

# Building Setback Scenario in Different Sized Plots of Planned Residential Area: A Case Study on Nirala Residential Area of Khulna City, Bangladesh

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## Abstract:

Setback is a regulation which controls the spacing between buildings to have adequate solar exposure and ventilation. Houses maintaining building setback ensure privacy between two consecutive buildings, ease in providing utility services and also enhance the aesthetic view of the residential areas. Setback allows room for lawns and trees and to serve as infiltration areas for storm water runoff. Khulna is the 3<sup>rd</sup> largest industrial city of Bangladesh having a population of about 1.5 million on its 45.65 sq. km. area. Nirala residential area is an old planned residential area of Khulna city where mainly the higher income people live for its various livable benefits. It has a population of about 3,000. Total area of this residential area is 67.31 acre. The residential area consists of 20 access roads and 300 residential buildings, most of which are 3 to 5 storied. The paper aims to explore the status of setback violation and compliance in the buildings, to find out the different uses of building setback area, the problems that the dwellers are facing for non-compliance of building setback; and to draw some recommendations for compliance of buildings towards better living environment. Three distinct category plots i.e. 3 *Katha* (4.95 decimal), 4 *Katha* (6.60 decimal) and 5 *Katha* (8.25 decimal) are considered for the study. A field survey among the house owners of 10% of the total buildings i.e. 30 buildings through questionnaire and face-to-face interview was conducted to collect necessary primary data. Building Construction Rules 1996, Khulna City Master Plans and Detailed Area Plan of Khulna Development Authority (KDA), newspaper clippings, journal and conference papers etc. are reviewed. Interviews of concerned stakeholders i.e. Planners, Architects, Civil Engineers, Ward Councilors are conducted to know the status of maintaining setback by the building owners. It is found that greater number of respondents in the area i.e. 20 % of their buildings have no setback area basically for 3 *Katha*, 4 *Katha* and 5 *Katha* plots. This is because; most of the households try to ensure optimum use of space due to scarcity of land and high land price. The major reason behind this circumstance is weak enforcement of law, which allows people to violate the rules. KDA should take necessary step to make the owners bound to follow proper setback while constructing the buildings for ensuring a better, healthy and vibrant life in Khulna City.

**Keywords:** *Khulna Development Authority, Building Construction Rules Building Setback, Planned residential area, Different sized plots.*

## 1. Introduction

Houses tend to maintain a certain distance from the street or sidewalk, a certain distance away from their adjacent neighbours, and have a certain depth of yard. This spacing is called a setback and is the required distance that a building must be located away from the streets, easements, and other structures. Absence of proper setback in residential areas deteriorates the aesthetic view of buildings and streets. Private buildings in individual level are grossly responsible for illegally maximizing the floor space of their buildings and violating the setback rules (Building Construction Rules, 1996). Primarily, it creates difficulties for the residents in maintaining privacy between neighbours and providing space for light and air circulation. This results in ill-ventilation and damp residential buildings which further creates various health hazards for residents. However, a setback rule as an important part of zoning

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regulation not only preserves a neighbour's privacy and light, but also provides emergency access around the property. The size of the setback is determined by a municipality's Planning and Zoning authority and the size of the setback depends on various conditions.

Khulna is the 3<sup>rd</sup> largest city with an annual growth of 5.1% (Henderson, 2002). The city is getting urbanized day-by-day due to its growing population. In next decade, the growth of the city is likely to increase rapidly. So, it is high time to control the planned growth of the city as per the regulations prescribed by Khulna Development Authority (KDA). However, like other development authorities, KDA follow regulations of building setback described in the Building Construction Rule, 1996. But, for Dhaka City, there has been a separate rule for building construction which is known as Mohanagar Imarat Nirman Bidhimala, 2007 (Amended in 2008). It provides more authority to RAJUK, clear-cut responsibility to monitor the development of the city, spread out the responsibilities to various actors, spell out the responsibilities of building designers, structural engineers, site supervisors and the penalties if they fail.

As a developing country with massive population and poor economic situation, Bangladesh is facing an immense difficulty to ensure adequate housing for all or affordable housing for all. Housing is one of the basic needs for human. For rapid growth of population and urbanization, residential areas and residential buildings are increasing largely sometimes in a wrong way. Bangladesh is facing problem to provide adequate housing for all (Khan, 2008). As a result of it, several planning regulations to control building construction like Building Construction Rule 1996, Mohanagar Imarat Nirman Bidhimala 2004 etc. are introduced. But, the promoting rules are being violated by many of the owners of the houses though they are also the most sufferers with inadequate living facilities.

The study aims to explore the present scenario of setback practice in Nirala Residential Area and compliance of setback standards as per Building Construction Rule, 1996. Moreover, the research can be a precaution for the future landowners to encourage them in practicing setback rules during building construction. The findings of the research may help future researchers in related researches.

## 2. Objectives of the Study

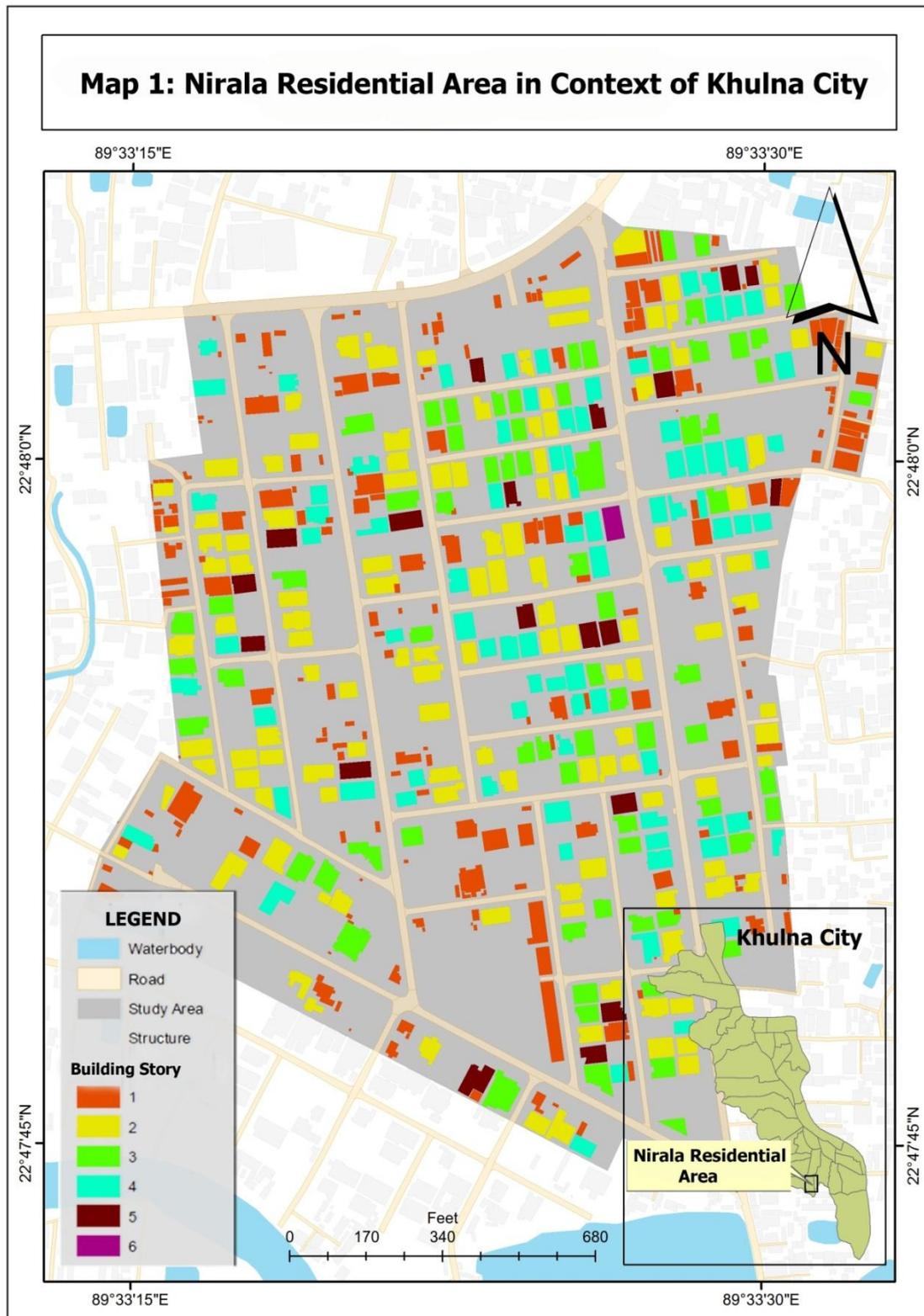
Objectives of the study are:

- To find out the status of setback violation and compliance in the buildings of Nirala Residential Area
- To find out the different uses of building setback area
- To explore the problems that the dwellers are facing for non-compliance of building setback and
- To draw some recommendations for compliance of buildings towards better living environment.

## 3. Nirala Residential Area as a the Study Area

Nirala Residential Area is an old planned residential area of Khulna. It is located at the southern side of Sher-E-Bangla main road in Ward No. 24 of Khulna City Corporation. The residential area has about 3,000 population (Ray, 2012). Among the 595 plots, 300 plots have residential buildings (mostly having 3 to 5 stories), 25 plots have commercial buildings and the rest of the plots are vacant. Various types of community facilities that are generally found in a planned residential area are available in the area. The facilities include health, clinic, market, mosque, bazar, park, community centre etc. (Ray, 2012). There are 22 access roads linked with all the plots. The roads are finally connected to the Sher -E-Bangla road. Map 1 shows Nirala Residential Area where different colour of blocks represents different

building story. As example, green colour represents 3 story buildings. There are 46 one story buildings,133 two story buildings, 63 three story buildings,18 five story buildings, 5 six story buildings, 2 eight story buildings and 1 nine story building in Nirala Residential Area.





#### 4. Methodology of the Study

Nirala Residential Area of Khulna City is selected as the study area. Plots of 3 *Katha*, 4 *Katha* and 5 *Katha* land are considered for this study. A reconnaissance survey for getting an overall idea of the area and issues under the study was conducted before starting the household questionnaire survey. A field survey among the house owners of 10% of the total buildings i.e. 30 buildings through questionnaire and face-to-face interview was conducted to collect necessary primary data. The data includes size of the plot, educational status and occupation of the house owner, building designer, existing scenario of setback practice, use of setback area, problems faced by the dwellers, suggestions for compliance of building setback etc. Secondary data was collected from review of Building Construction Rules 1996; Khulna City Master Plans and Detailed Area Plan of Khulna Development Authority (KDA); newspaper clippings; journal and conference papers etc. Interviews of concerned stakeholders i.e. planners, architects, civil engineers, Ward Councilors were conducted to know the status of setback maintenance by the building owners. Data are analysed by the SPSS (Statistical Package for the Social Sciences) Version 20. Several analyses were made on different factors influencing setback violation. These factors include different uses of setback, extension of buildings at the upper portion, vegetations and greeneries in the setback area, percentage of setback without softscape and so on. All these factors have developed a relation with setback showing how they influence violation or obedience of setback rules.

#### 5. Results and Discussion

Setback may be defined as open space around a building. The land contained in the setback belongs to the owner of the property. The amounts of setback for different sized plots are defined in Building Construction Rule, 1996. Four groups of plots are described there. Setback for 3 *Katha* plots are found in the serial no. 2, 4 *Katha* plots are in the serial no. 3 and 5 *Katha* plots are in the serial no. 4 of Table 1.

##### 5.1. Status of Building Setback in Different Sized Plots

This study focuses on three sizes of plots that are 3 *Katha* (4.95 decimal), 4 *Katha* (6.60 decimal) and 5 *Katha* (8.25 decimal). As Table 1 presents, different size plots show separate relation with front setback, side setback and rear setback.

Table1: Minimum setback standard in Building Construction Rule, 1996

Sl. No.	Plot Size ( <i>Katha</i> or Decimal)	Rear Setback (Meter or Feet)	Side Setback (Meter or Feet)
1.	Up to 2 <i>Katha</i> (Up to 3.30 Decimal)	1.00 meter (3.28 feet)	0.80 meter (2.62 feet)
2.	2 <i>Katha</i> to 3 <i>Katha</i> (3.30 to 4.95 decimal)	1.00 meter (3.28 feet)	1.00 meter (3.28 feet)
3.	3 <i>Katha</i> to 4 <i>Katha</i> (4.95 to 6.60 decimal)	1.50 meter (4.92 feet)	1.00 meter (3.28 feet)
4.	Above 4 <i>Katha</i> (Above 6.60 decimal)	2.00 meter (6.56 feet)	1.25 meter (4.10 feet)

Source: Building Construction Rule, 1996.

The minimum standard of front setback for all categories of plots is 4.92 ft. (Dhaka Metropolitan Building Construction Rule, 2008). The minimum standards for rear and side setback for different sizes of plots are given in Table 1. If Table 2 and Table 3 are compared then it is found that most of the buildings in Nirala Residential Area do not follow the minimum standards.

Existing side setback scenario is presented in Table 2. Most of the houses in Nirala Residential Area did not follow minimum standards side setback. Sometimes, the owners use side setback as their entry to houses and extend the building from the second or third floor (Figure 7). It is found from the Table 2 that 25% buildings on 3 *Katha* land did not have any side setback within their building premises.

Table 2: Existing side setback of the buildings in Nirala Residential Area

Maintained setback	No. of buildings in different sized plots						Total no. of buildings	Percentage (%)
	3 <i>Katha</i>		4 <i>Katha</i>		5 <i>Katha</i>			
	No.	%	No.	%	No.	%		
No setback	2	25.00	1	10.00	3	25.00	6	20.00
Up to 3 ft.	5	62.50	6	60.00	4	33.33	15	50.00
3-4 ft.	1	12.50	3	30.00	4	33.33	8	26.70
4-5 ft.	-	-	-	-	-	-	-	-
Above 5 ft.	-	-	-	-	1	8.34	1	3.30
Total	8	100.00	10	100.00	12	100.00	30	100.00

Source: Field Survey, 2015.

Here, it is clear that the tendency of violating side setback standards is more prominent among people having less land. The tendency of maintaining side setback up to 3 feet is more familiar among owners having 4 *Katha* plot.

However, no buildings were found having side setback up to 4-5 feet. Last of all, from total field survey only one building was found having setback above 5 feet. So, owners having less land are more prone to violate setback rules, because they want to ensure the optimum utilization of space.

Table 3 indicates that the tendency of violating rear setback standards is more among people having more land. Table 3 shows that 41.66 % buildings on 5 *Katha* land do not have rear setback within the plot boundary. The tendency of maintaining rear setback up to 3 feet is found among 62.5 % buildings belonging to 3 *Katha* plot. Side setback up to 3-4 feet is followed mostly by the buildings on 4 and 5 *Katha* land. However, rear setback over 5 feet is only found in 2 buildings, both of which belong to 5 *Katha* land.

So, building owners having more land are more likely to violate rear setback standard. They preserve more land in front of their plots for vegetables gardening, flower garden, plantation, vegetation, and parking or for further extension/construction of buildings.

Table3: Existing rear setback of the buildings in Nirala Residential Area

Maintained setback	No. of buildings in different sized plots						Total no. of buildings	Percentage (%)
	3 Katha		4 Katha		5 Katha			
	No.	%	No.	%	No.	%		
No setback	2	25.00	3	30.00	5	41.66	10	33.34
Up to 3 ft.	5	62.50	4	40.00	2	16.67	11	36.66
3-4 ft.	-	-	1	10.00	1	8.33	2	6.67
4-5 ft.	1	12.50	2	20.00	2	16.67	5	16.66
Above 5 ft.	-	-	-	-	2	16.67	2	6.67
Total	8	100.00	10	100.00	12	100.00	30	100.00

Source: Field Survey, 2015.

## 5.2. Use of Building Setback Area for Different Purposes

Proper setback provides open space for landscaping and recreational use within the property boundary. If the rules and regulations are maintained properly that are related to the building setback then more open spaces can be found for various activities. In the Nirala Residential Area the amount of unused setback area of buildings is found 50% (Figure 1). Only 43% setback area is used for plantation that includes different types of trees.

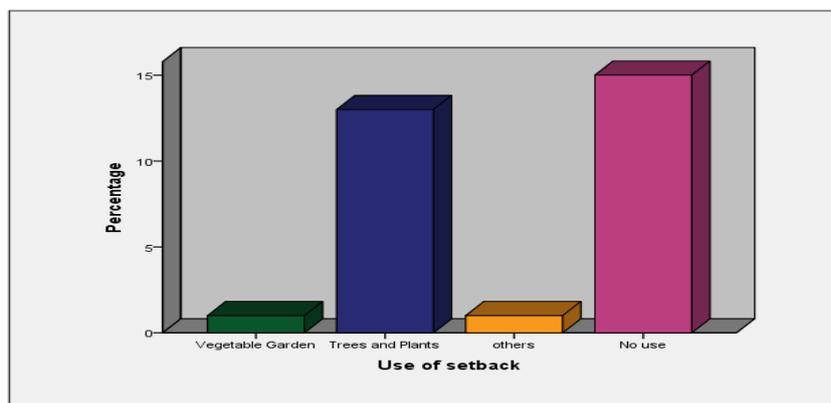


Figure 1: Different uses of building setback area in Nirala Residential Area  
Source: Field Survey, 2015.

In Figure 1 orange colour indicates other uses of setback. Other uses include drains, waste dumping place, small passage etc. No use means setback is totally covered with concrete pavement or hardscape area. Sometimes children use setback area as play lot for their recreation (Figure 2).



Figure 2: Use of setback as open drain  
Source: Field Survey, 2015.

About 2 percent of households have used the setback area for vegetables gardens (Figure 3). Different types of trees are planted in the setback area. Small flower gardens with recreational facilities can increase the aesthetic view of the buildings. This can create also healthy environment.



Figure 3: Use of setback for vegetables production  
Source: Field Survey, 2015.

Setback area for plantation in Nirala Residential Area is inadequate. People have a tendency not to use the setback area because of being the area very small for violating the setback rules.

### 5.3. Problems Faced by the Dwellers for Non-compliance of Building Setback

The residents of Nirala are suffering from various problems for violating setback rules. The problems are as follows:

### 5.3.1. Lack of Adequate Air and Light

Due to violation of setback rules, the buildings are congested to each other. So, the inhabitants of the buildings do not get adequate air and light. With the growing interest in sustainability, the use of sunlight has begun to play a major role in building design and green architectural strategy (Sakinc, 2011).

Residents of Nirala residential area are very vulnerable to these types of problems. The dwellers of such buildings are to suffer during load shedding at day times. Due to inadequate air and light people use more electricity that also increases electricity bill and family expenditure. Lack of natural ventilation system creates various health problems to the residents (Figure 4).



Figure 4: Buildings non-compliance of proper setback  
Source: Field Survey, 2015.

### 5.3.2. Absence of Playlot in Building Premises

The increased density of population in our cities caused the elimination of much open green space while at the same time it created a growing need for recreational facilities. So, it is very important to utilize every space within the building.

In the Nirala Residential Area, there is not enough space within house premise that can be used as playlot or for recreational purpose. Children and older people are the most suffered people for this. Sometimes the children use entry of the houses and the adjacent road to their houses as playgrounds. This usually causes small accidents and injuries to children. Figure 5 shows that children are playing in adjacent road.



Figure 5: Children are playing on nearby road of Nirala Residential Area  
Source: Field Survey, 2015.

### 5.3.3. Problems of Privacy, Security, Repair and Maintenance

Extension of buildings from the second or third floor is a common scenario in Nirala Residential Area. It is almost seen to all the three categories of plot. People usually keep 3 to 6 feet open in the ground floor mainly for passage and then extend the buildings from upper floors violating setback rules. Such types of activities distort the normal design of buildings and reduce the space between two consecutive buildings. As a result privacy between the consecutive buildings is hampered. It creates safety and security problems to the buildings. Such situation creates enormous problems at the time of building repair, reconstruction and maintenance.

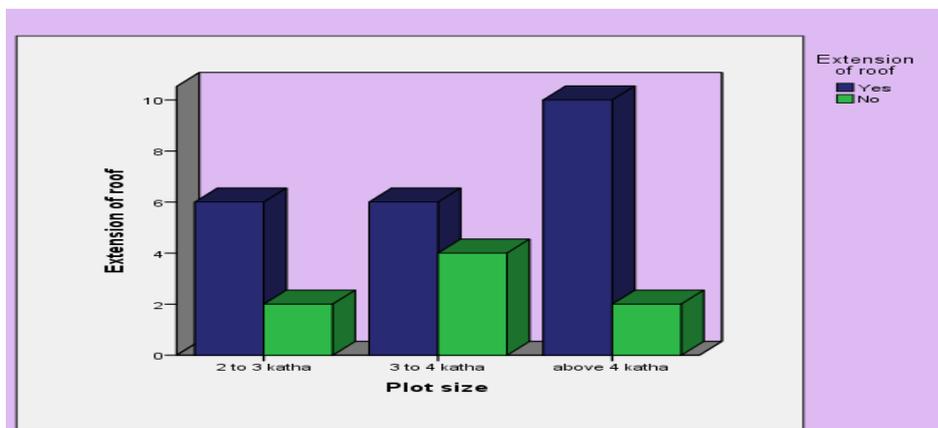


Figure 6: Extension of buildings at upper portion in different sized plots  
Source: Field Survey, 2015.

Figure 7 shows that more extension at the upper portion is seen to the buildings on 5 *Katha* land i.e. bigger sized plots. Smaller sized plots i.e. 3 *Katha* plots also influence the owners of the buildings in violating setback from upper floors as the land price is increasing day by day.



Figure 7: Extension of building at the upper floors  
Source: Field Survey, 2015.

#### 5.3.4. Unhygienic and Unhealthy Environment

The space between two consecutive buildings is so small that wastes disposed of there can hardly be cleaned properly (Figure 8). As a consequence, damp, unhealthy and uncomfortable living environment prevails that creates health problems to the dwellers (Kakon, 2012). Moreover, such problem also causes breeding of mosquitoes and the residents often suffer from Malaria. Bad smell spreads into the houses and people cannot escape after closing the door and windows. Children and older people suffer most.



Figure 8: Solid wastes disposed in narrow setback space between two consecutive buildings  
Source: Field Survey, 2015.

#### 5.3.5. Buildings without Setback and Softscape

Absence of softscape hampers water infiltration in the concerned area result in lowering ground water level. It sometimes creates short water logging even in low rainfall.

Table 4: Buildings in different sized plots with hardscape and softscape area

Different plot sizes of buildings	Buildings with hardscape and softscape area				Total	
	Hardscape		Soft scape		No.	%
	No.	%	No.	%		
3 <i>Katha</i>	7	87.50	1	12.50	8	100.00
4 <i>Katha</i>	8	80.00	2	20.00	10	100.00
5 <i>Katha</i>	9	75.00	3	25.00	12	100.00

Source: Field Survey, 2015.

Table 4 shows that in the Nirala Residential Area 87.50% buildings on 3 *Katha* plots have hardscape and only 12.5% buildings have softscape.



Figure 9: Building without setback and softscape

Source: Field Survey, 2015.

But it is not enough for a better an environment buildings. Presence of Softscape area covering grass and vegetation serves as infiltration area for storm water runoff. Figure 9 shows a building of Nirala Residential Area that has completely violated the setback rules. It did not sacrifice any space for setback. Total entire land area covered by the building and the boundaries are almost with road. There is no space for tree plantation or gardening.

#### 5.4. Examples of Compliance and Violation of Setback in Nirala Residential Area

##### Case Study 1: Violation of Setback

A major setback violation case is found in road-17 of Nirala R/A, where building setback rule is not maintained at all. The building is 4 storied and built up on 4 *Katha* land. There is no front setback or rear setback, only 3 feet side setback is found in one side but it is not according to the standards. The setback space is also not utilized in proper way. Besides, extension of floors is also found from its first floor. There is no place for vegetation, greeneries, playlot or recreation. Many children of the building are seen to play on nearby road. As the owner does not sacrifice any place for side setback, the space between the building and the neighbouring building is found dirty and it is really difficult to clean the wastes because of having no space. During investigation at indoor of the building, it is seen

that there is serious lack of proper air circulation and light and some parts of the building is also found damped. However, when land owner is technically asked if he faces any ventilation problem in the house, he strongly disagrees with that. But from the inspection, the problems are found visibly clear. From consultation with the landowner, it is also revealed that he possesses no knowledge regarding building construction rule or setback.

### **Case Study 2: Compliance of Setback**

A good example was found in road-17 of Nirala R/A. The 3 storied building is built upon 4 *Katha* land where the building setback condition is found just according to the BNBC guideline. Front setback was found 5 meter, side setback on both sides of the building was 1 meter, and rear setback was 1.5 meter approximately. It was seen that the landowners were conscious about building construction and setback rules during construction of the building. The existing setback space is mostly used by softscape. They have planted various types of trees like guava trees, banana trees, vegetables etc. within their premise. They enjoy gardening within their premises and it also provides them fresh fruits and vegetables. However, a small play lot was also found within the hardscape area. So, the children of this building do not find any difficulties for their recreation. Moreover, during investigation at indoor of the building, it was seen that the building is well-ventilated. The inhabitants are quite happy with their living environment.

## **6. Recommendations for Maintaining Building Setback**

Following are some recommendations for maintaining building setback in future:

- Since KDA has lack of manpower for inspecting building setback violations, KDA can develop a mechanism to inspect the on-spot construction activities by engaging both public and private organizations i.e. KDA; KCC; and Planning, Designing and Construction firms having planners, engineers, architects and other related professionals.
- Councilors and local Civil Society representatives can take initiative to make bound residents to maintain standard building setback during construction of their buildings. Regular field visits and inspection can be ensured to collect and update data on new buildings. A linkage between KCC, KDA and Civil Society representatives can be developed in this regard.
- Awareness on the consequences of violating building setback and benefits of maintaining building setback and other issues of the concerned stakeholders i.e. land owners, tenants, councilors, relevant professionals, construction workers, political leaders and policy makers can be raised.
- More researches can be conducted on the causes, consequences and remedies of building setback violation by the Universities and Research & Development organizations.

## **7. Conclusion**

Building setback is an important component of zoning regulation. It not only preserves a neighbour's privacy and light, but also provides emergency access around the property. Applying setback rules in building construction is one of the visible criteria to measure peoples' knowledge, awareness and attitude towards following planning rules. In the Nirala Residential Area of Khulna City, there is lack of enforcement of setback rules and regulations. Most of the houses in Nirala Residential Area did not follow minimum standards of side setback. It is also common in case of front and rear setback. The owners use side setback as their entry to houses and extend the buildings from the second or third floor. Most

of the owners try to ensure optimum use of their high priced scarce land and thus violate building setback rules. Poor ventilation, inadequate space for household waste management, playlot, gardening and plantations; risks of safety, security and privacy etc. are the consequences of setback violation. So, it is very important to make the future land owners and builders aware of the consequences of setback violation and benefits of setback. KDA should take necessary step to make the owners bound to follow setback properly while constructing the buildings for ensuring a better, healthy and vibrant life in Khulna City.

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