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Traffic Congestion in Dhaka city: Suffering for City Dwellers and Challenges for Sustainable Development

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Abstract: The most demanding and contradictory issues in Dhaka city management in the current decade for Bangladesh is the road traffic congestion. In this paper, the focus is on the comprehensive understanding of the impact of traffic congestion on urban dwellers in Dhaka city to get a critical point of view to investigate the relationship between road traffic congestion and urban dwellers suffering and vulnerability. Specifically, this paper attempts analyze the causes and consequences behind traffic congestion in the Dhaka city of Bangladesh through an integrative perspective. The study is intended to explore how traffic congestion creates a social problem and affect on our economic, social and health of urban dwellers in Dhaka city. However, the most participants recognized private car, illegal parking, faulty traffic signaling systems, Overtaking tendency of drivers, violation of traffic rules and VIP protocol maintaining as the main reason for traffic congestion. Overall, this study contains an analytical discussion of social, economical and health impact of road congestion problem in Dhaka city. It also assists policy maker, government and users with planning, perception, analyzing and decision making to improve the convenience, safety and efficiency of travel.

Keywords: Traffic Congestion, Sustainable Development, Suffering and Challenges.

Introduction

Traffic congestion is very common state of affairs and it has turn into normal phenomena in Bangladesh especially in Dhaka city. It is obstructing trade, commerce and our personal life as well. The most common example is the physical use of roads by vehicles. When traffic demand is great enough that the interaction between vehicles slows the speed of the traffic stream, congestion is incurred. Dhaka has the diverse significance in the national and regional city hierarchy. Governmental functions and all other functions are over determined in this capital city. The Dhaka city's traffic system is regarded as one of the most disorganized ones in the world. The inhabitants are forced to endure physical, mental stress, pressure and put up with economic losses in terms of man-hours lost on working days.

With over 18 million people, Dhaka is regarded as the biggest and most heavily inhabited cities in the world (UN, 2016). Its fast expansion has created many challenges, obstacles and the traffic congestion is the most familiar amongst these. Although Dhaka has become as the Asia's least mechanical capitals, its traffic congestion is the worst and steadily deteriorating. Last five years over 4.2 lakh motor vehicles have been registered and enrolled in Dhaka, yet the city is facing lack of road-space (Ahamed et al., 2016).

Dhaka is the capital of Bangladesh which located at South Asia and it is known as the world's 11th largest megacity (United Nations: New York, NY, USA, 2016). It has achieved its name as the fastest-growing megacity in recent times (Hossain, 2013). If we see it geographically, the central part of Dhaka city (belonging to Dhaka City Corporations—North and South) lies between 23.69° and 23.89° North latitudes and 90.33° and 90.44° East longitudes (Corner & Dewan, 2014). The core city covers about 127 km^2 of land area (Bhattacharjee, & Khan, 2017). However, the Dhaka Metropolitan Development Plan spans a bigger area of 1528 km^2 (termed as Dhaka Megacity) by foretelling growth spill into six surrounding municipalities (Kadamrasul, Gazipur, Narayanganj, Siddirganj, Savar and Tongi) to form the megacity.

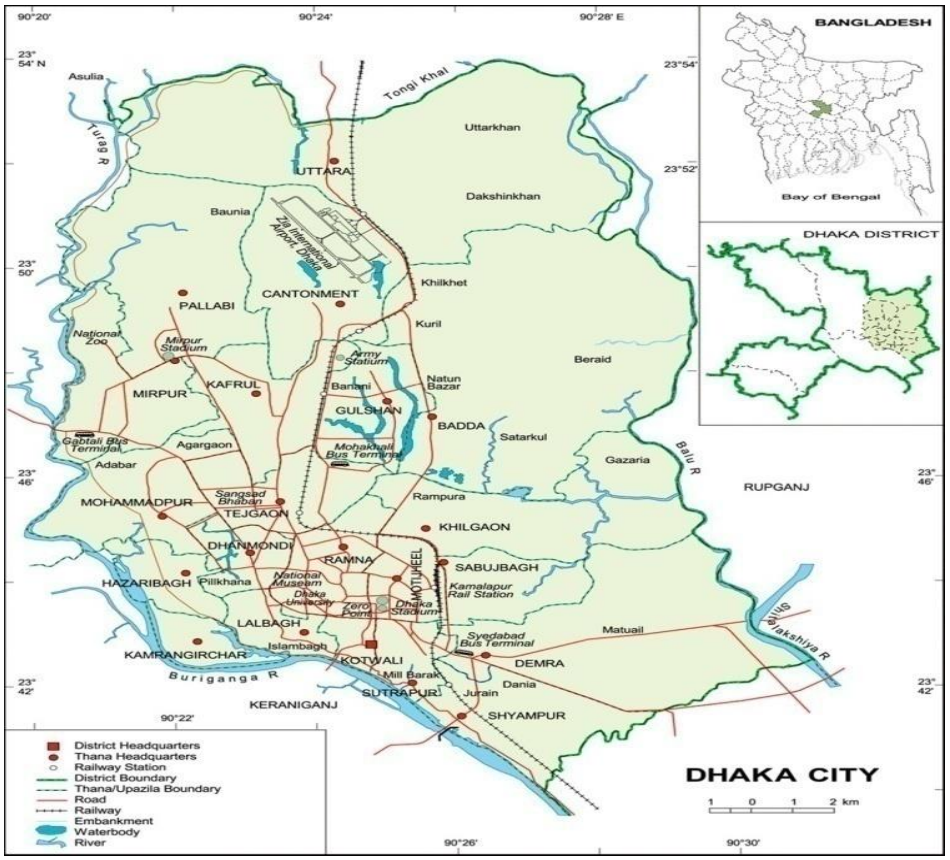

Figure 1. Map of Dhaka City.

Around 18.2 million people live Dhaka megacity and this number is predictable to arrive at 22 million by 2025, at an annual growth rate of 4.4% (United Nations: New York, NY, USA, 2016; Rajdhani Unnayan Kartripakkha et al., 2015). About 63% of the total population growth is coming by in-migration, and the remaining growth is causing to normal increase (Rajdhani Unnayan Kartripakkha et al., 2015). Dhaka megacity is regarded as one of the most over populated cities of the world having a density of 11,910 persons per km^2. The density is sufficient in the center region of the city (Dhaka North City Council (DNCC) and Dhaka South City Council (DSCC) area), which has considerably enlarged from 34,629 per km^2 in 2001 to 49,182 per km^2 in 2011, creation it an congested and not fit to live in living environment (Corner & Dewan, 2014). The population data also remembers that 40% of the total population represents reliant age groups, most important to a high dependency ratio and prevalent poverty among low-earner groups in the city (Mridha & Moore, 2005). The key demographic features of the megacity along with the past movement of population expansion are represented in Table1.

Table 1. Demographic characteristics of Dhaka megacity.

Year	Total HH	Population	Density	Sex Ratio (M/F)	Literacy Rate	HH Size	Growth Rate (%)
1951	NA	411,279	4815	165	–	6.4	–
1961	127,710	718,766	5796	154	–	5.6	–
1974	341,167	2,068,353	6156	137	–	6.1	11.15
1981	527,311	3,440,147	8547	139	48.1	6	5.22
1991	1,088,378	6,487,459	4795	126	57	5.4	6.55
2001	1,920,682	9,672,763	7055	125	65.1	4.6	4.08
2011 [a]	3,232,683	14,509,100	10,484	113	67.3	4.1	–
2016	4,550,000 *	18,200,000	11,910	-	-	4.0	-

Note: HH = Households (BBS. *Population Census—2001*); [a] Derived from BBS (BBS. *Population and Housing Census 2011*); * Estimated from UN (United Nations: New York, NY, USA, 2016).

Dhaka consists of two city corporations, one Dhaka North City Corporation (DNCC) has an area of 83 km^2 adding a population of 3,957,302. Dhaka South City Corporation (DSCC), on the other hand, has a minor area of 45 km^2 accommodating 2,288,812. The key demographic and urban features of the city corporations are listed in Table 2.

T**able 2.** The key demographic and urban features of Dhaka City Corporation's area.

Description	DNCC	DSCC	Total
Area	83 km^2	45 km^2	127 km^2
No. of Ward	36	57	93
Population	3,957,302	2,288,812	6,246,114
Population density	47,886/km^2	50,862/km^2	49,182/km^2
Holdings	172,254	122,780	295,034
Markets	43	78	121
Community Centre	13	36	49
Park	42	27	69
Play Ground	55	9	64
Public Toilet	37	28	65
Hospital/Clinic	239	193	432
Annual budget (2015–2016)	$USD (M) 202	$USD (M) 263	$USD (M) 465

Sources: Bhattacharjee and Khan (Bhattacharjee & Khan, 2017); DNCC (*Dhaka North City Corporation 2017*); DSCC (Dhaka South City Council: Dhaka, Bangladesh, 2017).

The demographic data represents that the number of male is higher than female. People come in City from all regions and areas of Bangladesh. The mass of the population, around 90%, is Muslim and 7% is Hindu, and others are various religious beliefs. About 40% of the city's population lives in 4000 slums and squats, of which the majority is female (Islam et al., 2016). The landownership system is highly contradictory. More than 70% of the city's population has no right to use to land, while only 30% possess about 80% of the land (Corner & Dewan, 2014; Hossain, 2013).

It is predicted that the future population will arise to over 26 million by 2035 (RSTP, 2015), several urban troubles have created Dhaka as one of the worst inhabitable cities in the world (EIU, 2015).Different predictions have been made concerned of the financial costs of traffic congestion in Dhaka city. One data in 2013 places the cost as high as $3.8 billion a year, mainly due to delays and ecological externalities (Khan & Islam, 2013). The RSTP for Dhaka set the cost in 2014 as high as $11.4bn per year (RSTP, 2015). The speed of traffic average daily was expected at about 21.2kph in 2004 (STP, 2005); after five years, according to the Dhaka Urban Transport Network Development Study (DHUTS, 2010) this had gone down to 15.1kph (DHUTS, 2010) and by 2015 this had fallen further to 6.8kph.Traffic congestion now suffer most of the city's road network, with traffic jams sometimes consisting several hours; often it is faster to walk than travel by motor vehicle (Revised Strategic Transport Plan (RSTP, 2015).

City transportation system helps the free movement of passenger and good which is sometimes problematic for social and economical activities. The city dwellers are growing up very quickly due to the facilities of well educations, treatment and employments. Moreover the population growth has increased the number of vehicles, travelers and goods carriers. Now the globalization and urbanization have exaggerated

travel demand in most of the countries around the world and have changed the travel systems of commuters and goods carriers in various ways (Giuliano & Wachs, 1992).

When transportation system fails to give suitable services to the people, numerous crisis arise including congestion, hindrance and subsequent secretion of pollutants .In these circumstances, policy makers and transportation experts have suggested that strategies to manage the travel demand will be more successful to solve the transportation problems rather than strategies to expand capacity or supply of the facilities (Alam & Habib, 2003).

In this paper, the focus is on the comprehensive understanding of the impact of traffic congestion on urban dwellers in Dhaka city to get a critical point of view to investigate the relationship between road traffic congestion and urban dwellers suffering and vulnerability. Specifically, this paper attempts analyze the causes and consequences behind traffic congestion in the Dhaka city of Bangladesh through an integrative perspective. The study is intended to explore how traffic congestion creates a social problem and affect on our economic, social and health of urban dwellers in Dhaka city. The following section of the article deals with the methodology of the study. Final section explains the result and discussion of the study. Last section concludes the article.

Methodology

The study was conducted by applying both the quantitative and qualitative approaches of social research. The quantitative data and qualitative information triangulated to get a comprehensive picture of the relationship between road traffic congestion and urban dwellers social suffering in Dhaka city. The study was conducted at different city dwellers both male and female from Mohamadpur area in Dhaka city of Bangladesh. In total 120 city dwellers (male 80 and female 40) were selected and interviewed total 120 questionnaire surveys in face-to-face interviews. Respondent were selected through random sampling.

Modality of Data Collection Instruments

With a view to getting a complete view of the relationship between road traffic congestion and urban dwellers social suffering, three data collection methods semi-structured questionnaire, Focus Group Discussions (FGD) and Case studies was adopted. A quantitative survey was conducted by using pre-designed questionnaire. A total of 120 semi-structured questionnaire surveys both male (80) and female (40) were conducted with city dwellers of Mohammadpur area. A total of 05 FGDs and a total of 10 case studies were conducted with a better informed group of urban dwellers in Dhaka city.

Quantitative and Qualitative Data Analysis Plan

After checking and cross-checking of the collected data, all the questionnaires will be coded and entered into excel sheet. After discussion in the FGDs and case studies, data were carefully examined, edited and transcribed. In the thematic analysis, the transcripts were implied and growing themes were selected. This framework helped to the data (indexing) using textual codes (categories) to classify specific pieces of data. Further codes were then conducted under each of the main themes, and the thematic framework was refined. The charting then was the outcome of the thematic analysis planned into these diverse themes by lifting quotes from their original circumstance and re-arranging them according to the conceptual framework of the study.

Results

To know the transport demand of diverse income groups, we studied the relation between housing and transport mode choice. Most of the urban dwellers of Dhaka live in low cost housing, slum or squatter settlements: we looked into the reasons why do people choose to live at their current location.

In a questionnaire survey of 120 transport users, 75 percent male and almost 63 percent female identified for living in city as the major reason for job facilities (Table-03). Table represents that around 48% male and 83% female are choosing city for having high status. For educational facilities around 57% male and 70 female are living city but in less rent male percentage is almost 23% and female is 30%.The number of living temporary of male is higher than female resident in city. Male percentage is almost 27% and male is 58%.

Table 3. Reason for living in current location by income group (M=80, F=40).

Major characteristic	Variable categories	Number		Percentage	
		Male	Female	Male	Female
Reasons for living in Dhaka city	Job facilities	60	25	75.00	62.50
	Educational facilities	45	28	56.25	70.00
	Medical facilities	48	22	60.00	55.00
	Low transport cost	27	13	33.75	32.50
	Permanent living	21	23	26.25	57.50
	Less rent	18	12	22.5	30.00
	High status	38	33	47.50	82.50

Source: *Field work, 2018*

Hasan Ali, 38 years old, a private employer replied;"*I come here to earn money. You know Dhaka is the only place where money is flying and you can earn more by working here".*

The table shows that male & female dwellers are living this city for medical facilities and there percentage is same. **Nabila, 28 years old, a Banker comments:**"*Most of the famous and good medial hospitals are in Dhaka. I am forced to live here to take care my family members even my cousin and relatives come to live Dhaka for treatment".*

Abul Hossian , 36 years old, an Engineer said; *My wife loves to live in Dhaka and she is fond of visiting market and restaurant but in village there is few market for buying modern dress and insufficient restaurant. She loves to gossip other about new dress and new food in Dhaka".*

Tasfia, 22 years old, a private university student said; "*Most of the street hawkers or small illegal shopkeepers are sitting on footpath beside main road. They are blocking the main road sometimes and passengers are forced to walk on the main roads that create huge traffic jam and sudden road accident in Bangladesh. Moreover, local customers are always visiting and buying daily necessaries from footpath shop and this makes block both footpath and main road".*

Ajgerali, 34 years old, a banker commented; "*Risky journey is increasing day after day. Most of the passengers are going to office, university, college. But during rainy season this type of journey can take place any accident by dropping the car on speed breaker system. Due to huge traffic jam in Dhaka city people are busy to go their destination without thinking life security and have a sudden accident in Bangladesh".*

Table 4. Summary of Interview about causes and consequences of Road traffic congestion in Dhaka City.

Causes	Consequences
Adequate license of private car	Corruption is increasing in Bangladesh through Road Transport Agency (BRTA) by providing illegal driving license.
Illegal and fitness old transportations	People are severely injuring and going to died by firing or gas destruction in public transportation
Illegal parking and illegal shops on road	Road accident, hijacking, drug users are raising.
Faulty traffic signaling systems	People are losing trust to digital traffic signal and misunderstanding about traffic rules.
Inadequate manpower and narrow road spaces	Corrupted traffic police and illegal parking due to lack of parking space are growing up.
Overtaking tendency of drivers	Sudden accident and death of main wage owner in a family affect on family members especially young child.
Drivers do not go by traffic rules	Economical activities are losing because of maintaining few traffic law and rules
VIP protocol maintaining	National time is wasting and students are suffering not going and attending school, university exam in a proper time.
Unplanned road excavating on the same road and divider problem	Patient are suffering when they are on road and planning to go hospital especially patient of operation.
Few traffic police and Violation of traffic rules	Way of earning money and space of violating traffic rules are rising.

Source: *Field Observation, 2018*

Milon Ahmed, 35 years old, a businessman replied; "*In rainy day numbers of buses are waiting for having traffic signal for a long time. Passengers and rickshaw puller are waiting to go their destination during rainy day. Traffic jam can take place in a rainy day because of having no traffic police on the road in Dhaka city".*

In the words of Sonia Akhter, 20-year-old women; "*Illegal parking and house construction materials like bricks and sand are in footpath. This is very common in Dhaka city. Pedestrians are compelled to walk on the main road that can take place any accident and sometimes traffic jam in the busy highway road".*

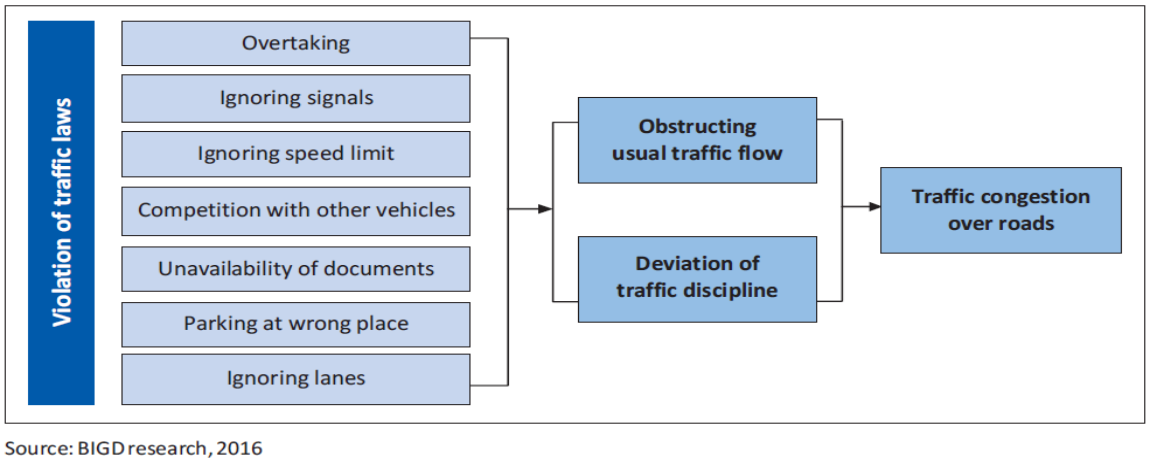

Figure 2. Flow chart of law violations and congestion.

Public transport in Dhaka City

The mass of passenger journey in Dhaka are made on public transport, including cycle-rickshaws, Tempo and CNG's, as opposed to private modes such as cars and motor cycles. Within the 'public transport' sector, buses make the major contribution. Table-05 shows 81% male and 57% female of public transport users rely on bus services 'without pre-paid ticket'. The main choice of transport for female is rickshaw (77%) and 41% for male users. **Nova, 25 years old expressed**;" *I love to go to my university by rickshaw because public transport is very congested and there is a possibility to face harassment by helper and passengers any time"* .Use of rickshaw is popular, especially for short trips, due to the heavy expenses of CNG trips and inconvenience of bus services . The lowest choice of transport is tempo/legona for female users and CNG for male users is 40% and 31% because of having frequents sexual harassment against women in public transport and male have facing low income in Dhaka city for insufficient job opportunities. Thus it is clear that a major part of Dhaka city's population is dependent on public transport; and due to high transportation costs, reliance on bus is a viable choice for most of the urban dwellers.

Table 5. Users' choice of public transport (M=80, F=40).

Major characteristics	Variable categories	Number		Percentage	
		Male	Female	Male	Female
Users' choice of transport	Rickshaw	33	31	41.25	77.50
	Tempo/Leguna	48	16	60.00	40.00
	CNG/Taxi	25	20	31.25	50.00
	Bus (without pre-paid ticket)	65	23	81.25	57.50
	Bus (with pre-paid ticket)	19	15	23.75	37.50

Source: Field observation, 2018

Impacts of traffic congestion

The responses recommend that congestion resulted in social and economic impact on their daily life. On average, more than 85% of male respondents and almost 88% female respondents claimed that extra transport costs are increasing due to traffic jam in Dhaka city. **Asma Akhter, 32 years old, a school teacher expressed;** "*I cannot travel by bus as it is very congested and bus cannot go faster because of plenty of traffic jam in Dhaka city. To go to my school on time I have to rend a rickshaw almost every day and I have to pay more money*

during rainy reason". Harassment is increasing in public transportation at present. Sexual harassment against women passengers are very common phenomena in public transportation. Table represents that 80% female and 15% male respondent are harassed by bus helper, common passengers and traffic police. Women are sexually harassment by young boys and bus helper during sitting on seat and collecting bus rent. Most of the time bus helpers are demanding high bus rent from women users and there is a common scene in public bus to make quarrel with female passers for sitting arrangement. **Asma khan, 22 years old, a university student replied;** "*You know that every bus has a specific sit for women although most of the time people do not follow the rules. One day I made quarrel with a middle age man for sitting female sit in bus but he used slag and revoked me, Nobody pays attention to my argument even bus helper do not help me".* Almost 48% female and 34% male users are in mental pressure for traffic jam. Female users are facing high dust allergy problems almost 38% rather than male users almost 23% for traffic congesition.60 % female passers are unable to attend social events for having traffic jam in Dhaka city. Male (70%) and female (45%) remember that traffic congestion is just waste of valuable time.

Table 6. Impacts of traffic congestion (M=80, F=40).

Major characteristic	Variable categories	Number		Percentage	
		Male	Female	Male	Female
Impacts of traffic congestion	Mental Pressure	27	19	33.75	47.50
	Headache	33	16	41.25	40.00
	Dust allergy	18	15	22.50	37.50
	Digestion problem and Dehydration	25	09	31.25	22.50
	Harassment	12	32	15	80.00
	Unable to attend social events	30	24	37.50	60.00
	Waste of time	56	18	70.00	45.00
	Extra transportation cost	68	35	85.00	87.50

Source: Field work, 2018

Thus traffic congestion has a huge negative impact on the living standards of the city-dwellers. That is the reason most of the people are choosing housing to live close to the work place. The impact of traffic jam on Dhaka City cannot be described in a word. Due to traffic jam we are losing money in four ways – Loosing man-hours, Extra transportation cost, Extra fuel consumptions, Vehicle operating cost and Miscellaneous cost. Impact on health includes Breathing problem, Headache, Mental stress, Hearing problem, unexpected sweating, Tiredness, Eye problem, Suffocation, Respiratory problem, Puking, Heart disease, Fever, Dust allergy, Digestion problem and Dehydration. There are many social impacts of congestion: for example, irritation and stress reduced social activities, negative influences on choice of transport and location of residence, employment or business, and so on.

Implication for sustainable development policy

Policy planers have a well strategy to construct Dhaka a inhabitable and more flexible metropolis, the problems should be solved competently and collaboratively. The premise of the framework supports a holistic approach to address the emerging urban issues that prevail in megacities.

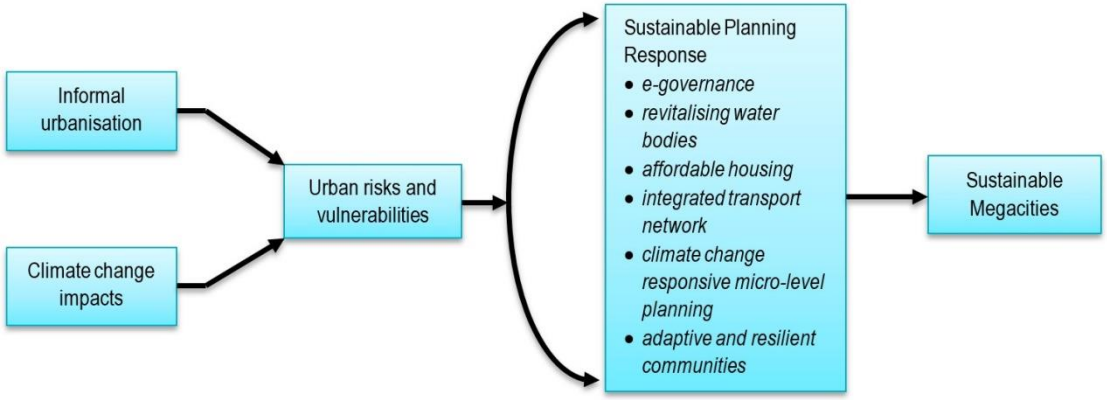

Figure 2. Framework for the sustainable urban development in megacities.

We know that city planning systems in Bangladesh are inclined by politicized patron-client networks and bureaucracy. The change from city management to modern urban planning practice permits that a many opportunities to improve local institutional capacities and systems may have been wasted. As European colonizers left, "western" systems continued to be incorporated, taking the focus away from the need to adopt, augment, and revive traditional governance and administration systems. The challenge of dealing with an unprecedented influx of refugees and migrants could largely explain why urban administrators opted for the imported state-of-the-art planning technology to handle large problems through equally large-scale plans. Consequently, knowledge of the local context or cultural sensitivity did not significantly temper the planning approach. A good-governance framework also suggests formal access to the information of land, property and housing. There is a growing demand in improving e-government to ensure efficient information management and effective urban service delivery systems (Doytsher et al., 2010).

Finally, while the megacities in developing countries are not the major contributors of greenhouse gas (GHG) emissions, there is a "growing exposure and vulnerability of these cities to climate change, due to a combination of poor socio-economic conditions and inefficient urban planning and management" (Roy, 2009). It requires sound land-use planning and consensus-based implementation mechanisms to stop the trend of informal urbanization process. In addition, regenerating alternative urban centers can be useful to decentralize the flow of rural-urban migration. A number studies suggest various adaptive measures including urban agriculture for food security during a disaster period, prioritizing risks and vulnerabilities to take graduated actions, and practicing more inclusive planning for local decision making (Hunt & Watkiss, 2011). A new wave of literature highlights the importance of improving social networks of individuals with relatives, immediate neighbors and local institutions, which has potential for making communities more resilient and capable of fast recovery from shocks (Islam, 2012; Walkerden, 2014). However, it is imperative to ensure integration among all the sectors to achieve a sustainable growth within the current urban context.

Conclusion

Getting a good urban transport system we believe Dhaka City Corporation and our local government should think rising its public transport fleet-buses and double dickers. Dhaka should consider permitting a small lane for Bicycles and free walk spot and it should set up a campaign to compose it popular. If people initiate using bicycle for commuting short distances, this can hugely diminish difficulty on buses, taxies and rickshaws. Besides this, cycling is healthy for environment and human body fit as well as it can remain the city dwellers healthy. It is clear that growing traffic congestion does enforce expenses upon not only users but also on the whole economic and social activities and finally have an effect on national income.

Conflict of interest

The authors declare no conflict of interest.

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