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INDUSTRIAL DEVELOPMENT, POLLUTION AND DISEASE: THE CASE OF SWAZILAND

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Abstract

This paper attempts to identify problems caused by industrial development in Swaziland; and identify the impact of industrialization on the environment; ascertain the level of corporate responsibility towards the environment by companies; and make recommendations on the management of industrial pollution. Data were drawn from primary and secondary sources, giving a representative selection of industries in Swaziland.

Findings shows that each industry has its own health hazards which result in certain health problems that require special consideration. The extent to which health problems occur depends on the design of the factory, the awareness of the workforce, the type of raw materials used, and the nature of the final product.

Introduction

Industrialization has greatly increased throughout the whole world. Small and large countries alike, have come to realize that benefits of a proper developed industrial environment, with all its benefits, including reduced unemployment and reduced poverty. Swaziland is no exception.

Swaziland is a small country with an estimated population of 800,000. She has two major cities, each city has its own industrial site where most industries are concentrated. Whilst the increase in the numbers of industries is applauded, attention should also be directed at the impact these industries have on the environment.

A number of researchers have expressed concern about environmental degradation. Mushala (1993), points out that population growth rate exerts pressure on land resources for increased food production which contributes to environmental degradation. Hines (1973), noted that pollution of the environment has outstripped the economic growth, which among other things is caused by an abundance and variety of output hitherto unknown from industry. This pollution has been distributed among the world's population with a cruel unevenness, causing an outcry for environmental protection.

Each industry that is developed adds a certain amount of pollution to the environment. It must be noted that, if pollution is not controlled to certain tolerable levels, it can lead to disastrous effects. The extent of pollution varies with the size of industry, the nature of the industry, the type of products used and produced, etc. Among other things, industries cause air pollution, water pollution, soil erosion, diseases related to soil degradation and injuries to mankind and many other forms of environmental degradation.

The increase in industrial development affects the Swazis directly or indirectly. Man is surrounded by air, land and water, which can be affected by industrial development. The atmosphere in most towns is polluted with particulate matter (dust, grit, smoke and fumes), sulphur oxides, carbon monoxide, hydrocarbons, nitrogen oxides, lead and a host of other contaminants. Sources of such pollution include motor vehicles, manufacturing industry, power plants, space heating for houses, offices, stores, restaurants, hospitals, schools, hotels, refuse disposal, etc.

At government level, it could be said that the Ministry of Natural Resources and Energy plays a major role in environmental protection, coordinating

national environmental activities and facilitating international environmental links. The Ministry of Agriculture and Cooperatives and the Ministry of Health also play major roles in this regard.

Other agencies and programmes have also been established for environmental management and protection. These include; the Swaziland National Trust Commission, the Natural Resources Board, the Rural Development Area Programme, and the Central Rural Development Board. All these agencies have developed programmes to create public awareness of environmental issues, clean-up campaigns and tree plantation. While government efforts to protect the environment are applauded, these have not been effective.

It is in the light of these problems that the researchers have embarked on this study; whose objectives are:

- (a) Identify problems caused by industrial development in Swaziland with emphasis on the workforce.
- (b) Identify the nature of problems caused by such industries and its impact on the environment.
- (c) Ascertain the level of corporate responsibility towards the environment by the companies.
- (d) Make recommendations on management of industrial pollution.

Plan of the paper

The paper is divided into three sections. Section one focuses on the pollution caused by the industry, with emphasis on water and air pollution. Though the subject of air pollution is well documented, very little seem to be understood about the latent effects of such pollution on man's well-being. Diseases or disorders commonly associated with air pollutants and aggravated by them include chronic bronchitis, lung cancer, emphysema and asbestosis. The second section will use the results from the survey to address the issue of industrial pollution in Swaziland and its management. Conclusions and recommendations are made in the last section.

Methodology

The information for this paper was gathered from both primary and secondary sources. A convenient sample was selected from a number of major industries at Matsapha Industrial Site. Data were collected through personal interviews using structured questionnaire. Thirty industries constituted the sample. These were manufacturing industries which included the wood pulp industry, steel and wire industry, textile industry, plastic and rubber industry, printing industry, chemical industry, milling and brewing industry as well as the food processing industry. The industries were chosen in order to come up with different types of pollutants since the extent of pollution varies with the nature of the industry, and the type of products used and produced.

The personnel occupying senior positions in the companies such as managers and industrial relations officers were interviewed. In the case of the companies with clinics the nurses were interviewed. Information was collected on patients with pollution-related diseases and on those who have sustained injuries within the company. The researchers also inspected the dumping site and the effluent section for those companies that have it. The data were then analyzed in a descriptive way.

Water and Air Pollution

Environmental pollution is the unfavourable alternation of our environment, through direct or indirect effects of changes in energy patterns, radiation levels, chemical and physical constitution and abundance of organisms. These changes may affect humans directly or through their supplies of water and of agricultural and other biological products, their physical objects or possessions, or their opportunities for recreation and appreciation of nature.

Pollutants that meet the criteria of this environmental pollution are gases (such as sulphur dioxide and nitrogen oxide) and particulate matter (such as smoke particles, lead aerosols, and asbestos) in the atmosphere, pesticides and radioactive isotopes in the atmosphere and in waterways, sewage, organic chemicals, and phosphates in water, solid wastes on land, excessive heating ("thermal pollution") of rivers and lakes, and many others. As mentioned earlier, some of these pollutants are introduced into the environment naturally, others by human actions, and in most cases in both ways. The major concern

is with environmental pollution resulting wholly or largely as a by-product of human activities, because these cannot be controlled most readily.

It is important to note that the effects of pollutants may extend much further than the region in which they were released as pollutants are transported by air and water. Some pollutants are very persistent and may continue to permeate the environment long after their release. Moreover, many pollutants occur only at low concentrations which produce no immediate adverse effects. Exposure to these concentrations for many years can lead to illness.

Water Pollution

It has been argued that water and air pollution may occur without man's intervention; from such natural causes as landslides and forest fires. However, most pollution is the result of man's actions. The industry has the widest possible range of pollutants, including biodegradable wastes in the paper and foods processing industries, heat discharge in a variety of activities, non-degradable wastes in the chemical and iron and steel industries, and radioactivity.

Industrial wastes are more abundant, and many are more difficult to treat than municipal wastes; but the range of coping with industrial pollution is also more extensive. According to Hines (1973), the industry is not limited to waste treatment approach. It may employ other forms of reducing water pollution, such as modifying manufacturing processes, recycling waste materials, and changing the nature of its products.

The Swaziland Water Act of 1967 states that any person using water for industrial purposes shall purify such water effluent or waste or tailing produced and/or resulting from the use of water for industrial purposes. The legislation aims at controlling water pollution by industrial effluent and other harmful discharges and is enforced by monitoring programs, river sampling and effluent sampling. Thus, the pollution levels in these rivers have been within safe limits.

It has been pointed out that the water quality of Swaziland is mainly affected by three broad activities namely; crop production, manufacturing industries and processing plants. Most of the manufacturing industries, with the exception of the Usutu Pulp Company, are located in Matsapha. The Usushwana river, which runs along the Matsapha Industrial Area, receives

most of the effluent. The major industries that produce potentially hazardous material are the textile and paper mills.

Air Pollution

Air pollution and its damage to man and his work are not of recent origin. The occupational risk of severe respiratory disability was early associated with chimney sweeps and others whose work brought prolonged exposure to the fume of combustion and the emissions of industry. One of the most insidious phenomenon of the industrialized societies is the high production of obnoxious gases, resulting in air pollution. The by-products of chemical reactions are discharged into the atmosphere, altering its composition and spreading fine particles. Some of these particles which are inhaled attack the lung tissues, and in some cases causing severe bronchitis and death.

Burning of carboniferous materials such as coal and oil generates large amounts of the gas carbon dioxide. The increase of this gas exceeds the green vegetation rate of conversion to oxygen. This is becoming more serious each day as more nations cut down their trees and destroy their lands for building more factories. Unless new methods can be devised for the transformation of this noxious gas into more useful oxygen then the future of our children maybe fraught with death by suffocation.

Air pollution monitoring in Swaziland is non-existent. However, the need for monitoring air pollution has been acknowledged. The United Nations Conference (1992), noted that chemical pollutants from local industries affect the cleanliness of urban air in different ways, depending on the toxic materials and gases produced. In addition, the gases that are emitted in the Eastern Transvaal Highveld in the Republic of South Africa contribute, to some extent, to urban pollution in Swaziland. The highest level of air pollution comes from the burning of fossil fuels and automobile emission.

Health and Diseases

In general terms, the health picture of every country depends on its state of economic development which is a result of industrialization. Industrialization has favourable and unfavourable effects. On the favourable note, it has led to improved water supplies, sewage disposal, housing, diets, education and hygiene in living standards.

These unfavourable consequences may disable a man from working. Lenihan and Fletcher (1976), noted that not-working is also dangerous to health as it demoralizes, degrades and negatively affects mental and ultimately physical health. It has been noted by Hodges (1977), that developed nations of the world are likely to be more concerned about the unfavourable effects of industrialization than those nations in which poverty and hunger are major unsolved problems. For instance, the harmful effects of pesticides and fertilizers are likely to be of less concern in a country in which insufficient food production is leading to malnourishment and starvation.

If there is a risk or a possibility of pollution within a company, the effects are most likely to be felt by its workers first. The latent period for such workers is likely to be long, and dissemination of the chemical may be widespread before the first case of cancer appears in the industry. It is of great importance that the exposure of the workers in the chemical and manufacturing industries be carefully recorded and their subsequent medical history followed up with great care. The prominent causes of high morbidity and mortality are diseases related to the environment. For instance, inadequate sanitation, unsafe drinking water and inappropriate solid waste disposal methods have led to a high prevalence of disease such as typhoid, cholera, malaria and bilharzia.

Industrial Pollution and Management

Developing countries that are experiencing problems of poverty, starvation and related problems are likely to see environmental issues as a luxury of the developed countries. However, for effective development to take place, people should not treat poverty, starvation, and pollution as unrelated variables. Pollution to the environment should therefore, be given the same attention world wide, if it is to be managed properly and kept at a minimum level. The laxity displayed by some countries, including Swaziland, on management of pollution has led the researchers of this paper to gather information on corporate responsibility policies. We also considered the type of policies they maintain; reasons for those policies, assessing the nature of the company's waste products, and how they are disposed of. In addition, we examined related diseases which are caused by the company's waste products.

Corporate policies

Some companies do not have any written policies on corporate responsibility towards the environment and on their employees. However, 73% have corporate responsibility towards the internal and external environment.

Most companies bear internal responsibility than external responsibility. This is indicated by the following findings:

Internal corporate responsibilities:

- | | |
|------------------------------------|-----|
| a) Fire extinguisher and fire exit | 96% |
| b) Protective clothing | 91% |
| c) Internal safety warnings/laws | 73% |
| d) Safety training programs | 50% |
| e) Inclusion of expiring dates | 32% |
| f) Other | 23% |

Other internal responsibilities involve safety committee, anti-glare screen for computer operations, noise proof, emergency alarms and good ventilation systems.

External corporate responsibilities:

- | | |
|--------------------------------------|-----|
| a) Anti-littering warning/facilities | 27% |
| b) Recycling waste | 32% |
| c) Anti-water/air pollution | 23% |
| d) Frequent checks on distributors | 50% |
| e) Health regulation compliance | 56% |
| f) Other | 32% |

Other external responsibilities involve anti-burning of waste pollutants by companies and setting up effluent stations by companies releasing toxic chemical liquids or foam. For instance, National Textile Corporation and Conco have these stations. Even though they meet minimum safety standards of waste to be released to the industrial sewer, they have exercised extra precaution. Conco is still going to set up a E7 million station to improve the current one. The station will provide a fish pond to serve as an example to other companies about the need to be "ozone friendly". These companies bear such responsibility in order to create a good corporate image (23%), others to

comply with the environmental laws and regulations (18%), while others do it for risk and waste minimisation (5%).

Most activities of these companies involve the release of pollution and, to some extent, the exposure of the environment to danger. However, since their survival depends on the environment, they are conscious of its preservation. Thus, they find themselves having to bear social costs for the environmental hazards which their chances of becoming viable in a highly complex and competitive environment.

Other companies complained about the absence of legislation that ban the dumping of any form of waste. Of the companies interviewed, nine per cent are aware of the impact of their operations on the environment. Nine per cent further expressed that the damage caused is insignificant to warrant any attention. This figure, though negligible, indicates the information gap that needs to be filled by environmentalists and other pressure groups to create awareness to all mankind, especially industrialists. Other companies are not concerned about social responsibility because they see that as a luxury. These companies are small in size and are still striving for survival.

Waste

The companies' wastes include waste originating from the manufacturing process to the finished product, as well as waste from cleaning the factory. The study revealed that 86% of the industries dump their waste at the dumping site. It was also noted that 27% of the industries recycle their waste, which is mostly glass products, cans, paper, wood off-cuts, as well as steel. Fourteen per cent of the industries' waste decomposes or disintegrates with time. Others either burn their waste within the industry's premises or dump it at the dumping site or pour it in their drainage.

Damage/Danger to the Environment

The researchers had a chance to inspect the dumping site, which is about 3 kilometres from the industrial site. The site is even close to a residential area, and in most cases people visit the site to look for reusable items. The researchers noted that it is not only solid waste that is dumped, but also such other materials that when burnt some of the particles explode. There is also a strong smell which attracts flies into the site as well as dark smoke.

In conducting the study, it was observed that chemical industries do not use the dumping site. Their waste goes through the industrial sewerage to the Usushwana River which flows through the industrial site. The river is polluted by chemical industries as well as the other industries when cleaning their production plants. According to Mtetwa (1992), the same water from the river is used for domestic purposes. The mostly affected people by this water pollution are the Dwaleni residents who reside within the vicinity of the industrial site.

There have been complaints with regard to this matter. A recent case involves Swazi Timber Industry where this company was burning its wooden off-cuts within the premises. When the timber was burnt dark smoke came out which resulted in a high level of pollution. The Labour Department and Health inspectors were aware of this, since they used to inspect the company. The government officials who inspected the company found nothing about the air pollution caused by the company. The company only refrained from burning its off-cuts because of pressure from neighbouring industries who were concerned.

This indicates that there are no appropriate pollution preventive measures. Existing environmental legislation is weak and inadequate. According to Mushala (1993), some of the legislation is not based on reality as most of them were enacted very long ago and are obsolete. These tend to favour the privileged and do not take into account the needs of the common people. These factors have heightened the frequency and extent of diseases, injuries and the level of pollution to the environment. The study showed that 77% of employees were treated for injury from machinery and corrosive chemicals, 14% were treated for fire hazards and 41% for chest related diseases as a result of inhaling harmful dust, fibre and carcinogens. Most of the injuries were minor but there were some fatal accidents.

This is further evidenced by the number of companies that do not comply with any regulations as regards their waste products (41%). Fifty nine per cent do comply with some of the regulations even though there might not be any direct imposition of a sanction. Some of those that comply with the regulations do so for fear of suspension or closure of the company and others are afraid of a penalty fee. The study also indicated that 45% of industrial waste cause air pollution, 9% water pollution and 5% diseases. Eighteen per cent indicated that they cause a combination of the above dangers. The figure might be under-estimated because of the nature of pollution-related-disease.

For instance, disease from cotton take as long as 20 years to develop into a full scale disease. About 36% of the companies interviewed have clinics and thirty two per cent have a medical aid scheme to cater for the dangers. However, all the industries have first aid facility.

Conclusions and Recommendation

Lenihan and Fletcher (1976), noted that man is more the product of his environment than of his genetic make-up. In other words, the health of human beings is determined not by heredity but by the conditions under which they live. The natural environment is under constant interference by man. It is therefore palpably unwise to continue to interfere with the environment without, at the same time, striving to determine the real and lasting effects of such actions on man's health and on his general well-being.

It is most unfortunate that most developed nations of the world are likely to be more concerned about the unfavourable effects than those nations in which poverty and hunger are the major unsolved problems. For example, the harmful effects of pesticides and fertilizers are likely to be of less concern to smaller countries like Swaziland. Poverty, starvation, and pollution are not unrelated problems; they all reflect failure of the human race to design social and political institutions capable of properly assessing, controlling, and taking advantage of technological innovations without harming the citizens of that country.

The industry must look for alternative sources of energy other than the use of coal and iron. If a dangerous substance has to be used, then it should be kept away from contact with workers, or should be so remote that its effects are negligible. The regulation of wastes which is defined as hazardous begins at the point of generation (e.g., a manufacturing facility), covers transportation, and continues to the waste's treatment or disposal.

Many workers handle materials which have some toxic properties and so precautions must be taken. Basically, any heavy metal, organic solvent or gaseous vapour can be toxic. Substances like mercury, silver, copper and lead are of importance as they may accumulate in the body as metabolic poisons. Manufacture of certain cosmetics and medications often involves the addition of hormones or synthetically produced similar compounds. The workers who handle such materials can absorb them through their skin, and thus suffer serious hormonal imbalances. More serious are the hazards of handling many

of the insecticides, especially the organophosphorus compounds. In very small amounts, these substances can cause nervous breakdown leading to death.

Inside the factories, care must be taken to keep (the) dust production down, to reduce chances of unprotected human contact with harmful chemicals. In some industrialized nations, industrial safety laws are very comprehensive and impose penalties on all who break them. Likewise, developing countries should follow suit if meaningful development is to take place. Human lives should not be sacrificed for development as they depend upon the environment for their survival.

It has been noted that strong legislative approach has led to great improvements in the health of the worker. In Swaziland, as mentioned earlier, the existing environmental legislations are weak and inadequate. They are not based on reality as most of them were enacted long ago and therefore are obsolete. Even those of recent origin do not provide deterrent sanctions. For instance, the Swaziland Environmental Authority Act (of 1992), states that for any offence the company will be fined an amount not exceeding E50,000 or a term of imprisonment not exceeding 10 years or both. The penalty is not significant, such that some companies are better off by paying the penalty than complying with the legislation. Strong legislation would go a long way towards improving the safety of the workforce. It is therefore, important to institute a national environmental machinery and strategies for regulating, enforcing, and monitoring the state of the environment in Swaziland.

It was mentioned earlier that the character of the effluent from different industries is enormously varied, consequently the complexity of the effects of industrial waste and efforts needed to control them also vary greatly. It would then help if the Swaziland government, in addition to maintaining a register of disposal sites, should also turn its attention to inspect and monitor importation, use, processing, production, and disposal practices and impacts. There is also a need to define the type of waste to be disposed of at the various dumping sites.