IMPACT: International Journal of Research in Applied, Natural and Social Sciences (IMPACT: IJRANSS)
ISSN (P): 2347-4580; ISSN (E): 2321-8851
Vol. 5, Issue 9, Sep 2017, 9-14

ANALYSIS OF THE HEALTH PROBLEMS AND DELETERIOUS EFFECT ON ENVIRONMENT DUE TO BHALSWA LANDFILL SITE, DELHI: USING GEOSPATIAL TECHNIQUE

SARITA SWAIN[1] & SASWATA SAHARIA[2]

[1]Research Scholar, Remote Sensing and Geographic Information System, Amity University, Noida, India.

[2] Research Scholar Project Assistant, Department of Geography, Cotton University, Assam, India

ABSTACT

The Bhalswa Landfill site is located in the northwestern part of Delhi and it is the capitals largest landfill site, which receives approximately 2700 tons of waste material every day. The landfill has already reached to its full extend in 2006, but due to population increase and no alternative site, Delhi is still using it as a dumping ground. The people residing near the site are suffering from various health problems and spontaneous fires are becoming more frequent during summer seasons. The ground water is highly contaminated in the area. The Remote Sensing and GIS techniques are very used full in analyzing the changes and show spatial effect on both human being and the environment. The result of this study indicates that there is a population increase in these areas and the health problems are becoming a serious problem, which can only be tackled by using good combustion practices by the way of incineration technology.

KEYWORDS: Bhalswa Landfill, Remote Sensing and GIS, Environment, Population

INTRODUCTION

Municipal Solid Waste (MSW) management includes hand sorting, screening, compacting grinding, shredding etc. These methods are necessary before dumping the MSW. The most important issues of all the metropolitan cities in India are to apply these methods before dumping a huge amount of waste generated by these cities. Delhi is facing the problem of MSW management, although it has three dumping grounds such as Bhalswa, Ghaziabad and Okhla. Households dump garbage in open and burn the garbage frequently. The motivating force of dumping garbage openly may include convenience, habit, or landfill and cost avoidance (Lemieux p., 1998). MSW rules came into force in 2000, but the three landfill sites are not organized according to MSW rules. The problems are becoming more severe because of the increasing amount of waste material day by day. The Bhalswa landfill site is surrounded by slums and unplanned settlement. These people are facing health hazards due to the dumping ground nearby. In order to encourage the citizen the municipal authority shall organize awareness programs for segregation of waste and shall promote recycling or reuse of segregated materials (Ministry of environment and forest 2000).

The Bhalswa landfill site is located in the latitude between 28° 42’30” and 28° 45’ and longitude between 77° 07’30” and 77°11’54”. It is situated in the most urbanized area and the soil is mainly comprised of alluvium soil. Bhalswa Lake is very nearby the dumping ground of Bhalswa and the site is also surrounded by a large number of human settlements.

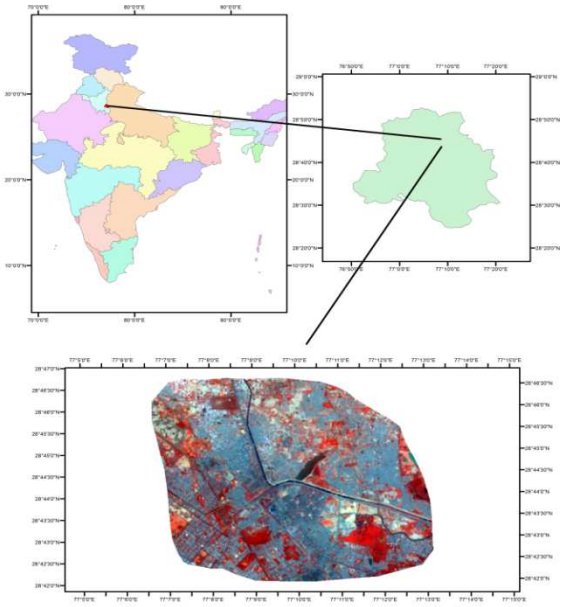

Figure 1: Location Map of Surrounding Areas Bhalswa Landfill Site

MUNICIPAL SOLID WASTE MANAGEMENT

MSW management is a process of managing the waste generated by a human being, for example, domestic, industrial, agricultural, e-products etc., Landfill is one of the ways of disposing the waste material. Waste material is collected, transferred, processed and then disposed. Before selecting the area of landfill site these following should be considered:

- Site selection: it is done to minimize the potential Environmental impacts
- Site investigation: In this stage topography, hydrology and Hydrogeology are carefully studied to minimize the health and safety risks of people living around the landfill site.
- Landfill methods: it is to make more efficient use of resources; methods include area method, trench method, ramp method etc.
- Monitoring of landfill site is a very important step to ensure potential environmental pollution and health hazards.

PROBLEMS ASSOCIATED WITH LANDFILL

The effect of the open dumping ground can be seen in both the natural environment and human beings. The changes in the environment cannot be easily diverted back because with environmental degradation the whole ecosystem is affected by the changes.

ENVIRONMENTAL PROBLEMS

Environmental problems include air, water and land pollution. Pathogen released from biochemical waste pollutes the air and they can remain in the air for a longer period of time. Burning of waste material releases various harmful gases in the atmosphere. When they are burned openly they can cause drastic changes in the environment. The leachate contaminant the ground water, the formation of leachate depends on the size, type, degree of compaction etc (Afsar et al. 2015). In a land fill operation leachate treatment system is very necessary for monitoring the ground water quality from time to time. In Bhalswa landfill side the monitoring has not been done for several years because the landfill side has already reached its full capacity long ago. Methane gas which is also known as a major green house gas is the cause of soil pollution in the surrounding areas of Bhalswa.

HEALTH ISSUES

The most common reported risk to human health from landfill site is from the use of ground water that has been contaminated by leachate (Jhamnani et al. 2009). Due to air pollution in Delhi approximately 10,000 people are dying annually, the respiratory problems are spreading each and every part of Delhi. Harmful dust particles, odor, smoke, windblown with litter are common in the poorly managed landfill site. All the birds, vermin's, insects, mosquitoes originate from these landfill sites and home to all the vector born diseases like Malaria, Dengue, Chikungunya, Kala ajar, Japanese Encephalitis etc.

METHODOLOGIES AND RESULTS

Initially satellite image are downloaded from Earth explorer and Bhuvan website. It has be geometrically rectified using ground controlling points, mosaic and the study area has been extracted. Land use and land cover are mapped by using ERDAS Imagine and Arc GIS 10.1 of the two years satellite image of 2008 and 2014. The major hospitals in the study area are demarked using Google Earth.

The land use and land cover image of the study area shows that there is a increase in settlement, density of population is highest in north and north east Delhi for example 36155 person per sq. km, according to census of India 2011. The area under vegetation has decreased from 2008 to 2014. When population expands in an area, people encroach upon the forest areas nearby to build new dwellings. Environment degrades with decreasing forest cover (Penman et al.2003). The no. of unplanned settlement or slums has been increased, due to rural to urban migration. Migration has been the major problem of all the metropolitan cities of India. Delhi population has drastically increased. The people who migrate from rural areas for the sake of employment occupy the most unfavorable areas such as Bhalswa landfill site.

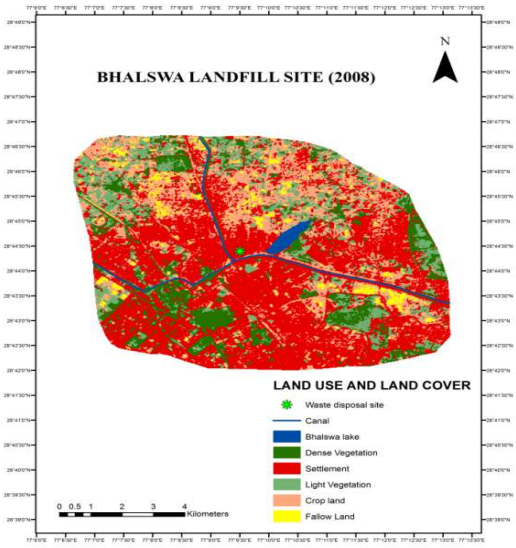

Figure 2: Land Use And Land Cover Map Of Study Area 2008

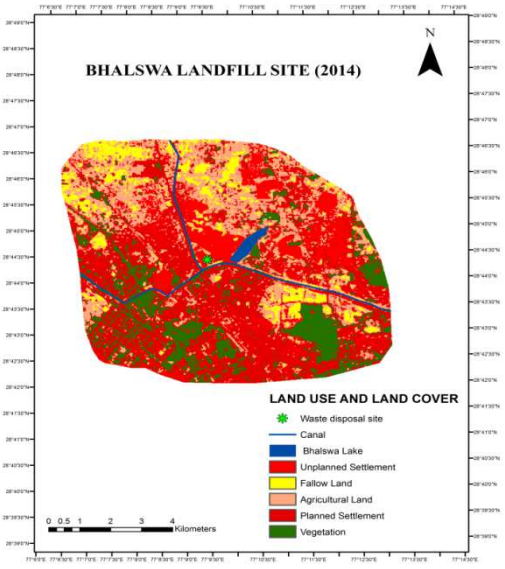

Figure 3: Land Use And Land Cover Map Of Study Area 2014

Delhi has Allopathic, Ayurvedic, Homeopathic and Primary health centers constructed by both private and public sectors. The no. of private registration of nursing homes occupies the largest no. of allopathic hospitals. According to department of health services, government of NCT of Delhi 2008 report, the total no. of hospitals of Delhi was 723 which have been increased to 1015 hospitals in 2014 report.

Table 1: Medical Facility Of Delhi (31-12-2007)

Name Of Organization	Alopathic	Ayurvedic	Homopatheic	Primary Health Centers
Delhi Govt.	29	1	2	--
MCD	45	2	--	5
NDMC	2	--	--	--
CGSC	4	1	--	--
DGSC	4	--	--	3
Dept. of ISM (AYUSH)	--	2	--	--
ESI	4	--	--	--
Northern Railways	2	--	--	--
Min. of Defense	3	--	--	--
Autonomous	3	--	--	--
Pvt. Registration	611	--	--	--
TOTAL	**707**	**6**	**2**	**8**

Source: Directorate of health services, Government NCT of Delhi

Table 2: Medical Facility Of Delhi (31- 12- 2013)

Name Of Organization	Alopathic	Ayurvedic	Homopatheic	Primary Health Centers
Delhi Govt.	35	2	2	--
MCD		--	--	--
NDMC	12	8	--	2
CGSC	2	--	--	--
DGSC	2	1	--	--
Dept. of ISM (AYUSH)	4	--	--	3
ESI	4	--	--	--
Northern Railways	2	--	--	--
Ministry of Defense	3	--	--	--
Autonomous	3	--	--	--
Pvt. Registration	930	--	--	--
TOTAL	**997**	**11**	**2**	**5**

Source: Directorate of health services, Government NCT of Delhi

The study area consists of 18 hospitals surrounding Bhalswa landfill. The northern region has less no. of hospitals and people have to travel a longer distance to reach health centers. There is need to add more hospitals or health facilities to this area.

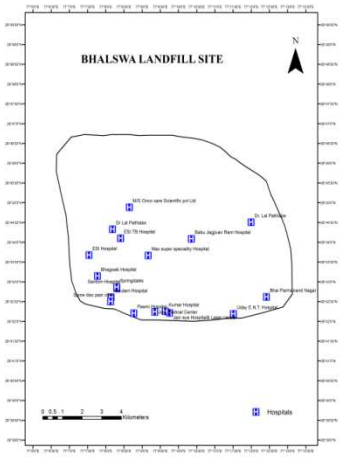

Figure 4: Hospitals in the Study Area

SUGGESTIONS

- Advanced technologies can help to solve the problem of MSW management. Segregating the MSW is the first step towards sanitary disposal of waste material. Next step is to reduce the volume of waste using compaction methods and then size reduction through Grinding and shredding. We can convert waste products into useful products using methods such as Aerobic and anaerobic composting, incineration, plasma gasification etc.
- Pyrolysis plant: This method includes burning of waste material with elevated temperature to produce valuable gasses, which will help in producing electricity.
- Plasma technology: This method was given by Dr S.L in 1973. In this methods waste material are burned in the absence of air, with the help of electrons or ions.
- Incineration: It is the process of burning waste in an incinerator to reduce the volume of the waste.

CONCLUSIONS

Based on the observation we can say that the pattern of land use and land cover does not support the open dumping ground in the middle of higher density of residential area. The waste material is deposed without segregating it properly, which further reduces the scope of recovery of resources. In this paper the health problems and environmental issues are observed during seven year gap between 2008 and 2014. It shows increase in built up area and decrease in vegetation cover. The no. of diseases like TV and respiratory problems are becoming common in the surrounding areas of Bhalswa landfill site. The number of hospitals is very few and occupies the southern area of the Bhalswa landfill. The Geospatial techniques are very much useful for monitoring the changes in land use and land cover changes, future planning of new landfill location.

REFERENCES

1. Ministry of Environment and Forest, GOI-Municipal Solid Waste (“Management and handling rules, 2000”)
2. Directorate of health services, Government NCT of Delhi report 2008 and 2014
3. Jhamnani B. and Singh SK (2009),”Groundwater contamination due to Bhalswa Landfill site in New Delhi”, International Journal of civil and Engineering
4. Afsar s. s., Kumar S., Alam p. (2015) characterization of Leachate at various Landfill site of Delhi, India, 2nd International conference on science, technology and management, University of Delhi.
5. Penman J., Gytarsky, M., Hiraishi T., Kruger, D., Pipatti, R., Buendia, L., Ngara, T., Tanabe, K., and Wagner, IPCC (2003), Good Practice Guidance for Land use, land use changes and Forestory, Intergoernmental panel on Climate Change (IPCC), Haryama, Japan
6. Paul M. Lemieux.(1998) Evaluation of emission from the open burning of Household waste in Barrels: project summary, United sates Environmental protection Agency (USEPA).