CONTEXT BASED STRATEGIC APPROACH OF DENSIFICATION: A CASE STUDY OF NIRALA AND RELIGATE

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ABSTRACT

As a new term, planned densification is not applied in Bangladesh for urbanization process. Urban sprawl has been underestimated since 1974. After the liberation war of Bangladesh, there was huge gap in communication with people to government to planning. Recent studies have taken to use the term but without any strategy for providing the extra-large people of Bangladesh (156.6 million). Govt. is only use it to accommodate housing for all but this only create clash. The densification process is not only to provide housing but also making the residence more quality based and sustainable. But different places having different criteria and different demographic, socio-economic and land use criteria. If densification has been conducted, then the strategy is also being change with its nature of the place and its own physical and socio-economic characteristics. Each place has its own significant characteristics which influence densification pattern and strategies. The strategies of densification are also obtained with the knowledge of its location, population, land use employment, economic, environment and other many more factors that should be considered for a sustainable densification.

Keywords: *Local Strategy, Vertical Expansion, Densification, Land Readjustment, Zoning*

1. INTRODUCTION

Bangladesh is a densely populated country and the population is increasing day by day specially in cities. Its area is 147570 square km and population is 152,518,015 and growth rate is 1.48%. (BBS, 2001) It is becoming a difficult task for the cities to accommodate this excess people with minimum facilities which is deserved by an urban dweller. Urban sprawling is taking a tremendous form in the third world countries so as Bangladesh. Densification is very essential for a developing country like Bangladesh. So as one of the city of it, Khulna is also going to practice this new term. Khulna is a metropolitan city in Bangladesh. It is one of the seven divisions of Bangladesh which is located in the south-west of the country. It has an area of 22,274 sq km with having population of 14.47 million. According to 1961, the population of Khulna city was 128,000. And in 2011 statistics says 2313000 which are 18 times greater than 1961. Densification is need for Khulna city because there is huge demand for housing and the demand is rising with the population over time. The headquarters of Khulna city is placed in Khulna District. Khulna is an industry based city in where some places are highly industrial based and some places is only mix used with residential and commercial. For supporting the industrial labor demand there are huge migration are placed in surrounding area of industrial location. The migration of inside and outside of the Khulna city is huge in number. Sometimes many foreign people are come to Khulna city for finding a better place for work and sometimes the migration of inner city also take places. This excess people need to a place for living which is leading them to the theme of densification. Densification means densified any area with planning and management for avoiding urban sprawl so Khulna badly needs it for future expansion. So densification is very essential for locating people according to economic activity and to provide environmental sustainability. Urban densification suggests environmental advantages of living closer together.
Religate area is industry based area and its developing process is slow and on the other side different development is taken place in Nirala for supporting the people and the development flow is speedy than other residential areas of Khulna. So the need of managing the growth of the both area is needed.
The main objective of this study is to identify the ways to densify both developed and developing residential area.

2. LITERATURE REVIEW

Densification can be taken place in the form of increased building heights, increased number of residential units per residential plot and increased the number of commercial and mixed use developments (Ezema & Oluwatayo, 2006). For sustainable densification, hybrid model can be used to stimulate the neighborhood land use pattern and formulates the demand of major city with arising trip and traffic demands and commuting distance within the city (Loibl & Totzer, 2003). Densification through vertical resettlement of residents of informal slums can help to free up vital land for other essential purposes, while providing essential housing for the poor at no cost to them or to the government (Gill & Bhide, 2012)

3. STUDY AREA PROFILE

Nirala and Religate is both very well-known part of Khulna city. One is near to the major business point of Khulna city and another one is beside the Khulna-Jessore-Dhaka highway. Nirala is a densely populated area with small area of 67.31 acre as compared to Religate 838 acre. The total population of Nirala is 15963 which is one half of Religate and it is 30000. In Nirala, the gross density is 237.17 people per acre and Religate is having gross density of 35.8 people per acre. The recent housing projects of Bangladesh have undertaken considering a target gross density of 350 people per acre which is proven disabled for both places. In this sense, both places are having equal opportunity for densification. Nirala is mainly a residential area and having other facilities which is needed for steering a residential area. Beside Rail-gate is a mixed use area. There are residential, commercial, small non-harmless industrial and agricultural lands in the rare side of Religate.
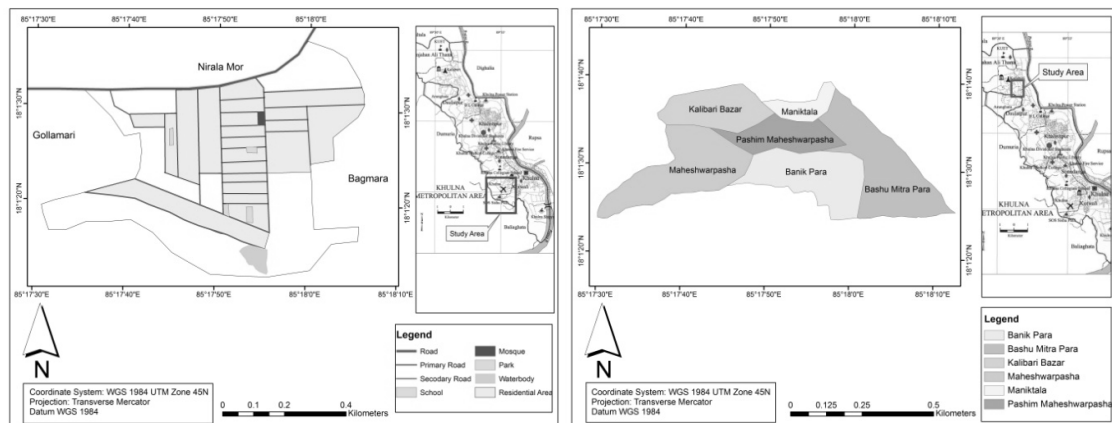
(Source: Authors Construction in GIS)

Figure 1: Study Area Profile

In Nirala, there are mainly upper classes and middle upper class people live in. The combination of every civic facility is present in Nirala. But for Religate, the facilities are hardly meeting the demand of daily need. The recreational facility is not good in Nirala residential area. There is few amount of open space here. There is only one park but it is not in good quality. In Religate area there are a lot of open spaces. But there are no recreational facilities present here. There is only a big playground which is known as 'Saradanga math' and few small playgrounds.

4. FACTORS OF COMPARISON

4.1 Land Use Variation

In land use variation both study area is totally different in nature. One is fully described as residential area and another one is mixed use area variation is not limited in nature of its construction type. The study showed that the area is not only a combination of urban cluster but also there is present agricultural land on the rare side. Religate area is 838 acres.

In Nirala, three-storey to seven-storey buildings will fit in well with a neighborhood's character; in fact, it already combing this kind of building structure, the study is conducted to improve the maximum law enforcement for ensure safety of this strategy. In other area, the place is now on the way of developing so it can possible to having a complete change of land uses specially the slum area.

Table 1: Strategic requirement for managing land use

Factors of consideration Land use	Strategic requirement
Nirala	Need assessment and manage the land use speciality as per "Private Housing Project Land Development Rule'2004"
Religate	Need to identification of demand on service facility on the basis of community future growth

4.2 Population Variation

The total population of Nirala is 15963. Religate is also densely populated like Nirala. The total population of Religate is 30000. If the analysis has been done with mathematical calculation, then Religate will accommodate more than 12 times of Nirala. For this large gap, it will prove that Religate having different statistics filling this large gap. This place has huge opportunity to modify the choosing process because it still not having any touch of urban sprawl. But Nirala need attention at their densification because it already densified with upper and middle upper group of people.

Table 2: Strategic requirement for managing population

Factors of consideration Population	Strategic requirement
Nirala	To control growth of population and create opportunity for renters who can accommodate in here with appropriate rate of per household.
Religate	Create space for people who engaged in different industrial work and continuously passing this area every day this type strategy can increase economical sustainability into this area. If part by part development can done by development authority, then there will be huge opportunity to reduce slum development

4.3 Variation for Geographical Location

Total area of Nirala is 67.31 acre and Religate is 838 acres. In this kind of variation, the analysis has shown that small area can be compared with large area and densify with better theme with better strategy. The Religate is 12 times larger than Nirala. It can provide huge amount of housing facility to people of Khulna city. But it requires need proper management with corresponding with geographical variation.

One location is near city centre and it provides maximum privilege to travel easily. Other one is 12 km away from main city centre and also having extra benefit in matter of rail transportation zone which will connect the whole country. Both having their own critical point is to change over time. Nirala is near to the Khulna University which can be turned a dramatic change in growth of population.

On the other side, Religate is continuing with industrial growth at the opposite side of this place. So it need place for living every living class for supporting the growth which also a greater opportunity to look back the variation in geographical strategy variation.

Table 3: Strategic requirement for managing geographical location

Factors of consideration Geographical location	Strategic requirement
Nirala	Need to stop this whole area as a future residential growth centre which can be done by creating housing management by like land adjustment
Religate	Need to use this area as future displacement area of other side of Khulna so use this area properly with zoning development

4.4 Income & Economic Variation

The people of Religate are mixed income people they don't have any particular income to introduce their status. But it can be said that people of this particular area having a common income source which is business. Nirala is for mixed in occupational distribution but it maintained a status for upper and middle upper class people.
The literacy rate of Religate is 73.6% which is greater than Nirala 72.9% but that doesn't prove any inconvenience in nature of economic variation (BBS, 2001). Both places are quiet differ from each view of understanding. Nirala is known to all as a place for upper-middle class and upper class people who obviously having a rich income ranges. On the other hands, Religate is for lower, and middle class and upper-middle class people.

An important criterion of densification is income of the people of the required area. It is important because it explains that the peoples internal and external need of life, their living standards, their utility usage and expenditure. As long as any place is having a differing range of income, they have very different income range.

Table 4: Strategic requirement for managing income and economic variation

Factors of consideration *Income & economic variation*	Strategic requirement
Nirala	Asking like advertising or providing various scheme like dropping land value to different occupational people to live or being part of business activities in this area
Religate	To lower the roadside land value and also provide land development for plotting the land for future movement of people

4.5 Neighborhood Condition Variation

For betterment of any living area it needs a better community facility which will combine the people with strong bond. This strongest bond can only grow a better living place. The main purpose of neighborhood arrangement is not only provision of bonding but also protect the environment; by concentrating people in the urban environment, natural spaces and habitats which are conserved. It is only possible with proper and safe densification.

Arrangement of an outstanding lifestyle with proper manner and accessibility in every service facility can be provided in a good neighborhood. Nirala is good example of having such arrangement in present. Religate can be future in practice of it.

Table 5: Strategic requirement for managing neighborhood

Factors of consideration *Neighbourhood*	Strategic requirement
Nirala	Provide more accessibility in Nirala and improve water drainage condition in road network
Religate	Good road network, greenery, natural water body is a proper environment for gowning up family and is a good starting for Religate. But this could need to happen with community corporation in neighbourhood.

4.6 Transportation Variation

In practice, higher levels of transit service are usually provided in higher-density areas. This is attributable to the economy of scale from the concentration of residences in dense neighborhoods (Schimek, 1996a). There is strong evidence that proximity to transit stations causes increases in property values, which indirectly suggests an increased housing demand and a potential densification effect in station-area neighborhoods (Shen, 2013).
A later study of six U.S. metropolitan areas by Smith (1984) also confirmed the significant influence of residential density on transit use. Using time-series data, Schimek (1996b) compared the trend of transit patronage in Toronto to that in Boston and found that higher residential density was one of the reasons why Toronto's transit system attracted more riders over time. The original magnitude of the impacts of density

depended on transit use also varies from one place to another. So Religate and Nirala is producing a huge amount of variation in their techniques of densification process characteristics.

Nirala is beside a main road which will connect at the Moilapota Saat Sastar Mor. At this Mor, anyone can go anywhere of Khulna city. So this is the main reason that Nirala area is developed early within very small time. Religate is far away from business point of Dak Bangle. So it needs a better point of changing its developing procedure. Like it can be provided two-way nonstop bus service and it will have given as public good not for financial purpose.

Table 6: Strategic requirement for managing transportation

Factors of consideration Transportation	Strategic requirement
Nirala	Nirala is connected with a major and width road network which connect with every possible destination to city but this road need road divider to avoid accident
Relegate	Introduce two-time nonstop bus service directly connected with city centre which could attract people to come and live here

4.7 Infrastructural Variation

If the improvement in infrastructure condition occurred simultaneously, it will improve leveraging densification of the urban environment. The creation of demand of infrastructure facilities can produce the ways of densification. In terms of it, Nirala is already improved in such facilities. But Religate need ornaments of modern life like better road network for disproving water logging, better waste disposal facilities, street lighting facilities, proper accessibility in structural facilities etc.

Both places are having huge variation in their nature of settlements. So they need care individually as teaching of one to another. Nirala is a future scenario of Religate but its beginning in not same as Religate. Nirala is never having riverside industrial one or slum area. Slum is the creation of 21th century and Nirala is established in 1980s. So both places need strategic variation in continuing densification process but in different manner.

Table 7: Strategic requirement for managing infrastructure

Factors of consideration Infrastructure	Strategic requirement
Nirala	Need to provide facility are more specific than future past so that people can reach any place at any time
Relegate	To avoid slum improvement need strategy to regulate the housing and access to the service facility. Infrastructure facility can be provided with population projection of next 20-30 year and then invite them to be part of it

5. APPROACH AND METHODOLOGY

This study was conducted to explore densification strategy according to its local context. Each place has its own demographic, socio-economic significant characteristics which influences the densification approaches and strategies. By primary review of literature, the idea about the project was generated and then two study areas were selected to gain the hypothesis. the selected study area was Nirala Residential area and Religate area of Khulna city Bangladesh. The desired data collected by reconnaissance survey, Household Questionnaire survey and secondary data collection.

5.1 Strategic Densification for Nirala Residential Area

5.1.1 Land Re-Adjustment and Vertical Expansion

In Nirala most of the people were high and middle income people and their economic condition was very well and literacy level was also high. Nirala residential area was declared for residential purpose by KDA (Khulna Development Authority). In that place some plots have been developed and some plots were vacant. In vacant

land "land re-adjustment plan" can be introduced and 3/4 plots can be joined together and the big plot can be vertically expand more times than each plot in a planned direction without causing urban sprawl .By land re-adjustment plan people will be benefited by open space and other facilities and more people can access to the land and future land scarcity can be reduced by vertical expansion .Most of the people at Nirala were middle and high income group so vertical expansion can proved successful and people can afford them Though Bangladesh is a developing country .A fixed vertical expansion limit for building should be enforced by law and regulation for this area.

5.2 Strategic Densification for Religate Area

5.2.1 Zoning according to economic condition and mixed use development

In Religate area low, middle and high income group of people live here. There was variation of employment service, economic condition and land use. If vertical expansion has done, then only high and middle income people can afford then and have access them. But in Religate area a large number of worker group would deprived from facilities and densification remain useless if all the people cannot get the opportunity. For giving access all class people zoning can be use for satisfy all class of people. Three zones were identified. They are-

- Low and middle height of Building with small apartment for low income people.
- High rise building with large and attractive apartment for Middle and high income people.

Low income people cannot afford high rise apartment so low and middle height of building should construct for them and the land distribution system can be fixed for them. For lower class people will get small amount cheap land like Sonadanga 3rd phase residential or Shiromoni industrial small plot. And for middle class and upper class people, the land will be fixed separately and it has to fix it structural condition for construction. In Religate area, there were industries and lower people works on those industries. That is because the slum part of Religate is the creation for those lower people. Slum is not good for any living people and it never approve basic minimum basic need of people. The low and middle height of building with small apartments should construct around the industries for easy and walking distance from work place. A buffer zone should create for the separation of residential and industrial zone. The height of building should be 4-5 storied which does not require lift. It will introduce incentives that encourage higher densities, and disincentives to prevent low-density sprawl and so people have a not only a greater community but also a greater place for living peacefully.

Middle and high income people want to live in peace, calm and quiet place and not around the industries. So this type of apartments should construct far from the industries. Some apartments need to be attractive and large enough for especially high income.

The strategy aims to increase the average density of the city as a whole and to identify those locations that are more suited to higher-density development (Sasekapa & Kaapstad, 2009).

6. RESULT AND DISCUSSION

The study aimed to investigate the variation in strategical decision in the matter of nesting densification in both Nirala and Religate. It is found that the approaches and strategies are different in both areas because of area's local context such as demographic situation, education, socio-economic condition, land use variation etc. Sometimes the diverse type of characteristics like soil and environment quality also included in it. Densification is very important concept to accommodate a large number of people with proper facility in a planned situation. If Densification strategy becomes a rigid solution, then it can be proved unsuccessful. It has to be flawless. Strategies should be taken according to the variation of nature, socio-economic and environmental characteristics. The densification strategy of Bangladesh should not be same as the developed country like USA or UK as considering Khulna city comparing to other cities in Bangladesh. Even the different areas like Nirala and Religate in the same city of Khulna is not same at all.

6.1 For Nirala

Nirala is mainly combination of high and middle class people. This people have high income level than Religate so it is easy to motivate them as the requirement of densification. Densification can be done in many ways but it has to be fulfil the demand of the location. Both area have similar educational percentage but development is not same speedy as it should be. Nirala have speedier than Religate for its high income level.

- There is some vacant land in Nirala which can be used as a part of land re-adjustment plan like 3/4 plots can be joined together and the big plot can be vertically expanding more times than each plot in a planned direction without causing urban sprawl.
- Other matters where already a structure is standing, those land can be developed as vertical expansion where it could possible like many building can be expanded 5 to 6 floor but it has only 3 floor. A fixed vertical expansion limit for building should be enforced by law and regulation for this area because of high income rate of people.
- Nirala is connected with major primary and secondary roads network which connect with every possible destination to city, so densification can prove successful but this road need road divider to avoid accident.
- A fixed rent rate for housing can be provide those people who wants to live in Nirala.
- Expansion is not only limited for owners benefit but also create opportunity for renters who can accommodate in here with appropriate rate of household.

6.2 For Religate

Densification in Religate can motivate higher class people to move from current place to cheaper land, especially at the matter of their peaceful environmental set up. There is lots of lower and middle class people who wants to live near their employment because these help to reduce transportation cost and other things. This strategy is the main base of developing theme of densification in Religate area. Some findings are found to sustain the strategy for densification.

- The low and middle height of building with small apartments should construct around the industries for easy and walking distance from work place. A buffer zone should create for the separation of residential and industrial zone. The height of building should be 4-5 storied which does not require lift.
- Introduce two-time nonstop bus service directly connected with city center which could attract people to come and live here from other places of Khulna city.
- Three zones were identified to distribute people from different income level. They are-(a) Low and middle height of Building with small apartment for low income people and (b) High rise building with large and attractive apartment for Middle and high income people.
- The Religate is 12 times larger than Nirala. With proper management of land, it can provide huge amount of housing facility to people of Khulna city.
- Create space for people who engaged in different industrial work and continuously passing this area every day this type strategy can increase economical sustainability into this area. If part by part development can done by development authority, then there will be huge opportunity to reduce slum development.

There are many possibilities to accommodate growing people in those places with a new understanding. It just need proper management and systematic development. Densification is one kind of solution if the authority is capable to use it in proper manner. So the findings are able to explain differences between both areas which need different strategies and approaches.

6.3 Discussion

The hypothesis is proved through the findings. In the research, the study approach for both areas are different and strategically is different in nature. If the zoning is used in Nirala then it won't work because the area is already being developed and it is distributed with different income group of people. But in Religate, there is opportunity to use zoning because this area is developing and limited in specific low income group of people. Developing area have scope for re-building of any thoughts. So the strategy for this area is to provide housing for all kind of people and also create opportunity to those people whose land is not still being used for any structural development with zoning. Structural regulation can be used in both areas but it seems to be different. One is requiring vertical expansion and land readjustment for managing plots. On the other hands, the other ones need zoning for developing industrial residential area and for normal people who live in different parts of Khulna city. This both approaches are reducing the pressure of population exploration in Khulna city and provide housing opportunity for all class of people.

7. CONCLUSION

Population growth is not constant it will increase with time and with the need of employment, education, and also a secure place for housing. People will construct their own house but most of the time haphazardly without maintaining proper planning. Densification is a process to create housing with controlled population growth. The real scenario may be conflicted but it has to come in touch with the process of densification. Densification means increased use of space, both horizontally and vertically, within existing areas properties and new developments, accompanied by an increased number of units and population threshold (The Cape Town

Densification Policy, 2012). To fulfill these criteria densification approach and strategy should be different because of the local context and local unique characteristics. Densification strategies need to be flexible, suitable for the areas need and accessible & affordable for all class of people.

ACKNOWLEDGEMENTS

There are some people who would like to acknowledge for their guidance, assistance and support of this research study. Special thanks to our Course teacher Muhammad Salaha Uddin, Assistant Professor, Department of Urban & Regional Planning, Khulna University of Engineering & Technology for his never ending support, encouragement for this project. We are also thankful to the people of Nirala and Religate for the contribution of these researches.

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