ASSESSING ENVIRONMENTAL DEGRADATION IN NEW PARADIGM TO ACHIEVE SUSTAINABLE DEVELOPMENT (A CASE STUDY OF LAHORE)

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ABSTRACT: The environmental scenario of City of Gardens is quite haze due to the presence of relentless perils. High density livings; due to break down of community and mass exodus of villagers from rural hinterland to urban centres, rural urban inequalities, presence of industry, increased car ownership trend and commercial activity at core of city are driving forces behind environmental degradation in metropolitan area of Lahore. These forces put lives of urbanites at risk and resultantly 1250 people are dying annually because of air pollution in the city of Lahore. Intolerable congestion, squatter development, growth of motorized vehicles and process of reconstruction to accommodate more and more commercial activity are common consequences of urban densification in Lahore. Sustainable solution of situation cannot be achieved without identification and address of foremost cause of environmental degradation. In this connection null hypotheses are made and testified. The paper highlights methodology of quantifying environmental degradation and to probe into its tended relations with other parameters. Based on the results different measures to reduce environmental degradation are recommended.

Keywords: High density living, Metropolitan Area, Spatial Imbalances

INTRODUCTION

The world population is quickly becoming urbanized. In 1950 only 29.1 % of the world population lived in cities and was 48.6% till the year 2005. According to United Nations Environment Program (UNEP) estimate urban population of South Asia is expected to reach about one billion by the year 2030, i.e. an increase of about 120% in three decades beginning with the year 2000.Four countries namely India, Pakistan, Bangladesh and Iran would accommodate an overwhelming 95.4% of region's urban population in 2030.According to Robert and Kanaly (2006) 44 million people are added annually in cities that require accommodation and other facilities.This urbanization phenomenon has increased the motor vehicles ownership rate and resultantly 4.3 million vehicles are plying on the roads of Pakistan. According to Pakistan Environmental Protection Agency (2005), the numbers of vehicles in Pakistan jumped from 0.8 million to 4.0 million within 20 years showing an overall increase of more than 400%.The average compound growth of vehicle ownership is about 11% per annum. This isdirectly responsible for environmental degradation particularly in central areas.The Daily Times (2006) in its publications clearly states that 1250 people are dying annually because of air pollution. Oberai (1990) states that Japan provides an example of national attempts to reduce the over concentration of population in major cities, develop 'Counter-Magnets', and improve the regional distribution of productivity and incomes.

Lahore the 'City of Gardens' is despoiled due to remorseless environmental degradation. According to IMPL (2004), the average annual urban growth rate of City District Lahore was 4.3% during 1951-61, which declined to 3.32% during 1981-98. It was still however, one of highest in the world. Qadeer (1983) explained the continuously deteriorating living trend of Lahore. In 1980, almost 23% of city's population was living in squatter settlements. During 1964 to 1979 squatter increased at yearly rate of about 17% per year which was almost three times rate of population growth.Metropolitan area of Lahore is suffering from intolerable congestion and gigantic growth of vehicles due to high concentration of commercial activity at core of city. Unrelenting level of air pollution put health of urbanites at stake.

MATERIALS AND METHODS

In order to identify the foremost cause of environmental degradation in metropolitan area five null hypotheses based upon observation and survey of the area are made and testified through chi-square test. These hypotheses are:

i. There is no strong relationship between environmental degradation and migration to study area
ii. There is no strong relationship between environmental degradation and high density living in metropolitan area.

iii. There is no strong relationship between environmental degradation and presence of commercial activity in metropolitan area.
iv. There is no strong relationship between environmental degradation and car ownership.
v. There is no strong relationship between environmental degradation and presence of industry in metropolitan area.

To test these hypotheses the present study was planned in Metropolitan Area of Lahore. Metropolitan area means the area which was controlled by defunct Metropolitan Corporation of Lahore. It comprises contemporarily planned as well as unplanned down town areas. Famous walled city area with high density living is a part of it. In order to give true representation, the entire metropolitan area was divided into four zones, viz-a-viz; high density living zone, commercial zone, industrial zone & mixed land-uses zone. Walled City area was selected to represent high density living zone, commercial zone representation was assigned to Urdu Bazar and Shahalam Market. Badami Bagh area was chosen to represent industrial zone and mixed zone representation was assigned to Bilal Gunj, Data Darbar and adjacent areas. Environmental degradation was divided into three categories namely High, Medium and Low on the basis of accumulative scores. The high category started from accumulated score of 18 and above, medium category ranged between 12-17 and low category was below 12. Scoring technique which was adopted to quantify environmental degradation highlighted in table-1. Questionnaires for citizen and concerned officials were designed separately. An observation sheet was prepared for the surveyor to record information like width of street, size of commercial centre, nature of industry etc.

Table-1: Scoring Patterns for Variables

Sr. No.	Categories	Category Variables	Score for each category Variables
1.	Jam/Congestion of Traffic	Traffic Jam for < half an hour	1
		Traffic Jam from 0.5-2 hour	2
		Traffic Jam for >2 hours	3
2.	Problem of Sewerage/Drainage	High	3
		Moderate	2
		Low	1
3.	Problem Regarding Solid Waste	High	3
		Moderate	2
		Low	1
4.	Quality of drinking Water	Satisfied	1
		Indifferent	2
		Dissatisfied	3
5.	Noise Pollution Level	Low	1
		Medium	2
		Low	3
6.	Air Pollution Level	Low	1
		Medium	2
		High	3
7.	Floor SpaceIndex	Single storey correspond to street width<15 ft	1
		Double storey correspond to street width <20 ft	2
		Triple storey correspond to street width<35 ft	3
8.	Encroachments	<2 ft	1
		2-4 ft	2
		4 & above	3
9.	Nature of Industry	Highly Polluted	3
		Polluted	2
		Non Polluted	1
10.	Open Drainage/sewerage	Yes	1
		No	0
11.	Environmental Degradation	High	18 & above
		Medium	12-17
		Low	<12
12.	Categories of Industry	High	Cluster of highly polluted industries
		Medium	Cluster of mixed /polluted industries
		Low	Non polluted industries
13.	Commercial Centre	Small	Commercial centre comprises upon 10 shops
		Medium	Commercial centre with 11-30 shops

		Large	Commercial centre with more than 31 shops
14.	Categories of Migration	High	Migration to the area within last ten years
		Medium	Migration to the area for 10-20 years back
		Low	Migration to area for 21 to 40 years
15.	High Density Living	Low	1-3 person/habitable room
		Medium	4-5 person /habitable room
		High	6 & above person/habitable room
16.	Car Ownership	Yes	Owned Car
		No	Not Owned

RESULTS AND DISCUSSION

The results of the primary data were recorded simultaneously on day to day basis. For the purpose of comprehensive data analysis, computer software namely Statistical Package for Social Sciences (SPSS) was used. The related tables are shown below:

Table-2: Environmental Degradation in Study Area

Sr. No	Environmental Degradation		
	Category	**Frequency**	**Percentage %**
1.	Low	8	16
2.	Medium	24	48
3.	High	18	36
	Total	**50**	**100**

Source: Field Survey

Table-2results show that most part of the metropolitan area is inflicted in medium size of the environmental degradation.

Table-3: Migration to Study

Sr. No	Migration to Study Area		
	Category	**Frequency**	**Percentage %**
1.	Low	2	4
2.	Moderate	10	20
3.	High	2	4
4.	No Migration	36	72
	Total	**50**	**100**

Source: Field Survey

Table-3 shows that 72% people either belong to this area or migrated at the time of partition.

Table-4: Distribution of People to their Respective Category

Sr. No.	Distribution of People		
	Persons / Habitable room	**Frequency**	**Percentage %**
1.	Low (1 - 3)	34	68
2.	Medium (4 - 5)	13	26
3.	High (6-- above)	3	6
	Total	**50**	**100**

Source: Field Survey

Table-4 shows that low category, i.e. 1-3 persons/habitable room constitutes a dominant part in the study area .

Table-5: Car Ownership in Study Area

Sr. No.	Category	Frequency	Percentage %
1.	Owned	10	20
2.	Not Owned	40	80
	Total	**50**	**100**

Source: Field Survey

Table-5 shows that most of the people, i.e. 80% do not own personal cars. The results clearly indicate that vehicle ownership is quite low.

Table-6: Testing of Hypothesis-a

Observed values

Environmental Degradation Migration to Study Area	Low	Medium	High	Total
Low	0	2	0	2
Medium	0	6	4	10
High	1	1	0	2
No Migration	7	15	14	36
Total	**8**	**24**	**18**	**50**

Degree of Freedom = (4-1) x (3-1) = 3x2=6

$X^2_{(Cal)} = 6.92$ $X^2_{(.05)} = 12.92$

$X^2_{(Cal)} < X^2_{(.05)}$

So the Null Hypothesis which states there is no relationship between environmental degradation and migration to study area is accepted.

Table-7: Testing of Hypothesis-b

Observed values

Environmental Degradation Density	Low	Medium	High	Total
Low	6	16	12	34
Medium	2	8	3	13
High	0	0	3	3
Total	**8**	**24**	**18**	**50**

Degree of Freedom = (3-1) x (3-1) = 2x2=4

$X^2_{(Cal)} = 6.5$ $X^2_{(.05)} = 9.48$

$X^2_{(Cal)} < X^2_{(.05)}$

So the Null Hypothesis which states that there is no strong relationship between environmental degradation and high density living in metropolitan area is accepted.

Statistical results show that Null Hypotheses i, ii, iv and v are accepted whereas Null Hypothesis, i.e.iii, is rejected which means a strong correlation exist between environmental degradation and commercial activity which is being carried out at the core of city. So the paramount cause of environmental degradation is concentration of commercial activity at core of city. Moreover, the results show that population of the case study area is increasing at high pace. Migratory trend indicates more densification to over dense areas. Likewise, increasing air pollution in undated urban environment and lifted degradation level into medium and high categories. Similarly, 80% of inhabitants of the study area don't own personal car and deficient linkages of public transport to the area cost them heavily.

Based on above results, there is a need to stop extension in existing commercial centres. The existing extensions not only has increased congestion but also proved an absolute impediment in the decentralization process.

Commercialization in land use policy needs to be reviewed. Moreover, spatial plan of the entire city district may be prepared with focussed self-sufficient commercial nuclei. These nuclei may be aligned with already under constructed ring road that has connections with the existing arterial roads. Apart from this the existing whole sale market within core of the city may be shifted at some suitable place along the ring road.

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