Journal of Sustainable Development in Africa (Volume 13, No.6, 2011)
ISSN: 1520-5509
Clarion University of Pennsylvania, Clarion, Pennsylvania

RIVER POLLUTION IN THE CITY OF MUTARE (ZIMBABWE) AND ITS IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT

This article discusses the problem of river pollution in Mutare (Zimbabwe) in the light of the city's quest for sustainable development (SD). This is done through an examination of the main causes and impacts of the problem as well as strategies, which have been adopted in the past. Although its main source of water (Pungwe River in Nyanga) is not under threat, the pollution of the Sakubva River, which passes through the city, is a hazard to downstream communities such as Dora. The paper is based on information that was collected between 2002 and 2010 based on literature surveys, field observations and public interviews. Quantitative data in the form of pollution levels reflect the magnitude of the problem at selected sections of the river. The paper argues that river pollution has serious negative ecological and socio-economic impacts, which should be addressed at both local and national levels. There is also need for more research and debate on the problem if workable solutions have to be found.

Keywords: River Pollution, Sustainable Development

INTRODUCTION

Waste disposal and management are major challenges, which confront urban centers throughout the world (Miller, 1994). This is particularly the case in developing countries where, due to poverty, municipal budgets are often under strain (Jordan, 1984). As a result, they fail to cope with the ever increasing demand of both spatial and demographic growth (WCED, 1991). In some cases, heaps of garbage lie in the open for weeks due to shortage of vehicles required to ferry them to dump sites. On the other hand, raw sewage sometimes flows in the streets due to pipe bursts and blockages, which frequently occur in some cities and take long to be attended to due to the lack of equipment, spare parts, and funds, which are required in order to fix them. Yet in others, rivers, which pass through urban centers, have been turned into sewers as they drain waste water generated in towns and cities (Mapira and Mungwini, 2005). These conditions are a threat to human health as they promote the spread of some water-borne diseases (Katyal and Satake (2001). For example, in recent decades, cases of cholera, typhoid and dysentery have been frequently reported in Southern African countries such as: Malawi, Mozambique and Zambia (Chenje and Johnson, 1994).

During the last three decades, Zimbabwe has experienced massive rates of urbanization, which are comparable to those in other parts of Africa (Zinyama, 1994). While in 1982, the country's urban population was only 20% of the national total (7.6 million), by 1992, the figure had risen to 31% of the 10.4 million citizens (CSO, 1982; CSO,

1992). During the last census (2002), at least 34% of its 11.6 million citizens were living in urban areas (CSO, 2002). Although these figures are quite low compared to those of Zambia (50%) and South Africa (59%), their impacts on urban life are remarkable (Chenje and Johnson, 1994). For example, waste management problems have worsened as urban centers strive to maintain clean environments (Moyo, 1997). However, this has not been easy due to limited budgets at both central and local government levels (Mapira and Mungwini, 2005). Cholera, typhoid and dysentery (water borne diseases) have been reported in several urban centers including: Harare, Chitungwiza and Mutare (Chenje and Johnson, 1994). Although the problem of river pollution dates back to the colonial era (Bagg, 1992), during the post colonial period it has worsened due to rapid rates of urban growth and the failure of municipalities to cope with increasing demands for urban expansion processes (Mapira, 2001).

This paper examines the problem of river pollution in the eastern border city of Mutare (Zimbabwe). It discusses the main causes and consequences of the problem in the light of the city's quest for SD. The study addresses five research questions, which include:

a) What are the main causes and sources of river pollution in the city?
b) How has river pollution affected the city and its downstream communities?
c) What strategies have been adopted in the past in order to solve the problem?
d) How effective are they in their goal of achieving SD?
e) What conclusions can be made from the study?

STUDY AREA

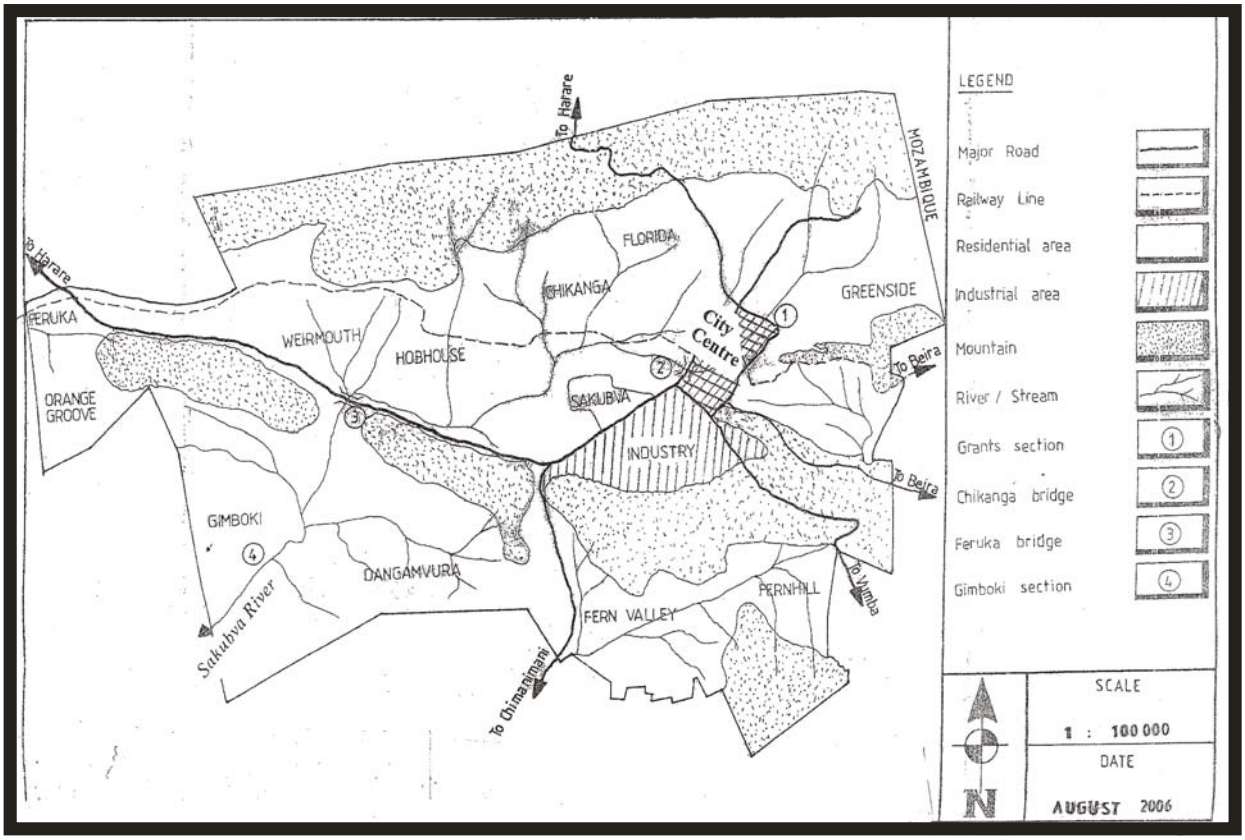
Mutare is one of Zimbabwe's eight cities. It occupies the fourth position in the country's settlement hierarchy (Mapira, 2001) and has a population of 170 106 according to the last national census, which was conducted in 2002 (CSO, 2002). However, more recent municipal estimates peg the figure at 200 000 (City of Mutare Housing and Community Services department, 2010). The city has a fairly long history, which dates back to 1890 (Bulpin, 1968). Fort Umtali (its colonial name) was originally located at Penhalonga, shifted to the present day Old Mutare along the Nyanga road in 1891 before moving to its present site in 1897 (Rugayo, 1997). The main problem of the original site was lack of building space due to gold mining activities. It was therefore abandoned in favor of Old Mutare, which later posed another challenge, that of linking up with the rail way line from Beira in Mozambique. Since funds for the construction of a tunnel through the Christmas Pass Mountain, a new site to the east of the mountain had to be found.

Located within a range of mountains and hills the city now occupies about 16 700 ha of land (City of Mutare, Department of Housing and Community Services, 2002). Most of the built-up area lies within the Sakubva River basin and its tributaries including the Nyapfumbi, which drains the main industrial areas (Figure 1). The Muneni, another stream within the Mutare Basin, flows directly into Mozambique just after the city's dumpsite in Park road. Sakubva River is a tributary of the Odzi, which in turn drains into the Save, one of Zimbabwe's major rivers. Consequently, the pollution of the Sakubva is a cause for concern at both local and national levels. The city of Mutare pollutes river water in at least three ways, namely by sewage, industrial and institutional waste (Mukokeri, 1999). Household detergents, which are fed into sewages, are a major threat to human health and aquatic life

(Miller, 1994). They contain phosphates and nitrates, which lead to the eutrophication (nutrient-enrichment) of river systems so that they accelerate plant growth rates at the expense of aquatic creatures such as crabs, fish, frogs and turtles. By depriving such organisms of oxygen, these plants upset the ecological balance of some rivers so that they eventually 'die' (Moyo, 1997).

On the other hand, metals such as zinc, lead, arsenic and mercury originating from industries also find their way into rivers and streams thereby endangering both human and aquatic life. In addition, oil spills, which drain into natural water courses, are also hazardous to natural ecosystems. Together with wastes derived from hospitals and clinics, they pose a threat to rivers and streams, which pass through urban centers (Miller, 1994). One of the communities, which are directly affected by the pollution of the Sakubva River, is Dora Communal Lands. Lying some 10 to 30km downstream from the city of Mutare, the area has over 30 000 peasants who depend on this natural water course (Mukokeri, 1999). They use the water for domestic and non-domestic purposes thereby exposing themselves to numerous health risks.

Figure 1: Sources of River Pollution in the City of Mutare



RESEARCH METHODS

The information used in this study was collected between 2002 and 2010. Three methods were employed, namely: literature survey, field observations and public interviews, which targeted the city's residents, industries, municipal officials and urban cultivators. Secondary information (literature review) on the problem of river pollution was drawn from various sources such as libraries, Mutare City Council, Environment 2000 (a non-governmental organization, which lobbies for environmental protection), the Environmental management Agency (EMA), the Zimbabwe National Authority (ZINWA) and The Manica Post, a local weekly news paper. While existing literature laid a theoretical framework for the study, field observations and interviews provided empirical evidence on problem under study. Data on pollution levels was obtained from EMA (Mutare Branch). Since it was quite recent at the time of the survey, it was considered adequate for the purpose of the study. Information collected from the various sources mentioned above was analyzed and provided a basis for the views, which are expressed in this paper.

CAUSES AND SOURCES OF RIVER POLLUTION IN THE CITY

The problem of river pollution in the city of Mutare was first exposed in 1998 following an outcry from the public (Mukokeri, 1999). In response, the City Council convened a meeting on the 28th of September in order to discuss the issue. The meeting's agenda included three items:

a) Examining the situation on the ground
b) Identifying causes of the problem, and
c) Discussing possible solutions to the problem of river pollution.

Soon after this meeting, the City Council launched an inspection of the various streams within the Sakubva River Basin. Observations were made and samples were drawn from different points. The resultant laboratory tests revealed the main causes and sources of the pollution. They included:

a) **Municipal Sewage Works such as Gimboki**, which release sludge effluent (almost raw sewage). Frequent sewage bursts often take long to be repaired while sewage works operate above their design capacity of 23.5 ML/day. Several electric motors on aerators had broken down and it took the council up to two months to repair them while raw sewage spills continued unabated. The council was also failing to cope with blockages of their trunk sewers. The situation was compounded by the growth of the city over the years. For example, Sakubva High Density Suburb was 'originally meant for only 5 000 but now it caters for 50 000 inhabitants' (Tagwira, 1998:6).
b) **Mutare Board and Paper mills**. This is a major paper manufacturing plant in the country. It produces and dumps huge paper and chemical effluent into the Sakubva River leading to an increase in pH levels and a decline in dissolved oxygen (DO %) levels. The amount of dissolved solids is also high making the survival of aquatic life very difficult (Mukokeri, 1999).
c) **The Forestry Commission, Border Timbers and PG Zimboard** release glue, oil, saw dust, pulp and timber chips into the river
d) **Cairns Foods and Tomango Food Processing** plants release and dump low pH effluent into the river

e) **Pungwe Breweries** produces opaque beer, releases acidic and low pH effluent and solids into the river

f) **Dairiboard** discharges milk washes into the river

g) **Workshops and Garages** such as: Zvinoira, B&C and Mupfumi bus companies, Amtec, Quest Manufacturing (a car assembly) and the Green Market dump used oils, greases, fuels, scrap metals, tires and other forms of refuse.

h) **Stream bank cultivation** is rampant in the city. It releases fertilizers such as phosphates and nitrates, which seep into the soil and eventually drain into the river.

POLLUTION CONTROL LEGISLATION IN ZIMBABWE

Environmental laws in Zimbabwe have a long history dating back to the colonial era, which was characterized by numerous pieces of legislation housed in different government ministries (Mapira and Mungwini, 2005). This scenario often led to conflicts at the implementation level. However, in 2002, a statutory board, the Environmental Management Agency (EMA) was formed through an Act of Parliament (Chapter 20:27). Its main aim is to safeguard the environment and promote the sustainable use of natural resources. Housed in the Ministry of Environment and Tourism, EMA has a mandate to enforce environmental laws as well as setting standards, which should be followed. At its formation, it took over some of ZINWA's functions such as water pollution control (ZINWA, 2000; 2002). ZINWA was formed in 1998 with a mandate to formulate national policies and standards on water quality, pollution control and environmental protection (Mapira, 2007). Essentially, it became a watch dog of the country's water resources.

Organizations, which seek to discharge their waste on land or in natural water courses, are obliged to apply for permission from the Pollution Control unit of EMA (Masocha and Tevera, 2003). Applications should be submitted at least three weeks in advance and failure to do so constitutes a crime. Permits 'attract penalties, which are based on the degree of risk that the waste poses to the environment' (Mapira, 2007:90). In its classification, EMA uses four categories (Table 1), which include: Blue (Safe), Green (Low Hazard), Yellow (Moderate Hazard) and Red (High Hazard). These fees should be revised from time to time in order to match the rate of inflation (EMA, 2002).

Table 1: Fees for Effluent Discharge into Surface Water (in Z$)

Classification	Risk	Reason for Classification	Fees
Blue	Safe	Complies with blue standards	Monitoring fee (Z$7 500)
Green	Low Hazard	Waste meets green or blue permit conditions not being met	Monitoring fee (Z$11 250). Environment fee (Z$30/ML)
Yellow	Medium Hazard	Waste meets yellow or green permit conditions not being met	Monitoring fee (Z$15 000). Environment fee (Z$67.50/ML)
Red	High Hazard	Waste meets red standard or yellow permit conditions not being met	Monitoring fee (Z$22 500). Environment fee (Z$120/ML) Penalty (+25%)

Source: EMA Pollution Control Unit Mutare Branch (2002).

POLLUTION LEVELS ALONG THE SAKUBVA RIVER

At the Grants section of the Sakubva River, dissolved oxygen percentage saturation (DO %), total suspended solids (TSS mg/L) and iron content (Iron mg/L Fe) are all outside acceptable limits (Table 2). Field observations revealed a general lack of aquatic life such as: fish, crabs, frogs and turtles while water displayed a dark, oily color with an unpleasant odor (Mapira, 2007). Such conditions reflected high levels of pollution.

Table 2: Pollution Levels at the Grants Section of the Sakubva River (9/04/02)

Parameter	**Result**	**Blue Sensitive**	**Blue normal**	**Green**	**Yellow**	**Red**
DO % Saturation	76	>76	>60	>50	>30	<15
Conductivity(uS/cm)	310	<200	<1000	<2000	<3000	<3500
Total Suspended Solids (TSS) mg/L	205	<10	<25	<50	<100	<150
Chloride/L	7.5	<200	<200	<300	<500	<1000
Iron mg/Fe	4.05	<0.3	<1	<2	<5	<8
Sodium mg/L (Na)	9.2	<200	<200	<300	<500	<1000

Source: EMA Pollution Control Unit (2002)

The situation at Chikanga Bridge (Table 3) is even worse as most parameters (total suspended solids, sulphates, iron and chemical oxygen demand (% COD) fall under the high hazard category (Red). In addition, the proliferation of the water hyacinth weed (Eichhornia Crassipes) from this point further downstream reflects a high degree of pollution. The Feruka Bridge or Refinery Road (Table 4) and the section just after the Gimboki Sewage Works (Table 5) exhibit the worst levels of river pollution. A study conducted by Mukokeri (1999) made interesting discoveries concerning the pollution of the Sakubva River. She noted evidence of oil on the surface and stream banks adjacent to the Queens' Hall. This was due to oil spills from moving tankers.

In a stream just after the Dairiboard Depot in Yeovil, Riverside Road, there was no sign of pollution. However, at Bhadella Wholesale and Blue Star, oil contamination re-surfaced. The stream after Mutare Board and Paper Mills was heavily polluted with pulp and paper, which produced a smelly, brownish effluent. Water and stream banks further downstream exhibited a strong odor and black color while pH (9.15) levels were high at the Mutare Board and Paper Mills section, an indication that the water was alkaline and had become a weak base. At the Dairiboard, the pH level was 7.06 while at all other spots, which she surveyed (12 of them); levels of pollution remained high in all water samples. Such conditions were not favorable to most forms of aquatic life.

Table 3: Levels of Pollution at Chikanga bridge (9/04/02)

Parameter	Result	Blue Sensitive	Blue Normal	Green	Yellow	Red
DO% Saturation	42	>75	>60	>50	>30	<15
Conductivity uS/cm	477	<200	<1000	<2000	<3000	<3500
pH units	7.19	6-7.5	6-9	5-6/9-10	4-5/10-12	0-4/12-14
Total Suspended Solids mg/l	160	<10	<25	<50	<100	<150
Sulphates mg/l SO4	730	<100	<250	<300	<400	<500
Iron mg/l Fe	230	<0.3	<1	<2	<5	<8
Chemical Oxygen Demand mg/l	258	<30	<60	<90	<150	<200
Oxygen Absorbed (PV) mg/l	334	<5	<10	<15	<25	<40

Source: EMA Pollution Control Unit (2002)

Table 4: Pollution Levels at Feruka/Refinery Road (9/04/02)

Parameter	Result	Blue Sensitive	Blue Normal	Green	Yellow	Red
DO % Saturation	58	>75	>60	>50	>30	<15
Conductivity (uS/cm)	549	<200	<1000	<2000	<3000	<3500
Total Suspended Solids mg/l	28	<10	<25	<50	<100	<150
Sulphates mg/l SO4	26.0	<100	<250	<300	<400	<500
Iron mg/l Fe	2.31	<0.3	<1	<2	<5	<8
Biological Oxygen Demand mg/l	49	<15	<30	<50	<100	<120
Chemical Oxygen Demand mg/l	44	<30	<60	<90	<150	<200

Source: EMA Pollution Control Unit (2002)

Table 5: Levels of Pollution just after the Gimboki sewage Effluent plant (9/04/02)

Parameter	Result	Blue Sensitive	Blue Normal	Green	Yellow	Red
DO% Saturation	**27**	**>75**	**>60**	**>50**	**>30**	**>15**
Conductivity (uS/cm)	**421**	**<200**	**<1000**	**<2000**	**<3000**	**<3500**
Total Dissolved Solids mg/l	**204**	**<100**	**<500**	**<1500**	**<2000**	**<3000**
Sulphates mg/l	**500**	**<100**	**<250**	**<300**	**<400**	**<500**
Chemical Oxygen Demand mg/l	**216**	**<30**	**<60**	**<90**	**<150**	**<200**
Phosphates mg/l	**2.25**	**<0.5**	**<0.5**	**<1.5**	**<3**	**<5**
Oxygen Absorbed (PV) mg/l	**26.6**	**<5**	**<10**	**<15**	**<25**	**<40**
Nitrates mg/mg/l	**35**	**<10**	**<10**	**<15**	**<20**	**<50**

Source: EMA Pollution Control Unit (2002)

IMPACTS OF RIVER POLLUTION

The Dora Community experiences negative **ecological, health, social** and **economic impacts** due to the pollution of the Sakubva River. This section examines them in brief.

Ecological impacts include:

a) Change of natural water chemistry at all the points, which were surveyed (Mukokeri, 1999). Such conditions upset the ecological balance that is necessary for the survival of species (Miller, 1994)
b) Death of aquatic life including: fish, crabs, frogs and turtles
c) Proliferation of the water hyacinth weed, a reflection of eutrophication
d) Unpleasant odor of water as well as its black, brownish and oily colors
e) Lack of safe water for domestic and non-domestic purposes including livestock and wild life

Mukokeri (1999) also identified several **health** and **socio-economic impacts**, which emanated from the pollution of the Sakubva River. They included:

a) Frequent outbreaks of water borne diseases such as: cholera, typhoid and dysentery. The dumping of toxic waste into the Sakubva River endangered the health of downstream communities such as: Dora
b) Mysterious deaths of livestock especially cattle, goats, donkeys and sheep in the area
c) Since these animals are important economic assets, their mortality is disastrous to the community
d) Cattle and donkeys are also the main source of draft power in Dora, hence their death undermines agricultural productivity in the area
e) Shortage of drinking water for human beings and their livestock is a threat to the survival of this rural community
f) Children who swim in the river are exposed to numerous health risks
g) Adults who quarry for building sand in the river also endanger their health. Since polluted water often has long term effects on human health, people may not realize the dangers they expose themselves to in their daily economic activities
h) Lack of safe water for the school, clinic, shopping centre and surrounding villages. People have to depend on bore-hole water for most of their daily needs. However, this is scarce during dry seasons when the water table is low

MEASURES TAKEN TO ADDRESS THE PROBLEM

According to Mapira (2007) several organizations have tried to address the problem of pollution of the Sakubva River. They include: EMA, Mutare City Council, Environment 2000 Manica Branch and some industries and the Zimbabwe National Water Authority (ZINWA). Firstly, EMA, as the custodian of natural resources in the country plays a number of roles including:

a) Granting waste discharge permits to industries and the municipality
b) Prosecuting persistent polluters. For example, in 2004 it brought the Mutare City Council before the courts and fined it a sum of Z$173 million (The Herald, Thursday, 20 May, 2004)
c) Recommending alternative waste management methods such as recycling of effluent and irrigation using treated water in order to avoid direct discharge into the rivers and streams, and Establishing a memorandum of agreement with the municipality on the maximum reaction time for the repair of blocked sewer lines

Secondly, Mutare City Council, as the local authority, has tried to alleviate the problem through several steps, namely:

a) Trying to upgrade the Gimboki Sewage Effluent Plant
b) Installation of a trade Effluent System where industries pay for discharging into its sewage lines The fees are based on the quantity and quality of the effluent
c) Reducing reaction time to sewage blockages, and
d) Conducting regular inspections of the river and identifying other polluters

Thirdly, Environment 2000 Manic Branch also plays a part. As a non-governmental organization (NGO), it lobbies for safer environmental practices. So far, it has taken some steps including:

a) Advocacy: exposing to the public about polluters who continue to operate without taking any remedial action. This pushes the culprits to reduce or avoid their actions for the sake of their name
b) Organizing public awareness campaigns for example during the World Environment day
c) Educating industries on the need for safer environmental practices, which include avoiding refuse disposal on public water courses, and
d) Coordinating cleaner production programs in which, industries are supposed to introduce processes that guarantee a safer effluent discharge.

Finally, industries are also major polluters and should play their part I solving the problem. Some have already acquired ISO 14000 Standards, which have been established by the Standards Association of Zimbabwe. This enables them to be monitored by external auditors on environmental practices. By 2004, Border Timbers had already acquired it while Wattle Company and Forestry Commission were planning to do so in future.

EFFECTIVENESS OF THE MEASURES

It is pertinent to assess the effectiveness of the above measures in the light of their set goals. Firstly, the use of fines or prosecution of the offenders seems to be quite effective as it ensures that the polluter is held accountable and pays for the damage caused to the river. Since fines are charged in the light of the prevailing local currency value, they are likely to be deterrent (EMA, 2002). However, in reality, this does not seem to be the case as shown by the defaulting of some organizations in the payment of these fines. For example, in 2004 the Mutare city Council owed Z$173 million to EMA (The Herald, Thursday. 20 May, 2004). The main reason was that the local authority was bankrupt just as other municipalities in the country (Harare, Bulawayo, Chinhoi and Marondera), which were also in defaulting for the same reason. Secondly, the threat of litigation (by EMA) has forced some organizations to try to solve the problem. For example, in 1999 the Mutare City Council embarked on a project that was aimed at upgrading its ageing Gimboki Sewage System. Although the project hit a snag when the contractor failed to perform as required, it reflected the seriousness of the municipality in trying to solve the problem of river pollution in the city (Mapira, 2007). However, in the implementation of the ISO 14 000 standards, there seems to be general apathy among some organizations since the requirement is not mandatory (EMA, 2002).

Thirdly, the efforts of NGOs such as Environment 2000 Manic Branch play a significant role in terms of public awareness. However, they need to be complemented by cooperation from the major polluters. Research suggests that some companies have resorted to the nocturnal dumping of their waste in order to evade detection by law enforcement agents, who conduct inspections during the day (Mukokeri, 1999). Corruption in the form of bribes paid to patrol officers and inspectors further complicates the problem as it enables culprits to escape prosecution by the criminal justice system (Mapira, 2007). Fourthly, legal action often takes too long in dealing with offenders. For example, it took EMA nearly four years to bring the Mutare City Council before the courts. Thereafter, courts proceedings dragged on for a long time while river pollution continued unabated (The Manica Post, 22-28 October, 2004). This delay in the implementation of justice compromises the effectiveness of EMA's strategies.

Another problem is lack of funds for the importation or development of technologies required to combat river pollution. Industrial firms, food processing companies and other polluters need adequate funds in order to address the problem. Lack of funds has also undermined the inspection system by the municipality while lack of transport has negatively affected waste disposal in the city over the years (Mapira, 2004). Since waste collection has been erratic, residents of high density suburbs such as: Sakubva, Chikanga, Dangamvura and Hobhouse have resorted to dumping their refuse into the Sakubva and its tributaries (The Manica Post, 10-16, May, 2002).

Other problems include: the mismanagement of funds by the municipality, ignorance of rural communities, which are victims of river pollution and the fact that the city's drinking water source is not affected by the pollution of the Sakubva River. Since Mutare draws its water from the Pungwe River in the Nyanga district, city residents hardly care about the plight of the Sakubva River. In the past, the city council has also diverted revenue budgeted for upgrading sewage treatment systems to other uses, indicating the municipality's apathy on environmental issues (The Manica Post, 10-16 May, 2002). Rural communities such Dora went for years without taking legal action until in 2004 when an outsider did it on their behalf (The Manica Post, 22-28 October, 2004).

IMLICATIONS FOR SUSTAINABLE DEVELOPMENT

In the light of the above facts, it is obvious that the management of river pollution in the city of Mutare is a problematic issue, which calls for more research and debates that are aimed at finding solutions, which are more effective than the present ones. If uncontrolled, river pollution threatens the survival of natural ecosystems and human communities. Several implications for sustainable development have emerged from this study, including:

a) Even though the city of Mutare does not depend on water from the Sakubva River, it has a moral obligation to safeguard it against pollution for the sake of present and future generations of rural communities such as Dora, who are innocent victims of the effects of poor urban waste management practices.
b) Previous attempts of the City Council to evade litigation for its actions reflect its insensitivity to the plight of those communities, which are directly affected by such pollution
c) Some of the polluters have resorted to the nocturnal dumping of waste in order to avoid detection while others dig under-ground channels, which are difficult to notice (Mukokeri, 1999). Such practices undermine the goal of sustainable development in the long run. Any damage to the environment should be viewed as a crime against humanity and other forms of life regardless of who commits it.
d) At national level, issues of environmental security should be prioritized and well funded. EMA and other environmental stakeholders should be more active and visible especially at the local level where their impact can be felt.
e) NGOs, which lobby for environmental protection, should continue until their goals are achieved. Where funds are lacking, efforts should be made to solicit them from foreign donors.
f) Environmental awareness campaigns should target both urban and rural communities so that they can be more conscious of and sensitive to the plight of the environment. To date, not much ground has been covered in this direction.

g) The Government of Zimbabwe has a moral obligation to resettle endangered communities such as Dora. However, owing to the costs involved in a project of this nature, it is likely to avoid taking any action of this nature.

CONCLUSIONS

This paper has discussed the problem of river pollution in the city of Mutare. The Sakubva River and its tributaries have been contaminated by sewage effluent from domestic and non-domestic sources such as: factories, clinics, the hospital and other institutional sources. Although the problem was first exposed in 1998, not much has been achieved in solving it. This is in spite of the existence of environmental watch dogs such as EMA, whose duty it is to prosecute offenders. Until recently, EMA has been under-funded and lacked the capacity to conduct its operations effectively. At the same time major polluters such as Mutare City Council did not have an efficient inspection system for its rivers. As a bankrupt municipality, it also lacked the capacity to deal with problems of waste disposal. Other polluters lacked the necessary will to address the problem as they resorted to the nocturnal dumping of waste so as to evade detection. This in turn undermined the goal of SD in the city. However, since these problems have also been ported in other cities such as Harare and Masvingo, there is a need to address them at national level so that sustainable solutions can be found. For example, more research and debates can be conducted with a view to finding workable solutions. At the same time, efforts should be made to procure donor funding from abroad so that EMA, city councils and other stake holders can operate more efficiently.

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