental management is unlikely to succeed.

Policy Issues for Government

Moving toward sustainability — The most important policy issue is how to reverse decades of economic development and industrial growth in South Africa that are largely unsustainable because they have generally proceeded without the necessary environmental safeguards. Too often, in situations of conflict, the environment has lost out. The burden of proof has usually been on those arguing that a particular discharge causes damage, instead of on those arguing that it does not. The tendency has also been to underrate the potential hazard associated with waste and pollution. Reversing this trend by adopting the Precautionary Principle in decision-making processes and conflict situations would shift the system toward greater respect for a healthy environment and more balanced interplay between development and the environment. The Precautionary Principle essentially suggests that, in case of doubt, it is prudent to err on the side of environmental quality and safety. Experience from other countries suggests that it makes economic, as well as environmental, sense to practice waste prevention and resource recovery from waste.

Waste disposal — Waste management and pollution control approaches in South Africa to date have, to a large extent, relied on the “assimilative capacity” of the environment to ultimately dispose of (nonhazardous) waste. In this approach, pollutants are dispersed and diluted in the air, water, and soil up to the level of pollution concentration that is deemed acceptable. In other words, the concentration of pollutants in the natural environment does not exceed a specified maximum permissible level. The problem is that the scientific basis for arriving at that level may be inadequate and local conditions can make permissible levels too high.

Laws and regulations for pollution control — South Africa’s national laws and regulations for pollution control have tended to focus on pollution of specific environments (air, water, and land).

Several different government departments have been responsible for administering such regulations. However, waste and pollution sources, such as industrial enterprises, often affect different environmental media at the same time. It is better to consider and regulate all waste streams as a whole to avoid the reduction of pollution in one medium (such as air) being achieved at the expense of increasing pollution in another (such as water). Such integrated pollution management also avoids a lack of coordination or duplication in monitoring activities on the part of government inspectors and makes it possible to monitor by pollution source or sector (such as by industrial subsectors) rather than by type of pollution or polluted environment. For integrated pollution management to work effectively, it is necessary either to integrate all regulatory and monitoring functions for pollution control into one ministry or to have better coordination across departments.

Financial liability — To date, polluting industries in South Africa have been continuing their operations without sufficient financial liability for the environmental damage they have caused or for the administrative costs accruing to the public for pollution regulation and monitoring. Fines have been variable and are usually too low to deter offenders, and much of the environmental and administrative costs have been shouldered by affected communities or by the general public. Application of the Polluter Pays Principle implies that the costs of maintaining a public regulatory system be covered, as much as possible, by the fees charged to individual polluters for pollution permits, and that stiff fines for violators of regulations be stipulated and enforced. It also suggests internalization of environmental impact costs through the use of fiscal instruments such as taxes.

Criteria for waste release permits — Government departments have generally applied the “best practical means” (BPM) criterion in granting industrial permits to release certain amounts of emissions or effluents and in setting conditions. Whereas application of the best practical means criterion involves consideration of a range of technological, financial, and location-specific factors in assessing and approving industrial technologies and practices, it excludes environmental aspects. For this reason, the best practical means must be replaced by a criterion that also takes into account environmental considerations. An example is the “best practical environmental option” (BPEO) developed in the United Kingdom (CSIR 1991).

Adopting cleaner technologies — The whole issue of the adoption of “cleaner technologies” by industries is one that the new government should consider early in its mandate. Exporting industries are already under pressure to conform to stricter international environmental standards, and introducing clean technologies at the cutting edge may secure economic competitiveness in the longer term. The South African government is well advised to consider fiscal incentives, such as subsidies and assistance in securing access to information (in particular for small and medium-sized enterprises), to create a climate within which technological innovation is encouraged.

Hazardous waste — There are a number of policy issues relating to hazardous waste that will require the new government’s early attention. South Africa lacks a coherent regulatory system for hazardous waste. Hazardous waste producers tend to regulate themselves. Hazardous waste is often not properly identified, handled, or disposed of.

Another policy issue on the public agenda is the importation of hazardous waste for resource recovery, to gain foreign exchange, or for other purposes. In the past, this has proceeded in secrecy and without any accountability.

The nuclear industry — The disposal of nuclear waste will also require the government’s attention. South Africa generates radioactive nuclear waste mainly from the Koeberg nuclear power plants. Since 1986, low- and medium-level nuclear waste from Koeberg has been stored in landfill sites at a dedicated nuclear waste disposal facility at Vaalputs.⁸ Spent nuclear assemblies⁹ are currently stored at the Koeberg site, but may be transported to Vaalputs starting in the late 1990s when storage space at the Koeberg site will be full.

In general, the nuclear industry requires review. Although the Mission has received written comments from the Council for Nuclear Safety that procedures and staff training are monitored by the council and have been found to be adequate, certainly during the Mission’s visit to Vaalputs, attitudes among site personnel toward radiation risks

⁸ The Vaalputs facility has been receiving annual deliveries of about 1 500 metal drums of low-level waste and 500 concrete-walled cannisters containing medium-level waste mixed with concrete.

⁹ Spent nuclear waste represents (or, in the case of fuel reprocessing, gives rise to) high-level radioactive waste.

and procedures for handling nuclear waste gave the impression of laxity, perhaps in a misguided effort to show us how “safe” nuclear waste is. Current regulatory arrangements are an area where government review would be advisable because the regulating agency (Council for Nuclear Safety) reports to the same ministry as the managing agency (Atomic Energy Corporation). Finally, irrespective of the particular future of South Africa’s nuclear power program, nuclear waste and high-level radioactive spent fuel already exist and will require containment and monitoring for very long periods of time.¹⁰

At Vaalputs, the Atomic Energy Corporation plans to store the spent fuel contained in metal casks 7 metres long in specially constructed air-cooled sheds for a minimum of 50 years. The assumption is that the casks will have cooled off sufficiently by that time to consider alternatives, such as reprocessing. This is a technology that extracts plutonium from the spent fuel. Currently, it can only be done commercially in Europe, and economies of scale make reprocessing in South Africa prohibitive. Having abandoned its nuclear bomb program, and any pretensions to developing fast breeder reactors, South Africa simply has no need or use for plutonium. Its possession will only create international suspicion about proliferation of nuclear weapons.

An alternative to reprocessing is long-term storage. This option carries with it very long-term environmental, economic, and managerial liabilities. Although encapsulation in concrete and deep burial is technically feasible now, the lead time for investigations prior to licencing such a facility is several decades. The need for this type of disposal facility will probably arise between 2020 and 2044 according to information received from the Atomic Energy Corporation.

Management of household waste — The question of government policy regarding household waste presents a different set of issues. Here, the key problem is one of huge and widely dispersed volumes of low-toxicity waste rather than small volumes of dangerous waste. Households are important sources of emissions (wood or coal smoke), effluents (sewage), and solid waste (organic and inorganic). Indoor emission and sanitation problems are essentially associated with

¹⁰ At least hundreds, if not thousands, of years because of the presence of long-lived radioactive isotopes in the waste.

poverty. Solid household waste is a source of pollution in the townships and at landfill sites. Current waste collection services are inadequate or nonexistent, particularly in the townships. There is a need for waste reduction and prevention at the source. In the townships, people cannot afford to pay for waste collection services, so reusing and recycling “waste” materials is typically practiced in poorer strata. Here, a system of rewards for waste collection, rather than charges, may be considered and community action to organize neighbourhood-based waste collection services may be more effective than commercially based services (Environmental Monitoring Group 1992).

The household solid waste management problem depends on socioeconomic conditions. Among the richer white segments, the underlying issue has been overconsumption and associated waste generation, such as from the packaging materials used for consumer goods. Here, appropriate strategies are needed to provide incentives for household members to reduce and minimize waste, as well as to separate waste streams for easier collection and recycling. Financial incentives, such as increasing charges for waste collection, can be a very effective way of inducing households and industry to generate less waste, and to put pressure on producers of consumer goods to reduce the amount of packaging materials and to use degradable or recyclable materials.

Moving to environmentally friendly products and processes — Another policy issue, one that deals with waste management at the “front end,” is how the government can encourage a move away from the production of disposable products and containers to a manufacturing strategy emphasizing durability, maintenance, repair, and reuse. This would strengthen employment-intensive service sector enterprises and would also create jobs. Although industry has already seized upon the environmental concerns of consumers, products may or may not be environmentally friendly, and there is no system in place to verify industry’s green claims and to protect consumers. Informed consumers, more than anything else, have been shown to influence industry to adopt environmentally friendly process and product technology, to minimize packaging, and to discourage the use of hazardous substances and the production of harmful products.

Recommendations

1. The government should establish integrated waste management as a central tenet of future waste management policy in the country. All waste regulation and management should be legislated as part of a single omnibus act covering waste management and pollution control as a whole, administered or coordinated by one ministry. This ministry should introduce a system of waste stream “auditing” to address the problems of illegal dumping and inadequate disposal practices.
2. The Precautionary Principle should be applied in all environmentally related decision-making and legislation.
3. The Polluter Pays Principle should be systematically adopted and practiced in adjusting and shaping the national environmental regulatory system and in encouraging the internalization of environmental costs arising from private economic activities.
4. There is a particular urgency with respect to hazardous waste. A comprehensive and effective regulatory system should be put in place to define and manage hazardous waste. This system should function on the basis of cradle-to-grave-to-cradle monitoring and unified control of all hazardous waste streams discharged by individual companies and at individual sites. The system for hazardous waste should be integrated with the overall system of waste management and pollution control and, indeed, with the overall environmental management system of the country.
5. Nuclear waste storage and disposal practices and standards should be reviewed, tightened, and monitored closely. A review should be undertaken of, and a policy developed on, issues and options relating to the storage and eventual disposal of spent nuclear fuel.
6. Importation of toxic waste should be discontinued and banned. At the same time, an inventory of all hazardous chemical substances entering and leaving the country, and their origins abroad or destinations at home, should be developed and updated on a continuous basis.
7. South Africa is a signatory of the Basel Convention on transboundary movement of hazardous waste and should now become

a party to the Bamako Convention, a regional convention banning the importation of hazardous wastes into Africa.

- In granting pollution permits, application of the best practical means criterion should be replaced by a broader criterion, such as the best practical environmental option criterion, which explicitly accounts for environmental factors.
- As the government examines options for industrial restructuring, it should keep in mind the objective of minimizing waste and pollution and place more emphasis on durability, maintenance, repair, and reuse in the durable consumer goods sector. Support should generally be provided to create an enabling environment for technological innovation toward environmentally friendly processes and practices that also create jobs.
- Product labeling laws should be reviewed and improved to include consumer information on the environmental impacts of the manufacture and use of the product. A South African ecolabeling system could be developed following the example of countries such as Canada. This should be linked to a national system for environmental audits (“cradle-to-grave-to-cradle”) of consumer products and services.
- Incentive systems, such as charges for waste collection in higher income areas or rewards for community-based waste collection in lower income areas, should be developed to encourage households to minimize waste generation and to ensure waste collection. Waste separation and recycling at the household level should also be encouraged.
- Government departments responsible for monitoring and enforcing regulations related to waste management and pollution control are understaffed and lack the necessary expertise. Efforts should be made to increase training and capacity in this area.
- A more open, transparent, and responsive environmental management regime should be developed that includes increased public access to waste and pollution data and a less stringent requirement for *locus standi* in court.
- Appropriate facilities are needed for proper treatment and disposal of locally produced hazardous waste. Workers who handle wastes

should be better protected and the problem of scavengers on waste sites, who may expose themselves to harm, should be addressed. Managers of waste sites should be required to keep records, which will also enable realistic waste reduction targets to be set.

- Within a new national framework for integrated waste management, provincial waste management authorities should be established to work with both industry and local communities and to exercise control over all aspects of waste management under their jurisdiction.

Chapter 12

AGRICULTURE, FORESTRY, AND FISHERIES

Agricultural Sector

The agricultural and rural sectors are crucial in the move toward sustainable development in South Africa. As such, their fragile resources must be protected. New policies, attitudes, and methods need to be developed and encouraged that will result in the protection and enhancement of natural resources.

South Africa has a fairly high level of agricultural output relative to available resources (see Figure 6). However, only 3 percent of the land in South Africa is high-potential agricultural land, and 86 percent of this land is under crops. Low and irregular rainfall limits the crop potential of large areas of the country. Less than 1.5 million hectares of land is irrigable, with 1.2 million hectares already under irrigation. Sustainable use of the limited arable land resources, therefore, is crucial to the future of South Africa.

Commercial agriculture, while contributing in large part to meeting the food needs of South Africa, has often used methods that have led to land degradation. High levels of inputs, such as fertilizer and pesticides; monocropping; intensive irrigation; and the use of heavy machinery have all contributed to soil degradation and further dependence on high inputs. Subsidies supplied by the former apartheid government rewarded these unsustainable practices, which have led to negative impacts on natural systems, especially riverine environments and bird populations. The South African government, reportedly, has

used pesticides such as DDT, which are banned in other countries, for pest and disease control.

Agricultural runoff contains pesticides and other agricultural chemicals, but there is very little monitoring of agrochemical use in South Africa. The Council of Scientific and Industrial Research is currently conducting research on pesticide residues on food, and tracing their presence back through the food chain. It is recognized that excessive and poorly controlled use of fertilizer, pesticides, fungicides, and herbicides result in an increase in phosphorus and nitrogen in river systems, leading to extreme enrichment of the water. This results in excessive growth of algae and aquatic plants, resulting in the deterioration of water quality and blooms of toxic cyanobacteria. Linked to the environmental impacts is the concern for the health of agricultural workers and farmers. There is a lack of information on agricultural workers' health, which is exacerbated by some farmers reportedly not allowing labour union representatives access to their farm workers.

It is estimated that 8.1 million hectares of commercial rangeland has been severely degraded through overgrazing, and 22.1 million hectares has been moderately degraded. These figures exclude the former "independent" homelands of Transkei, Bophuthatswana, Venda, and Ciskei (collectively referred to as TBVC), for which accurate figures are not available. Estimates suggest that at least 20 percent of those areas is moderately degraded. The use of traditional seeds and livestock breeds was largely abandoned, but is now being encouraged in some areas within the agricultural sector. Indigenous plants and local livestock breeds are better adapted to South African conditions than imported species, requiring fewer agricultural inputs and less drinking water, respectively.

Recommendations for the agricultural sector

1. Agricultural policy should encourage low-input, sustainable cultivation. This will require farmer education, demonstration projects, and economic incentives to "shift" farmers away from high-input, unsustainable practices toward low-input practices. The primary aim of conserving the agricultural resource base must be food self-sufficiency for the country and sustainable income for those working the land.

- Much of the land that will be redistributed over the next few years is already in a degraded state and is likely to be sold in lots that are too small to maintain a family without further degradation. It is anticipated that land that is already degraded will be made available first by the private sector for sale to the state for redistribution. This, combined with the possibility of limited access to credit, will increase the probability of further land degradation. A support system, including education, technical services, and credit, should be developed immediately to ensure that new owners are able to maintain and restore the agricultural capital of their land as much as possible.
- Soil conservation is a priority area for urgent government action and a new policy needs to be developed. Resources need to be increased for conservation programs, and current economic incentives, such as tax write-offs for heavy machinery, should be reviewed.
- Existing agricultural extension services should be redesigned and extended to reach small-scale and poor farmers.
- Multiple cropping systems, crop rotation with an emphasis on legumes, and conservation tillage practices should be high priority. Education, extension services, and simple legislation related to such issues should be developed.
- Research should be conducted on the environmental impact of the sugar industry in KwaZulu-Natal to assess the situation and to develop policy and mitigating measures where necessary.
- Research on sustainable agriculture and the current state of the agricultural environment should be expanded, should be driven more by farmers' needs, and should be closely linked to agricultural extension services.
- The importation and use of hazardous pesticides that are banned or restricted in other countries should be reviewed. Farmers and agricultural workers should be educated about the dangers of the chemicals with which they are working and should be given suitable protection. A chemical identification system to inform end users of the chemical components in the products they use should be developed.

- Better monitoring systems should be introduced to assess the use of agricultural chemicals and to monitor their effects on the environment. Such systems should involve local farmers and communities as part of overall environmental education and rural policy.
- Data on the current state and rate of degradation of rangelands are needed to develop a clear picture of this important resource upon which new sustainable rangeland management policies and practices can be based.
- The use of local species for agricultural purposes, the identification of new species, and traditional methods of cultivation and husbandry should be researched to identify and encourage those practices that are ecologically and economically beneficial.

Forestry Sector

South Africa is poorly endowed with natural forests, and the indigenous forest area has been further curtailed by overexploitation over the past 100 years. Demands for tree-based products in South Africa have to be met from other sources. Large areas of timber plantations have been established for industrial purposes. The extent to which rural demands for tree-based products are being met without extensive woodland areas is not clear. Forestry accounts for 1 percent of South Africa's total land area and 7 to 8 percent of total water use. This is small compared with agriculture, which consumes about 50 percent of the country's water, but is still significant and an issue of concern.

Indigenous forests — With a total area of 122 million hectares, South Africa has 3.1 million hectares (2.6 percent of the country) devoted to national parks and another 2.8 million hectares (2.3 percent of the country) under other forms of conservation. This means that at least 4.9 percent of the country's landmass is protected. It is estimated that the country only has 330 000 hectares of indigenous forest, of which 54 000 hectares are privately owned (ADB 1993). The indigenous forest comes under the forestry branch of the Department of Water Affairs and Forestry. South Africa is experiencing limited deforestation because most of the indigenous forests were cleared over the past 100 years. The main reasons for deforestation are conversion of

Table 3. Plantation area (hectares) by ownership and species.

Species	Private	Public	Total
Pine	334 000	277 000	611 000
Eucalyptus and wattle	576 000	54 000	630 000
Total	910 000	331 000	1 241 000

Source: ADB (1993).

forests for agriculture and harvesting for construction, timber, and fuelwood.

Commercial plantations — South Africa's plantation area by type of tree and broad ownership categories is presented in Table 3. Seventy-three percent of the total planted area is owned by the private sector; 27 percent is owned by the state through the South Africa Forestry Company (SAFCOL). Half of the planted area is under pine and the other half is under eucalyptus and wattle. About 60 percent of the afforestation programs has been concentrated in KwaZulu-Natal and Eastern Cape, with 9.6 percent of commercial forests being in the former homelands. Approximately 80 percent of commercial timber is used in the pulp and paper industry, which forms part of the export market. The mining industry uses about 20 percent of all roundwood produced in South Africa (ADB 1993).

The forestry industry provides raw materials for saw mills and pulp and paper industries, as well as the wooden underground supports used in mines. It provides direct and indirect employment, mainly for rural people, and is a sizeable export earner for South Africa. Timber growing can be undertaken by small-scale producers. Therefore, it has a role to play in the development of the economy. However, there are concerns about the environmental impact of commercial plantations.

- **The loss of biodiversity** — In instances where commercial plantations have replaced indigenous forests, there has been a loss of biodiversity, although the Mission was informed by the South African Timber Growers' Association that only 1.3 million hectares (about 1 percent) is under plantation and that these have largely replaced grasslands rather than indigenous forests.

Table 4. Rural woodlot area (hectares) by type and region.

Region	Type ^a							Total
	TA	DP	MU	CO	CG	PN	UC	
Bophuthatswana	1 000	—	—	—	—	—	—	1 000
Ciskei	350	425	50	—	—	—	—	825
Gazikulu	13	14	—	—	—	—	17	44
Kangwane	1 457	—	—	—	—	—	—	1 457
KwaZulu	582	—	—	31	10 927	250	2 280	14 070
Lebowa	38	841	—	—	—	—	216	1 095
Qwaqwa	—	550	—	—	—	5 000	—	5 550
Transkei	12 000	14 570	1 000	35	—	45	1 000	28 650
Venda	594	—	—	—	—	—	45	641
Total	16 034	16 400	1 050	66	10 927	5 295	3 558	53 332

Source: Gandar (1991).

^a TA, tribal authority; DP, department; MU, municipality; CO, community; CG, commercial small grower; PN, private noncommercial; UC, unclassified.

- **Impacts on water resources** — As monoculture species have a higher rate of water uptake than the natural forest, there are significant effects on the groundwater table.
- **Competing with other uses for land** — As the demand for industrial wood increases, there will be pressure to expand plantations.

Woodlots — Information on woodlots is incomplete and does not include woodlots on commercial farms owned by white farmers. White farmers have a long history of growing trees to provide fuelwood for farm labourers. Available data deal with the 20 percent of South Africa's total land area that was once set aside for blacks as Native Reserves or "homelands." Rural woodlot area by type and region is presented in Table 4.

- **Tribal authority woodlots** — These are woodlots started by the various forest departments, which are then handed over to the tribal authority to manage and maintain. The tribal authority system varies from place to place and in Ciskei it has been replaced by residents' associations (Gandar 1991).
- **Departmental woodlots** — These are established by the relevant forestry department on land allocated by a tribal authority. They

range in size from 30 to 300 hectares each. Some departments' woodlots are planted as buffer zones to protect indigenous forests and grasslands (such as in Transkei).

- **Municipal woodlots** — These are oriented toward commercial timber.
- **Community woodlots** — According to Gandar (1991), this type of woodlot is not common and only two community woodlot programs were reported, in Transkei and Kwazulu.
- **Individual woodlots** — Many rural households have been reported to be establishing their own small woodlots. Gandar (1991) reports that about 30 percent of the households in Pondoland have small woodlots. In KwaZulu, many woodlot owners are planting wattle to sell the bark. Wattle wood is also an excellent fuelwood. Small-scale eucalyptus timber producers have also started small woodlots in KwaZulu to produce poles for large companies. By-products from the eucalyptus woodlots are used as fuelwood.

There is no comprehensive policy regarding proper management and control of the forestry sector to balance the commercial, ecological, social, and cultural needs of the country, but a voluntary code of conduct has been in place since 1989. The Afforestation Permit System was established in 1972 to deal with some of the environmental concerns related to plantation forests. Before new afforestation can take place, a permit must be granted by the Department of Water Affairs and Forestry. The permit system is designed to measure the runoff reduction that would result from proposed afforestation. After an environmental evaluation, a permit is issued that allows a certain proportion of the land to be afforested. Under the permit system, afforestation is not permitted in riparian zones — a stretch of land within 20 metres of any waterway. In addition, forests are not usually permitted to take up more than 75 percent of any property (Department of Water Affairs 1986).

In theory, the permit system should protect water resources from overexploitation as a result of forest plantations. However, there are some concerns about the effectiveness of the permit system given the serious water shortages in the country. One concern is that the permit is based on experiments that were carried out in 1972 and that

assumptions made at the time need to be reviewed. Since that time, for example, new clones have been developed that grow faster and use more water. There is also concern that the permit system does not take into account differences between catchment areas and that permits are inappropriately allocated as a result. There are also allegations that regular contraventions of permit limitations take place and that little or no action is taken against offenders. No company or individual has ever been prosecuted for contravening the permits (Johns 1993). Despite this, a study of five river systems, conducted by the Wildlife Society of Southern Africa, notes that “riparian zones on the private forest plantations of Sappi and Mondi are being soundly managed within the permit conditions . . . while riparian zones on state forestry land are overgrown with no sign of reparation. In fact, on some state forestry land, new plantings are in direct contravention of the 20 metre rule” (Wildlife Society of Southern Africa 1991).

Another concern is that the permit system was only introduced in 1972, and has only been applicable to new afforestation. As a result, almost 70 percent of forest plantations are not regulated by permits (Johns 1993). In addition, the permit system has not operated in the former TBVC states, and commercial forest plantations in those areas are completely unregulated.

Forestry matters currently come under the Department of Water Affairs and Forestry. The Mission heard some opinions favouring forestry being placed under a combined Department of Agriculture and Forestry. The forestry section of the Department of Water Affairs and Forestry manages indigenous forests, particularly those designated as primary conservation areas, such as the Tsitsikamma state forest. The Department of Water Affairs and Forestry is in the process of withdrawing forest extension services to commercial growers and focusing on developing forestry programs in rural areas. The structure of the forestry sector hitherto in South Africa has favoured the development of large commercial plantations. This commercial bias has limited participation of small-scale growers and processors.

Policy issues for government — Of primary importance is the need to recognize that the forestry sector has several competing roles to fulfill in meeting ecological, social, cultural, and economic needs. In particular, the importance of indigenous forests must be appreciated and recognized, especially in terms of conserving biodiversity, protecting

water resources, regulating climate, providing other ecological functions, and serving local community needs. This calls for a national policy and strategy in the forestry sector that incorporates the social and commercial forestry needs of the country.

As commercial plantations also impact on the environment, there is a need to review and take stock of this sector. The commercial sector should explore increasing yields on existing land and efficient use of existing commercial plantations before planting new areas.

Recommendations for the forestry sector

1. A national strategy should be pursued for the forestry sector so that the ecological, social, cultural, and economic needs of the country can be met. This may require a review of the current arrangements for administering the forestry sector to determine whether the Department of Water Affairs and Forestry, a new Department of Agriculture and Forestry, or even an independent forestry authority would be most appropriate.
2. In formulating a policy strategy, local community involvement and participation are imperative, especially for those who are dependent on forest resources for their livelihood and existence. In addition, greater participation of small-scale growers and processors should be encouraged.
3. Whereas state-owned plantations have been commercialized under the South Africa Forestry Company, indigenous forests should be placed under the control of the state through an appropriate forestry institution.
4. The problem of unsustainable harvesting of woodland resources in the former homelands should be addressed immediately through the provision of alternate sources of energy and biomass supply enhancement options.
5. Reforestation of indigenous forests should be encouraged and community forestry and social forestry options should be explored and implemented. Afforestation efforts should involve planting indigenous species. Such a program should be built on ecologically sound community forestry knowledge and practices.

- An in-depth review of the impact of commercial plantations and related industries should be undertaken. Environmental and social impact assessments of existing plantations are recommended and should be required for all future projects before they are carried out.
- The permit system should be reviewed, paying particular attention to the issues of water shortages, the destruction of biological diversity, and maintaining scenic views. A revised system may place stricter limits on further afforestation (and even reverse afforestation in some areas), but it would ensure that afforestation is both sustainable and publicly acceptable. Ways should be found to extend the coverage of the permit system to the former “independent” countries known as TBVC and to areas that were afforested before the permit system came into effect.
- In addition to a restructured permit system, the voluntary code of conduct for all forestry companies and individual timber farmers should be extended. The code should take the form of a forestry charter that sets out environmental objectives for forestry and agrees to a set of appropriate practices. A forestry forum that meets to address such issues should also deal with other issues of common interest, such as labour practices and long-term development of the forestry sector. The forum is most likely to succeed if all major players, including companies, timber farmers’ cooperatives, state authorities, trade unions, and environmental groups, are incorporated into the process.
- Extreme caution should be taken with regard to further afforestation. In 1989, the state forestry directorate proposed doubling the existing forest area within 30 years, although the Forest Owners’ Association told the Mission that this plan no longer stands. This appears to be unsustainable from an environmental point of view. Officials in the Department of Agriculture informed the Mission that, according to their research, the overall forest area should not be extended at all, and that there are areas where commercial forestry should be reversed.
- The state has recently moved to commercialize and ultimately privatize state forests. Any such privatization program should be the subject of public debate and the effects of privatization on

indigenous forests in particular should be considered. As far as possible, indigenous forest areas should come under the control of the state to ensure long-term conservation of these areas, in cooperation with forestry, nature conservation, and agricultural authorities.

Marine Fisheries Sector

The Mission was unable to examine freshwater fishing and recommends that this sector be investigated further as it relates to food production.

The natural resources of the oceans around South Africa should be more accessible, especially to coastal communities. The rich marine resources could go a long way toward alleviating poverty in coastal areas. But, under apartheid, the right of access to marine resources was removed from many coastal communities and was concentrated in the hands of white-owned commercial enterprises. There is a need for access to fishing resources (licences and quotas), particularly by fishing families and communities that do not have much capital or equipment. Similarly, there is a need for access to credit for poor communities to invest in the necessary equipment to make use of the marine resources. Profits from commercial fishing enterprises are leaving the area and, therefore, are not benefiting local communities.

Fisheries development in recent decades has favoured large commercial fishing companies (national and foreign) that have received virtually the entire fish quota allocation. At the same time, small-scale fisheries enterprises and artisanal fishing communities have been disempowered through the loss of access to licences and control over their longtime fish resources. There is a need to reallocate and protect fishing quotas in a more equitable fashion, and to ensure that fishing communities maintain access to fish resources to ensure sustainable livelihoods and fish stocks. Alternative quota-allocation systems, such as individual transferable quotas and “single-entry” systems, which have worked in other countries, should be explored.

Increasingly, small-scale fisherfolk have been forced to work for large fishing companies, under unfavourable conditions, to make a living. Joining these companies has often been the only option for fisherfolk in terms of gaining access to fishing equipment and being able to

sell their fish. Mechanisms should be developed to encourage less exploitative employment practices. Workers' participation and comanagement in fishing companies has been mentioned as one possibility.

Fish stocks have been managed by a combination of limits on access to fish resources (number of quotas) and limits on catches. The total allowable catch has sometimes been allowed to adjust quickly to changing fish stocks. This has led to overcapitalization of the fishing fleet and pressure on fish resources. The total allowable catch should be set as conservatively as possible to avoid these problems.

Recommendations for the fisheries sector

1. The existing system of resource allocation should be restructured to ensure more equitable and sustainable utilization of available fish resources. This should be done on the basis of the following principles: more conservative national quotas; greater security of tenure for individual, corporate, and communal quota holders; and more effective policing of waters to deter poaching and other illegal operations.
2. The restructuring process should proceed in a participatory fashion, building on mechanisms such as the Fishing Forum. The current regulatory system should be reviewed with a view toward ensuring a sound legal basis, effective control, and appropriate institutional checks and balances. The state should retain ultimate ownership and control over all fish resources.
3. Small-scale traditional and artisanal fisheries should be redeveloped for reasons of equity and sustainability of fish resource use and to create local employment. There is considerable international evidence of successful community-based common-property regimes for local sustainable and equitable management of fish resources. These regimes can function effectively by locally setting and enforcing rules of access and use and by excluding outsiders. It is worth exploring the possibility of giving fishing communities proprietorship over nearby sea areas so they can manage, use, and police fish stocks.
4. The option of local fish processing and marketing through the establishment of cooperatives should also be examined. The government would need to monitor community management systems

and maintain ultimate control over levels of exploitation, but at the same time provide technical assistance and financial and marketing support, thereby strengthening local management capacity in the process.

- The rights of small-scale fisherfolk should be protected in cases of resource conflict (real or perceived), for example, trek-net fisherfolk being harassed by ski-boat owners at False Bay; local fishing operations being hindered by boats searching for alluvial diamonds in Olifantsdrif; and seals under protection, nationally and internationally, impairing fishing operations (Olifantsdrif).
- A certain proportion of national quotas for given fish species, in particular those relevant to inshore fisheries, should be reserved for small-scale community fisheries. The proportion might be determined by surveying all communities currently engaged or interested in fishing. In addition, government assistance should be provided to communities to acquire necessary equipment. New Zealand, for example, makes available 10 percent of its national quota to dispossessed communities and provides them with grants to purchase equipment.
- Greater security of tenure should also be provided for large commercial fishing operations in the private sector. Current annual reassessment of tenure acts as a disincentive for companies to reinvest profits into capital goods and has contributed to the fishing fleet becoming old and obsolete, with attendant safety concerns. Quota-allocation systems that have been successful in other countries, such as individual transferable quotas or single-entry systems, should be tested on an experimental basis and, if successful, introduced on a larger scale.
- Employment practices by national companies, as well as foreign vessels, should be reviewed and, in future, monitored on an ongoing basis with a view toward strengthening workers' rights, encouraging their management inputs, and improving their welfare.
- Quotas to foreign vessels should be phased out in favour of national companies. This would tend to reduce overcapacity in the national fishing fleet and provide incentives for the renewal of capital stock.

- At the national level, administrative responsibility for fisheries should be transferred from the Department of Environment Affairs and Tourism and merged with the Department of Agriculture. Consideration should also be given to a single unified Ministry of Renewable Natural Resources, which would combine agriculture, forestry, and fisheries.
- Fisheries research should be redirected, reflecting the new policy and management approach and priorities. There is a great need for socioeconomic and policy research and for involving communities in the research process.

Chapter 13

NATURE CONSERVATION

Situation Synopsis

The primary function of protected areas is to conserve ecosystems and biodiversity. The objectives of national parks and provincial nature reserves also include protecting viable representative samples of different habitats, protecting rare species, and facilitating research to further our understanding of ecosystems and their functions. In the future, nature conservation will include more environmental education and will be more concerned with issues of social equity, such as access to the benefits of nature reserves for all South Africans and an improved quality of life for those who live in and near nature reserves. Nature conservation, once seen as separate from economic development, will increasingly be drawn into the reconstruction and development framework, with conservation authorities playing a developmental as well as a conservation role.

South Africa has an impressive network of protected areas. Currently, there are 17 national parks and 136 provincial reserves in the former Cape Province, 68 in the former Transvaal, 13 in the Orange Free State, and 74 under the Natal Parks Board. In addition, a number of reserves are also managed by the former homelands and there are also numerous private nature reserves. There are also eight national botanical gardens devoted to plant conservation, education, and botanical research.

Formal conservation areas comprise about 6 percent of South Africa's surface area. If private nature reserves are included, some regions, such as Natal and the former Transvaal, have more than one

third of their surface area under conservation. Although the eastern and northern parts of the country cater to most indigenous mammal species, endemic species in the northwest and southwestern Cape are not well represented. There is, however, no indication of whether other biota are adequately conserved.

Historically, national parks and other nature reserves were managed more as isolated islands of biodiversity than as part of a holistic land-use policy. Their potential for serving as benchmarks and scientific data banks for assessing alternative land-use options in similar habitats is only now being explored.

National parks and nature reserves are one of the most important drawing cards for tourism, which could potentially become a major source of foreign exchange. Tourism could also be one of the most effective means of increasing incomes in rural communities, provided that benefits related to tourism are made accessible for the development of economic opportunities within those communities.

A large percentage of visitors to South Africa feel that the natural environment, including the climate, scenic beauty, and wildlife, provides the most enjoyable aspect of their visit. In particular, the “big five,” that is, the lion, elephant, rhinoceros, buffalo, and leopard, have proven to be the biggest attraction for foreign visitors. Ecotourism can contribute to the improvement of the quality of life of all South Africans, particularly those living in and around areas of particular ecological and cultural value.

Tourism is one of the world’s fastest growing economic sectors, with a trend toward adventure and exploration, contact with local cultures, and getting away to unspoiled wilderness areas. Tourists are increasingly demanding travel experiences that are in harmony with the environment. The numbers of foreign tourists in South Africa are small compared with the potential that exists. The ecotourism industry could potentially develop into a major South African industry and become a key source of valuable foreign exchange. However, tourism of any kind brings with it environmental and social costs. Attention should be paid to the carrying capacities of different sites for tourists, as well as strategies for minimizing environmental impacts, such as water abstraction and waste disposal.

In the creation of national parks, some communities were forcibly removed without receiving adequate compensation for the land they lost (see box, p. 158: “Kosi Bay: A Case of People versus Nature

Kosi Bay: A Case of People versus Nature Conservation

Kosi Bay is situated in the northeastern corner of Maputaland near the Mozambique border. It consists of four lakes and a system that is about 12 kilometres long. The southeast side of the area is barely accessible by vehicle and access to some areas is only possible on foot or by boat. The kwaDapha, eMalangeni, and Nkovukeni (KEN) communities are the oldest existing communities in the Maputoland region, having been there for over 700 years. They are also the last remaining communities on the shores of the Kosi Bay lake system.

In 1991, research conducted in the Kosi Bay area brought to light demands on the part of the indigenous people of Kosi Bay to be involved in the establishment and benefits of a nature park in their area. On the western side of Kosi Bay, all residents, with one exception, have been persuaded to move. On the southeast side, the KEN communities have remained in the reserve. An alternative to moving has been sought by these three communities under the KEN Community Resource and Development Project.

The KEN Community Resource and Development Project is developing a community-based ecotourism project managed and owned by the community. The KwaZulu Department of Nature Conservation has agreed to share its expertise and to develop a partnership between residents and conservation authorities. In the past, tourism in South Africa has offered very few significant benefits to local communities. Usually, benefits are confined to low salaries for menial jobs, whereas most profits are made by private landowners or state agencies. If successful, the Kosi Bay ecotourism project could serve as a model for community-based tourism in other areas of South Africa. Kosi Bay also offers an opportunity to develop an integrated approach toward agricultural development, conservation, and ecotourism.

Central to the project are the residents' rights to remain on the land and participate in conservation and development plans that affect them. Pivotal to this has been a concept of local community franchise of tourism, as well as programs to create permanent facilities where local indigenous knowledge of the environment would be recorded and deliberated for integration into plans for conservation and development in the region. Support and participation by local resident communities and their development committees have been recognized by all concerned, including the KwaZulu Department of Nature Conservation, as key to any effective resource planning and development program. To succeed, any land-use plan and development program must be community-based and must include achievable building blocks and tangible benefits as part of its process.

Conservation”). People were denied access to resources, such as grazing for cattle, hunting grounds, medicinal plants, firewood, and thatching grass. In the process, they were alienated from their natural environment and they lost some of the traditional knowledge and cultural values associated with the natural environment.

In South Africa, conservation, and particularly nature reserves, in the past has been associated with a privileged elite. Conservation often took place at the expense of communities that were forcibly removed to create nature reserves. At the same time, rural black South Africans are dependent on a wide variety of indigenous plant resources for building materials, fuelwood, and food. For nature conservation to be viable at all, it is essential that it be based on principles that are equitable.

Similarly, the role of national parks and nature reserves in environmental education for the public, and especially for schoolchildren, is becoming better understood. Unless the population as a whole has access to national parks, conservation will continue to be perceived as elitist and irrelevant to the majority of people. The challenge facing a new democratic government is to make the national parks a truly national asset that benefits all citizens of South Africa, and has a vision that encompasses conservation and human development goals.

Urban nature areas have important roles to play both in environmental education and in enabling the urban poor to have access to nature and the all-important nature experience. The possibilities range from simple open spaces within urban areas to larger and more established urban nature reserves, such as the Klipriviersberg Nature Reserve south of Mondeor and the Melville Koppies Nature Reserve between Melville Westdene and Emmarentia West Park Cemetery in Johannesburg. Both are only a bus ride away from the homes of the most densely populated parts of Gauteng Province. These urban nature reserves offer special opportunities for urban people to get in touch with nature and, in some respects, are more valuable to many urban people than the more distant big game reserves. The urban reserves will also continue to be under pressure for development and will need vigilance on the part of local authorities and nature conservation authorities. Their role as living, outdoor classrooms cannot be overemphasized.

Policy Issues for Government

Land claims and compensation — The first issue facing government is that of land claims and compensation for those who were dispossessed as a result of the establishment of protected areas. The historical context within which national parks and nature reserves were created requires an equitable response in favour of those communities whose rights to land and land use were usurped. Land claims will be dealt with by a land claims commission in the first instance. If resolution requires it, the matter will be referred to a land claims court. The court will, in cases where restoration of the land is not feasible or in the national interest, have the right to award appropriate compensation to those affected. Compensation could be part of a package that would include the types of measures proposed in later sections of this document.

Access to protected areas — The second issue is that of ensuring access to national parks and other protected areas for all South African citizens, including those who live near protected areas. This involves not only the price of the ticket at the gate, but developing a strategy that enables poor citizens to reach the parks, to stay in them, and to learn about nature conservation.

Park community relationship — A third policy issue involves the relationship between parks and local communities, and how to build a better relationship between the two while managing a common environmental resource and benefiting from the economic value that parks bring. A number of solutions have been proposed, including local liaison committees, multiuse zones, local employment opportunities, and community-based tourist facilities.

Park management — The fourth issue is sustainable development of parks in terms of balancing the goals of nature conservation with the need for local and national development, chiefly in the area of tourism. This will involve trade-offs and the resolution of different interests. One key debate focuses on the size of the protected area necessary for nature conservation and the management of surrounding lands and water. Another topic of discussion is the kind of tourism and numbers of visitors that would be compatible with nature conservation.

Distributing the benefits of conservation — The distribution of benefits from nature conservation is an area needing early government attention. Currently, tourism assets lie in the hands of either the public sector (national and other parks) or a very skewed private sector, whose investments are owned and controlled, for the most part, by whites. Benefits to local communities are restricted to menial jobs, with no mechanism for ensuring co-ownership, co-management, or transfers of resources. It is important that tourist facilities do not remain islands of affluence in a sea of poverty. Future tourism strategies need to link tourism to rural economic development and provide communities with the opportunity to gain direct benefits and to own and operate their own tourist facilities. This will require new government initiatives to increase capacity in environmental education, natural resource and wildlife management, and tourist services.

The image of park administrations — The last issue centres on the image and corporate culture of the parks fraternity. Despite recent efforts aimed at change, and notable successes in some parks, there is an overall problem with the elitist and paramilitary image of park administrations that will tend to undermine other policy reforms unless positive action is taken. The only staff members who need to look like law enforcement officers are those who are directly involved in law enforcement (such as antipoaching units and gate guards).

Recommendations

Administrative and legal restructuring

1. The *National Parks Act* should be amended to ensure greater accountability by statutory boards to the public and to bring all types of parks and reserves, including those in urban areas, under one legislative roof. Appropriate regional representation at the national level should be secured. Within the context of constitutional arrangements regarding the exercising of powers at different levels of government, a national framework and philosophy related to the protection and development of parks and reserves should be established. New and representative members of the National and Provincial Parks Board of Trustees should be nominated and elected in a transparent and democratic way.

2. A national liaison committee made up of representatives from national, provincial, and metropolitan parks should coordinate conservation on a national basis. This committee would coordinate legislation, international treaties, and cooperation among different provincial, urban, and national parks on issues such as research, expertise, translocation, and wildlife.
3. At the regional level, bioregional forums, ideally the size of water catchment areas, should have representatives from national parks, provincial parks, agricultural bodies, industrial and urban interest groups, and local communities. These would enable civil society to participate in long-range planning and monitoring and evaluating the relationship between people and conservation areas. The needs and aspirations of people living in or near conservation areas should be recognized and zoning of management areas should take into account local tradition, knowledge, and sustainable resource utilization. In this process, pre-existing traditional land-use patterns should be recognized. Such a forum may transcend provincial boundaries if a water catchment area is divided by a provincial boundary.
4. At the local level, in the immediate vicinity of nature reserves, legislation should provide for the creation of community liaison committees. To achieve this objective, the *National Parks Act* should be amended to give national and provincial parks the authority and responsibility to apply their mandates beyond the fences of the parks. National parks and nature reserves should be restructured to give greater priority to social responsibility programs. Community liaison committees should enable neighbouring communities to gain access to economic benefits and allow them to participate in management decisions in conformity with guidelines determined at the national level for national parks or at a regional level for other nature reserves. The committees will inevitably have to develop conflict-resolution mechanisms to deal with such issues as local grazing rights and subsistence hunting versus wildlife management.
5. Institutional change should redress current imbalances with regard to gender and race in the management of national and provincial parks and other nature reserves. The invaluable

expertise of the people currently employed in these reserves should be recognized. However, there is a need to build capacity in communities disadvantaged in the past. Creating additional employment opportunities, therefore, should be a priority.

6. Once required affirmative action and capacity building have been achieved, various functions related to the management of national parks could, where appropriate, be delegated to provincial authorities. In this way, management of national parks could be integrated into a bioregional context involving provincial, communal, and private nature reserves. At the same time, however, management functions that require national coordination would be retained by the National Parks Board. Provincial authorities would manage national parks on an agency basis on behalf of the national parks. But, where the management of such parks does not conform with agreed upon standards, the National Parks Board would, as a last resort, retain the right to change the management.

Community-based conservation and rural development

7. National and provincial parks can be forces for stimulating rural development without compromising their primary ecological and educational functions. Some of the income generated by parks should be used to stimulate the regional economy. Parks should obtain goods and services from local producers as much as possible, and local employment should be part of the development strategy. Consideration should also be given to joint venture programs or profit sharing. This should be done through structures on which the community is represented.

8. Direct benefits in multiuse community resource management areas, which could include grazing rights, hunting, and utilization of medicinal plants, firewood, and thatching grass, should be determined by park management in consultation with communities.

9. In dealing with poaching, a distinction should be made between subsistence hunting and commercial poaching. Antipoaching management strategies should be worked out in close cooperation with neighbouring communities. One of the benefits of community involvement in the management of nature reserves is that

poaching is much less likely to be a problem because communities will protect their own resources. A “shoot on sight” policy should be avoided at all cost. Antipoaching units should also deal with dangerous animals that have broken out of the reserve.

One of the models that may be applied is the “community game guards” system. The essence of this system is that game guards are appointed by the community and are primarily responsible to the community. The essential philosophy of these programs is that communities must gain direct economic benefits from wildlife and other natural resources. Communities therefore, must be empowered to manage their natural environment and to contribute to and enforce decisions that affect their environment.

10. Consideration should be given to the development of multispecies animal production systems. National parks and nature reserves should play a positive role in the introduction of wildlife into communal and farming areas as an alternative resource to supplement conventional farming. By broadening a community’s resource base, it becomes more self-sufficient and buffered against drought and other hardships, and less dependent on government for support. The economic utilization of wildlife alone or in combination with livestock can be more profitable and sustainable than livestock alone. African wildlife and indigenous, drought-resistant crops are also better adapted to the African environment than cattle, especially with respect to surviving droughts and disease.

11. Multiuse zones should be established in and around national and provincial parks as part of an integral conservation and rural development strategy. If wildlife management is more profitable than cattle farming, then conservation areas will expand according to market forces. If there is a decline in tourism and cattle farming becomes more profitable, however, multiuse zones would revert back to cattle farming and conservation areas would contract back to the core conservation areas. This approach requires careful and creative management as changing use reflects a changing distribution of costs, benefits, and employment patterns. These core areas would always be protected under national and provincial parks authorities. Conservation areas, therefore, should be seen not only in a bioregional context but also in the context of long-term economic and environmental fluctuations.

Tourism

12. In developing the tourism potential of an area, consideration should be given to possible negative environmental and social effects. Numbers of tourists and inappropriate consumption of materials, water, and energy should be controlled. In addition, the tourism industry should be sensitive to local cultures.

13. Employment in nature reserves should be expanded by developing labour-intensive ecotourism. For example, small bush camps offering guided game drives and bush walks not only expand the range of services available but also create more jobs per tourist.

14. The marketing of crafts should be stimulated by giving the local crafts industry preference over imported curios. Craftsmen and craftswomen should be given the opportunity to sell their crafts inside tourist camps and should also be assisted in gaining access to marketing outlets in cities.

15. Over and above traditional crafts, consideration should be given to the establishment of an arts and crafts training centre. The potential to create tanning and leather-craft industries, based on the annual production of animal skins in national and provincial parks, should be developed. Screen printing, pottery, and other crafts should also be developed.

16. Ecotourism can also provide a major source of added revenue to conservation bodies for environmental management and conservation purposes. Thus, the very resource base that is in need of appropriate management would provide the source of income to do so.

17. Mechanisms are needed to ensure that an appropriate portion of the funds generated by national, provincial, and metropolitan parks is channeled to nature conservation goals, including the protected areas themselves.

Research and education

18. Research on ecological processes is essential to ensure the scientific management of protected areas and should continue to be supported by government. In addition, the environmental

knowledge, skills, and expertise of traditional healers and trackers should be respected as a legitimate research methodology.

19. Indigenous knowledge should be better protected by legislation, and communities should be recognized and compensated for their expertise and contributions. There is an ironic situation in South Africa in which the state and its representatives propose teaching the African people about the environment when it is part of African culture and tradition to be intimately associated with nature. These people have demonstrated sustainable systems in agriculture, forest management, and aquaculture. The strengthening of indigenous knowledge by valuing it and encouraging its transmission, as well as trying to better integrate indigenous and local knowledge of, for example, the environment into scientific research programs, is receiving more scientific and policy attention in other countries. In South Africa, it would also help in the reconciliation of the country and its different sets of traditional knowledge and practices.

20. Environmental education facilities should be an integral part of park management and should be visited by schoolchildren as part of their general education. Urban nature reserves and reserves close to urban areas have a key role to play as outdoor classrooms. Environmental education should include learning about traditional environmental knowledge and how nature signs can be used as “grass-roots indicators” of environmental change and sustainability. Education should involve all sectors of the community, including people who are land and resource managers, such as farmers, as both teachers and students.

21. Research is not only needed on the ecological and biological aspects of conservation but also on the social and human dimensions. These will range from a better understanding of the meaning of nature for individuals and communities to park management systems and conflict-resolution mechanisms.

Part V

Strategic Issues



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Chapter 14

HUMAN RESOURCE DEVELOPMENT

A major, if not *the* major, constraint on the implementation of many of the recommendations of this Mission is the lack of trained South Africans to carry out the tasks required. In general, the legacy of apartheid has meant that large proportions of the population, some 15 million black adults, particularly in the former homelands, are illiterate and lack the basic education needed to form a foundation for skills training. At all levels, the Mission was told, there are too few people available with the appropriate education and training. It is a major and urgent challenge for the new government to put in place a nationwide basic education campaign for children and for adults, and to “fast track” the training for specific cadres of skilled workers.

Within this overall context, the particular human resource needs of environmental policy are in danger of being assigned a lower priority. The Mission hopes that this is not so because the ability to manage natural resources as the raw material for appropriate economic development, and the ability to control environmental pollution as a major constraint on productivity and human health, will be critical to successful future development in South Africa. The difficulty is that there are no quick and easy solutions for human resource development. The process now under way will take years, if not decades, to achieve equality in the employment of scientists and higher level skilled workers, and to integrate environmental concerns into the general education of all scholars.

Beyond the urgent need for training and skills development in natural resource management is the need for a national vision for a South African path to sustainable development that includes social justice,

community participation in decision-making, respect for traditional and local environmental knowledge, and sustainable use of resources. Environmental awareness and environmental responsibility — “education for sustainable living” — need to be part of every South African child’s cultural heritage and the development of such attitudes should be encouraged in all schools. The children of today will be the decision-makers of tomorrow; they must be appropriately educated and adequately trained.

It is unfortunate, however, that the concept of environmental education has, in the past, carried with it the notion of educator as “expert,” who teaches the correct facts, figures, and analysis to the “ignorant” scholar. This situation has been compounded by a tendency, in the past, for environmental education to focus on the protection of animals and plants — the “save the white rhino” syndrome. This has arisen out of a top-down approach to environmental education that has determined the agenda for the learners, and not vice versa.

An alternative approach to environmental education is now being developed that includes such methodologies as action research and community problem solving. The Environmental Education Policy Initiative (EEPI) has done considerable work in this area.¹¹ In action research, the “expert” participates as a co-researcher, not as an expert, and in community problem solving, the community (or scholars) are assisted to develop the skills for problem solving. This is an important new development in environmental education that should be incorporated more fully into the education system.

Environmental Education at Primary and Secondary Levels

There has been considerable debate within South Africa about the relative merits of integrating environmental education into all subjects taught at school or whether to have separate courses in environmental studies, or both. Currently, one of the biggest constraints to environmental education in schools is that there are too few adequately

¹¹ The Environmental Education Policy Initiative has been engaged in a 2-year consultative process of developing policy options for formal environmental education. Its recommendations are more detailed than those contained here, and documentation can be obtained from EEPI, Box 613, Auckland Park 2006, South Africa.

trained teachers. Teacher training in interdisciplinary approaches, including environmental studies, is a necessary first step. Training in field studies related to the environment is also needed.

Sponsored by the Department of Environmental Affairs and Tourism and the Environmental Education Association of Southern Africa, EEPI has held wide consultations around the country to develop a national education policy for environmental education. The initiative proposes

- That environmental education, as a perspective, should be integrated within subjects in a way that allows each subject to develop its own unique orientation toward environmental issues, concerns, and processes;
 - Three separate environmental courses, namely a thoroughly revised environmental studies course at the lower primary level, “education for sustainable living” at the middle school level, and a vocationally oriented subject at the senior secondary level, including, for example, environmental law, environmental planning, primary health care, development studies, and conservation management;
 - Subject-based components, such as a module on the environmental implications of the chemicals industry in the chemistry syllabus; and
 - The promotion of what is called “local, environmental problem-solving curriculum action,” which promotes environmental activity beyond the school grounds in ways that enhance the curriculum within the school and can fundamentally alter the way a school operates.
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¹² A system similar to this has been introduced in Uganda, where students have to take part in the practical implementation of some element of environmental protection or enhancement that they have studied during the year, such as soil conservation activities within the school grounds or in the community. This activity takes place during school holidays, and students have to pass this activity to pass their year.

Another alternative is that environmental education can be integrated into community-based environmental monitoring by training students to observe the environment and to take simple measurements. This monitoring could form part of a national environmental monitoring system. Other countries have used this approach with success.

In addition, EEPI has examined the implications of environmental education on teacher education, resource materials development, teaching and learning, assessment and evaluation, curriculum development structures, and other areas.

The new curriculum for environmental education should also incorporate elements of traditional environmental knowledge and cultural practices related to natural resource management, many of which have proved to be sustainable over many centuries.

Tertiary-Level Education and Training

South Africa has a major industrial sector, but lacks sufficient numbers of scientists, engineers, and technicians to fulfill the needs of this sector. This problem is compounded by the fact that higher education has, historically, disadvantaged the black majority and women, particularly in the fields of science and engineering.

The teaching of science at the tertiary level in South Africa, as in many other countries, has been characterized by its compartmentalization. Science curricula have not, traditionally, required students to study or investigate the social, philosophical, or environmental impacts of their area of study. As a result, science has been taught, and learned, in a vacuum. Economists, for example, have tended to regard the environment as an externality and have paid little attention to the valuation of natural resources or to environmental economics. Chemistry students have studied the impact of one chemical compound on another, but not the impact of the resultant chemical on the health of humans or plants when it escapes from the laboratory into the world of industry.

Thus, many of the traditional disciplines at the university level will need to be augmented or upgraded (or even reconceptualized) to incorporate environmental concerns and increase the capacity to identify, analyze, and solve environmental problems. This will mean additional curriculum inputs on the environment (including the social elements) and natural resources for all professions, such as civil engineering, architecture, law, economics, and social and natural sciences.

At the technical level, the Mission was told that existing courses for water and waste management, and soil conservation need updating, both in the specialist content and in bringing a more holistic and

integrated approach to the understanding of natural resource and environmental management. Recommendations made by the Mission for an Environmental Monitoring and Extension Agency have implications for the need to produce greater numbers of people trained for employment as environmental inspectors and the need for a different type of training, which brings an interdisciplinary perspective to the particular technical skills received.

In addition to modifying and upgrading existing disciplines, full-fledged specialists are also required in the area of environmental sciences and engineering to help industries and mines solve specific problems. Environmental engineers are not able to find training in South Africa, yet the 1991 President's Council report states that within 5 years over 50 qualified environmental engineers will be needed.

In the short term, better trained people can be provided through "on-the-job" skills upgrading and "cross-training" through short-duration training courses in environmental management for those who are already on the job in various organizations ranging from government departments to nature parks, industries, mines, and other commercial establishments. Material for higher level courses and training is currently being developed by many countries and the international experience should be examined for its applicability to South Africa to avoid duplication of effort.

Of particular importance is the need for an accelerated training and development program to produce a cadre of public servants with expertise in the area of environmental management. Key components of such a program could include the following:

- In-service training programs in the field of environmental management, initiated by the Public Service Commission and organized by the government Training Institute. The Institute could benefit from an examination of similar courses developed in other countries.
- Specialized short-term training courses in the area of environmental management tailored to the needs of public servants. These courses could be offered by academic institutions with expertise in the field in question.
- Work attachments outside South Africa to expose newly appointed or designated public servants to environmental management

practices in other countries. These work attachments should be for a minimum period of 3 months and involve observing the operations of the agencies concerned and actually performing certain duties within them.

- Familiarization visits for newly appointed ministers or senior officials to expose them to the operation and functioning of agencies in other countries. These visits would be less than 2 weeks in duration and could be part of government-to-government twinning arrangements at the departmental level.

Given the new government's objective of building a representative public service within 5 years, the establishment of an accelerated development training program focusing on the area of environmental management should be viewed as a priority.

Workplace Education

Workers can be invaluable to the protection of the environment, as frontline monitors of compliance with environmental legislation by industry, government, and local municipalities, and should be part of the Environmental Monitoring and Extension Agency recommended by the Mission or any other model of integrated inspection being considered. However, for workers to be able to function properly in this regard, they require appropriate education and support, such as user-friendly "kits." Currently, industry has accredited courses for health and safety officials or representatives. Several industries are moving toward the notion of health, safety, and environment structures. This needs to be encouraged, and accredited environment courses for industry workers need to be developed. Worker health and safety representatives should become health, safety, and environment representatives, and their reports should be included in companies' environmental reports.

Nonformal Education

Environmental education should not be restricted to the classroom. Environmental education is a means of empowering people to understand the quality of their community and work environments and to

take action to remedy negative situations. Public environmental awareness and education should be based on an appreciation of indigenous and local environmental knowledge, both in terms of managing natural resources and in being alert to danger signals of environmental degradation, as well as the development of problem-solving skills. Communities and workers are the frontline observers of environmental quality and change, and environmental education should enhance their capability to monitor and care for their local environments.

However, the notion of nonformal environmental education must be revisited and challenged. It is not only about clean-up campaigns organized or sponsored by the government or transnational corporations, and brightly coloured posters and brochures, but more profoundly about empowering local communities to take part in decision-making about environmental issues that concern their daily lives. This also includes empowerment to monitor environmental quality. The empowerment of disadvantaged communities to take part in monitoring and managing their own environments is crucial to ensuring that environmental racism as it has been widely practiced in South Africa is no longer tolerated. At the same time, nonformal environmental education within affluent sectors of society is needed to continually bring to people's attention the environmental impacts of consumerism and the disposable life-style. Although the government has the primary responsibility to ensure that nonformal environmental education takes place, the commitment and participation of the NGO and private sectors will be necessary for its success.

One proposal that the Mission feels has considerable potential for environmental education is that of rural training institutions (originally proposed in the RDP) to build capacity in community tourism management, hospitality services, resource management, lodge construction, proficiency in languages, and other skills related to gaining income from ecotourism. Instruction could be undertaken by local people in local languages. It is anticipated that such institutions would prevent the leakage of skilled rural people into the urban job market. They could also be extended to provide capacity in organizational development, small business development, small- and medium-scale agriculture, and craft-based industries, as well as basic, formal, and nonformal adult education. In the evenings, these institutes could double as community centres and provide a focal meeting point for

activities such as development forums, local RDP structures, youth environment clubs, and women's organizations.

Nonformal environmental education can also take place through mechanisms such as agricultural extension services, primary health care services, water committees, and so on. What is needed is a coherent strategy for the participation of community members, government officials, and NGO workers in action-based environmental problem solving, particularly in poor and isolated rural communities, communities living in particularly sensitive areas, and communities that are particularly dependant on natural resources, including marginalized urban and peri-urban settlements.

It is crucial that nonformal education be accessible to women, particularly black women. Women are traditionally the guardians of the health and welfare of their families and, as such, are often very active in environmental issues that impact on the health of their children. Nonformal education methodologies, therefore, must be developed that take into account the special needs and constraints facing women in disadvantaged communities.

Funding

The creation of new curricula at primary, secondary, and tertiary levels; development of appropriate educational materials; retraining of teachers; encouragement of research; and development of appropriate nonformal education mechanisms will all require considerable dedication on the part of the new government, including the financial commitment to make these things possible.

Research

The Mission heard many expressions of the need for research and has reported these under different sections of this report. The most important general issue facing the new government is the need to set some clear research priorities and to establish strategic research as a development priority.

One of the concerns raised about research in South Africa, in addition to the outcry that resources allocated to research in general, and to environmental research in particular, are insufficient, is that the new

self-financing mode of key research agencies, such as the Council of Scientific and Industrial Research (CISR) and the Human Sciences Research Council (HSRC), means that less attention is being paid to important research — research that is in the national interest — but for which no clear paying client exists. This view was raised frequently enough for the Mission to urge the new government, despite its financial constraints, to ensure that critical strategic research on the environment and natural resources is supported. The research budgets of many government departments are relatively small and they cannot afford to commission CISR or HSRC to undertake basic surveys and analytical research on environmental resources and quality.

However, it is also important that appropriate methods of research be used. More research is needed that is conducted with the affected people in a participatory manner, and the product of the research should be owned by the people concerned, as well as by the academic or commercial organization that carried out the research “on behalf of” affected communities. This changing “research ethic” is becoming more widely accepted in other countries and is an especially valuable approach to engage researchers as active partners in the reconstruction and development process.

Gender

All education should take into account the needs of women, and tertiary education and training must be made available to women through a process of affirmative action. This is particularly necessary in the case of black women, who have traditionally been the custodians of natural resource management knowledge, but who have been most disadvantaged by the patriarchal, apartheid education system.

Recommendations

Primary and secondary school education

1. Environmental education should be integrated within subjects in a way that allows each subject to develop its own unique orientation toward environmental issues, concerns, and processes.

2. Three separate environmental courses should be offered, namely a thoroughly revised environmental studies course at the lower primary level, education for sustainable living at the middle school level, and a vocationally oriented subject at the senior secondary level.
3. Courses should include subject-based environmental components.
4. “Local, environmental problem-solving curriculum action” should be promoted.

Tertiary education and training

5. Science curricula at the tertiary level should be revised to develop a more holistic approach that incorporates an understanding of the environmental implications and impacts of the field being studied.
6. Existing technical courses for water management, waste management, and soil conservation should be updated, both in the specialist content and in bringing a more holistic and interdisciplinary approach to the understanding of natural resource and environmental management.
7. Training opportunities for specialists in the area of environmental sciences and engineering should be expanded.

Workplace or “on-the-job” education and training

8. Industry should be encouraged to develop accredited courses in health, safety, and environment for workers.
9. There is an urgent need for an accelerated training and development program to produce a cadre of public servants with expertise in the area of environmental management. Key components of such a program could include in-service training programs in the field of environmental management, specialized short-term training courses, work attachments outside South Africa, and familiarization visits for newly appointed ministers or senior officials to other countries.
10. “On-the-job” skills upgrading and “cross-training” through short-duration training courses in environmental management should be provided for those already employed.

11. Research should be carried out on the applicability to South Africa of educational and training materials currently being developed by other countries.

Nonformal education

12. A joint program of action around environmental awareness and education, including action-based problem solving, should be undertaken by the government, private sector, and environmental NGOs.

Research

13. The government should encourage and subsidize research on the development of appropriate curricula and methodologies for formal and nonformal environmental education.

14. Strategic research on environmental management and natural resources should be supported and conducted in a participatory manner, where possible.

Gender

15. All environmental education initiatives must be gender sensitive and take into account the constraints (including time, finances, and access to institutions) facing women, particularly black, working-class women, in South Africa.

Chapter 15

INTERNATIONAL LINKAGES

Rejoining the International Arena

South Africa has recently emerged from a period of international isolation and trade sanctions. Increasingly, it is playing an active role in international negotiations and is now more directly affected by actions taken elsewhere in the global economy. The new government has had to take these factors into account, and past attitudes and experiences have less relevance to the new status of South Africa as a developing country accepted by the world community of nations. With increased globalization of the environment, South Africa will not be able to disassociate itself from its regional and international responsibilities and obligations. Given that international negotiations, especially in the areas of trade, environment, and development, have increasingly impinged upon domestic policy, the government is having to ensure that the departments responsible for such negotiations are better prepared. There also needs to be consistency between international negotiating positions and national policy, and national policy should be anticipatory rather than running from behind.

Although the South African government was not officially represented during the United Nations Conference on Environment and Development (UNCED) in 1992, it has committed itself to the principles and agreements that resulted from this summit meeting. UNCED ushered in a new global agenda to promote international cooperation to bring about sustainable development, particularly in developing countries. This ambitious program is contained in a document known as Agenda 21 and is intended to be the basic blueprint for achieving

sustainable development in the next century. The program is predicated on much greater financial support to developing countries, trade liberalization, and the development of appropriate policies that link environment and development to the alleviation of poverty. A major roadblock is that so far the additional financial resources required have not materialized and it is unlikely that they will appear in the near future.

Within the context of globalization of environmental and developmental issues, sustainable development needs to be viewed in an international context as it is influenced by the state of the world economy, commodity prices, interest rates, energy imports, cultural behaviour, conditional aid packages, shared resources, and transboundary pollution. These external factors combine with internal factors, such as inappropriate political and policy instruments, low environmental investment levels, a lack of capacity, and unequal distribution of resources, to work against sustainable environmental management.

South Africa is party to over 20 international environmental conventions. In particular, South Africa has signed, but not ratified, conventions on the Law of the Sea, Climate Change, and Biodiversity. The government has become a signatory to the Basel Convention on transboundary movement of hazardous wastes, yet South Africa is not a party to the Bamako Convention, a regional treaty banning the import of hazardous wastes into Africa. South Africa is a signatory to the Montreal Protocol and has committed to reduce chlorofluorocarbon (CFC) emissions. In relation to international "environmental" agreements, the new government will need to take early action as follows:

1. A policy decision has to be made regarding whether the new government should ratify the conventions that it has signed, especially those on the Law of the Sea, Climate Change, and Biodiversity, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Ratification should carry with it wide support of stakeholders and not simply be rubber-stamped by legislators. One of the key issues that emerged from the Biodiversity Convention is intellectual property rights and patenting of genetic resources. This is an issue to which the government should pay close attention.

- On the issue of importing hazardous wastes, South Africa should strengthen its commitment to restrict trade in hazardous waste to Africa by signing and ratifying the Bamako Convention.
- South Africa should publicize and stimulate national debate on current negotiations in relation to the Convention on Drought and Desertification.
- After broad international consultation, South Africa should ratify the Framework Convention on Climate Change in the spirit of aligning itself with the interests of developing countries.
- Having become party to the Nuclear Non-Proliferation Treaty (NPT), South Africa should underline its commitment to nonproliferation by working for a treaty under which the continent and islands of Africa become a nuclear-weapons-free zone. South Africa should ensure that the ongoing commitment to the NPT is accompanied by significant and steady nuclear arms reductions on the part of existing weapons states.

As South Africa's economy opens up to transnational corporations, the environmental behaviour of these corporations — particularly those that extract or process local natural resources — will need careful monitoring. South Africa will need to ensure that it has in place mechanisms and the necessary expertise to guard against technology “dumping,” or the transfer of old and dirty technologies, sometimes tied to market opportunities, concessionary arrangements, or even foreign aid. Likewise, as South African-based corporate capital takes advantage of exploiting new opportunities in Africa and elsewhere, its environmental record should come under close scrutiny. With the formal closure of the United Nations Centre on Transnational Corporations, new mechanisms will need to be found, perhaps at the regional level, to monitor foreign investment for its social and environmental impacts.

Structural Adjustment and Deregulation

South Africa cannot operate outside the context of the international financial community. Its membership in the International Monetary Fund and the World Bank are realities. The Reconstruction and

Development Programme is predicated on renewed foreign aid, loans, and direct investment in the national economy.

Yet, from an environmental policy viewpoint, certain caveats are necessary. The structural adjustment programs, insisted upon by the Bretton Woods institutions in their making funds available to other African countries, have directly contributed, in the name of fiscal discipline and increases in social and economic equality, to impoverishment and have passed an extra burden of poverty onto women, children, the aged, and the unemployed.

If applied along the same lines in South Africa, the policy of structural adjustment programs will defeat the poverty-fighting efforts of the RDP and extend poverty and inequality. In turn, this will lead to increasing environmental degradation at the margins of society that can least afford an unsustainable life-style.

It is not only structural adjustment programs that are a cause for environmental concern, but also the past environmental record of projects supported by the World Bank. Despite a dramatic increase in staffing of the environmental division of the World Bank in recent years, its lending policies continue to bring about environmental problems. A case in point is the Lesotho Highlands Water Project, designed to divert water from the headwaters of the Orange River in the Lesotho interior to make it available for use in the densely populated Gauteng Province of South Africa. Not only have there been environmental and social impacts resulting from dam and tunnel construction in Lesotho, but it is also predicted that other areas of the catchment, from the estuary to well inland, may run dry as a result of the project. This will have a severe impact on the economy and livelihood of inhabitants of Namaqualand and other parts of the Northern Cape Province.

South Africa needs to strengthen its own environmental evaluation and assessment procedures for all large-scale projects, whether facilitated by the World Bank, other transnational and international lending institutions, or transnational corporations with an interest in medium-or large-scale investment in the country.

South Africa needs to be aware that deregulation policies carry with them dangers for the environment, whose regulation is currently quite weak. Increasing proposals for deregulated export processing zones, which exempt manufacturers in these zones from complying with labour and environmental legislation, are likely to undermine efforts toward securing a living wage for all workers and protection of

the environment. Deregulation measures of this kind should, as a minimum, be subjected to social and environmental impact assessments with maximum stakeholder participation.

Regional Initiatives

Until recently, South Africa was excluded from regional¹³ initiatives, in particular the Southern Africa Development Community (SADC), a regional grouping of 10 Southern African countries.

South Africa faces constraints similar to those faced by other regional countries in pursuit of a harmonized development strategy. Some of these constraints are inappropriate land-tenure policies, fragile environments, low levels of technology in rural areas, a lack of recognition of the long-term value of natural resources, a lack of capacity to implement integrated environmental management, weak institutions and legislation, and low levels of investments in the environment sector.

In this regard, it is both economically and environmentally desirable for regional countries to pursue joint initiatives. Some of the potential areas for regional collaboration are discussed here.

Population and migration — The region is characterized by a migrant labour economy and cross-border movement. In many instances, this movement is necessitated by boundaries that have divided communities. The interdependency of the people of the region is likely to increase with peace in Mozambique and Angola, and the democratization of South Africa.

Management of transboundary resources (grazing, wildlife, forests, and minerals) — As the region's resources come under increasing pressure, joint management strategies and ecoregional approaches to management will become more important. South Africa shares boundaries with countries in which these issues will arise.

¹³ Regional in this context refers to the Southern African region. In other documents, Africa is sometimes regarded as a region; Southern Africa, a subregion. The region should not be confused with the internal divisions of the country, still referred to as provinces.

Management of shared rivers and aquifers — The Southern African region is generally drought prone. Shared rivers and aquifers need to be managed jointly so that their waters can be developed and harvested in a sustainable manner. South Africa is already extracting water from Lesotho and, as demands for water increase, other river systems, such as the Zambezi, will be considered.

Energy demand and supply — South Africa's installed electricity generating capacity is surplus to its current needs. It is well placed to export this surplus to other countries in the region. In the long term, the region could be interconnected so that the total available electricity generating capacity can be efficiently harnessed and utilized. Oil, coal, and gas are other energy resources available in the region that can form the basis of a regional energy strategy, including hydropower from Zaire, which, the Mission was told, is under consideration by Eskom.

Transboundary pollution — This is an area that requires immediate attention so that appropriate regional laws and agreements can be prepared and implemented.

Scientific and technical cooperation — South Africa is more advanced in some scientific and technical areas than its neighbours. At the same time, experience in other countries in the region has much to offer South Africa in areas such as social forestry and land tenure options.

Integrated pest management — Pests, such as locusts, do not recognize political boundaries and effective pest management will require regional cooperation.

Food security — There is a comparative advantage in addressing aspects of food security both at household and national levels through regional cooperation, especially given the frequency of droughts and low yields achieved by most farmers.

Trade — With a gross domestic product of 115 billion US dollars in 1993, South Africa could become sub-Saharan Africa's economic dynamo. With the regionalization of markets, foreign investors might favour South Africa as the manufacturing hub. The region has several trade arrangements, such as the Common Market for East and

Southern Africa (COMESA); the Preferential Trade Area (PTA); the SADC; the East African Community, which is being revived by Tanzania, Uganda, and Kenya; and the South African Customs Union (SACU). Some rationalization of these overlapping organizations is inevitable, but it could take some time. Within this rationalization, trade and environmental policies need to be harmonized. The size of the South African economy will result in unequal partnerships with its neighbours. Policymakers will have to intervene to regulate regional markets and avoid dominance by the stronger economies. Equitable development across Southern Africa is likely to become a key issue in regional policies.

Militarization and the Environment

Apartheid's legacy includes the environmental impacts of war and destabilization on neighbouring countries, especially Mozambique and Angola since 1975. The disastrous environmental impact results from the following military activities: research, development, the production of weaponry, testing manoeuvres, the presence of military bases, disposal of toxic wastes, and armed conflict in the region.

Internally, the military alienated large amounts of land for its purposes. This included land for testing missiles — portions of which were natural protected areas (St Lucia and De Hoop). The military sector is still one of the largest landowners in the country. Testing of chemicals by the military–industrial complex has also been challenged by communities adjacent to the testing sites (such as Rooi Els). Relocation of Namibians loyal to the former South African Defence Force (SADF) on South African military bases has also created social and ecological problems in the Schmidtsdrift area.

South Africa has the most powerful army in sub-Saharan Africa: the new integrated South African National Defence Force (SANDF) has inherited a total mobilizable strength of about 1.3 million troops. It also has a powerful arms-manufacturing capability. A debate is currently under way on the dynamics of transition to a new, legitimate, and representative defence force in South Africa. This debate is focused on integration of the former armies: the SADF, forces of the former homelands, uMkhonto weSizwe (MK), and the Azanian People's Liberation Army (APLA).

The backdrop to this debate involves threat analyses that take into account the variety of security problems in the Southern African region brought about by the effects of poverty, war, drought, disease, and social dislocation. It is increasingly recognized that a broadened concept of “national security,” which emphasizes ecological factors, is necessary.

The election of a democratic government in South Africa may have implications for the level of political unity in the frontline states. Access to environmental resources could become a source of tension and conflict in the region. Southern Africa could become caught up in what has been termed the “green war factor” — a vicious circle in which environmental degradation leads to tensions and local disputes and violence, which lead to civil and interstate wars, which in turn cause more environmental degradation.

A further debate surrounding the conversion of military production to socially and ecologically useful production is also under way. There are those who favour an extended arms industry in the name of increased foreign earnings. Those who argue for conversion, on the other hand, see an enhanced peacemaking role for South Africa on the African continent and farther afield. The scientists who helped manufacture South African nuclear weapons have a great deal to offer if their skills and research priorities are redirected to the development of clean technologies.

The new government needs to reconsider giving “carte blanche” to the military. There is a need now to build a culture of peace and good neighbourliness. The new South Africa has no external enemies. Its resources, including its military human resources, should be converted to combat problems of hunger, homelessness, and environmental degradation.

Environment and Trade

Although South Africa’s economy is expected to grow for the rest of the decade, the new government is under pressure to reduce the budget deficit while providing funding for an ambitious reconstruction program. As the economy recovers and imports increase, the country will have to export more and borrow to meet increasing debt repayments. Hence, to fund development, earn foreign exchange, and service debts,

one scenario is that the country will have to export more goods. As South Africa's major exports are minerals and agricultural products, increased mining and farming activities will create environmental stresses.

It is the structure of the economy that will ultimately determine the extent of the country's environmental problems. With an unemployment rate estimated at about 46 percent, it is unrealistic to expect that the dependence on mining as a source of foreign exchange and employment will diminish in the short term.

The controversial and recently completed Uruguay Round of the General Agreement on Tariffs and Trade (GATT) establishes the international framework for trade for the rest of this century. That framework rests on the liberalization of trade, which theoretically may facilitate access by developing countries such as South Africa to northern markets. However, some of the measures that are predicted to be of greatest benefit to developing countries will only be phased in over an extensive period. Replacement of the GATT Secretariat with the World Trade Organization (WTO) is only likely to benefit developing countries if they are adequately aware of the issues and can unite to look after their own interests. South Africa, therefore, should ensure that it has adequate representation and a good understanding of the issues being discussed at the WTO and that relevant parts of government have sufficient expertise and resources to watch this vital area of national interest.

One area of interest to developing countries is how the WTO will deal with agricultural exports and their impact on national agricultural development. This is an area for South Africa to watch, particularly from the point of view of rising food import costs and how these relate to domestic food production policies. If prices rise, there is fear that food aid and concessionary food trade will fall, with consequent negative results for food-importing countries.

Subsidies are particularly targeted under the WTO in an effort to reduce subsidies to exports except for the least-developed countries. Some agricultural subsidies can be placed in the "green box" category, which will be exempt from subsidy-reduction commitments on the principle that certain costs for environmental programs and research, extension, and advisory services are to be exempt. But it is not yet clear if some environmental programs and research will be exempt.

Therefore, it will be important for the government to pay attention to the evolving definition of allowable subsidies under WTO regulations.

The “safeguards clause” may be of particular interest to South Africa as it enables a country to justify selective import controls against imports from countries that have increased disproportionately.

Intellectual property rights are recognized by participants in the Uruguay Round of GATT, and there is a requirement to establish national enforcement mechanisms under one regime or another. With one important deadline at the end of 1995 approaching, this is another international policy area requiring immediate attention and resolution by the government that will have repercussions not only for the policy environment of South Africa in relation to foreign investment but also for the protection of indigenous knowledge, farmers’ rights, and community biodiversity management.

Although the environment was discussed mainly in a series of parallel meetings to the Uruguay Round deliberations, it is anticipated that proposals will come forward to protect the environment through the mechanism of international trade rules. Among these are the need to be transparent in the way national environmental regulations will affect trade, and the trade effects of new packaging and labeling (including ecolabeling) requirements designed to protect the environment (Stevens 1994).

Environmental conditions are increasingly entering international trade relations. Trade markets and trade agreements may prevent trade in environmentally damaging products. The prospect of environmental pressures being imposed through international trade brings both dangers and opportunities for South Africa. The danger is that its capacity to export and to increase world market share will be threatened by an inability to meet environmental requirements. The opportunity is that South African companies will be forced to improve their environmental performance more fundamentally or more quickly than they would in the absence of international pressure.

Given the long-term decline in mineral exports, South Africa needs to refocus its export strategy to increase international market share in a range of products, including manufactured goods. This is especially important given the balance of payment pressures it faces. Therefore, South Africa needs to secure renewed access to world markets, and to Northern markets in particular. At the same time, the country needs to raise levels of environmental protection and find

development paths that are more environmentally sustainable than those followed by the North.

In negotiating environmental clauses in trade agreements and in managing company trade relations, South Africa will need to be mindful of the twin objectives of development and improved environmental protection. Environmental pressures exerted on South African companies through the trading system may be helpful in raising environmental performance under certain conditions, but may hamper development under others. More research is needed to identify the action that can be taken by industry, government, and trade unions to manage this important balance.

One important caveat in conducting this research should be the question of technology transfers that allow for the importation of dirty technologies. Mechanisms need to be created to work toward product life-cycle evaluations in a way that discourages or prevents such transfers. Technology needs to be made appropriate to the resources available for its development. Trade and aid are often used as instruments to tie developing countries to technologies produced by donor countries. There needs to be an office or mechanism for the rational evaluation of technologies appropriate to local needs and resources.

Recommendations

1. The government should work with other developing countries, especially those in the region, to ensure that the impact of new trade agreements on the environment is addressed through GATT and other international agreements, and to develop mutually supportive trade and environment policies at national, regional, and international levels with a view to achieving sustainable development.
2. Through GATT and regional agreements, the government should seek to prevent the dumping of products so that countries with low environmental standards are assisted and encouraged to raise them. South Africa should be leading such a process rather than being reluctantly brought to the negotiating table.
3. The new government should seriously consider ratifying the Convention on the Law of the Sea. This convention is certainly a

step forward in dealing with issues such as controlling marine pollution, fisheries conservation, passage through international straits, and the controversial issue of deep seabed mining.

- The Convention on Biodiversity has been signed by South Africa. However, to further strengthen the rights of local communities, an alternative system of rights within domestic law, which recognizes and protects local commons for local communities, should be developed in accordance with the traditions, customs, and practices of such communities and should also take into account the social and ecological objectives of biodiversity conservation.
- In relation to the Convention on Climate Change, the former government published a *Proposed Policy on Global Environmental Change* that sets out the factual position relating to climatic change and possible impacts on the natural environment and implications for various sectors of the South African economy. This policy should be reviewed and reconsidered before the Convention is ratified.
- To prohibit the export and import of hazardous wastes into South Africa, the government should consider signing and ratifying the Bamako Convention, a regional convention for African states. Domestic legislation should also be passed as a further move to prevent the import of wastes.
- South Africa should actively work with other countries in the region, especially those within the Southern Africa Development Community, to achieve a harmonized environmental management strategy, and rationalized trade and environment policies.
- South Africa should seriously pursue the redirection of its military production and scientific expertise to advance South African leadership in areas such as clean technology, alternative energy, and technology assessment.

Appendix A

MEMBERS OF THE MISSION

External Members

Anne V. Whyte (Mission Leader) — *Director General, Environment and Natural Resources Division, International Development Research Centre, PO Box 8500, Ottawa, ON, Canada*

Trained in both the natural and social sciences, Dr Whyte has undertaken research in many countries on natural resource management and environmental policy, specializing in environmental risk assessment. Author of over 50 books and articles, she is a Fellow of the Royal Society of Canada, President of the Canadian Association of Geographers, and sits on numerous international scientific boards and committees.

Yemi Katerere — *Regional Director, IUCN Southern Africa, PO Box 745, Harare, Zimbabwe*

Dr Katerere is currently Regional Director for the International Union for the Conservation of Nature and Natural Resources (IUCN) in Southern Africa and was formerly Chief Executive Director of the Zimbabwe Forestry Commission. He is also Chairperson of ZERO, a regional environmental organization. A forester by training, Dr Katerere has been involved in studies on local-level natural resource management issues. He has also worked on regional energy and land-use projects.

Hartmut Krugmann — *Senior Program Specialist, Environment and Natural Resources Division, Regional Office for Eastern and Southern Africa, International Development Research Centre, PO Box 62084, Nairobi, Kenya*

Currently based at IDRC's Regional Office for Eastern and Southern Africa in Nairobi, Kenya, Dr Krugmann has conducted or managed research on issues relating to energy and environmental policy in many countries in Africa, Latin America, and Asia. He has published widely in the fields of energy, environment, and development.

Meenakshi Raman (Deputy Mission Leader) — *Lawyer, Consumers' Association of Penang, 228 MacAlister Road, 10400 Palay, Penang, Malaysia*

Ms Raman is a public interest lawyer with the Consumers' Association of Penang, Malaysia, a leading organization dealing with development, basic needs, environment, health, and consumer issues.

Jyoti Parikh — *Senior Professor, Indira Gandhi Institute of Development Research, General Vaidya Marg, Goregaonle (East), Bombay 400 065, India*

Currently a professor of energy and environment at Indira Gandhi Institute of Development Research in Bombay, Dr Parikh has worked on sustainable consumption patterns, natural resource accounting, trade and the environment, and environmental standards. She also works in the area of global negotiations related to the environment, in particular climatic change, and was a convening lead author for the intergovernmental panel on climatic change.

David Pulkol — *Minister of State, Ministry of State for Karamoja, Box 7168, Kampala, Uganda*

A development economist, the Honorable David Pulkol is currently Uganda's Minister of State for Karamoja and was formerly Deputy Minister of Education and Sports. He is also a Research Fellow with the Makerere Institute of Social Research in Kampala and has undertaken socioeconomic policy studies in groundwater resource management, human resettlement, land tenure, and resource management in arid areas. As a member of the legislature, he has been involved in policy formulation, project planning and implementation, social mobilization, and high-level decision-making. He also lectured at Makerere University in the Faculty of Social Sciences for 2 years.

Full-Time South African Members

Tami Sokutu (Head, South African members; representing ANC) — *National Coordinator, ANC Environment Desk, and Head, Department of Environmental Affairs, Eastern Transvaal, Private Bag 11233, Nelspruit 1200, South Africa*

A botanist by training, with broad experience in environmental issues, Mr Sokutu is currently a member of both the National Steering Committee and the Environmental Justice Networking Forum in South Africa.

Lael Bethlehem (representing COSATU) — *National Labour and Economic Development Institute, Box 5665, Johannesburg 2000, South Africa*

A research officer at the National Labour and Economic Development Institute, which serves as a research centre for the Congress of South African Trade Unions, Lael Bethlehem is an industrial sociologist by training. She has worked as a researcher on the industrial strategy project and has lectured in sociology at the University of Witwatersrand.

Siva Chetty (representing SANCO) — *67 Andora Road, Bluff 4052, South Africa*

Mr Chetty has worked as a chemical engineer in the Durban Waste Water Management Department and has more than 10 years experience working at the community level. Most of his environmental activism is rooted in the community of Merebank and the water-scarce and poverty-stricken communities in southern KwaZulu-Natal. With the South African National Civic Organisation (SANCO), he has focused on the need for community empowerment and participation in decision-making. He is an executive member of the Merebank board of the ANC and, in 1993, was nominated to an eminent 20-person group to develop a sustainable environmental vision for South Africa up to the year 2020.

David Fig (representing GEM) — *Director, Group for Environmental Monitoring, 195 Smit Street, Braamfontein 2001, South Africa*

As Research Director of the Group for Environmental Monitoring (GEM), a Johannesburg-based NGO active in environmental policy research, Dr Fig represents South Africa on the Scientific Advisory Committee of the Southern Africa Research and Documentation Centre in Harare. He is also a member of the ANC National Environment Task Group and the Advisory Board for *New Ground* magazine, which focuses on environment and development issues.

Louis Liebenberg (representing ANC) — *4 Leith Road, Rondebosch 7700, South Africa*

Mr Liebenberg coordinated ANC policy proposals on national parks, nature reserves, and rural development and is the author of *The Art of Tracking: The Origin of Science* (1990) and *A Field Guide to the Animal Tracks of Southern Africa* (1990), both published by David Philip Publishers in Cape Town. His research has involved fieldwork in wilderness areas of South Africa, Botswana, and Namibia. He has also conducted ecotours in both Namibia and South Africa.

Barbara Schreiner (representing SACP) — *Department of Development, Planning, Environment and Works, Gauteng Province, 110 Derby Road, Kensington 2094, South Africa*

A member of the ANC Environment Desk, Barbara Schreiner is currently Materials Development Coordinator and coordinator of the Group on Environmental Work at Planact, an NGO working on urban reconstruction issues.

Part-Time South African Members

Chris Albertyn (representing EJNF) — *National Coordinator, Environmental Justice Networking Forum, Box 100029, Scotsville 3209, South Africa*

Mr Albertyn is National Coordinator of EJNF, a broad cross-sector network of organizations concerned with environmental justice and

sustainable development. He is also a member of the ANC National Environment Task Group and founding member of the voluntary activist group Earthlife Africa.

Saliem Fakir (representing LAPC) — *Land and Agricultural Policy Centre, Box 243, Wits 2050, South Africa*
Trainee manager and researcher for the Natural Resource Management Project at the Land and Agricultural Policy Centre (LAPC), Mr Fakir trained as a molecular biologist and is currently completing a master's of science degree in environmental management at Wye College in London.

Stan Sangweni (representing ANC) — *ANC National Environmental Task Group, Public Service Commission, Private Bag X121, Pretoria 0001, South Africa*
Mr Sangweni has been closely associated with the ANC's environmental policy formulation process since 1990, representing the organization at regional and international consultations, including the 1992 Earth Summit (UNCED) in Rio de Janeiro. From 1982 to 1991, he worked for UNEP in Nairobi and, from 1991 to 1994, he was Professor and Director of the School of Rural Community Development at the University of Natal.

Trainees

Maria Mbengashe — *ANC Environment Desk, Box 8031, Schauderville 6060, South Africa*
A teacher by training and currently working on her master's of education in environmental education at Rhodes University, Maria Mbengashe is Head of the ANC Environment Desk in the Eastern Cape and a National Steering Committee member of the Environmental Justice Networking Forum. She is also currently Director of the Community Environment Network in Port Elizabeth, South Africa.

Sandile Ndawonde — *Greater Edendale Environmental Network, Box 418, Plessislaer 4500, South Africa*
Sandile Ndawonde founded and works on a voluntary basis for the Greater Edendale Environmental Network. The main objective of the network is to coordinate environmental awareness campaigns through schools and the community.

Tebogo Phadu — *ANC National RDP Department, 51 Plein Street, Marshalltown, Johannesburg 2001, South Africa*
In addition to being Regional Coordinator for EJNF, Tebogo Phadu is Assistant National Coordinator of the ANC Environment Desk and Deputy Secretary of the ANC Pembisa Branch.

Appendix B

BACKGROUND PAPERS PREPARED FOR THE MISSION

A number of South African experts were invited in 1993 to prepare background papers on selected topics. Their purpose was to review the literature, identify key issues for the Mission's attention, and provide background data for the Mission's report. The papers listed here can be consulted in their original unedited form through IDRC's Johannesburg office or through the library at IDRC's Ottawa headquarters.

Abrahamse-Lamola, T. *General overview.*

Albertyn, C. *Addendum to industrial and municipal waste.*

Archer, D.J. *Environmental economics.*

____ *Environmental economics: recommendations.*

Chetty, S. *Airborne pollution.*

____ *Water supply, sanitation and health.*

Cooper, D. *Land, agriculture and forestry.*

Coovadia, Y. *The urban environment: urban and peri-urban agriculture.*

Fig, D. *Ecotourism.*

Glazewski, J. *Environmental law: recommendations.*

____ *Legislative framework and environmental law.*

Huma, W.; Jone, D.; Dehlen, G.; Mirrilees, R. *Transport.*

Jack, B. *Rural planning and development.*

Jackson, L. *Marine pollution.*

Kahn, M. *Environmental education.*

Liebenberg, L. *Nature conservation.*

Lukey, P. *Industrial and municipal waste.*

Poultney, C. *Military operations and the environment.*

Schreiner, B. *Urban planning and development and the environment.*

____ *Urban planning and development and the environment: recommendations.*

Sewnarain, R.; James, L. *Mining and mining waste.*

Short, R. *The industrial sector.*

Sokutu, T. *Traditional knowledge and natural resource management.*

Sowman, M. *Government departments and non-governmental organisations which have an interest in or are responsible for environmental matters.*

Sowman, M.; Cosijn, M. *Environmental policy.*

van Horen, C. *The South African energy sector.*

____ *The South African energy sector: summary of key points in briefing paper.*

Wynberg, R. *The protection, use and management of biological diversity in South Africa.*

Appendix C

ORGANIZATIONS AND INDIVIDUALS CONSULTED

Organizations

AC Pipes Ltd

AECI Ltd

Aerotek Ltd

African National Congress

Agricultural Research Council

Altron

ANC Environmental Desk

ANC Youth League

ANC Women's League, Port Elizabeth

Anglo American, Coal Division

Anglovaal Ltd

Atomic Energy Corporation of South Africa Ltd

Bohlokong Builders Association

Border Environment Network (East London)

Botanical Society of South Africa

Built Environmental Support Group

Cape Nature Conservation (Eastern Cape)

CARE International

Chamber of Mines of South Africa

Chemical and Allied Industries Association

Chemical Engineering Research Group, University of Natal

Chemical Workers' Industrial Union

Chesterville Civic Association

City of Johannesburg, Conservation Department

City of Johannesburg, Health, Housing and Urbanisation Directorate

Coastal Zone Management Task Team

Community Environmental Network

Congress of South African Trade Unions

Council for Nuclear Safety

Council for the Environment

Council of Scientific and Industrial Research

Department of Agricultural Development

Department of Environmental Affairs and Tourism (formerly Department of Environmental Affairs)

Department of Labour (formerly Department of Manpower)

Department of Law, Rhodes University

Department of Mineral and Energy Affairs

Department of Health (formerly Department of National Health and Population Development)

Department of Sociology, University of Cape Town

Department of Trade and Industry

Department of Transport

Department of Water Affairs and Forestry

Development Action Group

Development Bank of Southern Africa

Durban Urban Development Department

Earthlife Africa

Ecolink

Eco-programme

Ecoserve

Environmental Law Association

Energy for Development Research Centre

Environmental Advisory Unit, University of Cape Town

Environmental Evaluation Unit, University of Cape Town

Environmental Justice Networking Forum

Eskom

Everite Ltd

Farmer Foundation

Federation of South African Labour

Food and Allied Workers' Union

Forest Owners Association

Friderich Ebert Stiftung

Greater Pietermaritzburg Environmental Committee

Green Coalition

Group for Environmental Monitoring

Habitat Council

Human Rights Trust

Human Sciences Research Council

Inanda Civic Association

Industrial Environmental Forum

Institute of Natural Resources, University of Natal

Institute of Social and Economic Research, Rhodes University

Kangwane Parks Board

Keep Pietermaritzburg Clean Association

Kokstad Civic Association

Kosi Bay community

kwaDapha and Mbasas community

KwaZulu-Natal Province, Department of Agriculture

KwaZulu-Natal Province, Department of Nature Conservation

Lamontville Residents' Association

L&W Consulting Environmentalists Ltd

Legal Resources Centre, Cape Town

Management Plan Committee, Richtersveld National Park

Medical Research Institute

Merebank Community Centre

Merebank Community Organisation

Merewent Environmental Project Unit

Merewent Ratepayers' Association

Mineral and Energy Policy Centre

Mintek

Mvula Trust

Natal Conservancies Association

Natal Parks Board

Natal Primary Health Care Unit

Natal Provincial Parliament

National Association for Clean Air

National Labour and Economic Development Institute

National Parks Board

National Union of Mineworkers of South Africa

Northern Cape Province, Nature Conservation Service

Northern Cape Province, Office of the President

Northern Province, Agriculture and Forestry Department

Northern Province, Land, Housing and Local Government Department

Orange Farm community

Pietermaritzburg City Council Refuse Management Department

Pietermaritzburg City Health Department

Pollution Research Group, University of Natal, Durban

Port Elizabeth Municipal Health Department

Post and Telecommunications Workers Association

Randcoal Ltd

Richards Bay Minerals Corporation

Sasol Ltd

Sea Fisheries Research Institute

South African Communist Party

South African Democratic Teachers Union

South African Mine Workers Union

South African National Civic Organisation

South African Nature Foundation, Stellenbosch

South African Press Association

South African Timber Growers Association

Surplus People Project

The Argus

Thor Chemicals Ltd

Transvaal Provincial Administration, Nature Conservation

Trees for Africa

Umgeni Water Board

Umlazi Civic Association

Umzinto Civic Association

Urban Foundation

Urban Problems Research Unit

Waste-Tech Ltd

Western Cape Marine Conservation Society

Western Cape Province, Nature Conservation Department

Wildlife Society

Individuals

Craig Anderson

Michael Carlson (Community Law Centre)

Jacklyn Cock (Associate Professor of Sociology, University of Witwatersrand)

R.I. Emery

Phillip Everitt (Department of Civil Engineering, University of Natal, Durban)

Bev Geach (Walmer)

Jan Glazewski (Environment Law Unit, University of Cape Town)

David Hallowes

Grant Hates (Faculty of Agriculture, University of Natal, Pietermaritzburg)

Alan Howgrave-Graham (Department of Microbiology, University of Natal, Pietermaritzburg)

David Lincoln (Department of Sociology, University of Cape Town)

Bridget McBean (Women's Bureau of South Africa)

David McDonald

Jim Petrie (Department of Chemical Engineering, University of Cape Town)

Delva Roberts (D-MOSS)

Denys Schreiner (Department of Civil Engineering, University of Natal, Durban)

Roy Sookder (KBDA)

Mary Stewart (Departments of Environmental Engineering and Chemical Engineering, University of Cape Town)

Bruce Wells (Wiz Biz)

Appendix D

ACRONYMS AND ABBREVIATIONS

ANC	African National Congress
APLA	Azanian People's Liberation Army
BACT	best available control technology
BATNEEC	best available techniques not entailing excessive costs
BPEO	best practical environmental option
BPM	best practical means
BPT	best practical technology
CFC	chlorofluorocarbon
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COMESA	Common Market for East and Southern Africa
COSATU	Congress of South African Trade Unions
CSIR	Council of Scientific and Industrial Research
DBSA	Development Bank of South Africa
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DWAF	Department of Water Affairs and Forestry
EEPI	Environmental Education Policy Initiative
EIA	environmental impact assessment
EJNF	Environmental Justice Networking Forum
EMEA	Environmental Monitoring and Extension Agency
EMPR	Environmental Management Programme Report
EPA	Environmental Protection Agency
EPU	Environmental Project Unit
ETH	Eastern Transvaal Highveld

GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
GEM	Group for Environmental Monitoring
GNP	gross national product
HSRC	Human Sciences Research Council
IDC	Industrial Development Corporation
IDRC	International Development Research Centre
IEM	integrated environmental management
IMF	International Monetary Fund
IUCN	International Union for the Conservation of Nature and Natural Resources
KEN	kwaDapha, eMalangeni, and Nkovukeni
LAPC	Land and Agriculture Policy Centre
MK	uMkhonto weSizwe
MOSS	metropolitan open space
MRA	Merewent Ratepayers' Association
NEDLAC	National, Economic, Development and Labour Council
NGO	nongovernmental organization
NPT	Nuclear Non-Proliferation Treaty
OECD	Organisation for Economic Co-operation and Development
PTA	Preferential Trade Area
PWV	Pretoria–Witwatersrand–Vereenignig
RDP	Reconstruction and Development Programme
RWQO	receiving water quality objectives
SACP	South African Communist Party
SACU	South African Customs Union
SADC	Southern Africa Development Community
SADF	South African Defence Force

SAFCOL South Africa Forestry Company
SANCO South African National Civic Organisation
SANDF South African National Defence Force
SASOL South African Coal, Oil and Gas Corporation

TBVC Transkei, Bophuthatswana, Venda, and Ciskei

UNCED United Nations Conference on Environment and Development

UNEP United Nations Environment Programme
UNIDO United Nations Industrial Development Organization
WTO World Trade Organization

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