Full Length Research Paper

Environmental services and development in an African port city

Mark Jury[1]* and Sylvain Guyot[2]

[1]Environmental Studies Department, University, Zululand, KwaDlangezwa, South Africa. Current affiliation: Physics Department, University Puerto Rico, Mayaguez 00681, USA
[2]Social Geography Department, University of Grenoble, France.

Environmental services may be guided in the process of urbanization through the actions of local stakeholders. In the evolving cultures of Africa, there are contrasts driven by past colonisation and recent democratization. Stakeholders' attitudes towards the environment are molded by the problem of pollution in the port city studied, and the industries' positive effects on the local economy. Environmental activists see a need to maintain ecological integrity through spatial integration. Some recommendations to optimize development and reduce conflict are provided.

Key words: African development, environmental conflicts, port city, pollution, beach use, environmental lobby.

INTRODUCTION

Coastal zones are experiencing increasing environmental impacts from growing populations and development strategies are needed to ensure sustainability. This paper discusses these aspects with particular reference to Richards Bay, a port city situated on the southeast coast of Africa characterised by beaches, dunes, lakes and wetlands rich in flora and fauna. Given the warm climate and scenic landscape, service sector growth is inevitable and should be guided through culturally informed environmental research.

The environment is a space altered by humans, whose natural (fauna, flora, morphology) and social (residents, housing) components, in dynamic interaction, may become imbalanced. The environment can be endangered by human (polluting by industry, clearing a forest) or physical ('natural' catastrophe) action: one speaks, thus, of 'environmental problems'. This dynamic definition of the environment suggests that the researcher must take a position on the seriousness and long-term outcome of development decisions that lead to temporary imbalances. We recognise that improving social well-being should take priority over the strict preservation of 'nature' (Biehl, 1995; Guyot, 2003; Thompson, 2002).

Social progress and environmental sustainability can be associated under certain conditions, but these conditions may be difficult to achieve (Bond, 2002; Eden, 2000).

Diverse groups of stakeholders, in shifting coalitions, position themselves differently on local environmental questions. The environment, as defined above, thus implies that conflicts will arise over the use of space. Since the environment is a spatial dynamic, and conflicts between stakeholders cover processes that are not spatially defined (coalitions, strategies), one can study environmental conflicts in the context of land use and stakeholders motives (Dahl, 1993, Collinson, 1996; Wong, 1996; Eden, 2000; Dietz, 2001; Bond, 2002; Clarke, 2002; Dovers et al., 2002; Guyot, 2003). Through arbitration in the process of development planning, decision makers may be compelled to take a stand on problematic environmental questions whilst accomodating other stakeholders' viewpoints. Environmental conflict thus brings to the fore practices and coalitions linked to the stated problem (Crowfoot and Wondolleck, 1990; Moore, 1998).

Moore (1998) suggests "Looking at the: Involvement of multiple and diverse parties - Incompatible interests between or among parties - Differing appraisals of the situation by diverse parties - Contrasting forms of powers and leverage among parties - Lack of relationships among involved parties or history of problematic relation-

---

*Corresponding author. E-mail: jury@uprm.edu.

ships - Divergent expectations regarding who should be involved in the resolution process - Confusion over the appropriate forum for resolving issues - Unequal levels of knowledge and expertise - Lack of an identified and respected convenor who can bring parties together." Whilst Crowfoot and Wondolleck (1990), suggest: "Environmental conflicts are rooted in different values of natural resources and environmental quality. Some individuals perceive an intrinsic value in things that are wild and natural while others do not. Some see societal obligation to protect species and preserve habitats while others do not. Some place priority on maintaining biological diversity and environmental integrity for future generations while others place priority on harnessing nature's resources to service the needs of today's society."

The case of Richards Bay, an industrial and port city, pertinently illustrates conflicts over the uses of space and environment between industrialists, municipal government, residents and environmentalists.

RESEARCH METHODOLOGY AND GEOGRAPHICAL CONTEXT

This study is based on field-based surveys conducted between January 1998 and May 2003. Around fifty representative stakeholders (industrial stakeholders, environmentalists, politicians, heads of associations, residents) were interviewed by means of 'sociological'-type interviews (Olivier de Sardan, 1998) either as participant or passive observer. All interview recordings were archived by the author.

Richards Bay (29S, 32E) serves as a hub for infrastructure development (Figure 1) and its port handles much of South Africa's maritime cargo. Although its port is 60 km^2, the population is less than 100 000. In the early 1900s it was a small fishing village, and later in the 1950s a coastal resort. During harbour development in the 1970s, a number of heavy industries were located there to generate revenue, creating environmental consequences (Aniruth 1997, Cubbin 1998). Sea discharges of industrial waste exceed 100 000 T/day, a level comparable to some of largest cities in the world. Air pollution output is 7 000 T/day, 1% of which is directly harmful to health. Unfortunately an earlier city plan put three industries upwind from the central district, resulting in health impacts. Thus mitigation strategies and informed plan-ning are needed.

Richards Bay lies 160 km north of Durban and 230 km from the Mozambican border. Richards Bay's coastal population and management is partly Afrikaans ('Afrikaans' refers to conservative white people of Dutch descent who colonized this part of Africa) (Nicholas, 1997; Guyot et al., 2001; Demarcation Board, 2004). (We use colonial-era racial categories as follows: whites are referred to as

elites, black people are referred to as tribal or rural). Richards Bay is a spread-out urban ensemble (Folio, 2003) with territories formerly separated under earlier colonial laws (white city centre, Indian and black cityships, black rural chieftainships) now combined in one municipality. The social stake lies in upgrading the historically disadvantaged areas.

Richards Bay is the largest shipping port by tonnage in Africa (90 M T/annum), specialising in coal exports. Imports supply the industrial area near the port - two aluminium smelters, a fertilizer plant, a paper pulp plant, a mining smelter - (Figure 2). Most industrial products are exported by ship (Lamy, 2003). The large industries and their subcontractors (small to medium-sized businesses) employ about 10,000 people, representing > 50% of the city's formal jobs. They pay 75% of all local taxes (The municipality depends on the industries for 65% of its budget in property taxes and fees for city services (information provided by the municipal budget service, 25 April 2003). It is a good situation for industrialists, where land for expansion and extension is readily available. With a concern for diversifying its activities and reinforcing a metropolitan image, the Richards Bay municipality has attempted to promote a re-birth of tourism development that includes the construction of numerous infrastructures, such as a waterfront (Tourist waterfront with restaurants, hotels and yacht club), a marina and a casino. However, 'an industrial port' remains the lasting impression most visitors have of the city.

The city and its residents, the industrial-port area and the tourist-recreational area co-exist in a problematic manner. Conflicts over the use of space exist between these different stakeholders: residents complain of air pollution, the beach is dirtied by water pollution. The city's image is defiled. Environmentalists are mobilised to address these urban planning issues, but have an uphill battle: given the national priority for Richards Bay to function as an industrial centre. The necessity of sharing natural ammenities across different cultures to create a multiracial character is gradually emerging (Magi and Nzama, 2002).

At Richards Bay, pollution is one of the outward and negative signs of industrial development. More efficient environmental regulations would help prevent problems (On 16 July 2002, the sulfuric acid plant of the fertilizer suffered an accidental leak, resulting in 229 people being treated for gas poisoning). Yet, the industries generate conside-rable revenue and help drive a city budget in excess of $ 100 M/annum (Bethlehem and Goldblatt, 1997).

The sustainability of environmental services implies spatial segregation at Richards Bay, e.g keeping polluting industries away from residential areas. Conflicts occur over the need to add value to scenic areas, whose recreational potential could benefit the entire population. Plans that make optimal use of the coastal zone for sus-
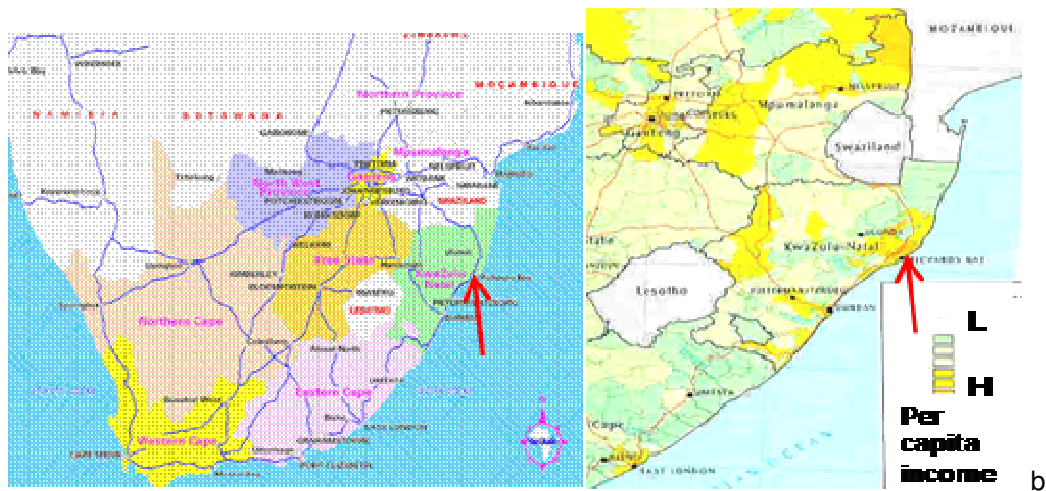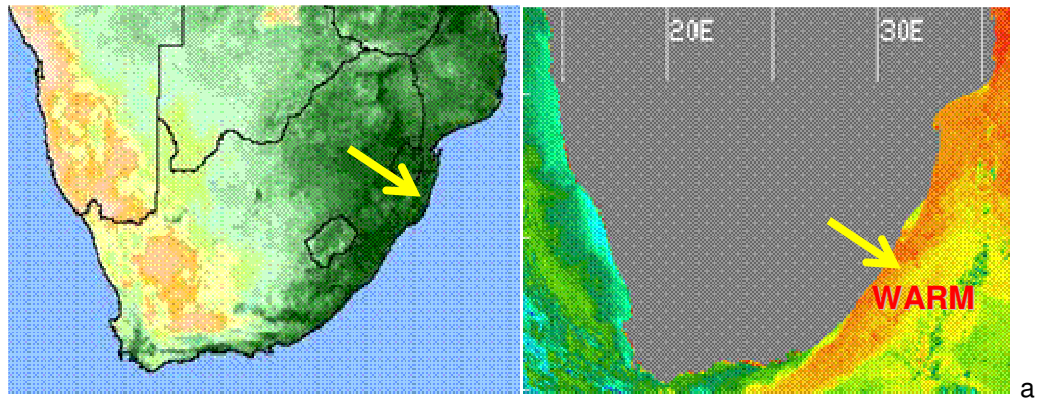
Figure 1. a) Vegetation and sea temperature maps from satellite imagery; b) Transport routes and per capita income (arrows point to Richards Bay); **c)** View of Richards Bay harbour mouth looking seawards.
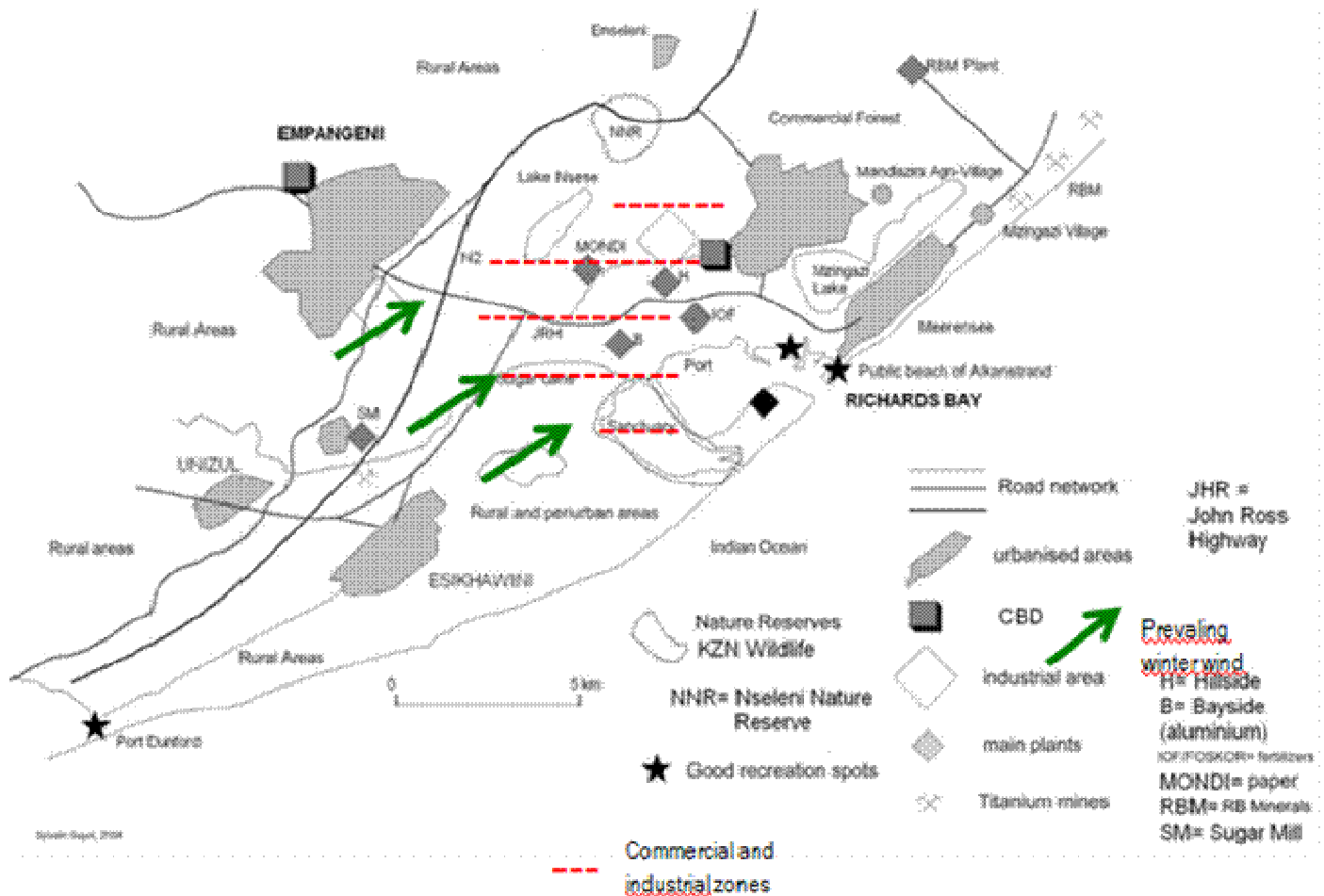
Figure 2. Richards Bay, the city and port area.

tainable development are thus a high priority. A new road system to connect the port cities of Maputo and Durban will increase trade in the Zululand area, whose demographics are comprised of small areas of wealth (Mtunzini, Richards Bay, St Lucia) surrounded by rural poverty where annual income is less than $1000/person and unemployment exceeds 80%.

To reduce the gap between rich and poor, job-producing developments are needed. Yet current trends suggest that only 5 000 jobs will be generated via manufacturing industry in the next decade. If development shifts to the service sector, over 50 000 jobs could be created with the same investment, improving socio-economic conditions. This presents a challenge to environmental scientists to find ways to promote development that places value on a scenic landscape and its ecological services.

Industrial development in Richards Bay

Richards Bay's industries are unequally polluting, as the

diversity of their manufacturing processes demonstrates. Certain liquid or gaseous effluents create a genuine threat of pollution for the land or marine environment, or for the residents (Not to mention the workers of the Industry under consideration). Others imply only an aesthetic problem (unpleasant smells, colour, etc.).

These discharges, guided by the prevailing winds or by pipelines, are spatialised. The proximity of the industrial areas to the city (1 km) exposes residents to the effects of pollution (Figure 2). Most people can not distinguish between the smell of 'rotten eggs' (H_2S) – and sulphur dioxide or hydrogen fluoride pollution, less odorous but more dangerous to the health of children and the elderly, in particular. The paper mill environmental officer explains this confusion often made by people.

People talk about the smell first. The odour people get from our plant is reduced sulphates, hydrogen sulphide - not dangerous at the concentrations emitted. It has been proven that there is no negative

impact, but unfortunately there is an aesthetic impact (Some interviews conducted in various languages have been translated for this article)

"The pollutants intensify in winter during windless days, when the wind blows from the west, they are particularly dangerous for nearby residents. All the residents interviewed – except those working for the industry – mention air pollution as being one of Richards Bay's environmental problems. A Meerensee resident developped allergies since she began living in Richards Bay'', at the beginning of 2000. The city's doctors attribute most of the sinusitis, rhinitis and other allergy problems to the frequency of air pollution. However, there again it is a matter of perception. A scientific study on these correlations, found a direct and significant link between pollution levels and health impacts (Jury, 2000). Residents say their visitors refer to Richards Bay as 'a city that smells'. Most of the industries are located on the main access road. It is a detrimental location that only can be resolved with difficulty. How do environmentalists react, organise themselves and confront the problem of industrial pollution?

The "green edge" put to the test

Different residents' associations and environmental groups have formed to pressurise industry to reduce their emissions. These groups are now coordinated through the Richards Bay Clean Air Association. However, rivalries can occur between people at the centre of the issues.

One councillor took action to oppose the construction of the Hillside aluminium plant in 1993. In 1995, she was behind the discussion group on pollution and was elected in 1996 as municipal councillor of Meerensee, the suburb of highest per capita income, representing the Richards Bay Ratepayers Association (RBRA), using the environmental theme. The new municipal election regulation of 2000 prevents rate payers associations from contesting elections. So the Meerensee councillor was re-elected under the banner of the DA (The liberal, capitalist Democratic Party defends the interests of the elite) (Democratic Alliance). Having earlier criticised the city's industrialists for 'destroying' the environment; the discourse has become tempered by the realities of South Africa's growing unemployment and crime. The discussion group on pollution has shifted attention to public services in rural fringe communities integrated under the new municipal boundaries in 2000.

"We now have adjacent municipalities, and people need to be mindful of the costs of municipal services. These are rural people with tribal customs. We have municipal regulations, so it can be difficult

to accommodate them''.

''This is a conservative viewpoint that challenges the post-colonial political strategy, which aims to redress past injustices against the 'historically disadvantaged communities.'

The Richards Bay Clean Air Association (Richards Bay Clean Air Association (RBCAA)) is criticized as biased:

The Richards Bay Clean Air Association is 'industry moni- toring industry'. It is paid for by industry, industrial people people serve on it and … industry is policing itself ''.

Another active environmentalist, got involved in the Richards Bay Ratepayers Association in 1994 and was also an elected municipal councillor in 1996. In this case wearing two hats, that of President of the RBRA and Vice President of the Clean Air Association. 18% of elected municipal officials came from the RBRA, which demonstrates a popular will for independent politics. The Clean Air Association includes stakeholders from industry, civil society, the municipality and the provincial Department of Environmental Affairs.

Presently, SO_2 and particulates are regularly measured, and the association envisages the measurement of fluorides and other trace gases (RBCAA meeting, December 2001). This association is financed by the industries with an objective of self-monitoring and assuming a sense of responsibility. Not all of Richards Bay's industries subscribe to this ethic of self-monitoring, promoted in international circles on relations between environment and industry. This association takes into account residents' complaints but may also seek to to justify the excesses perpetrated by the industrialists. It also has the possibility of making development suggestions to the local environmental regulatory authority, the provincial Department of Environmental Affairs.

''Our frustration with the RBCAA remains that we are not a regulatory authority. We do not have the power to enforce laws. If one industry does something wrong, we cannot fine them. All we can do is bring the matter to the relevant authorities. At least they sit on the RBCAA board. But at the moment my concern is the conflict between the association and DEA (Department of Environmental Affairs)''

The RBCAA does the job of pushing to the forefront the government's unwillingness to regulate pollution. Instead the government priority is to attract new investments, which create jobs and business. A university academic, resident of Meerensee, and member of the Zululand Environmental Alliance (ZEAL) is an opponent of air pollution, but realises that industry is a major economic driver. So he seeks ways to keep industrial development

away from recreational and residential areas. But this is difficult given that the city's largest polluter is situated less than 500 m from the city's commercial and residential centre (Figure 1).

Richards Bay's environmentalists thus engage in actions that pull in many directions. The conservation authority, Ezemvelo KwaZulu-Natal Wildlife, also applies pressure on the industrialists so that they will respect the needs for biodiversity in green belts alongside the commercial and recreational areas. These actions have increasing weight, despite the coalition between the municipality and industry, as evidenced by the location of a new steel smelter being moved from one of the Industrial Development Zoned sites, due to the presence of rare plant species (TATA Steel, EIA 2005).

The 'municipality – industrialists' coalition: serving development needs?

The current urban regime is made up of decision-making and localised components of two interpersonal networks, composed of members of the public- and private-sector elite. According to Stone (1984) in Stocker (1998), such an informal coalition is relatively stable and has institutional resources at its disposal that allows members to participate on a long-term basis in important decisions. The members of a regime generally have an institutional base and authority in a given domain without much hierarchy. It is an expression of governance in the new system of power between local authorities and industrialists, yet environmentalists are excluded.

The municipality recognises the pollution problems, but can not be critical because industry is the number one contributor to local taxes. The mayor was elected in 1999 under the more rural (IFP) political party and is a recognised and experienced administrator, but he must simultaneously satisfy elites and rural communities lacking basic services. Therefore, he must appear to be concerned with the preoccupations of one and the other. This explains why he advocates 'cooperative local government', where he can rely on the support of other political parties (eg. ANC) when necessary. With the new municipal system, an executive committee of ten municipal councillors (plus the mayor) makes decisions. But the situation is changing with rural party influence having declined, both nationally (to 6%) and locally. The coalitions are often more cultural than political, as explained a former mayor of Richards Bay.

There are issues that push rural needs against elite, in which case councillors form coalitions to guide development funding.

This is the case for environmental issues. Some councillors debate the environmental consequences of various projects to be authorised or refused. However, these discussions rarely lead to a development being turned away, but rather amended in terms of its location and design.

The mayor has a positive image of the industrialists, who bring in positive and profitable results for this port city, but also understands the need to diversify Richards Bay's economy and further the opportunities for tourist development.

''We have to move away from this image of being an industrial operation because tourism creates more jobs and I am very sensitive to that, but within our tight budget we have to do things as we can and I think the balance between the environment and the industrial growth of the city is fine''.

Richards Bay's local government only created an environmental regulatory office in 2004 and must still safeguard the income it earns from industry. Despite some progress toward diversified development, the formal unemployment rate remains near 50%, (about 20% of which are informally or part-time employed).

Richards Bay has both internationally and nationally exporting industries. Many products manufactured there are sought by Japanese, European and American clients. Some markets are more sensitive to the environmental context of industrial manufacturing. Labels are created (Referring to the European Union, Japan and North America) to certify that the process that is applied respects the environment. An informed consumer may no longer necessarily buy goods produced in Third World polluting plants. For example, 60% of the paper manufacturer's earnings – come from exports to countries in the Northern hemisphere. This configuration is taken into account by the plant's management. If you can assure a clean area, it is much easier for other industries to come into the area and to create more jobs.

If the industries start to put cleaner technology as a higher priority, then we optimize our resources. That is not something that one person can do. It is an attitude that comes from management.

The smelter built in 1996 produces aluminium exported to Asia from the port at Richards Bay. The plant gives off a great deal of SO_2, but has resolved some of the problem of fluoride emissions through recycling (Guyot, 1998a).

Not all the industries attach importance to negative externalities. Two industries produce fertilizer and aluminium for the national market. They are old and polluting plants with low efficiency of performance.

Some of the industries, because they are not international industries, might have a problem seeing that they have a history of poor environmental publicity and performance. The manager was some-

one that just wanted to maximize profits. To change that mindset is not an easy thing.

A recognised social investment policy

There is recognition of the social and community investment by large industry. Clinics, schools, housing and training programmes are placed at the disposal of rural residents and neighbouring tribal areas. Industry has a public assistance role that should be similar to that of government. The industrialists compensate, locally, for the municipal loss of earnings by participating in projects of local policing, 'cultural' programmes and through foundations. The Zululand Chamber of Business Foundation establishes numerous cultural and social projects for development of small businesses. The industries' power in the interplay of local stakeholders, are the constituent reasons for the emergence of an industrial area in Richards Bay, juxtaposed to the municipality. However, the inappropriate location of industry so close to the city centre creates many problems, such as the July 2002 explosion at the fertilizer plant that sent many people to hospital.

Industrial firms no longer escape their environment, in the sense that their harmful discharges are subject to the direct control of their legal, political and social environment, despite Richards Bay being a 'company city', with a somewhat monopolistic labour market with spatial layouts designed according to their own needs (Baudelle, 1999). In a small city that is 'hostage to industry', environmental protection is a low priority and co-management by environmental stakeholders is unlikely.

Air pollution is not the only problem handicapping Richards Bay in diversifying its economic base, in particular through tourism. Water pollution and spatial contradictions, form a unique dilemna.

The environment for selected users (The 'pollution' of freshwater Lake Mzingazi by its neighbouring rural villages is unfounded)

The beach at Richards Bay represents one of the city's main recreational and tourist assets, despite industrial water pollution. However, these problems do not represent the priority worry for elites, who are concerned with littering on the beach.

Waste water from industries, as well as those of the municipality, is collected in two pipelines. They discharge their effluents 3 km off the beach, at a depth of 30 m. The CSIR (Council of Science for Industrial Research) measures and models the impact of these discharges and reports them to the Department of Water Affairs and Forestry (DWAF).

A technical officer at the Mhlatuze Water Board assured us that the consequences of such pipelines on the marine environment are limited because of the very efficient ocean dispersion.

''Sewage treatment is necessary in an enclosed sea if conditions are stagnant and there is high volume tourism. But here in Richards Bay the efficient oceanic dispersion (by swells and strong winds) and the low tourism market can't sustain such an investment. But maybe in 10 years because of the pressure of overseas market on products like paper you will see some industries realizing that they have to recycle their water''.

Water recycling by the industries still remains a costly process. The cost of one cubic metre of water in Richards Bay is $ 1. The industrial price of water could be increased to promote recycling.

The potential impact of discharges on the beach does not seem to have been truly taken into account. A boat survey close to the pipelines allows one to note that the water colour fluctuates between a yellowish brown and a blue-green, and that its odour resembles that of the air discharges and permeates the beach there.

Is the water dangerous? Those in charge of Alkanstrand beach since 1983 have indicators for environmental degradation.

''The pollution is a problem. We need independent analysis rather the one from the Mhlatuze Water Board or the CSIR. The mussel indicator is quite pertinent. In the past, along this jetty you had plenty of mussels, now they are rare since the building of the sea pipeline''.

The environmental officer of the Port of Richards Bay considered that the quality of the sediments at the port's entrance channel is compromised by the impact of the discharges from the two pipelines. It is also recognised that the behaviour of vessels in the port varies. A small amount of the primary materials transported end up mixed into the harbour waters and some vessels drain their bilges.

The Port of Richards Bay has an entrance channel bound by two large jetties. As elsewhere in the world, the jetties trap the silt generated by the coastal drift upstream and create problems of erosion downstream. At Richards Bay, the average coastal drift is from SW to NE (Mitchell et al., 2005). The beaches north of Richards Bay are eroding rapidly. At the same time, the port's entrance channel must be dredged in order to maintain sufficient depth for the entry of bulk carriers. A dredger pipeline was installed to clear the silt from the port's entrance channel and move it towards the north. The dredger pipeline dumps sand directly onto the beach (Figure 3).

From an aesthetic viewpoint, such an operation contra-

Figure 3. Outlet of the dredger pipeline that carries the polluted and sandy waters of the port entrance back onto the public beach at Alkanstrand. To compensate for the erosion due to the breakwaters trapping the coastal drift, this pipeline allows the regular fortification of the beach.

dicts the existence of a popular beach. The quality of the silt transferred from the port entrance is muddy, according to the port's environmental authority. The dredging occurs at all times and the water-borned silt is brown and smelly. The beach could be rescued from erosion in another way, certainly more costly, with a submerged pipeline passing through a purification plant that selects larger sediments (Miossec, 1998).

Managing such a contradiction in the use of recreation space is tricky, because the dredging operations are a responsibility of the port and the beach belongs to the municipality. The Mhlatuze Water Board has no responsibility for the coastal pollution. The financial priority lies in securing access to the industrial port for the vessels. The municipality cannot constrain the port, which represents a national interest. For most of the stakeholders interviewed, the problem of the beach's attractiveness does not lie in potential risks of pollution.

Potential problems with beach use

Alkanstrand was a beach reserved for whites during the colonial era. Since democracy, residents from rural areas enjoy going there, especially in the summer Christmas season (Figure 4). Municipal councillors consider the number of people going to the beach to be a major problem.

The majority of visitors do not use the facilities provided. You cannot enjoy the area because of the litter and crime. So it is sad, but what can we do in South Africa, where criminals are above the law?

This discourse is representative of the conservative elite, but many residents share this view.

''But the worst problem with the beach is all this mess (litter) associated with the rural people who come in public transport. If you are a respectable local family, you do not want to be there at the same time''.

A solution would be to require an entrance fee (Richards Bay SDI (The SDI, or Spatial Development Initiative, is a government programme for prioritizing development, such as Richards Bay)), or transform the beach into a nature reserve.

''It should not be a public beach. If we handed it over to Nature Conservation (NC), they could upgrade it like they did in Mtunzini (Seaside resort 50 km south of Richards Bay). They have a beautiful place there. Many of the other resorts up and down the coast are controlled by NC. They have got the background and knowledge. But the municipality just do not have the know-how and funding''.

A privatised environment would reduce the level of pedestrian traffic and would encourage responsible users to enjoy the beach in peace. Neither the mayor, nor officials in charge of the SDI like to put their feet on the

1378 Sci. Res. Essays

Figure 4. 'Recreational overload' at Alkanstrand. This aerial photograph, taken on 1 January 2002 (Zululand Observer), shows a record number of people visiting the beach.

beach. And many other residents are like them.

Thanks to environmental pressure, the beach has taken on a new face. Alcohol was forbidden, security was reinforced and the grounds and bathrooms are regularly cleaned. Apart from the poor quality of the water, everything was brought together to make Alkanstrand the multiracial, pleasant beach of a South African municipality. However the municipality still does not have sufficient budget for realizing continued improvements.

After the beach, the lagoon attracts many residents and visitors, with numerous possibilities for nautical sports. However, littering remains a common problem in Africa (Taxis that provide transport to rural villagers also result in littering at waiting areas). Improving behaviour may come slowly through basic education, the work of diffe-rent organisations – public or private; and the pas-sage from an individualist to a collective type of mental outlook.

The negative externalities produced by industries are thus not necessarily a priority of local residents, who are more worried by the rise in crime and the loss of their traditional recreational areas; and not necessarily either a priority for rural visitors, suffering from unemployment and receptive to any attempts at development.

DISCUSSION AND RECOMMENDATIONS

Environmental problems often concern a small fraction of the population, incapable of presenting a united front.

However, genuine contradictions exist in the spatial development of Richards Bay. The industrial area conti-nues to encroach onto residential areas. The incompa-tibility between liquid discharges and the recreational area is unresolved. The 'industrial' nature of the city entrance nullifies efforts by tourist stakeholders to make the area attractive. Coalitions of stakeholders occur be-tween environmentalists and the tourism and recrea-tional sectors, opposed – in a constructive way – to the industrialists, whose impact on the economy is over-whelming. The municipality tries to please everyone in attempting to apply a coherent spatial development strategy. It seems rather preoccupied by its new territorial boundaries and the immense work of upgrading the surrounding rural suburbs. It would seem difficult to move away from an industrial image, and we believe that the global trend that has left so many industrial cities economically stagnant will also influence Richards Bay.

The spatial layout and timing of coastal development projects is in need of guidance, based on knowledge of economic trends and planning solutions that enable the co-existence of industrial and ecological services. Generic projects in order of priority, grouped by theme, include:

Land and coast

• Monitor a core set of Environmental Indicators and re-

port annually through an Environmental Resource Information System

• Identify 'green' residential development opportunities around the port city and revise land-use planning accordingly

• Define areas where sand dunes should be protected and implement an on-going rehabilita-tion programme, combined with beach replenish-ment to by-pass sand across the harbour mouth. Monitor beach erosion annually

• Develop a Coastal Management Plan and extend the green open space plan to cover the entire Municipal area

• Implement projects to improve beach, harbour and lake-side recreational facilities

• Develop and implement an environmental education programme through local schools.

Air

• Identify areas for the optimal placement of new industries and designate industry-free buffer zones

• Compile an inventory of all pollution sources and constituents, and continue air quality monitoring

• Set targets for the reduction of pollution outputs in the area, in consultation with industry

Water

• Implement a surface and groundwater quality moni-toring system to study anthropogenic impacts. Regularly assess waterborne pollution and biotic uptake, and the ecological implications of flow rates, etc

• Implement a management plan to protect inland lakes and wetlands

• Develop a management plan for water quality and make provision for sanitation systems to reduce contamination

• Launch water-recycling projects for industries

Biodiversity

• Compile a biodiversity/wetlands inventory and include relevant findings in the municipal plan, to improve forward planning for the area.

• Assign protection status to areas of high conservation importance. Improve connectivity between these areas through development of a Municipal Park system in conjunction with KZN Wildlife Conservation Services.

• Conduct regular campaigns to eradicate and rehabi-litate land invaded by alien vegetation.

• Monitor informal settlements and promote projects that reduce their impacts on sensitive areas.

Economic development

• Identify job creation projects that will enhance aesthe-tic value

• Study obstacles to environmentally sustainable development and implement appropriate changes in governance

Over the period 2000 – 2005 the Richards Bay Invest-ment Center has promoted 15 new investment projects worth $100 M, creating 1000 new jobs. A further 19 new projects worth $1 B have been identified. Richards Bay has an Industrial Development Zone next to the Port and small business initiatives have been launched in aluminum, furniture, aquaculture, tourism, and energy sectors.

A major need in governance in South Africa and many developing countries is a shift of tax revenue to the local level, where infrastructure delivery is needed. Once the revenue is there, decision-making needs to be done within the executive domain (not political). An issue that needs to be addressed is the small portion (< 0.1%) of municipal budget ($100 M/yr) set aside for environmental management, mainly for planning not implementation. This should grow over time as benefits to the local economy are realized at the intersection between the port, recreational facilities and commercial activities; not industrial. Ecological services then become important as attractors for development. The message is 'manage your assets, and your liabilities will take care of them-selves.'

Environmentalists involved in Port Cities need a two pronged approach to be most effective. The traditional approach highlights the problem, say for example expressing concerns about pollution levels. The second approach seeks a solution. In Richards Bay, working with industry in the Clean Air Association, to monitor air pollution levels and study engineering solutions to reduce emissions without disrupting company profits. The local Mhlatuze Water Board is doing the same for water pollution. In parallel, environmentalists lobby develop-ment planners within the Municipality and Port Authority to shift their attention from big, polluting, goods-producing industries, to smaller, cleaner, service-providing Indus-tries. They will produce more jobs per investment, and help reduce the crime rate. Then, development can move forward considering both community and environmental needs.

REFERENCES

Aniruth J (1997). Regional Economic Development: A Case Study of the Dynamic Underlying Richards Bay Economic Development, M.Sc-Urban and Regional Planning, University of Natal, p. 130.

Baudelle G (1999). Industrie et environnement: entre contrainte et gouvernance', Revue de Géographie de Lyon, 74(3) : 275-278.

Bethlehem L, Goldblatt M (1997). The bottom line: industry and the environment in South Africa, UCT Press: Cape City, p. 226.

Biehl J (1995). Ecology and the Modernization of Fascism in the German Ultra-Right, in Biehl J., Staudenmaier P, 1995, Ecofascism, Lessons from the German Experience, AK Press.

Bond P (2002). Unsustainable South Africa: Environment, Development and Social Protest, University of Natal Press: Pietermaritzburg, p.

Clarke J (2002). Coming Back to Earth: South Africa's Changing Environment (Jacana: Houghton), p. 374.

Collinson H (1996). Green Guerrillas: Environmental Conflicts and Initiatives in Latin America and the Caribbean, Latin America Bureau: London, p. 250.

Crowfoot JE, Wondolleck JM (1990). Environmental Disputes: Community Involvement in Conflict Resolution. Island Press: Washington, DC.

Cubbin T (1998). A History of Richards Bay 1497-1970's, Zululand Annals Vol.iii: Richards Bay, p. 78.

Dahl G. (ed.)(1993). Green Arguments and Local Subsistence, SSSA: Stockholm, p. 248.

Demarcation Board (2004). www.demarcation.org.za.

Dietz T (2002). Thinking About Environmental Conflicts, in Kadous, ed.: Celebrating Scholarship, Fairfax, Virginia, College of Arts and Science, George Mason University.

Dovers S, Edgecombe R, Guest B (2002). South Africa's Environmental History, Cases & Comparisons, Ohio University Press: Athens, David Philip Publishers: Cape City, p. 326.

Eden S (2000). Environmental Issues: Sustainable Progress, Prog. Human Geogr. 24(1): 111-118.

Folio F (2003). Les villes du KwaZulu-Natal en Afrique du Sud, entre diversité héritée et évolutions récentes, Doctoral thesis, University of Reunion, p. 457.

Griffiths S (1996). Competition for Land Between Conservation and Low Income Settlement Users: The Classical Case of Reserve 6 in Richards Bay, M/TRP, University of Natal, p.116.

Guyot S (1998-a). Contradictions et enjeux du développement à Richards Bay, Masters in Geography, University of Provence, p.136.

Guyot S (1998-b). Les contradictions et les enjeux du développement à Richards Bay, IFAS-Recherche, research supplement to Newcity Zebra, 11 : 14-15.

Guyot S (2003). L'environnement contesté. La territorialisation des conflits environnementaux sur le littoral du KwaZulu-Natal (Afrique du Sud): Kosi Bay, St Lucia, Richards Bay et Port Shepstone, PhD Thesis, University of Paris X/IRD, p. 508.

Guyot S, Folio F, Lamy A (2001). Réussites, enjeux et contradictions du développement d'une ville industrialo-portuaire: Richards Bay, Afrique du Sud', L'Espace Géographique, 2-2001, 30, Colin-Reclus, pp. 127-139.

Jury MR (2000). Determination of health impacts in urban regions exposed to atmospheric pollutants, Clean Air J. 10: 7-13.

Lamy MA (2003). Les sept ports de commerce sud-africains, de Richards Bay à Saldanha Bay, Doctoral thesis, University of Reunion, p. 461.

Magi LM, Nzama TA (2002). Perspectives of Recreation and Tourism Geographies in South Africa, South Afr. Geogr. J., 84(1): 67-76.

Mitchell J, Jury MR, Mulder G (2005). A study of Maputaland beach dynamics, South Afri. Geo.l J. 87: 43-51.

Moore CW (1998). The Practice of Cooperative Environmental Conflict Resolution in Developing Countries, in C. Napier, Environmental Conflict Resolution, Cameron May: London, pp. 160-195.

Nicholas C (1997). Richards Bay, A Rough Diamond, KwaZulu Natal Briefing, The Helen Suzmann Foundation, May.

Olivier de Sardan J-P (1998). Anthropologie et développement, Essai en socio-anthropologie du changement social, APAD - Karthala, p. 218.

Stocker G (1998). Cinq propositions pour une théorie de la gouvernance', Revue internationale des sciences sociales, 155: 19-30.

Thompson G (2002). The dynamics of ecological change in an era of politicial transformations: an environmental history of the Eastern Shores of Lake St Lucia, in Dovers S., Edgecombe R, Guest B. South Africa's environmental history, cases & comparisons, Athens: Ohio University Press, Cape City: David Philip Publishers, pp. 191-214.

Wong PP (1996). Tourism Versus Environment, The Case for Coastal Areas, Kluwer Academic Publishers: Dordrecht, p. 225.