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SOCIO-ECONOMIC IMPACTS ON URBAN DOMESTIC WASTE MANAGEMENT: CHALLENGES AND OPTIONS FOR DEVELOPING COUNTRIES

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Abstract

Urban domestic waste is a looming environmental hazard. The developing countries are worse off as urbanization, resource, and capacity constraints exacerbate the matter. Regrettably, these nations are ill-prepared for such challenges, rendering their inhabitants prone to environment-related perils. Demographic pressures and a lack of awareness about contextual demands are barriers to productive collaborations in developing countries. Therefore, context-based assessments are needed for realistic inputs. However, the understandings based on stakeholders' inputs are less focused in developing countries. Integrating socioeconomic information with urban planning/management framework is possible and meaningful. Therefore, this study attempted to weigh the impacts of socio-economic drivers on urban household waste. Data from 305 respondents, male (63.6%) and female (36.4%), was collected for assessments. Lower representation of females urges for integrated measures to enhance their representation in decision-making. Statistical examination revealed that socio-economic factors meaningfully impact domestic waste generation and disposal. The statistics inferred that age, duration of stay, and income significantly influence the preferences regarding domestic waste production and disposal ($P<0.05$). The role of education in this regard was also observed as critical ($P<0.05$). However, gender and family size were adjudged insignificant ($P>0.05$). The observations are relevant for policymakers, urban planners, and researchers engaged in urban studies. The feedback will help them improvise doable synergistic arrangements to address urban household waste. Thus, the inputs of this study are significant for stimulating eco-friendly urban developments in such developing regions as Pakistan.

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Index Terms: Urbanization; Municipal Solid Waste; Domestic Waste; Urban Environmental Hazard; Environmental Integrity; Circular Economy; Waste Management.

1. INTRODUCTION

Human settlements are gradually converting into waste dumps [1]. The demographic pressures, socio-economic transformations, and concomitant waste-oriented life patterns are fueling domestic waste generation [2, 3]. Consequentially, the discarded domestic materials stress natural and human systems [4] and compromise environmental resilience [4-6]. The imprints emerged and magnified much earlier in the industrialized economies as compared to the developing countries. The cognizable explanations are linked to their lifestyle and access to resources. However, the growing environmental consciousness among these nations is screaming for curative measures and coping strategies [7]. The improved awareness and access to technologies support such proclivities for smart-production. Albeit, more focused efforts are needed for promoting conservative cconsumptios in the developed world. Contrary to that, the per-capita household waste generation in developing countries is meager compared to global standards [8, 9]**.** Nevertheless, the repercussions of domestic waste are more stressful for life and infrastructures in these countries [3, 4]. The strains are more vivid in urban landscapes as compared to rural surroundings. The heaps of unattended waste in cities are expediting urban environmental degradation. The scenario exacerbates due to rapid population growth [10]. Allied to this, unplanned urbanization [11, 12], globalization [3]; industrialization [4], and societal transformations [2] are adding fuel to domestic waste production in these developing countries. Resultantly, the stimulators are triggering urban environmental dilapidations. The resource constraints, lack of awareness, and apathy towards eco-friendly inclinations are worsening the scenario for urban life in countries like Pakistan [6]. Thus, the natural and human systems are confronting novel challenges in these contextual settings [4, 8]. But, the reported notions authenticate that newfound challenges unfold opportunities for action [13, 14]**.** Therefore, the remedy lies in adopting integrated measures based on holistic assessments of socio-economic drivers [2, 10].For this purpose, the following aspects demand focus considerations: Firstly, the quantum of solid waste is rapidly multiplying in the urban areas of developing countries, and secondly, identifying options for these nations to deal with urban domestic waste.

Thirdly, academic insights for action are mostly available from the perspectives of developed nations. Thus, the situation in less developed regions calls for context-based measures [4]. Therefore, the present study intends to evaluate the impacts of socio-economic drivers' on the perception of residents about solid domestic waste in Islamabad (Pakistan). These socio-demographic determinants influence the quantum and composition of household waste in urban areas and meaningfully regulate the choices available for domestic waste disposal. The literature survey infers that several scholastic attempts have been made to assess urban domestic waste in Islamabad. The studies scrutinized the phenomenon from different perspectives. For this purpose, the investigators have deployed diverse conceptual frameworks and analytical approaches.

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[1] evaluated the prospects of market-based strategies to manage domestic waste in Islamabad. The scholars also focused on domestic trash as a source of employment and revenue generation [15]. The prospects of composting as a safe and productive option for biodegradable waste in Islamabad were weighed [16]. The studies also evaluated the locations of waste-dumping sites [17], their repercussions on human health [18], soil [19], and vegetation [20] in Islamabad. The study by Zia, et al. [21] assessed the impacts of income and seasonal variations on the composition of municipal solid waste. The prospects of geospatial data as an input for improving the waste disposal mechanism in Islamabad were also examined [22]. These initiatives highlight the need and significance of integrated waste management in Islamabad. However, these studies predominantly focused on the physical, chemical, and biological characteristics of domestic solid waste. Contrariwise, there is a growing realization when humans cause waste; they need to be part of the solution [23]. Thus, the stakeholders' involvement is incumbent for reliable estimates through consultative process [24, 25]. The participatory decision-making productively contributes towards social acceptability, economic viability and durability of initiatives for the resilience of environment [4]. Therefore, the scholastic assessments based on socio-economic [2, 26-30] and demographic parameters [2, 28, 31] are gaining recognition. For this purpose, conventional statistical tools, techniques, and measures such as correlation analysis [28, 32] and regression analysis [31] are frequently deployed. It helps to decipher the role and connections between/among the determinants concerning domestic waste.

Despite such dividends, assessments based on socio-economic parameters from developing regions are scarce in contemporary research [9, 25]. Though, they are obligatory for converting looming challenges associated with urban domestic waste into opportunities [2, 10]. Therefore, the present study evaluated the impacts of socio-economic drivers on domestic solid waste disposal in Islamabad. The city is a heterogeneous blend of natives, migrants, and the international community [33]. Thus, the locale offers a variety of socio-economic and cultural diversities. Moreover, the physiographic setting of the area (Annexure 2) has peculiar imprints on urban planning, waste management, and the environment.Besides this, the reported demographic pressure (Annexure 3) and socio-economic transformations stress domestic waste management [1, 21, 22]. The emerging scenario is unfurling challenges for safe, secure, and economical disposal of discarded domestic trash. It calls for informed decision-making through holistic appraisal. Hence, the perception and inclinations of residents regarding household solid waste in Islamabad were assessed (Figure 2).

The following are the principal objectives of this study:

1. To assess residents' knowledge, attitude, and practices pertaining to household solid waste in urban areas.
2. To analyze the impacts of socio-economic determinants on domestic waste disposal in developing countries.

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The findings of this study may prove relevant for improvising synergistic arrangements to deal with urban domestic waste in developing economies. The empirical evidence and contextual interpretations may be used for converting urban household waste into energy in similar contextual settings. The methodology of this study has been explained in the subsequent sections. Section 3 deals exclusively with results based on significant findings and assessments. In section 4, all conceivable causations, plausible explanations, and consequential impacts of reported observations have been deliberated. At the same time, the conclusions have been drawn in the last section.

2. MATERIAL AND METHODS

2.1 Study area

The current study was carried out in the urban center of Islamabad (Pakistan). The total area of Islamabad is about 906.50 sq. km (Figure 1). Approximately 1.01 million people live here [34]. The Capital Development Authority (CDA) regulates and supervises the city's urban planning and civic management [35]. The city is broadly compartmentalized into five distinctive zones [36].

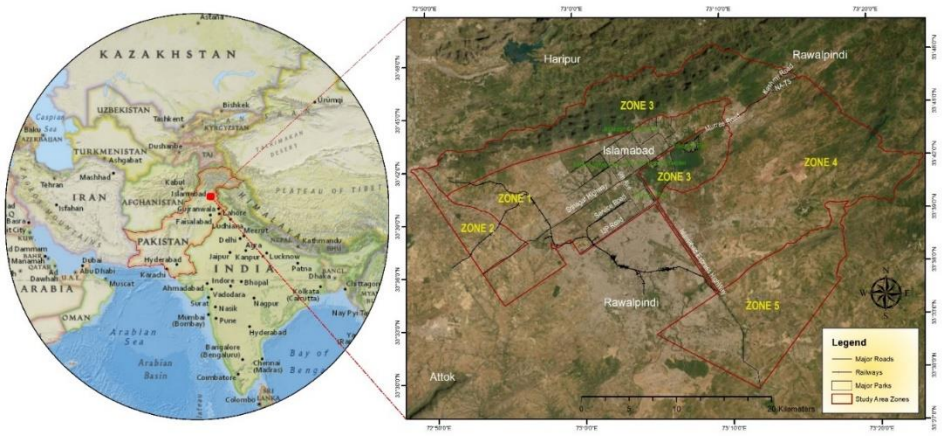

Figure 1: Location map of the study area

2.2 The data collection, processing, and analysis

The data for this exploratory investigation was collected from the residents of Islamabad. These respondents are primarily located in zone 1, zone 2, and zone 4. The data was retrieved through a structured questionnaire. This instrument for data collection is a cumulative outcome of literature review and contextual assessments. The questionnaire was framed on the principles Likert scale. It was subdivided into two sections based on homogeneity in intent. The first portion deals with the demographic and socio-economic information of the respondents. The second part weighs the orientations toward domestic waste production and management. It predominantly focused on waste removal and preferences for participatory governance. Therefore, the probe mainly evaluated whether

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the urban domestic waste is a problem in the study area. Moreover, the questionnaire chiefly weighs the impacts of socio-economic determinants on awareness and waste management. Besides this, it tried to decipher the orientations toward participatory initiatives for waste management. Subsequently, the validity and robustness of the questionnaire were authenticated through a pilot survey (Annexure 4). The process of data collection was performed through the convenience-sampling technique. Therefore, the potential respondents were identified/ contacted through instant messaging applications like WhatsApp and Facebook. However, the questionnaires were physically provided, explained, and collected after completion from the participants. This process was completed from October 2021 to March 2022. As a result, 353 responses were received. In the next stage, the invalid/ incomplete responses are screened out before quantitative assessments. Therefore, 305 responses were selected from the total 353 received entries. Following this, R-software performed the data processing, tabulation, and statistical testing (version R-4.2.1). The significant findings were mapped and illustrated through Geographic Information System (GIS) (ArcGIS version 10.3).

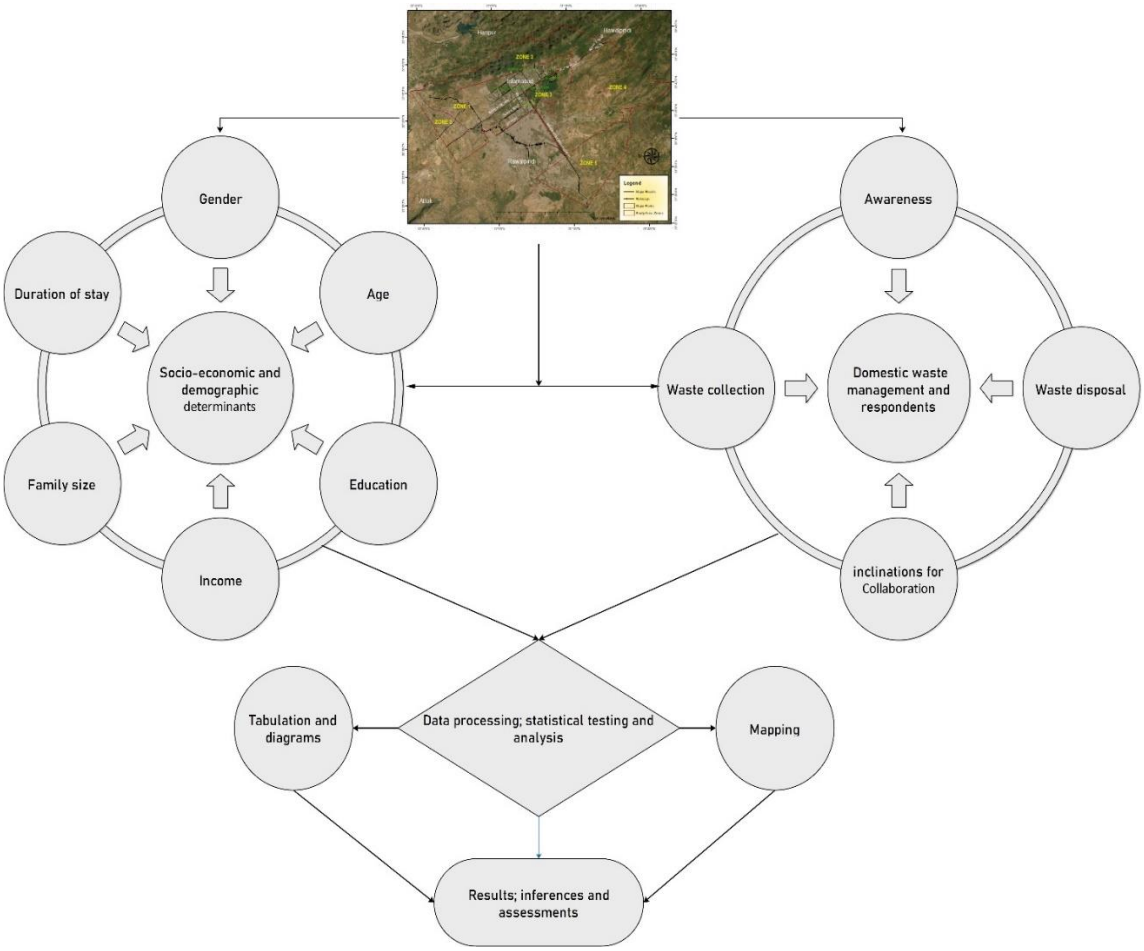

Figure 2: The graphical representation of the methodological framework

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3. RESULTS

3.1 Socio-demographic profile

The summarized statistics concerning demographic and socio-economic characteristics were compiled (Table 1). The findings (Figure 3) depict that the responses were retrieved from the entire study area. The proportion of male (63.6%) is more significant than the female (36.4%) respondents. The majority (63.9%) belong to middle-aged brackets. The assessment of academic/educational qualifications is obligatory for the present nature of the investigation. The information divulges that the majority (35.1 %) of the sample population graduated after 16 years of education or a bachelor's (31.8%) after 14 years of education. Approximately (7.5%) of master's and (3.9%) of doctoral degree holders also participated in this study. However, a sizeable share of less-educated people (8.9 %) also participated in the study. While a substantial proportion (60%) is engaged in the service sector (public and private institutions), and (5.2 %) of respondents fall in the category of self-employed. While a significant proportion (10.5 %) is doing business, a sizeable share (24.3%) also belongs to miscellaneous occupations. Income is a reliable indicator for assessing domestic waste generation and management. It determines purchasing power and influence consumptive patterns. Hence, it significantly influences the nature and volume of household waste generation. Therefore, it is deployed as a proxy indicator for assessing inclinations toward domestic waste in urban areas. Table 1 reveals that most of the selected respondents (29.8 % of the total sample) fall into two income categories: Rs. 50,001- 75,000 and the other exceeding Rs.15, 0001 per month. The remaining options have been condensed for comparison. Similarly, the assessments are based on the number of family members, ownership status of the dwelling, and the duration of stay in their present residences. The majority (69.2%) had been residing in their current locality for less than five years.

Table 1: Socio-economic and demographic Characteristics of the respondents

Characteristics	No. and % age of respondents N = 305 (100 %)	
	Participants	Percent
Gender		
Male	194	63.6
Female	111	36.4
Age group		
less than 18 years	2	.7
18-25 years	41	13.4
25-34 years	58	19.0
35-44 years	69	22.6
45-54 years	68	22.3
55-64 years	45	14.8
65 and Above Years	22	7.2
Education		
Below Matriculation	3	1.0
Matriculation	24	7.9

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Characteristics	No. and % age of respondents N = 305 (100 %)	
	Participants	**Percent**
Intermediate	39	12.8
Associate Bachelor (14 Years)	97	31.8
Bachelor (16 Years)	107	35.1
Master (18 Years)	23	7.5
Doctoral	12	3.9
HH Income (monthly) *(Pak rupee)*		
0 to 25000	6	2.0
25001 to 50000	26	8.5
50001 to 75000	91	29.8
75001 to 100000	37	12.1
100001 to 125000	37	12.1
100001 to 125000	17	5.6
150001 to Above	91	29.8
Family members		
1 to 3	32	10.5
4 to 5	124	40.7
6 and above	149	48.9
Duration of stay(years)		
Less than 5 years	211	69.2
6 to 10 years	30	9.8
11 to 15 years	21	6.9
16 to 20 years	9	3.0
21 years and above	34	11.1

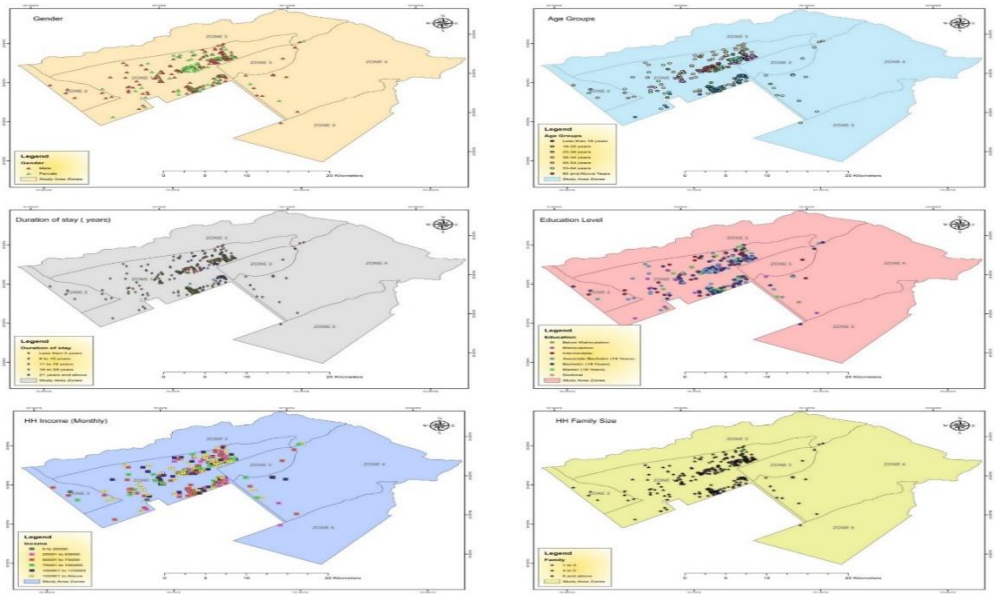

Figure 3: Geographic distribution of respondents based on the predictor variables

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3.2 The respondents and household solid waste

The observed orientations concerning household waste were statistically examined. Therefore, the strength of associations between predictor variables (Table 1) and response options (Annexure 4) was measured. For this purpose, awareness regarding domestic waste and its growing magnitude was focused on. Moreover, the methods deployed for waste disposal and approaches relied upon for trash removal were statistically evaluated. Therefore, the inferences through the Pearson Chi-square test of association were made (Table 2). The benchmark ($P < 0.05$) was deployed to identify the significant factors responsible for the observed variations. It transpired that gender and family size have insignificant imprints on respondents' choices. Subsequently, the factors that appeared as significant determinants regarding a proposition were identified ($P<0.05\%$). They were selected and thoroughly analyzed later. The closer scrutiny/ examination helped to decipher and interpret the intra-factor variations concerning the observed tendencies.

Table 2: Predictor Variables and their association at a 5% Significance Level (*p <0.05*)

Parameters	Predictor Variables (*Chi-square Association*)					
	Gender	**Age**	**Education**	**Duration of stay**	**Income**	**Family Size**
Domestic waste and awareness of respondents	0.355	0.05	0.007	0.372	0.362	0.838
Perception about waste collection and management	0.119	0.001	0.813	0.018	0.027	0.156
Inclinations for waste disposal measures	0.156	0.001	0.346	0.001	0.007	0.4
Participation in collaborative efforts (seminars/campaigns or meetings)	0.131	0.017	0.535	0.327	0.152	0.113

3.2.1. The awareness about household waste

The findings (Table 2) construe that formal education significantly influences the awareness of respondents regarding household waste ($P < 0.00$). The impacts of the remaining predictor variables were adjudged insignificant ($P > 0.05$). Accordingly, the scrutiny concerning perception and awareness was conducted on the criterion of education. The measurements inferred the impacts of academic qualification on responses (Annexure-1 (A)). It emerged (Figure 4) that a change in the level of education causes associated transformations in perceptions.

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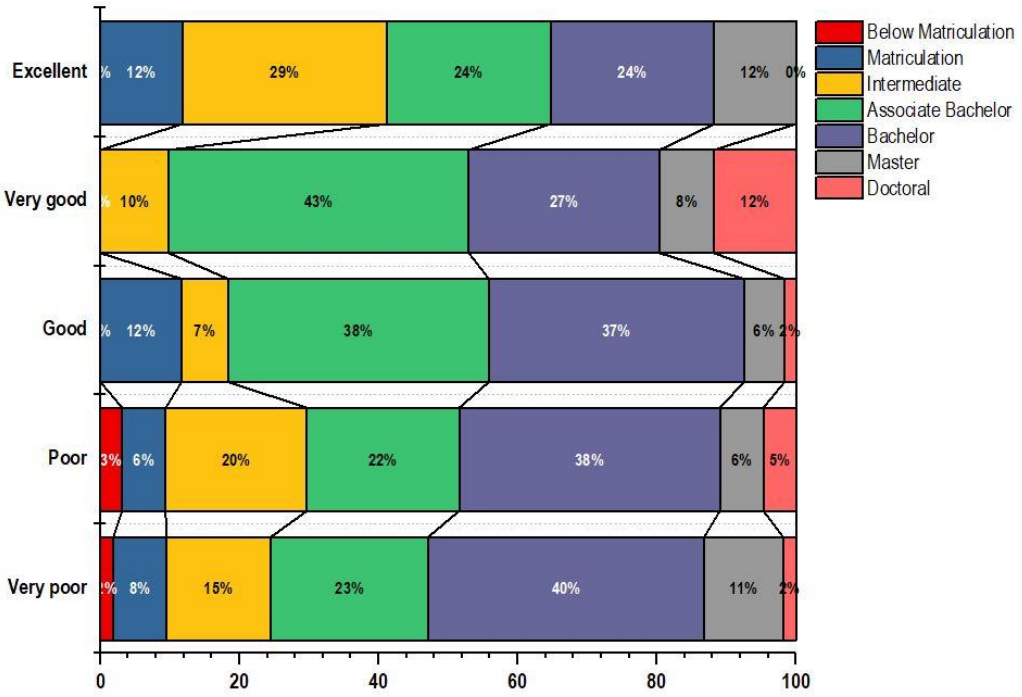

Figure 4: The impacts of education on household waste management

3.2.2 Domestic waste collection and respondents

The collection of household waste is an integral component of the waste-disposal framework. The socket connects the "waste producers" with the waste disposal mechanism. Therefore, the perception of waste collection symptomatically influences the inclinations toward domestic waste disposal. Thus, the views of respondents regarding waste collection problems were weighed.

The findings (Table 2) were relied upon as benchmarks for the subsequent probe. It transpired that age ($P < 0.00$), longevity of stay ($P < 0.01$), and income ($P < 0.02$) significantly influence perceptions concerning waste collection. In comparison, the predictor variables such as gender, education, and family size were adjudged insignificant ($P > 0.05$). Hence, the reported variations based on age, duration of stay, and income (Annexure 1(B)) were analyzed. The assessments (Figure 5 (a), (b), and (c)) comprehensively magnify the observed associations between responses and socio-economic parameters

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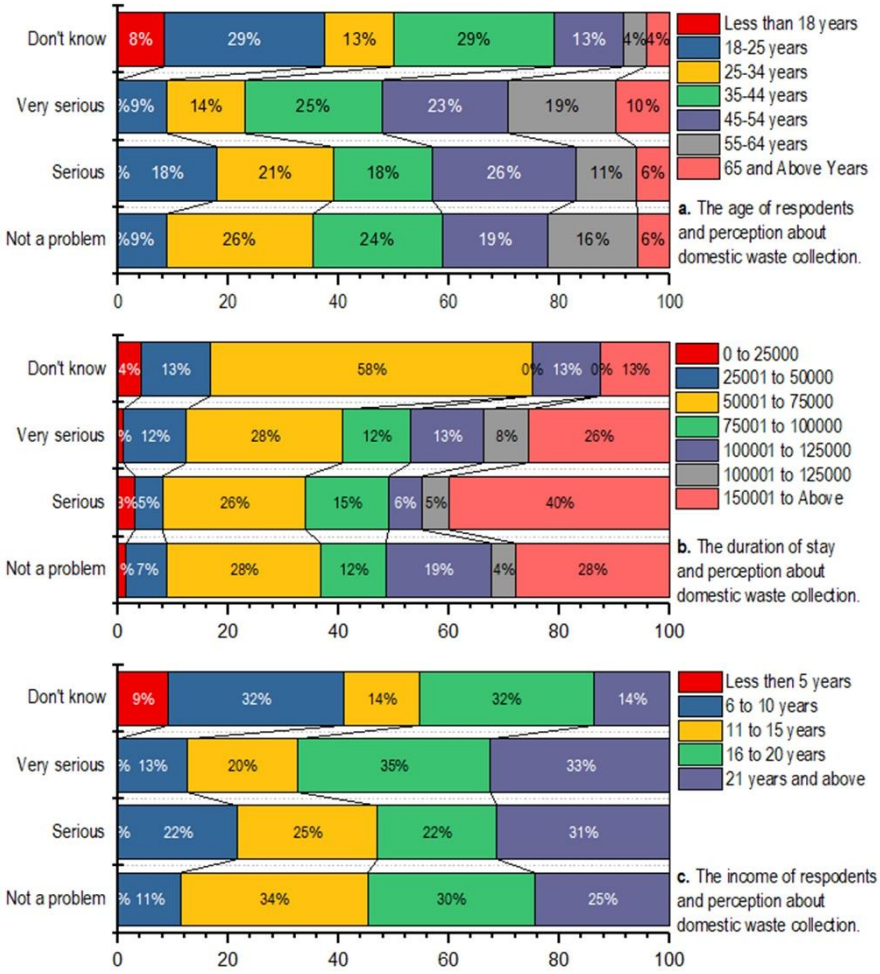

Figure 5: Perception of the respondents and waste collection practices

3.2.3 The inclinations for waste disposal measures

Socio-economic status, views, and practices influence domestic waste generation and management. Consequently, these determinants influence the choices/options for household waste disposal. Therefore, the proclivities toward waste disposal strategies were evaluated. The findings (Table 2) were relied upon for closer scrutiny and assessments. It transpired that the age ($P < 0.00$), duration of stay ($P < 0.00$), and income of respondents ($P < 0.00$) have significant bearings on the strategies/measures adopted for waste removal in the study area. At the same time, the role of gender, education, and the numerical strength of the family insignificantly influence the choices ($P > 0.05$). Subsequently, intra-class variations based on age, duration of stay, and income (Annexure 1(C)) were observed. The findings (Figure 6 (a), (b), and (c)) succinctly illustrate the observed variations based on these parameters.

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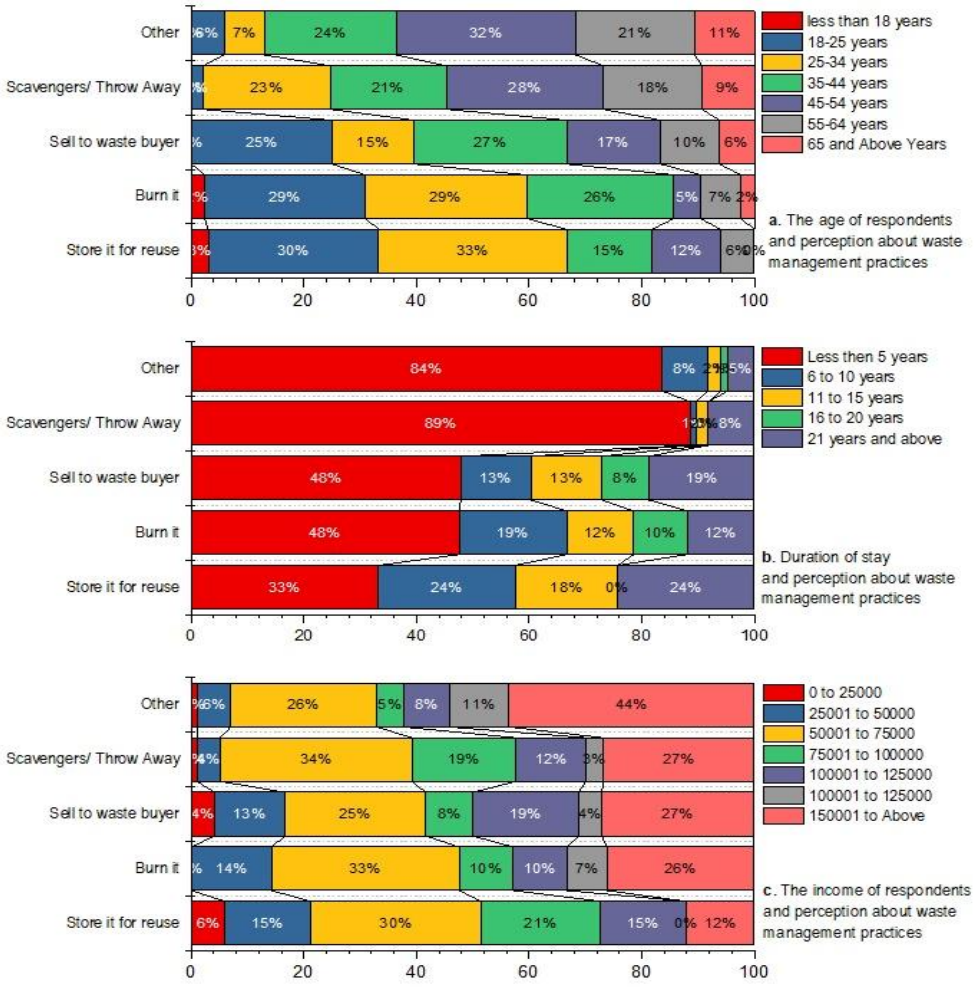

Figure 6: Perception of the respondents and waste disposal practices

3.2.4 The respondents and collaborative measures

The sustainable disposal of household waste calls for participatory efforts based on context-specific postulations. Therefore, the evaluations (Table 2) were used to filter out the factors stimulating the inclinations for participatory efforts. It transpired that it is primarily age that significantly impacts such tendencies ($P < 0.05$). In contrast, all remaining selected variables are insignificant ($P > 0.05$). It conjectures that the majority of respondents remained indifferent towards consultative proclivities/initiatives. The examination (Annexure 1(D)) helped to magnify (Figure 7) the impacts of age on participation in the consultative process.

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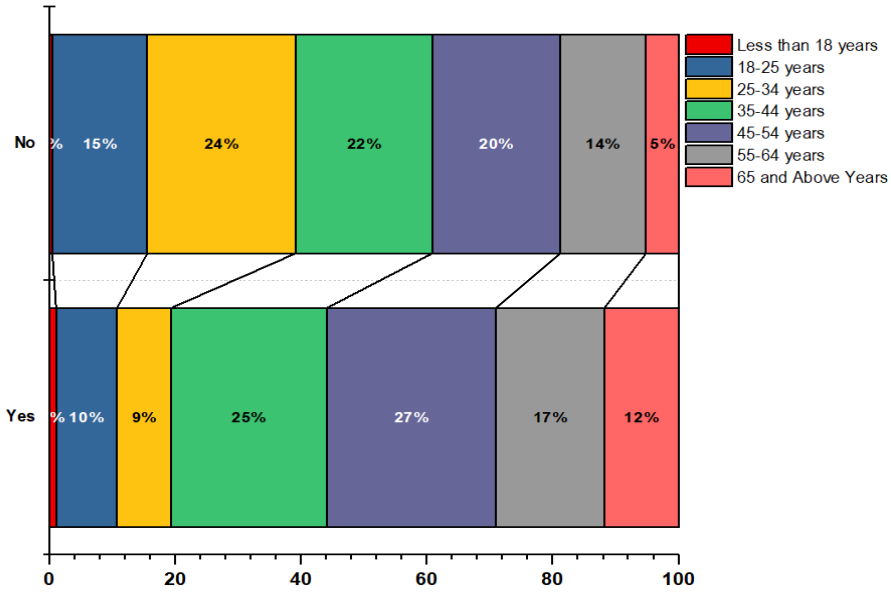

Figure 7: Perception of the respondents and waste management practices

4. DISCUSSION

The natural and human systems differently interpret resources and wastes. Nature operates on the premise of recycling, thus, perceiving every component of the environment as a resource. Hence, the word "waste" is absent in the vocabulary of nature. Contrariwise, humans are more obsessed with the linear utilization of environmental assets and their byproducts. Therefore, the objects of instant utility are appreciated as resources, and the rest are ignored as useless [8, 37]. It deduces that the distinction between waste and resource is an intrinsic product of perception about utility. The perception transformation concerning the waste-to-resource dichotomy depends on awareness and exposure to utilitarian perspectives [8, 38]. Socio-economic norms and capacities significantly determine such avenues for material utilization and environmental protection. Thereupon, the household waste assessments are focused as they infer human inclinations toward waste generation and sensitivities for environmental integrity.

The advent and subsequent growth in human settlements stimulated domestic waste production [39]. The socio-cultural changes and technological advances added volume and complexities to it. The ensuing impacts are straining humans and their environments [40]. The trickle-down impacts are challenging the integrity of natural and human systems. However, the bearings are asymmetrical across the globe. The deteriorations are more visible within and around urban settlements. The reported gravity is due to a throwaway lifestyle and consumerism. Therefore, the developed and developing regions showcase their seriousness for domestic-waste containment. Besides, they are endeavoring to dilute and mitigate the indelible imprints of such stresses on their urban landscapes.

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Despite severe concerns regarding throwaway culture, the phenomenon is gaining momentum in transforming economies. Resultantly, domestic waste in developing countries is causing urban environmental dilapidations [9]. Its impacts are multiplying due to rapid urbanization [12, 35] and compromises over urban environmental governance [41, 42]. Moreover, socio-economic transformations and access/exposure to technologies during Covid-19 further stirred consumer culture, and hence domestic waste multiplied [4, 9]. The consequential strains are exhausting social, economic, ecological, and environmental tolerance in urban areas.

Pakistan is not immune to such stresses and strains. The reported findings affirm that household waste in Islamabad is multiplying [6, 11]. The enormity of domestic waste damages biotic and abiotic environments, thus compromising inhabitants' socio-economic resilience [6]. Besides this, the associated stresses challenge the coping capacities and elasticity of civic infrastructures in Islamabad. The looming scenario calls for holistic assessments [10]. It entails curtailing and converting urban waste into productive use through realistic measures [8, 43]. Abrupt experimentations without consulting stakeholders fail to yield dividends for urban life and infrastructure. Therefore, conversation with the stakeholders is a practical option for action. However, contextual assessments are a neglected arena for concentration in developing countries. The context-based improvisations produce cost-effective measures. Besides this, the postulations have more acknowledgments and ownership. Moreover, it enhances the integrity and durability of the initiatives. Thus, the residents' socio-economic status, institutional arrangements, and orientations toward participatory approaches to waste management were focused on in the study. These factors act as regulators and characteristically control the efficacy of waste disposal arrangements.

Islamabad was inherently designed for specific administrative purposes and demographic needs. The urban development in Islamabad intrinsically focuses on the uninterrupted provisioning of civic facilities for a heterogeneous population [44]. During the early phase, the city was mainly inhabited by foreign diplomatic staff, government employees, and the indigenous population. The landfill-driven urban waste management system was designed to manage domestic waste. The subsequent demographic pressures (Table 1) and socio-economic transformations triggered household waste generation. Consequently, the capacities of landfills have been exhausted [11]. The scenario warrants improvisations in techniques and approaches for sustainable disposal of domestic waste.

Therefore, the present study evaluates the orientations of residents regarding household waste. The study mainly weighs the inclinations toward all-participatory approaches and practices. For this purpose, the opinion was retrieved through the "Likert scale" format. It enabled for deducing quantitative estimates through qualitative responses. Thus, considered a robust assessment tool. It relies on proxy variables. The reliance on indirect methods for data acquisition is a pragmatic/ choice in undocumented economies [44].

The findings (Table 1) reflect that the majority of respondents belong to divergent socio-economic groups. Including demographic diversities is a sine qua non for pluralistic and

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holistic appraisals [45]. Moreover, significant proportions of participants belong to the middle-aged category. These observations align with the reported demographic profile of Islamabad and Pakistan [46]. The inferences serve as contemporary benchmarks and aid futuristic planning. Thus, the findings will have long-term significance as well as relevance. However, the representation of females (36.4%) as respondents is lesser than their share of the total population. The observed anomaly is linked to the socio-economic environment. Thus the focus is required to enhance female participation in economic and financial activity. It will directly contribute toward female capacity-building and empowerment as enshrined in the "environment and justice" debate.

The study offers valuable insights regarding linkages between academic qualifications and domestic waste in Islamabad. It affirms that education influences domestic waste disposal (Figure 6). These observations substantiate the notions based on "cognitive behaviorism" that the level of awareness and considerations determine the integrity of remedies. The findings (Annexure 1(A)) reaffirm the observations rendered by [3] regarding the cardinal role of education. The resultant capacity enhancements support the efforts for environmental sustainability. It emerged (Table 2) that age (Figure 5(a)), duration of stay (Figure 5(b)), and income (Figure 5(c)) strongly influence the perception about the problem and its remedies ($P< 05$) in Islamabad. These findings substantiate the observations that socio-economic factors meaningfully outline the composition, quantum, and nature of the household waste (Annexures 1, 2, and 3), thus influencing the choices of waste disposal (Annexure-1, 2, and 3). The study also highlighted (Table 2) the significance of age ($P <0.05\%$) for consultative processes and participatory approaches/initiatives (Annexure 4) in Islamabad.

However, demographic pressure is compromising the durability of corrective measures in the city. It calls for population control through awareness and policy interventions. Moreover, a curtailment of rural-to-urban area migration in Pakistan is also needed. For this purpose, a focus on infrastructural development in less-developed regions of the country is incumbent. It warrants decentralization of power and equal access to resources for sustainable development in developing countries. The horizontal and vertical distribution of resources is obligatory for social harmony, balanced economic growth, and social progression. It will discourage/curtail the flow of the human population toward the big urban centers. Consequently, it will rid the large urban settlements of environmental stresses in developing countries.

For this purpose, the most enlightening lessons can be had from "mother nature" herself. Nature gives us clarion calls through its circulatory mode of processes and production. The synergistic arrangements in the natural systems leave no room for waste generation. Nature ensures the conservation of resources. Moreover, it ensures waste elimination. Those with the ears to hear, decipher and decode such implied messages concentrate on doable measures. These are the very people who cultivate and subsequently harvest the dividends of eco-friendly notions and actions. Thus, the scholastic initiative must transcend the challenges, transforming them into opportunities.

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5. CONCLUSION

Socio-economic transformations and technological innovations have tangible impacts on urban domestic waste. The resultant transformations trigger urban environmental degradation. It calls for holistic appraisals for sustainable disposal of urban household waste. Therefore, context-based improvizations are stressed and gaining recognition for pragmatic responses. However, socio-economic-based scholastic assessments are less frequently pursued in developing economies like Pakistan. At the same time, inclinations are vitally needed for coordinated efforts. Therefore, the present study evaluated the impacts of socio-economic drivers on domestic waste disposal in Islamabad (Pakistan). This pioneering effort will stimulate scholastic initiatives for improvising a more sustainable mechanism for household waste disposal. Besides this, the study successfully summarizes and synthesizes observations for objective assessments. The empirical findings of this study provide valuable benchmarks/insights for rationale policy initiatives concerning domestic waste disposal. The findings affirm that socio-economic and demographic determinants suggestively influence the perceptions and practices regarding household waste. It substantiates the notion that female empowerment and capacity-building contribute to eco-friendly waste disposal. Moreover, the findings also stress integrated efforts through population control and curtailing rural-to-urban area migrations in Islamabad. Such measures shall beget an eco-friendly environment. Thus, the study will meaningfully support the administrative and regulatory initiatives for eco-friendly domestic waste disposal. Moreover, the context-based interpretations of this study are relevant for policymakers, scholars, and practitioners striving for sustainable disposal of urban household waste in similar contextual settings.

6. ANNEXURES

Annexures 1:

	Annexures1 (A): Identify your level of awareness regarding waste management										Total	
	Very poor	%	Poor	%	Good	%	Very good	%	Excellent	%		
Education Level												
Below Matriculation	1	1.89	2	3.13	0	0.00	0	0	0	0	3	0.98
Matriculation	4	7.55	4	6.25	14	11.67	0	0	2	11.76	24	7.87
Intermediate	8	15.09	13	20.31	8	6.67	5	9.80	5	29.41	39	12.79
Associate Bachelor	12	22.64	14	21.88	45	37.50	22	43.13	4	23.53	97	31.80
Bachelor	21	39.62	24	37.50	44	36.67	14	27.45	4	23.53	107	35.08
Master	6	11.32	4	6.25	7	5.83	4	7.84	2	11.76	23	7.54
Doctoral	1	1.89	3	4.69	2	1.67	6	11.76	0	0	12	3.93
Total	53	17.38	64	20.98	120	39.34	51	16.72	17	5.57	305	100

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	Annexures.1 (B): In your opinion, how serious is the waste collection problem in your sector?								Total	
	Not a problem	%	serious	%	Very serious	%	Don't know	%		%
Age of Respondents										
less than 18 years	0	0	0	0	0	0.00	2	8.33	2	0.66
18-25 years	6	8.82	18	18	10	8.85	7	29.17	41	13.44
25-34 years	18	26.47	21	21	16	14.16	3	12.50	58	19.02
35-44 years	16	23.53	18	18	28	24.78	7	29.17	69	22.62
45-54 years	13	19.12	26	26	26	23.01	3	12.50	68	22.30
55-64 years	11	16.18	11	11	22	19.47	1	4.17	45	14.75
65 and Above Years	4	5.88	6	6	11	9.73	1	4.17	22	7.21
Total	68	22.30	100	32.79	113	37.05	24	7.87	305	100.00
Duration of stay (Years)										
Less than 5 years	50	73.5294	70	70	80	70.7965	11	45.8333	211	69.1803
6 to 10 years	7	10.2941	6	6	14	12.3894	3	12.5	30	9.83607
11 to 15 years	1	1.47059	9	9	6	5.30973	5	20.8333	21	6.88525
16 to 20 years	1	1.47059	3	3	2	1.76991	3	12.5	9	2.95082
21 years and above	9	13.2353	12	12	11	9.73451	2	8.33333	34	11.1475
Total	68	22.2951	100	32.7869	113	37.0492	24	7.86885	305	100
Income of House Hold (Monthly)										
0 to 25000	1	1.47	3	3	1	0.88	1	4.17	6	1.97
25001 to 50000	5	7.35	5	5	13	11.50	3	12.50	26	8.52
50001 to 75000	19	27.94	26	26	32	28.32	14	58.33	91	29.84
75001 to 100000	8	11.76	15	15	14	12.39	0	0.00	37	12.13
100001 to 125000	13	19.12	6	6	15	13.27	3	12.50	37	12.13
100001 to 125000	3	4.41	5	5	9	7.96	0	0.00	17	5.57
150001 to Above	19	27.94	40	40	29	25.66	3	12.50	91	29.84
Total	68	22.30	100	32.79	113	37.04918	24	7.8688525	305	100

	Annexures.1 (C): Which method do you mainly use for waste disposal?										Total	
	Store it for reuse	%	Burn it	%	Sell to a waste buyer	%	Scavengers/ Throw Away	%	Other	%		%
Age of respondents												
less than 18 years	1	3.03	1	2.38	0	0.00	0	0.00	0	0.00	2	0.66
18-25 years	10	30.30	12	28.57	12	25.00	2	2.06	5	5.88	41	13.44
25-34 years	11	33.33	12	28.57	7	14.58	22	22.68	6	7.06	58	19.02
35-44 years	5	15.15	11	26.19	13	27.08	20	20.62	20	23.53	69	22.62
45-54 years	4	12.12	2	4.76	8	16.67	27	27.84	27	31.76	68	22.30
55-64 years	2	6.06	3	7.14	5	10.42	17	17.53	18	21.18	45	14.75
65 and Above Years	0	0.00	1	2.38	3	6.25	9	9.28	9	10.59	22	7.21
Total	33	10.82	42	13.77	48	15.74	97	31.80	85	27.87	305	100.00
Duration of stay (Years)												
Less than 5 years	11	33.33	20	47.62	23	47.92	86	88.66	71	83.53	211	69.18
6 to 10 years	8	24.24	8	19.05	6	12.50	1	1.03	7	8.24	30	9.84
11 to 15 years	6	18.18	5	11.90	6	12.50	2	2.06	2	2.35	21	6.89
16 to 20 years	0	0.00	4	9.52	4	8.33	0	0.00	1	1.18	9	2.95
21 years and above	8	24.24	5	11.90	9	18.75	8	8.25	4	4.71	34	11.15
Total	33	10.82	42	13.77	48	15.74	97	31.80	85	27.87	305	100.00
Income of the House Hold (Monthly)												
0 to 25000	2	6.06	0	0.00	2	4.17	1	1.03	1	1.18	6	1.97
25001 to 50000	5	15.15	6	14.29	6	12.50	4	4.12	5	5.88	26	8.52
50001 to 75000	10	30.30	14	33.33	12	25.00	33	34.02	22	25.88	91	29.84
75001 to 100000	7	21.21	4	9.52	4	8.33	18	18.56	4	4.71	37	12.13
100001 to 125000	5	15.15	4	9.52	9	18.75	12	12.37	7	8.24	37	12.13
100001 to 125000	0	0.00	3	7.14	2	4.17	3	3.09	9	10.59	17	5.57
150001 to Above	4	12.12	11	26.19	13	27.08	26	26.80	37	43.53	91	29.84
Total	33	10.82	42.00	13.77	48.00	15.74	97.00	31.80	85.00	27.87	305.00	100.00

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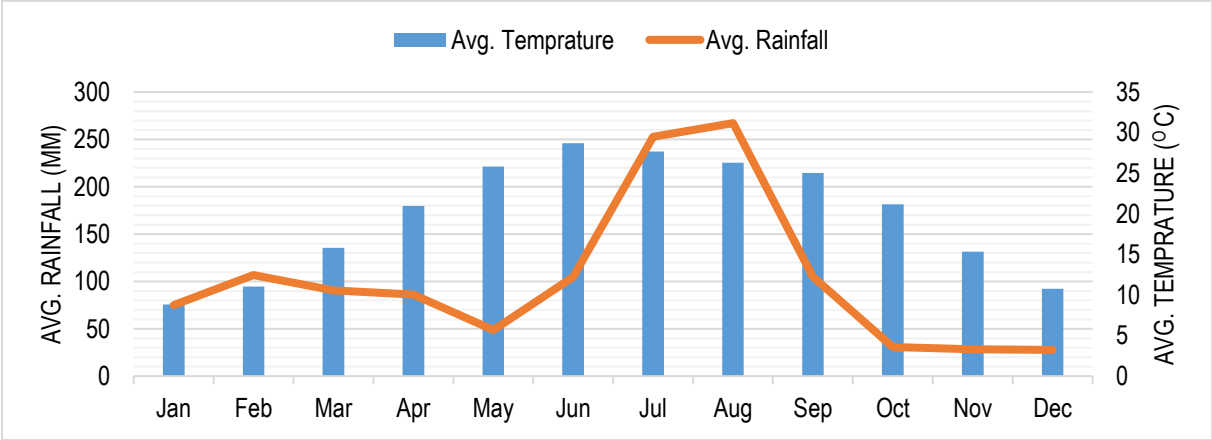
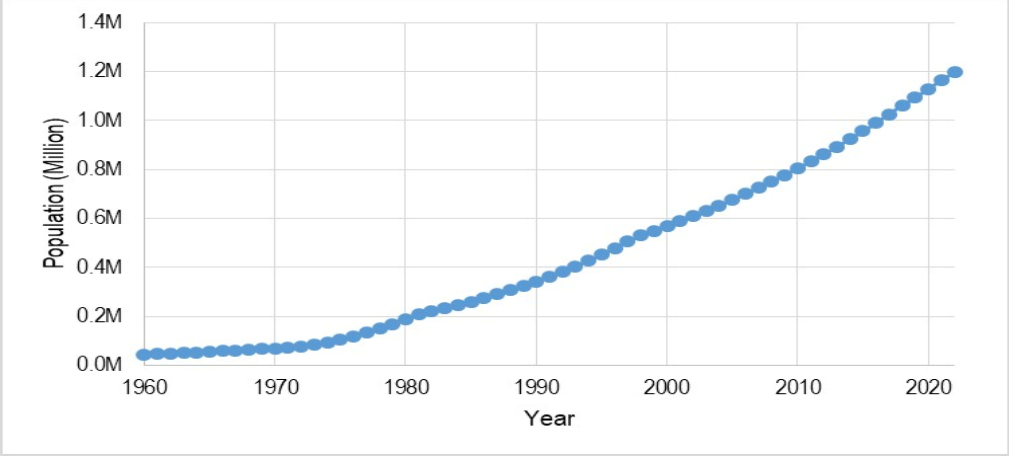
	Annexures.1 (D): Have you ever participated in a meeting/ campaign regarding solid waste management during the past five years?				Total	
	Yes		No			
Age of the respondents						
less than 18 years	1	1.075	1	0.47	2	0.66
18-25 years	9	9.677	32	15.09	41	13.44
25-34 years	8	8.602	50	23.58	58	19.02
35-44 years	23	24.731	46	21.70	69	22.62
45-54 years	25	26.882	43	20.28	68	22.30
55-64 years	16	17.204	29	13.68	45	14.75
65 and Above Years	11	11.828	11	5.19	22	7.21
Total	93	30.492	212	69.51	305	100

Annexures 2



Source: https://climateknowledgeportal.worldbank.org/ Access on 18 August 2022

Annexures 3



Source: https://worldpopulationreview.com Access on 18 August 2022

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Annexures 4: Survey questionnaire

Section-1: Socio-economic and demographic parameters

Q.1. What is the Homestead location of the respondent?

_____

Q.2. Year of birth or age of the respondent?

_____

Q.3. Gender of the respondent?

□ Male □ Female

Q.4. The highest academic qualification of the respondent?

□ Below Matriculation □ Matriculation □ Intermediate
□ Associate Bachelor (14 Years) □ Bachelor (16 Years) □ Master (18 Years)
□ Doctoral

Q.5. What is the average monthly income of the family?

_____

Q.6: How many of your family members reside in this dwelling?

□ 1 to 3 □ 4 to 5 □ 6 and above

Q.7: How long has your family been residing in this house?

□ Less than five year □ 6 to 10 years □ 11 to 15 years □ 16 to 20 years
□ 21 years and above

Section-2: The orientations toward domestic waste production and management

Q.1: Please indicate your level of awareness regarding domestic waste production and its management.

□ Very poor □ Poor □ Good □ Very good □ Excellent

Q.2: In your opinion, the domestic waste collection in your vicinity is a problem or not?

□ Not a problem □ A serious problem □ A very serious problem □ Don't know

Q.3: Which method do you primarily deploy for waste disposal?

□ Store it for reuse □ Burn it □ Sell to waste buyer

□ Scavengers/Throw Away □ Other

Q.4: Have you ever participated in a meeting/ campaign (during the past five years) regarding domestic waste management at the community level?

□ Yes □ No

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