



RESEARCH PAPER

Current Status and Future Directions for Industrial Waste Management in Quetta City, Pakistan

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ABSTRACT

Present study tries to identify the existing industrial waste management practices in different industrial areas of Quetta city. Industrial waste, results as rapid urbanization, population, industrialization and economic growth, is the source of environmental threats but if it is managed in a proper manner from generation to final disposal, remain not a problem anyway. Primary data for this descriptive study is collected through pre-designed questionnaire and checklists. Comparative tabular description for the both industrial areas is made on the basis of provided information. Findings revealed that the situation regarding waste management of industrial areas of Quetta city is not up to the mark from collection to final disposal. Even the hazardous industrial waste has not dealt under special precautionary methods. Raising awareness, devising industrial waste management rules/regulations and managing the waste just at point of production at industrial unit are strongly recommended areas for improvement

Keywords: Industrial Waste Management, Quetta Industrial and Trading Estate, Small Industrial Zone

Introduction

Rapidly growing population and living standards triggers the consumption and industrialization which finally pose a serious threat to environment and other resources (Akter & Muniruzzaman, 2021; Rasel et al., 2019). In other words, increasing urbanization, population and technological advancement are the major determinants of economic growth in any area. All these factors directly affect the consumption behavior of goods and services over there as well as the amount of generated industrial waste. Basically population and consuming behavior clearly defines the amount of generated waste (Akter & Muniruzzaman, 2021; Hassan et al., 2021; Sharma et al., 2019).

Waste will not remain a serious problem if it is managed in a proper manner from generation to final disposal. Proper industrial waste management provides not only the environmental benefits but economic benefits too (Hassan et al., 2021) like; systematic and well planned waste management system may provide thousands employment opportunities specially in developing nations as these activities demands huge skilled and unskilled human resource (Sharma et al., 2019). Developed nations are performing well regarding industrial waste management (Hassan et al., 2021) now it's our turn to recognize and pay due attention towards the severity and sensitivity of this burning challenge.

Literature Review

Anything which is discarded after primary use, worthless, defective and is of no use is called waste (Zainu, 2019) but it may be used as valuable secondary carbon source (Lee et al., 2020). There are two broad categories of the waste; hazardous and non-hazardous (Zainu, 2019). Waste generated as a result of industrial activities like manufacturing, fabrication, construction, demolition, chemical plants, wholesale trade etc is known as industrial waste (ADB, 2021; Menbere & Menbere, 2019). In simpler words, industrial waste produced as the ending materials of any industrial process of productivity. Housekeeping waste, packaging, construction & demolition materials and hazardous waste are included under the head of industrial waste (Sharma et al., 2019).

Rapid industrialization elicits the production of hazardous industrial waste but adequate knowledge and awareness may reduce the severity (Menbere & Menbere, 2019). There are numerous industries which are the source of hazardous waste generation like, electrical, electronic, mechanical, chemical, construction, food, dyeing, textile, leather and metallurgical industries. E-waste is another challenging issue while managing the industrial waste as it is the main source of pollutants like cadmium, mercury, lead, PVCs, furans and dioxins (Thai, 2009). Human health, environment, water bodies and air are adversely affected by pollutants present in industrial waste. (Hassan et al., 2021; Menbere & Menbere, 2019).

Pakistan generates 30 million metric tons of solid waste annually including industrial waste. The rate of collection of this generated waste ranges from 50-80% (ADB, 2021). Industrial pollution is one of the major causes of environmental degradation in Pakistan. Almost every city of Pakistan is lacking proper waste management system in general and industrial waste management system in particular. This is the reason of clogging drainage system and providing the breeding grounds for insects and animals which in turn spread different diseases (Hassan et al., 2021; Shah, 2014). Open dumping of the urban waste is a common practice throughout the country (ADB, 2021).

There are seven industrial zones/estates in Balochistan province namely; Hub industrial and trading estate, Uthal industrial estate, Windher industrial and trading estate, industrial estate Dera Murad Jamali, Quetta industrial and trading estate (QITE), small industrial zone Quetta and Gadani industrial estate. Each of these estate/zone has its peculiar function. Now the government of Balochistan has decided to establish four industrial zones at Muslim Bagh, Dalbandin, Turbat and Chaman to boost economic activities in the province.

The objective of the study is the examination of existing industrial waste management practices, identifying the problems and suggesting the further improvement which in turns ensure sustainable development in the Quetta, capital city of Balochistan.

Material and Methods

Study Area

This study is descriptive in nature. Quetta city is the study area as it is the provincial capital and industrial and trading hub of the Balochistan province. According to census 2017 the population of Quetta city is 2.26 million whereas the total population of Balochistan is 12.34 million. City is the center of urban services like, industrial, commercial, household services etc. There are two industrial centers in the main city namely, Quetta Industrial and Trading Estate (QITE) and Small Industrial Zone located at eastern/Saryab bypass and Sirki Road respectively. Both industrial areas are thoroughly visited and observed.

Data Collection Tools

Data were collected through pre-designed checklist, and questionnaire. Face to face interviews and focused group discussions covering all the phases of waste management; from generation to final disposal assisted in filling up the questionnaire. The main objective of the study is to examine the practices of industrial waste management, which is relevant to higher administration and management of industrial waste, so the top administrative management personnel of the both industrial areas were interviewed face to face according to pre-designed interview questions and checklist, comprising the questions regarding each stage of waste management; from generation to final disposal. Simultaneously a detailed focused group discussion with the staff members engaged in the relevant field was held to elaborate the existing industrial waste management practices in both industrial areas of the city. The findings of the provided information not only depict the existing practices but highlight the way forward for the future betterment.

Results and Discussion

Quetta city is a significant industrial area of the province comprising of both small- and large-scale industrial activities. Small industrial wing situated at Sirki road established in 1972. It mainly comprised of flour mills, spices, ice factories, bottled water supply and ware houses of renowned companies and various items like; wood, iron, tiles, marble etc. 23 training centers of carpets, garments and tailoring skills are working under its supervision.

Quetta Industrial and Trading Estate (QITE) established in 1985. There are 75 industrial units including steel mill, flour mills, oil & ghee factories, feed factories, plastic factories, manufacturing of batteries and oxygen cylinders etc. These industrial zones generate recyclable, plastic, compostable and hazardous waste. Detailed comparative description of industrial waste management practices in both industrial zones is depicted in Table 1.

Table 1
Industrial Waste Management Practices in Industrial Areas of Quetta City

Specifications	Quetta Industrial and Trading Estate	Small Industrial Zone Quetta
Location	Saryab bypass, 13km from Quetta	Sirki Road, Quetta
Year of establishment	1985	1972
Amount of generated waste	Not measured	Not measured
Type of waste	Recyclable, compostable, plastic and hazardous waste	Compostable, wheat husk, recyclable waste
Total no. of plots	160	450
Size of plot	Variable	2-4 Canals
Available infrastructure	Road, Water, Power, Gas	Road, Water, Power, Gas, telephone
Type of industry	Steel, flour mills, oil & ghee, feed, plastic factories, food, beverages, handicrafts, light engineering, manufacturing of defense parts and armaments	Flour mills, spices, ice factories, bottled water supply, wood and iron depots, ware houses of various companies and items
Segregation of waste	Not in practice	Not in practice
Collection of waste	Each industrial unit is responsible for the collection of their waste.	Each industrial unit is responsible for the collection of their waste

Storage of waste	Not practiced	Not practiced
Transportation of waste	Large tractors owned by the estate are reserved for transporting the waste	Large tractors owned by this zone are reserved for transporting the waste
Disposal of waste	There are no specified disposal techniques. Waste openly dumped and burnt	There are no specified disposal techniques. Waste openly dumped and burnt
Rules, regulation regarding industrial waste management	Number of documented guidelines are available regarding industrial activities but unfortunately the industrial waste management rules are not mentioned separately	Number of documented guidelines are available regarding industrial activities but unfortunately the industrial waste management rules are not mentioned separately
Special methods for hazardous industrial waste	Not in practice	Not in practice

Administrative officers brief the researcher during face-to-face interview about existing practices of industrial waste management thoroughly. They clarify that initially government establish an industrial estate, then industrialists are invited over there. They hire the land on lease and establish their industrial units. So every industrial unit is responsible for the waste it generates. In other words, management of the industrial waste from generation to final disposal is the responsibility of that industrial estate/zone. Local government or Municipal Corporation Quetta (MCQ) do not cooperate in this regard.

According to Phuong et al., (2021) knowledge about waste generation and characterization is the first and the most important factor to consider while designing different waste management activities; collection, treatment and final disposal, but both industrial areas do not measure the waste generated in their premises. Segregation of waste just at the point of production ensures proper waste management, but it is also not followed in both industrial areas of the city. Only recyclable waste is segregated which further may sell; like iron, steel waste, sulphur from coal, ashes from steel industry, and recyclable plastics.

The extensive services of municipal corporation Quetta do not facilitate the industrial sector. From collection to disposal all waste management activities are maintained by the industrial estate/zone. For which each industrial unit is responsible for its generated waste. They have their own sanitary staff and vehicles for collection, transportation and disposal of generated waste. Sanitary staff is working on daily wages, fuel and other charges are fixed separately. Open dumping and open burning of industrial waste is common in both industrial areas.

Attention seeking fact is that there is no special method of treating, transporting and disposing the hazardous industrial waste. They are treating hazardous waste just like other industrial waste in a very casual way. QITE not allowed the storage of hazardous and explosive materials in the area. Proper methods must be incorporated to treat this waste on urgent basis so that the environment, human health and nearby water bodies must be protected sustainably.

Government of Pakistan and Balochistan is much concerned with industries and commerce, as it may consider the backbone of the economy. Some of the national and provincial environmental protection agency's (EPAs) efforts are:

- Sectoral guidelines for Environmental Reports- Industrial Estate, 1997

- National Environmental Quality Standards (Self-monitoring and reporting by Industry) Rule, 2001
- Pollution Charge for Industry (Calculation and Collection) Rules, 2001
- Handling, Manufacture, Storage, Import of hazardous waste and hazardous substances Rules, 2022
- Balochistan Environmental Quality Standards for Industrial Gaseous Emission
- The Balochistan Environmental Quality Standards (Self-Monitoring and Reporting by Industry) Rules, 2020
- Balochistan Bio Safety Rules 2020
- Balochistan Hazardous Substances Rules 2020.

All these rules and regulations deals industrial waste management as just an aspect of industrial management. There is extreme need of devising thorough guidelines in the form of industrial waste management rules/regulation just like hospital waste management rules, 2005/ 2022.

Conclusion

Quetta city is the provincial capital and urban hub of the Balochistan province. QITE and small industrial zone are the two industrial areas of the city comprising of small to large scale industrial units. Although the estate is working under governmental supervision, ministry of industries and commerce, but Municipal Corporation is not serving the area in terms of providing sanitary services. Collection, transportation, disposal of industrial waste is the responsibility of concerned industrial unit. The Proper setup of segregating, storing and disposing the industrial waste in sustainable way is lacking. Eye opening fact is that hazardous industrial waste is dealt casually like all other waste, there is no special techniques to deal with this waste. There is not special guidelines, rules, regulations for industrial waste management separately.

Recommendations

It is highly recommended that some industrial units must be established within the industrial estate/zone premises specifically for industrial waste management plants for managing, recycling and refurbishing the waste produced in the area. So that the waste can be successively treated and managed just at the point of production. Raising awareness regarding severity of mismanaging the industrial waste may play positive role. Besides this, industrial waste management rules/guidelines at governmental level must be devised and implemented on urgent basis to ensure environmental sustainability in Quetta city.

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