

Need for Alternative Approaches in Solid Waste Management - Case Study Kathmandu Valley

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This paper presents the case study of the failure of traditional solid waste management approaches, using the case study of Kathmandu Valley, Nepal and stresses on the need to change to a community focused one. It studies the impacts caused by solid waste dumping in Gokarna Landfill Site considering various monitoring points, the analysis of which concluded the quality of water used by the community is not potable. Further, the community survey conducted revealed that a complete lack of awareness and involvement of the community during the planning stage has resulted into community resentment, lack of ownership and acceptance, and is hampering appropriate monitoring of the landfill. Considering planning and developing solid waste management solutions to date as a purely technical problem has led to the failure of these 'solutions' with catastrophic impacts. Hence, there is a need for a major shift in approaching the solid waste management issue.

Introduction

With growing urbanisation, environmental sanitation, including solid waste management has become a critical issue. Production of solid waste is closely linked to the behaviour and attitudes of people. Even today, in rural communities, where less waste is generated, nature usually takes care of the waste. In urban areas, dumping of waste around houses or improper dumping is resulting in an accumulation of health and environmental problems.

The production of waste in the Kathmandu valley has dramatically increased over the last 30 years. The increase is mainly attributed to rapid population growth, economic and industrial activities, and increased consumption of packaged foods and other items. The volume of daily waste is approximately 1,000 cubic meters, which is broken down as shown in figure 1. (ITO, 2003)

In this paper the planning, development and management

approach, and the impacts of Gokarna Landfill site, where solid waste from Kathmandu Valley was dumped from 1986-1994, are discussed. A community survey was conducted to understand the community perceptions and issues.

Solid waste a growing urban problem in developing countries

In addition to well-known constraints, there are many other factors acting against effective solid waste management in urban areas of developing countries, some of which are traditional values, religious beliefs and the existing caste system. For example, it is widely believed in Nepal that work requiring direct contact with solid waste is strictly for the lower classes.

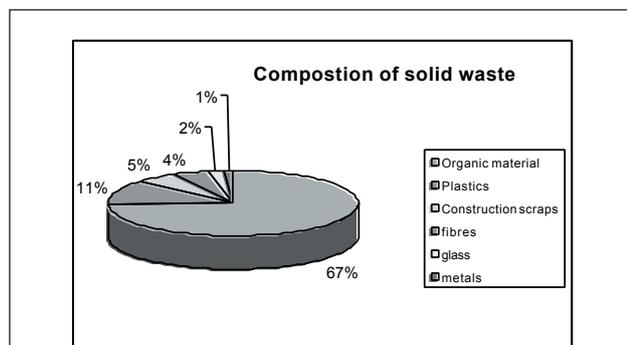


Figure 1. Composition of urban waste

Source: ITO, 2003

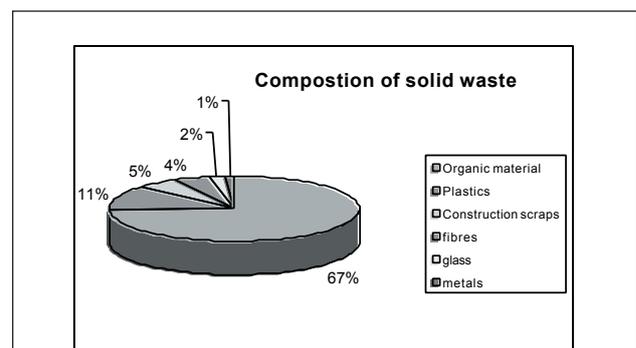


Figure 2. Public opinion about environmental problem in urban areas

Source: CBS, 1997

Furthermore, the absence of environmental standards in most developing countries has taken the onus away from the Governments on solid waste management. Figure 2, above shows the result of survey of 3,980 urban residents from all over Nepal in which unmanaged waste is considered to be the main environmental and sanitation problem in the cities.

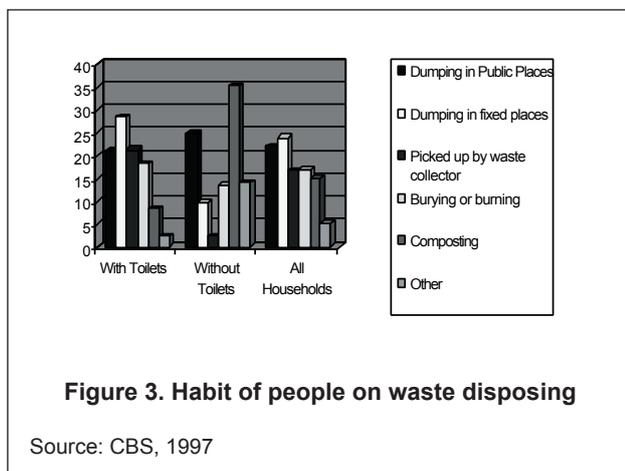
Waste disposal: A habitual issue

A survey carried out in 1996 indicated that the habit of residents of Kathmandu is that most urban residents dump their waste in public places or on fixed sites along the streets. In general these 'fixed sites' are not delineated or marked in any special way, they have simply developed through use. The survey also indicated that only 16.76% of the urban population has their waste picked up by a garbage collector. The number was less in poor communities, the indication for which was households without toilets, of which scarcely 2.36% have their garbage collected as shown below in figure 3.

Policies on solid waste management in Nepal

In Nepal, the Solid Waste Management and Resource Mobilization Act was formulated in 1987 in order to regulate, collect, recycle and dispose solid wastes generated in the three cities of Kathmandu Valley. It has also emphasized on the provision of construction of public conveniences, bathhouses, mobile public toilets and slaughterhouses at appropriate places. Involvement of private sectors in collection and transportation of solid waste dumping sites is also encouraged. In 1996, the Government took another major step by announcing Solid Waste Management National Policy in order to provide a long-term solution of garbage problems arising from unplanned urbanization. This new policy also states that national and foreign private agencies will be invited to undertake the work of solid waste management. However, this policy has not yet been implemented.

From the beginning of 1997, the responsibility of managing solid waste of each municipality has been handed over to the respective municipalities.



Photograph 1. Solid waste open dumping at Bishumati river bank

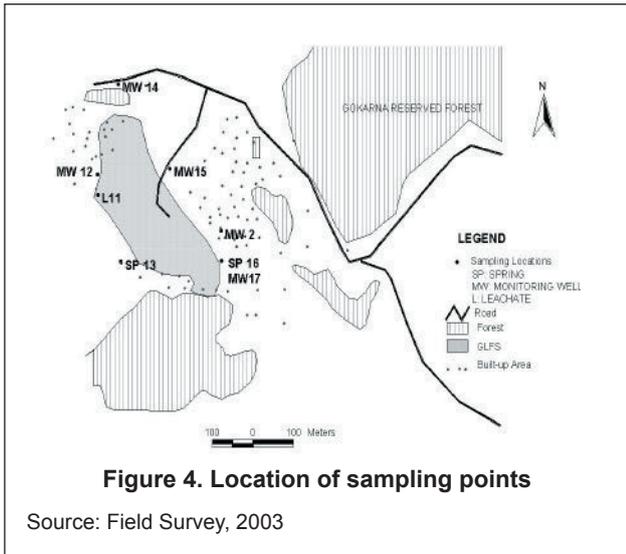
Solid waste management attempts for the Kathmandu Valley

Implementation of organized solid waste management started in 1980 in Kathmandu Valley with the establishment of Solid Waste Management Resource Recovery Mobilization Center (SWMRMC). As a result, Gokarna Sanitary Landfill Site (GLFS) was developed and operated from 1986 with the assistance of the German Technical Cooperation (GTZ). Compost production and resource recovery was established at Teku in 1985, which was terminated in March 1991 due to local resident's opposition. A sanitary land fill site for the final waste developed in 1986 came in operation at Gokarna, northern part of Kathmandu city, which was also closed down in January 1994 due to strong opposition from the people. Following that Shova Bhagavati along the Bishnumati River (see photograph 1) was chosen as a temporary dumping site for one and a half years, which ended in 1995. SWMRMC and the Government, have now chosen a new landfill site at Okharpauwa, about 15 Kilometres north-west of Kathmandu city.

Assessment on surface and ground water quality of Gorkarana landfill site

The GLFS is located in a small-branched valley system, called Nagdah valley northeast of Kathmandu along the road to Sankhu and at a distance of 8 km (as the crow flies) from the centre of Kathmandu. It about 500 m long and 150 m wide, valley drained to the west by a small tributary to the Bagmati River. The landfill site was operated haphazardly till January 1994. The local people were not consulted during the planning phase, nor involved during the management and monitoring, and claim that the mismanagement of waste at the landfill had deteriorated the local environment and threatened public health.

Most of the neighbouring villages on the downstream side of the GLS use water from open wells and roar pumps. Water quality and leachate assessment of some of these were carried November 2003 and March 2004 by the researchers which include daily and hourly variations for different parameters using eight monitoring points as shown in figure 4.



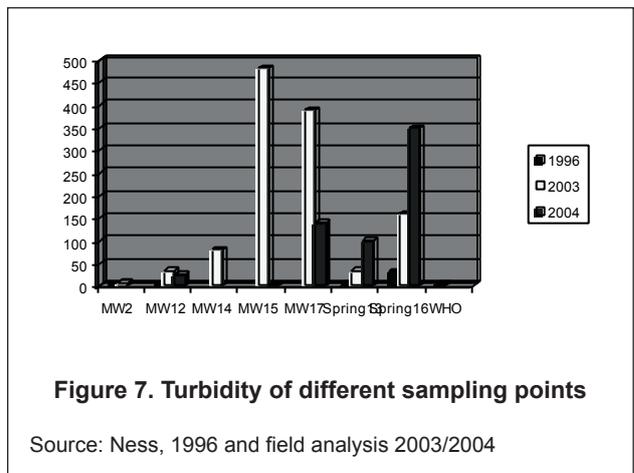
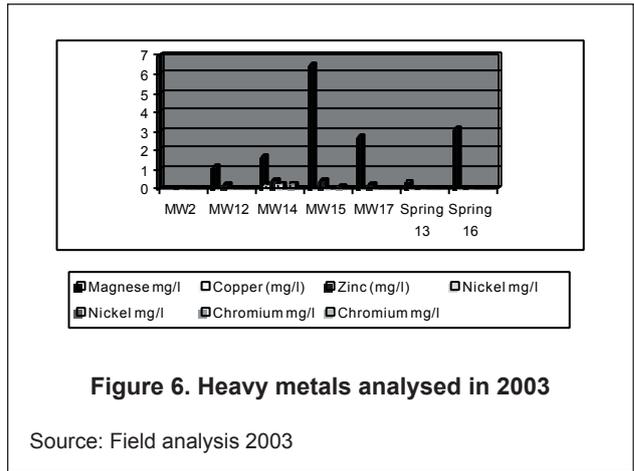
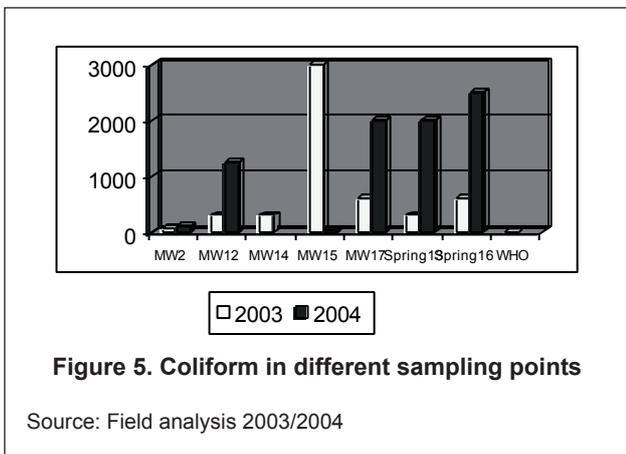
Analysis of various physical, chemical and microbiological parameters in the samples as tabulated indicate that these water sources are contaminated and should not be used for drinking and domestic purposes. In all the samples analysed, coliform was found to be significantly higher than WHO guideline as shown in figure 5.

Heavy metals analysed in 2003 as shown in figure 6, also shows that the concentration of manganese in all the sampling points were greater than WHO guideline. Same was the case with Turbidity as shown in figure 7. For more details on the field research and the analysis, please refer Devkota et al, December 2003.

Causes of Failure

There are various technical issues leading to the failure of the landfill, some of which include:

- Heavy compromise to install basic infrastructure requirements like landfill liner, leachate control, collection and treatment facility; gas control, and collection facilities; surface water and drainage facilities; compaction facility, final cover soil availability and environmental monitoring facilities, including the monitoring wells.



- Not sufficient soil cover – leading to a high leachate production and litter nuisance.
- No allowance for proper operation and maintenance - service equipment, site facilities, human resources etc.
- Lack of proper management of gas produced as a result of decomposition. It was observed that the local people had inserted pipes into the dumping site to take gas for cooking purposes. It not only has the risk of accidents, also has health hazards associated with it.

However, the root of the problem lies at the people and planning aspects, rather than the technical ones. Firstly, the Government doesn't appear to have implemented this within the context of a clear, overarching integrated environmental management policy, and with the understanding of the planning and operational responsibilities, nor did it consult with all the stakeholders, in particular the local community.

Conclusion

In summary, though waste is a behavioural issue, its management is approached simply as a 'technical' problem, not just in developing countries but also in the developed world. This generally ends up in grave consequences such as the one faced by Gokarna residents, which cannot be easily fixed neither by the decision makers nor the residents.

Instead, waste should be managed only with a socially responsible and people centred approach, which can be explained in four steps:

- Regulation formation with an integrated approach by the policy makers, which involves a wide stakeholder discussion and acceptance
- Information sharing – with the stakeholders and acceptance
- Education and awareness campaign – where all are on the same understanding of what's required and the steps ahead
- Cooperation and Implementation– where the residents work with the Government to own and implement the infrastructure, plan and policies

In very simple words, the new approach should be that the administration makes the rules with the people, has all the people know about, own and accept the rules. Then it teaches what they have to actually do, and where it is heading. Then only finally, based on the understanding, people cooperate with the administration, they educate each other, and implement and run it together.

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