Proceedings of IOE Graduate Conference, 2019-Summer
Peer Reviewed
Year: 2019 Month: May Volume: 6
ISSN: 2350-8914 (Online), 2350-8906 (Print)

Socio-Economic Implications of Landfill Sites in Urban and Peri Urban Areas: A Case of Landfill Sites of Kathmandu Valley

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Abstract
Waste management is one of the major challenges of urban areas particularly in developing countries like ours. Economic cost is lowest for landfill which is the major reason for its global adoption although it has lowest position in waste management hierarchy. Along with environmental issues numerous other imperceptible socio-economic issues have been raised due to poorly managed landfill sites. While researches on effects of active landfill sites have been studied, socio-economic aspects seems to have been very limited study even though it needs equal importance. The objective of this paper was to assess social-economic impacts of landfill sites on its surrounding neighborhood and perception of local inhabitants regarding such issues around the landfill sites of Kathmandu. The research is located within interpretivist paradigm with a case study strategy. Theory of saturation was followed for the determination of sample size. Accordingly, to achieve such objectives, primary data were collected via descriptive questionnaire survey with local inhabitants residing within the buffer zone regarding perception on social, cultural and economic impacts, key informant interviews with municipality chairman and health officials, in-depth interviews with the nearby inhabitants regarding perception towards landfill impacts, and field observations. Case studies on Gokarna Landfill (Post closure) and Sisdol Landfill (Operation) helped to understand the socio-economic implication of landfill sites on surrounding areas in Kathmandu. Secondary data were extracted from different published and unpublished materials. Analysis of collected information with reference to literature reviewed show that majority of respondents agreed to the fact that negative impacts of landfill are associated with health issues, increased traffic flow, degraded social image, disturbance on landscape, water source, flora, fauna, degrading education and land value. Although such negative response were quite common, some of the respondents still agreed that there were few economic opportunities and handful of development due to the landfill project.

Keywords
Landfill Site, Socio-Economic implication, Social perception, Initial and Post closure phase

1. Introduction

Waste is related with virtually all human activities since the beginning of time It is inevitable that as long as life continually exist on earth waste will be produced by human activities. Rapid population growth, industrialization, improved living standards, social, economic and cultural attributes are some factors associated with waste generation and management. Solid waste generation rate and composition in developing and developed countries is unprecedented. Land filling is the ultimate waste disposal technology which is relevant even when other management techniques are being used. In spite of the fact that the EU waste hierarchy establishes the preference of reuse, recycling and recovery of waste above land filling, a significant amount of waste is still land filled. It is widely adopted approach in developing countries like ours because of its lowest cost for disposal. Sanitary landfill is the most cost-effective system of solid waste disposal for most urban areas in developing countries. [1] In meantime, landfills are unwelcome as neighbors, and regularly attract a hostile response from prospective host communities because of the established fact that landfill disposal generates various community concerns, from its construction phase to even after post-closure phase. In Nepal, issues have been raised by public about landfill impacts on numerous occasion. It is essential for better SW management

practice in Nepal. There is no effective waste management system except some limited recycling and composting activities. So, the landfills are essential for our context to manage current waste management. Generally, the environmental or physical aspects are studied to some extent in our context but there have been very limited research regarding socio-economic or non-physical aspects which are as important as environmental aspects. The main research question is to understand the socio-economic implications of landfill site on surrounding urban and peri urban areas from its initial phase to post closure phase.

2. Social Impacts from Closed & Operating Landfill Sites

A well-known fact is that the establishment and operation of a landfill in any location creates negative externalities which include environmental stigma and damage to negative impacts on social, economic as well as cultural aspects. Study by (Zeiss and Atwater, 1989) [2] gave importance of understanding the linkage between physical impacts, beliefs and attitudes of host community on waste disposal facilities. He identified consecutive linkage which starts from physical impacts to beliefs and finally ends to attitudes. Moreover, physical impacts generates non-physical impacts which are categorized into economic (Property value), social (community image), and political (lack of fairness) impacts. Social and political opposition to landfill siting has been indicated as the greatest obstacle for successfully locating waste disposal facilities. (Lober, 1995 c.f. (BAŞAK, 2004)[3]) The NIMBY (not in my back yard) phenomenon (Kao and Lin, 1996; Lober, 1995; Erkut and Moran, 1991), is both an important consideration and restraint to landfill siting (ibid). Some attributes can be measured as physical impacts, other, nonphysical, impacts (community image, loss of control) appear only through interpretation of the facility's physical impacts in the residents' beliefs. [2] It also highlights that the relatively minor physical impacts (noise, odor, view, risk) may contribute more strong non-physical impacts due to the interpretation and perception of residents. It can have visual effect on the scene and landscape. The integration of landfill site is another issue which could affect tourism related activities. The first landfill landslide event recorded in the literature occurred in the 1970s in Sarajevo, Bosnia. (Gandola, Grabner, and Leoni, 1982)[4] A buffer zone will act as a separation between the surrounding areas and the landfill. Further development could be controlled by using land use regulations which is not a common practice in Nepal, because there is a lack of specific rules and regulations for the provision of a buffer zone for a landfill site. With reference to the guidelines of various organization (International Solid Waste Association), and countries (South Australia, Canada, Malaysia), a distance of 200m to 500 m from the boundary of the Waste Processing and Disposal Facility (sanitary landfill) is mostly taken as buffer zone which can differ in case to case.

3. Economic Impacts from Closed & Operating Landfill Sites

Researches in international context refers to the environmental, ecological and socio-economic impacts of landfill sites in vicinity areas. (Taylor and Markandya, 2006) [5] performs a meta-analysis of 6 hedonic pricing studies, and provides broad support to the hypothesis that landfill impacts are sensitive to the particular characteristics of the surrounding area. The relationship between landfill externalities and income, population density, and the size and operating status of the site are all found to be significant and of the expected sign. This research also demonstrates that local areas characteristics are an important determinant of landfill effects.The economic impact that a landfill has on the value of properties in close proximity to it is important for a number of reasons. Contingent valuation (CV), hedonic, pair-wise rating, and CE methods have been used to examine the public concerns of siting waste disposal facilities. (Sasao, 2004) [6]Using the hedonic method, Hirshfeld et al. (1992), Nelson et al. (1992), and Kohlhose (1991) examined to what extent the negative effects of a landfill can be observed on the residents who live around it.Lober and Green (1994) conducted a CV survey and demonstrated an inverse relation between distance and opposition to siting the four following types of facilities: waste-to-energy plants, recycling centers, transfer stations, and ash landfills. (Sasao, 2004)[6] The establishment of landfill sites influences the property values of the area. Many researches suggests its impact on surrounding areas along with high economic and social cost of landfill management. From the management of the from landfills to groundwater contamination management, and ensuring compliance with environmental regulatory

policies needs a lot of the municipality's and tax payer's money in terms of integrated waste management. Because materials disposed in the landfills take very long time to decompose, designing effective strategies and facilities for managing landfills requires high capital investments with regards to management and recycling initiatives. Prior studies on the impact of sanitary landfills on residential properties have found negative relationship between residential house prices and proximity to landfills. Negative value effects have been rarely found for properties located in excess of six kilometers away from landfills. [7] Suggests that the landfill sites have effect on property prices which is significant as well as frequent. It also suggests that the discernible impact of active and historical sites on property prices extends over a different geographical range which it categorized ad 0-3 km for active landfill sites and 0-1 km for the historical landfill site. It further highlights that the historical or closed landfill sites continue to depress property prices more than 20 years after their closure. Only studies primarily focusing on the socio-economic impacts and resident's perception are included in the review, those concentrating on other types of impacts including physical or environmental impacts, energy concerns, technical or engineering issues were excluded. Finally, papers concentrating on the analysis of legislative, regulatory or policy issues were also excluded as well. Key features of the studies were extracted, including main objectives, site type (proposed, existing, closed), study approach, sample size determination, methods of data collection, analysis and main findings.

4. Methodology

The study of impacts of landfill sites on surrounding area would have different characteristics in different context. For this study, the attitude of local people towards landfill sites is vital which can only be understood with study of social context in subjective manner. Following the perspectives of various research paradigms, this research best fits in the interpretivist paradigm. Prior research on socio-economic implications of landfill sites on vicinity areas and people perception towards such waste management facility was identified via a comprehensive search using internet (Ex. Google scholar, Science direct, Sage Journal). Only studies which focused mainly on socio-economic or psychological impacts were covered in the review. Papers focusing on the legislative, regulatory, policy issues, waste management strategies as well as technical/engineering issues were also excluded. Finally, papers concentrating on energy or environmental impact such as noise, odor, groundwater, landscape etc. were covered to some extent which could be associated with social issues. Case study method have been adopted as research strategy since the socio-economic implication of landfill can only be understood by empirical inquiry of the real life context of surrounding area which can't be studied separately from its context. As a case study approach this study uses qualitative methods such as unstructured participant observation of sites and surrounding areas, content analysis of written and audio visual documents, mobile ethnography, transect walk, key informant interview, unstructured in depth interviews and questionnaire survey.

4.1 Study Area & Survey Design

Gokarna landfill site (GLS) and Sisdol landfill sites (SLS) have been taken as representative case study area to understand the different phases of landfill site and its socio-economic implication on surrounding area. GLS have been used by Kathmandu during1986 to 2000 whereas SLS is still being used as landfill site of Kathmandu. GLS area have been developing as the international cricket stadium of Nepal. Two landfill sites have been taken to have broader understanding of socio-economic implication on surrounding area during operation phase and post closure phase.Research (Saffron, Giusti, and Pheby, 2003) [8] suggested that the study area for the research related to community health impact by landfill sites should be done in less than 2 km radius. Guideline of various countries (South Australia, Canada, Sri Lanka etc.) shows that a distance of (200-500) meter from the boundary of disposal facility should be maintained. Thus, this study takes residents as eligible study respondents who are living within the approximate radius of 500m from the landfill site as the study area as there is no area designated as buffer zone. Responses were taken from the head of household in most cases and from the highest educated member of household as much as possible. Those guidelines are set to ensure that the respondents possess understanding on socio-economic aspects impact by landfill site. Survey method was adopted for primary data collection. The questionnaire was divided into four sections, namely, (i) General information, (ii) Perception on Socio-cultural dimension,

(iii) Perceived impact on Economic dimension and (iv) Perceived impact on Environmental dimension. Pilot test of the questionnaire was done in both sites resulting in some site specific alteration on questionnaire design. Survey was voluntary and respondents were notified that there are no monetary benefits and rewards from participating in the study. Twenty five household survey have been conducted on February (winter season) with Principle of data saturation which refers that when the ability to obtain additional new information has been attained and when further coding is no longer feasible.

5. Data Set and Analysis

The average age of interviewed people is 44 years with maximum of 82 and minimum of 23. Among them, 14 were female and 11 were male. Most of the questionnaire survey were taken with the household head. Only 16 percent of interviewee were not head of household.

5.1 Perceptions of impacts on social dimension from closed & operating sites

Past researches have examined inhabitant's perception and attitudes toward waste treatment facilities such as a landfill or incinerator. Literatures demonstrates that social impacts by landfill sites on surrounding areas during its operation as well as post closure phase. The perceived impacts range from issues involving public health and psychological burden to social image of locality, to education of children. Siting of landfill in the vicinity area, the host community may have various concerns which would result in resistance to such establishment, especially when those issues have not been addressed effectively by concerned authorities. The concerns regarding social impact can be grouped into following categories:

5.1.1 Demography

GLS have similar percentages of nuclear and joint type of family whereas at SLS there are more nuclear type of HHs. Majority of respondents don't think that the landfill site siting did not physically divide an established community. 24 percent of respondents of GLS think that it had divided an established community whereas 4 percent thinks that it divided community in some way. 20 percent of respondent of SLS thinks that landfill site divides the community in some way. Only 4 percent of respondents of SLS thinks that the landfill have induced population growth in the area directly or indirectly. 12 percent and 4 percent of respondents from SLS and GLS thinks landfill played role in some way population growth in the area while majority of respondents do not believe any role of landfill in population growth. Most of the respondents were local people from the area who were living there before landfill sitting i.e. 84 and80 percent in SLS and GLS respectively. 16 percent of respondents of SLS were migrated there who are basically workers in landfill area from *Rasuwa*, and *Nawalparasi*. Twenty percent of respondents were migrated at GLS who were migrated after the closure of landfill.

5.1.2 Public Health

They frequently feel respiratory diseases, eye itching, skin infections, cough, skin problems, headache and injury related problems. Psychological impact cane be felt due to continuous exposure to bad odors causes stress, bad mood and enhance the feeling of helplessness, since they cannot change the situation. They also fear the explosion and fire hazard they are exposed to. Literature ((Elliott, et al., 1997)[9] also confirms such health impact by landfill. In SLS 60 percent of respondents thinks those health problems are associated with the impacts of landfill whereas only 12 percent of respondents from GLS thinks so. Research in Shanghai, China (Che, Jin, Zhang, Shang, and Tai, 2013)[10]reports that 82.5 percent of the residents living close to a landfill considered health effects as the most important issue. Significance portion of respondents of SLS agrees on health impact than GLS which is because SLS is still in operation and its perceived impact in greater than closed GLS. People seems to associate health impact more with landfill site if there are more odor, noise, litter etc. Meanwhile, 28 percent (SLS) and 16 percent (GLS) of respondents thinks these health issues maybe associated with landfill impacts in some way. Research (Wakefield and Elliott, 2000)[11] demonstrates that respondent referred psychological symptoms such as uncertainty, stress and anxiety associated with landfill in Ontario, Canada. It focuses on that they felt that dealing with uncertainty was more difficult than coping with an actual landfill.

5.1.3 Traffic

All of the respondents feels that the landfill project have increased the traffic load. Literatures ((Furuseth,

1989)[12], (Okeke and Armour, 1999)[13]) validates the increase of site-related traffic concerning to residents. Among them 44 percent of respondents from SLS felt disturbance with increased traffic whereas 12 percent of them feels some disturbance maybe related to traffic.Those researches also shows that the disturbance such as traffic noise, litter and odor from site trucks. 44 and 84 percent of respondents do not feel any kind of disturbance with increased traffic from SLS and GLS respectively. (Furuseth, 1989)[12] found that landfill related traffic in North Carolina, US was most serious problem as per resident's rating. One participant at SLS stated as;"...traffic have been certainly increased creating problems like noise, odor, accident, litter. But these issues are overshadowed by other more important problems which are not properly managed..." (Interview with Ram Kr. Ghimire) In case of GLS, during landfill operation, it was a rural area with limited services and facilities and very low traffic flow. Thus, it can be related with less disturbance felt in GLS.

5.1.4 Social Image

The landfill site of Gokarna has been developing as the international cricket stadium for Nepal these days. People feel that the new image of the area as an international cricket stadium has brought positive impact on development. Before that, they refer the locality as *'Fohor Danda'* which was spreading the negative impressions to outside communities. It was perceived as a polluted and non-attractive place to live in. After mentioning where they live, they are frequently asked questions as: is that the place close to the landfill, Does it smells so badly? How can you stand to live there? These statements also affect the community inhabitants psychologically. 84 percent (SLS) and 64 percent (GLS) of respondents agrees that landfill have affected social image whereas few (16 percent) at GLS do not agree on that. Remaining respondents believes there are some relation on social image and landfill site.

5.1.5 Landscape

Majority of respondents, 84 and 52 percent from GLS and SLS respectively feels that the landfill have substantial adverse effect on scenic vista. Some former fields, agricultural lands have been transformed into dump mounds. More respondents from SLS feels disturbance on recreational or open space than GLS (68 and32 percent). More respondents from GLS feels no such disturbance from landfill. Meanwhile some respondents do feel moderate disturbance in both cases. In GLS, no one agrees on such substantial change. Meanwhile majority of respondents form GLS, 80 percent feels some effect from landfill. Research by (Furuseth, 1989)[12] also indicated the deleterious impact on landscape and appearance which are non-spatial in nature.

5.1.6 Education

Every HH from both cases consists of educated members varying from SLC to post graduate level. It is found out that people of GLS has got higher level of education as compared to SLS where majority of HH has got members with highest education as high school in SLS. Majority of respondent's HH has got graduate level education as highest education among HH members in GLS. There are no any type of assistance from landfill project for education of society. And 60 percent of respondents of GLS think that landfill site had affected the education of children directly or indirectly whereas everyone thinks its impact in SLS.

5.1.7 Water and Sanitation

They were dependent on piped water supply and jar for drinking and household work in GLS. No well or boring was available. In case of SLS inhabitants rely on natural source of water which is distributed on HHs in community basis. Most of respondents from GLS uses filter for water purification. All of respondents uses boiling technique while none of them uses potash or piyus for water purification. Everyone from both cases agrees on disturbance on water source in some way. 72 percent of respondents were fairly satisfied with the water supply whereas 16 percent people are dissatisfied with water supply. All of them agreed on disturbance of water source by the landfill site. All HH have septic tank in the area.

5.2 Perceptions of impacts on economic dimension from closed & operating sites

Economic impacts are the effect of landfill site on commerce, employment of local people, and income generation of the inhabitants. The analysis typically measures the change in economic activities before and after the landfill establishment which usually concerns on changes in business revenue, business loss and

profit, personal wages of people, creation or loss of job opportunities by the landfill development on the local or host communities. The nature of economic impact by the landfill sites usually differs from one phase to another i.e. operation phase and post closure phase.

5.2.1 Property Value

Although it is difficult to evaluate the exact property value depreciation duet to landfill in the area, research (Reichert, Small, and Mohanty, 1992)[14] indicates such depreciation concerning people. Majority of respondents from both cases i.e. SLS (84 percent) and GLS (92 percent) agreed on adverse impact on property value due to landfill in vicinity area. Similar adverse impact were exhibited in researches (Danthurebandara, Passel, Nelen, Tielemans, and Acker, 2013)[15] (Okeke and Armour, 1999)[13]. Similarly, Majority of respondents (86 percent) were concerned about property devaluation because of landfill site in (Okeke and Armour, 1999)[13] study in North Carolina, USA. Only few respondent denied on such impacts. Also, 40 percent of SLS and 32 percent of respondents found difficulties in selling land because of landfill. Many of them (60 percent both) did not know about such difficulties because they did not tried to sell land.

5.2.2 Development

In the opinion of the community inhabitants the presence of the landfill had not helped much in the development of the community. It had assisted in some sectors of development like road construction, infrastructure development but not much. In GLS, 60 percent of respondents does not agree that landfill project have brought development with some problems. Similarly, 44 percent from SLS also thinks so. Still, 32 percent from SLS and 24 percent of GLS agrees on that the landfill has brought some level of development. Meanwhile 24 percent from SLS and 16 percent from GLS have moderately agreed on such development. Majority of respondents from both cases 72 percent from SLS, 68 percent from GLS believe that the development would be done in more managed way without landfill site in vicinity area.

5.2.3 Economic Opportunities

Family members from 24 percent of respondents of GLS were involved with landfill site works. Most of them were involved in initial phase of project in vehicle management inside landfill site, worker and caretaker. Now, only 2 HH is still involved with the landfill related work. They said that they were forced to move out from their job. The do not believe that the landfill project had brought the economic opportunities to the area. They perceive landfill as a barrier in economic development of local area. In SLS, 48 percent of respondent's HH members were involved with landfill works. One of the local driver stated as: "....yes, the landfill project have brought opportunities for low skilled members of society. It is helping in livelihood of the lower class people who don't have higher education, skills so it is helpful in some way for people like us...." More percentage of people were getting economic opportunities in SLS than in GLS. It can be associated with the governance system and awareness of people. IN GLS, they were involved as low level workers which did not need specialized training whereas in SLS most people were involved as driver requiring training.

5.2.4 Resettlement and Compensation

In GLS, no inhabitants have directly lost their land as a part of landfill site development. The land used as landfill site was barren public land. It was a gorge on which wastes had been dumped and buried. People didn't get the any kind of compensation for the establishment of landfill in vicinity area. Some local people had been initially provided with economic opportunities inside the landfill which was later dismissed. The SLS have slightly different scenario to Gokarna landfill site. As the land for landfill in Sisdol had been bought from the local people. Certain compensation money had been provided to the land owners. Some of the land were being used as farmland where most of the land were barren.

6. Findings and Discussion

Goal of this paper was to focus on socio-economic implication of landfill sites on surrounding area with reference to the current literature study and site study. Review of prior relevant researches regarding socio-economic impact highlighted major aspects of impacts and their nature in different contexts. The major aspects identified were those related to demographic change, perceived physical and psychological health, landfill traffic, and social image of locality, landscape, education, as well as concerns about property devaluation, development and economic opportunities. Primarily all of the identified

aspects have negative impact except some economic opportunities and physical development. Most of the researches were focused on resident's perception towards landfill site resulting on more perceived negative status. Researches involving a broader scope of analysis and stakeholders may increase the some positive impacts. Many of the researches were focused on resident's perception towards such facilities, property devaluation and health concern, and had consistently negative.

Both sites were developed as a sanitary landfill site with proper managed systems which worked well during its initial period but didn't last long. People mentioned that there were no inspection on waste dumped eventually resulting in various environmental, social and economic problems. People from GLS feel relieved that the landfill site have been closed now and being re-developed as Mulpani International Cricket Ground. But, according to the chairman of Kageswori municipality this project do not have connection with the former landfill project. After the landfill site have been closed there are no any works regarding post closure management, inspection have been done by the landfill project other than final soil covering. From literature review, it is understood that post closure assessment and inspection is mandatory for landfill site which generally last for approximately twenty years. It is necessary to allocate certain fund for post closure management before closing which is not found in GLS. Now, the municipality holds the responsibility for its management but it referred that there are not such problems after closure. In contrary, people living around the former landfill site reports on various problems due to landfill site such as water contamination, landfill landslide, odor etc. It clearly shows the communication gap between authorities and local people in these issues. Results from both cases reveals that moving out from the local area is very difficult and not a preferred option. At GLS, most of the respondents agrees that the population have been increasing after the closing of landfill.During its operation phase there were no population growth by migration. But, they feel that the scenario have changed drastically after the development of cricket stadium in former landfill site. Positive changes can been seen in physical, social as well as psychological aspects. In migration of some workers from landfill site can be seen; mostly informal workers from *Rasuwa* and *Nawalparasi* district working on landfill site. Results suggests that siting of landfill would discourage the people to move in, meanwhile making difficult to move out due to various underlying reasons which are described below.

Both landfill sites are affecting the health of residents which is confirmed by health officials. Perceived health impact is also greater in SLS than in GLS. Literature also supports that operating sites would have more perceived impact than closed one which could be associated with idea that even minor physical impacts could contribute more strong non-physical impacts due to the interpretation and perception of people. Increase in traffic volume is obvious due to continuous transfer of wastes from city/transfer station to landfill sites. In most of the researches, residents were very much annoyed by such traffic increment but in both sites, the traffic disturbance was not prioritized by them. It can be said that there are other more prominent issues such as health, compensation scheme, job etc. which overshadowed traffic disturbance. Social image is another non-physical aspect with long term impact on the society and its residents. It is found that the landfill siting have been done on gorge area which do not significantly disturbed the landscape but perceived impact is found more in both cases. It can be said that people need to be well informed about the regarding certain technical issues too. Otherwise, it could led to public dilemma and dissatisfaction among people which is evident in both cases. Water sources have been disturbed in both cases and there is still problems in water supply and sanitation system. They related impact on education due to health issues in children which may or may not be totally associated with the landfill. Some assistance on development work have been done by the landfill project in both cases such as road and drainage construction, water supply, culvert, club and hospital buildings, temple in both cases. In spite of such compensation works done by project, people don't agree with the development by landfill. In their opinion, the project did not provide compensation works as promised before the project siting. Also, the management was ineffective on implementation of compensation work resulting in numerous public protests. Some people were still convinced about development by project. In SLS, it was developed as landfill site for only 2 years as a temporary landfill which is still being used as landfill or dumping site for more than 14 years and people think that it is not fair to locals. It has created the distrust with government and its policies.

7. Conclusion

The modern society is producing ever increasing amounts of waste due to which the concerned authorities are struggling to manage wastes particularly in developing countries. Thus identification and practice of appropriate methods for waste management have become very important. Landfilling is the ultimate disposal technology with many social, economic, environmental dimensions to be considered while operation and after closure phase. It concludes that the there are certain pros and cons of landfill which are located on the proximity of such locality as selected for the study. Majority of people perceive landfill site as a problem which in most of cases is because of the mismanagement by the concerned authorities. It can be an integral part of waste management system of rapidly urbanizing areas if operated and well managed by considering environmental as well as socio-economic dimensions. These sorts of study are performed by using various theories, mathematical models, economical pricing methods to calculate the impact on economy, property value, traffic volume increment etc. This study, however, is based on interpretation of perceived socio-economic impact of landfill sites. Questionnaire survey, In-depth interviews, key informant interview with officials, health officials, experts and residents living in the vicinity area of landfill are interpreted. This study was done in winter season; there could be different perceived impact during rainy or windy season due to prominent physical stresses (odor, litter, and landslide).

Finally, some suggestions for further research seem to arise from this study such as the social, economic as well as environmental impact of landfill can be better understood by the reviewing in longer time period. Researches in Nepalese context are limited to a very short period of time which could not capture the whole scenario of the field. Another suggestion is that the actual impact on environment, health, economy can be compared and correlated with the perceived impact of residents to understand actual scenario.

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