

CHAPTER 2

REVIEW OF LITERATURE

2.1 GENERAL

A literature review on management of solid waste has been carried out, to understand the solid waste management practices in various towns and cities. MSWM is one of the major environmental problems of Indian cities various studies reveal that about 90 percent of MSW is disposed of unscientifically in open dumps and landfills, creating problems to public health and the environment. Review comments are presented for functional elements of MSWM covering source of waste generation up to treatment option.

2.2 GENERATION, COLLECTION, DISPOSAL AND LEACHATE ANALYSIS

Daskalopoulos et al (1998) predicted the amount and the composition of the municipal solid waste (MSW) to be generated in future in order to devise a most appropriate treatment / disposal strategy in European Union countries and the United States of America. A typical composition of MSW was expressed in terms of the fraction of the total consumer expenditure on goods and products resulting in the generation of MSW ie, Related Total Consumer Expenditure (RTCE).

El-Fadel et al (2002) evaluated the potential effect of waste composition and site specific operational procedures on biodegrading processes and leachate quality at a field scale landfills that receives in excess of 1800 tonnes per day of refuse chemical analysis were performed. Leachate COD was a measure of all oxidisable matter in the leachate, while BOD was a measure of the biodegradable organic mass. Chemical concentration levels were related to biological activity within landfill and results indicated that pre-sorting and baling of the waste did not hinder waste stabilization and the high organic and moisture content resulted in extremely strong leachate.

Gawaikar and Deshpande (2006) reported that municipal agencies manage municipal solid wastes from urban areas with the objectives of providing good sanitation facilities as also protecting public health. Estimation of resource requirement for collection, transportation processing and disposal requires correct assessment of quantity of waste generated per day from different sources and their characteristics. Added to this, source specific significance which will enable accurate assessment of waste load and it would be easier for proper planning of solid waste management system.

Ramachandra and Sairavarghesek (2006) reported that in Bangalore, the garden city of India with a population of 6 million is facing the daunting tasks of handling 3613 tonnes of municipal solid waste per day. Added to this, are the constrain backup, inefficient funds, inadequate infrastructure etc,

Utpal Goswami and Sharma (2007) conducted a survey in the Guwahati, from his study it reveals that about 500 metric tons of solid wastes are generated in the city everyday. The proportion of the waste generation varies for people of different categories. Though the dustbin provided by

municipal corporation is used as a general means of disposal by the people, yet open dumping is usually seen.

Utupal Goswami and Sharma (2007) reported that unscientific dumping of solid waste leads to deterioration of the environment and its various components like air, soil and water. In Guwahati, about 500 metric tons of solid waste is generated daily. The Guwahati Municipal Corporation collects and disposes most part of the solid wastes in the dumping site through open dumping mode of disposal. The leachate produced from the dumping site was collected and physics-chemical characteristics of the leachate were analyzed and resulted that nature and characteristics of the bio-degradable solid wastes disposed in the dumping site.

Sharholly et al (2008) attempted to provide a comprehensive review of the characteristics, generation, collection and transportation, disposal and treatment technologies of MSW practiced in India.

2.3 CHARACTERISTICS OF SOLID WASTES

Richard J. Palczynski (2002) In his study encompasses a literature review of municipal waste management options in African countries and close examination of current waste management practices in the four main African municipalities of Cairo (Egypt), Nairobi (Kenya), Accra (Ghana) and Cape Town (South Africa). The project's objective is to contribute to the improvement of municipal solid waste (MSW) management systems in Africa, to promote appropriate management policies on national, regional, local and sectorial levels in order to enable the integration of suitable management practices and to guide the African Development Bank's Task Managers in the design of waste management practices or in the integration of waste management concerns into sanitation or urban development projects. Through the provision of a comprehensive and thorough literature review, a

detailed analysis of four major African municipalities and the presentation of a SWM project framework with reference to World Bank guidelines, this study should fulfill the task of guiding the ADM Task Manager in the design of waste management projects or the integration of waste management concerns into sanitation or urban development projects.

Utpal Goswami and Sharma (2007) analysed the characteristics of biodegradable solid waste scattered in Gowati. The amount of pH, electrical conductivity and available concentration of organic matter was analysed. The pH was mainly found to be almost neutral to alkaline, the electrical conductivity value for water soluble and acid digested part varied widely for same sample extract. The organic compound found to be in the range of 16.3 percentage to 31.7 percentage.

Aji et al (2007) envisage the solid waste management system in sabarimala, Kerala during its festival season, solid waste were generated at an average of 65 tonnes and 53 percentage of vegetative matter and remaining 47 percentage constituted plastic, paper cloth, glass metals and other miscellaneous items. The chemical composition reveals an average of 33 percentage organic carbon, 0.5 percentage nitrogen, 1 percentage phosphorus, 0.4 percentage potassium and 0.4 percentage sodium. Thus, a proper solid waste management was a prerequisite for the conservation of the remaining pristine forest that surrounds the Sabarimala Pilgrimage Centre.

Karthikeyan and Murugesan (2007) analyzed the various parameters like hardness, EC, alkalinity, chlorides, colour, odour and sulphates of the groundwater samples collected from dumping yard of Salem Municipal Corporation they reported that the hardness was about the prescribed limit of 300mg/L.

Utpal Goswami and Sharma (2007) studied the infiltration of rain water, the municipal solid waste leachate produced at dumping site ultimately fine its way into the groundwater causing contamination in Guwahati and also analyzed the number of physic-chemical characteristics of groundwater samples to as certain the extent of groundwater pollution by leachate and resulted that the concentration of most of the analyzed chemical parameters referring to the available groundwater quality is beyond permissible limit.

Srinikethan et al (2008) have assessed the influence of media related factors such as particle size, porosity pore size and specific surface area on performance of up flow anaerobic bio filters (ABFs). Three ABF reactor simple models of 8 litres capacity, packed with support media as granite of size 40, 20 and 10mm respectively were installed. From their study and demonstrations, it is found the up flow anaerobic bio filter packed with granite media of moderate particle size of 20mm, revealed the highest BOD and COD removal of 91.02 percentage and 82.01 percentage respectively.

Odile Schwarz-herion, Abdelnaser omran (2008), Presented a case study on municipal solid waste management in the city of Karlsruhe in Germany .In his study, It is recommended that clear goals and timeframes need to be established, duties and responsibilities of national and local governments and industry clarified and funding needs to be allocated in order to produce an effective waste management framework in developing and developed countries in the world.

Jeyapriya and Saseetharan (2008) studied the characterization of Municipal solid waste and its leached liquid were was carried out, which not only forms a key for an efficient solid waste management system and to assess potentially of impairing the ecosystems but also provide information about the rate and extent of decomposition of dumped waste.

Anupam Khajuria, Yugo Yamamoto and Tohru Morioka (2010) In their study explains the correlation analysis of among different factors of municipal solid waste and the objective is to assess the future municipal solid waste stream in Asian developing countries. The other goal of this study was to calculate the future land area that would be required for landfill site disposal in Asian developing countries.

Amit Singh (2011),Presents the problem of ineffective municipal solid waste management (MSWM) is also prevailing in the urban environment of Jaipur. Therefore the present study was undertaken to find out the current status, problems and prospects of Municipal solid waste management in Jaipur city. During the study it was found that the JMC has failed to implement MSWM in an effective way and neither do they have any concrete plan to have better MSWM for the coming years. It was also found that JMC prioritizes only those areas where the social connectivity is stronger than others. From the study it was found that the JMC is not following the standard procedure of handling MSW. There should be segregation of MSW at the generation stage itself. Collection efficiency was found to be only around 80% which consequently leads to a huge amount of waste being left out in the city.

2.4 COMPOSTING AND VERMICOMPOSITING

Charles Darwin (1881) drew attention to the great importance of epigenics in the breakdown of organic material and the release of essential nutrients from it. The formation of vegetable mould through the action of worms, and his conclusion have been fully confirmed and utilized during the last century.

Grappelli et al (1983) found that worm cast when used as manure increased height of plant, leaf area index, number of branches, stem girth and yield in plants like saliva and aster in posts.

According to Jogdant (1985), millions of tonnes of individual excreta, wide range of animal wastes including chicken, duck, cattle manure, farm wastes in the form of slurry range of agricultural wastes, spent mushroom compost, plant residues, food processing wastes can be disposed of using them as substrates for vermicomposting.

According to Senapati and Dash (1985), vermicompost contains different growth promoting substances including root growth promoters, the water holding capacity of soil is said to increase due to colloidal materials like earthworm mums, which is an absorbing agent.

Kale and Kubra Bano (1986) reported that the possibility of replacing chemical fertilizers field experiments conducted on the paddy variety IR-20. The final yield did not show any significant differences in both the plots though the vegetative growth was better in worms cast applied plot.

Bhawalkar (1989) concluded that the wastes could be gradually bio processed by earthworms, into balanced plant nutrients. In addition, stated that the earthworms bio system enrich growth of beneficial bacteria and actinomycetes in its surroundings.

Gunasekar and Dhanapal (1990) in their study related to energy from island water in madras city have concluded that 15813 GJ of energy can be recovered from the 1521.73 tons of disposed solid wastes.

Jambhekar (1990) reported application of vermicomposting increased the available N, P and K content in soil. Application of vermicompost leads to significant increase in nutrient status of soil.

Chinnamani (1992) reported that burning of one kilogram agricultural waste produced about 20-114 g carbon monoxide and 2.1-11.4 g total suspended particles smoke.

Reid and Tittlebaum (1993) carried out study on “Energy Cost Savings associated with MSW Recycling” and he has concluded that waste to energy conversion will be necessary if energy recovery and volume minimization of solid waste are to be optimized simultaneously.

Tandon (1993) evaluated the manure value of the vermicompost and control, the pH, electrical conductivity and nutrient elements nitrogen, phosphorus, potassium, organic carbon, iron, manganese, zinc, copper and C:N ratio were tested.

Balaji (1994) reported that the vermicompost obtained from garbage-neem waste was in good nutrient content and the vermicompost supported luxuriant growth of Amaranthus plants. Ramesh Babu (1995) reported that apart from the available nutrients, the plants growth promoter substances are found in the worm cast.

Skinoer (1994) reported it is important to understand that separation of materials from the solid waste stream by itself does not constitute recycling, which occurs only when these materials are incorporated or processed into products that enter the commercial area and are sold as commodities or goods. Waste minimization at source also leads to payback. Recycling of waste is an aid to resource conservation.

Edward (1995) reported that the earthworms were important in converting organic wastes into a valuable and efficient plant growth media which can be efficiency used as agriculture input.

Ismail (1997) suggested that the waste converted to organic manure will have a long term impact for sustainable agriculture by improving the soil fertility. In addition, stated that the earthworms casts contained a good percentage of available nutrients.

Govindan (1998) suggested *Perionyx Excavatus* is easily adaptable to organic waste like sugar cane trash, coir waste, paper pulp, faecal matters of cow, sheep, horse, activated sludge and biogas sludges of poultry droppings.

Tamil Selvi (1998) concluded that the high percentage of NPK- in utilizable form and the required amount of calcium and magnesium were found in vermicompost obtained from garbage, coir pith and Pongamea leaf litter.

Carll Potter et al (1999) reported that the conventional aerobic compost process passed through four major microbiological phases identified by temperature: Mesophilic (30 to 45°C), thermophilic (45 to 75°C), cooling and maturation.

Ramesh Kumar Jalan (1999) reported that producing aluminium and steel from recycled garbage requires 95 percent less energy as compared to refining then from natural ores. Glass is 100 percent recoverable and bottle from recycled glass require much less energy. Similarly, recycled paper is produced using much less energy and waste and resulting in less pollution.

Ju-sheng Huang et al (2000) suggested that the physical and chemical characteristics of solid wastes (constituents, pH and moisture) and operating conditions of solid waste composting (carbon to nitrogen ratio, aeration rate, reaction temperature and time) improve significant effects on an ecological succession of micro organisms.

Ju-Sheng Huang et al (2000) studied the operating condition of thermophilic composting of vegetable waste by determining total dry solid loss and total volatile solid loss.

Quazi Bari et al (2000) observed that significant variation in temperature and biodegradable volatile solids degradation occur in composting mass along the vertical direction when unidirectional aeration is applied.

Sannigrahi and Charabortty (2000) reported that vermicomposting was many times faster than other conventional techniques. Different biodegradable refuses like cabbage leaves, kitchen wastes, old newspaper, spent straw sub state and wood shavings were collected from different houses at Tezpur, Assam, mixed separately with fresh cow dung at 1:2 ratio which is converted to vermicompost by releasing perionyx excavates earthworms.

Srivastava (2000) suggested that soil, organic matter, leaves, rice, straw dried water hyacinth, elodea, saw dust, activated sludge and any fermented substrate can be used as culture media to raise worms boxes or containers. Earthworms feed on everything expect plastic and metal.

Areti kanvilaki et al (2001) noticed that there are no universally accepted standards for the evaluation of compost stability. Several countries in Europe have produced and used their own set of standards and others are in the process of doing so.

Banjarata Jolanun et al (2001) predicted that composting of vegetable and fruit waste operated with high amount of bulking agent (the waste: saw dust ratio 1:1.58) without aeration gave a k value of 0.1057 per day.

Bhide and Sundaresan (2001) reported that the solid waste is a heterogeneous material and its composting varies from place to place. The process developed for a particular situation may not be directly suitable for another. Dixit (2004) indicates that the consistent character of MSW is its inconsistency. The characteristics of MSW of Indian cities are different in quality and quantity as compared to developed countries.

Nobu Yuki Yoshida et al (2001) reported that in spite of several benefits of composting only 1 percent of wastes was disposed of by means of composting in Japan in 1996 and it is not possible to take into account the supply and demand for the compost product Mantell reported that the high population density of Germany requires maximum production from the agricultural land available and sustained high level productivity over a long period of time, so that soil loss must be minimized. Compost has been found to be an effective material soil loss control.

Ravichandran et al (2001) prepared vermicompost from different solid wastes and the vermicompost were found to be high in nutritive value.

Sujathamma et al (2001) predicted that all the vegetable, animal and other wastes can easily be processed into good organic manure of high nutrient value through composting. Organic matter helps in soil management for sustainable cultivation of any crop.

Gundaru is one of the major rivers in Tamil Nadu with catchment area of more than 1000 km². Gundaru Basin lies between Vaigai and Vipparu

Basin to its north and south direction respectively. In many areas of Gundaru river basin nearly half of solid waste generated remains unattended, giving rise to unsanitary conditions especially due to microbial and parasitic infections in all segments of populations. Meenakshi and Muthuchelian (2002) analysed the water quality of Gundaru river and to determine its portability, microbial diversity and health status of people in the Gundaru river basin.

Jeenger and Mathur (2002) studied the physical and chemical analysis of solid waste collected from collection sites representing all the municipal wards of ajmer city and revealed an alarming use of plastics, predominant physical constituent was ash and dirt (58 percent) followed by organic wastes, newspaper, plastics, textiles, glass, leather, rubber and metallic cans. Density of the waste was 168.5 kg/m^3 . Chemical analysis showed a moisture content of 19 percent, pH 7.6, c-19 percent volatile substances 9 percent and calorific value was 5431 kj/kg. Vermicomposting and other sustainable way need to be urgently evolved in order to prevent environmental hazards of this ever increasing solid waste.

Kiyohiko Nakasaki et al (2002) used 1.12g of inoculums (in dry weight), which was a commercially available seeding material as a starter culture in composting dog food by batch operation.

Kumar et al (2002) reported that one of the severe problems associated with the open dumps is infiltration of leachates into the surrounding environment, subsequent contamination of the land and water.

Liwarksha et al (2002) reported that the process that the process of aerobic biodegradation of MSW conducted in the bioreactor with intensive aeration enable a high reduction of organic load (95-98 percent BOD_L) in a

very short time (3-4 days) in comparison with composting if the optimal process parameters are kept.

Nikolas Themelis et al (2002) had estimated that the municipal solid wastes (MSW) collected in the U.S, amount to 190 million tonnes per year. And 3.5 percent of the MSW i.e., 6.3 million tonnes per year undergoes aerobic composting process.

Raghunatha Reddy et al (2002) assuming the potential role of epigenic earthworms is decomposition of solid urban waste (SUW) is great potential. Vermicomposting facilitates bioconversion of urban waste which enables to regulate and utilize SUM is the production of nutrient rich manure, which can efficiency be used as an agricultural input. The findings show that the consortium of earthworms have proved well in decomposing SUW after preliminary predecomposition. In addition, advantages of vermicomposting is the physical nature of compost, which is pellet like and provide vermi dropping pre coated by enzymes of the mid gut of earthworm which serves as value addition of compost.

Ravichandran et al (2002) reported in Tiruchirapalli City, the total solid waste generated per day is about 340 to 350 metric tonnes. The amount and types vary from place to place in Tiruchirapalli City. The types and amounts of wasters depend on the life style of the population which in turn is determined by the economic status of the people. The wastes were collected from different location and their composition was analyzed. The amount biodegradable wastes was estimated and subjected to vermicomposting and quality of composting was rich in nutrients.

Sanjay Kumar Sharma (2002) studied the assessment of soil suitability biodegradation pattern of waste via microbial activity prevailing at different stages of vermicomposting and standardizations of parameters for

obtaining their effective degradation with both surface feeder and deep burrower earthworm species. In addition, he discussed the impact of technology on the change in the soil properties in terms of soil aggregation neutralization of soil pH and change in bacterial count etc.

Sannigrahi (2002) prepared the useful compost from biodegradable wastes either in small scale in the house or in larger scale by the entrepreneurs after collation from different houses or the biodegradable waste marked dustbin of the municipality. Vermicompost is a marketable product and offers a scope of extra income to house wives and other family members besides using it in potted plants or in kitchen garden.

Shahul Hameed et al (2002) evaluated the vermicomposting of solid wastes from tanning industry. The solid waste consists of salt waste hair, waste lime, waste flesh, my bob dust, buffing dust and trimmed waste. In addition, analysis of the manure value of vermicompost to evaluate micro nutrient and macro nutrient.

Richard et al (2002) found that moisture is a key environmental factor that affects many aspects of the composting process. Biodegradation kinetics is affected by moisture through changes in oxygen diffusion, water potential and water activity and microbial growth rates.

Sharma et al (2002) studied the bio degradation level of paper under different composting condition by measuring temperature pH, cellulose, protein, carbohydrate, organic carbon, C: N, nitrogen content, BOD, COD and volatile solids.

Baby Rani Devi et al (2003) reported that living organisms utilize about 30 parts of carbon as energy source for each part of nitrogen, for cell

building. Hence an initially available C: N of 30 is favourable for composting. Higher the C: N, longer is the reaction time.

Claudio Mondini et al (2003) observed that the results obtained from the different parameters used to evaluate the degree of transformation of cotton and yard wastes during composting, the C:N, humifications parameters, thermo stability index demonstrated the effective stability reached by the end product.

Navindu Gupta et al (2003) suggested that the high organic content (40-50 percent) of Indian wastes can be better utilized by converting them into compost.

Girija Devi et al (2004) suggested that aerobic composting is unsuitable at high moisture content above 50 percent because the waste tends to ferment anaerobically, producing odorous organic acids and sulphides.

Himali Desai et al (2004) reported that there are no specific standards for compost or organic manure in India.

Mahmet Colak (2004) found that by molasses addition the microbial activities within the compost, shoot the inner temperature to the highest level. Acceleration effect of molasses in microbial activity was therefore understood.

Sanjay Gupta (2004) worked on issues and sanitation noted that the India's green revolution rescued the nation from famines. But left over 11.6 million hectares of low productivity, nutrient depleted soils ruined by unbalanced and excessive use of synthetic fertilizers and lack of organic manure or micro nutrients. India's 35 large cities will need a year of organic nature if their biodegradable waste is composted and returned to the soil.

Heldur Hakk et al (2005) observed that porosity and practical size of the composting material can effect material can affect the degradation of organic materials by limiting air movement and providing too small surface area for decomposition.

Agamuthu and Fauiah (2007) determined the possibility of converting the organic component of the wet market waste into organic fertilizer through a large scale composting. Fruits and vegetables were shredded into 5 cm to 7 cm and mixed with goat manure at ratio of 3:1 which is converted into compost with approximately 60 percent volume reduction.

Jeevan Rao et al (2007) reported that maximum total nitrogen content of 1.29 percent was found in 100 percent. Urban solid waste compost treated with chemical additives and bio-inoculums while a minimum of 0.85 percent was recorded in 100 percent agricultural waste compost without addition of chemical amendments. The apparent increase in total nitrogen content in compost is not only due to enrichment but also to the reduction in weight because of decomposition.

Karthikeyan et al (2007) revealed that the market waste generated in Salem city can be converted into bio-compost by adopting the vermin composting technology using cow-dung as inoculants in 1:1 substrate which will yield optimum macro nutrients value. The process will reduce the environmental damage and fetch revenue from the waste in a short span of time.

Preethu et al (2007) reported that coffee pulp; husk and effluent are the main by products generated by the coffee processing units and are disposed into arable land and surface water. The presence of phototoxic substances, organic acids in these by products is affecting the soil, water quality and restricts the crop growth. In addition, these wastes contain high

concentration of biodegradable organic and minerals of plant origin which can be better utilized by composting with other organic materials.

Viswanathan et al (2007) focused on upgrading the existing dumpsites, enhancing of waste degradation in landfills and mitigation of environmental impact from leachate and gas emission. Minimization landfill emissions and space requirements with simple and efficient pre-treatment technologies such as composting enhancing leaching and dry anaerobic digestion are of principal concern. The distribution of research tasks among the network partners eliminates redundancies, maximizes the resources and effectively uses the expertise to provide better solution by information sharing for comparison and confirmations of outputs.

Rajesh Patil et al (2008) evaluated the effectiveness of microbial consortium in composting the waste generated from kitchen production of garbage is considered as an integral part of the growth of societies and civilizations, but for healthy development of any important community, it is imperative that people pay due attention to the handling and treatment of solid waste as garbage is not only the source of nuisance but also poses a threat to the health of community.

2.5 LEACHATE

Barlaz (1989) reported that percolation of leachate from uncontrolled open dumping site into the soil aquifer is a serious problem of water environment. Decomposition of solid waste in the dumping site proceeds by physical, chemical and biological process. The quantity of leachate is a function of all these processes. The leachate takes up organic and inorganic constituents by means of physical, hydrolytic and fermentative processes.

Krauses et al (1992) reported that the most important problems of operating aerobic composting plants are the odour pollution due to the emission of volatile compounds. Emission of volatile already starts upon arrival of the fresh bio-waste in the composting plants.

According to Eitzer (1995), most volatile organic compounds (VOC) in aerobic composting plants are emitted at early stages of processing i.e. at the tipping floors, at the shredder and at the initial composting region.

2.6 INTEGRATED SOLID WASTE MANAGEMENT

Carina Weingaertner Kohlscheen (2003), in his study discusses about two main strategies: The first is an overview and discussion of concepts and practices involved in integrated solid waste management strategies. In the second part, a case study on the waste management strategies Based on case studies in two low-income areas, Chesterville (formal) and Cato Crest (informal) it is revealed how unemployment is reduced due to the employment of community members for labor-intense waste collection activities. KDBA, a nongovernmental organization working side-by-side with the municipality, created educational programs with the aim of informing and motivating people to keep the community area clean.

Prin Pukrittayakamee (2010), the purpose of his research was to focus on the analysis of a community-scale ISWM System. The results of this research demonstrate that the designed ISWM system, with the intensified extent of treatment facilities, has the most environmental benefits with acceptable cost. The assessment also shows that the MDR sorting facility is the most significant treatment option that influences the environmental benefits of the ISWM system. In addition, relative low capital and annual cost per tons of waste of the MDR sorting facility compared to the AD and aerobic

MBP facility also make this treatment option the most important in the ISWM system.

2.7 LAND FILL

Emile Jurgens Christopher Barr (2005), this brief has been prepared in the interest of promoting a more informed and transparent dialogue on the proposed project among financial decision makers, policymakers, and other stakeholders. We believe that the following issues need particular attention and ought to be urgently addressed before the project proceeds further. **First**, the Environmental Impact Analysis and associated project documents made available by UFS provide only limited information on the plantation development program at PT HRB and the mill's overall fibre supply strategy. **Second**, the proposed project is likely to place direct pressures on the 77,000 ha of natural forest that reportedly remains at the PT Hutan Rindang Banua (PT HRB) plantation concession, and particularly on the 44,000 ha of areas covered by 'mixed tropical hardwood' (MTH) that were designated by Jaakko Pöyry to be appropriate for plantation development.

John Philip Bevan (2009), in his case study focusing on impacts upon the socio-economic and water environment. It is recommended that this research forms part of a research agenda focusing on the practice of determining significance in EIA, establishing a consensus on the way it should be undertaken. This discussion is essential if the predictions presented in EISs are to become credible and hence valuable to stakeholders, and ultimately achieve EIA's substantive purpose, sustainable development.

Nishanth et al (2010) conducted suitable site determination for urban solid waste disposal using GIS and Remote sensing techniques in Kottayam municipality, India. They studied the impacts is due to location of dumping site in unsuitable areas and they suggested a suitable site for the disposal of

urban solid waste generated from Kottayam municipality and surrounding areas using GIS techniques.

Adrian Nedelcu, Ion Enache (2010), in their research approached the following problems: quality of the environmental factors, analysis of the size of the impact, evaluation of the potential impact on the environmental factors, evaluation of the global impact and post-closure monitoring of Târgoviște- Aninoasa solid waste dump. Taking into account the value of the global pollution index and the bonity grades for each environmental factor, we have noticed that, through the closure of the solid waste dump, the environment is affected within the allowable limits, the impact is low and local, and the effects of this project on the environmental factors are positive.

Abdolrassoul Salman Mahiny, Iman Momeni and Sahebeh Karimi (2011), in their study indicates that improvement of environmental impact assessment methods is achievable, using the basic concepts on ecology and the relevant fields. In addition, authors believe that determining the status and revising current methods of environmental impact assessment will be helpful to recognize the development trend of the EIA. The study provides a ground for criticizing and testing some concepts of the new and the traditional methods in selecting from the sites.

Tamilenthi.S et al (2011) they studied, "The data base, land use and land cover and solid waste disposal site, using remote sensing and GIS: A case study of Sakkottai-block, Sivagangai District, Tamilnadu, India. They selected a suitable site for waste disposal is based on several factors. GIS technology using weighted overlay analysis help to select the possible, suitable solid waste disposal sites. IRS-P6, LISS III imagery and GIS as a tool have been found to be very useful for the interpretation and identification of solid waste disposal site. Thus with the use of these technologies management of municipal waste will no longer be a problem for city administrators.

Hossein Yousefi, Sachio Ehara, (2011), in their study, an attempt was made to identify and assess the likely key impacts of geothermal exploration, drilling and operation. Then on the basis of current evaluation suggest monitoring program and mitigation plans.