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STUDY ON ENVIRONMENTAL PROBLEMS AND CHALLENGES IN URBAN AREA

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ABSTRACT

Various fields, including commerce, manufacturing, research, and culture, flourish in metropolitan environments. However, rather than being considered production centers, these are considered to be consumption centers. People are driven to towns and cities because they offer employment opportunities, economic growth, and a higher quality of life. It is estimated that by the year 2050, towns and cities will be home to two-thirds of the world's population. This has a number of adverse effects on the environment, including the contamination of the air, the land, and the water respectively. Numerous problems, including but not limited to population growth, a deficiency in infrastructure, emissions of greenhouse gases, urban smog, traffic congestion, noise, and housing that does not meet standards, beset metropolitan places all over the world. The objective of this study is to present an overview of the environmental problems that are prevalent in metropolitan areas and to suggest some potential remedies. The purposes of this study were to investigate the perceptions of urban environmental issues held by stakeholders in the setting of Iraq, as well as the importance and priority of these concerns. During a nationwide survey with a sample size of 643 people, a structured questionnaire consisting of 25 questions was utilized to capture the opinions of respondents on a Likert scale with five points, in addition to demographic information. Principal component analysis (PCA) and statistical testing were utilized in order to study the relationship between individuals' perceptions of urban environmental problems and demographic factors. It was determined that the five primary components are as follows: water, waste, and materials; environmental effect; natural danger; personal mobility; and transportation. "Water conservation" was found to be the most significant urban environmental problem, followed by "increased variety of transportation modes." This was the conclusion reached by the researchers. Sixty-seven point two percent of respondents ranked "effective infrastructure and utilities" as the third most significant item in their list of considerations. In terms of perception, every demographic element, with the exception of geography, displayed statistically significant differences.

Keywords: *Environmental implications, Population growth, urban areas.*

INTRODUCTION

The growing urbanization of many countries, in conjunction with the rapid development in living standards, is putting a strain on natural resources and posing a threat to the quality of the environment. The majority of regions across the world with high, medium, and low incomes have experienced population density at levels that have never been seen before. It is anticipated that by the year 2050, urban populations would account for approximately 66% of the overall worldwide population. In 2014, urban populations made up 54% of the total global population, which is an increase from 30% in 1950. The contamination of air, water, and soil within urban areas is one of the many environmental health concerns that urban regions are currently confronting. Congestion in traffic is caused by sprawling urban areas, which also contributes to air pollution, noise, and lengthy commute times, all of which have a negative impact on public health and productivity for people all over the world.

Furthermore, climate change is likely to exacerbate certain urban health risks and inequalities by increasing the frequency and severity of extreme weather events (heatwaves, storms, and floods), potentially contributing to air pollution episodes (ground-level ozone and pollen), and disrupting urban ecology. These are all examples of how climate change is likely to exacerbate urban health risks and inequalities. Heat stress is made worse in locations that are densely populated by the urban heat island effect, which refers to the disparity in temperature that exists between the central business district of a city and the countryside that surrounds it. Because of this, the indoor atmosphere, the demand for energy (for ventilation and cooling), and the health of the general public are all impacted accordingly.

While this is a challenge, it also presents an opportunity: the implementation of climate change adaptation and mitigation strategies can result in a variety of positive health outcomes. These health benefits are likely to be the result of "low carbon" policies that aim to reduce greenhouse gas emissions by increasing energy efficiency in buildings (which will improve thermal comfort for occupants), decreasing reliance on the use of private automobiles (which will improve levels of physical activity and local air quality), increasing the generation of renewable energy (which will improve ambient air quality), and decreasing the consumption of meat and dairy products (which will reduce the amount of saturated fat consumed). Taking into account the health advantages that are associated with climate change mitigation contributes to the strengthening of the argument for reductions in greenhouse gas emissions from a variety of industries. However, it is also important to pay attention to the unforeseen and perhaps detrimental implications that various measures regarding carbon reduction may have. For instance, the promotion of active transport has the potential to raise the risk of road injuries if cyclists and pedestrians are not separated from other road traffic. This is because energy efficiency measures in the home have the potential to impair the quality of the air inside the home if efforts are not taken to maintain adequate ventilation.

City systems are quite complicated. Methods that are systems-based and interdisciplinary are required for research that aims to shed light on the pathways that lead to improved health and well-being. These methods require the participation of epidemiologists, toxicologists, urban planners, environmental scientists, mathematical modellers, engineers, information technology specialists, social scientists, public health researchers, and health care professionals. Getting local communities involved in research projects that aim to inform local policies at an early stage is an important step that needs to be taken seriously. This is something that may be accomplished through true stakeholder involvement, citizen science, and knowledge co-generation initiatives. These methods raise awareness, provide useful information, and improve the acceptability of interventions.

When it comes to addressing complex environmental health concerns in the context of climate change and sustainable development, there is a need for methodological innovation in epidemiology, exposure assessment and risk analysis, as well as the standardization of approaches across nations. A number of topics that are pertinent include the evaluation and reduction of the health risks and impacts of weather extremes, air pollution, water contamination, and other types of environmental hazards, particularly in the context of climate change, as well as the evaluation of strategies for adaptation and mitigation. Because of these issues, there is a pressing need for integrated evaluation methodologies that take into account the intricate connections (including feedback loops) that exist between climatic, environmental, and behavioral elements, as well as the urban fabric. This is especially true in megacities around the world, where the amount of exposure to environmental stressors (such as air pollution, traffic congestion, heat, and noise) can be significantly higher than in rural areas. There are a number of cities in low and middle income nations that are rapidly emerging, and these places may present particular chances for being able to influence development routes. It is possible to characterize the expected overall implications of policy alternatives in urban contexts with the assistance of system dynamics methodologies and multi-criteria decision analysis methods that integrate quantitative and qualitative evidence.

OBJECTIVES

1. To discuss urban environmental issues and
2. To investigate the influence of urbanization on environmental goods in the country's largest cities.

METHODOLOGY

In order to investigate the perceptions of stakeholders about urban environmental concerns, a questionnaire consisting of 25 questions was sent across the country. It was decided that the questionnaire would be the primary method because it allows for the collection of the opinions of a large number of individuals in a manner that is both efficient and consistent. It has been utilized well in a number of earlier research on public perception in a variety of subjects.

Questionnaire development

Five stages were involved in the development of the questionnaire:

First, an exhaustive literature analysis of urban environmental and sustainable development concerns was conducted, which resulted in the identification of an initial set of urban environmental indicators.

Furthermore, one of the authors traveled to four governorates located in the center and southern parts of the country. We reached out to stakeholders from the general public, professional organizations, and government agencies by phone, through social media, and through internal contacts within the relevant government departments and municipalities. Interviews were conducted with stakeholders who were willing to participate in order to investigate their perspectives on the chosen indicators and other pertinent urban environmental concerns unique to the area. Because of these face-to-face contacts, the list of indicators was revised, and their descriptions were improved in order to make them more understandable. As a consequence, the final list consisted of 25 different things.

On the basis of the two steps that came before it, a preliminary version of an online questionnaire was constructed. The questionnaire was initially developed in English, and then it was translated into Hindi in order to facilitate participation from a larger portion of the general audience, some of whom may not be fluent in English. During the review process, two experienced translators checked the draft to ensure that the information was accurate and easy to understand. A pilot survey was conducted in order to evaluate the draft of the questionnaire in order to determine the degree of comprehensibility and clarity of the items that were associated with the psychometric characteristics of the instrument. City planners, urban designers, academics, architects, civil engineers, and members of the general public were among the participants in the pilot project, which had a total strength of sixteen individuals. It was requested of them that they provide feedback regarding any shortcomings in the content, the length of the questionnaire, the level of comprehension of the components, any other potential perceptions, and the significance of the items. The findings from the pilot study were incorporated into the final questionnaire, which resulted in an increase in the content validity.

In the fourth place, the final questionnaire was disseminated through the use of the internet, which is not only more expedient than a manual survey but also more cost-effective. The survey was carried out with the assistance of Survey Monkey, which makes it possible to disseminate questionnaires to a large number of people, gives the authors the ability to control and monitor the responses, and enables them to obtain a preliminary analysis of the data in a short amount of time.

At the fifth level, in-person interviews were carried out with individuals belonging to the two age groups that have the lowest internet usage rate: those aged 55 to 60 years old and those aged 61 and older. During the interviews, one of the researchers went through the questions from the questionnaire and recorded the replies on the SurveyMonkey online tool using a tablet that was equipped with internet access.

A Likert-type scale with five points was used to allow participants to score their perceptions of the questionnaire items. The scale ranged from 1 to 5, with 1 indicating that the item was not relevant, 2 indicating that it was of little importance, 3 indicating that it was moderately important, 4 indicating that it was important, and 5 indicating that it was extremely significant. In addition, the questionnaire included open-ended questions, which gave respondents the opportunity to provide feedback on the things that were included in the survey as well as any other relevant elements that they believed were important. The information that was provided was demographic in nature and included things like age, gender, occupation, academic qualification, governorate (also known as region), and location (also known as urban, suburban, or rural).

Survey respondents

In the course of the research, participants of both sexes, who came from a variety of social backgrounds, vocations, and qualifications, participated. In this study, all regions were taken into consideration, including the northern, central, and southern regions, which together comprised all 18 governorates. One and only one criteria for participation was that the individuals who participated had to be at least 18 years old. Those who participated in the survey were given written notice that their participation was entirely optional and that the information they provided would be kept confidential.

Sampling and data collection

For the purpose of this study, a snowball sampling technique was utilized in order to ensure that the survey was distributed on a vast scale across all cities and areas. According to the findings of the earlier research conducted by Hamilton-Maclaren et al., snowball sampling expands the scope of a questionnaire so that it can cover a large number of participants who were previously unknown. Following the distribution of the survey, the link was distributed to a group of individuals who were eligible to reply from all across India through the use of email, text messages, and messaging on social networks. During the course of the survey, the same procedure was carried out multiple times until the appropriate quantity of stratified samples was gathered.

Data analysis

For the purpose of statistical data analysis, version 20.0 of IBM SPSS Statistics developed for Windows was utilized. Calculations were made to determine descriptive statistics regarding the scale frequencies, response percentages, means, modes, and standard deviations (SD) of the indicators and scale responses. A descriptive analysis was also performed on the demographic data, which included the computation of frequencies and percentages. For the purpose of determining the reliability of the questionnaire, the Cronbach's alpha (α) coefficient was utilized to evaluate the internal consistency reliability. This coefficient offered a single estimate of the internal consistency or average correlation of the questionnaire items. Based on the findings of multiple social research, the threshold of acceptable dependability was determined to be $\alpha = 0.70$.

Principal Component Analysis (PCA) was performed on each of the 25 indicators in order to ascertain the underlying structure. This was accomplished by defining a collection of variables that were correlated with one another. In order to determine the significance of a component, scree plots were tested, and the percentage of total variance that each component contributed was greater than five percent. Using the results of the principal component analysis (PCA), an orthogonal rotational method known as Variance Maximization (varimax) was implemented. The interpretation of the analysis is simplified as a result of rotation, which minimizes the number of factors on which the variables that are being investigated have large loadings. For an item to be considered for inclusion, it had to have a factor loading that was more than 0.40. To determine whether or not there were significant correlations between the items, the Bartlett test of sphericity was utilized. This study utilized the Kaiser-Meyer-Olkin (KMO) metric to evaluate the appropriateness of the sampling, which yielded a value of 0.918. The presence of a KMO that is bigger than 0.8 is indicative of the usefulness of principal component analysis for these variables.

RESULT

The respondents' characteristics

A total of 643 replies were obtained, with 411 of those responses providing answers to all of the survey questions. Out of the 411 legitimate responses, the following analysis is on those. The following text provides a description of the demographic features of the respondents.

- **Gender**: A total of around 68.4 percent of the respondents were male, while the remaining respondents were female.

- **Age**: 19.2% of the participants were between the ages of 25 and 30, which was the greatest percentage of engagement, followed by 15.8% of those who were between the ages of 41 and 45. 4.4% of people in the age category of over 61 years old participated in the survey.
- **Occupation**: Five-thirds of the people who responded were employed by the government, partly due to the fact that they make up twenty percent of the workforce. Members of the jobless, students, and homemakers made up the second largest category of responders, accounting for 16.5% of the total votes.
- **Qualification**: Following closely behind with a post-graduate degree, which was held by 32.8% of the respondents, the highest qualification held by 49.1% of the respondents was an undergraduate degree. 18% of the population had either completed their secondary education or had no official qualification at all.
- **Geographical coverage**: It was the southern region that had the highest participation rate (65.9%), followed by the center region (32.4%) and the northern region (1.7%).
- **Location**: In terms of location, the majority of respondents were located in urban areas (83%) followed by suburban areas (13.9%) and rural areas (3.2%).

Principal component analysis (PCA)

Every single item on the questionnaire showed a significant factor loading that fell somewhere between 0.4 and 0.8. A total of five summated indices were derived from the twenty-five components, which are as follows: influences on the environment; water, waste, and materials; natural hazards; personal mobility; and transportation. The initial analysis was performed on each component in order to acquire an eigenvalue that is greater than 1.0 according to Kaiser's criterion. Between 1.044 and 9.549 was the range of the eigenvalues for the five different factors. Based on the results of Bartlett's test of sphericity as a factor solution, it was found that there was a substantial correlation between the questions on the questionnaire ($p<0.000$). This indicates that all of the variables that were picked were connected to each other and could be used for further study. According to the KMO (0.918) measure, the sampling adequacy was confirmed, which indicated that the variables in the questionnaire were suitable for factor analysis and can be regarded as high. 63.72% of the total variance was recovered from the data. The first component, which was referred to as "environmental impact," was grouped together by ten different items and accounted for the highest amount of variance that was explained (38.19 percent). The fourth and fifth components, on the other hand, each contained only two items, which caused them to account for 5.4% and 4.17% of the variance, respectively.

Table 1: Rotated Component Matrix of the survey items

Items	component				
	Environmental impact	Water, waste & materials	Natural hazard	Personal mobility	Transport

Reduce environmental pollution	.837				
Increase vegetation cover	.826				
Efficient infrastructure and utilities	.816				
Minimize GHG emission	.806				
Minimize water consumption	.763				
Reduce vehicles on road	.755				
Minimize energy consumption	.744				
Increase water recycling	.719				
Effective and smart management of energy resources	.506				
Maximize the use of renewable energy	.458				
Promote the use of alternative sources of water		.711			
Use recycled/grey water		.705			
Water recycling		.688			
Reuse of materials		.669			

Sewage treatment		.667			
Waste separation and recycling		.633			
Rainwater harvesting		.632			
Water conservation		.497			
Desertification of lands			.817		
Drought			.762		
Sandstorms			.678		
Promote the use of bicycle				.815	
Walking as a mean of mobility				.803	
Increase choice of transport modes					.659
Promote and provide for the use of public transport					.641
Cronbach's alpha coefficient (0.925)	.918	.866	.751	.706	.657
Eigen values	9.549	2.477	1.509	1.351	1.044
Percentage of explained variance(63.721)	38.194	9.910	6.036	5.404	4.177

It was determined that none of the twenty-five items had dual loading, which is a measure of how clear the questionnaire was. As a result of the huge sample size, the convergence of the scree plot, and the results of Kaiser's criterion, five components have been preserved for the final analysis. Table 1 shows that the reliability estimates for all of the components that were generated were greater than 0.60, which indicates that there is a strong internal reliability between the questionnaire items that have similar characteristics. In general, the Cronbach's alpha was 0.925, which indicates that the level of reliability is extremely high.

The relationship between the impression of environmental challenge indicators and the personal information that individuals have

The participants were reorganized into new groups, and the variables were reclassified in order to summarize the analysis and interpretation of the data. The data did not follow a normal distribution. Therefore, non-parametric tests were performed on each and every item in the survey by adhering to a distribution that was not statistically normal. The Mann-Whitney U-test was performed on the variable 'gender,' and the Kruskal-Wallis test was performed on the variables 'occupation,' 'qualification,"region,' and 'location' simultaneously. As can be seen in Table 2, there were statistically significant differences in perception across all demographic factors, with the exception of location.

While gender has a substantial impact on how people perceive the importance of reducing energy consumption, age group has a big impact on how people perceive the importance of expanding vegetation cover, reducing greenhouse gas emissions, and increasing the number of transportation modes available. In terms of water, waste, and materials, as well as the utilization of recycled or greywater, water recycling, trash separation, and recycling things, occupation has a huge impact on how people think about these topics. There is a considerable impact that the region has on how people think about water, waste, and materials. This has the potential to encourage the use of alternative water sources, the utilization of recycled or grey water, and the necessity of sewage treatment. In conclusion, certification has a substantial impact on how people perceive the component, which in turn leads to an increase in trash recycling.

Table 2: Results of non-parametric test

PCA	Questionnaire items	Mean	Non parametric test (p-value)					
			Gender	Age group	Occupation	Qualification	Region	Location
Minimize environmental impacts	Efficient infrastructure and utilities	4.45	.427	.067	.877	.223	.581	.324
	Increase vegetation cover	4.43	.946	.046*	.798	.117	.424	.430
	Effective and smart management of energy resources	4.33	.427	.067	.877	.223	.581	.324

	Reduce environmental pollution	4.30	.281	.153	.273	.085	.589	.882
	Maximize the use of renewable energy	4.15	.835	.295	.181	.249	.696	.477
	Minimize water consumption	4.14	.057	.095	.864	.160	.784	.346
	Reduce vehicles on road	4.12	.121	.110	.935	.055	.556	.898
	Minimize GHG emission	4.11	.405	.018*	.261	.650	.263	.799
	Minimize energy consumption	4.07	.001*	.575	.821	.061	.845	.689
	Increase water recycling	4.05	.052	.062	.245	.033*	.696	.534
Water, waste and materials	Water conservation	4.56	.529	.058	.431	.353	.943	.697
	Sewage treatment	4.29	.901	.903	.135	.212	.047*	.139
	Waste separation and recycling	4.24	.099	.089	.010*	.108	.172	.995
	Water recycling	4.07	.810	.188	0.18*	.314	.263	.650
	Reuse of materials	3.90	.892	.866	.087	.163	.660	.592

	Use of grey water	3.88	.436	.186	0.31*	.249	.002*	.422
	Promote the use of alternative sources of water	3.86	.972	.059	.510	.931	.022*	.548
	Rainwater harvesting	3.72	.240	.361	.132	.293	.832	.301
Natural hazards	Desertification of lands	4.29	.480	.128	.592	.838	.306	.843
	Drought	4.22	.180	.311	.271	.341	.147	.235
	Sandstorms	4.11	.861	.144	.211	.824	.057	.719
Personal mobitlity	Walking as a mean of mobility	3.95	.053	.168	.356	.836	.174	.701
	Promote the use of bicycle	3.40	.013*	.723	.796	.241	.922	.985
Transport	Increase choice of transport modes	4.46	.463	.004*	.947	.716	.793	.094
	Promote the use of public transport	4.36	.756	.663	.416	.631	.448	.982

Note: $p<0.05$, Mann whitney U-test, Kruskal wallis test

CONCLUSION

At this point in time, there is a universal consensus that environmental concerns are of utmost significance to each and every community, both in the present present and in the future. Involving stakeholders in the process of identifying urban environmental concerns is a work that is both vital and ongoing. This is done in order to facilitate informed decision making and the efficient execution of policies that have been enacted. This study first defined

the environmental concerns that are pertinent, and then it gave a complete snapshot of public opinion regarding the importance of these challenges and the priorities that they should be addressed. The respondents' perceptions of the identified urban environmental difficulties were a product of their day-to-day interactions with the settings that were immediately surrounding them, as well as their hopes and dreams for the future. A significant number of these difficulties are the direct consequence of the political instability that has persisted in the nation for more than forty years. This study comes to a close with the following major recommendations for those who make decisions, those who work in the field of urban development, and those who conduct research in the field.

- It has been determined that the most urgent problem is the restricted availability of water. Both the water quality, which is below acceptable standards, and the occurrence of high amounts of contaminants are contributing factors that make the problem even worse. Consequently, the recycling of water and the promotion of the utilization of alternative water sources that are readily available are regarded as priorities in both the existing urban development projects and the new Urban Development projects.
- According to the findings of this research, increasing the amount of vegetation cover, boosting infrastructure projects, and adopting sustainable and diverse transportation are all highly important to stakeholders. Therefore, it is imperative that attention be made to reducing the negative affects that are already occurring on the environment.
- By increasing the proportion of renewable energy sources and implementing intelligent management of energy infrastructure, it is possible to achieve future policy goals related to environmental sustainability and energy efficiency, while simultaneously alleviating the severe electricity deficit that is currently occurring.
- It is imperative that urban waste recycling be given priority in order to transform various types of waste into goods that are of use while simultaneously preventing the accumulation of waste. Recycling of waste helps to cut down on the amount of raw materials and energy that are consumed.
- Walking and cycling as modes of transportation should be supported through the planning and construction of communities that are conducive to walking and cycling, as well as the establishment of cycle paths. Campaigns aimed at raising awareness are necessary in order to combat the social stigmas that are associated with cycling.

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