Challenges, Issues of Solid Waste Management in Himalayas: A Case Study of Srinagar City

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Abstract: Overburdened and ineffective solid waste management systems in congruence with rapidly changing consumption patterns plague cities within the developing world. The resulting discrepancy between the current solid waste management systems and the growing need for expanded collection and disposal facilities has left an accumulating amount of solid waste within the urban environment producing unaesthetic and unsanitary conditions. Presently Srinagar city is facing the worst solid waste management issues due to rapid urbanization, tourism industry, insufficient funds and poor management practices. To understand solid waste challenges and issues information was gathered from different sources to accomplish the objectives of the study. To facilitate the intelligent analysis of existing solid waste management, geospatial techniques were employed. Research findings reveal there are more than 518 solid waste collection points and single dump site, which is proving to be unsustainable for managing huge solid waste generated from Srinagar city. On account of inadequate solid waste management strategies, rapid growth in population and insufficient funding results in traffic jamming, water pollution, infectious diseases, blockage of open drains and loss of biodiversity in city.

Key words: Consumption Patterns • Himalayas • Urbanization • Srinagar City • Dump Site • Biodiversity

INTRODUCTION

The rapid growth of population and urbanization decreases the non renewable resources and disposal of effluent and toxic waste indiscriminately, are the major environmental issues posing threats to the existence of human being [1]. The most common problems associated with improper management of solid waste include diseases transmission, fire hazards, odor nuisance, atmospheric and water pollution, aesthetic nuisance and economic losses [2]. It includes the heterogeneous mass of garbage from the urban community as well as more homogenous accumulations comprising of countless different materials such as food wastes, construction wastes, industrial process wastes and pathological wastes etc. [3, 4].

Since waste generating is as old as human history, but the management of solid waste was hardly an issue for the old communities. But however with the progress of civilization, the waste generated became of a more complex nature. It assumed serious proportion only after the human concentrations became engaged in non-agricultural forms of production [5]. Most municipalities in developing countries spend a large proportion of their budgets on the collection, transport and disposal of solid wastes. The disposal of solid waste is becoming a severe logistic and costly problem in many countries, particularly in high mountain trekking and expedition areas. Waste minimization could be the first step in dealing with waste management either at the household, or community or manufacturing level (such as the food and drink sector) [6], in both trekking [7].

The disposal of solid waste is becoming a severe and costly logistical problem in many Asian countries [8]. In most cities of developing countries, municipal solid waste management costs consume 20-50% of municipal revenues yet collection service levels remain low with only 5 to 70% of residents receiving service and most disposal being unsafe [9]. Municipal Solid Waste Management (MSWM) of developing countries have typical problem areas such as inadequate service coverage and operational inefficiencies of services, limited utilization of recycling activities, inadequate landfill disposal and inadequate management of hazardous and healthcare waste [10]. Solid waste is regarded as one of the most adverse forms of pollution it requires environmentally sustainable solutions to reduce overall environmental burdens [11].
The Himalayas have been a home of meditation for saints since time immemorial; these areas have also been reserves of biodiversity and scenic beauty and magnets for recreation, adventures and expeditions for visitors from all over the world. In particular, the beauty and tranquil environment of these mountains have always been a source of attraction and matter of pride to every nature lover. But the beauty and recreational resources of the Himalayas, which were once considered unique and distinct compared to other parts of the world, are changing fast. In the name of mountain ecotourism or adventure tourism, the number of tourists, trekkers and mountaineers is increasing rapidly. Consequently, the load of human-induced pollution, solid waste, being deposited in these ecologically sensitive and topographically fragile areas of the mountains is also increasing. In the absence of any formal waste management bodies and the absence of infrastructural services, the practice of ‘leaving behind’ self-generated wastes is the major factor increasing the load of garbage in the trekking and expedition locations. Srinagar is the first Metropolis and fastest growing city of Western Himalayas [12]. The problems of Srinagar City and its environs constituting the metropolitan area are becoming more and more critical with the increase in population and deterioration in existing level of services. The problems are assuming serious propositions in all aspect of urban living and are extremely critical in major sectors of sewerage, drainage, traffic and transportation, housing for urban poor, conservation of natural or cultural heritage. Tourism, Srinagar, Jammu and Kashmir. For instance at present Sewerage generated in city is directly draining or pumped into water bodies.

Study Area: Srinagar city the summer capital of Jammu and Kashmir State is situated at an average elevation of 1600 meters above mean sea level and its spread over in the heart of the oval shaped Valley of Kashmir. It is situated between 74°41’ 6” and 74°57’ 27” East Longitude and 33° 59’ 14” and 34°12’ 37” North Latitude. The city as well as its hinterland is bounded by natural wall of mountains (sub-mountain branches of Pirpanjal Ranges and Zanskar mountains). In the east city is bounded by Zabarwan Mountains with lush green vegetation, locating famous Dachigam Sanctuary and Mughal Gardens and is enviored by the shallow and swampy lakes of Dal and Nigeen with the eminence of hillocks of Takth-i-Suliman in the east and Kohi-Maraan (Hariparbat) in the centre adding to its beauty and making surroundings of the city invigorating. As per 2011 census population of Srinagar is about 1.2 million. It experience moderate climate during summer and severe cold in winter.

Objectives of the Study: The main objective of this study is to highlight operational system and core challenges related to the solid waste management in Srinagar city. Lethal environmental impacts and other related issues due to improper management of solid waste are also systematically examined.

MATERIALS AND METHODS

Information has been gathered using a variety of methods to gain a better understanding of the situation, issues and challenges of solid waste management and related problems. The present study is based on both primary and secondary data. Data collection includes document/literature review, semi structured interviews, published data regarding solid waste from Srinagar Municipal Corporation to understand existing waste management situation. The remote sensing data of 2008(Resource sat) and top sheet of survey of India were used for the present study. The data obtained was subsequently scanned and then georeferenced in ERADAS, IMAGINE 9.0 software. The data regarding dust bins and quantity of the solid waste generated from Srinagar city has been obtained from Srinagar Municipal Corporation. Data regarding tourist flow and tourist accommodation sector was acquired from Department of Tourism, Srinagar, Jammu and Kashmir. Location of dust bins and dumping ground was determined with the help of GPS and then data were drawn in different layers’ in GIS environment to facilitate various analysis.

RESULT

In Srinagar city solid waste is being collected manually by the help of sweepers through street and road sweeping because household solid waste is thrown from windows/doors or put in open places. Total numbers of sanitation workers in 34 wards are 2238, out of them 1826 are Male and only 412 are female [SSWMP 2007]. They are normally using wheel borrows and hand carts for the collection of solid waste from the streets up to collection points. Presently there are more than 519 waste collection points and only one dump site in the city. The profile of solid waste collection system and its distributional pattern is shown in Table 1 and Fig. 1.
Table 1: Profile Solid Waste Collection Systems in Srinagar City

<table>
<thead>
<tr>
<th>Waste Collection Point Type</th>
<th>Capacity of Waste Holding Waste</th>
<th>Total No.</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dumper bins/containers</td>
<td>2 metric tons</td>
<td>112</td>
<td>Such bins can are mainly found along roads around hotels, shopping complexes, main market, old city etc</td>
</tr>
<tr>
<td>Garbage sheds</td>
<td>5-7 metric tons</td>
<td>7</td>
<td>Mainly located in city core (CBD)</td>
</tr>
<tr>
<td>Open collection points</td>
<td>variable</td>
<td>400</td>
<td>They spread throughout the city along roads, streets and open urban land patches</td>
</tr>
</tbody>
</table>

Total: 519

Source: field survey 2012

Table 2: Major Challenges and Problems in Srinagar City Due To Improper Waste Management

<table>
<thead>
<tr>
<th>S.No</th>
<th>Problem And Issue</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Predominant crude open dumping</td>
<td>Providing habitat to flies, rodents and stray animals and also causing environmental pollution and loss of terrestrial and aquatic ecosystems</td>
</tr>
<tr>
<td>2</td>
<td>Disposition waste on roads, streets and open spots</td>
<td>Blockage of drains, Street flooding during rainy seasons, in-convenience in traffic and passenger flow and also increase the chances of dogs attack</td>
</tr>
<tr>
<td>3</td>
<td>Frequent burning of municipal solid waste</td>
<td>Degrade the air quality</td>
</tr>
<tr>
<td>4</td>
<td>Lack of segregation of solid waste at source</td>
<td>Frequent injuries to scavengers and municipal workers from sharp metal items and glass and plastics, also cause tier puncturing of vehicles at dump site and near waste collection points.</td>
</tr>
<tr>
<td>5</td>
<td>Transporting waste in open body trucks without any cover</td>
<td>Lighter waste items like plastics, polythene and ash gets blown away.</td>
</tr>
<tr>
<td>6</td>
<td>Over dependence on single dump site</td>
<td>Increase transport cost, delay in trip frequency per vehicles, wastage of fuel and time and cause traffic jamming</td>
</tr>
<tr>
<td>7</td>
<td>Lack of proper supervision and monitoring</td>
<td>Delay in waste pickups, absence of employees at work and mismanagement of funds</td>
</tr>
<tr>
<td>8</td>
<td>Inadequate machinery and infrastructure</td>
<td>Hinder the proper handling of solid waste</td>
</tr>
<tr>
<td>9</td>
<td>Faulty location of dump site</td>
<td>Spread of diseases in neighboring villages, ground water contamination, atmospheric pollution and public inconvenience</td>
</tr>
</tbody>
</table>

DISCUSSION

Disposal of Solid Waste in Srinagar City: There is only one dump site located at Achans in the North of the city and approximately 5-6 Kms from the center of city, has been in use since 1987 for the disposal of solid waste. The solid waste of the entire city is being transported to the dump site from 518 collection points as depicted in the Fig. 4. Area of this partially fenced site is about 34 hectares. The amount of waste generated in Srinagar City is 370 metric tons/Daily and only 250 metric tons of Solid Waste is being collected by Srinagar Municipal Corporation, the balance quantity is not lifted owing to lack of adequate infrastructure and supervision [SSWMP 2007].

The location of existing dumpsite is in the middle of settlement and water body as shown in Fig. 5. The residents of nine villages comprising of Saidapora, Shonglipora, Waganpora, Sangam, Braywar, Danmar, Guzerbal, Noorshah Colony and Bagh-i-Lal Pandith compliant that they have been affected with dumping of solid waste and demand closure of the dump site. The present method of operation of the sanitary landfill is also very crude and unscientific. Condition of internal
roads is very poor, due to which there is a tendency to dump at wrong places which either create obstruction or helps in deposition of waste in heaps at certain points. There is high frequency of waste burning at the dump site. Fig. 3 and 6 depicts the unsanitary and improper and pathological conditions of solid waste at dumps site.

CONCLUSION

Given the geo-ecological fragileness, Himalayan urban centers are seriously struggling to design useful and economical solid waste management systems. Srinagar is the first Metropolis and fastest growing city of Western Himalayas, municipal solid waste is being dumped openly along roadsides and open spots. Open dumps are responsible for so many negative environmental impacts in the study area. Due to lack of funding and unscientific management the existing solid waste management system is not working successfully in the city. Due to shortage of storage bins, collection efficiency is very low which has severely damaged the environmental condition and also induces to stray dog population phenomenally. The acute absence of waste segregation at the source all types of Materials are being disposed along with municipal solid waste which make waste handling very risky especially dumping and disposal points. The distribution of dustbin, collection points and lone dumpsite have major role in sustainable management of solid waste in Srinagar. Considering the
overall negative impacts associated with open dumping and open burning, these practices must be strongly discharged. GIS technique has successfully helped in depicting the existing loopholes of solid waste collection and dumping system of the city it can also be employed for designing a long term planning for sustainable environmental management for urban centers of fragile Himalayas.

REFERENCES