

Impacts of Private Residential Land Development Projects in the Flood Flow Zones of DMDP Area: Case Study of Tetuljhora Union

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Abstract

Dhaka the Capital of Bangladesh is experiencing outstanding growth over the last one decade. Dhaka has expanded 17.88 times from its initial size over the period 1951-2000, in the same time span the population has increased 25.09 folds. In response to growing demand for housing and other urban uses, private land development companies play a dominating role in the land market. Even though there are sufficient policies for planned development of housing projects, due to high profit making approach of land developer companies, Dhaka is growing in an unplanned way. This is causing adverse effects on the wetlands. For the survival of Dhaka city, it is important to protect the flood flow zones and high value agricultural land. In Tetuljhora union of Savar, housing projects are being developed since the 1980s without following the existing rules and regulations for housing development. Projects are being developed on those areas, where these types of uses are not permitted and they do not follow the standards of PRLD, 2004. So, this area is already facing many environmental, social and economic problems and in the future, if people began to reside here in unauthorized way, they will face problems due to lack of utilities and community facilities. There are problems with planning and development regulatory authorities and loopholes in PRLDR, 2004. To reduce the impacts of unplanned housing projects and ensure planned development of housing projects, measures should be taken to address the loopholes and weaknesses of policy guidelines and regulatory functions.

Introduction

The population of Dhaka Statistical Metropolitan Area (DSMA) is about 10.71million (BBS, 2001), whereas the city was planned for 10 lakh people in 1959 (Mitra, 2009). In 2015, population of the city may reach 19.5 million. Dhaka Metropolitan Development Plan (DMDP) has distributed the projected population at different locations and elaborated on various strategies to accommodate the population. Urban fringe area and peripheral area will provide housing respectively for 12% (1.868million) and 17.5% (1.2886 million) of 15.75 million (projected total population in the year 2015) people, whereas in 1991 it was 7.5 % (0.5512 million) and 15.5% (2.413 million) of 7.35 million (total population of 1991). New urban area will provide housing for 20% (3.114million) of 15.75 million people (Islam, 2008). Existing fringe areas of Dhaka city adjacent to the established urban areas are proposed to be developed at an accelerated pace. Whereas in case of new area development, the plan gave emphasis on relatively flood free land,

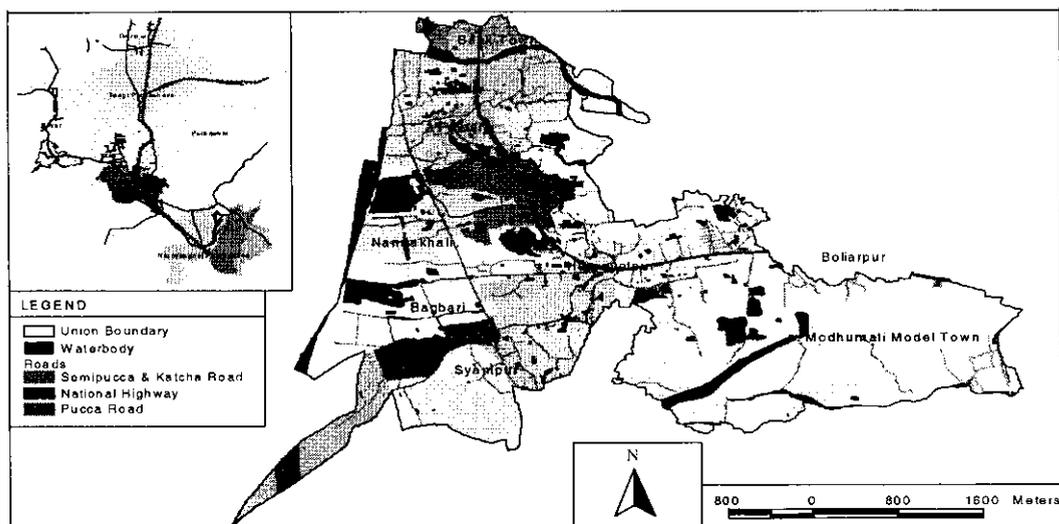
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minimum conflict with high value agricultural land, close to existing core settlement and so on. But to reduce the pressure, city is expanding outward in an unplanned way. People are filling the low laying areas to meet the demands of land for residential, commercial, industrial and so on. In Dhaka, around 49 housing projects without approval have been identified to be inside the flood flow zones covering around 9,241 acres of land (The Daily Star, 2007). Land filling activities are going on even after the enactments of the "Wetland Conservation Act 2000". The low laying lands around Dhaka city work as natural retainers of storm water, act as natural drainage system and help maintaining balance in the ecosystem. In Dhaka, yearly rate of loss of wetland during 1989-1999 was 1.23 percent, whereas during 1999-2003, the rate was 5.67 percent. Dhaka is still left with 19.3 percent of wetland. If the current rate of loss of wetland continues, by the year 2037, all temporary wetlands of Dhaka will disappear (Islam, 2006). In this context, this study tries to identify the impacts of unplanned housing development and suggest measures to prevent such illegal development.

Study Area

The study area Tetuljhora (Figure 1) Union is one of the unions of Savar Upazila, Dhaka. Total area of this union is 5183.742 acres. This union consists of 33 villages, 23 mouzas (BBS 2001). The area is bounded on the north by Bangram and Savar Union, on the east by Amin Bazar Union, on the south by Bakurta Union and on the west by Singair Upzaila. The soil is composed of the alluvium soil of the Bangshi and Dhalashwari rivers. The area situated in SPZ17 (3) flood zone, west of DMDP.



Source: EPC, modified by author, 2010

Fig. 1: Location map of the Study Area

Objectives and Methodology

The objectives of this study is to identify the impacts of unplanned development of private residential land development projects and recommend measures to ensure planned development of residential land development projects and to mitigate the adverse impacts of unplanned housing development.

Primary data for this study was collected through questionnaire interview of 120 sample local people and field observation. Data and information of private housing projects of study area was collected from site offices and head offices of those projects through questionnaire survey of respective officials. Information was also collected from Rajdhani Unnayan Kortipokko (RAJUK), different sources like Real Estate and Housing Association of Bangladesh (REHAB), Center for Urban Studies (CUS), Institute of Water Modeling (IWM), Detailed Area Plan of the study area, and various other sources. The literature survey for this research covers books, articles, journals, newspapers and Internet. The map of the DMDP is collected from RAJUK. The base map and data of the study area was collected from a consulting firm, EPC (Engineering Planning Consultants) and then modified according to the need of the study. Layout maps of housing projects were collected from the site and head offices of the projects and from internet.

Land Development Activity for Residential Purpose in Dhaka

It is stated in DMDP that 1980's were a period of major land conversion. Between 1960 and 2005, the built-up area increased approximately to 15,924 ha, while agricultural land decreased by 7,614 ha, vegetation decreased 2,336 ha, wetland/ lowland decreased 6,385ha, and water bodies decreased about 864 ha. The amount of urban land increased from 11% to 344% in 2005. Similarly, the growth of landfill/bare soils category was about 256% in the same period (Dewan and Yamaguchi, Y. 2006).The participants in the land and the housing development process can be grouped in the following two categories:

- Public sector residential land development
- Private sector residential land development

Public Sector Residential Land Development

The government through its various organizations like RAJUK, HSD, PWD and other development authorities are involved in the development of land for housing purpose. From 1950s till now, 11 areas in Dhaka have been developed for residential purposes by public authority. At present, four public housing projects are ongoing on. Existing residential projects of RAJUK are shown in Table 1.

Table 1: Ongoing Public Residential Projects in Dhaka.

Name of the projects	Location	Area in hectare	Number of service plot	Population accommodation
Purbachal(Yousufgonj residential project)	Rupganj, eastern side of Balu river under Narayangonj district and Kaligong under Gazipur district.	1470	28000	3 million
Nikunja (residential housing estate)	Jorshara near Kurmitola Airport.	27.52	500	5000
Jhilmil (residential project)		154.38	500	10000
Uttara 3 rd Phase		2126.25	7500	156000

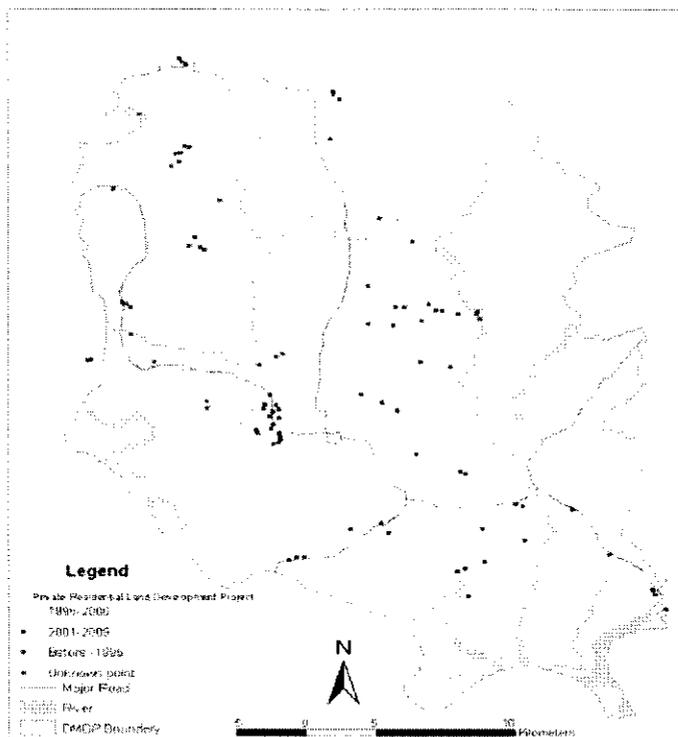
Source: RAJUK, 2010

Private Residential Land Development

The increasing population in Dhaka city creates demand for housing. The government can meet only 7% of the total demand, whereas private sector entertains the bulk of 93% of the total housing demand (Haque, 2004). In Dhaka, Private Housing Cooperatives and Housing Companies have been active since the 1950s gaining some momentum in the 1990s. Only five companies were engaged in this sector in the initial stage, but now there are more than 800 companies in this sector. Almost 650 companies are member of REHAB (REHAB, 2010). The activities of these companies are limited to conversion of agricultural land and development for future sale and distribution and profit making. In a study, it has been shown that there are about 143 private housing projects within RAJUK boundary (Roy, 2006). Because of low land price and availability of large segment of land, private companies buy land in the flood flow zones, agricultural zones etc. Figure 2 shows different residential land development within the jurisdiction of RAJUK.

Existing PRLD Projects in Tetuljhora Union

There are six private housing projects in Tetuljhora union. Almost since 1980s private housing projects start in study area. the land filling sites of study area since 1980s to 2010 is shown in Figure 3. Total area of Nondokhali Janata Housing by Janata Housing Ltd. is 250 acre and it start from 1987. Shapla Housing by Shapla Housing Ltd. is 180 acre and



Source: RAJUK, Roy, 2010

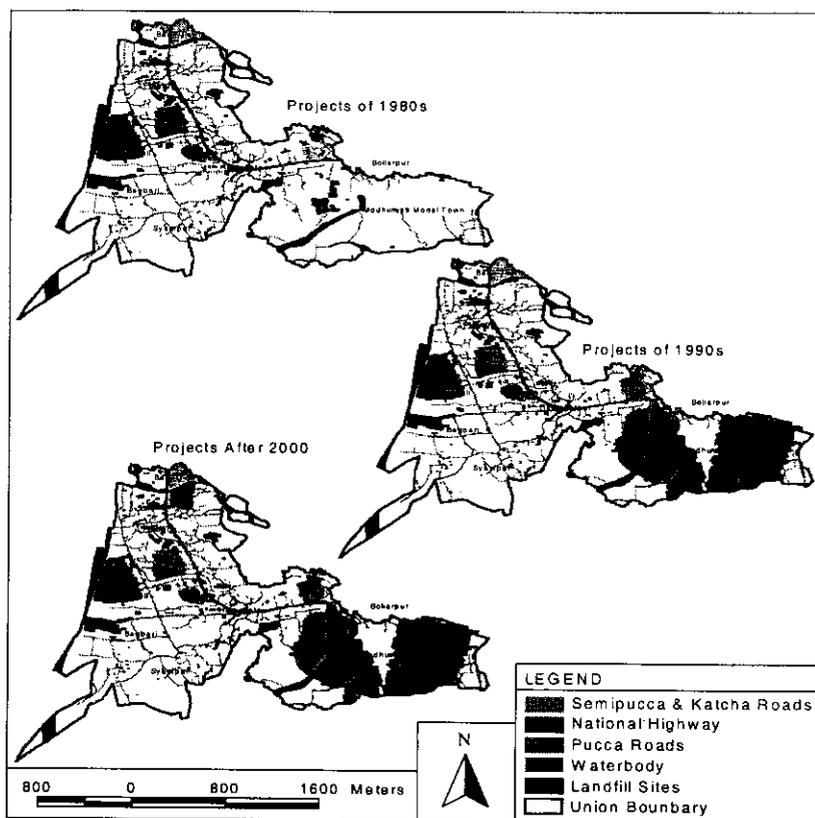
Fig. 2: Private Residential Land Areas within RAJUK Boundary.

start from 1979. Alomnagar Housing by Shugandha Property Development Ltd. is 35 acre start from 1990. These three housing projects do not take the permission from RAJUK and even they do not apply for approval. There is no space allotted for community facilities in their lay out plan. Modhumoti Model Town by Metro Makers & Developers Ltd. starts from 1990, which is almost 512 acre. Mayakanon Lake City by Eastern Housing Ltd. with 707.19 acre and Advanced Angel City by Advanced Development Technologies is 13 acres.

These three projects have applied for the RAJUK approval but have not got the permission till now. Figure 3 shows the location of different land development projects in the study area.

Impacts of Private Housing Projects

Without taking permission all projects in study area are filling up lands and sailing their plots. Due to illegal development of these projects in sub- flood flow, main flood flow zone and areas of low value agricultural land as demarcated in structure plan this area at present is facing problems and this may also cause some serious adverse impacts in the study area in near future.



Source: EPC, modified by author, 2010

Fig. 3: Landfill sites in the study area at different time period.

Social Impacts

Resettlement/ Rehabilitation

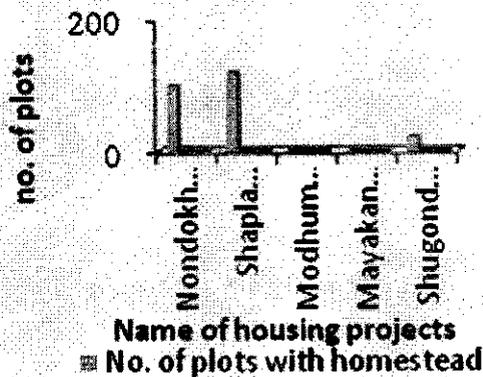
According to subsection 2,3 and 4 of section 7 of PRLDR 2004, who have homestead in the project area have to give extra 50% of compensation, give rehabilitation plot at 50% discount compared to market price and rehabilitate the person in the same location or as near as possible, who have homestead in the project area. This provision of rehabilitation or giving extra compensation is not followed in the projects of study area. So, there are great social impacts on those people who have to migrate from the projects area. Figure 4 shows the rehabilitation scenario taken by the ongoing projects in the study area.

Forcing People to Sale Their Land

From the questionnaire interview it is revealed that in study area, 49% people sale their land to the housing projects. Among these only 10% people sold their land willingly to the housing projects and 90% people had to sale land on force. Developers create pocket land and compel them to sale their land. Sometimes they bought these pocket lands less than the market price. So the land owners did not get the actual market price and economically they become sufferer.

Impacts on Local Cultural and Community Norms

According to PRLDR, 2004 standards (350 person/acre) after the development of these projects area additional 5,94,017 people will began to reside in 1697.19 acres of the study area. There will be an interaction between the local community and the new developed community. The local customs, norms, traditions will be affected and changes will occur. Cultural change will also be occurred in study area.



Source: Questionnaire Survey, 2010

Fig. 4: Showing the rehabilitation condition of the housing projects in Study Area.

Impacts Due to Lack of Common Facilities

According to section 9 of PRLDR, 2004, 30 percent of the developed land will be available for different community facilities consistent with the space standards. Common

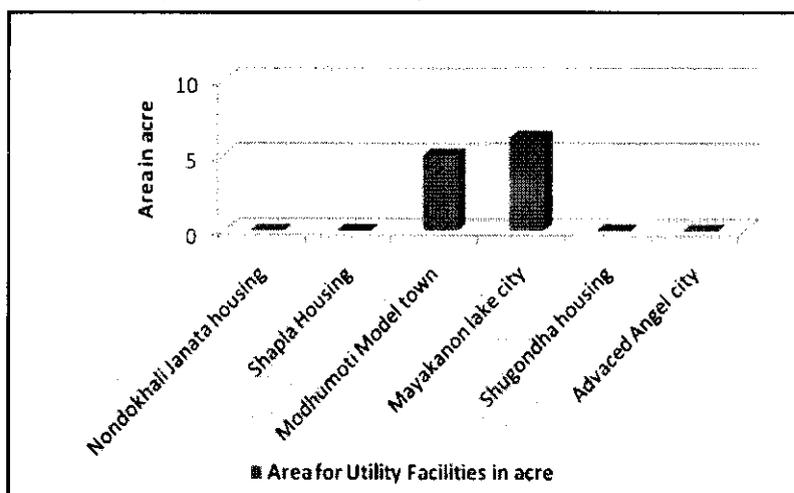
facilities mean education, health, recreation, commercial facilities. In any private housing projects the community facilities should be provided by the project authority. Modhumoti Model Town, Mayakanon Lake City, Alomnagar Housing and Advanced Angel City shows in their layout plan that they will reserve space of respectively 84.95acre, 121.03acre, .25 acre and 1 acre for common facilities. Other two projects do not have space for such facilities. So after the development of these projects the community people suffer from lacking of common facilities.

Impacts on Utility Services

Except Mayakanon Lake City and Modhumoti Model Town other projects don't reserve any space for utility services in their layout plan. In Shugandha Housing 85 families and in Shapla Housing 33 families began to dwell. They use electricity, supplied from Rural Electrification Board (REB). Gas, water supply and waste disposal and telecommunication facilities are not provided in these two projects. Figure 5 shows the area reserved by the housing authorities in the study area.

When all the housing projects will be completed and people will start to live in these housing estates, then it will create several negative impacts on different utility services in the study area. Some of the probable impacts on different utility services are mentioned here.

Electricity: Increasing demand of electricity will also have negative effect on the study area. REB provides 88.9 MW² per day for residential purpose in Tetuljhora union with 8-10hour load shading. After the development of these projects, demand for electricity will increase about 1654 MW per day. It will be difficult for REB to meet such demand. Duration of load shading will increase in study area.



Source: questionnaire survey, 2010.

Fig. 5: Shows the Area Reserved for Utility Facilities in Housing Projects

Water: People of these project areas have to meet their water demand by using deep tube well individually. It will create negative effect on ground water storage. In a study

Ahmed and Rahman (2000), shows a standard of volume of water required per day per person. They consider here the type of area. Housing projects with 594017 people, about per day 1,06,92,360 liter water will be required. From the management information report, 2008 of WASA it is revealed that about 88.25% of their total production comes from ground water. At present the capacity of WASA is to supply 146 crore liter whereas the demand is 194 crore.

Table 2: Water requirement in rural and urban areas of Bangladesh.

Areas	Water Consumption, lpcd
Rural area	50
Upazilla town	100
Zilla town	120
City corporation	180

Source: Ahmed and Rahman, 2000.

Sewerage and Garbage disposal: In Tetuljhora union at present there is no public sewerage facilities. Without approval from RAJUK the housing projects will not get the sewerage facilities from WASA and garbage disposal facilities from DCC. If the authorities of the projects don't develop the sewerage system, it will create adverse environmental effect on surrounding areas.

Economic Impacts

Increase of Landless People

Housing projects buy large segment of land. These projects sometimes make people landless. The people who have one parcel of land situated in the housing projects have to sale his land. With the compensation money they do not able to buy another parcel of land. In study area about 6% people become landless due to housing projects and 43% people sale 5katha to more than 15katha land.

Increase of Land Price

From the questionnaire interview, it has been revealed that during the period of 2000-2009 the land price of study area increase tremendously. The growth rate of land price is more than double. The developers buy land at low price and sale it about more than 15 times high rate. Maximum profit making approach of developers and rapid increase of land price in study area makes land unaffordable for middle and low income people and also instable the price of land market. Figure 6 shows the trend of land price increase in the study area.

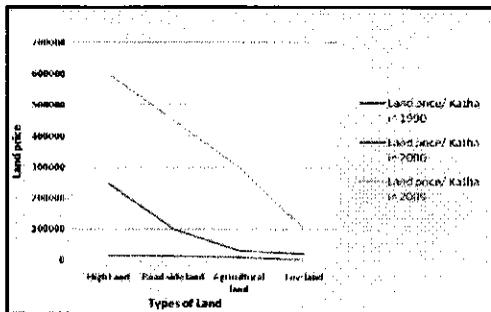
Loss of Agricultural Land and Production

At least 70% of each project area was used for agricultural purpose. Housing projects destroy minimum 1244.79 acre of agricultural land. The agricultural lands in study area were used mainly for tobacco, maize, paddy, jute, sugarcane etc. With the development of technology productivity of land increase but people divert to produce seasonal vegetables because of lack of water during February and March. Whereas in 1990s about

180 hectare land use for paddy production in 2009 only 90 hectare land use for paddy production (Department of Agriculture, Savar upzilla, 2010). Figure 7 shows the percentage of land occupied by different sectors in the study area.

Impacts on Employment

The people who were engaged in agricultural activity in the project areas have to change their activity due to land use change. People without having skill to engage in other activity become redundant. 11% people will become jobless. Some people have single parcel of land where they produce agricultural product which was the only source of income for their families. After losing the land though they get the land price but economic condition of those families become terrible.



Source: Questionnaire Survey, 2010.

Fig. 6: Trend of Land Price Increase in the Study Area

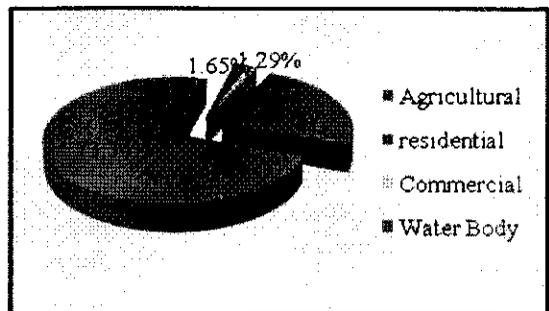


Fig. 7: Percentage of Different Types Land Occupied by PRLDCs

Environmental Impacts

Flood and Drainage

The study area is situated in the flood and sub-flood flow zones of the DMDP. It acts as water retention body during the rainy season and active flood plain for Dhaleswari River. About 80% of mean annual rainfall occur during June to September. Flooding of Dhaka usually occur during this period, when surrounding rivers cannot accommodate the water flow within the main courses (IWM, 2007). If the study area filled up, it cannot act as retention body. The vast amount of water that retained at study area will flood peripheral villages. Millions of cubic meter of water will be retained at Dhaka city and will create drainage congestion in Tetuljhora Union along with Dhaka city. Housing Projects are located on sub flood flow and main flood flow zone covering area of –

- Sub flood flow zone- 1434.19 acre
- Main flood flow zone- 263 acre

Total 1697.19 acre area captured by the housing projects and hampers the flood water flow, increase flood vulnerability to surrounding areas and Dhaka city.

Decrease of Ground Water Level

About 95% of water supplied for Dhaka extracted from underground and average annual decline of ground water within the city area during 1995-1999 varied from 1.02 m to

2.46m (SWMC, 2000). Wet land act significant rule in groundwater recharge and it depends on surface water level at the wet land area and on rainfall around the area. Study area has importance as ground water recharger. Due to reduction of recharge surface the lowering trend of ground water since last 32 years is 20 to 30 meter with an average decline of 1meter per year without replenishing water table. Under the present obstruction scenario the ground water level would continue to decline at a rate of 3m per year in the densely populated area (BWDB, 2004).If the groundwater level decline in such an alarming rate due to unplanned land filling in flood flow zone, it will create adverse effect on water recharge, ecology and environment of study area.

Destruction of Wetland and Biodiversity

The lowland of study area has dominant function on natural drainage system. Storm runoff from surrounding areas is stored in lowland of study area. The accumulated water gradually drained to the Dhaleswari River, Karnatali khal, Zirabu Khal through drainage canal. The housing projects hamper the drainage canal and natural drainage system. Wetlands have significant impact on local ecology and biodiversity. During dry season wetlands of study area used for agricultural purpose, during wet season it merge with the adjacent water body, khals, and river and become fishing ground. Filling up of low laying areas will create environmental ruin and degrade entire ecosystem. Continuous reduction of wet land will also effect on socio economic activity.

Air and Dust Pollution

Air quality of study area is not so good due to fugitive emissions from brick fields, industries and dust generated from haul roads, exposed soils, and material stock piles. After development the housing projects will lead to the generation of pollutants such as total hydrocarbon compounds, carbon monoxide, nitrous oxides, sulfur dioxide (SO₂), total suspended particulates, and lead due to traffic generation. Dhaka Aricha Road have to act as arterial road, so after the project the movement of vehicle will increased and generate pollutants that create air pollution.

Impacts on Transportation and Communication

Five projects are directly connected with the Dhaka Aricha road and the Nondokhali Housing is linked with Shingair road. These projects will provide housing to upper and upper middle income people. All these projects together will accommodate maximum 5,94,017 people (According to PRLDR, 2004. 350 people per acre). Grossly 11ach family (with 5 member) will reside and if every 3 family have one transport mode than about 34,000 additional transport mode will add with the existing transport facilities. Additional transport mode will create pressure on Dhaka Aricha road Shingair road network. It may create traffic congestion, increase accident and sound pollution.Impacts to the transportation network and its operations will occur during both the construction and operational phases of the project.

Contravention of Existing Planning Laws

Though there are several rules and regulations for planned housing development, but these are not being applied effectively in study area. Housing projects are being developed without considering the rules and regulations. The compatibility of housing projects with existing planning laws is shown in Table 3.

Table 3: Compatibility of housing projects with existing planning laws.

Planning Laws	Related Issues for study area	Compatibility
DMDP, 1995-2015	<ul style="list-style-type: none"> • Raising Land level and land filling strictly prohibited in Main flood flow zone • In sub flood flow zone development is permitted under conditions that the development should not hamper the flood flow. 	<ul style="list-style-type: none"> • Projects area taken in main flood flow zone, example-Advanced Angel City, Nondokhali Janata Housing • Projects area taken in this zone and hamper the flood flow example - Modhumoti Model Town, Mayakanon Lake City, Shapla Housing, and Alomnagar Housing.
PRLDR, 2004	<ul style="list-style-type: none"> • Have to follow the permission process • Provision of rehabilitation plots • 30% area reserved for community facilities • Water bodies and flows within the project area should not be hampered and its area cannot be reduced. 	<ul style="list-style-type: none"> • Projects are not following the permission process and selling plots without permission. • No rehabilitation plots area there. • Do not preserving 30% land for community facilities. Example-Shapla Housing, and Alomnagar Housing and Nondokhali Janata Housing • No water body is preserving in its original nature.
Wetland Conservation Act, 2000	Any area that declared by master plan as water body, open space, flood flow zones cannot be changed without permission	Not following the wetland conservation act.
Environmental Conservation Act, 1995	Have to take environment clearance certificate	Projects are initiating without permission and clearance certificate.

Source: Prepared by Author, 2010.

Recommendations

Implementation of DAP

As soon as possible, the DAP should come into force. The complications at the policy level in the plan preparation and implementation should be reduced. In DAP, the land use of restricted area like sub flood flow zone, main flood flow zone, special area, water retention pond, agricultural high value land should be more specific and should avoid loopholes and should follow the strategies of DMDP so that the developer companies can not initiate any project in those areas.

Application of Land Use Zoning

Areas of agricultural land play a significant role in economic sector. Policies should be taken in such a manner that valuable agricultural land should be kept free from development and crop land cannot be converted to other non-agricultural purposes. Authorities should strictly follow the strategies for preserving agricultural land.

Flood flow zones have significant importance in the ground water recharge, storm water flow etc. Any unauthorized development should be restricted by the authorities. Flood flow zone can be used as recreation area. Government can take effective measures to provide recreational facilities. The low-lying open areas provide great relief to the dwellers of a highly congested city like Dhaka.

Coordination among Various Agencies

In the study area, four public agencies are directly involved for planned development of the housing projects. These are RAJUK, DoE, BWDB and local government bodies. Planned development of private housing projects can be ensured through the better performing of these agencies. Again, their activities should be transparent. Planner should be engaged in proper position in RAJUK as well as private land development companies. The planning authority should have to be transparent and accountable to maintain fair activities from the top to the bottom level. Several research and academic works by Islam (2005), Siddiqui (2004), and Jahan(2005) concerning urban planning and development of Bangladesh have identified that there are problems of coordination among concerned agencies and governance in general. Coordination among various agencies is also responsible for unplanned housing development in the study area. Improvement in the role of local level institutions and reduction of gap between the local level governing agencies and central planning agencies will help planned development of housing projects.

Regular Monitoring System

RAJUK is responsible to monitor the development work within its jurisdiction. RAJUK should improve the technical expertise, monitoring system and increase manpower. RAJUK has to establish field offices to monitor the development work and enforce laws properly. At the same time, land development companies should follow the government approved rules and regulations. They should develop their project design taking environmental, social and economic concerns into consideration.

Modification of PRLDR, 2004

There are several loopholes in PRLDR, 2004. Modification of those loopholes is necessary. Provision of penalties for those projects without approval should be included. It should be clarified in PRLDR, 2004 that if RAJUK disapproves their projects what should be the next step. Whether the company takes out the land fill or not and the compensation for those who buy plot in this project should be clearly defined in PRLDR, 2004. To design a planned residential area, to maintain the Building Construction Act, 1952 (E.B. Act II of 1953) with the present context of Building Construction Rules, 2008 and Environment Conservation Act, 2005 and to assess the environmental impact in the project area, appointment of a planner must be included and clearly defined in the rule.

Strengthening of the Capacity of Local Government

To monitor the development work properly, RAJUK can include local level organizations such as union parishad, ward office and pourashavas. At the field level, elected persons like chairman and ward commissioners of the Union Parishad can play a vital role in monitoring development work. RAJUK can impart training to inform about the existing planning laws, regulations and different development programs. Thus they may be able to

create awareness among the local community about the consequences of unplanned development.

Public and Private Partnership

Public and private sector (NGOs, local elites, MPs) interaction is necessary to enforce DMDP Structure Plan. For providing the housing facilities to the people, public and private organizations can work together. Government policy as well as DMDP encourage the private sector to take part in the development process of Dhaka metropolitan area. In this case, RAJUK will acquire land, develop land, and make subdivision of plots. The private sector will be responsible for constructing infrastructure and services. The government will retain the power to allocate plots to the private sector. An important advantage of this process is that private resources can be mobilized for infrastructure provision.

Conclusion

In the housing market of Dhaka, private land development companies can play a vital role in providing housing. In this study, it is clear that PLDCs are violating rules and regulations and ignoring the plan. It is also evident that agricultural land, sub flood flow zone, main flood flow zone are rapidly being transformed into residential uses. This will cause loss of agricultural production, adversely affect the flood flow and create drainage congestion in the city. As a result, frequency of flood will increase by increasing flow velocity and rising water level in river. In this situation, DAP can be an effective opportunity to regulate the unplanned development. With effective policies, regulations and active participation of local people within a responsive administrative system, indiscriminate land filling in the flood flow zones and low-lying areas of the city by private sectors can be controlled. It is expected that the development restriction should not only be in the written document, but also come into enforcement and practice.

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