ASSESSMENT OF ENVIRONMENTAL CONDITION OF DHAKA SOUTH CITY CORPORATION (DSCC) USING MULTI-CRITERIA ANALYSIS

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Abstract: Dhaka is one of the rapid growing cities in the world with several environmental problems. For these problems, the city has been identified as one of the worst livable cities of the world. There are two city corporations in Dhaka: Dhaka North City Corporation (DNCC) and Dhaka South City Corporation (DSCC). The environmental condition of DSCC is deteriorated because of dearth in open space, vegetation and water body as well as for inadequate service facilities like water supply and waste management. In this study, assessment of environmental condition of wards (administrative unit) of DSCC using Multi-criteria Analysis has helped to perceive the comparative environmental scenario of different wards. Environmental criteria are categorized into Primary Tier Criteria (PTC) and Secondary Tier Criteria (STC). The weightage of the selected criteria has been obtained using expert opinions and Analytical Hierarchy Process (AHP). Ward basis data for selected criteria has been collected from different secondary sources. Using these data and weightage values of selected criteria, the score values for 54 wards of DSCC has been calculated. With this score value, we analyze inter-ward comparison and overall assessment of environmental condition of study area. We rank and classify the wards using these score values. From the analysis, we found that the environmental condition of most of the wards of DSCC is abject. Especially condition of wards is inferior considering natural aspect of environment since many wards do not have any open space, water body and vegetation area within their boundaries.

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INTRODUCTION

Bangladesh is one of the highly populated countries with a very low land-man ratio. Since Dhaka is the capital of this country, it becomes the hub of economic growth and industrialization. It was designed to accommodate one million people at best in the '60s which is having now more than twelve million people (Khan, 2009). Nearly four lakh people annually migrate to the capital from rural area in search of better employment and livelihood. Most of them end up as slum dwellers due to uneven resource distribution and lack of opportunities in other cities (Ishtiaque and Ullah, 2013). Dhaka has been ranked as second least livable city among whole world by Economist Intelligence Unit (EIU) in 2015 (The Daily Star, 2015).

Once Dhaka was called the 'Venice of the Orient' because of its large open spaces with the lushness of nature but with the passage of time and advancement of urbanization all its natural beauty and open space has become rare scenario. Statistics says old Dhaka has only 5% and in new Dhaka 12% of land is green and open (Khan, 2009). Urban population increases because of rural-urban migration, so to accommodate the city dwellers, many wetlands, water bodies and open spaces have been converted into residential and commercial land uses. Loss of wetlands, open space and vegetation area etc. has a substantial effect on environment. Water logging and flood hazards are one of most common phenomena due to this type of losses (Tawhid, 2004). Besides this, population growth increases pressure on existing water supply, sanitation, drainage system and waste management. Moreover poor condition of sanitation system in Dhaka has negative impact on drainage and surface water supply since 98% of untreated sewers are discharged in storm drain or nearby water body (Water and Sanitation Program, 2014). This entire phenomenon is responsible for inimical environmental condition of Dhaka city. Between Dhaka North City Corporation (DNCC) and Dhaka South City Corporation (DSCC), the condition of DSCC is worse because of lack of open space, water body, poor drainage management etc. So in this study, we have assessed environmental condition of wards of DSCC which will help to anticipate the actual environmental circumstance of DSCC. The objectives of the study are to identify different criteria for assessment of environmental condition of different wards, to weight the selected criteria on the basis of expert opinion and to rank different wards of DSCC on the basis of selected criteria.

Multi-criteria analysis is the widely used technique for assessment of environmental condition, land suitability analysis and sustainability analysis of a particular area. Kashem, Shabnam and Talukdar (2005) performed a research on sustainability of development trends in the urban fringe. In their research, they evaluated sustainability using Multi-Criteria Analysis (MCA) in north-eastern urban fringe area of Dhaka city. They used three main category of sustainable development (environmental, social and economic) as Primary Tier Criteria (PTC) and 28 Secondary Tier Criteria (STC) under these PTC. STC were weighted under their respective PTC using Analytical Hierarchy Process (AHP). Sustainability Impact Value (SIV) for each STC was found from survey of local respondents, field survey in the study area and analysis of secondary data. The study represented that the area experienced highly negative environmental sustainability based on their impact value.

Dai, Lee and Zhang (2001) studied on GIS-based geo-environmental evaluation for urban land-use planning where they used GIS data for deriving large amount of spatial information. Multi-criteria analysis was performed to evaluate development suitability for various land-use categories according to applicably measured and weighted factors. Suitability map for each land use category were prepared using an algorithm, which combines factors weighted linear combinations. Chen (2014) conducted a study on GIS-based multi-criteria analysis for land use suitability assessment in City of Regina where he used Multi-criteria Decision Analysis (MCDA) approach for visible assessment of current land use in Regina. He incorporated both geographical data and stakeholders' preferences into enumerated values for assessment. He assigned different weight to obtain a total score of every region using weightage index formula. Finally a map with five suitability level (least suitable, less suitable, medium suitable, suitable, most suitable) has been prepared for the city. So in this study, we have used Multi-criteria Analysis for assessment of environmental condition of wards of DSCC.

MATERIAL AND METHODS

Identification of Criteria

To identify different criteria influencing the environment condition, a number of literature and reports was studied. Two tier criteria were identified, one was Primary Tier Criteria (PTC) and another was Secondary Tier Criteria (STC). The following **Table 1** is showing the selected primary and secondary tier criteria for the study.

From **Table 1**, we can see that there were three primary tier criteria which were natural aspect, physical/infrastructural aspect and socio-economic aspect. Under each primary tier criteria, there were four secondary tier criteria thus total number of STC for this study is twelve. Based on these twelve STCs, we assessed environmental condition of all wards of DSCC. Indicators for STCs have been presented in **Table 1**. For example, indicator of amount of water body is considered ratio of water body compared to area of ward for our study.

Table 1. Primary Tier Criteria (PTC) and Secondary Tier Criteria (STC) with their indicators

Primary Tier Criteria	Secondary Tier Criteria	Indicators
Natural aspect	Amount of vegetation	Ratio of vegetation space compared to area of ward
	Amount of open space	Ratio of open space compared to area of ward
	Amount of water body	Ratio of water body compared to area of ward
Physical/ Infrastructural aspect	Flood Hazard	Frequency of flood occurrence (in 20 years from 1985-2005)
	Drainage	Ratio of surface/open Drainage compared to area of ward
	Sanitation	Percentage of Household having access to sanitary toilet
	Water supply	Percentage of Household having access to drinking water from tape/tube well
	Waste Management	Number of Dustbin
Socio-economic aspect	Population	Total number of population
	Housing Characteristics	Percentage of Pucca (permanent and build with solid material) household
	Number of floating people	Total number of floating people
	Number of unemployed people	Total number of people looking for job

Relative Weightage of Selected Criteria

Multi Criteria Analysis (MCA) was used for determining the relative weightage of selected criteria. Expert opinion was considered for MCA and ten experts were surveyed to find their opinion about different environmental criteria. Chosen experts are currently working in Department of Environment Bangladesh, Centre for Policy Dialogue (CPD), Department of Geography and Environment in Dhaka University, Institution of Water and Flood Management (IWFM), Department of Civil Engineering in Bangladesh University of Engineering and Technology (BUET) and BRAC University. They have vast knowledge and experience in working environmental sectors.

In MCA, experts were given different options in pairwise comparison format. One can express the relative importance of one option over another with respect to a given criterion either verbally or numerically. **Table 2** has represented both scales and their relationship. For examples, expert has been asked to compare between amount of vegetation and amount of open space criteria and to give a relative score. Again he has been asked to give relative score between amount of vegetation and amount of water body. To compare amount of open space and amount of water body, he has been requested to give another relative score between these two criteria. This process has been followed to find the relative score of all the Primary and Secondary Tier Criteria. Then using Analytical Hierarchy Process (AHP), the weightage of different environmental criteria was determined. The first step of AHP is to formulate pairwise comparison matrix from the relative score given by experts. Then the column total of each matrix has been determined. The next step is dividing the values of each column by corresponding column total for formulating conjugate matrices. Then we find the average value of each row for conjugate matrices to find average matrices. These steps were followed for all the primary and secondary tier criteria to find the average matrices. These average matrices were used for finding weightage of all STCs. To check the consistency of data, the Consistency Index (CI) and Consistency Ratio (CR) of each matrix were also prepared.

Table 2. Scales and Their Relationship

Numerical Scale	Verbal	Explanation
1	Equal preference for both options	Two options contribute equally
3	Moderate preference of one option over another	Experience and judgment favor one option over another
5	Strongly preference of one option over another	An option is strongly favored
7	Very strongly preference of one option over another	An option is very strongly favored
9	Extremely preference of one option over another	An option is favored by at least an order of magnitude difference
2,4,6,8	Intermediate values between two adjacent judgments	Used for compromise between two judgments.

Score Value for Wards of Dhaka South City Corporation (DSCC)

Ward basis data for all STCs were collected from GIS landuse map of Dhaka, satellite image and Population and Housing Census, 2011 (Community Report: Dhaka). In Community Report: Dhaka, ward basis data on sanitation, water supply, population, housing characteristics, number of floating people and number of unemployed people were found. The vegetation data of study area was collected from satellite image of Landsat 5 satellite image from Earthexplorer website in zip format. Using 'ERDAS Imagine 2014' software, the raster data of satellite image was converted into vector data to find the amount of vegetation within wards. Other ward level data of STCs were extracted from GIS landuse map using ArcGIS software. After collecting ward basis data for all the STC, composite score of twelve criteria were calculated. For positive criteria such as amount of open space, housing characteristics etc., the ward which had highest value in terms of any criteria, an assigned constant value 100 was given to that ward. The composite score of other wards were determined

corresponding to constant values of the previous ward. Therefore:

$$\text{Composite Score, } S_j = (100 * X_j)/ \max (X_k) \tag{1}$$

Composite score of negative characteristics is calculated using the following **Eq. (2)**.

$$S_j = (100* \min (X_k))/ X_j \tag{2}$$

where, S_j = Composite score of a particular criteria of ward j, X_j = Value of the particular criteria for ward j, k = Subscript for Ward varying from 1 to the number of wards in the study (54).

Using weighted index method, the score (index value) of each ward for environmental condition has been determined. The following **Eq. (3)** has been used to find the relative score of each ward based on selected environmental criteria. Thus, score or Weighted Index is obtened by:

$$\overline{S}_w = \sum (wS)/ \sum w = (w_1 S_1 + w_2 S_2 + w_3 S_3 + \ldots\ldots\ldots + w_n S_n)/(w_1 + w_2 + w_3 + \ldots\ldots\ldots + w_n) \tag{3}$$

where, $\overline{S}_w$ = Score of each ward, w_n = weightage of PTC / STC found from AHP, S_n = Composite score of each ward against criteria n derived from secondary data

Ranking and classification of wards were done using this score value. Two types of classification were conducted. In one classification, the score values were converted into z-score which was used for classification of wards of DSCC. The z score of a particular score is calculated using the **Eq. (4)**.

$$z = x - \overline{x} / \sigma \tag{4}$$

where, x = particular score value, $\overline{x}$ = average of all score value, σ = standard deviation of all score value. After determining the z-value of all wards, classification has been prepared using the following range of z-value. **Table 3** represents classification based on z score value. This classification has been used for wards of DSCC for the study.

Another type of classification was used to observe the overall environmental condition of wards of DSCC. This classification was based on final score values of wards using equal class interval. For this classification,

Table 3. Classification using z-value

Class	Range (Z-score)	Remark	Explanation
1	< - 1.50	Worst	Worst compared to average
2	-1.50 to -0.50	Bad	Worse than average
3	-0.51 to 0.50	Moderate	Average
4	0.51 to 1.50	Good	Better than average
5	>1.50	Best	Best compared to average

Table 4. Classification using equal class interval (based on final score value)

Class	Range (Final score)	Remark
1	1-20	Worst
2	21-40	Bad
3	41-60	Moderate
4	61-80	Good
5	81-100	Best

an imaginary ideal ward was considered where condition of all the STCs were best and thus final score was 100. Five classes were demarked using equal class interval for final score values. **Table 4** represents this type of classification.

RESULTS AND DISCUSSION

Weightage and Ranking of all STCs

The weightage values of all STCs were calculated using AHP. The values and ranking are given in the following **Table 5**. From **Table 5**, we can see that amount of vegetation was given highest preference by experts among the twelve STCs. The weightage of amount of vegetation is 15.28% and it is under natural aspect criterion. The second preferential criterion has been found sanitation which is under physical aspect criterion. The final weightage below of this criterion is 14.61%. Amount of water body has been identified as third prioritized criterion for assessment of environmental condition of wards of Dhaka South City Corporation. This criterion has been given a weightage of 13.48% and it is also a STC of natural aspect criterion.

Experts have been identified housing characteristics as least prioritized criterion for the study. This criterion is a STC of socio-economic aspect which has been given only 1.89% of weight. The second least prioritized criterion has been found population with a weightage of 2.86% which is also a criterion under socio-economic aspect. Waste management has been described as third least prioritized criterion in this study.

Classification of Wards using z-value

Using z-score value, 54 wards of DSCC were classified into five categories according to **Table 3** values. Classifications were done considering Natural Aspect, Physical/Infrastructural Aspect and Socio-Economic Aspect separately and considering all the twelve STCs. So four classifications of wards were conducted based on z-value. Four maps were prepared using these classifications which is represented in **Fig. 1**.

There are four Secondary Tier Criteria (STCs) in natural aspect: amount of vegetation, amount of open space, amount of water body and flood hazard. In the first map of **Fig. 1**, we can perceive that no ward has fallen in worst classification considering only natural

aspect (four STCs among it). Five wards are in best

Table 5. Weightage of Criteria and Ranking

Primary Tier Criteria (PTC)	Secondary tier criteria (STC)	Weightage (PTC*STC)	Ranking
Natural Aspect (0.1932)	Amount of vegetation (0.5401)	0.1043	1
	Amount of open space (0.2746)	0.0531	5
	Amount of water body (0.1381)	0.0267	3
	Flood Hazard (0.0472)	0.0091	6
Physical/ Infrastructural Aspect (0.7235)	Drainage (0.5579)	0.4036	4
	Sanitation (0.0569)	0.0412	2
	Water supply (0.1219)	0.0882	9
	Waste Management (0.2633)	0.1905	10
Socio-Economic Aspect (0.0833)	Population (0.5583)	0.0465	11
	Housing Characteristics (0.0661)	0.0055	12
	Number of floating people (0.1153)	0.0096	8
	Number of unemployed people (0.2603)	0.0217	7

category with z-score more than 1.50. Most of the wards (21 wards) have occupied their position in bad category. Considering natural aspect, ward no. 49 has highest score (45.286). This ward has occupied highest amount of vegetation among all other wards of DSCC. Conditions of other three criteria are also good that have given the ward first position in respect of natural aspect. Ward no. 52 has been identified as worst ward considering natural aspect. The reason is this ward has no vegetation and open space and has negligible amount of water body.

In physical/infrastructural aspect, four STCs are drainage, sanitation, water supply and waste management. In second map of **Fig. 1**, it has been observed that most of the wards have positioned in moderate category for physical/infrastructural aspect. Two wards have been placed in worst category and five wards are having position in best category. Ward no. 15 has been identified as the best ward considering physical/infrastructural aspect. This ward has obtained largest drainage network among all other wards of study area. Condition of sanitation and water supply is also better than most of the wards. On the other hand, ward no. 3 has obtained the lowest score. The ward has no drainage network and condition of sanitation is worst among all other wards of DSCC.

Four STCs in socio-economic aspect are population, housing characteristics, number of floating people and number of unemployed people. From third map of **Fig. 1**, we can see that no ward has been found in the worst category and four wards have been observed in best category. Most of the wards have positioned in bad category based on socio-economic aspect of environment. Ward no. 27 has been ranked as the best ward based on socio-economic aspect. In this ward, population is small, there is no floating person and number of unemployed people is only four which is

much lower than most of the wards. Number of unemployed people and number of floating people has been identified as respectively first and second prioritized criteria of socio-economic aspect by experts. So their lower values have placed the ward in highest rank. Ward no. 3 has been found as the worst ward based on this aspect. Reason for this resultant is housing characteristics in this ward is worst and population is third highest among all the other wards.

Fourth map of **Fig. 1** represents classification of wards based on all twelve criteria. Most of the wards (19 wards) of the study area have been classified in moderate category. Three wards have been placed in best category based on all twelve STCs selected in this study while four wards are in worst category. Ward no. 15 has highest score considering twelve STCs. The reason is the ward has second highest amount of water body and third highest amount of open space among all other wards of DSCC. The second highest score has been observed in ward no. 21 because population is less in this ward and amount of open space and water body is better than most of the wards of DSCC.

Ward no. 27 has possessed third highest score value because this is the only ward where 100% of household have access to sanitary toilet and water supply from tape/tube well source. Population, number of floating people (which is zero) and number of unemployed people is also lower than most of the wards. On the contrary, ward no. 7 has lowest score considering all the STCs. The reasons are, ward has no water body, open space and drainage facility and number of unemployed people is highest here among all the wards of DSCC. Ward no. 16 has contained the second lowest score because there is no open space and vegetation in this ward. Amount of vegetation and amount of open space has greater weightage values than most other criteria, so the ward has obtained lower score value. The third

lowest score value has been obtained by ward no. 2 as
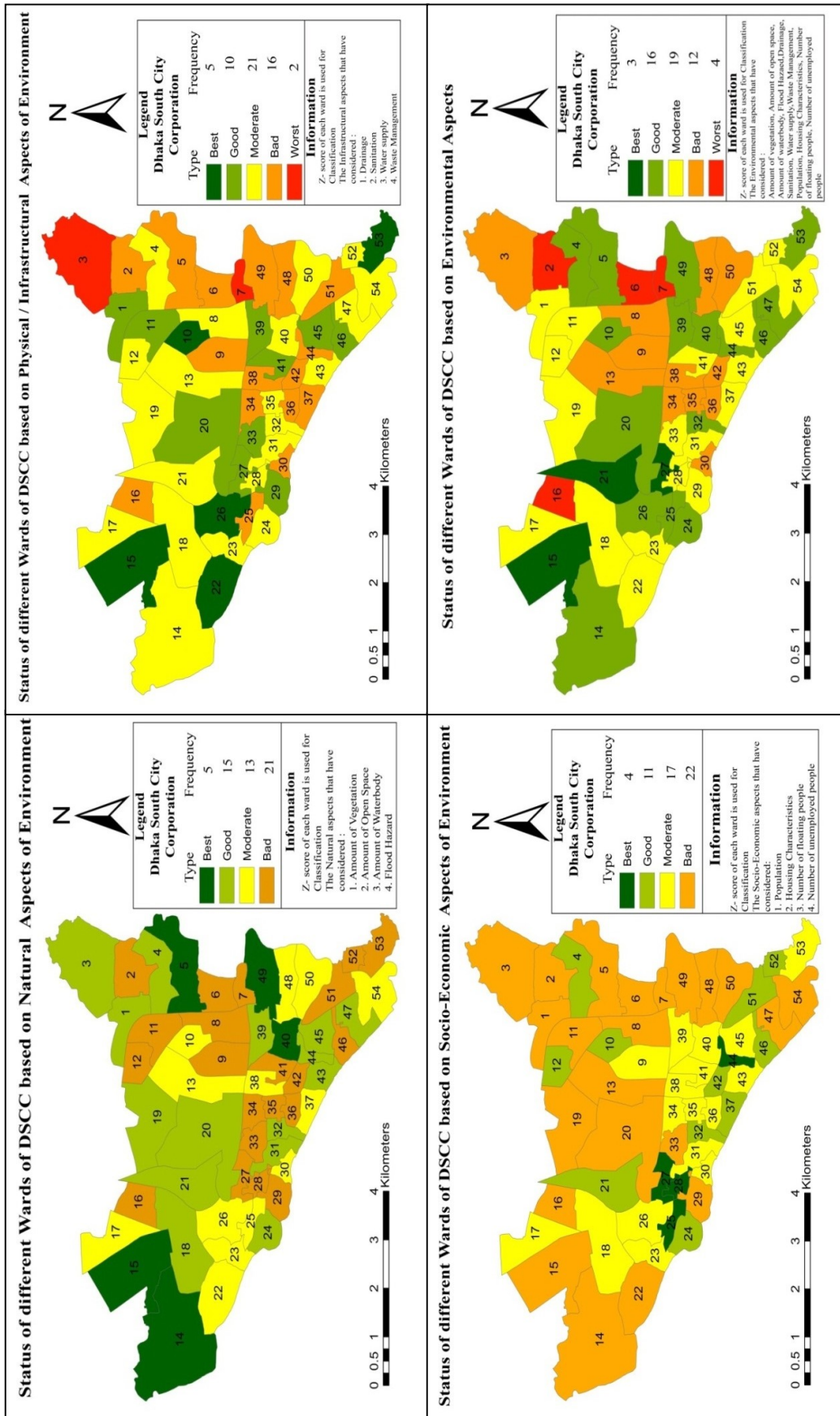amount of vegetation, amount of open space, housing

Fig. 1 Maps of DSCC wards classification based on z-score value.

characteristics, sanitation and drainage is poor compared to most other wards.

If we compare these four types of ranking of wards, we can summarize the resultant in **Table 6**. We can observe that, ward no. 15 has been in the first position for both final ranking considering twelve STCs and also considering physical/infrastructural aspect of environment. So, physical/infrastructural aspect has greater influence on placing this ward in the first position of final ranking. Ward no. 27 has been in the third position in final ranking considering twelve STCs but it is in the first position if only socio-economic aspect of environment is considered. Ward no. 2 and ward no. 7 have been identified among three worst wards considering both twelve STCs and physical/infrastructural aspect of environment. So, infrastructural aspect has greater impact on placing these wards in worst category.

Some differences of ranking have also been observed from this comparison table. Though ward no. 49 has been identified as the best ward considering natural aspect, it has been identified as second worst ward considering socio-economic aspect. Ward ranking has been varied significantly for three Primary Tier Criteria. So, it can be concluded that all the criteria are not best in one particular ward.

Overall Environmental Condition of Wards

Classification of wards based on specific z value has been conducted in the previous part. Here, another type of classification using equal class interval based on the final score value has been determined. This classification have also been done in four ways: based on natural aspect, based on physical/infrastructural aspect, based on socio-economic aspect and finally based on all the Secondary Tier Criteria (STC). These classifications are based on the imagination of an ideal ward where condition of all the STCs is best and thus final score of the ideal ward is 100. Compared to the ideal ward, conditions of wards of DSCC have been settled in five classes shown in **Table 4**. Finally four maps of Dhaka South City Corporation (DSCC) have been produced based on these classifications which represent the overall environmental condition of the study area. **Fig. 2** represents the maps.

From first map of **Fig. 2**, it has been observed that no ward has been positioned in best and good category considering four STCs of natural aspect. That means if an imaginary ward has been considered where final score would be 100, compared to that ward no ward in DSCC can be said good or best for natural aspect. Only two wards have been placed in moderate category and

most of the wards have been placed in worst category considering natural aspect of environment.

Considering four STCs of physical/infrastructural aspect, no ward has been placed in worst or bad category compared to imaginary ideal ward. Most of the wards of DSCC have been positioned in good category. Five wards have been placed in best category based on physical/infrastructural aspect of environment which can be seen from second map of **Fig. 2**. There is clear difference between second map of **Fig. 1** and **Fig. 2**.

From third map of **Fig. 2**, we can perceive that no ward has been positioned in best category considering only four STCs of socio-economic aspect of environment. So compared to imaginary ideal ward, no ward in DSCC can be said best for this aspect. Most of the wards have been positioned in bad category and three wards have been placed in good category based on socio-economic aspect. The dissimilarity between third map of **Fig. 1** and **Fig. 2** has been clearly observed.

In third map of **Fig. 1**, no ward has placed in worst category but in third map of **Fig. 2** some wards have been placed to worst category. The fourth map of **Fig. 2** represents that no ward has been positioned in best, good and worst category considering all the STCs compared to imaginary ideal ward. Most of the wards have been positioned in bad category.

Significant Findings

Two types of classifications have been represented two different types of outcomes. Classification based on z-score values has represented inter-ward comparisons of environmental conditions. These classifications have shown the distribution of wards compared to average environmental condition.

Table 6. Comparison among rankings of wards of DSCC

|	Final ranking (considering all PTCs and STCs)	Natural aspect	Physical/ Infrastructural aspect	Socio-Economic aspect
Three best Wards	1. Ward no. 15	1. Ward no. 49	1. Ward no. 15	1. Ward no. 27
	2. Ward no. 21	2. Ward no. 5	2. Ward no. 53	2. Ward no. 28
	3. Ward no. 27	3. Ward no. 14	3. Ward no. 10	3. Ward no. 44
Three worst Wards	1. Ward no. 7	1. Ward no. 52	1. Ward no. 3	1. Ward no. 3
	2. Ward no. 16	2. Ward no. 9	2. Ward no. 7	2. Ward no. 49
	3. Ward no. 2	3. Ward no. 8	3. Ward no. 2	3. Ward no. 22
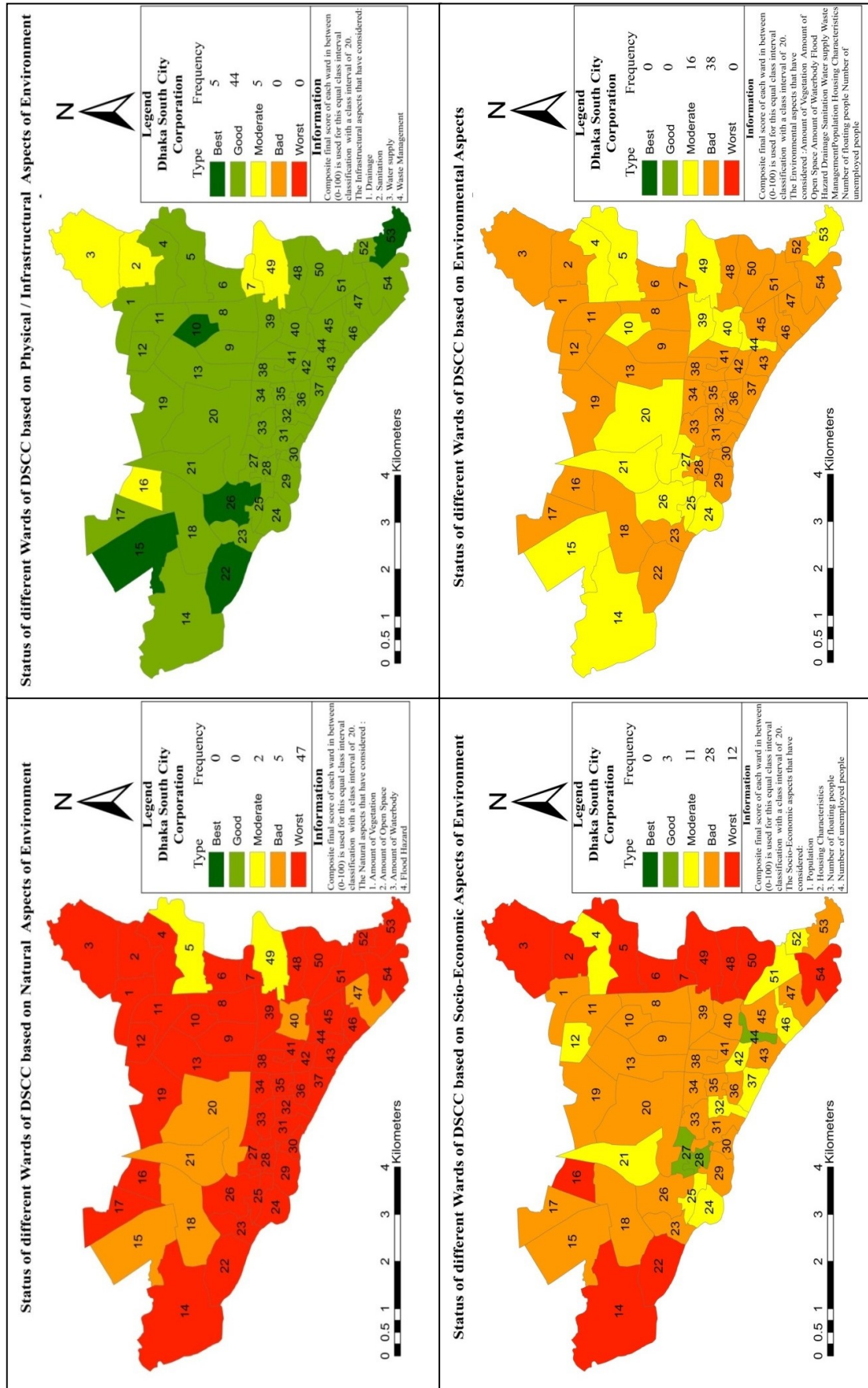
Fig. 2 Maps of DSCC wards classification based on final score value.

However, the classifications based on final score have represented the overall environmental condition of wards compared to an imaginary ideal ward. The reason behind two types of classification is that even the best ward of DSCC considering all STCs has not been identified in the good category in the classification compared to imaginary ideal ward. Compared to imaginary ideal ward where final score value would be 100, the best ward of DSCC (Ward no. 15) has only occupied less than 50% of score (final score for ward no. 15 is 47.42).

The reason for worse environmental condition based on natural aspect is that many wards do not have any or negligible amount of vegetation, open space and water body. Moreover, natural aspect has been identified as most prioritized criterion among the three Primary Tier Criteria (PTCs). So those wards have received lower score considering all the STCs.

Sanitation has been identified as second most prioritized criterion among all the Secondary Tier Criteria (STCs) of this study. It has also been identified as most prioritized criterion among the four STCs of physical/infrastructural aspect of environment. But the composite score of wards for this criterion does not vary significantly. Moreover, the composite score of water supply also does not deviate significantly for wards. These reasons influence the greatest number of wards in moderate category in the classification based on z-score values for both physical/infrastructural aspect and for all the twelve STCs.

Greatest variation in composite score of wards of DSCC has been observed for Drainage, amount of open space, amount of water body, amount of vegetation and waste management criteria. The differences between highest and lowest composite score for these criteria are 100. Among these five criteria, three are STCs of natural aspect of environment. So based on natural aspect of environment, disparity among wards are high.

CONCLUSION

The purpose of the study was to understand the environmental condition of wards of DSCC so that it can help during policy formulation. To operate a city successfully and efficiently, consideration of environment in every decision making activity is vital. But due to rapid urbanization, explosive expansion of population, poor urban planning and management Dhaka city is turning into a desert of concrete. This results in many problems such as unhealthy condition, poverty, social unrest and economic inefficiency, environmental hazards etc. Protecting and managing environmental resources are crucial to a city's goals, significant to ecosystem health and advantageous for the community. Nevertheless in case of the wards of DSCC,

condition of natural, physical and socio-economic environment is very miserable. Not a single ward has scored more than even 50 out of 100 when the final score has been calculated for all the criteria of this study. If one ward is having very good score in one environmental criterion, it is balanced by the low scores in other criterion. So the overall situation of the environment is very deprived. For some wards the amount of open space, vegetation and water body is zero from which it can be easily imagine the quality of the environment. To improve environmental condition of wards of DSCC, several steps should be taken. As many of the wards of DSCC are having no amount of vegetation and water body, it creates unpleasant heat island effect. Moreover lack of open space making it more difficult as there is no place which can be used for tree planation. 'Rooftop Gardening', a growing trend can be alternative solution which can help to improve the living environment and increase amount of vegetation (Howard, 2016). Natural environmental aspects like open spaces, water body, vegetation etc. are in great threat as every now and then the land grabbers are trying to convert these landuses in commercial, residential or industrial purposes through illegal ways by violating the master plan of Dhaka city. There are certain acts to preserve the open spaces, parks and water body of Dhaka City. The enforcement of these rules and regulations are necessary for mitigating environmental degradation. So, to protect these landuses the government agencies need to be more strict and active in using the laws and rules (Islam, et al., 2010). Decentralization of administrative institutions and other resources can help to reduce rural-urban migration and releasing enormous pressure on utility facilities (water supply, drainage, sanitation) (Labib, 2013). Disparity among wards of DSCC has been observed from this study. Some wards are neglected in housing, water supply, drainage and sanitation. So while providing new services or allocating budget for providing facilities within the city, these wards should be prioritized.

Moreover, many of the environmental aspects consider in this research has already been considered in the Sustainable Development Goals (SDG). These goals are goal 6: Ensure availability and sustainable management of water and sanitation for all, goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all, goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable, goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation, and halt biodiversity loss (The Guardian, 2015). So while making policies, the government should consider the sustainable developments goals and this

will eventually create a better living environment for the inhabitants of Dhaka South City Corporation (DSCC). Urban planner or policy makers can gain knowledge about the reason for worse environmental condition of a particular ward of DSCC from this study. To improve the environmental condition of that ward, he can give attention to the reason for solving problem. If we do not take initiatives to address these alarming problems then in very near future this city will be abandoned by the people because it will be impossible to live here.

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