Assessment of Neighborhood Environmental Quality andIts Impact on Health and Lifestyle of Residents in Bengaluru

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Abstract

Environmental Quality is crucial factor for the people's health in the neighborhood. Examining the quality of the neighborhood's environment will play vital role in determining the health and its impact on their lifestyle. The aim is to find out vulnerable areas so that diagnostic planning can be taken out in those areas. The analysis helps figuring out what can be done on improving quality of life on the residents. In the study, efforts were made to collect the information like Environmental Factors, Societal Influence, Neighborhood Management and Healthy life. Questionnaire was prepared on the Factors and a survey of 306 samples has been collected on people's view, on the Quality of their Life. This data was analyzed using the statistical tools like JMP, excel and SPSS, for getting view on the Quality of the environment in the neighborhood. The variables are considered and the descriptive statistics, correlation, regression and hypothesis testing are drawn out of the 306 samples. The local authorities if they come forward to implement workshops, health education, drainage system, common public toilet, less carbon emission and common parking centers, will have positive impact on quality of life and which in turn has impact on society and finally benefits the whole country.

Keywords
Neighborhood management, carpooling, odd-even strategy, environmental factors, healthy life factors.

1. Introduction
Life of people depends on the environment they live in and the neighborhood they stay in. Quality of life can be characterized into two parts; one is mental and other one is physical (Nematchoua, M., Sadeghi, M. and Reiter, S., 2022). Mental quality depends on the people manners and their way of thinking, whereas the physical quality consists of how the natural resources are used, waste managed, Community and mainly the availabilities in the neighborhood like Ambulance, help desk, community parks and so on. And how these facilities are maintained for wellbeing of the people in the neighborhood. By finding out the mental and physical Quality of life in different neighborhood which will help the people to improve their health and lifestyle.

Rapid growth in Urbanization and increase in population as led to the depletion of the environment and shortage in housing and public services. Urbanization played an important role in developing slums and haphazard land use. This urbanization also has surpassed to make available the adequate basic services like water supply, sanitation,

sewage, drainage and welfare facilities to the residents. Neighborhoods with good services have a better-quality life compared to the societies which does not have them. Therefore, the analysis of environmental quality of neighborhoods will helpin environment management at that area (Owusu, G., 2010).

Bangalore is mix of different culture and people all around the world, who occupy their carriers here. Mix culture means mixed opinions as well as mixed ways of living, so getting to know about that area is getting to know about them and what they think about their neighborhood. To know their opinion a survey has been conducted by using the following factors as a base which are Environmental Factors, Societal Influence, Neighborhood Management and Healthy life.
For these factors, variables should be taken into consideration such as:

- Variables which come under for environmental science are noise pollution, drainage system, Rain waterharvesting, green ecosystem, solar energy etc.

- Variables which come under societal influence are fitness centers, awareness programs, private first aidcenter's etc.
- Variables which come under Neighborhood management are disposal bins, restaurant access, parking unitsetc.
- Variables which come under Health life are Waste management, health facilities, health infrastructure etc.

The factors and their variables will help in building up proper questions which can bring out complete details of the neighborhood.

Survey is one of the ways where data collection will be easy and quicker. Measuring environmental quality helps the planners, members of the community, sponsors and environmentalists. Natural and social factors play an import role in preparing the ideological concept of the quality of the environment (Pickett, K.E. and Pearl, M., 2001). Measuring of the environment is a difficult task, like it has some uncertainties and subjective decisions. So, to handle such problems in measuring, collecting datais one step understanding is another step, understanding the data can be done by structuring the data and analyzing it, collection of data is done by preparing a questionnaire. Questionnaire is prepared by using Google forms which is free and easy to use. Considering the factors, questionnaires will consist of a total 50 questions which have 10 each for each factor. Considering the questions, a survey will be conducted throughout the neighborhood.

The neighborhoods where survey was taken up are Yelahanka, Sanjay Nagar, R T Nagar, Hennur, Hebbal, Vijay Nagar, K R Puram, Malleshwaram, Sadashiv Nagar. This survey will bring out the wants and needs in the area and their quality of life. The analysis will be done when all the data collected in a structured form. Structured format datais data which is in order and can be used for analysis. To get a clear idea on the data we use JMP and SPSSS software which are data analysis tools. By using the software, we find out the Descriptive statistics, hypothesis testing, co- relation and regression. By these tools we can easily find out what are highs, lows, available etc. These software's help in completing the tasks faster and easier. By doing this analysis we can easily get a clear view on the quality of life in each Neighborhood and work on the lagging services and how one Neighborhood is better in considering the other.

When the analysis is completed, a detailed review will be done. This review help's in finding out what are affecting those areas and what can be done. The analysis will suggest the neighborhoods to know and learn from their neighborhoods. Is required and what should be not, the aim is to find out the vulnerable areas so that a diagnostic planning can be taken out in those areas (Ratner, B., 2009)

1.1 Objectives
I. To identify the influencing factors which will improve the quality of neighborhood environment.
II. To analysis the relationship between societal influencing factors and environmental factors which leads to quality of neighborhoods environment.
III. To examine the neighborhood management practices.
IV. To develop a framework and provide suitable recommendations for quality of life and happy living.

2.   Literature Review

Filling the literature gap in evaluating community values and stakeholders' perspectives on disaster resilience when identifying metrics for resilience interventions in urban neighbourhoods (Alan H. Kwok et al.)

The European based Smart Urban Isle approach can lead to the development of an innovative local energy system and also can be applied to similar neighbourhoods. (Sabine Jansen, Saleh Mohammadi and Regina Bokel). The proposed model can be employed by any household which encourages renewable energy consumption.

There are many problems that lead to improper waste management. Firstly, there is direct disposal at wrong places. Moreover, solid waste is burnt openly which pollute the environment. Thirdly, there is a delay in the periodic collection by the responsible bodies/agencies. Fourthly, there is limited awareness/environmental education of the health hazards resulting by poor waste handling. In addition, there is the negligence and lukewarm attitude on the part of waste handlers (Ross, A. and Wilson, K., 2021). Similarly, corruption affects the smooth operation of waste management, through misappropriation of funds meant for waste management. (Alhaji Mukhtar and Joseph C. Akan).

Willingness to sort garbage differs from various household types. Households living in commodity housing neighbourhoods have the highest willingness to sort garbage, reaching 93.89%, followed by living in security housing neighbourhoods (92.74%), unit neighbourhoods (90.34%), urban shantytown neighbourhoods (90.14%), residential neighborhood changed from a rural neighborhood (88.09%), and old residential neighbourhoods (86.13%). (Liyuan Zhao and Hongsheng Chen). Explored National Sustainability Assessment Tools-related research articles published over the last two decades. In total 117 articles were reviewed, and key observation and recommendation have been made to determine the research trends and impact of NSATs on the built environment since the first emergence of NSATs research in literature. (Ayotunde Dawodu, Ali Cheshmehzangi, Ayyoob Sharifi and Jumoke Oladejo).

Using sampling methods and finding ways to improve the acoustic environment of the neighborhood (Hiral J. Jariwala et al.) Various problems that arise with water management such as diminishing state resources and lack of infrastructure. (Alphonce G.Kyessi), Understanding how activities like gardening can relieve human stress and boost nature connection during the COVID- 19 pandemic. (Monika Egerera et al.). Learning the effectiveness of Rain Water Harvesting for flood reduction. (Gabriele Freni and Lorena Liuzzo). The ill effects of rapid urbanization that lead to poor sanitation facilities. (George Owusu)

3. Research Design and Methods/Methodologies

We have collected 306 samples across 10 areas located in Bengaluru (Table 1) and have also developed a conceptual framework (Figure 1).

<div align="center">Table 1. Research Design</div>

|	Sanjay Nagar, Yelahanka, Malleshwaram, Mathikere, KR Puram, RT nagar, Vijayanagar,Kengeri, Sadhashiv nagar, Hennur
Population	650000 @ 92% confidence level
Sample size	306
Sampling techniques	Cluster Sampling
Accepted rate	Out of 310 samples 306 were accepted and 4 samples not accepted due to incomplete information, with acceptance rate of 98.70 % acceptance rate
Rejected rate	Out of 310 samples 4 were rejected, with1.29% rejection rate
Tools used	JMP, SPSS and Excel
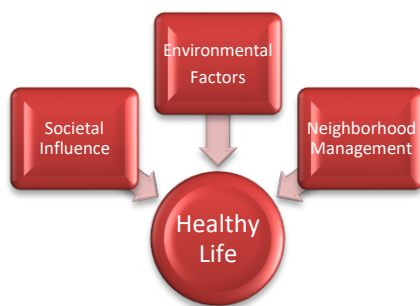
Figure 1. Conceptual Framework

3.1 Survey Through Questionnaire

Responses were collected through a questionnaire which was made in Google Form(The questionnaire and the relevant data can be viewed at
https://drive.google.com/drive/folders/10KFOlZXWZTtC0_v5JKqhpsFod0Ih_yBm?usp=sharing)

Table 2. For each of our objectives, these are the methods/methodologies we have designed

Objectives	Methodology
To identify the influencing factors which will improve the quality of neighborhood environment.	Literature survey has been carried out and through gap identification, the critical factors have been identified and listed in tabular column.
To analyze the relationship between societal influence factors and environmental factors which leads to quality of neighborhood environment.	The critical factors such as societal influence and environmental factors have been analyzed using JMP software and correlation resource was tabulated.
To examine the neighborhood management practices	The variables with respect to neighborhood environment and healthy life have been examined by correlation analysis by using JMP software and accordingly both hypothesis was developed.
To develop a framework and to provide suitable recommendations.	Conceptual framework has been developed using the identified critical factors and based on the output analysis report suggestions have been given.

Table 2. Methodologies of the Research

3.1.1 Descriptive Statistics

Using Pivot chart in MS excel, descriptive statistics of the demographic profile was made.
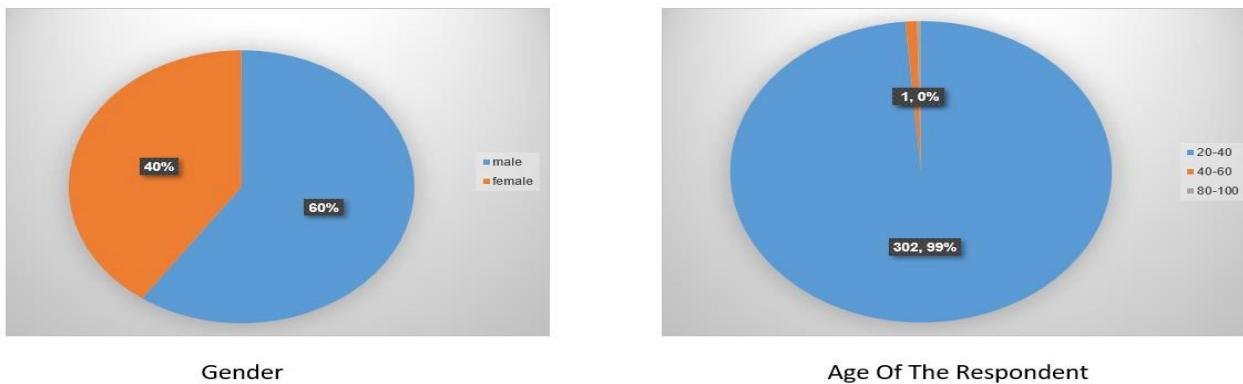
Figure 2. Descriptive Statistics of Gender and Age

In the data that was collected, 60% of the respondents were male and 99% of the respondents were between the age groups of 20-40 years as shown in Figure 2.
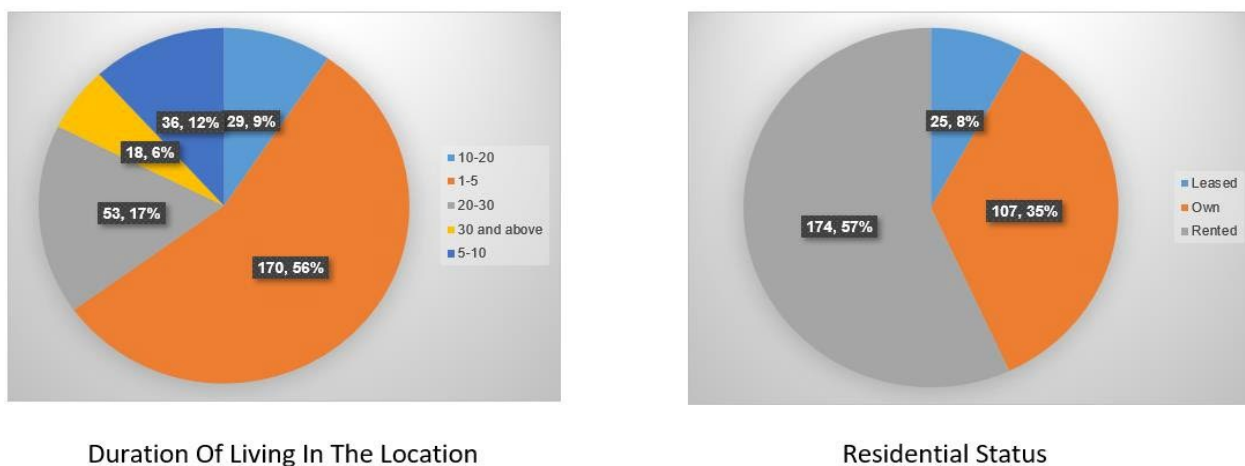

Figure 3. Descriptive Statistics of Residence

From Figure 3, it is evident that 56% of the respondents lived in the same location for 1-5 years and majority of the respondents (57%) lives in rented house.
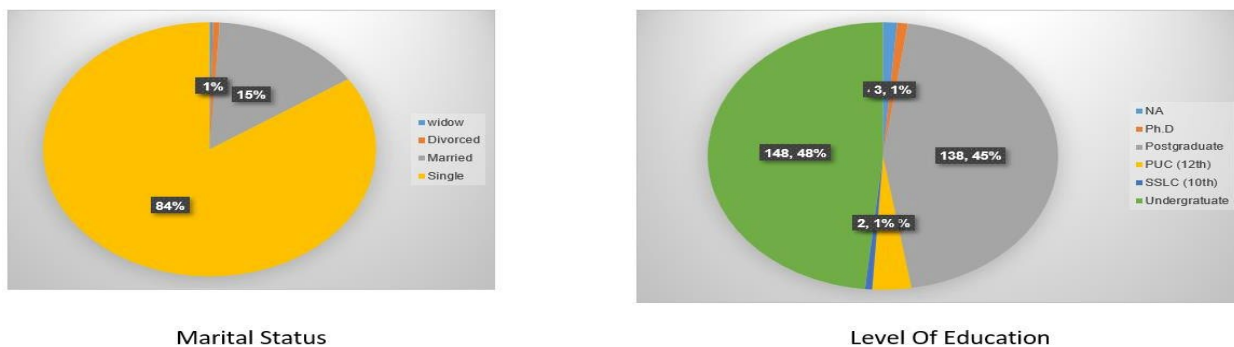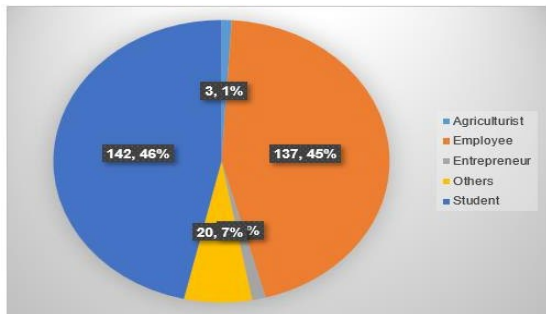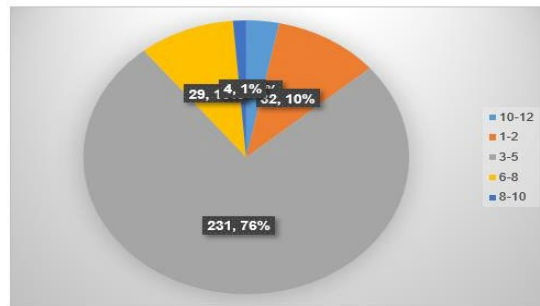

Figure 4. Descriptive Statistics of Marital Status and Residence

In Figure 4, we can see that most of the respondents are single/unmarried and most of the respondents
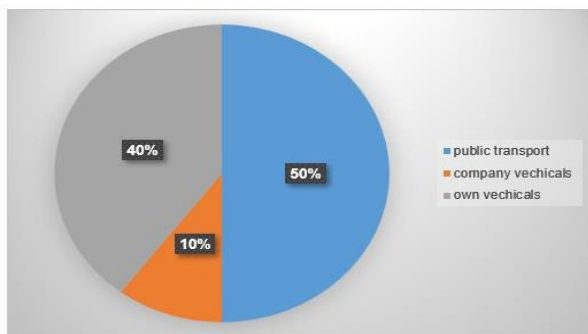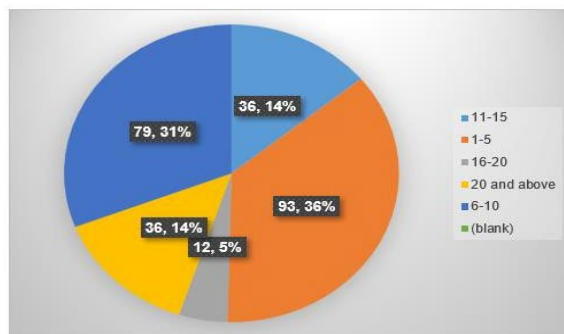
(48%) are undergraduates.

Figure 5. Descriptive Statistics of Occupation and Total Members in the Family

From the Figure 5, most of the respondents are students and 76% of the families consists of 3-5 family members.

Figure 6. Descriptive Statistics of Work

Many respondents have to travel 1-5 kilometers to their place of work and the most used means of transport by the respondents in public transport. (Figure 6). The advantage is that by using public transport instead of own vehicles, a lot of air pollution is reduced.

3.2 Research Gaps and the Critical Factors

From the literature review, research gaps have been identified (Table 3) and critical factors were listed based on the research gaps.

Table 3. Critical Factors and Variables Based on the Research Gap

Serial No	Factor Identified	Variables Identified
1	Environmental sciences	Green eco-system, Less carbon emission, Waste management, Water quality, Solar energy, Terrace gardening, Rain water harvesting, Noise pollution, Drainage system
2	Societal influence	Solar water heater, Awareness program, Private first aid center, Fitness, Convenient parks, Security management, Insurance activities, utilities and communications infrastructure, energy management, organizing events
3	Neighborhood management	Common Water purifiers, Common parking center, Disposal bins, Common overhead tanks, Common working areas, Common public toilets, Easy access for hospital and pharmacy
4	Healthy life	Good sanitation, Proper health facilities, Health infrastructure, Good environment surrounding, Proper waste management, Proper underground system, Less Co2 Emission, Stress management, Maintaining physical activity,

3.3 Hypothesis Development and Correlation of the Critical Factors Using JMP

Using JMP, correlation for various variables was made and the results are as follows: (Tables 4, 5 and 6)

Table 4. Outcome of Objectives

Variable	Hypothesis testing	P value	Result
V1:-Drainage system V2:-common public toilet	H_0:-common public toilet has a positive impact on the improvement of drainage system in the neighbourhood. H_1:- improvement of drainage system in the neighbourhood will not have impact on common public toilet.	0.266153	Weak positive correlation
V3:-water quality V4:-common water purifier	H_0:- common water purifier has a positive impact on the improvement of water quality. H_1:- improvement of common water purifier in the neighbourhood will not have impact on water quality.	0.43746	moderate positive correlation
V5:-less carbon emission V6:-common parking centre	H_0:- common parking centre has a positive impact in less carbon emission in neighbourhood. H_1:- improvement of common parking centre in the neighbourhood will not have impact on less carbon emission in neighbourhood.	0.215706	Weak positive correlation

Table 5. Outcome of Objectives

Variable	Hypothesis testing	P value	Result
V7:-waste management V8:-Disposable bins	H_0:- Disposable bins has a positive impact on waste management in neighbourhood. H_1:- Deployment of Disposable bins in the neighbourhood will not have impact on waste management.	0.378866	moderate positive correlation
V9:-solar energy V10:-solar utility centre	H_0:- presence of solar utility centre around the neighbourhood has a positive impact on generation of solar energy. H_1:- presence of solar utility centre around the neighbourhood does not have a positive impact on generation of solar energy.	0.378866	moderate positive correlation

Table 6. Outcome of Objectives

Variable	Hypothesis testing	P value	Result
V11:-life before and after pandemic V12:-pandemic precautions	H_0:- Taking pandemic precautions has a positive impact on life before and after pandemic of neighbourhood. H_1:- Taking pandemic precautions will have a negative impact on life before and after pandemic of neighbourhood.	0.041776494	Weak positive correlation
V13:-health centre distances V14:-health care centre	H_0:- with minimal health centre distance around neighbourhood has positive impact on health care centres. H_1:- with minimal health centre distance around neighbourhood will have a negative impact on health care centres.	0.180813	Weak positive correlation
V15:-health education V16:-healthy lifestyle	H_0:- with proper health education in the neighbourhood has a positive impact on healthy lifestyle of neighbourhood management. H_0:- with proper health education in the neighbourhood will have a negative impact on healthy lifestyle of neighbourhood management	-0.01055	Weak negative correlation
V17:-service of health V18:-service to society	H_0:- Improvement in the service to society has a positive impact on service of health on quality of neighbourhood management. H_1:- Improvement in the service to society have a negative impact on service of health on quality of neighbourhood management.	0.272913	Weak positive correlation

3.3.1   Cronbach's Alpha Validity test for the Variables:

Cronbach's alpha test was done in SPSS for all the variables and the result was 0.887 which indicates that the data is good. (Figure 7). Steps to do the test and Interpretation of Cronbach's alpha (Zhao, L. and Chen, H., 2021): Cronbach's alpha – a measure of the consistency strength (bachelorprint.eu)

Scale: All Variables

Case Processing Summary

		N	%
Cases	Valid	305	100.0
	Excluded[a]	0	.0
	Total	305	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.887	56

Figure 7. Cronbach's Alpha Test

4. Findings and Recommendations

1. Findings from objectives 1 (From page 2, 1.1 – Objectives)

- Factors and variables were identified from the literature review
- Descriptive statistics was found out with respect to quality of neighborhood environment

2. Findings from objectives 2 (From page 2, 1.1 – Objectives)

Through different variables, hypothesis testing was done and correlation between them was found out where P valuesfor different variables was found out where most of them are moderately correlated and remaining are weakly correlated

- The neighbourhood should have a good infrastructure with proper drainage system. The neighbourhood should have a public toilet system so that the cleanliness will be maintained
- Also, in order to reduce carbon emission and parking on roads, the following can be done:

Carpooling and following odd/even strategy for reducing the number of vehicles on road which in turn will reduce the pollution (Azmal, U., 2022).

A dedicated parking space in each layout so that the roads will be less congested without vehicles being parked on either side.

3. Findings from objectives 3,4 (From page 2, 1.1 – Objectives)

- Through different variables hypothesis testing was done and correlation between them was found out where P values for different variables was found out. Most of them are weak positive correlation and one is having Weak negative correlation
- In weak negative correlation, we would like to say that if there is proper health education in the neighbourhood, healthy lifestyle of neighbourhood will improve and will have a positive impact on quality of neighborhoodenvironment

Since a greater number of people are travelling to their work in the collected samples which is too far from and have to travel a long distance in(km), recommending a common pooling system can be implemented so that transportationcost can be reduced which in turn helps in reducing crude oil price and hence traffic can be avoided

At present, implementation of odd even vehicle strategy for reducing carbon emission is gaining popularity and momentum, where vehicle number plate ending with. So, from this recommendation it reduces pollution and consumption of fuel, which has direct impact on growth of GDP of country (Auchincloss, A.H., Mujahid, M.S., Shen, M., Michos, E.D., Whitt-Glover, M.C. and Diez Roux, A.V., 2013).

Every layout having more than 100 occupants can create a common parking center with various facilities in which new technology is implemented, so that parking problem and inconvenience can be avoided (Jansen, S., Mohammadi, S. and Bokel, R., 2021)

Create eco-friendly, organic movable toilet with minimum usage charge and with easy waste disposal system which can create better environmental impact for visitors and people in and around the locality (Carver, A., Timperio, A. and Crawford, D., 2008).

Here we can nominate a society president who can easily be trained with health policy that can be freely

communicated to the society peoples through regular workshops basis for creating awareness about quality of healtheducation and health life style

5. Limitations

- The research study was limited only to 10 areas in Bangalore.
- Smaller sample size when compared to the population of Bangalore city.
- There are many other critical factors which were not explored.

6. Conclusions and Future Research

The local authorities if they come forward to implement workshops, health education, healthy lifestyle, drainage system, common public toilet, less carbon emission and common parking centers this will have positive impact on quality of life and which in turn has a impact on society and finally it benefits the whole country.

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