

SUSTAINABLE CITIES 2008



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Foreword

This is the second Sustainable Cities Annual published by the South African Cities Network. It is a collection of positive stories and constructive opinions on how cities in South Africa are responding to the big question of how we can live urban lives that do less damage to the planet.

As a partner in the SA-Denmark Urban Environment Management (UEM) Programme, and with the support of the Danish Government, the SACN is responsible for recording, assembling and disseminating emerging learning, analysis and experience in the field of sustainable urban development in South Africa.

During 2008, the SACN hosted a Renewable Energy Summit that was attended by over 250 people – making it the largest learning event the SACN has ever hosted. This is a clear indicator of the level of interest in sustainable solutions to the energy supply crisis. Energy became the key challenge facing cities in South Africa this year, but there are signs that all of our natural resources are under strain. During 2008/09 the SACN will further explore the biodiversity, waste management and green building themes.

We continue to build constructive relationships with the UEM Programme partners; and organisations such as Alliance to Save Energy, Green Buildings Council, Renewable Energy and Energy Efficiency Programme, Sustainable Energy Africa, SA National Biodiversity Institute, and SA National Energy Research Institute. Our grateful thanks go to all of these partners for their valuable contributions to our programme.

The SACN secretariat would also like to thank those officials in the SACN member cities who contributed information and photographs for this publication; and the writers and analysts who contributed articles: Siva Chetty; Ralph Hamann, Fleur Boulogne, Ibini-bini Mara and Shane Chandaka; Dorah Lebelo and Annie Sugrue; Simon Ratcliffe; Kim Walsh and Sarah Ward.



Sithole Mbanga
CEO, SA Cities Network

UEMP Foreword

Denmark is proud to be in partnership with the South African government on the Urban Environmental Management Programme (UEMP). Denmark's commitment to development in South Africa stretches back to 1995, during which time the Danish government has spent over one billion South African Rand (ZAR) on a diverse range of initiatives. The UEMP is a targeted intervention that has among its objectives the goal of improving the livelihoods of some two million poor households in five metros (eThekweni, Ekurhuleni, Cape Town, Johannesburg and Sedibeng). The programme prioritises poverty alleviation through people-centred development with appropriate environmental management.

The ever increasing rate of urbanisation is the greatest challenge facing modern cities – especially in the developing world context. An excerpt from the Department of Environmental Affairs and Tourism's *10-year Review* confirms the truth of this assertion for South African cities:

'Urbanisation and industrialisation in South Africa have impacted negatively on the quality of life of the urban poor and those living in dense settlements; inadequate water and sanitation systems, lack of access to electricity and other essential services have compounded environmental problems. The poor and disenfranchised have historically borne the burden of environmental pollution and degradation.'

The four-year (2007 to 2010), ZAR350 million UEM Programme is fully aligned with South African Government priorities and is linked directly to existing budgets and plans within National and Provincial Government, and the Metros themselves. Programme interventions are framed according to the following themes:

- the integration of environmental planning into broader planning processes, including metro's Integrated Development Plans, amongst others,
- implementation of the National Waste Management Bill
- implementation of the Air Quality Management Act
- support for the implementation of Sustainable Energy interventions at a local level.

Many of these themes are relevant within current global perspectives, and the issue of climate change affects all cities and contexts whether in developed or developing countries.

Denmark will be hosting the 2009 United Nations Conference on Climate Change (COP 15) and will be looking to address, at local level, many of the climate-change issues that are intrinsic to global concerns. These issues may be directly linked to potential impacts of climate change (internationally or nationally), to improving people's livelihoods and opportunities, or to developing people's resilience and ability to cope with the impending impacts of climate change. Many of these concerns form part of the context within which the UEMP is being implemented.

The methodology at the heart of the UEMP is crucial not only for the successful implementation of relevant policies, but also because it will contribute to the South African government's priority of achieving the Millennium Development Goals.

International donors are increasingly channelling aid according to a sector-wide, programme-based approach in line with the Paris Declaration on aid efficiency. The initiatives and involvement that constitute the UEM Programme should serve as a model for others to ensure National, Provincial and Local Authorities invest in and own various projects, and that they engage actively in service delivery, stimulate local and micro economies and participate actively in local institutions and initiatives - increasingly those of global concern relating to sustainable development and climate change.

Dan E Frederiksen, Ambassador, Royal Danish Embassy

DEAT programme

Foreword

Over the first two-and-a-half years of implementation of its five-year programme, the UEMP has initiated 257 sustainable and poverty-oriented, urban environmental management projects. A number of these projects have, in fact, been completed by the ten program partners. The UEMP projects contribute to the integration of environmental planning into broader processes. The projects focus on Environmental Health – including clarification of functions and improved local inspection and enforcement, Implementation of the Waste Management Bill, Implementation of the Air Quality Management Act and Sustainable Energy Interventions in some cities. The programme aims to improve dialogue and collaborative effort where synergies and co-operation can be achieved between the various levels of government.

Complementary to the UEMP, a 'mini program' has been created which gives the UEMP metro partners access to funding for 22 Climate Change and Energy Efficiency implementation and demonstration projects on the ground. The metro partners include Johannesburg, eThekweni, Cape Town and Ekurhuleni. Each metro partner has been given a grant of R15 million to implement projects which will assist in the reduction of green house gas emissions over the long term and which will focus on roll outs or improvements of existing planned energy efficiency and climate change related projects. This 'mini program' will be implemented from June 2009 to June 2011.

Support for the production of this publication is funded by the Royal Danish Embassy, a co-operation between the governments of South Africa and Denmark.

These interventions build on the goal of the UEMP to implement South Africa's development policies and to promote a sustainable development path which contributes to poverty reduction, economic growth and the achievements of the Millennium Development Goals.



***Joanne Yawitch, Deputy Director General:
Environmental Quality and Protection.***

***Chair of UEMP steering committee,
Department of Environmental Affairs and Tourism***

Sustainable Cities 2008

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Introduction

The year 2007/08 has been a significant one for South African cities as a national energy crisis resulted in severe power shortages that impacted business, industry and households, highlighting the imperative of alternative energy options and energy-saving strategies.

After a decade of democratic local governance, infrastructure development and service delivery remain the primary responsibility of cities. In the context of ongoing urbanisation and under increasing pressure to address apartheid-era backlogs, cities must redesign institutional models to increase delivery rates and ensure long-term sustainability.

Cities must also take on the role of stewardship of the natural environment that we look to for the extensive resources we require for development. The biodiversity that is the essence of our natural ecosystems must be preserved and protected.

Energy and cities

South Africa's recent energy crisis presents opportunities for local government to take a proactive stand on their city's involvement in energy management and promote the development of renewable energy sources and new technologies.

The Renewable Energy City Summit, convened by the South African Cities Network (SACN) in May 2008, emphasised the importance of prioritising the renewable energy agenda in South Africa, noting that local municipalities and cities can play a key role in ensuring the uptake of renewable energy technologies.

Discussion at the summit made it clear that much work is already being done with regard to renewable energy from sources such as solar energy, bio-energy, landfill gas, hydro energy and wave energy.



The summit raised the need for clarity in institutional frameworks around renewable energy and the fact that South Africa should revise its renewable energy targets. In addition, funding must be made more accessible and a feed-in tariff to support renewable energy should be put in place.

In the global picture, analysts are speculating that we have reached peak oil – the crest of the global oil-supply bell curve – and that oil supplies will decline steadily from this point. Our cities are characterised by urban sprawl, a structure that requires a high degree of mobility based on oil-intensive transport modes. Cities need to begin planning and restructuring now to avoid severe problems in the future as fuel supplies dwindle.

Building Sustainable Cities

Successful delivery of services such as water and waste management are central to poverty relief and equitable urban development. However, this vision must be realised through the lens of environmentally and socially sustainable practices. For many years national government has worked to finalise legislation that outlines best-practice models in governance. Provincial and local government plans detail the implementation of these agendas.

Experience at municipal level has shown that a critical factor in ensuring the sustainability of development initiatives is involving community structures and residents in all stages of the initiative. The wisdom of residents and communities in municipal areas on development issues can be a key factor in the success or failure of delivery. Processes that facilitate this involvement must be used when seeking to change the development trajectory of an area. A DBSA development project in the Grabouw area in the Western Cape explores the processes involved in achieving genuine community buy-in.

Empowerment and awareness raising projects involving national, provincial and local government; non-governmental and civil society organisations; and international governments and organisations have also been shown to be key to capacity building, and delivery in all sectors of local government. Urban Programme partnerships between Nelson Mandela Bay municipalities and two Swedish towns have been highly successful in aligning the local authorities' waste management practices with national goals.

Ongoing migration from rural areas to already overcrowded urban areas means that informal settlements are growing. Cities need to escalate delivery of basic infrastructure and services to ensure that urban fringes and inner city areas do not turn into slums. Recognising that informal settlements will be an urban reality for many years to come, eThekweni municipality has launched an initiative to involve residents of these settlements in ensuring that they remain acceptable, if not ideal, living environments until residents can be formally housed.



Conserving our Biodiversity



In the last decade issues relating to climate change and global warming and the nature of the threat posed by ongoing environmental degradation have become central concerns at all levels of government. As biodiversity comes under increasing pressure from human settlement and expansion, people are jeopardising the ecosystems that provide for their continued survival at the most basic level.

South Africa has some of the most unique marine, aquatic and terrestrial ecosystems on earth. These ecosystems have intrinsic natural value and they provide food, livelihood and recreation. Local governments

are putting in place institutional frameworks and creating local, national and international partnerships to preserve these ecosystems.

South Africa's marine and coastal resources are rich and diverse. However, increasing human and environmental pressure has changed the functioning and structure of these ecosystems, and uncontrolled or mismanaged use has led to over-exploitation, degradation, and resource loss.

The will and capacity of cities to manage their coastal and marine resources in ways that promote human well being, for present populations and for future generations, are important issues.

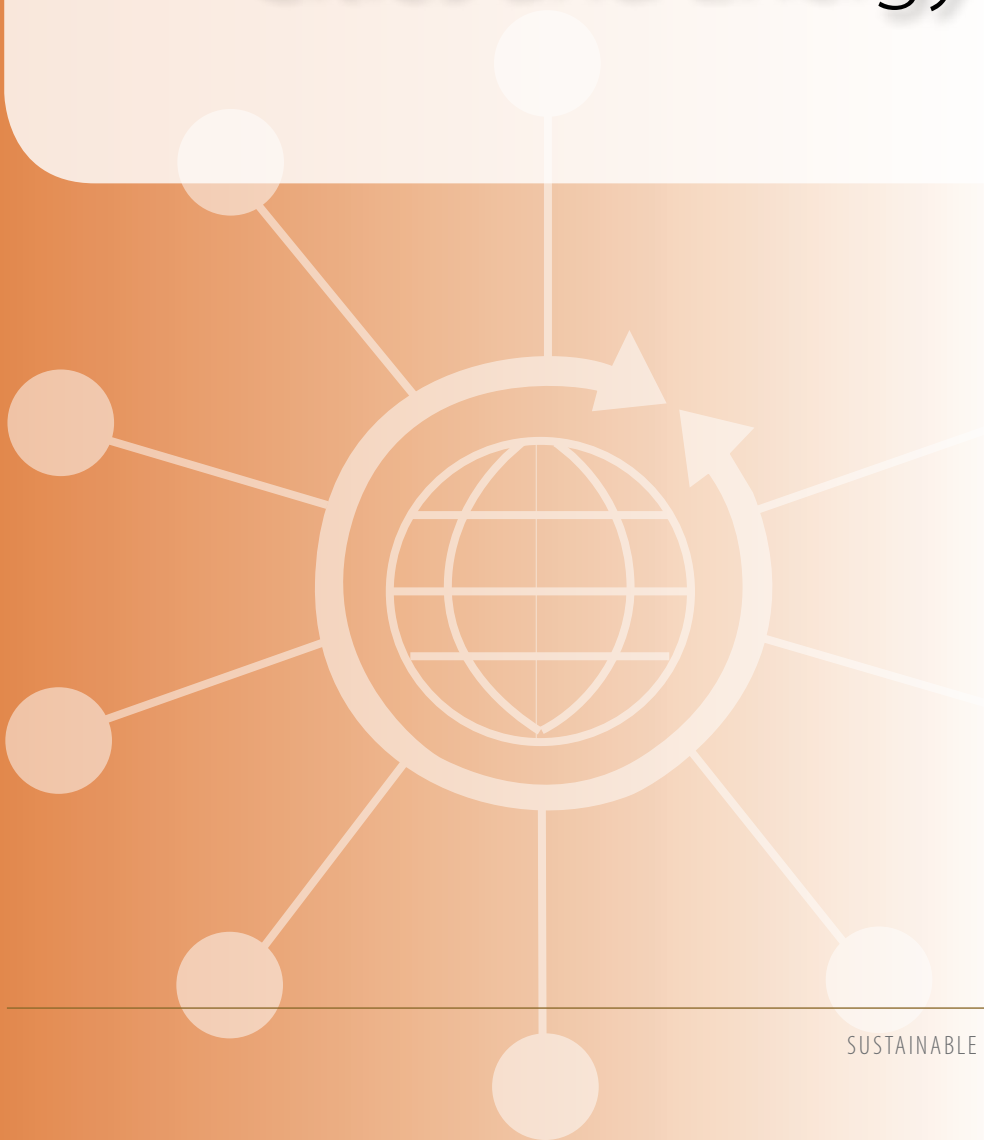
Sustainable cities

South African city governments are seeking to build energy efficient, environmentally sound, and adequately serviced urban habitats. In this book we look at the progress made and lessons learnt in the areas of energy, service delivery and environmental protection as we seek to establish sustainable cities, and we look at ways of taking development forward.



Section 1

Cities and Energy





The Silver Lining in South Africa's Power Crisis

by Sarah Ward¹

South Africa is in the grip of a severe energy crisis, complete with rolling blackouts, industries stopping operations, much blaming and frustration – and plenty of opportunities.²

¹ Sarah Ward is an urban planner specialising in the field of sustainable energy.

² This article first appeared in Business Day on 26 March 2008. The article is reproduced with permission from Business Day newspaper.

The crisis now squeezing Africa's most industrialised (and electrified) nation has been brewing for some time. Eskom is one of the largest single electricity utilities in the world – it produces 96% of South Africa's electricity and 85% of sub-Saharan Africa's electricity; its electricity is the cheapest and among the dirtiest in the world. South Africa has been ranked as the least efficient user of electricity out of 13 comparable upper middle-income countries (Brazil is more than twice as efficient, Hungary three times and Mexico four times).

Now there is not enough power – somehow Eskom and the government did not respond to demand projections. Billions of rands are being hastily allocated to Eskom to build new coal-fired and nuclear plants 'quickly'. There is very little mention of – and no serious funding for – renewable power plants or energy efficiency programs.

Fundamental to the problem in South Africa is the centralisation of power (in all senses of the word). Eskom is the proverbial tail that wags the dog. We are a country force fed, and by now heavily addicted to, big power from one utility and one source of energy (electricity from coal power). This was a system built up to serve a heavy industry, mining, nuke-friendly apartheid state and, despite some efforts to change this by our new democratic government, it has in effect been allowed to continue. When we should have been investing in efficiency and renewable energies, Eskom and the government were pursuing a pebble bed pipedream (small nuclear reactors which we would sell to China – China has now built its own pebble beds). Promising renewable energy generation sources like wind, wave and concentrating solar power plants are relegated to endless studies and even bogus pilot projects. Skilled staff have been laid off and maintenance schedules ignored. As with Jack's giant or David's Goliath, the colossus is falling. We stand at a moment in history which

will determine South Africa's energy future: do we shore up the giant, or do we make a break for it – and change South Africa's energy picture forever, and for the better?

There is nothing like a crisis for opening doors for much needed change. Suddenly energy has become everyone's issue – and it is this 'democratisation' of energy that can spur the change. But how? Cities have the potential to be key movers and shakers here. Energy is the lifeblood of cities and they stand out as highly energy-intensive nodes. South Africa's largest 10 cities use almost half of the country's energy, they account for three quarters of the GDP and are home to 50% of the population. Cities have different regional functions, needs, climates and resources: it is time for cities



to step out of the 'one-size-fits-all' national shoe and take charge of their own energy security, carbon emissions and equity of access, and actively engage in developing an energy picture to suit their needs.

Imagine a city where:

- substantial energy supplies are provided by locally available sources (ocean, wind, sun, waste...) by several utilities
- energy efficiency is heavily incentivised (it is much cheaper to save electricity than to make it) and the 'polluter pays' principle is applied
- safe and affordable energy sources are available to the poor and industry is encouraged to produce and purchase clean power
- local government buildings are retrofitted for energy saving and staff are incentivised to reduce their energy consumption

- waste is turned into useful energy
- all residential areas glitter with solar water heaters.

Sustainable Energy Africa (SEA) has worked in partnership with cities to develop progressive sustainable city energy capacity and strategies. A number of cities have excellent approved strategies with impressive targets – the real struggle now is with implementation. Cities are stuck in a quagmire of risk aversion, legislative and policy constraints and a history of being removed from their own energy production and supply. What is needed to help cities take charge?

Firstly, from within local government, we need political champions to take a proactive stand on their city's involvement in energy management. This must be supported by appropriate institutional changes and, as energy affects every aspect of local government, it is essential that energy capacity is built across all departments.

Secondly, many cities around the world that are successfully implementing sustainable energy strategies have established energy agencies based on public-private partnerships to drive and co-ordinate sustainable energy project implementation. These agencies co-ordinate stakeholders around an Action Plan, raise and manage project funds and carbon trading, support the development of local energy business, support the development of much needed skills training programmes, carry out monitoring and evaluation, and provide input to strategy revisions. Most importantly, they have the capacity to bring key players together and to make things happen.

Thirdly, national government needs to support decentralisation and provide clarity around the energy mandate of cities; it must also support diversification particularly by creating a conducive environment for renewable energy technologies (through appropriate subsidies, feed-in tariffs, policy and regulatory support).





The key projects that southern African cities should be implementing are:

- Information and education of residents and business (experience shows that energy efficiency gains are derived 20% from technology changes and 80% from the education of users).
- Mass solar water heater roll-out projects (would save 20–30% of household energy use which translates into a 5% saving of South Africa's electricity use), – this must be supported by training programs for solar water manufacture and installation.
- Energy efficiency projects in commercial buildings, housing and in industry.
- Power purchase agreements for renewable electricity generation supported by active engagement with national governments around tariff subsidies to support renewable power.
- Waste to energy projects.
- Energy efficiency in municipal operations – cities must lead by example.

The benefits of greater energy security, reduced carbon emissions (and the associated economic competitive advantage), and local job creation that these will bring don't need to be spelt out. The challenge now is for cities to see the opportunities in this crisis and step forward to take their place at the power table.³

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Renewable Energy City Summit

by Kim Walsh⁴

Introduction

Limited medium-term electricity supplies, steep increases in the cost of electricity, and the new tax on energy generated through non-renewable sources make it imperative that local government implement innovative and sustainable renewable energy strategies. Local government must not miss the opportunity that is presented by local renewable energy purchase agreements, generation partnerships, and initiatives to diversify household energy supply and demand. These types of initiatives will allow municipalities to mitigate the impact of limited electricity supply on local economies and ensure sustainable growth and development.

⁴ Kim Walsh has a Masters degree in economics and a first degree in engineering. She is a consultant with PDG specialising in municipal finance, environmental economics and sustainable development.



In 2003 a City Energy Strategies Conference set a clear vision and targets for sustainable energy strategies. Five years on, the South African Cities Network (SACN) hosted a Renewable Energy City Summit to consider the renewable energy strategies and solutions in more detail. This Summit was convened in association with the Renewable Energy and Energy Efficiency Partnership (REEEP), SA National Energy Research Institute (SANERI), SEA, the Alliance to Save Energy; and with the support of the Danish Government, USAID and ABSA.

This is the largest event under the SACN's sustainable cities learning programme for 2007/08; and it is a contribution to the knowledge-sharing component of the SA-Denmark Urban Environmental Management Programme (UEMP).

This report provides a brief overview of the summit proceedings, and then looks at key themes emerging from the deliberations at the summit. The intention was not to commit cities to targets or outcomes, but rather to share experience and provide information on options for the promotion of renewable energy.

Renewable energy technologies

This section provides a brief summary of key points raised regarding renewable energy technologies available in South Africa, using case studies outlining where such technologies have been applied. Note that these are not necessarily the only technologies available in South Africa.

Solar energy

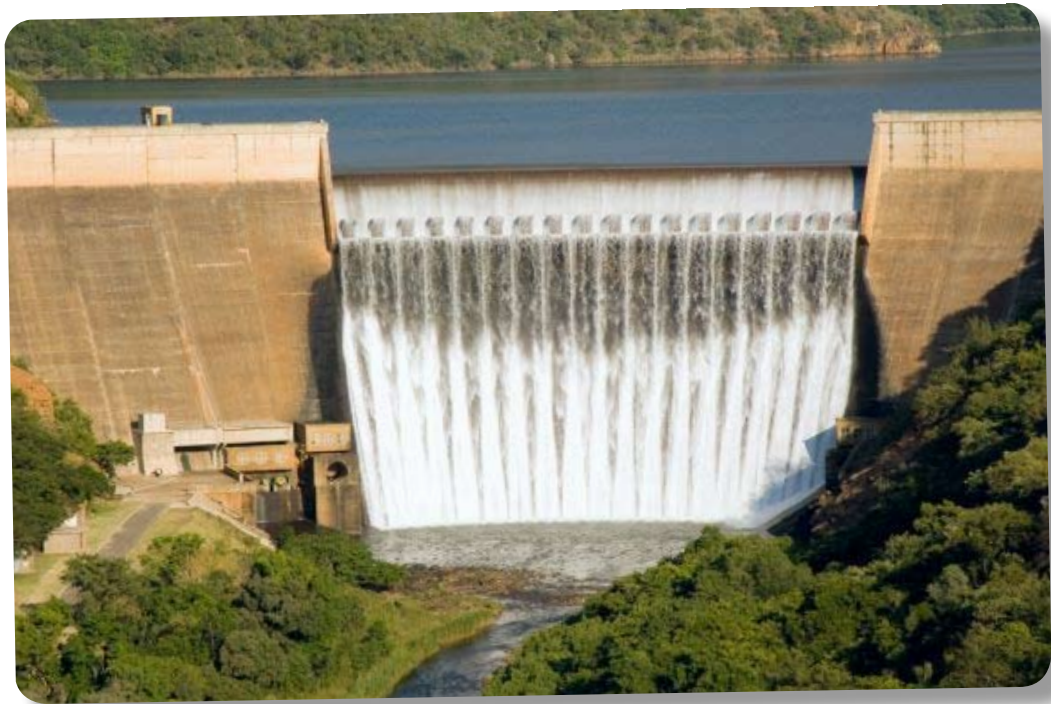
South Africa has excellent sunshine, and there are several technologies available for harnessing the energy of the sun. Almost all solar technologies have the advantage of allowing diversified generation of energy. They have great potential for poverty alleviation.

The solar technology discussed in most detail was Solar Water Heaters (SWHs). SWHs use energy from the sun to heat water in a geyser. SWHs are finding increasing application in South Africa, and many cities and other municipalities are looking at ways to promote their use. Municipalities are taking various different approaches to this. Examples are attempts by the City of Cape Town to introduce a by-law requiring people to install Solar Water Heaters, and the plans by the three Gauteng metropolitan municipalities to facilitate the emergence of an agent to implement mass roll-out of the heaters in that province.

Wind energy

The energy of the wind can be harnessed using wind machines that work in a similar manner to old-fashioned windmills. Initial resource studies indicate that there is significant potential for generating wind energy in South Africa, although this is geographically varied. Wind energy generators can be combined with other technologies, which can help to overcome the perceived problem of its intermittency.

Current wind projects in the country include the Darling National Wind Farm Demonstration project and an Eskom wind test site at Klipheuwel. Nelson Mandela Bay municipality is also investigating the development of a wind farm near Port Elizabeth. In addition, the South African Wind Energy Programme (SAWEP) is undertaking a number of projects to facilitate the increased uptake of wind energy.



Bio-energy

Bio-energy uses biological sources to generate energy. These biological sources are varied. Most people are aware of the biofuels industry, which converts plant materials such as maize, canola or soybeans into fuel. Less well known is biogas, generated from organic waste matter such as animal manures, agricultural residues or human waste.

There are several biofuel projects in South Africa at present. Those discussed at the summit included a biofuels programme in the Eastern Cape, and a maize-to-ethanol-gel project in the North West province. These projects can have strong poverty alleviation benefits, and uplift rural areas, but concerns were raised at the summit about the conversion of food products into fuel. It was noted that food and fuel needs should be carefully balanced.

Biogas is less controversial. It has been piloted on a small scale in several municipalities. Biogas is efficient and flexible, and its use can be incorporated into integrated waste management plans.

Landfill gas

Landfill gas is a form of biogas, but it is generally treated separately due to its scale and location. While biogas projects can be introduced on a small scale and can be distributed widely – landfill gas projects are typically large scale and can only be located at landfill sites. Several municipalities in South Africa either have landfill gas projects in place, or are considering introducing them. These include eThekweni, Ekurhuleni and Nelson Mandela Bay. Several of these projects have been certified under the Clean Development Mechanism, and are thus being financed in part using carbon credits.

Hydro energy

Hydro energy can be large scale, such as the Cahora Bassa scheme in Mozambique, or far smaller scale. There is significant potential in South Africa for mini- and micro-hydro projects with capacities of less than 10 MW. An example of such a project is the Bethlehem Hydro project, at Merino in Sol Plaatjie municipality. This project has faced numerous delays, but commissioning is anticipated to take place in August or September 2008.

Wave energy

There are several ways to make use of the energy of the ocean, including wave energy, salinity gradients, bioconversion, thermal gradients, tidal barrages or tidal streams, and ocean currents. Studies in South Africa indicate that wave energy is the most promising of these. Wave energy is not being used at present, although a technology was developed in the 1970s to harness its power off the south west coast of the country. The project was rejected when the oil-price crisis of the 1970s ended, but it demonstrated the potential for wave power.

Themes emerging from the summit

Several broad themes and points of consensus emerged from plenary presentations and breakaway discussions. These are outlined below.

The importance of renewable energy

There was very clear agreement at the summit about the importance of increased use of renewable energy in order to ensure a sustainable future in South Africa.

We currently face challenges around growing electricity demand. Demand is likely to increase even further as we continue to address the needs of the many people in South Africa who still experience energy poverty. The conventional fossil fuel-based resources on which we currently rely are finite, and their use has direct and indirect impacts on the environment and on the health and welfare of our citizens. These impacts include climate change and its global warming implications which are felt disproportionately by the poor. Increased reliance on renewable energy sources will allow us to meet rising electricity demand without these negative impacts.

A further challenge that we currently face is that of rapidly increasing fossil fuel prices. Renewable energy does not face the same commodity price fluctuations as fossil fuels. Increased reliance on renewable

energy will thus allow us to ensure increased security of energy supply at lower risk. The availability of renewable energy in South Africa was demonstrated in several presentations at the summit. It is clear that renewable energy resources are abundant in South Africa.

The issue of the costs of these resources was also raised. Renewable energy technologies have high initial capital costs, and so the price that must be charged for renewable energy is higher than that charged for fossil fuel-based energy at present. However, renewable energy prices are expected to decline significantly over time, as efficient models are developed, while fossil fuel prices will increase. At some point in the future, renewable energy will become less expensive than fossil fuel-based energy.

The summit was strong in its recognition of the importance of renewable energy in ensuring a sustainable future in South Africa, and in recognising that we must act now to invest in that future.

The summit also acknowledged that promoting renewable energy alone will not be sufficient to solve the challenges currently

facing the energy sector in South Africa. Energy efficiency projects and Demand Side Management are also critically important. However, this summit was intended to focus on renewable energy, and so this is given most importance in the discussions recorded here.

The role of cities in promoting renewable energy



There was an acknowledgement at the summit that cities have several roles with regard to energy. While there was consensus around some of those roles, and the ways in which they can be used to promote renewable energy, there was debate about others.

There was broad agreement that cities play a role as regulators, purchasers, planners and distributors of energy. All of these roles provide scope for promoting renewable energy. As purchasers, for example, cities procure services for themselves and for their residents. They can choose to procure renewable

energy services rather than energy services based on fossil fuels. As regulators, cities can introduce by-laws requiring new houses to have SWHs installed.

There was also a strong feeling among delegates that cities have a role to play as facilitators, sending out signals, creating confidence and leading technology change. As such, cities can play a significant leadership role in promoting renewable energy. While some saw the lack of clarity in the regulato-

ry environment around renewable energy as a challenge, others saw it as an opportunity for cities to shape this environment.

Debate centred largely around whether cities should take on the role of generators of electricity. While some cities, notably Nelson Mandela Bay, are investigating the possibility of generating renewable energy themselves, it was noted that electricity generation is not a constitutional function of local municipalities. It was suggested that cities should leave generation up to those who have been allocated the function, and focus on other ways of promoting renewable energy that are more clearly their responsibility.

The need for revisions to the renewable energy target

The White Paper for Renewable Energy, published in 2003, set a target of 10 000 GWh of renewable electricity to be generated per annum by 2013. The mid-term review of this target is this year. The delegates at the summit expressed the view that this target should be revised, making it significantly more ambitious. A more ambitious target would provide more motivation for promoting renewable energy, and the resources are available to achieve such a target. There was also a suggestion that the target be disaggregated, so that targets for generation by particular technologies are established.

The need for a clearer institutional framework

The institutional framework around renewable energy is still not clear. The roles of the national Department of Energy and Minerals, National Energy Regulator of South Africa (NERSA) and Eskom require clarification. There was a sense from delegates

that these institutions are not showing sufficient urgency in driving a renewable energy future. Cities saw themselves as well placed to provide this urgency. However, there is still confusion about precisely what cities can and cannot do, and how they should interact with the national and parastatal bodies mentioned above, and with provinces, to ensure that a renewable energy agenda is a priority.

The delegates at the summit called for clarity around the mandates of the various spheres of government with regard to renewable energy, and also called on national government and other stakeholders to work with local government and support their efforts to introduce renewable energy programmes.

The need for a clearer regulatory and legislative framework

Related to the need for a clearer institutional framework is the need for more clarity in the regulatory and policy frameworks around renewable energy. Although the White Paper on Renewable Energy acknowledges the importance of renewable energy, and the need for support, it does not make clear what that support should be, or who should provide it – and how. Delegates suggested that a renewable energy support framework is required.

There are some areas where municipalities felt that the current regulatory and legislative framework in fact inhibits the promotion of renewable energy. An example is the fact that municipalities may not spread the higher cost of renewable energy across their customer base.

The perceived barriers presented by legislation such as the Municipal Financial Management and Municipal Structures Acts were mentioned several times dur-

ing discussions at the summit. However, the fact that municipalities such as Nelson Mandela Bay and others have made such good progress with renewable energy projects indicates that the extent of these barriers might be perceived rather than real. The suggestion was that municipalities should find ways to work within or around the frameworks provided by this legislation. In addition, there was an offer from National Treasury to assist municipalities to iron out any legislative constraints posed by the Municipal Financial Management Act.

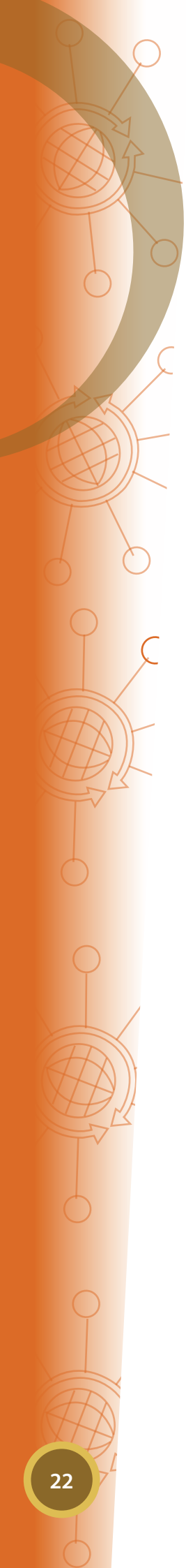
Difficulties in accessing funding for renewable energy

There was a sense at the summit that there is a lot of funding available for renewable energy. Funding has been allocated by national government for the promotion of renewable energy and other associated initiatives. In addition, funding is available through the Clean Development Mechanism, from international donors and from local financial institutions and parastatal bodies, such as the DBSA⁵. However, many delegates expressed the view that there are blockages in accessing this funding. This is reflected in the fact that Renewable Energy Financing and Subsidy Office (REFSO) funding set aside by National Treasury has been under-spent by almost 50% in the past few years.

Delegates expressed the view that processes to access funds should be streamlined and that there should be greater clarity about precisely what is required in order to access funds. It was suggested that funding from the fiscus should be provided directly to municipalities, without the need for application or going via other institutions.

It was also noted that much of the funding

⁵ See the Grabouw case study for details on the DBSA Sustainable Communities Programme.



available is capital in nature. While capital funding is important, it does not ensure long-term sustainability of renewable energy projects. On-going financial support, such as that provided by a Feed In Tariff (FIT), is also required.

The need for a Feed In Tariff

Delegates at the summit expressed very strong support for a FIT to support renewable energy, and called for such a tariff to be introduced as soon as possible.

FITs have been widely tested internationally and have proved to be the most effective way of supporting renewable energy. They support the creation of a local renewable energy industry, which creates jobs and thus promotes poverty alleviation. They are investor friendly, and provide security of revenue for developers. In addition, FITs are easily implemented, transparent, have low transaction costs and no cost to government.

It is understood that work on developing a FIT for South Africa has been undertaken by NERSA, and delegates called for this work to be speeded up and the FIT to be introduced without delay.

Conclusion

The Renewable Energy City Summit highlighted the importance of renewable energy in ensuring a sustainable energy future in South Africa. The summit noted that local municipalities and cities can play a key role in ensuring the uptake of renewable energy technologies. The presentations and discussions made it clear that a lot of work is already being done by various role-players around the country with regard to renewable energy. From the city perspective, many cities are working on renewable energy projects.

Initiatives such as this summit provide a forum for role-players to share experiences and learning. It is vital that this spirit of communication and coordination continue.

Douglas Banks

It is with a sense of great loss to all in the renewable energy field that we inform you that Dr Douglas Banks, Managing Director of Restio Energy and keynote speaker at the Renewable Energy Summit, passed away on Friday 4th July 2008 after a brief, but spirited fight with liver cancer. Doug's sudden absence from the renewable energy world in which he worked with huge zeal and passion is felt by many who were his colleagues and associates. He will be sorely missed by all who knew him.

Looking Back to Leap Ahead

Current approaches in renewable energy that focus planning around generating electricity for consumption might be directing attention away from the search for alternative energy sources that could be more readily available, argues an Engineering Research Group at the University of Cape Town.⁶

The assumption, for example, that Cape Town's renewable energy target will be met by increasing the capacity for electricity generation of installed wind turbines 'excludes alternative means of meeting energy needs, such as renewable liquid fuels and inhibits creative energy planning processes at the earliest stage', says the group.

As an exercise in illustrating this point, they carried out a material flow analysis of wood fibre-based materials – as potential energy sources – in all aspects of the Cape Town city's waste chain.

Research revealed four different sectors that use wood or wood materials: construction; fuel wood; pulp, paper and cardboard; wastewater treatment; and the woody waste from parks and gardens.

At this point wood-based materials from all these sectors goes either to landfill, is used in fires – with very low energy efficiency – or is composted or used in construction materials.

These existing streams could be converted to energy at an energy efficiency rate of 25% using standard existing technology.

In summing up their research, the group concluded that 'up to 70% of an inclusively defined renewable energy target for the City of Cape Town (10% of energy demand to be covered by renewable energies by 2020) could theoretically be met by redirecting wood fibre-based material flows ... within the Cape Metropolitan Area and by utilising innovative [energy] transformation technology.'

⁶ Adapted from the article by Nissing, C and von Blottnitz, H (2007) 'A material flow analysis of wood and paper in Cape Town: is there potential to redirect flows in formal and informal sectors to foster use as a renewable resource?' *Int. J. Environment and Sustainable Development*, Vol. 6, No. 2, pp.147–156.



ABOUT THE AUTHOR

Sarah Ward is an urban planner specialising in the field of sustainable energy. She is a founder and former director of Sustainable Energy Africa. She developed and co-ordinated the influential Sustainable Energy for Environment and Development (SEED) Programme and has been a leader in establishing sustainable urban energy planning with cities and towns in South Africa.

ABOUT THE PUBLISHER

Sustainable Energy Africa promotes sustainable energy approaches and practices in the development of South Africa and Africa. They do this through research, capacity building, information dissemination, project implementation, lobbying and networking. SEA supports local government in developing sustainable energy plans for cities and manages the SEED Programme (Sustainable Energy for Environment and Development). SEED is a national capacity building and partnership programme working with cities and towns across South Africa.

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ABOUT THE BOOK

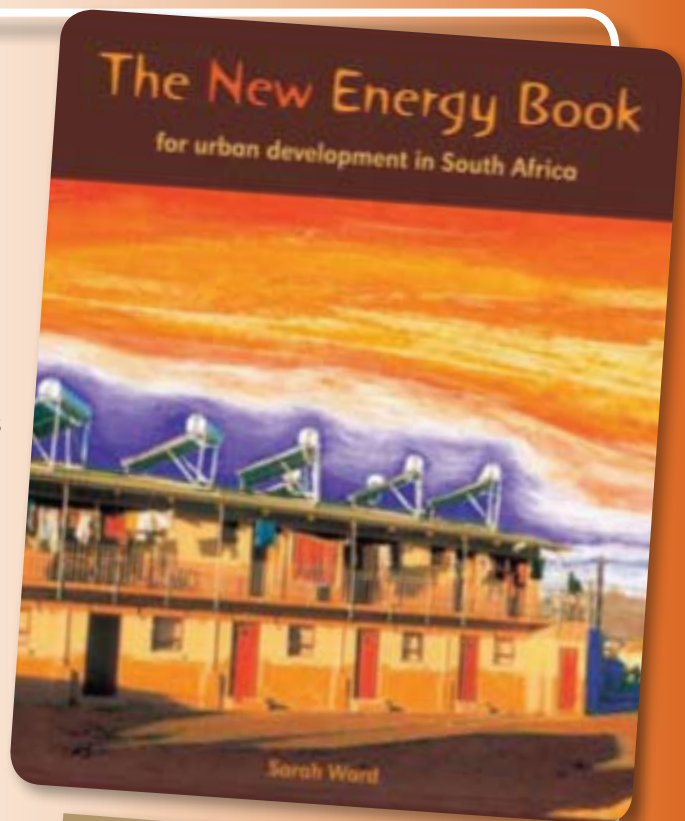
The New Energy Book is a resource for people seeking a more sustainable future and provides a practical guide to sustainable energy approaches and practices. It aims to make the whole energy picture accessible to citizens, professionals, policy makers, development workers, teachers and students. This second edition includes extensive new and updated information as well as new chapters on energy planning for cities and on sustainable transport. It takes the reader from the big energy picture through energy planning and projects for cities, to energy choices for the home and energy efficient housing. In this book you can find:

- The global energy story
- The South African energy story
- Sustainable transport
- Energy and local area development
- Access to energy
- Energy in the home
- Making energy efficient housing
- Working with people and energy
- Energy planning for cities and towns

The book also provides useful contacts, readings and websites.

"The struggle for human development and democracy will be won or lost in our cities. Energy must be at the centre of any sustainable city development strategy. This is the energy handbook we have all been waiting for. It is essential reading for those who are students of, or are working with transport, city planning, urban housing, or community development in South Africa."

SOUTH AFRICAN CITIES NETWORK



REVIEW OF THE FIRST EDITION

The Energy Book is an impressive bouquet of well-written text, interesting case studies, startling statistics, clever illustrations and practical applications. The simple approach of the book not only makes it extremely readable but also accessible to anyone interested in sustainable energy. Fact is, everyone of us MUST be interested in sustainable energy - ignorance is no longer bliss! The Energy Book incorporates the bigger energy picture with great success into a South African context. It makes sense of day to day energy needs, the energy options that are available to end users, planning with energy principles as framework, and addresses many other vital issues. The layout is excellent and the reader's mind is ever entertained with the array of facts, shared wisdom, graphs and illustrations. The Energy Book is highly recommended.

JW du Toit, CSIR

BOOK DETAILS

The New Energy Book for urban development in South Africa
Author: Sarah Ward
Publisher: Sustainable Energy Africa
ISBN: 978-0-620-40184-5
Edition: 2nd
Covers: Softback
Size: 250mm x 210mm
Extent: 138 pages
Illustrations: 240 drawings, photographs, maps and graphs.
Price: R 140.00 including VAT



Rethinking our Cities

by **Simon Ratcliffe**⁷

*Our city models have evolved around high levels of mobility predicated on assumptions that oil-based fuel is cheap and sources are infinite. As fuel shortages kick in, transport modes will need to adapt and our cities will change shape accordingly. Cities need to begin planning for these realities immediately to ensure a smooth transition to an energy-constrained environment.*⁸

⁷ Simon Ratcliffe, is an energy and sustainability consultant and is the Chairperson of the Association for the Study of Peak Oil South Africa (ASPO South Africa).

⁸ This article first appeared in the Cape Argus on 8 November 2007.

Most South African cities increased in size dramatically over the course of the 20th century. In large part, our cities were structured through the lens of segregation and apartheid. 'Blacks' were excluded from urban amenities and lived to service the mines, factories and homes of 'whites' – they were confined to ghettos on the urban edge or beyond. The evolution of our cities is also intimately bound up with the prevalence of abundant cheap oil, which enabled individual mobility to, from and within urban areas.

As the motorcar evolved and was mass produced, individuals had increasing mobility, so the structure of our cities expanded horizontally into the form of the urban sprawl that we have today. Urban sprawl as an urban form is practically possible only with high levels of mobility, which enable people to work, school their children, and access medical care, recreational facilities and social services in different parts of the city.



In South Africa, we rely for our mobility on private and public transport – private cars as well as buses, trains and taxis, particularly in black residential areas. The underlying assumption that holds this structure together is that cheap fuel is infinite and is able to fuel our need for mobility. However, oil is finite, and is depleting with every journey.

We need to consider seriously how appropriate our city models and structures are in an oil-constrained – and hence mobility constrained – world. It is important that we understand that oil is a finite non-renewable resource, which depletes according to a bell-shaped curve. Independent researchers looking into oil discovery and production are warning that, globally, we are very close to, if not past, the midway peak of the bell curve. Beyond the peak, oil production steadily declines. This is happening at a time when global demand has never been greater.

The consequences are not difficult to predict. Not only will the price of oil continue to rise substantially and become more volatile, there will be less of it to go around. What this means is that our form of urban mobility will be affected, which will dramatically impact our ability to use cities in the ways in which we are accustomed. With constrained mobility we will need to look for ways of coping with the shortages of fuel we are likely to experience.

This can take many forms, from car pooling and sharing to new types of urban transportation. The fuel-shortage situation will become increasingly severe – putting relentless pressure on our current lifestyles and our urban systems, including the movement of goods and food. We will need to be constantly improving the energy efficiency of the systems that enable cities to function, such as refuse collection.

How appropriate are our cities and the way they are structured to cope with these pressures? At the moment, it is reasonably

easy for us to live, work, school our children, engage in recreational activity and access health and other social amenities. We get into our cars and drive to wherever we need to be or we use some form of mass transportation such as a bus, a taxi or a train. Just how well will we cope if our mobility becomes increasingly restricted?

Our suburbs and townships are going to need to become much more integrated and will need to work at a much smaller scale. Urban densities will need to increase – thus placing pressure on existing service infrastructure. We will need to be able to access all the services and amenities we need without making long journeys. New modes – or possibly quite ancient ones – of transport will dictate city structure just as the current structure has been made possible by cheap oil.

As we find ways to manage fuel shortages we may find ourselves doing much more walking and cycling, which means that work related opportunities are going to have to find their way into the suburbs. Additionally, more walking will bring with it a need for increased security. In fact, security concerns are likely to increase as high oil prices affect employment and affordability of staple foods.

Increasingly, we will be faced with the challenge of creating sustainable urban communities that require low levels of mobility and transportation. Our big metropolises will need to be divided up spatially in ways that make economic and social sense and which enable urban living, but on a much smaller scale. Smaller areas will need to be connected by fast, efficient and reliable public transport to facilitate the movement of goods and people between them. This will require a dramatic increase in investment in new appropriate public transport infrastructure.

All of this will require high levels of co-ordination and planning in time frames that are

decreasing exponentially all the time. The longer we have to plan our transition to a post oil-dependent society, the greater the likelihood that the transition process will be able to be smooth and well managed.

Food production and distribution also, are highly dependent on oil. We must reduce our dependence on highly mechanised food farming that uses fertilisers and pesticides, which are also fossil-fuel by-products. People will need to begin to think about ways of producing food within cities and distributing it locally. Urban agriculture will require that any unused land be used in creative ways to generate food.

But what size of population can be sustained on urban agriculture? Will people migrate back to rural areas, which themselves are under pressure to convert their production to more labour-intensive methods? It is worth looking at how other cities in the world are thinking about and dealing with these issues.

Portland in the American state of Oregon is perhaps the furthest advanced in its thinking, having just released the 'Descending the Oil Peak Report' prepared by its Peak Oil Task Team. The City of Portland has realised that even the most optimistic predictions of when the oil peak will occur, leave us very little time to adapt. Thus the municipality has committed resources to planning its transition strategy.

The task team formulated a two-faceted set of recommendations to reduce the city's exposure and strengthen community cohesion. The City of Portland proposes to cut oil and natural gas consumption in half over the next 25 years by transforming how energy is used in transportation, food supply, buildings and manufacturing.

The task team recognises that descending the oil-peak curve could bring with it high levels of social dislocation in the form of unemployment and other economic hard-



ships and recommends putting in place social and economic support systems. Portland is making contingency plans for fuel shortages that may last for months or years. Portland has recognised that perhaps the most profound change that is likely to emerge from the peaking of oil production is that economies will need to become much more local.

It is vital that South African cities begin to think about planning in this regard given that our cities have far greater income disparities than a city such as Portland, with existing higher levels of unemployment. Our globalised economic relationships will be put under pressure as increased oil prices affect air and road transport dramatically - seriously challenging current business models. This will mean changing both economic and spatial arrangements so that local economies flourish. Importing and exporting (and anything that requires

long distance transportation) will become much more expensive and will place huge strain on the economic relations that underlie these models.

Like Portland, we too will need to look at strategies to maintain business viability and employment in an energy-constrained environment. The kinds of changes necessary will bring opportunities that could have positive social and economic impacts as we begin to spend less on imported fuel and redirect our money into local economies.

Our city leaders need to begin to embrace this inevitability. It is no longer a matter of if, but rather a matter of when oil supplies run out. Strong leadership by our city officials is necessary and needs to come through action. The bottom line is that we need to plan for a significant reduction in oil use and the consequences that flow from this even if we have to compromise some of our current comforts in the process.



Section 2

Building Sustainable Communities

Participation and Partnerships in Waste Management deliver Best Practice

Introduction

South Africa will reduce waste generation by 25% and waste disposal by 50% by 2012 and we will have a Zero Waste plan by 2022, states the Polokwane declaration of 2000 – and government has a plan to achieve these targets. The National Environmental Management Waste Bill that will be signed into law in 2008, presents a detailed outline of waste-management best practices for national, provincial and local government and structured plans to put these into place.



Taking into account the constitutional rights of all South Africans, the bill aims to 'unite the people of South Africa in working towards a society where all people have sufficient food, clean air and water, decent homes and green spaces in their neighbourhoods, enabling them to live in spiritual, cultural and physical harmony with their natural surroundings'.⁹

To achieve this the bill emphasises the importance of detailed planning backed up by suitable information systems, waste minimisation and recycling, efficient waste collection and transportation and finally environmentally sound waste treatment and disposal and pollution prevention.

9 The National Waste Management Strategy, Department of Environmental Affairs and Tourism, South Africa, 1999.

This waste-management strategy represents a reform in thinking from previous waste management approaches as it seeks to ensure that waste management focuses on minimising the amount of waste that enters waste streams rather than concentrating purely on waste collection and disposal.

Provincial and local authorities around the country have spent many years developing Integrated Waste Management Plans (IWMP) that include appropriate financing mechanisms to ensure delivery of the ambitious national waste-management agenda. Partnerships, projects and initiatives that prioritise the active participation of business and industry, and local communities have been put in place.

Waste Recovery, Reuse and Recycling

The aim of resource recovery is to treat all discarded materials as potential – nothing is treated as waste. While materials recovery is a small industry at the moment, there is potential for considerable expansion. Entrepreneurs and civil organisations can partner with governments to find alternative technologies and creative solutions to convert nearly everything that is currently treated as waste into valuable products. Recycling, composting, resource recovery, and resale of reusable solid waste can be an effective way of minimising waste and contributing to the economic welfare of poor communities on urban fringes.

Effective waste management, particularly when targeting informal settlements, should begin with a consultative, participatory process involving all stakeholders from sectors that are mostly voiceless, such as the shack dwellers and the informal sector waste workers, to the municipal government and the private sector. Community-based enterprises, incentives for increased

private sector participation and innovative multi-sectoral partnerships are often used to more effectively implement waste-minimisation policy objectives.¹⁰

10 The Grabouw Case Study showcases a working partnership between municipality, the Development Bank of South Africa and the local community in setting up participatory structures towards achieving sustainable development.



'To meet our national waste management goals, all South Africans must support an integrated waste management approach [which] has obvious benefits, less land wasted on landfills, less strain on natural resources and a cleaner, more hygienic

and more attractive environment', says our deputy minister for environmental affairs and tourism.¹¹

¹¹ Quoted in *Environmental responsibility and sustainability key to new Bill*, by Neal Goldwyer, published in Engineering News online, 24 August 2007.

Challenges

At the same time as municipalities are planning to implement new and reformed approaches to waste management they must seek to address a range of problems that have become endemic in the waste chain.

Illegal dumping in unmonitored open spaces has become a massive problem in cities in South Africa. Businesses, industries and individuals not willing to pay for waste management services have been able to dump massive quantities of domestic, industrial and even agricultural waste on open tracts of land causing environmental degradation and pollution.

Poor communities and informal settlements have had little or no support from municipalities in the area of waste management and there are massive infrastructural backlogs in many areas. Pollution resulting from build-up of waste is a habitual problem for many such communities.

Many municipalities are struggling with the costs and logistics of waste disposal. When landfills fail there can be toxic runoff, pollution of water and soil resources, and methane gas emissions – constituting serious health hazards for communities in sur-

rounding areas. Incinerators – also generally located on outskirts of cities near poor areas and informal settlements – generate high levels of smoke and spread air-borne pollutants across wide areas. Additionally many landfills have reached or are reaching capacity and municipalities need to find alternative appropriate sites for landfills in areas where there is already increasing pressure on urban and urban-fringe land for human settlement.

Local authorities urgently need to address these challenges. Infrastructure imbalances must be addressed and adequate services extended to all communities. Waste disposal sites and mechanisms must be moved and reshaped to ensure maximum effect with minimal human and environmental impact. Facilities for recycling and disposal of waste must be provided and open land that has been the site of illegal dumping must be monitored and dumping stopped.

Showcasing Cities

Waste Management in Buffalo City and Nelson Mandela Bay¹²

The Urban Programme initiated support to Buffalo City and Nelson Mandela Bay to develop Integrated Waste Management Plans (IWMPs). The IWMPs integrate all facets and processes of waste management, identify and describe the needs and problems of waste management, guide municipal waste management, and facilitate funding and project management.

Before the development of IWMPs in Buffalo City and Nelson Mandela Bay, the municipalities focused on waste collection and disposal, but the services were not customer focused and massive illegal dumping took place throughout the cities.

¹² This article is printed with permission from Sida – the Swedish International Development Cooperation Agency (Sweden’s official government body for International Development Cooperation). This article is part of the The Urban Development Programme 1996-2007 – a series of 8 booklets produced and published in 2007 to share lessons from ten years of urban development co-operation between South Africa and Sweden. The text is an excerpt from booklet no 5 “Environment – Waste management, Water & Sanitation”. Additional thanks to Nelson Mandela Bay and Buffalo City municipalities who participated in the programme and facilitated the publishing of this article.

Waste management in Buffalo City

Work on developing an IWMP in Buffalo City started in 2001, when the municipality prepared the first IDP. As a result of municipal amalgamation in the same year, the new Buffalo City Municipality and its vast geographical coverage posed new challenges of providing vast rural areas with waste management services. The IWMP was adjusted to the context, completed, and approved in 2003.

While developing the IWMP, practical projects were implemented. One of these was the establishment of a regional waste disposal site, enabling closure of the illegal and poorly constructed sites previously used.



Another example was the initially successful school recycling-project, which involved children bringing recyclable waste to containers at schools. Local recycling companies collected the container contents, but unfortunately they considered the volumes of waste to be insufficient to cover their transport costs, and the project came to an end. The project also engaged children in composting at schools, supported by the municipal Environmental Services Unit.

The projects aimed at improving income generation for poor people, and there are plans to establish Buy-Back Centres, where informal recyclers organise to buy and resell recycled items.

To enhance awareness among people, the Buffalo City Municipality also established a Waste Minimisation Unit with responsibilities to educate citizens about e.g. littering and its negative effects, through information material and campaigns.

Waste management in Nelson Mandela Bay

Work on an IWMP in Nelson Mandela Bay was initiated during 2000. The Swedish twinning city Göteborg provided its support and a survey was carried out regarding residents' priority issues related to waste management. However, the IWMP was not finalised at this stage.

Results from the survey indicated that services to low-income communities were inappropriate. For example, the plastic refuse bags that were used in other areas in the city were not practical in disadvantaged areas due to a lack of holding bins, little space to store bags, animals tearing bags apart, the poor quality of bags, littering of bags.

A new Waste Planning Unit was then created in the municipality to support better collection and disposal services. The collection system was improved and tariffs were restructured. Education and awareness campaigns were run in schools and communities, and Community Liaison Officers educated communities on waste and environmental issues.

In 2004, a long-term advisor from a Swedish consulting company was appointed to support municipal officials in finalising the IWMP.

This co-operation resulted in an IWMP that is user-friendly and accessible, with measurable objectives for a five-year period and 34 projects to achieve the objectives. One project focused on building capacity in the Waste Management Division in the municipality, including training on HIV and AIDS, gender, environmental awareness and customer service.

Another project included the creation of Waste Cooperatives that clean townships and create jobs. Wheely bins in low-income areas further resulted in a dramatic decrease of litter in streets. Initially, illegal dumping in the nearby fields increased due to delays in constructing waste transfer stations for bulky waste, and there was a slow start with awareness raising on how to use the new system, but these problems have now been solved.



The Nelson Mandela Bay IWMP was developed by a working group that included Swedish and local consultants and also drew on experience from Göteborg.

The community at large, and interested and affected parties were consulted to identify priority issues for the plans. Starting with the identified priorities, the appointed working groups developed planning principles and objectives, and listed projects to address priority issues and develop innovative solutions. All municipal departments were included in the process.

Training on HIV and Aids was given to all waste workers in Nelson Mandela Bay Municipality.

Public participation sessions presented plans in an accessible manner, primarily in township areas. Comments and views were used as input to further develop the plan. The draft final plans were sent to local environmental and community-based NGOs for comments.

Gender concerns in waste management

Domestic waste management in South Africa is mostly the responsibility of women, while men dominate in provision of services. The Nelson Mandela Bay IWMP therefore has a number of women-specific objectives, including increasing women's satisfaction with the waste management system.

A gender equity plan has been developed for the waste management service to mainstream gender issues. Priority issues were identified and objectives were set to change the way these male-dominated services function in the future. Plans included having female waste collection teams.

An example of how the waste management business can accommodate female labourers is the use of wheely bins instead of heavy plastic bags for waste collection.

Capacity building included workers

Capacity building preceded planning in both municipalities so that staff became less dependent on consultants, thus developing gender and 'owning' the plans to a greater extent. Study tours to Sweden gave the staff insight into alternative waste management scenarios including composting, service delivery, legislation, waste-stream analysis, recycling, planning and public participation.

In Nelson Mandela Bay, the long-term Swedish advisor facilitated many skills transfer initiatives to empower the IWMP working group, which developed significant new capacities and successfully finalised the IWMP.

An 18-month IWMP awareness campaign reached all waste management staff in the municipalities. It included training on the IWMP, environmental awareness, customer care, HIV and AIDS and gender. The 350 directly targeted waste-management staff in Nelson Mandela Bay greatly appreciated the training.

The IWMP project resulted in new co-operation

The previous culture in both municipalities did not encourage co-operation between departments. In developing the IWMPs a new interdepartmental, consultative approach was initiated, that continues today. The co-operation between the municipalities also grew stronger and they benefited from each other's knowledge and experience; e.g. the waste management model developed in Buffalo City was also applied in Nelson Mandela Bay, saving time and



effort. The co-operation has also resulted in a new partnership together with Norway on waste recycling and minimisation. Both IWMPs have furthermore been shared with other municipalities and have attracted significant interest.

At municipal level, considerable organisational improvements were made in the Waste Management Divisions. New units such as Waste Planning and Waste Minimisation (Public Awareness) were established. The Buffalo City Waste Minimisation Unit is doing a good job educating communities about littering by engaging people at taxi ranks, staging events at schools and arranging community clean-up cam-

paings. A large number of municipal officials gained new skills as a result of the support, including improved computer, auditing, procurement and technical skills, and awareness of HIV and AIDS, gender and the environment. Staff development and capacity building has also changed from a limited focus on senior management to targeting entire departments.

In Nelson Mandela Bay a management system has been established to monitor the performance of the Waste Management Division and achievement of IWMP targets, and six monthly reports will keep councillors informed.

Other important results

- The municipalities have developed a new understanding of how to work with public participation.
- The IWMP working groups have the skills to develop the 2009 – 2010 IWMPs without further support.
- The new Waste Cooperatives in Nelson Mandela Bay are successful instruments of community upliftment and staff now have the knowledge to establish, develop and nurture them to success.
- The new regional waste disposal site in Buffalo City has improved living conditions for the informal recyclers living and working with waste.
- In Nelson Mandela Bay, the project has worked so well that the Municipality has been awarded one first and two second places in the South African competition for the cleanest metropol.



The way forward

Communities need to become more engaged in waste management and attitudes need to change. People need to rethink the idea that 'the more waste you throw on the streets the more jobs you create'. Awareness campaigns are necessary, as clean-up campaigns can do more harm than good if communities are not given the right message. Innovative approaches such as Waste Cooperatives supported by Waste Minimization Units might be one answer.

The benchmarking project between Nelson Mandela Bay and Göteborg is now focusing on learning from each other's experiences of customer care. Additional areas for benchmarking such as gender will be looked at in the future.

Large portions of waste are still under relatively poor control in the two cities, e.g. hazardous and medical waste from households. Inventories and risk assessments must be conducted in order to design strategies to deal with hazardous waste.

Lessons learned on integrated waste management

Even with the plans in place, it can be difficult to secure funding for implementation, which was the case in Buffalo City Municipality. This shows the importance of lobbying to achieve political support.

Momentum is sometimes lost when trying to finance IWMP projects. Consequently, the municipality should start with the projects it can afford and if possible postpone more expensive ones. Municipalities can learn a great deal from each other in the field of strategic financing and fund-raising.

It is important that municipalities continuously invest in waste management and collection services and not only act when the accumulation of waste has reached such levels that 'emergency' action become necessary.

As both municipalities have been experiencing high staff turnover, the importance of capacitating the institution, rather than individuals, has been highlighted. This is done by including enlarged groups of staff in training and planning, sharing responsibilities and cooperating in projects, and by documenting work, work processes and decisions, so that new staff easily can understand how things are done.

Landfill Gas Project

The eThekweni Municipality is working on the world's largest Clean Development Mechanism (CDM) project – a landfill gas-utilisation project that plans to reduce carbon emission by more than 3.8 million tons.

In June 2004 the eThekweni's mayor signed an Emissions Reductions Purchase Agreement (ERPA), in Cologne, Germany, with the Prototype Carbon Fund (PCF). PCF is the World Bank's funding mechanism for Carbon Finance.

eThekweni has agreed to develop a landfill gas to electricity project that will deliver emission reduction credits (ER's) for sale to the PCF. The agreement was for the sale of a total of 3.8 million tons of carbon credits¹³ for a value of approximately R100.0 million.

The project will draw additional revenue from electricity sales to the value of some R91.4 million. The generation of such 'green power' will be a leading example of good environmental and business practice by the eThekweni Municipality and South Africa.

¹³ The Kyoto Protocol sets out a system for Carbon emissions trading. There is an agreed global maximum for carbon emissions. Countries are assigned quotas of this total and governments then assign businesses and industries a certain number of carbon credits. The protocol allows companies and organisations to purchase carbon emission credits from each other for cash.

Facts and figures of waste disposal in Cape Town

- Citizens and businesses of greater Cape Town produce 2,3 million tons of waste per year – this equals 8 400 small truckloads stretching for 38 km every day!
- Managing the waste efficiently costs R860 million annually.
- Disposal cost to private waste contractors at landfill sites and transfer stations is R86.00 per ton.
- One landfill compactor vehicle costs R3 million.
- One waste collection truck costs R1,7 million.
- Every citizen of Cape Town generates on average 2kg of waste every day.
- Waste streams (residential, commercial, industrial and other streams) can be identified or 'characterised' for recycling purposes by looking at the:
 - amount (weight or volume) in kilograms or cubic metres
 - type of waste (e.g. glass, paper, plastic, organic).

Underground Bins for Johannesburg

The City of Johannesburg is investing in new underground waste systems for street litter and waste collected by street cleaners. The waste containers will consist of a 5m³ waste bin positioned in the ground inside a concrete sleeve with a metal frame housing a safety platform.

The top part of the system contains the external refuse bin that is equipped with a swivel lid. Waste is disposed into the system by sliding the lid open, which seals again when pressure on it is released. When the steel waste vessel is removed from the ground to be cleared of waste, the safety platform closes the main container until the bin is placed back into the unit.

The units will be emptied regularly and cleaned once a month. The container is intended to be used for dry waste only.

The system will provide additional waste-bin capacity in high density areas and areas with high pedestrian traffic such as the Johannesburg CBD, taxi ranks, sport complexes and even residential complexes.

The bins are able to contain between 1 and 3 tons of waste. One ton can be compared with around 4 wheely refuse bins filled with waste or 12 full refuse bags. In an initial trial-ing period, the bins will be monitored to learn how fast they fill up in specific areas, which will then determine the frequency of collection.



Zero Waste Initiative for the 2010 world Cup

An initiative aimed at implementing a Zero Waste concept for the 2010 World Cup was launched in South Africa in November 2006 with the support of the government as well as local and international businesses.



The Zero Waste 2010 Coalition initiative, described as a way to 'Green the World Cup African Style' is being driven by the non-profit group Institute for Zero Waste (IZWA).

The aim is to avoid and reduce the potential negative impacts of excessive waste and pollution during the 2010 World Cup, while maximising the positive economic and social impacts through a Zero Waste approach.

The initiative will include a learnership project run by IZWA and supported by the Department of Environmental Affairs and Tourism. The project is currently training

64 interns nationally with practical skills enabling them to support 2010 service providers using Zero Waste principles.

According to IZWA's National Co-ordinator of IZWA, Muna Lakhani, the response from all sectors of South Africa, as well as international organisations has been very positive. Lakhani described the initiative as 'an idea whose time has come', saying that it had fired up people's imagination. Lakhani was involved in Zero Waste-ing the NGO component of the World Summit on Sustainable Development in Johannesburg in 2002, which turned out to be the most successful greening project for the entire summit.

The Zero Waste principle will be achieved by redesigning products and methods of production to eliminate waste by mimicking natural processes; converting waste to resources for the benefits of local production; promoting resource conservation over incineration and land-filling; and collaborating with others with common interests worldwide.

A practical example of Zero Waste in action would be the manufacturing of sustainable

packaging from waste paper. Paper can be hygienically pulped, dewatered, and pressed into burger and hot-dog containers, egg-trays, and even ceiling boards. This adds value to materials recovery, instead of traditional recycling of paper, which only brings in 20c to 25c per kilo of waste paper.

IZWA can be contacted on 031-202-4576 or emailed at admin@izwa.org.za for more information about joining the coalition.

Conclusion

South Africa has reformed and refocused its approach to waste management – placing emphasis on waste minimisation, reuse and recycling, pollution control, and preservation of environment. Public participation has been identified as key in successfully implementing plans.

However, local authorities are still faced with a number of additional challenges. Infrastructure imbalances must be addressed and adequate services extended to all communities. Waste disposal sites and mechanisms must be moved and reshaped to ensure maximum effect with minimal human and environmental impact. Facilities for recycling and disposal of waste must be provided and open land that has been the site of illegal dumping must be monitored and dumping stopped.

Municipalities have generated IWMPs to deliver best practice waste management scenarios. Infrastructural development and awareness-raising campaigns have been put in place and partnerships between communities and various government, civil society, and international organisations established to develop and promote excellent waste management. In areas such as Nelson Mandela Bay and Buffalo City these partnerships have provided critical capacity to enable municipalities to formulate IWMP and establish waste best practice initiatives.

Lessons learned in each city must be shared to maximise the impact of these partnerships and initiatives in building the capacity of all local authorities across the country.

Water in Cities

Lack of access to safe water is poverty. Lack of access to safe sanitation is poverty. We cannot claim to have won the war against poverty until all our people have access to safe water and functional sanitation systems.¹⁴

Introduction

Water is a scarce resource and therefore a limiting factor for sustainable economic growth and poverty alleviation. Water is essential for commercial and industrial development, hydro electrical power, the sustainability of our biodiversity, wildlife, and – of course – it is fundamental to sustaining human life. Domestic needs account for approximately 10% of the country's total water use, industry and mining use 10.3%, agriculture 51%, and forestry 7.5%. 'Water for the environment', a relatively new term, describes the water required by our natural resource base to maintain itself. In line with this, conservation is allocated 15.5% of the total water used in South Africa.

¹⁴ Speech by Mrs LB Hendricks, Minister of Water Affairs and Forestry, National Water Summit, Gallagher Estate, March 2008



Yet South Africa's current water consumption rate is not sustainable in the medium to long term with available water supplies. South Africa's population is less than 25% of the population of southern Africa, yet we use approximately 60% of the total freshwater withdrawal in the region. In contrast to the per capita available water in the country of between 100 000 and 150 000 litres/person/year, South Africa withdraws an average of just over 300 000 litres/person/year. Current estimates put the country's available water in 2025 at under 100 000 litres/person/year. This is as the population increases in size and demand for water grows exponentially.

Due to unplanned and chaotic urbanisation across the globe, 1 billion of an ap-

proximate total of 3 billion people who live in cities around the world live in slums. Slums are defined as areas where people cannot secure key necessities such as clean water, a nearby toilet, or durable housing. An estimated 1.6 million urban residents die each year as a result of lack of clean water and adequate sanitation. While South Africa has made significant progress in bringing water to its citizens, we still have a long way to go before everyone has access to clean, safe water. In her speech at the National Water Summit 2008 quoted above, the Minister of Water Affairs and Forestry emphasised South Africa's commitment to provision of water as a basic human right that is critical to social development in our country.

South Africa's Free Basic Water Policy

South African standards relating to a level of water supply sufficient to promote healthy living come from the World Health Organisation standard of 25 litres/person/day. This is about 6 000 litres/household/month for a household of 8 people. This amount has been set as the target 'basic' level for all households in South Africa. This quantity will be regulated as part of the national strategy in terms of *Water Services Act of 1997 (RSA, 1997)*.¹⁵

Although there is a broader policy commitment to the extension of free basic services to all households, the primary target of the policy is poor households for whom free basic services represent a significant poverty alleviation measure.

Local authorities have some discretion over this amount. In remote areas with scattered settlements and high water costs it is often not feasible to provide 6 000 litres of water. In such cases a 'basic' level could be related to the water provision technology suited to serving the area (e.g. hand pumps or boreholes). In other areas, where poor households have waterborne sanitation, the total amount of water seen as a 'basic' supply may need to be adjusted upwards (if financially feasible) to take into account water used for flushing toilets. Some local authorities have already defined free basic water as 9 000 litres/month to take into account waterborne sanitation.

¹⁵ Sections 9 and 10

Municipalities can choose from three targeting options in implementing the Free Basic Water policy in their areas. The first is a rising block tariff where a free basic amount (or block) is provided to all water users and the next portions of water usage (or block) are charged for at increasing rates for increasing consumption. This only works when people have taps and meters and can be billed for consumption. The second option, a slightly different version of this, is targeted credits or subsidies used in some municipalities, where people considered indigent get a subsidy amount credited to their bill every month.

The third method of targeting in implementing the Free Basic Water policy is service level targeting. This ensures that access to water is limited to the free basic portion. The most common form of service level targeting is the communal tap system, which should be available within 200 metres of every home without water on site. People are unlikely to carry larger quantities of water than the free basic portion. Municipalities with a high proportion of poor consumers commonly use the service level targeting approach.

Since the implementation of the Free Basic Water relies on municipalities, the result is that the poorer and weaker municipalities are less able – both administratively and financially – to implement the policy as effectively as wealthier, better-resourced municipalities.

Providing Water

As approximately 57% of our population lives in cities, a significant amount of the responsibility for providing water and sanitation falls on our municipalities. The Water services Act 108 of 1997, requires municipalities to prepare water supply and demand management strategies (WDM) as part of their overall plans and suggests the following:

WDM strategies should be based on the following strategies:

- Water institutions should strive to supply water in an efficient and effective manner, minimising water losses and promoting WDM to their consumers
- Consumers should not waste water and should strive to use water efficiently
- WDM should be considered as a part of the water resources and water services planning process

In other words, municipalities are not merely required to provide water and sanitation systems but they are required to introduce effective measures to ensure that water losses are dramatically reduced and water conservation measures are put in place, and also to implement and monitor water quality standards.



Showcasing cities

The cities of Cape Town and Johannesburg and the eThekweni municipality have launched a range of initiatives to address these challenges.

The City of Cape Town's Integrated Water Leaks Project

The City of Cape Town developed an innovative project that will save water and reduce residents' water bills for those included in the project. The project focuses on the specific challenges in poor communities where the municipal property values are generally less than R100 000.¹⁶

The project aims to save water and make the water and waste-water (sewage) bills more affordable to residents by empowering them to identify and repair water leaks and reduce wasteful consumption. It deals with all aspects of water provision including the social, regulatory, commercial, and technical.

The City of Cape Town's Water Services directorate has saved millions of litres of water a month by piloting this project in Mfuleni, thus improving water-conservation awareness and practices among homeowners. The goal of the Mfuleni Integrated Water Leaks Repair Pilot Project (now completed) was a leak-free, affordable, equitable and sustainable water supply in Mfuleni. In addition, the project aimed to:

- ensure that households consumed only what they needed and what they could afford; and
- use the lessons learnt from this pilot to roll out the Integrated Water Leaks Project to other areas in the City.

Mfuleni consists of about 8 000 households (formal and site-and-service), of which about 4 500 are billed. As a result of the project, average consumption dropped from 18,9 kilolitres per household a month to 11,4 kilolitres – a saving of 7,5 kilolitres per household a month. The total domestic consumption dropped from an average of 147 megalitres/month to 89 megalitres/month, a saving of 58 megalitres/month, or 40%.

More than 1 000 homeowners signed an agreement with CCT to become responsible water users and maintain use within approved norms. Those who kept this up for six months had their water and sewer arrears written off. Residents also agreed to settle accounts regularly and to pay for future repairs, when the project was completed.

¹⁶ Adapted from an article on the website <http://www.capetown.gov.za/>

During the course of the project, 20 community-liaison officers from Mfuleni were trained to identify water leaks and educate residents on how to identify, stop and repair water leaks and on ways to use less water.

Sixteen people living in Mfuleni were trained as plumbers. The plumbers repaired the plumbing on 3 355 properties at the city's expense. Of these properties, 2 524 (75,2%) had toilet cistern leaks. Ten leak-free cisterns were installed to monitor their effectiveness for future projects.

During the course of the project all household water leaks were repaired free of charge. After the project, the community liaison officers will visit each house to assist the resident to identify water leaks, to read the water meter, and show each resident how to maintain their plumbing in good order and reduce water consumption. The aim is to help residents reduce water consumption to below 11 kilolitres/month, which means they will not pay for water.



eThekwini Water Services Sustainable Education Programme

eThekwini Water Services has launched a structured and sustainable education programme¹⁷ aimed at enhancing the knowledge of its customers and school children about water and sanitation. Different elements of the programme focus on promoting water conservation, water demand management, sanitation and health, and hygiene awareness among learners and adult members of the community. Trained consumer agents visit schools, speak on TV and radio, and organise focused campaigns in the printed media. These agents also pay site visits to consumers who are in arrears with accounts to discuss different payment options and levels of service that are affordable and meet their needs.

The education and training campaigns aim to mould learners into being responsible water users with good sanitation habits – the education team offers a programme supporting the water and sanitation message to schools and tertiary institutions. The programme supports the philosophy of outcomes based education and includes presenting the 2020 Vision for Water School Project, hands-on workshops, community theatre, and tours of the water/wastewater treatment works.

The following educational programmes are available for senior primary and high school level and include various materials/resources for both rural and urban schools:

- Water conservation and water supply
- The water cycle
- Wastewater treatment
- Water and sanitation
- Health and hygiene
- Pollution control
- Bird watching

The Sewage Disposal Education Programme

The Water and Sanitation Unit of the eThekwini municipality was formed in 2001 to provide the water and sewerage needs of the newly created municipal area.

Apartheid-era infrastructural development meant that many communities were left without basic water and sewerage services and, where facilities were provided, municipalities often neglected to adequately maintain and manage these services. Consequently, communities placed little value on the proper use and maintenance of sewerage systems. When the Water and Sanitation Unit was put in place, abuse and misuse of sewerage systems was costing the council about R6 million per annum. To address this reality the Water and Sanitation Unit has launched an education and public information programme to promote the idea that provision of improved services must be accompanied by corresponding community responsibility to take care of new facilities.

¹⁷ Adapted from an article on the website at www.durban.gov.za

Objectives

The main objective of the Sewage Disposal Education Programme is to create a better understanding of the workings of the sewerage system amongst all communities, with a focus on first time users of these services. This is done through a number of innovative educational interventions, which encourage interactive and participative learning. This programme is believed to have had a significant part to play in the reduction of blockages throughout the metro area by one third over a 12-month period.

Perception Study and Resource Development

Before the programme was developed the unit conducted a study to investigate people's attitudes, opinions and perceptions. The results of this study were used as a guide to develop a range of educational materials and an education programme designed to develop a sense of ownership of sewerage services amongst adults and scholars.

In collaboration with Coca-Cola, the Unit also developed an education road show, which visits communities, hostels, schools, etc. on a regular basis. The Coca-Cola road show vehicle – a large pantechicon complete with foldout stage and speakers – provides an opportunity to deliver the poster-based education programme and theatre production to large crowds. This road show also provides an opportunity for councillors to demonstrate their active support for our education programme.

Sustainability of the Programme

A curriculum guide for learners and educators entitled *Durban Metro's Sewers – It's All Connected*, was developed in consultation with the Environmental Education Curriculum Forum school principals and educators. The guide provides details on

outcomes-based activities around the theme of water and the disposal of sewage.

The KwaZulu-Natal Department of Education and Culture has endorsed this resource. In partnership with the Durban Environmental Education Resource Centre, education officers from the Unit provide support for educators during training workshops as well as during 'Schools Sanitation Awareness Week', when learners work through the activities in the curriculum guide.

Education Awareness Centre

The Wastewater Education Awareness Classroom at the Northern Treatment Works allows a completely flexible approach to learning about the role that the Treatment Works plays in health and environmental protection, from first hand practical experience.

Street Theatre Performance

This highly interactive drama reaches out to a broad spectrum of users of the sewerage system and particularly serves less literate communities. Performances are held in places where under-serviced or first-time users of municipal services congregate – at taxi ranks, shopping centre, clinics, hospitals and councillor ward meetings. Within a period of one year, 550 performances have been given in the Durban metropolitan area, reaching approximately 35 600 adults and 40 000 school children. Community participation is enhanced further through a competition, run in conjunction with the street theatre, with a lucky draw and prizes as incentives.

Whilst the message of the street theatre performance is presented in an amusing way, it is a serious attempt to obtain the co-operation of residents in keeping the sewers free of blockages, in reporting blockages, and in refraining from making illegal connections to sewers.

The City of Johannesburg's Operation Gcin'amanzi

*Johannesburg Water (JW) is a public utility, wholly owned by the City of Johannesburg (CoJ) and mandated to provide water and sanitation services to the residents of Johannesburg. The entity supplies approximately 650 000 domestic, commercial and industrial customers and serves an estimated 3 million people. JW has a mandate to deliver the best quality water at the lowest possible price to the consumers of Johannesburg. To ensure that it will be able deliver on this target, the utility is implementing a R450 million project to upgrade and replace old pipes and infrastructure.*¹⁸

The project was introduced in Phiri, Soweto after a number of workshops as well as public meetings with all 43 ward committees in Soweto were held to explain the objectives of the project.

The objective of the project is to substantially reduce water wastage both on private properties and within the municipal water network. This will lead to savings of up to R158 million a year to the CoJ, as well as to drastically reduced water and sanitation bills to individual households. This will in future enable ordinary consumers to pay less than a third of what they are currently billed for each month.

The existing reticulation network is being taken out of service and replaced by new pipes and fixtures. Workers from JW will move from door to door in Phiri to fix leaking pipes and taps and replace faulty water systems within the houses. JW will provide this service free of charge as part of the project.

Pre-payment water meters will be installed in every residential property to enable consumers to take ownership of their water usage and to budget effectively. The first 6 000 litres of water dispensed to households every month is absolutely free, in terms of the government's programme on free basic services discussed earlier in this chapter.

JW, together with the CoJ is providing all households within the city of Johannesburg with 6000 litres of free essential water. This programme is part of an overall poverty alleviation campaign and is aimed at providing relief to the poorest of the poor.

¹⁸ Adapted from an article on the website www.johannesburgwater.co.za



A case study – the Jo'burg EcoCity Initiative in Ivory Park

The EcoVillage in Ivory Park – a Johannesburg EcoCity Trust initiative – is a pilot project that combines all aspects of water saving and enhancing technologies as they apply to housing, energy, and water and sanitation. The EcoVillage emphasises the importance of ensuring that water stays where it falls and gets purified on site. In alignment with water-efficiency principles of reduce, reuse, and recycle the EcoVillage also integrates a number of measures towards reducing the cost of water to the user. The technologies we discuss below already exist at the EcoVillage or they are in the process of being established.

Composting toilet

Composting toilets are a dry, non-flush, zero-discharge sanitation system. In these toilets, air is brought into the waste chamber, and this prevents anaerobic bacteria from growing. It is these anaerobic bacteria that cause the unpleasant methane smell commonly associated with pit latrines. Compost toilets require little maintenance and can be designed easily by a householder who understands this basic principle. The only maintenance required is cleaning out the compost every few years.

Grey waste water system

Grey waste water is the water that comes from basins and baths as opposed to black water, which comes from toilets. Grey water can be used again to flush toilets, or it can be filtered to irrigate gardens. There are many ways of building grey water systems. One way is to have a pipe from a basin back into the cistern of a toilet. Another is to create a filtration system such as a single gravel, stone and sand filter. A more sophisticated system can be built by creating a two-compartment system. In this system a block work pit with a central partition is constructed from cement. Bath and basin water is fed in via the bottom of the pit through a grease trap. The first chamber contains a sand filter, after this the water goes through a lower pipe into another chamber, which contains soil, and reed beds where it is further cleaned of bacteria and chemicals. The business phase of the EcoVillage uses this two-compartment system.

Setting up grey water cleaners is inexpensive if it is a new housing project as you can build it into the original design at no extra cost. It does, however, require some initial expertise to put in place.

Rainwater harvesting

The EcoVillage harvests rainwater for gardening, cleaning and flushing toilets so that drinkable water is not wasted. One gutter down pipe leading from a roof into a closeted plastic tank is sufficient to catch and store rainwater. A mesh over the top of the down

pipe keeps leaves out. Rainwater harvesting is also about collecting storm water and this is described under the landscaping section.

Landscaping

The landscaping at the EcoVillage site has been designed to facilitate water efficiency. Different water features are being used to reduce water wastage and, at the same time, make the site more attractive.

Plants create a more hospitable microclimate around houses or buildings, so well planned gardens enhance sustainable living. Indigenous plants are the best to use for water conservation, as they require very little water compared to alien ones. They also require less modification of the soil and are hardier and more drought resistant.

Areas between buildings in the commercial area of the EcoVillage will have indigenous plants planted as far as it is possible.

Mulching is done on all the bare soil without plants. Mulch allows more water to percolate into the soil and decreases the rate of evaporation considerably. For hard landscaping soilcrete has been used extensively on site to create hardwearing surfaces and collect rainwater for the dam. Soilcrete is a very weak natural soil and cement mixture that reduces mud and defines areas.

Swales (trenches along contours) have been created along the contours of the site and these likewise ensure that as much of run-off filtrates into the ground with the excess being channelled into the dam. Dam water is used for irrigation on the organic farm below the site.

Innovative Water Conservation Measures in the City of Alamogordo, New Mexico, USA¹⁹

The city of Alamogordo in New Mexico in the United States of America has instituted some simple but innovative approaches to conserving water resources. We look at these below:

- The city uses an extensive reclaimed-water irrigation system for watering all city green spaces, including parks, sports fields, the zoo, the golf course, and the cemetery.
- The Department of Public Safety/ Fire Services Division implemented water saving measures by building a pump test facility and installing an in-ground tank to recirculate fire truck testing water. A modified surplus tanker is used for cleaning fire hydrants. Water captured by the tanker is reused in the reclaimed water program. The department also developed a new computerised system for testing each fire hydrant's capacity that saves tens of thousands of litres of water per year.
- The city provides conservation education throughout the year to the general public and in schools. In a pilot project in one of its secondary schools, learners were given kits with water saving devices, and information on how to save water. Out of the 55 learners who were tested on their knowledge of water conservation before and after the programme, 85% reported that they changed the way they use water. Projected annual savings based on the number of households these learners were drawn from estimated that 1.35 million litres of water per year would be saved.

All water reservoirs are lined and covered to prevent leakage and evaporation.

¹⁹ Based on an article on the website www.ci.alamogordo.nm.us



Conclusion

A significant part of the burden of ensuring an equitable and adequate water supply to all households falls on the shoulders of local authorities. This is within the context of historical imbalances in infrastructural development, current increasing domestic and industrial demand and future scarcity of supply. Local authorities have made significant headway in addressing these challenges through community empowerment initiatives, education campaigns and infrastructural development and waste reduction and prevention projects. Additionally, there are important examples both locally and internationally that showcase water conservation efforts in developed and underdeveloped communities. Lessons learnt in these contexts could be used to the benefit of local authorities.

Working Towards Livable Informal Settlements

By Siva Chetty²⁰

Background

There are over 750 000 people living in over 500 informal settlements in the eThekweni municipality. Despite unprecedented efforts to house people in formal dwellings – with the municipality delivering at the rate of 16 000 units per annum – informal settlements will likely remain a reality for some years. Accelerating urbanisation, where people typically locate themselves in informal settlements when they arrive in the city mean that these settlements are continually increasing in size. Given their nature, informal settlements constitute the poverty nexus in the region. Taking a strategic view of the situation, the eThekweni Health Unit embarked on a project to enhance localized problem solving capacity using participatory communication strategies.



Informal settlement in Shayamoya, Claremont

Sekuyisikhathi Sokukhuluma **It's Time to Talk**

The Communication Strategy for Informal Settlements is a method used by the Health Unit of eThekweni Municipality to address the environmental health challenges in informal areas. The strategy has been tested in many settlements via the Danida Urban Environmental Management (UEM) funded projects. The primary aim of the strategy is to improve the quality of life of people living in informal settlements by engaging the residents in identifying and resolving environmental health issues in their living environment.²¹

²⁰ Siva Chetty is Deputy Head: Air Pollution & Risk Control: Health Department, eThekweni Municipality

²¹ This strategy was initially tested jointly by DWAF and local authorities in 9 provinces throughout SA from 1999-2001. This strategy formed part of the DWAF 'Managing Water Quality Effects of Settlements', where Burlington Halt in Durban represented the test case for KwaZulu-Natal (KZN). Officials from DWAF and the eThekweni Health Unit managed the project.

Scope of the project

The aims of the Livable Informal Settlements project are to

- develop capacity building with a focus on 'Clean, Green and Healthy' issues
- identify health challenges in the community by addressing various waste streams, namely solid waste, sewage and storm water
- investigate the nature of various problems – whether they are socio-economic, infra-structural or institutional issues
- work with the community to discover the root causes of the environmental problems in their surroundings
- identify the stakeholders and skills required to minimise health risks, assess the knowledge, attitude and practices regarding linkages between health and a polluted environment, compile interventions to deal with environmental pollution problems in the community.

The Process

The structured-facilitated approach of this strategy develops the capacity of the community of informal settlements to prioritise health challenges in the four main waste streams: solid waste, sullage, storm water and sewage.

At the start of the intervention the health unit delivers a number of educational workshops and events to promote understanding of various issues including pollution and its links to health, cost of pollution to the community, and levels of services versus the affordability of the services (both to municipality and community).

These are followed by situational, problem-analysis and intervention workshops with the residents to identify and investigate the root causes and effects of the priority environmental pollutants. The problem analysis identifies the interrelated physical, social and institutional causes associated with environmental pollution.

A set of focused and sustainable interventions is then drawn up to form an 'Intervention Plan'. This process allows for the clear identification of the pertinent stakeholders and assures their involvement in the planning of the interventions.

The work groups are made up of representatives of local development committees, community based organisations, ward councilors, environmental health practitioners and related stakeholders.

The progress of the structured, facilitated process is monitored by knowledge, perception and attitude surveys and ongoing interaction with the relevant stakeholders.



Teaching the Communication Strategy

Snapshot of Survey Results

- 90% of residents have lived in the area for more than 2 years
- 85% of residents have a monthly income of less than R1000
- Over 50% visit a medical facility at least once a month
- Most common ailments are 'flu, colds and TB
- 82% had informal pit toilets and 8 % had flush toilets

The Structured Facilitated Approach

The first step in the process is to prioritise a settlement and identify stakeholders in the area. The aim of the approach is to obtain and ensure community investment in the project from the outset.

The next step is to organise field excursions and focus groups, where participants identify waste streams that are a problem. The methodology requires participants to ask the question 'why?' until they can identify the root cause of each problem.

For example, this photograph shows sullage water polluting the pathway in the Burlington informal settlement. The consequences are negative for the people and the environment. By asking why the problem exists, one is able to track the problem to a tap that is leaking or a blocked sullage drain. This means the problem can be resolved.



Sullage water in Burlington informal settlement

Project Benefits

- The project benefits the community and environmental health practitioners (EHPs)
- EHPs build understanding and knowledge of the processes and workings of participatory engagement
- The project develops residents' skills and resources to enable livable settlements
- Local success stories can be used as demonstration centres for project replication and to encourage ongoing work.



Conclusion

The project has resulted in the establishment of core groups in the targeted communities whose prime focus is health and environment. This social formation on the ground provides a useful link to the environmental health practitioners who service the area. The local community monitors the situation on the ground and provides useful feedback regarding the need for infrastructural repairs to facilities or the need for critical resources. This link with the community has facilitated timely intervention to resolve problems.

A National Model for Innovation and Sustainable Development

The Grabouw Sustainable Development Initiative: A Vital Learning Experiment

by Ralph Hamann, Fleur Boulogne, Ibini-bini Mara, Shane Chandaka²²

Introduction

The Development Bank of Southern Africa (DBSA) plays an important role in financing public infrastructure. When the bank began to experience severe and complex challenges in the provision of services and housing and in ensuring integrated planning and implementation, DBSA recognised that their organisation needed to develop more innovative approaches to building sustainable communities. The bank's governor, Finance Minister Trevor Manuel, challenged DBSA to define what sustainable communities should look like and how the bank can help achieve their development.



²² This article is based on a case study commissioned by the Development Bank of Southern Africa (DBSA), but it does not necessarily represent the views of DBSA. Ralph Hamann and Fleur Boulogne are based at the University of Cape Town Environmental Evaluation Unit; Ibini-bini Mara and Shane Chandaka are with DBSA.

In response, the bank established a strategic project backed by significant resources called the Sustainable Communities Programme.²³ The programme is premised on the need to build cohesive communities, bridging racial, language, cultural and race divisions, while integrating economic development, social well-being, and environmental integrity. A 2005 position paper suggests that the programme represents a shift for DBSA from a focus on infrastructure planning and lending to a broader, more interventionist approach.

The bank's website defines the programme as follows: 'It involves the bank combining its roles as financier, advisor and partner, to adopt a hands-on management style and assert a significant local presence.'²⁴ The programme currently consists of ten pilot projects in diverse communities around the country. It emphasises entire communities, rather than just municipalities, focusing on achieving results by drawing on people's lived experiences, their problems, and possible solutions to realise a tangible, visible 'turnaround'.

One of the first pilot projects has been implemented in Grabouw, a small town in

the Theewaterskloof (TWK) Municipality about 80 km from Cape Town in the Western Cape. Recognising that this Grabouw Sustainable Development Initiative (SDI) is likely to hold important lessons for the broader sustainable communities programme as well as developmental local governance, an in-depth case study²⁵ was prepared by a team of researchers from the University of Cape Town and DBSA. The focus of our research was to understand whether the initiative was achieving its objectives and what were the key factors in success or failure. Recognising that different stakeholders are likely to have different perspectives on these issues, we emphasised the identification of lessons emerging from both the perceived strengths and weaknesses of the initiative.

This article provides an overview of the case study and its findings in the context of the challenges faced in achieving sustainable community development. We feel that the Grabouw experience is an important contribution to what Edgar Pieterse and his colleagues call 'our collective social learning experiment to foster a meaningful developmental local government system.'

23 In DBSA *Activities Report 2005/06* the project budget of the Sustainable Communities programme is given as R3.7 million.

24 <http://www.dbsa.org/about/pages/strategicinitiatives.aspx>

25 The case study was based on document analysis and in-depth interviews or focus group discussions with a range of stakeholders – including consultants, municipal councillors and officials, as well as representatives of local community groups, businesses, and so on.



An overview of the Grabouw SDI

Genesis and project design

DBSA was involved in the TWK municipality through 'Project Consolidate'. This led Leon Lombaard, the co-ordinator of the bank's Sustainable Communities Programme, to propose adopting Grabouw as a pilot project. TWK's Mayor and the acting Municipal Manager welcomed this proposal, and a memorandum of understanding was signed in February 2006.

To get the SDI underway, the DBSA programme team worked with the Sustainability Institute of the University of Stellenbosch to prepare a Strategic Framework document.²⁶ This involved relatively extensive discussions with local role-players in Grabouw, and included spending time in TWK, walking the streets, visiting various sites and engaging informally with members of the community to gain a broad understanding of the challenges, opportunities, and dynamics in the Grabouw area.

The team researched specific issues in the area including the natural systems and their interface with human and governance systems; demographic trend; the resources available for sustainable development; the political dynamics and administrative structures; and the nuances involved in local community dynamics. Consideration of political developments was particularly pertinent in relation to the municipal elections on 1 March 2006, which resulted in a change in political leadership.

The Strategic Framework document provides the conceptual framework of the SDI, including the 'six senses' that are seen as conditions for and proof of a sustainable community: Sense of Place, Sense of History, Sense of Craft, Sense of Nature, Sense of Limits, and Sense of Justice.²⁷

Key areas of intervention and associated deliverables for the pilot study were defined as:

- the social compact, 'a dynamic dialogue on the future of Grabouw and the role that different role players would commit to', including a signed document that reflects agreements reached;
- a revision of spatial planning, including the preparation of a spatial development plan and sustainable development framework (which were subsequently merged into one deliverable); and
- the achievement of 'low hanging fruit' deliverables, such as the improvement of existing sports and health facilities.

The discussion surrounding the need for a social compact led to the decision to split the roles of the development facilitator and the professional team. This was to ensure that the process was driven by the client municipality and community and to minimise the possibility of consultants dominating the process. This decision to split the roles emphasised the belief that developing community buy-in and deliberation is crucial to the long-term success of the intervention.

²⁶ DBSA (2006) Strategic Framework and Implementation Plan for the Grabouw Sustainable Communities Pilots (unpublished document)

²⁷ D. Kelbaugh (1997) *Common Place: Toward Neighborhood and Regional Design* (Seattle: University of Washington Press). Also note that these six senses have subsequently been used in the Western Cape Provincial Government's Sustainable Human Settlements Strategy.



The separation of roles and the corresponding requirement that the technical advice respond in an iterative manner to the public participation process were seen as critical features that distinguish the SDI approach. At the same time, however, the actual execution of this process design gave rise to a number of important challenges. Some informants argued that co-ordination and communication between the facilitation and technical design teams were not as effective as they should have been – leading to inefficiencies and missed opportunities.

Implementation structures

As the project was implemented there was ongoing engagement between DBSA's Leon Lombaard and a range of local, provincial and national stakeholders. This led to the MEC for Local Government and Housing adopting the SDI as a special project, with the promise of support where necessary. In June 2006, Shane Chandaka was appointed by DBSA as a dedicated local representative. One of his objectives has been the continuous engagement of diverse local role-players. Although a number of actors within the municipal structures understood the need for change and embraced the pilot project, there were also some who were less positive or resisted change.

In September 2006 a comprehensive tendering process led to the appointment of the technical design team and development facilitator. Grant Thornton led the appointed team of transaction advisers, who were meant to investigate the feasibility of taking four particular projects to market in the form of public-private partnerships (PPPs). Shortly afterwards, two key co-ordinating structures were established:

- The SDI 'steering committee,' consisting of the municipal manager, DBSA, and representatives of the Provincial Department of Local Government and Housing and the National Department of Public Works. As appropriate, municipal officials or members of the technical design team were asked to provide inputs. The objectives of this committee were to track progress and provide strategic direction; take decisions or refer to relevant political structures; and identify and leverage resources for achieving SDI objectives.
- The 'management team,' consisting of representatives of the municipality, DBSA, the technical design team, and the development facilitator. Its main purpose was to co-ordinate the activities of the key role-players. In addition, the management team would meet prior to steering committee meetings to prepare an agenda and agree on priority issues.

Most informants agreed that these structures played a vital role in ensuring a legitimate and coordinated process. The prominent role of the municipal manager was identified by a number of informants as a crucial contribution to the process. A further strength of the steering committee was its contribution to intra-governmental co-ordination, especially in terms of involving and informing relevant provincial government departments in decisions pertaining to the SDI.

However, one of the concerns raised in connection with the steering committee was that significant resources were employed in managing the process. It was often noted that Grabouw is only one of eight towns in the TWK municipality's jurisdiction.

There was a related concern about the limited alignment between the SDI and the municipal Integrated Development Plan (IDP). For a start, the timing of these two initiatives precluded a close alignment, as the IDP preparation process had already progressed some way and was under significant time pressure. Arguably, there was also limited understanding of how the SDI and the IDP relate to each other. However, the Mayor and municipal officials emphasised that, alignment between the SDI and the IDP is currently being achieved.

The Stakeholder Forum and its difficulties

Soon after the appointment of the development facilitator, a steering committee meeting identified approximately 20 key individuals as legitimate and respected community or stakeholder representatives. These individuals nominated people to participate in the Stakeholder Forum (Forum). The first Forum meeting took place in December 2006 and was attended by 56 participants.

This meeting agreed that smaller groups would be formed for subsequent, more focused discussion on particular themes such as education, transport, and environment. Participants at these meetings noted that many of them had lived in Grabouw all their lives, but that they were now speaking to each other for the first time. A full Forum meeting at the end of March focused on developing a vision for the area – including identifying opportunities and constraints for attaining the vision.

The Forum deliberations generated a document entitled 'Social Accord of the People of Elgin/Grabouw', in September 2007. It states the Forum's 25-year vision: 'Our vision is to create, with a sense of urgency, but over this long term, a sustainable community [and] to protect our environment for future generations.'

Given the central role of the Forum and the resulting Social Accord in the SDI, it is worth noting a number of points raised by informants with regard to its effectiveness and its legitimacy. As a point of departure, it must be noted that all informants were broadly supportive of the underlying rationale for the forum, and they appreciated the chance for local stakeholders to discuss matters of common concern.





One informant noted, 'Overall it was a very positive process as it focused on the involvement of the community in the development of the town; it is crucial that the community takes ownership of the plans... People who would normally not speak to each other interacted in a very positive way, relationships were built.'

At the same time, a number of criticisms were offered with regard to the constitution of the Forum and its contributions to conflict resolution, authentic deliberation, and the technical design process. Such comments should not be interpreted to argue that the Forum was fundamentally flawed, but they are useful as they suggest areas for potential improvement.

At the time of conducting this research (end of 2007) there was some confusion prevalent among Grabouw stakeholders as to the current status of the SDI. This is closely related to broader concerns and confusion regarding the transition of the SDI from its planning stage to implementation.

The technical design process and report

In late 2006, the design team began the contextual analysis in the study area. They generated baseline data (land uses, history,

transport and other services, etc), and engaged local community members to create a picture of the history and sense of place of the town. In May 2007 the design team began to propose the key components of their study, with an emphasis on the spatial development framework, economic growth strategies, and tangible implementation interventions. The final draft for comment was made available in July 2007, and the final report was submitted in September 2007.

The third chapter of the report describes existing human settlement patterns, emphasising that 'the current spatial structure of Grabouw sharply reflects the characteristics of apartheid and post-apartheid planning'. It argues that the existing approach to providing subsidy housing reflects 'an engineering solution to most cost effectively deliver to the minimum standards,' resulting in socially and environmentally problematic settlements. The report criticises the municipality's existing five year housing plan and in particular its intention to build subsidy houses on site 3578 (see Figure 1 below), explaining that this development would contribute to the perpetuation of the apartheid-city form, urban sprawl, and limited social, cultural, and economic opportunities for the intended beneficiaries.

It is apparent that the final consultants' report is detailed and comprehensive. Perhaps one of the most important aspects apparent from the report is the relatively high degree of integration achieved between the various disciplinary perspectives, based on the spatial framework as an integrative platform. The report reads as a coherent whole and there are no overt disciplinary biases in its various sections.

However, informants also raised some limitations and concerns regarding the technical design process and the resulting report, over and above those identified in the report itself. Some informants pointed to apparent difficulties in integrating the infrastructure related considerations into the broader approach of the SDI, and some raised concerns with regard to the emphasis on spatial design and the comparatively lower level of detail in the economic plans. However, the pre-eminence of the spatial design is probably appropriate, as it seems to have been an important platform for integrating the various disciplines and for encapsulating the key recommendations of the report. Furthermore, it must be noted that more detailed studies, including on economic strategies, are recommended in the report and have already been commissioned.

Initial outcomes and implementation measures

Notwithstanding some of the concerns raised with regard to the Forum and the technical design process, it is apparent that they have led to tangible, important outcomes that contribute to the SDI's broader objectives. An especially prominent and illustrative example of this is the SDI's influence on the Municipality's housing strategy and, in particular, the proposed housing development on site 3578. In this context, it must be noted that many of the initial efforts of the design team focused on housing issues, because this was the most pressing, overt development challenge in

the area and because large-scale investments and projects were being planned and implemented, which would have significant bearing on the principles and objectives of the SDI.

Initial discussions in the early stages of the process already led to the Municipal Manager suggesting that the existing 'five-year housing plan' be reviewed with particular reference to sustainability criteria. As noted, a specific concern in this regard included the intention to develop low-cost housing on site 3578.

In response to the Municipal Manager's request, a meeting was set up between the lead SDI consultant and the architects, contractors, and planners involved in the implementation of the existing housing plan on site 3578. The meeting did not go well because the existing consultants felt that their approach and commitments to the Municipality and the Provincial Government were being undermined. This episode illustrates a crucial challenge encountered in the SDI with regard to the role of prior commitments and contracts that are potentially binding on the Municipality or other government organisations. There was uncertainty regarding the legal status of the contracts.

Despite these frustrations, developments thus far seem to suggest that the SDI was able to alter existing commitments with regard to housing. The technical design team's concerns regarding site 3578 were explained to a councillors' workshop in June 2007. The workshop agreed that only a proportion of houses would be built according to prior plan at the bottom of site 3578 and that the plans for the rest of the area would be revised to take into account the SDI's recommendations. Subsequently, the special Council Meeting in September 2007, which formally adopted the Social Accord and the technical report, included a specific resolution on site 3578.

Following the Council's adoption of the SDI's primary outputs in September, a Grabouw Exhibition Day was organised on 6 October 2007 as a means to communicate the SDI's progress to a broader range of local citizens.

Monitoring and evaluation

In April 2006, during the early stages of defining the aims and principles of the Sustainable Communities Programme, it was decided that monitoring and evaluation (M&E) ought to be part of the pilot project process. A programme evaluation process was suggested that was meant to provide ongoing, consistent feedback to role-players involved in the initiative. A questionnaire was designed to provide quantitative information on issues such as infrastructure development and institutional responsiveness, as well as qualitative questions linked to the six senses. The objective of the questionnaire was to assess local stakeholders' perceptions of the current progress towards sustainable development in the area.

This questionnaire was administered to 40 respondents across a range. The results of this first data generation exercise are meant to provide a baseline against which future developments may be compared. They are graphically illustrated in Figure 2, which provides the actual, average scores compared to a 'base' that was subjectively identified as representing an acceptable average. Figure 2 shows that respondents assessed progress on all issues as being very low, especially with regard to such issues as local economic development and institutional responsiveness.

Though methodological concerns may be raised with regard to this baseline survey, it arguably provides a platform for subsequent studies that could assess community perceptions as they relate to objectives of the SDI. However, an important concern in this regard is the apparent lack of integra-

tion between this baseline study and the broader SDI.

Evaluating the SDI and lessons learnt

How do participants evaluate the SDI thus far?

Most informants were generally positive and optimistic about the SDI and the degree to which it would achieve its broad objectives. Two particular benefits were highlighted. The first was the fact that the SDI was able to affect tangible change in the planning and implementation of particular developments in the town. The revision of housing on site 3578 being the most commonly cited example in this regard. The second aspect relates to the degree to which the SDI is perceived to have contributed to tangible increases in education, awareness, and discussion on issues of sustainable development in the area and beyond (including within DBSA itself).

Over and above these two particular perceived benefits of the SDI, the overarching sentiment among many informants was that the SDI was a significant catalyst for change, though its long-term impacts depend on current and future implementation measures. In this regard, there were dissenting perspectives. Some emphasised what they saw as a lack of continuity between the planning and implementation processes, and a concomitant lack of ownership or capacity to implement among key role-players, especially the Municipality.

Are explicit aims and objectives being achieved thus far?

A feature of the SDI is its emergent process, which required that the project outputs and terms of reference were not too prescriptive or detailed. The most explicit outputs and outcomes were identified in a

Project Charter established between DBSA and the Municipality in early 2007. For the social compact, these objectives include 'the beginnings of social cohesion and a sense of community that will be apparent in a common vision and clearly defined objectives.' Though the social compact is an important and innovative initiative that has made important contributions to the broader SDI and arguably has provided 'the beginnings of social cohesion', there are a number of concerns regarding its legitimacy and effectiveness, as noted above.

The Project Charter also includes the objective to establish partnerships. We argue that this broad intent has been achieved in important instances, including the partnership between DBSA and the Municipality itself, important commitments and contributions from a range of public and private sector organisations, and the four PPP projects.

Unintended consequences

Though it is notable that informants mentioned very few unintended negative consequences, there is one important exception. This relates to the concern that the Forum did not include sufficient proactive efforts – over and above initial invitations and interactions – to involve existing or emerging civil society organisations or broader networks, especially marginalised

groups. Because of the important role that the Forum was meant to play – and in many ways did play – in deliberating and creating a vision for the community, it needs to be considered whether the absence of such civil society organisations and groups is not only a missed opportunity for the Forum but also entails negative impacts on these groups' ability to organise themselves and make themselves heard. This is raised here as an issue for further consideration only.

Strengths of the SDI

The overarching strength of the SDI, recognised by most informants and evident in the chronology of events and initial outcomes, is its potential impetus for significant change in the long-term development trajectory of the town. This is based on a variety of more particular strengths, such as: the SDI's conceptual framework and organisational approach; the implementation of tangible change within a relatively short time frame; the involvement of a range of skilled and committed people; the facilitation of a range of collaborative arrangements involving key public and private sector organisations; the role of DBSA as a catalyst of collaboration and resources; and contributions to crucial education and awareness-raising in the area, as mentioned above.



Recommendations

The following recommendations are based on both the strengths and weaknesses of the Grabouw SDI, and they should not be interpreted to imply gaps or weaknesses in the Grabouw SDI, unless stated explicitly.

- 1. Develop and implement a comprehensive communication and education strategy linked to monitoring and reporting.** Such a strategy identifies communication objectives, key target groups, diverse and innovative communication mechanisms, and roles and responsibilities. This strategy should ideally merge into a monitoring and reporting framework based on indicators developed by the local stakeholders.
- 2. Develop and implement a comprehensive community participation strategy that includes a Forum in conjunction with auxiliary participation measures, with particular emphasis on inclusiveness and effective deliberation.** This ought to include the preparation of a community participation plan at the outset of the process, in conjunction with the above mentioned communication strategy, which provides an overview of the various communities and groups in the area and related challenges and opportunities with regard to the public participation process. This allows for proactive measures to ensure the effective participation of marginalised groups, in particular. An important opportunity is to link the Forum more explicitly to the ward committees. In the Grabouw case, the ward committee reforms undertaken by the Municipality at the end of 2007 arguably ought to have occurred at the outset of the SDI.
- 3. Support the development of facilitation skills for community participation and deliberation.** The Grabouw experience

highlights the need for skilful facilitators. There is hence an argument to be made for proactive, strategic efforts at building related capacity among professionals with diverse backgrounds in South Africa.

- 4. As far as possible, develop specific and mutually agreed expectations and guidelines for service providers – including provisions for a clear, integrated relationship between the activities and roles of the facilitator and the technical design team.** There is an important tension between the emergent character of this process – especially considering the incentive to make it community-driven – and the need to develop clear and specific expectations and guidelines for service providers. The Grabouw experience can be used to develop more specific expectations for service providers, with outlines of roles and responsibilities for the management team, steering committee, and other role-players. Such guidelines will contribute to effective project management and the early identification of possible problems; explicit and strategic means of interaction and co-ordination between the technical design team and the Forum facilitator; and will cater for some of the special demands the emergent process is likely to make on the design team in particular.
- 5. Strategically align the SDI with developmental local government processes and structures – including targeted capacity building.** The selection of pilot projects ought to consider municipal readiness, considering that a number of respondents noted that the timing of the Grabouw SDI may have been more auspicious one or two years later. There is also a need to provide proactive support for capacity building among mu-

nicipal mayors, councillors, and officials. The strengths of the Grabouw SDI in this regard ought to be built and expanded upon. Such capacity building must involve organisational strengthening, a crucial aspect of which is the ward committees (see point 2 above). There is also much scope to integrate SDI principles and objectives into the performance management systems of municipalities. Finally, proactively influencing the IDP process and outcome ought to be an explicit objective of the SDI.

6. Plan for implementation and ensure coherent sequencing of activities.

Entry negotiations with the municipality should provide for an agreed, transparent management process for the transition from planning to implementation, including time frames, and roles and responsibilities. The project budget

ought to include some seed funds for implementation and/or prior commitments from other sources to provide such seed funds. Where appropriate, the community participation and planning processes ought to provide for 'quick wins' – in which such seed funding can contribute to tangible, visible benefits for the community. This relates to the four PPPs, which were the subject of significant dissenting opinions about their timing. Though in the case of the Grabouw SDI there are a number of important arguments to support the concurrent implementation of the SDI and the PPPs, we recommend that ideally and in general there ought to be a sequencing of activities that allows the Forum and technical design process to provide an overarching vision and plan for the area, with the identification and definition of the PPPs occurring as part of that process.

Conclusion

The overarching message of this case study is that the Grabouw SDI is a crucial initiative that has decisively shifted the development trajectory of Grabouw in a manner that is aligned with our current, emerging understanding of what it means to create sustainable communities. Furthermore the Grabouw SDI is not just aligned with our emerging understanding; it is deepening and expanding this understanding as well. An important aspect of this is the willingness to experiment and to put into action innovative ideas. We hope that this case study adds a little to this broader contribution of the Grabouw experiment.



Section 3

Conserving Biodiversity and Ecosystems





Biodiversity and Conservation in large South African Cities

Introduction

Biodiversity is a term used to refer to the complex web of interrelated, interdependent organisms that form the earth's natural environment and that we depend on to sustain human life. Biodiversity includes the range and variety of these living organisms, their genetic differences, and the communities and ecosystems where we find them. As biodiversity comes under increasing pressure from human settlement and expansion, people are jeopardising the ecosystems that provide for their continued survival at the most basic level. In 2008, 57% of South Africans (23 million people) live in towns and cities. By the year 2010, 73% of our population will be urban – 43,7 million people! There is an ongoing battle to push for more development at the expense of protecting natural ecosystems.

Urban environments are characterised by activities that put pressure on the natural environment – people living close together, traffic, buildings, roads and noise. Natural sites and other open spaces provide a wealth of services to cities that often go unnoticed. Urban ecosystems provide services such as water management and natural catchment areas, recreational spaces, noise and pollution barriers, and offer shade and wind protection. City dwellers tend not to realise or acknowledge how the natural environment significantly improves the quality of their lives because they do not pay for it directly, but without it the quality of life we enjoy in our cities would be very different.

Many larger cities in South Africa have biodiversity conservation policies and programmes, but a large number of small municipal authorities have no conservation agendas. Given that South Africa currently has the second highest number of plant extinctions in the world, it is imperative that all of our cities join other stakeholders and play an active role in preserving biodiversity and the natural environment.

This case study outlines some of the initiatives that cities in South Africa are undertaking to protect and preserve biodiversity and progress the conservation agenda in the face of ever-increasing challenges in the development arena.



The City of Cape Town's Biodiversity Program

Cape Town is an area with world-class biodiversity and thus unique conservation value, but it also holds the unfortunate distinction of being the city with the highest number of threatened plant species in the world. The city boasts inland ecosystems – both aquatic and terrestrial – as well as diverse coastal and marine habitats created by the warm waters of False Bay and the colder waters of the Atlantic Ocean.

Cape Town is located within one of only six floral kingdoms in the world. The Cape Floristic Kingdom is the smallest of the world's floral kingdoms but it is also one of the richest – with a high proportion of endemic²⁸ plant species. Many of these species are endangered making the Cape Floristic Kingdom a 'global hotspot'. This places an international responsibility on the City of Cape Town (CCT), and provincial and national government to ensure its conservation. Particular conservation focus is needed in the under-conserved Cape Town Lowlands, which supports more than 1 466 plant species.

A further unique feature of Cape Town's urban biodiversity is the Table Mountain National Park (TMNP), situated entirely within the city's administrative borders. In addition, the CCT is bordered by, and overlaps with, two biosphere reserves – the Kogelberg and West Coast Biosphere Reserves – which are administered by CapeNature, the provincial conservation agency.

The CCT administers a total of 22 conservation areas. Of these, only 5 are currently managed to appropriate standards, due to a lack of capacity and resources and significantly more conservation areas are necessary to conserve a minimum representative sample of Cape Town's huge biodiversity. This situation highlights the need for increased resources and focused and efficient action, particularly in the Cape Town Lowlands, to conserve and protect the unique biodiversity.

28 i.e. species that occur nowhere else in the world



Cape Town Biodiversity facts²⁹

- Cape Town contains remnants of the threatened renosterveld vegetation of which only 3% remains of its original extent, making it one of the most endangered vegetation types in South Africa, if not in the world
- 70% of the Cape Floral Kingdom's 9 600 plant species are found nowhere else on earth
- The Cape Town Lowlands area has the highest concentration of threatened plants per area of remaining vegetation in the world
- The Cape Town area supports more than 1 466 plant species in 1 874 km² of which 76 are endemic and 131 are red data³⁰ species
- The Cape Peninsula Mountain Chain supports 2 285 plant species in 471 km² of which 90 are endemic
- 41 mammal species remain in Cape Town while six recently became extinct
- 250 bird species live in Cape Town – ten are endangered and at least three species have become extinct in recent years
- There are approximately 111 endemic invertebrate species on the Cape Peninsula mountain chain alone
- There are 18 amphibian species in Cape Town of which four are listed in the Red Data Book
- 48 reptile species, of which four are endangered and two are locally extinct, are found in Cape Town
- 24 fish species are dependant on Cape Town's estuaries

²⁹ www.capetown.gov.za/enviro/esm/biodiversity.asp

³⁰ Species listed on the International Union for the Conservation of Nature and Natural Resources Red Data List as being in danger of becoming extinct. There is a range of subcategories within this list.

Threats to Biodiversity in the City of Cape Town

The City of Cape Town's biodiversity is under significant threat from the impacts of urbanisation.

Among the immediate challenges identified are:

- Infrastructural development and additions to the built environment as well as overall natural resource depletion re-

sulting in the loss of biological corridors important for movement of species.

- Invasive alien vegetation that threatens indigenous plant life and the food supply of a number of organisms and animals and poses a fire hazard.
- Reckless and inappropriate off-road vehicle usage, which damages coastal dunes and vegetation, causing erosion and impacting on archaeological sites.

The CCT has initiated some programmes to address these and other conservation challenges.

Cape Town Biodiversity Network

Cape Town has established a 'Biodiversity Network of Sites'. This network is a detailed register of the minimum sites that must be protected to conserve a representative sample of the city's unique biodiversity and thus promote sustainable development. The network was identified as part of Cape Town's broader Integrated Metropolitan Environmental Policy. The network will contribute to Cape Town's goals of integrated human settlement and improved quality of life by creating easy access to safe natural areas for education and recreation; enabling local economic growth through tourism and other job opportunities; and ensuring sustainable use of natural and cultural resources.

The Biodiversity Network of Sites

During 2001/2002, a systematic conservation planning study was undertaken to identify the minimum set of sites required as a basis for the Biodiversity Network. During 2006 the network was updated using 2005 aerial photography and local vegetation types aligned to the latest national vegetation types. In this way, CCT aligned the city's conservation targets with national conservation targets. Biodiversity Network targets are also aligned with CapeNature conservation priorities and targets.

Current flagship CCT conservation projects

- The False Bay Ecology Park – an urban park that boasts approximately 250 species of birds, an environmental education centre with a range of programmes, and recreational activities including bird watching, walking and boating.
- Nature reserves such as Rondevlei, Tygerberg and Helderberg, which conserve biodiversity and offer environ-


mental education programmes, amenities, and recreational activities.

- Blaauwberg Conservation Area – an area being developed by CCT in partnership with local civic bodies and others. The Blaauwberg Conservation Area possesses unique and endangered flora and a range of fauna, as well as historical and cultural sites from the later Stone Age to the present. An education centre and recreation facilities will be established.

Cape Flats Nature Project

Cape Flats Nature started as a partnership between CCT, the South African National Biodiversity Institute (the implementing partner), the Table Mountain Fund and the Botanical Society of South Africa. The partnership builds good practice in sustainable management of nature sites in the City of Cape Town's Biodiversity Network in a people-centred way that develops local leadership for conservation action and benefits the surrounding communities, particularly townships where incomes are low and living conditions are poor. The project works with the city's Biodiversity Management Branch to develop, share and spread skills and lessons for conservation action.

The Cape Flats Nature partnership recently expanded to include CapeNature and the Table Mountain Park in an effort to build a common practice across nature conservation agencies working in the Biodiversity Network, and to ensure that all the agencies are communicating a common message about the many ways in which biodiversity enables socio-economic development.



Examples of community conservation action in Cape Town

Two examples of local participation in nature conservation efforts are provided by the communities adjoining the Harmony Flats Nature Reserve and the partnership organised by the Friends of Tokai Forest.

The Harmony Flats Nature Reserve community working group in the Strand area, is made up of members from some under-resourced communities. Through the Cape Flats Nature partnership process, the working group was established in 2003. This volunteer group runs door-to-door fire awareness and general awareness campaigns about the reserve and many local people are now volunteer fire beaters. The working group has done alien clearing, erosion prevention and developed paths to make the reserve a safe and properly managed area where children can play and learn. Over the past five years the community working group has led the Arbor Week environmental education programme, guiding 400 learners around the reserve, introducing them to special plants and telling the history of the community's relationship with this precious natural area.

On the slopes of Table Mountain, the Friends of Tokai Forest obtained international funding from the Critical Ecosystems Partnership Fund to get the local community involved in restoring two hectares of critically endangered Cape Flats Sand Fynbos. The area selected is next to an existing small remnant of fynbos, which supports several Red Data species. To stimulate germination of the fynbos seed bank a section of pine plantation was removed from the area and the Table Mountain National Park assisted by organising a post-clearance burn in April 2006. The Friends of Tokai forest has hand-cleared alien wattles in the burnt area and the group is monitoring the recovery of these red-list fynbos plants – so far over 100 species have been recorded. To sustain this recovery, the Tokai friends group has adopted plots in the Soetvlei wetlands to keep the area clear of invasive alien plants.

ICLEI's Local Action for Biodiversity Initiative

The Local Action for Biodiversity (LAB) Project is a 3-year project that was initiated by CCT, supported by the eThekweni Municipality, and developed in conjunction with ICLEI (International Association of Local Governments). LAB aims to assist local governments in their efforts to conserve and manage biodiversity sustainability. South African project partners include the International Union for the Conservation of Nature (IUCN), Countdown 2010, the South African National Biodiversity Institute and RomaNatura.

LAB involves a number of cities around the world and focuses on exploring the best ways for local governments to engage in urban biodiversity conservation, enhancement, utilisation and management. The project focuses on facilitating understanding, communication and support amongst decision-makers, citizens and other stakeholders on urban biodiversity and the need for local action to conserve biodiversity. LAB emphasises the importance of integrating biodiversity considerations into planning and decision-making processes; and seeks to demonstrate best practice urban biodiversity management. The project grows capacity around documenting and developing biodiversity management and implementation tools, sourcing funding from national and international agencies for biodiversity-related development projects, and increasing global awareness of the importance of biodiversity at the local level.

The City of eThekweni's Biodiversity and conservation Programme

eThekweni's biodiversity has been shaped by millions of years of geological and climatic processes, and recently by accelerated development associated with human settlement. Due to the variety of landforms and climatic conditions in eThekweni Municipality, as well as its unique biogeographical position, the area has a wide range of terrestrial and aquatic ecosystems that are home to a rich diversity of organisms. It contains three of the country's eight terrestrial biomes – savannah, forest and grassland. eThekweni's aquatic biomes include both freshwater and marine habitats incorporating 18 major river catchments and 97 km of coastline.

The city of Durban's biodiversity enables the natural environment to deliver environmental goods and services. The wetlands near the city reduce the negative impact of floods, trap valuable nutrients, purify water, and support bird, fish and mammal populations.



eThekwini Municipality's sustainable development structures

The eThekwini municipality has used the IDP to mainstream sustainable development in the region. This means that sustainable development is the responsibility of all officials in all municipal departments. The Environmental Management Department (EMD) of the municipality provides support to all departments and communities in the municipality to ensure conservation and protection of eThekwini's natural resources. The EMD has developed the eThekwini Environmental Services Management Plan (EESP) that 'sets out to present an integrated and organised approach to ensuring that the significant natural resources of Durban are protected, enhanced and managed, whilst social and economic opportunities are optimised within a framework of sustainability.³¹ The plan outlines 15 strategies for achieving this aim. These are:

- 1 Spatial Environmental Planning
- 2 Municipal Planning
- 3 Development Assessment
- 4 Compliance Monitoring
- 5 Enforcement
- 6 Implementation Instruments to Secure the EESMP
- 7 Ecosystem Management
- 8 Invasive Alien Species (IAS)
- 9 Rural Environments
- 10 Climate Disruption
- 11 Conservation Plans for Biodiversity of Special Concern
- 12 Policy and Legislation Development
- 13 Communication, Education and Awareness
- 14 Stakeholder Fora and the eThekwini Biodiversity Partnership
- 15 Monitoring, Data Collection and Management and Reporting³²

31 <http://www.durban.gov.za>

32 Ibid

Threats facing eThekwini's Biodiversity

Some of the challenges facing the EMD in the eThekwini region include:

● Invasive Alien Species

Invasive alien plants pose the single greatest threat to Durban's biodiversity. The proliferation of alien species, if not checked, could result in significant biodiversity loss. Alien species transform ecosystems and modify landscapes as they consume large amounts of water, light and oxygen, and add nitrogen to soil. This influences natural fire cycles, alters sand movement, and affects patterns of salt accumulation and redistribution. This issue is being addressed as part of the EESP.

● Land transformation (habitat destruction)

Given current estimates that put human population growth in eThekwini municipal area at 1.8% per annum, the approach that local government takes to urban development will impact the underdeveloped land, water and beaches. The mainstreaming of sustainable development in the IDP and the support provided by the EMD to stakeholders in the development process will ensure that development is adequate for the needs of the growing population and that it happens in a context of conservation of the natural environment.

● Unsustainable use of Medicinal Plant and Animal Resources

It is estimated that more than 70% of South Africa's population relies on traditional medicines made from plant and animal products. The national trade in medicinal plants is said to be worth about R270 million per year. eThekwini is a hub for the regional trade where over 4 000 tons of plant material are traded annually in the Durban area alone. Intensive harvesting of wild

stocks of medicinal plants is considered a serious threat to the biodiversity of eThekweni Municipality.

- eThekweni municipality has introduced an education programme to help combat over-harvesting of indigenous plants for medicinal purposes. People involved in the process of harvesting

plants are taken through a three-day plant identification, propagation and nursery establishment and management course. A propagation project was also initiated to produce and conserve these threatened and heavily used medicinal plants. This project successfully developed about 20 indigenous medicinal plant species.

Environmental Site Guide Training Programme

This programme offers people interested in the natural sciences an opportunity to learn more about the biodiversity of Durban. The course started in 2006 and is aimed at training volunteer guides to assist with interpretation at the various natural environment and cultural history sites in the city. The programme is run primarily by municipal staff of the Durban Botanic Gardens, Natural Science Museum and Natural Resource Division. The programme runs for seven months (440 hours of learning) and has been devised in accordance with official training authority standards for a National Qualification Framework Level 2 qualification-certificate. WESSA assists with the assessment and accreditation process. The course is run annually and will contribute to increased biodiversity awareness.

City of Johannesburg's Biodiversity and Conservation Program

The City's vision of the environment is defined in the following manner in the Joburg 2030 strategy:

'A natural environment in which the remaining biodiversity, ecosystems and natural open space are conserved and sustainably utilised for recreation and scientific research, while scarce natural resources such as water and topsoil are more efficiently used, with increasing reliance on renewable resources.'

A built environment which values and conserves its cultural and historical heritage, with buildings and open spaces which are aesthetically pleasing and designed using ecological principles (e.g. energy efficiency), and infrastructure which is equitably distributed and well maintained, rather than degraded.

A human environment in which people's work and residential environment is safe and healthy, the air and water is clean, noise is not invasive, sufficient opportunities for leisure exist and the organisation of the society promotes individual and community well-being in line with the Bill of Rights contained in the Constitution.⁷³³

Ecologically speaking, the city of Johannesburg falls within the Highveld mixed grassland zone, which is dominated by indigenous grasses³⁴ and trees³⁵. The vegetation includes pure grassland, bush grassland, mixed grassland, and temperate mountain bushveld and wetland areas. Pockets of the area's original indigenous Bankenveld vegetation still exist in the eastern part of the city and the Klipriviersburg Nature Reserve. However, after more than a century of residential suburban development, Johannesburg has become a heavily wooded area where different species of exotic plants, such as Blue Gum, Black Wattle and Jacaranda negatively influence the water table, drainage and erosion capacity of the area.

Johannesburg is home to many different species of fauna and flora, some of which are indigenous to the area but its biodiversity is increasingly threatened as the city faces increasing pressure on land for development. Like most cities in the world, the City of Johannesburg must deal with a legacy of insensitive and unsustainable development over the last several decades on its natural environment. As the city struggles to keep up with the ever-increasing need for development, Johannesburg must also deal with the challenges of burgeoning informal development on its urban fringes. Unplanned and under-serviced settlement can place additional pressure on the natural environment with a resulting reduction in biodiversity and negative effect on the natural environment.

33 State of the Environment report of 2003. <http://www.joburg-archive.co.za/2003/budget/idp/annex3.pdf>

34 such as *Loudetia simplex* (common russet grass), *Themeda triandra* (red grass) and *Trachypogon spicatus* (giant spear grass)

35 such as *Acacia caffra* (common hook thorn) and *Rhus leptodictya* (Karee)

Causes of biodiversity loss in Johannesburg

Johannesburg's aquatic ecosystems have been highly degraded by bacteria, chemicals and heavy metal pollutants resulting in the loss of plants, and the death of fish, frogs and invertebrates. Increasing diversion of urban water sources and insensitive infrastructure development has led to the loss of Johannesburg's wetlands. Contamination of rivers by industrial, urban and mining effluents and seepage has also impacted on the water quality, and hence the biodiversity which they support. Only fragments of natural riverine forest habitat remain.

Terrestrial ecosystems survive mainly in parks, open spaces and in natural conservation areas. While certain rivers and ridges enjoy protection status, the scarce natural Highveld grasslands are increasingly threatened within the city and they continue to be eroded by uncontrolled development and clearance for agriculture or new settlement. Many natural areas, particularly in peripheral areas where development pressures are expanding, lack formal conservation or protection status. In addition, habitat fragmentation and loss of linkages threaten the maintenance of genetic flow between remnant natural areas, and of the ecosystem services provided by natural systems.

Maintained open space is unevenly distributed, with disadvantaged areas having a deficiency of managed, natural or landscaped open spaces and recreational parks. Conservation areas are only found on the outskirts and alongside ridges and rivers in the metropolitan area. Management and maintenance of open space and conservation areas is inconsistent and generally lacks sufficient resources, with open spaces

being vulnerable to illegal clearing and dumping, uncontrolled burning, informal settlement, and the spread of invasive plants which compete unfairly with native species for habitat and food, ultimately altering ecosystems.

Many of the open spaces in the city are not zoned as parks and this creates a challenge as developers – who see them as potential sites and not considering their natural value – constantly threaten their survival. The city has started a zoning project focused specifically on Johannesburg's agricultural land and open spaces.

How biodiversity in Johannesburg is impacted

Natural habitats in Johannesburg are coming under increasing pressure from human settlement, mining and other commercial activities, and alien invasive plants are causing massive disturbance in natural systems. Problem plants such as *Acacia saligna*, a type of wattle, have dominated large areas of the city to the extent that natural vegetation has been almost completely lost. Other alien plants present a threat to water availability because they use greater amounts of water than indigenous vegetation and therefore reduce the amount of run-off water reaching streams and rivers.

Escalating soil degradation, declining biodiversity and soil productivity, and over exploitation of open land undermine the development prospects for present and future generation in the city. These impacts reduce the diversity and cover of indigenous plant species, and thus alter the functioning of the ecosystem.

The City of Johannesburg's initiatives to conserve biodiversity

Open spaces are non-built public or private green areas, which include parks, squares, gardens, pathways, cemeteries and natural reserves. The role of open spaces includes serving as national, local and private parks, preserves and recreational areas, archaeological preserves, urban green belts, greenways and trails, land for urban agriculture, and buffer zones to provide separation between conflicting land uses or to protect vulnerable areas. The need for parks and open spaces forms an essential part of addressing the recreational and aesthetic needs of the community in the City of Johannesburg.

The City of Johannesburg's Metropolitan Open Space System (MOSS) and Catchment Management Strategy form the

bulk of the Environmental Management directorate's portfolio, which includes the Johannesburg City Parks and the Johannesburg Zoo. MOSS is also involved in greening the city even further, with 100 000 indigenous trees to be planted by 2011. The project relies heavily on partnerships with the private sector, both voluntarily and through building guidelines given to developers.

The green areas (indigenous biodiversity areas and other green open spaces) within the city are managed as a system, based on the ecological links that exist between them. The overall aim is to create an ecologically friendly city by mapping the biodiversity profiles of the various open spaces and parks within Johannesburg's boundaries. The documenting of the various organisms and plant species that exist within specific areas will help with development management and environmental control, thus protecting Johannesburg's biodiversity as far as possible.

Johannesburg City Parks

Johannesburg City Parks takes care of 18 500 hectares of open space and green areas made up of:³⁶

- 1.6 million street trees
- 6 564 hectares of developed open space
- 5 500 hectares of pavements
- 3 600 hectares of undeveloped open space
- 2 328 parks
- 174 hectares of water surfaces
- 87 kilometres of river trails
- 35 cemeteries consisting of 1 088 hectares
- 22 nature reserves
- 15 bird sanctuaries
- seven hiking trails
- two crematoria
- two environmental and education centres
- one nursery

The main role of City Parks, an agency of the City of Johannesburg is to protect, manage and restore the integrity of the city's ecological systems with special concern for biological diversity, cultural landscapes and the natural processes within open spaces. Today, City Parks oversees 2 328 parks, all actively serving the communities in which they lie. Parks are essential green lungs for Johannesburg, but they are also priceless environments where residents can relax and revitalise body and soul.

Among its projects, Johannesburg City Parks is championing the Greening Soweto initiative, which is one of the most exciting projects leading up to the 2010 FIFA Soccer World Cup. As South Africa prepares for millions of fans, players and media to descend on its cities and soccer stadiums, Soweto stands out as the gateway community.

³⁶ www.joburg.org.za

Climate Change, Biodiversity and Conservation


The recently released report of the intergovernmental Panel on Climate Change prepared by 2 500 experts from 130 countries has made it clear that climate change is real. Many studies are linking the impacts of climate change to biodiversity. They predict changes in terrestrial and marine ecosystems, which will have a profound effect on agriculture, forestry, rangelands and fisheries, as well as on biodiversity. Shifts in temperature and precipitation will result in loss of biodiversity and compromised ecosystem function with a general aridification of conditions in the western half of South Africa. Such conditions would lead to a significant decrease in river flow in the southern and western catchment areas of the country, while change in precipitation patterns would result in of the areas amenable to the country's biomes shrinking to about half of their current size, with resulting huge losses in biodiversity.

Biodiversity is a serious contributor to genetic diversity, and has direct implications for the sustainable livelihoods of many communities, and employment and revenue in the form of eco-tourism. The variety of plants, animals and micro-organisms also underpins a range of services provided to communities by healthy ecosystems,

including the provision of fresh water, climate control through absorption of carbon dioxide by vegetation, and opportunities of recreation.

As discussed, climate change is an important driver of loss of biological diversity, as species and ecosystems struggle to keep





up with the pace of rapid changes in temperature and rainfall. However, the ability of humans to adapt to climate change will also be compromised if we fail to reduce the other pressures on biodiversity. It will be increasingly difficult for ecosystems to adapt naturally to the present climatic changes brought by human activity. Firstly, because the rate of change projected over the coming century is much greater than anything experienced in recent time. Secondly, because the options available for natural adaptation have been greatly reduced by the large-scale conversion of habitats. Animals and plants are unable to shift their range to more sustainable locations should their territories become unsuitable due to climate change if they are surrounded by urban sprawl.

Climate change has the potential to accelerate the current rate of species extinctions. A failure to address the causes of biodiversity loss will have huge implications for human development, especially since the poor are more immediately dependent on the ecosystem for their basic survival.

As South Africa becomes warmer, ecosystems are likely to become increasingly

prone to invasions by more tropical alien species. Extreme climate events such as floods would exacerbate the problem, allowing alien plants to move into riverine areas. The effects of climate change on highly variable environments such as estuaries are difficult to predict but expected to be severe. Changes in the passage or volume of the Agulhas and Benguela currents are likely to have enormous implications for marine organisms along the South African coast. Healthy terrestrial and aquatic ecosystems, and the existence of intact ecological corridors linking different parts of the landscape, will help to mitigate the impacts of climate change and should be seen as a crucial element of South Africa's climate change adaptation strategy.

In addition to maintaining healthy ecosystems, even in highly populated cities, other interventions can be put in place to mitigate the effects of climate change. For example, changing current energy consumption patterns that contribute to global warming. We have the opportunity to act now, and thus ensure a healthy environment for us to live in today and in the future.

Conclusion

Human well-being and the health of our planet's biodiversity are vitally linked and yet people living in cities often ignore the role that natural ecosystems play in their quality of life. Local authorities must develop strategic biodiversity plans in order to protect the assets that provide critical environmental goods and services.

South Africa is a signatory to a number of specific international agreements, such as the Biodiversity Convention and World Heritage Convention, and it is incumbent on local authorities to give effect to these conventions by adopting appropriate management strategies.



Coastal Management Key to Conservation and Job Creation

Introduction

South Africa's varied coast extends for about 3 200 km from the border with Namibia to the border with Mozambique. Our coast is a global treasure and a fundamental part of our national heritage, an asset that needs to be carefully managed to yield sustainable benefits for all South Africans.

Nearly a third of our population lives at the coast, mainly in the cities of Durban, Cape Town and Port Elizabeth as well as centres such as East London, Saldanha and Richards Bay. These port cities are gateways to international trade. Coastal ecosystems provide food and sustenance to many people and support a range of coast-dependent businesses and commercial ventures.



Beaches and coast areas are an important asset for recreation and tourism, and are places of cultural, educational, religious, scientific and spiritual importance to many South Africans. Significantly, our coast offers many opportunities for future economic and social development, particularly in the under-developed areas of our country.

The coast is also a distinctive, complex and interconnected natural system, with resources that are finite and vulnerable to overuse and degradation. The biodiversity of the coastal zone encompasses many designated protected areas, both wetland and marine. The coral reefs, sea-grass beds, sand dunes, estuaries, mangrove forests and other wetlands that occur around many shores provide crucial nursery habitats for marine animals and sanctuaries for endangered species. Maintaining the diversity, health and productivity of our coast is central to realising and sustaining the economic and social benefits it provides.

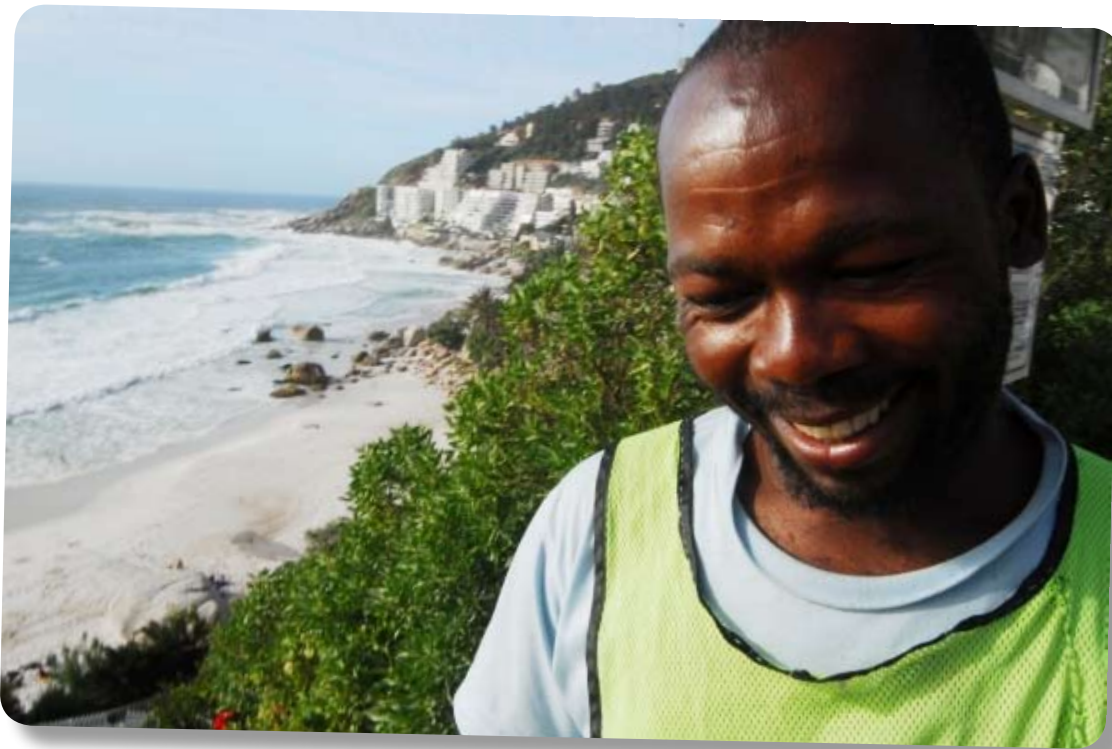
In order to realise and sustain these benefits, the value of coastal ecosystems as a cornerstone for development needs to be explicitly acknowledged in the decision-making processes of government and the private sector, and by communities and individual coastal resource users. At present, this is rarely the case. Consequently, our valuable coastal resources are be-

ing squandered. Unless we maintain the diversity, health and productivity of coastal ecosystems, we will miss out on current benefits as well as jeopardise the future development opportunities our coast offers. A profoundly new approach is needed to manage our coastal resources wisely and to harness them for sustainable coastal development.

Coastal management ensures ongoing quality of life of human communities that depend on coastal resources, and maintains the biological diversity and productivity of coastal ecosystems. Coastal management involves natural resource management, and also the co-ordination of the activities of a range of actors who operate in the spheres of both direct and indirect coastal influence. In fact, it is this focus on co-ordination and integration that distinguishes coastal management from many other sector-specific management activities. Coastal management also entails the effective implementation of coastal policy, through a cycle of continual improvement based on ongoing implementation, review and revision.

Given the enormous value of coastal resources, as well as the mounting human pressure on coastal ecosystems worldwide, increasing attention has to be given to improving the management of all coastal regions.





Impact of Climate Change on Coastal Areas

In 1998, tropical sea surface temperatures were the highest on record, the culmination of a 50-year trend. At the same time coral reefs suffered the most extensive and severe degradation on record. This is believed to be due to global warming. Climate change threats are compounded by pollution and over-exploitation. Even reefs in marine sanctuaries are threatened by global climate change.

In South Africa, the predicted rise in overall temperature would raise sea surface temperature, resulting in the migration of coastal species. Studies have also indicated that the occurrence of 'red tide' on the west coast would increase. Dense concentrations of red tide organisms can suffocate fish by clogging or irritating their gills, so that they cannot extract sufficient oxygen from the water. Red tides may also kill indirectly by depleting the oxygen dissolved in the water. Other predicted results of climate change are changes in sand inundation on the eastern coast and an increase in the intensity of storms.

Not all sections of the South African coast are equally vulnerable to the impacts of climate change. The high cliffs of the Cape

Peninsula are less vulnerable than gently sloping sandy shores. Soft erodible coastlines backed by flat and low lying coastal plains are most vulnerable – tidal inlets, deltas and barrier islands are the natural environments most at risk.

Associated with the sea level rise will be a rise in the groundwater table. Areas which were previously dry may become marshy or at least suffer from high water tables, possibly with accompanying engineering problems. The coastal water table will rise everywhere along the coast, even in urban areas, unless suitable aquifer management is carried out. Likewise increased intrusion of salt water into the coastal aquifers and possibly some rivers will need to be managed.

Destruction and Pollution of Coastal Areas

Key issues in the management of the coastal zone and offshore waters include the loss of biodiversity and habitats through human-related pressures, the impacts of which have become increasingly acute within the last 50 years. Physical destruction and pollution of habitats from land-based and marine sources as a consequence of economic development is rife.

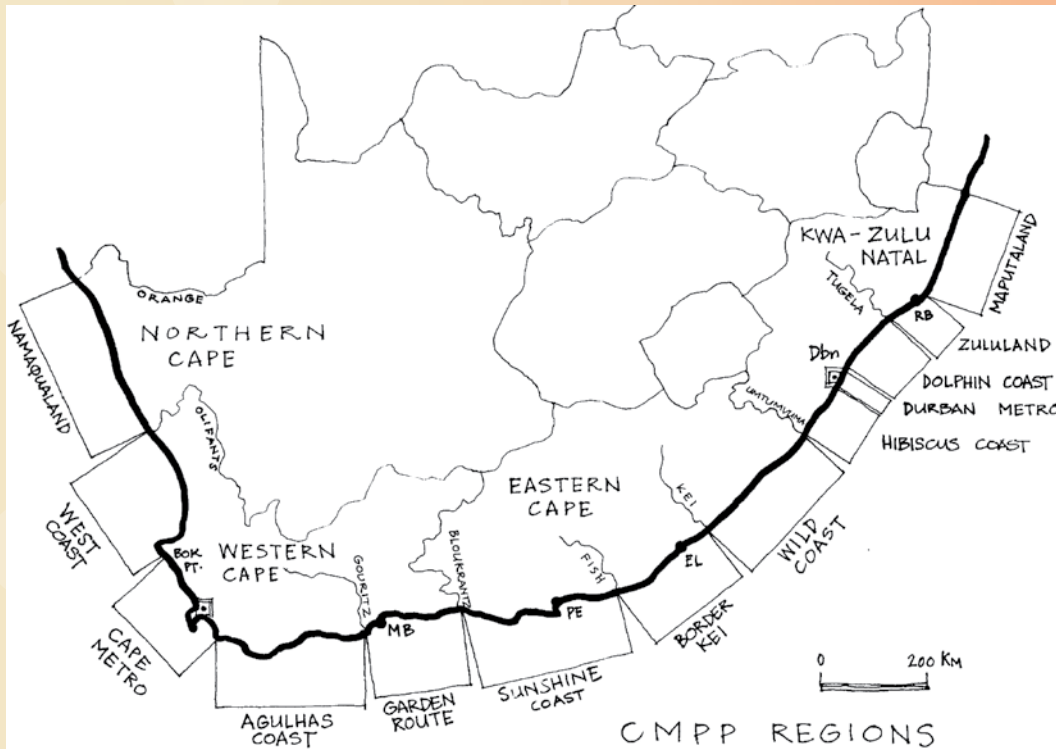
The main causes of this degradation, apart from natural disasters, are poverty and the pressures of economic development. Economic gains, many bringing only short-term benefits, are being made at the expense of the integrity of ecosystems and the vulnerable communities that they support. The over-exploitation of offshore fisheries impacts on the food security of coastal populations.

These pressures have driven an overall decline in marine productivity, creating significant socio-economic opportunity costs. Direct impacts by humans are exacerbated by the fact that seawater links and disperses marine populations over vast areas, easily spreading invasive alien species and pollutants.

The general South African public, however, especially coastal stakeholders, appears to be increasingly aware of the value of our seas and coast and of the importance of effective management. Protection, in the form of marine protected areas and improved management, has most recently been receiving high priority at national and international levels, and several of the acts, policies, and protocols used to govern South Africa's marine and coastal environment are either under review or have recently been revised to promote improvement. It is still too early to measure their effectiveness, but dramatic change for the better is required if the country is to benefit from the opportunities available and reverse the current negative trends.



Coastal Cities' Challenges



Coastal resources in South Africa are faced with many pressing challenges. We explore both these challenges and the opportunities for development and job creation in each of South Africa's coastal regions in detail below.

The Cape Coastal area

Cape Metro

Cape Town (Cape Metro) has 307 km of coastline stretching from Silverstroom Strand in the north-west to Kogel Bay in the south-east and including two of the largest bays in South Africa, namely Table Bay and False Bay³⁷.

Key biophysical features of the coastline in Cape Town include:

- dunes
- coastal erosion
- high levels of marine biodiversity
- high levels of terrestrial biodiversity
- estuaries
- contrasting water temperatures between the Atlantic and False Bay coasts

³⁷ (both recognised internationally as World's Most Beautiful Bays)

Agulhas Coast

Proximity to Cape Town, good road networks, natural features and the scenic beauty of the Agulhas Coast have resulted in rapid development and economic growth, especially in the holiday- and tourism-related sectors. This has not led to a large amount of job creation, however, as the economy of the region is seasonal and is not diverse or labour-intensive. Private property development has reduced access to the seashore. Increased demand for offshore, in-shore and intertidal coastal resources has intensified illegal practices and user-conflicts.

The region is rich in natural assets. It is the centre of the Cape Floral Kingdom and provides excellent opportunities for shore-based whale watching. This region is also the centre of South Africa's abalone industry. If the diversity, health and productivity of the region's coastal ecosystems can be retained, significant opportunities exist in the property development, agricultural, forestry, nature-based tourism and fishing industries.

Garden Route

The scenic beauty and high biodiversity of the Garden Route, with its bays, rivers, estuaries and lakes, underlie the region's relative economic success. Conservation has been a priority in the region, with the Wilderness Lakes system and three protected areas incorporating 13% of the coastline. There are large areas of indigenous coastal forest and timber plantations – with fynbos and high-potential agricultural land comprising the remaining undeveloped areas.

The economy of the Garden Route is focused on tourism and holiday-related activities, although fishing, forestry and agriculture take place and there is a petroleum industry. Disadvantaged residents face limited access to coastal resources,

highly seasonal employment, high levels of unemployment and low investment in infrastructure. The influx of job seekers from the Eastern Cape is a particular challenge for the Garden Route. Since the scenic nature of the region is important to its economy, there is an urgent need for effective management of the natural resource base, at the same time creating jobs, dealing with urbanisation and developing the enormous tourism potential of the region must be prioritised.

The Eastern Cape Coastal Area

Comprising the Sunshine Coast, Border-Kei and Wild Coast regions, the Eastern Cape coastline is over 800 km long, yet the provincial government has very limited capacity for coastal management. There is a marked contrast between the cities and the rural areas. The main cities of Port Elizabeth and East London dominate the economy of the province, through port activities and manufacturing. The rural areas are economically depressed, with widespread poverty, poor infrastructure and limited capacity to manage the coast. These regions have spectacular cultural and natural assets, however, and have high potential for nature-based tourism with community participation. Algoa Bay and Wild Coast-Emonti are two of the areas selected as pilot projects for job creation.

Sunshine Coast

The Sunshine Coast is a mixture of a few urban centres and undeveloped coastal areas rich in natural assets such as dune fields, large estuaries and a wide variety of vegetation types. The economy of the region centres on Port Elizabeth's manufacturing, commercial and industrial activities. With well-developed infrastructure, the region attracts tourism and recreation, especially



in the resort towns. In some areas, intense development and the demand for scarce fresh water supplies have led to degradation of natural resources such as estuaries.

Poverty levels are very high and the influx of job seekers from surrounding rural areas contributes to the situation of inadequate services and infrastructure. This has added impetus to the need for large-scale development projects, such as the proposed Nquna harbour and Industrial Development Zone, and the extension of Addo Elephant Park. The greatest economic potential of the region lies in export-orientated industrialisation in the Port Elizabeth area.

Border-Kei Coast

The Border-Kei region is largely rural, with great scenic beauty, high biodiversity and wilderness character. East London is the main urban centre, although there is also a scattering of small towns, resorts, hous-

ing clusters and rural villages along the coast. East London has a well-developed infrastructure, and an economy based on manufacturing and industry, with some tourism, farming, recreational fishing and quarrying. In contrast, the more rural areas of the coast are characterised by high unemployment, poverty, lack of infrastructure, poor access to the coast and a high level of subsistence activity.

The economy of the region has good scope for expansion. The possibility of large-scale industrial projects related to the port has been explored, for example, the proposed East London Industrial Development Zone. Commercial, subsistence and recreational fisheries have potential for development, as do mariculture and seaweed harvesting. The region has great potential to support nature-based tourism and recreational ventures with community participation.

Wild Coast

The Wild Coast is mainly rural, with spectacular scenery, indigenous forests with high biodiversity, and deep and fertile soils. There is a low level of infrastructural development, with few towns and resorts. Most coastal communities live in extreme poverty – high unemployment and poorly developed infrastructure make access to the coast difficult.

The economy of the region is based to a large extent on subsistence agriculture and on income from pensioners and migrant labourers working outside the region. Development is limited by high male absenteeism coupled with the tribal tenure system, which limits women's access to land. The weakness of government structures has allowed uncontrolled and often illegal use of coastal resources by residents and visitors. The coast, however, remains an important source of food and provides other resources for local people.

Agriculture, forestry and tourism are the main potential growth industries, and form the basis of the proposed Wild Coast Spatial Development Initiative. Opportunities exist for small-scale farming and small, medium and micro enterprises around nature-based and adventure tourism with community participation.

The Durban Coastal Area

The Durban Metro is an expanding urban centre with a population of over 2,5 million. Important economic activities include tourism, recreational and leisure activities, manufacturing, commerce, financial services, the petrochemical industry and the textile industry. The region is a popular destination for local and national visitors. Durban Port has the largest volume of container traffic in southern Africa and – with

its associated manufacturing and industrial activities – is crucial to the to the KwaZulu-Natal economy.

The development of industrial and port facilities has provided significant employment and economic development opportunities. Urbanisation and industrial and commercial developments have, however, raised serious challenges for the coastal environment. These include coastal pollution from industrial wastes and shipping, and the inappropriate siting of petrochemical industries. Infrastructure is insufficient to keep pace with the expanding population – about a third of residents are still without formal housing and basic services, and more than half do not have electricity.

The region's accessibility from other parts of the country and its affordability ensure that Durban will remain one of South Africa's premier holiday destinations, at least in terms of the domestic market. Other areas for potential economic development include export industrialisation and trade growth related to an expansion of the port capacity, and the possible relocation of the international airport.

Hibiscus Coast

The Hibiscus Coast, Durban Metro, Dolphin Coast, Zululand Coast and Maputaland Coast regions comprise the coast of KwaZulu-Natal Province. This relatively short coastline, some 562 km, is one of the most densely populated in Africa.

The province has experienced significant economic growth in recent years. Durban and Richards Bay, with port facilities, are the centre of industrial and manufacturing activities. Durban is also a very popular tourist and holiday destination. Tourism and recreation are important sectors for the Hibiscus and Dolphin coastal regions,

but have often been characterised by linear coastal development. By contrast, Zululand and Maputland are among the poorest regions in South Africa, with inadequate infrastructure limiting development prospects. These rural regions display some of the most spectacular coastal environments and offer potential for community-based tourism, agriculture and fishing.

Significant disparities exist between the former KwaZulu and Natal areas, which together make up the Hibiscus Coast region. The former Natal coastal area contains many small towns, where infrastructure and services are well developed. The inland coastal area falls in the former KwaZulu and is characterised by a large population, high unemployment, limited infrastructure and services, and continuing conflict in some places.

The economy is based largely on seasonal leisure-based tourism and recreation. The Hibiscus Coast is well positioned to develop nature-based tourism with community participation, because of its proximity to Durban, warm coastal waters, reefs with high biodiversity and dense coastal thicket with a variety of unique animals and plants. Although tourism infrastructure is well developed, there is concern that development has not always occurred in a socially and environmentally responsible manner.

Ribbon development and private ownership of land have limited equitable access to coastal resources. The coast, however, continues to provide an important source of food and other resources for local people. In addition to carefully managed tourism and recreational development, there is some scope for further agricultural development in the region. Small-scale farming, in particular, can provide alternative livelihood prospects, for example, through the cultivation of tropical fruits and sugarcane in association with land-reform programmes.

Dolphin Coast

The Dolphin Coast region has undergone substantial change as a result of land clearing for sugarcane and timber cultivation, and coastal housing, but pockets of the original coastal vegetation remain. The Dolphin Coast forms the primary industrial-development axis between Durban and Richards Bay, the focus of new investment in the proposed Spatial Development Initiative for the area. The strength of the economy, based on agriculture, light industry, wood products, property development and tourism, is due mainly to its proximity to the Durban Metro.

The region is reputed to have the fastest growing real-estate industry along the South African coast, with much linear development of holiday homes and tourism infrastructure. Recreational harvesting of in-shore resources is extensive and the accessible beaches attract large numbers of holidaymakers. The proposed new airport at La Mercy, near Tongaat, could benefit the area and increase the number of visitors to the region.

Potential exists for job creation in agriculture through diversifying crops and widening opportunities for small-scale farming. The region may also have the province's best prospects for re-attracting higher-income and international tourism, given careful environmental management.

Zululand Coast

This mostly rural region is rich in natural assets, such as long sandy beaches, high, forested dunes and broad coastal plains. Many rivers, coastal lakes and wetlands support a wide variety of birds and animals, including hippos and crocodiles. Port activities in Richards Bay, light and heavy industry, mining, sugar cane and timber are the main focus areas of the formal economy. Infrastructure includes a well-developed road network and airport facilities.

Zululand experiences extreme poverty, high unemployment, a lack of educational opportunities, a lack of basic services and high male absenteeism. Rural subsistence activities such as agriculture and fishing are important to the region. An influx of job seekers to the industrial area of Richards Bay has placed strain on infrastructure and government services provision.

A mix of industry, mining, agriculture, forestry and nature-based tourism with community participation could provide a strong and sustainable economic foundation for the region, although effective planning and management are required.

subsistence activities. Unemployment is high, as is male absenteeism, and nearly two-thirds of the population is under 20-years-old.

Land-ownership issues and historical forced removals of residents underlie deep-rooted conflicts between communities and conservation bodies. Currently, commercial, recreational and subsistence use of natural assets is largely uncontrolled. With appropriate management of natural resources and economic development opportunities, however, this region could provide an important economic base for the benefit of coastal communities.

Maputaland Coast

This rural region is well known for its tropical natural features and scenic beauty, most notably the St Lucia Lake and estuary system. It is also characterised by poverty, underdevelopment and a lack of infrastructure, with widespread health problems. The economy is focused on rural

This is the focus of the Lubombo Spatial Development Initiative that has commenced in the region, and existing partnerships between the private sector and tribal authorities around the development of appropriate tourism infrastructure along the coast. Small-scale agricultural development also offers prospects for supplementing incomes and creating jobs.



Working for the Coast

Working for the Coast (WftC) is a national project that helps coastal communities to keep our coast healthy and clean for everyone's benefit. It is co-ordinated by a dedicated team of people in the Coastal Management Section of the Department of Environmental Affairs and Tourism, and supported by the Wildlife and Environment Society of South Africa (WESSA). The main thrust of the Working for the Coast (WftC) programme is poverty alleviation through sustainable development. Over 2000 people, mainly women and youths are employed by the programme.

All along our coast, jobs have been created, the coastal environment is being improved, people are being trained and small businesses are being started. Some of the most needy coastal communities are being given a chance in a lifetime and – through an education, training and development programme – they are being given a foothold to sustain their lives in the future.

The WftC teams come from our neediest coastal communities and many of them have never had a job before. When they graduate from the programme after two years, they have the necessary skills to develop economically viable opportunities for themselves. By helping to keep our coast environmentally healthy and safe, they are, in turn, self empowered by a programme that helps them.

WftC's work is vitally important for the health and integrity of the coast because it provides valuable support for local authorities and conservation bodies. The teams are involved in:

- rehabilitation and clean-up of the coastal environment
- providing safety and security along the coast
- providing tourism information and interaction
- upgrading of coastal infrastructure



Conclusion

The marine and coastal resources of South Africa are a rich and diverse national asset, providing important economic and social opportunities for the human population, which, in turn, has developed a strong reliance on these resources for commercial opportunity and gain, food, recreation, and transport. These resources have facilitated job creation and general economic upliftment in coastal regions. Increasing human and environmental pressure on the country's marine and coastal ecosystems, however, has changed the functioning and structure of many components of these ecosystems, and uncontrolled or mismanaged use has led to over-exploitation, degradation, and resource loss.

There is a widespread lack of resources and skills for coastal management, particularly in smaller local authorities. This means that proactive coastal management efforts are especially difficult to initiate. In attempts to boost their capacity, some local authorities co-operate with nature conservation agencies and are involved in co-management initiatives with community groups.

The will and capacity of cities to manage their coastal and marine resources in ways that promote human well being, for present populations and for future generations, are important issues. Effective governance at community to global levels is a prerequisite for environmental stewardship, while the development and maintenance of that stewardship depends on a sustained commitment to human and technical capacity building.

Such capacity building encompasses scientific data collection and monitoring, the construction of appropriate legal frameworks, and improving capabilities in surveillance and the enforcement of legislation. Capacity building in monitoring and enforcement at community level offers important opportunities. Community-based or participatory monitoring has been very effective in increasing the personnel available for monitoring and at the same time enhancing environmental awareness and ownership among community members.



