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**RESEARCH ARTICLE**

## Environmental Impacts of Waste Management in the City of Taluqan

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### ABSTRACT

This study aims to find the environmental impacts of waste management within four seasons (spring, summer, autumn, and winter) of the year in Taluqan City. In this research, samples from 100 families during one week noted that dustbin setups for each house and labels like plastics, metals, organics, ashes, diapers, and plastic cans were used to separate waste easily. Household waste generation was analysed using various methods; a questionnaire survey was carried out among 400 householders to assess the current state of waste management in Taluqan City. The result showed that the government has no proper waste management; the residents collect and throw waste into the environment (surface water, vacant lands, streets, agricultural areas, etc.). The average waste generation was 0.903 kg/capita/day for winter, 0.805 kg/capita/day for summer, 0.53 kg/capita/day for spring, and 0.6 kg/capita/day for fall. The percentage of solid waste components in Taluqan City is organic at 60%, glass at 4.2%, metals at 13.25%, plastic and papers at 7.75%, and diapers at 15%. The average generation rate for all seasons is 0.72 kg/capita/day in Taluqan. Based on the respondents, 90 % of households throw their waste into surface water or vacant lands, 75% were interested in receiving information regarding the 3Rs (reduce, reuse, and recycle), 70 % wanted to pay for the collection, 65% wanted to collect from Masjid-to-Masjid, 35% like to be visited house-to-house and 17% were willing for separation of their waste.

### KEYWORDS

Taluqan Waste Management, Four seasons of the year

### ARTICLE INFORMATION

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### 1. Introduction

Waste is defined in France as "any remaining of a process of production, processing or use of any substance, material, product or more generally, any personal property abandoned or which its holder intends to abandon." The definition of household waste (solid or liquid) means waste from daily household products. Regular waste management is the set of provisions for the collection, transportation, and environmentally sound disposal of waste (Patricia et al., 2013). In developing countries around the world, solid waste management is one of the most challenging and perpetual issues (Forouhar, 2012). Definition of waste: unwanted remains, materials, residues, and unnecessary by-products which are no longer required by the initial user. These materials are by-products of human activities such as the process of preparation, manufacture, packing, repacking, unpacking, construction, renovation of structures, and mining operations. Almost any substance that is discarded is designated as waste (Ibrahim, 2020). Public health is also threatened by the infiltration of leachate from MSW disposal into groundwater and particularly into drinking water supplies (Ruth F et al. 2003). The composition of waste generated is extremely variable as a consequence of seasonal variations, the lifestyle of the population, demographic structure, geographic conditions, and legislation impacts (Gidarakos et al. 2006). Global municipal solid waste is estimated to generate about 1.3 billion tons/year, a 1% increase every year. (Aderoju et al; 2020). In general, there is a lack of organization and planning in waste management due to insufficient information about regulations and financial restrictions in many developing countries (Al-Khatib et al., 2007). Many health impacts of poor solid waste disposal depend on the

type of exposure, nature of the waste, and disposal site proximity. Common environmental impacts include contamination of underground water quality, emission of odors, breeding places of insects, such as flies and mosquitoes, and dumping of rodents.

## 2. Literature Review

Managing solid waste improperly poses a threat to the health of individuals and the environment. If these wastes are not disposed of properly, they create breeding places for insects such as flies and mosquitoes as they provide food and harborage for rats. These insects and rats are health risks in that they are potential disease transmitters (Ibrahim, 2020). According to the Japan International Cooperation Agency (JICA), a production rate of 6000-7000 tons per day in Kabul city and a collection ratio of 50% and 50 % percent left in the source of production (JICA, 2011). The main impact of health risks is that 3,000 people die per year in Kabul City (Azimi, 2017). 68% of groundwater is contaminated by wastewater and solid waste in Kabul city (Farkhari, 2016). Open dumping and open burning remain widespread activities in economically developing countries, and collection rates are as low as 30% to 60% of total generated waste. In Kabul, the capital city of Afghanistan, a low-income country, only 25% of waste is currently collected (Azimi, 2020). There is no proper waste management in Taluqan City; households throw their waste into the environment.

In the city of Taluqan, residents collect garbage in mixed forms; the residents throw waste into surface waters, and more than 100 streams pass through the city; twenty years ago, they used these streams for drinking and cooking; today, all the surface water and underground water are polluted by solid waste.

Taluqan is located in the Northeast part of the country capital of Takhar province at  $36.73^{\circ} 19''$  N and  $68^{\circ} 65.4''$ E, with a mean altitude of 800 m. The climate of Taluqan is considered to be cold, semi-arid climate and rain deficient, with an annual mean temperature of  $15.4^{\circ}\text{C}$  and 256.30 mm of precipitation (Bahzad et al., 2021).



Figure 1. The city of Taluqan located in east north of Afghanistan

## 3. Methodology

The data samples were collected randomly from 100 families in Taluqan city in four seasons of the year (spring, summer, fall, and winter). The questionnaire was distributed to 300 people around Taluqan city. Both primary and secondary data were used to achieve the goal of proposing improvements to solid waste management in Taluqan. Primary data in the form of a survey of residents was used to collect their comments and concerns over the solid waste issues and how they can cooperate in its amelioration. Different sources for secondary data on solid waste management practices have also been reviewed, including textbooks, research papers, online sources, news, and other reliable evidence and resources. These sources were used to help describe the ongoing situation as well as to propose possible methods for improving waste management practices in Kabul.

## 4. Results and Discussion

A sample was taken from 100 families in four seasons of the year: 25 houses in spring, 25 houses in summer, 25 houses in autumn, and 25 houses in winter. They were randomly selected. On average, the waste generation rate for winter is 0.903 kg/capita/day, for summer 0.805 kg/capita/day, for spring 0.52 kg/capita/day, and for autumn 0.6 kg/capita/day. The total average generation for all seasons is 0.72 kg/capita/day in Taluqan city; the waste increases in winter because of a used collier, and in summer, the fresh fruit is cheap and produces more waste.

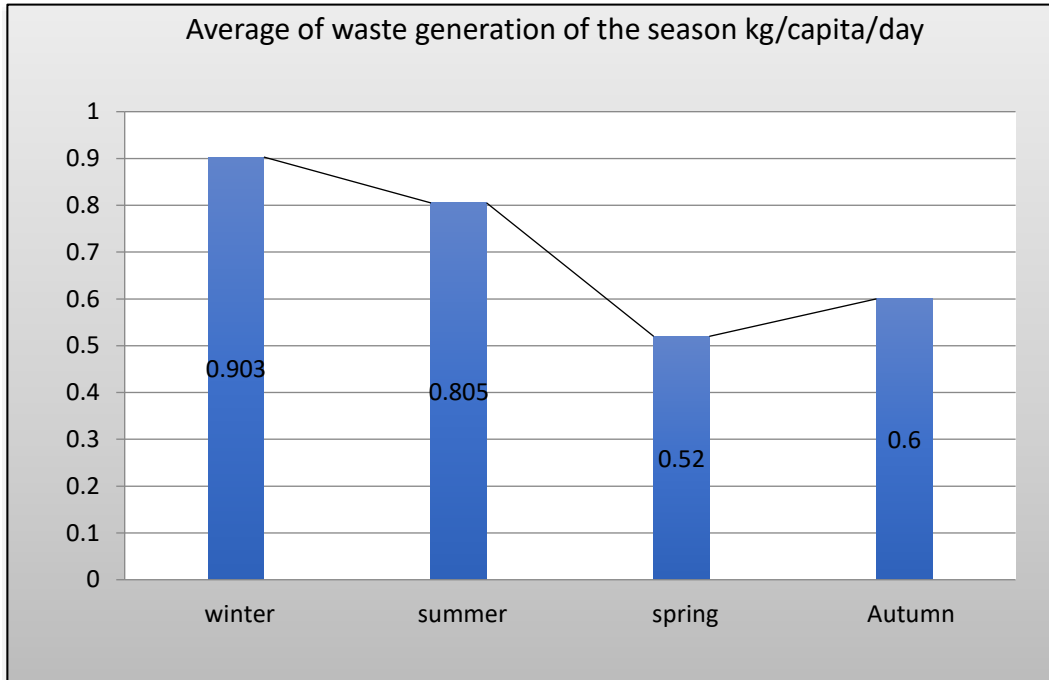


Figure 2. Average generation of the seasons.

Azimi (2017) found in Kabul city, on average, the waste generation rate for the high class is 0.73kg/capita/day, for the middle class is 0.50kg/capita/day, and for the low-income group is 0.40 kg/capita/day. Thus, the result shows the average for all income groups is 0.54 kg/capita/day.

UN-Habitat (2009) reported that the average solid waste per capita generation for all income groups is 0.54 kg /capita/day, which is above the reported rate of generation of 0.40kg /capita/day. The table below shows the amount of waste production, both organic and nonorganic, in the four seasons of spring, summer, autumn and winter in Taluqan city, which shows significant changes and also the nature of waste and its amount of organic and non-organic materials, how much is produced.

Table1. Shows generation of households Kg/Capita/Day waste in the seasons.

Component	Winter		Summer		Spring		Autumn	
	Kg/Capita/d	Percentage	Kg/Capita/d	Percentage	Kg/Capita/d	Percentage	Kg/Capita/d	Percentage
Organic	0.2	23	0.4	50	0.28	47	0.3	50
Glass	0.01	1	0.09	11	0.02	3	0.01	2
Metals	0.013	1	0.14	17	0.1	17	0.11	18
Plastic, Paper	0.04	5	0.025	3	0.08	13	0.06	10
Ashes	0.5	58	0.05	6	0.02	3	0.01	2
Diaper's	0.14	12	0.1	13	0.1	17	0.11	18
Total	0.903	100	0.805	100	0.6	100	0.6	100

**4.1 Components of Solid Waste**

In this experiment, the quantity and composition of waste in Taluqan city were influenced by many factors such as level of economic development, culture, religion, agricultural product, energy consumption Pattern, Politics’ and geographical location. The result achieved was different in each season; for example, the percentage of organic food consumed in spring was 41%, summer 50%, autumn 50%, and winter 77%. Due to a lack of electricity, residents used class stoves for heating and burning wood, napkins, and collier. The charts below show the waste generation in each season of the year.

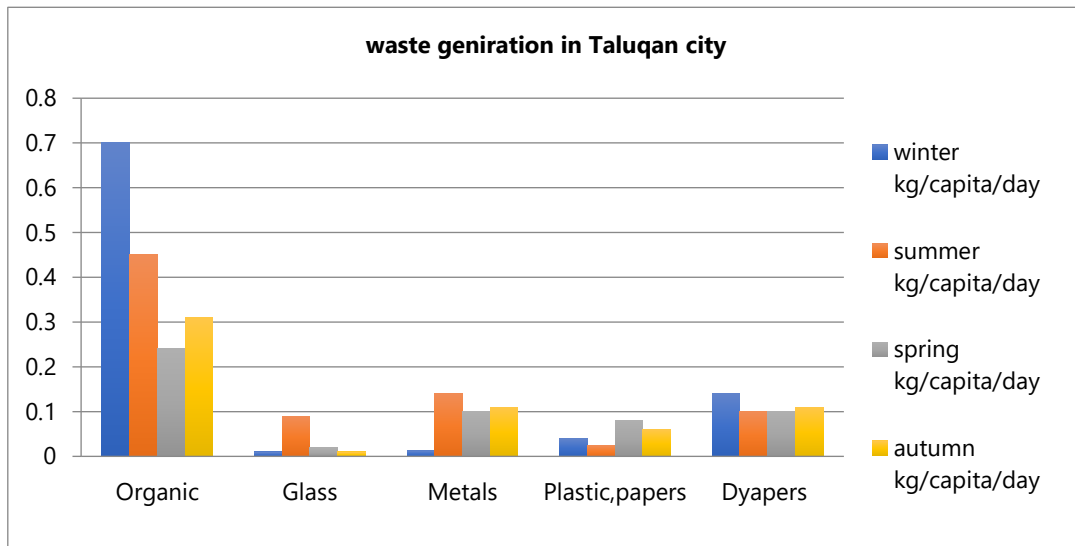


Figure 3. Generation waste all season.

**4.2 Composition of Solid waste in Taluqan city**

The component of solid waste is influenced by many factors such as level of economic development, culture, religion, energy consumption patterns, politics’ and geographical location. For this research survey, HSW were categorized into six groups: food, paper (recyclable, non-recyclable papers), plastic (valued and non-valued plastics), metals (including metal and aluminum cans), glass (colored and non-colored glass); others (textiles, ashes, rubber, leather and rubber, inert material and miscellaneous items) the classification of HSW helped to evaluate the amount of recyclable material for the purpose of waste recycling and management; likewise, organic waste amounted to the largest in all income groups followed by plastic and paper.

The average generation of waste in Taluqan City in four seasons: in the winter season, the average waste is 0.803 kg/ capita/ day; in summer, 0.805 kg /capita/day; in spring, 0.52 kg/capita/day and in autumn 0.6 kg/capita/day the below chart explains the generation of waste all season of the years.

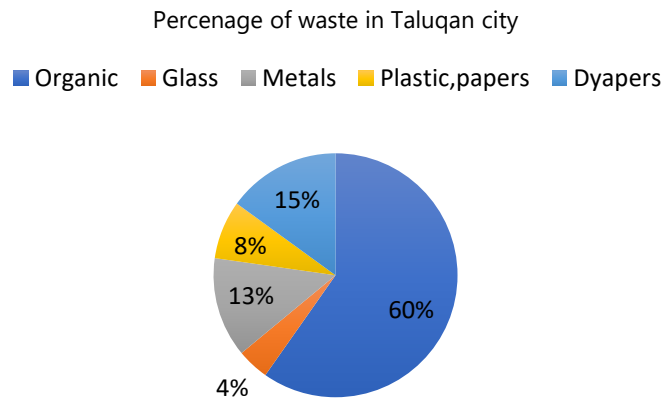


Figure 4. Composition of waste in Taluqan city.

The research conducted in the city of Kabul shows the level of income in families, high-income, medium income and small-income families. Based on the total average composition of waste, organic is 74%, plastic 7%, metal 4%, paper 5%, glass 2%, and other 8%. This composition of waste has almost the same value in Taluqan. The chart below shows the composition of waste in Kabul.

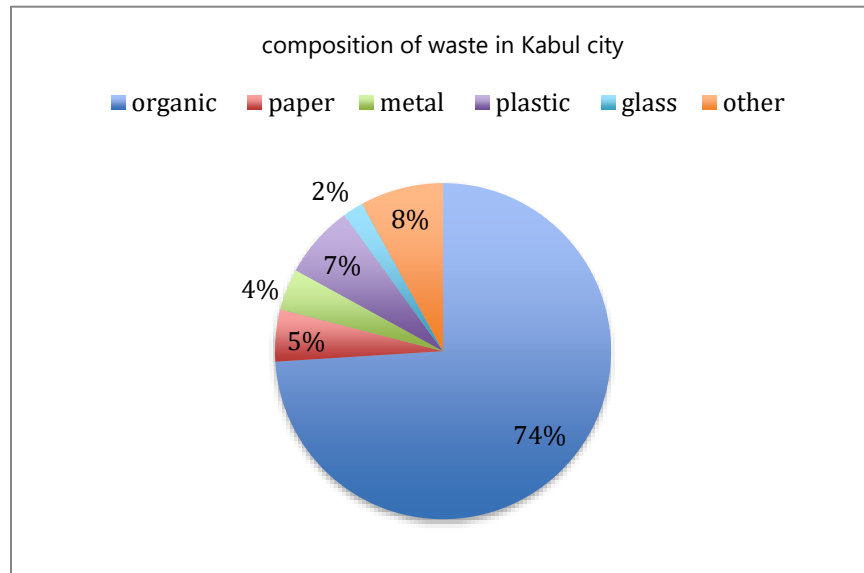


Figure 5. Composition of waste in Kabul city

**4.3 Solid Waste Collection**

According to the questionnaire survey, 10 percent of solid waste is collected by the municipality from Commercial areas and urban areas, and 90 percent is thrown in surface water, vacant land and drainages. Air, water, and soil are contaminated by a lack of waste management system. Segregation is 17%, recycling is 17%, and proper waste is 56%. The recycling waste is collected by workers, who buy 1kg of 10 Afghani; they are sold to traders and sent to local companies in Pakistan or Iran. Of the respondents, 70% are interested in receiving information regarding the 3Rs (reduce, reuse and recycle), 65% want to collect from Masjed-to-Masjed, and 35% want to collect their waste by visiting house-to-house.

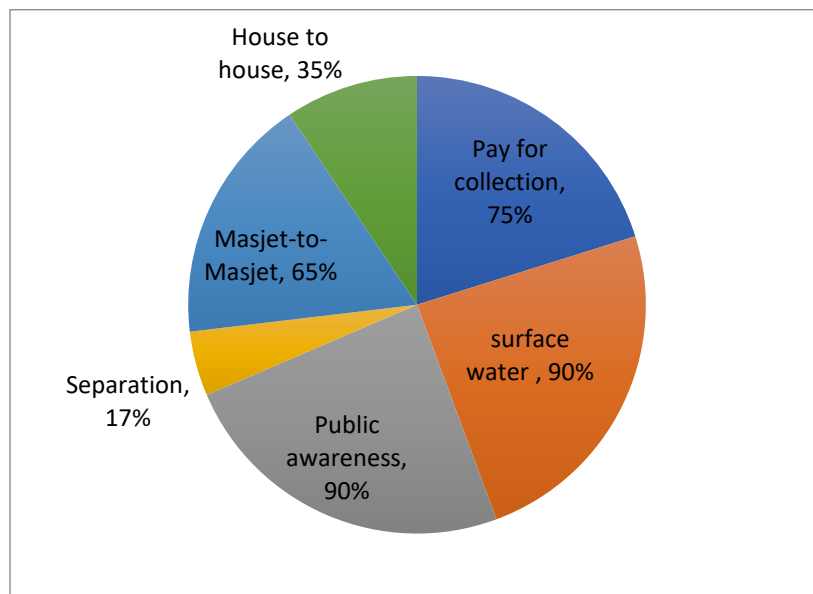


Figure 6. Collection of the waste management system

**4.4 Population in Taluqan city**

The Afghanistan Central Statistics Organization reports that the population of Taluqan City was 214,900, both male and female, in 2012 in rural and urban areas, but 109,500 live in urban areas annually, increasing the population in Afghanistan by 2.6%. At the same time, total waste generation is 48.24 tons per day, and 17,607 tons of waste is produced in a year in Taluqan city.

**4.5 Payment for Collection Services**

The residents can pay waste charges, which has an important impact on helping with waste management in Taluqan city. The study indicates that 55% of households want to pay for improved waste collection services, and 35% are unwilling to pay for waste management systems because of poor people.

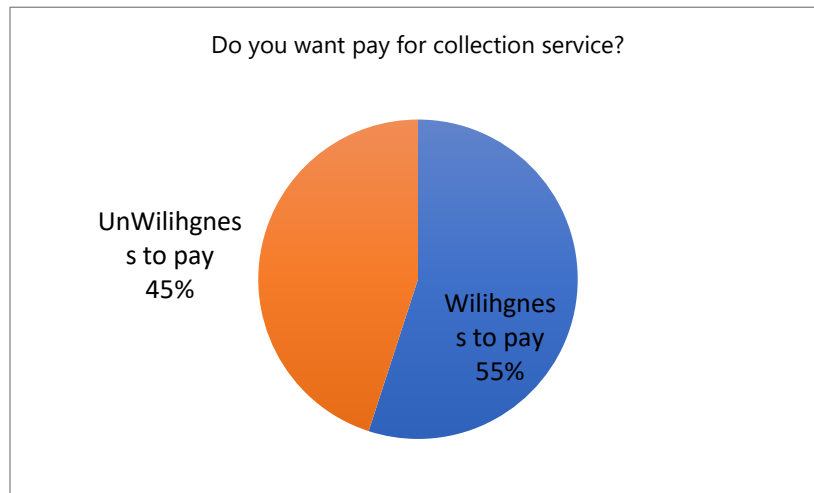


Figure 7. Shows the percentage of people who want to pay and or do not.

**4.6 Health Impact**

Due to a lack of planning and policy, and without waste management day by day, environmental pollution, such as air, water, and soil pollution, increases. According to a case study survey, 90% of surface water contamination by waste and diseases was increasing, with cholera at 11%, Typhoid at 24%, dysentery at 30, malaria at 17% and fever at 18%. The chart below explains diseases caused by the lack of solid waste management in Taluqan City. Lack of waste management system diseases was increasing in the city area, especially underground water pollution; the residents used surface wells without any treatment; the below charts show the percentage of diseases.

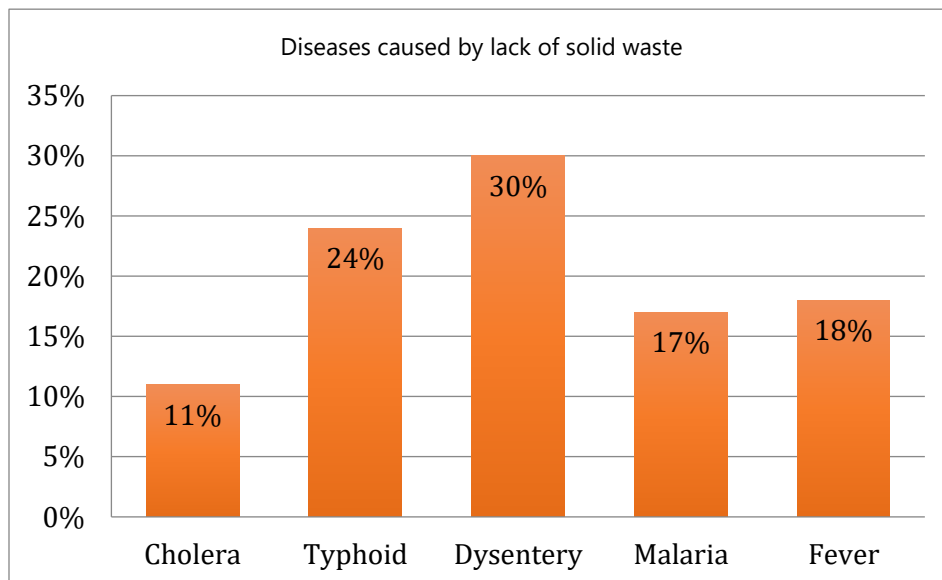


Figure 8. Impact of waste on public health

