Solid Waste Management to Prevent Urban Flood Risk: A Study of Aurangabad City

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Abstract

Indian society is known as fastest urbanizing society in the world. After China, India is the second most populated and economically growing country of the world. The speed of urbanization in India is remarkable. So the urban local governance is now overburdening about various services which they are provided. Management of urban waste is one of the services provided by Municipal corporations in India. Most of the municipal corporations have facing the management issues regarding urban waste. The issue is definitely reflecting to the elections of Municipal Corporation.

Aurangabad is known as a capital of a sub region 'Marathwada' within Maharashtra state. So this is a case study of fastest growing Aurangabad city and its urban waste management problem with concern to the Municipal Corporation Elections.

This paper therefore considers the role and awareness of waste management in flood risk reduction by reviewing the literature related to flood risk management and solid waste management. The review was focused in particular on case studies that demonstrate the combination of waste management and flood risk reduction in developing countries. It aimed to address three research questions: one is poor solid waste management a major contributor to flood risk management? Second, is solid waste management an effective measure in flood risk reduction? And third, are community based measures successful in improving the disposal of solid waste and reducing flooding?

Introduction:

A municipal corporation, City Corporation, Mahanagar Palika, Mahanagar Nigam or Nagar Nigam or Nagara Sabha is a local government in India that administers urban areas with a population of more than one million. The growing population and urbanization in various cities of India were in need of a local governing body that can work for providing necessary community services like health care, sanitation, educational institution, housing, transport etc. by collecting property tax and fixed grant from the State Government. The 74th Amendment made the provisions relating to urban local governments.(*"THE CONSTITUTION (AMENDMENT)". indiacode.nic.in.*)

The Twelfth Schedule to the Constitution lists the subjects that municipal corporations are responsible for. Corporations may be entrusted to perform functions and implement schemes including those in relation to the matters listed in the Twelfth Schedule. Public health, sanitation conservancy and solid waste management is the most important service provided by the municipal corporation.

The collection, removal, treatment and disposal of savage, offensive matter and rubbish and, if so required by the [This word was substituted for the word "provincial" by the adoption of law order 1950] (state) Government, the preparation of compost manure from such savage, offensive matter and rubbish [This word was added by Gujarat 16 of 1993s 14(1)] (and solid waste management) these are the responsibilities of Municipal Corporations in this country.

Solid Waste Management: A growing issue before Municipal governance

India's current population of 1,200 million will continue to grow at the rate of 3-3.5% per annum. With the per capita waste generation increasing by 1.3% per annum, the yearly increase in waste generation is around 5 % annually. The government is under constant pressure to efficiently handle the ever growing amounts of solid waste and make cost effective changes. Added to constrained budget allotments in the solid waste sector, poor administrative management practices have been a focus of increasing concern

(ERM, 2004). A review of literature of SWM in India highlights institutional/financial issues as the most important ones limiting improvements in SWM; Hanrahan et al (2006) specifically notes that "There is an urgent need for much improved medium term planning at the municipal and state level so that realistic investment projections can be developed and implemented." New methods for cost planning will support waste managers when faced with difficult decisions (Milke, 2006)

Problems due to improper solid waste management

The most easy and popular solution of waste disposal is open dumping. The open dumping of solid waste is the most un-scientific method of disposal. It has been found that there are major problems of the open dumping practice. The chemicals leach out from the garbage and pollute the ground water and soil. The gases like carbon dioxide and methane, released from the site pollute the air.

Environmental problems

The impact of waste on environment also differs from different categories of waste. The waste which may appear harmless at its generation point could be dangerous as it comes in contact with environment. For example a kitchen waste, which include left over leaves vegetable fruits etc, appears harmless at its generation point. However once it enters the environment, it attracts flies insects and prove site for growing disease producing microorganisms. Another example is of plastic which appears inert at initial stage. This plastic leads to choking of drainage, clogging of canals, ill health of animals. The plastic leaches out and releases different chemicals which severely affect the environment. Hence a strategy has to be adapted right from handling of solid wastes to its treatment. Water samples were collected from the dug wells and bore wells, around the dumping site at Naregaon. The sampling was carried out in the mid of every season i.e. summer, Monsoon and winter for two years. It has found that the concentration of the metal ions is increasing with respect to the vicinity to the dumping site. The continued practice of waste dumping may result in further pollution of groundwater sources. (Iqbal M and Gupta S 2009)

Health

The organic waste present in garbage degrades and hosts several living organisms. Flies, insects, rodents etc get attracted to such site. The birds, cattle and dogs lead to further spreading of the waste. The colonies of living organisms further pollute the site. The wind and rain also act as agents to spread the as there is no written document created as schedule by AMC. The bins are designated for storing bio degradable and non-biodegradable wastes. The practice was not used traditionally. However it came into force since 2017. The bins are not properly located and maintained. Community bin is a main practice for collection of garbage. Garbage bins are located in city but the number is inadequate. The bins are not emptied regularly. It is a common sight to find an overflowing bin.(Kallawar Gauri , Tiwari Rekha , Jadhav Sushen , Mahesh Joshi, 2009)

Results

The case study reinforced existing perceptions in the flood management literature regarding the importance of solid waste management in reducing flood risk. However these examples also highlighted the fact that no single approach to waste management was universally successful in practice. Literature demonstrates that poor waste management is a perennial problem that is set to get worse with the rapid expansion of urban areas in the developing world and the inability of municipalities to resource the necessary waste collection. The case study confirmed that solid waste management is a major contributory factor to urban flooding I Aurangabad city. For many of the examples blocked drainage is particularly implicated in localised flash flooding; but solid waste was also seen to worsen the impact of all types of floods.

The case study illustrate the fact that the impact of poor solid waste management is experienced very keenly by residents of informal settlements that are often outside the

control of municipal authorities. These residents are also more vulnerable to the impacts of flooding and less able to cope with it: therefore improvements in solid waste management can have a disproportionate effect on reducing vulnerability.
In such settlements a combination of private enterprise and community participation was seen to be the only way forward to improve waste management. Communities can generate employment opportunities and revenue by sorting and recycling waste rather than dumping it.

Another feature of the case study is that interventions in drainage and solid waste by governments and NGOs were often effective in the short term but their effectiveness reduced in the longer term as the impetus faded and systems were not maintained. This tendency for systems to fall into disuse may be partly compounded by the fact, also seen in the example here, that locally based schemes cannot wholly address the blocked drainage problems, as new waste is conveyed from upstream areas that are out of the control of the local activists.

Conclusions

1. Poor solid waste management contributes to urban flooding and, as urban populations increase, is likely to be an increasingly important factor.
2. The control of solid waste within areas at risk of flooding has the potential to reduce risk by minimising the amount of waste blocking drainage channels. However local programmes are limited in their effectiveness as solid waste is often carried downstream and residents do not reap the benefit of reducing their own waste.
3. Reduced accumulation of waste in general will reduce the environmental impact of flooding and has multiple other benefits to health and wellbeing.
4. Engagement of communities in risk reduction is helpful in increasing resources and in generating the necessary awareness and motivation to reduce dumping. Measures implemented without community participation are often undermined by poor waste disposal habits.
5. There is a need to educate the public to bring change in their attitude towards dumping and reduction of waste. Disapproval of undesirable activities and tackling apathy towards appropriate operation and maintenance of existing infrastructure may bring forth good user practices.
6. Community based measures need to be a part of a wider waste management plan in order to make a permanent scalable difference to the amount of waste dumped in cities and by extension to flood risk.
7. Flood risk reduction via solid waste management can be effective as part of an integrated flood management plan, however, it requires long term, ongoing, commitment from municipalities and communities.

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