Enhancing Social and Environmental Qualities in Shelter Design for ALL[1]

By Altering Shelter Design Regulations in Dhaka, Bangladesh

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Globalization and rapid urbanization has been the major causes for shelter development crisis in Dhaka, Bangladesh. This has been exaceberated further due to the outdated building regulations that requires modification to reduce negative impact of rapid urbanisation process. This study is the outcome of the exercise to seek alternative solutions to shelter design and development in Dhaka city. This research is an outcome of one of these research exercises reflecting on the recent reformation of building regulation to be applied from the year 2007 after it has been approved by the Bangladesh Parliament refer to as the 'Bangladesh Gazzette- Dhaka Building Construction Act, 2006' in April 2006.

Shelter Situation Analysis

Being one of the fastest urbanised country in Asia, Bangladesh faces many challenges due to its huge population figuring 147,365,352 (July 2006 est.), having -0.68 migrant(s)/1000 population (2006 est. by CIA, 2006, The World Development Indicator, 2005) that has contributed to the growth of higher urban density in Dhaka mega city from 4795 persons/sq.km. to 8573 persons/sq.km. This has subsequently excerted pressure on limited buildable land. Increase in density has further been negatively affecting the urban environment due to lack of detailed area plan coupled with inappropriate building regulations that requires major reformation (Islam, 1999, 2004, 2005, 2005a).

[1] ALL refers to population of all income levels those who are actively participating in the urban economic activities.

In urban area, 62.3 sq/ft per capita space indicates rising pressure on social space. Increasing rate of migration of job-seekers from rural area to urban area (DFID, 2005), as a result of globalisation and creation of pseudo-industrial growth, subsequently increases the demand for new housing on existing urban area[2] (Amin, 1986). This excerts pressure on the remaining open space around the footprint of residential development. Although the National Housing Policy advocates for 'shelter for all'[3] in urban areas, conflicting urban development policies allow structures to be erected without any regards to sustainable parameters, hence, generating poor quality built form devoid of a) social outdoor and indoor spaces; b) an urban environment that balances outdoor-indoor thermal qualities; c) privacy; and d) any possibilities of ground water recharging.

Identification of Critical Shelter Problems

Bangladesh has emerged historically based on its primary-based economy and reached a stage where economic transformation has been rapid for the last couple of decades, shifting its core economy from primary (agriculture) to secondary (manufacturing) mode. This shift can be defined ethnologically (Åstrand J., 2006a) as rapid urbanisation process from the traditional homogeneous culture to the city culture after industrialisation; and can also be attributed to the need for rapid urbanization with accelerating economic activities coupled with accelerating growth in residential development. Globalization with rapid urbanization has triggered ill-planned densification in residential areas, significantly in low and middle-income residential development. Moreover, outdated building regulations have offered no way-out for planners and architects to solve crises in shelter development leading to slum creations.

The study aims to identify critical shelter problems due to old building regulations and explores positive elements of new building regulations in slowing down slum formation; and discusses further by SWOT analyses its potentiality in creating a balanced urban growth keeping in mind equal opportunity for shelter and 'less residential segregation by design' (as stated in Espriella, 2006). This reformation in building regulations aims at influencing changes in urban environment and in

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2 1.2 million housing units are required to build immediately, as estimated in 2000

3 NHA (National Housing Authority) of Housing & Public Works Department drafted "Housing Policy 2005" with the aim of providing permanent & adequate shelter; safety & stable socio-economic condition; environmentally sound and maintaining heritage, culture & religion. Ultimate aim would be to help in poverty alleviation.

enhancing social qualities since housing quality means both creating favourable environment for physical and psychological needs (Liuke, 2006).

Analysis of Critical Shelter Problems

Social and Environmental Crises in shelter design and development for all has already been discussed in the previous sections. Given the fact that the outdated planning and building regulations do not satisfy present-day social and environmental criteria, emerging urban crises are found to be as follows:

Crisis 1 → It is estimated that over 70% residential development falls under SLUM condition due to lack of proper building regulations

Crisis 2 → No minimum standard of Public Realm due to outdated building setback regulation and absence of detailed area plan, such as pedestrian linkages to residential development

Crisis 3 → No minimum standard of Public Realm and urban space for daily urban management

Crisis 4 → No minimum standard of Public Realm, especially focusing on barrier free design

Crisis 5 → Urban Confinement & Sedentary LIFESTYLE Due to lack of SOCIAL SPACE For children & Elderly people. According to United Nations: "… the right of the child to rest and leisure, to engage in play and recreational activities appropriate to the age of the child and to participate freely in cultural life and the arts."[4] Crowding, poverty, crime, traffic, low air quality, and a lack of parks, sports and recreation facilities, and sidewalks make physical activity a difficult choice.[5]

Crisis 6 → No Sustainable Micro-Climate in built residential environment due to lack of balnced density (Mahtab-uz-Zaman et al, 2006), such as:

- Lack of NATURAL LIGHT
- Increasing heat gain
- Lack of Ventilation
- Lack of Privacy

4 Play provision can be a space, some facilities or equipment or a set of activities intended to give children the opportunity to play as defined. At its most successful, it offers children and young people as much choice, control and freedom as possible within reasonable boundaries. This is often best achieved with adult support, guidance or supervision. The child's right to play is recognized in Article 31 of the United Nations Convention on the Rights of the Child, which was ratified adopted by many countries.

5 According to WHO: Sedentary lifestyle is a major underlying cause of death, disease, and disability; Approximately 2 million deaths every year are attributable to physical inactivity; Sedentary lifestyle is one of the ten leading causes of death and disability in the world; Physical inactivity increases all causes mortality, doubles the risk of cardiovascular disease, type II diabetes, and obesity. It also increases the risks of colon and breast cancer, high blood pressure, lipid disorders, osteoporosis, depression and anxiety (WHO, 2004). Current patterns of urbanization and motorization also are associated with more sedentary lifestyles, diminished space and opportunities for physical activity, a consequent surge in related non-communicable diseases (WHO, 2004). Physical inactivity is estimated to be responsible for some 1.9 million deaths globally every year, as a result of disease such as heart ailments, cancer and diabetes (WHO, 2002)

Crisis 7→ Urban Water Crisis[6] due to Reduction of water table as a result of enlarged building footprint and increasing hard surface over majority of urban areas that make reduced greeneries and water bodies.

Crisis 8 → Housing for urban poor pushed to fringe with informal shelter creating unfavourable living environment (Nawaz, 1999) with lack of proper infrastructure, which puts pressure on natural environment turning into degraded areas (Chowdhury, n.d.).

Inefficient urban development schemes exist due to lack of strategic area plan and detailed area plan in Dhaka city (Dhaka City Corporation, 2004). Therefore, the technical and finanacial assessment of the distribution and consumption of land, infrastructure and public services in residential areas could not be done for a comprehensive benefit for the entire city. For instance, increasing density and its effects on infrastructure has never been scrutinized, which led to overburdening of water and swerage system in the city, and allowed minimum social space in shelter design and development. Density of urban development is a crucial area to deal with. Any decisions made on density profile can have significant impact on health, on urban environment, on the productivity of cities, and on human development as a whole (Acioly Jr. and Davidson, 1996).

6 WASA (Water and Sewarage Authority) supplies 145 crore (1450 million) liters of water in the city against a demand of 210 crore (2100 million) for 12 million people per year. According to a recent study appeared in 'Paribeshpatra' (Environmental life Quarterly Magazine, 2006), water table has been reduced by 65 feet in 7 years between 1996 to 2003. Water demand in 1998 was 1345 million liter/day, which has reached to 2000 liter/day in 2003; and in future it would be impossible to meet the needs of the minimum requirement of water as a basic elemet of survival. This is exact opposite of the developed world where almost 100% of the households have access to safe water (Åstrand J., 2006a), thus, presenting us the question whether we need to restructure the policy and relate to what highly industrialised countries have achieved to solve the water crisis.

Proposal for Change and Improvement

'Pro-socio-environmental' Urban Development Strategy

A new strategy should evolve from an attempt to solve a wider urban problem, thus, addressing following issues, which will enable change in relevant sector/policy:

Objective	**Change required/Organisations**	**Areas**
building and planning regulation reflecting land sharing	Planning and building policy RAJUK (Building Authority)	Building and Planning Regulations
anti-encroaching mechanism of natural environment	Change in building and planning application by introducing occupancy certificates RAJUK (Building Authority)	
intensification of land use to accommodate relevant urban poor directly linked to urban economic activities and urban management	Change in area plan and detailed land use plan RAJUK and Public Works Department	
urban development with active environmental parameters-increasing open ratio, increasing water recharging capacity, reducing urban heat island etc.	Change in building regulation RAJUK (Building Authority)	

Time Frame for Action Plan

Immediate Action

a) Devising new building regulation 'Floor Area Ratio': Done by the Ministry of Housing in June 2006 with the help of professional institutes and environmentalist group.

b) Devising detailed areas plan → To be commenced by the Institute of Planning in January 2007 layering social and environmental parameters.

c) Creating opportunity for capacity building for all: On going project of BRAC University, Department of Architecture

Long-Term Action

a) Balance between rapid urbanization, densification (Mahtab-uz-Zaman et al, 2000) and socio-environmental qualities , where environmental plans need to be integrated with the city master plan, as this is significant element which has already been established as part of good governance by many countries (49% of the world's cities have established urban environemtnal plans (Åstrand J., 2006a).

Expected Outcome and Benefits of Action Plan

A. Social Benefits (Mahtab-uz-Zaman et al, 2006)

- Floor Area Ratio-generated open space allows more open spaces; water bodies; and pedestrian tracks that generate following activities:
- Encourages social activities, such as, children's play area nearby their home; aged population light strolling areas, as in tropical climate outdoor activities are done throughout the year;
- Creates web of jogging tracks along pedestrian way, green and lake areas that allows people to have healthy atmosphere;
- Allows social interaction by face-to-face meeting between neighbours;
- Ensures social security by having proper visual and physical linkages through various sizes of connected open spaces;
- More open spaces means more green elements [trees and shrubs] that creates a balanced nature, in turn, creates healthy environment for residents
- Careful space design to recreate public realm in urban settlement means more social cohesion and ensured justification of urban space and avoid 'unfilled container of space' (Grundström, 2005), thereby protecting these spaces from illegal encroachment and shifting land-title. This also ensures gender-level activity since exposing both genders in urban spaces mean a strong social cohesion and less attitude of social crime. This works well in a settlement where low and middle-income group of people interact within informal settlement.

B) Environmental Benefits (Mahtab-uz-Zaman et al, 2006)

In the context of Dhaka the benefits are no doubt achievable by following outcomes of Floor Area Ratio method:

- Create air circulation passage/tunnel by increasing set back
- Create direct sun light passage on open areas by reducing building footprint
- Reduce urban heat island by re-creating greeneries on open areas
- Reduce cost of artificial air cooling method as a result of increased natural ventilation
- Maintain the existing character of established residential neighbourhoods
- Minimize the out-of-scale appearance of large homes relative to their lot size and to other homes in a neighbourhood

- Minimize loss of light and privacy to neighbors caused by the construction of large homes
- Minimize the environmental damage of tree removal and grading or destruction of natural features which may result from overbuilding
- Permit reasonable expansion of existing dwellings in future.
- Recharging ground water table
- Careful delineation of roofing materials must be done as most of the urban slums have roofs having non-innovative materials and detailing that trap indoor heat accelerated by low intensity of airflow, thus, create discomfort. Innovative studies on roofing configuration and materials are available in the study of Landaeta and Larsson (1987).

Action Plan

Controlled Institutional Support for Cooperation in Slum Redevelopment

Slum improvement should not be taken as one-way investment from the major stakeholder, such as government or non-governmental organizations, since investment cannot ensure capacity building for any collective community-level effort for the consistent upgrading process by the slum-dwellers themselves (Mukhija, 2003). Rather it is the method of enabling them to combine their resources; receive advise of capacity builders; and take collective responsibility, micro-credit in this case (Yunus, 1998) for ensured/insured ‘return on investment’; and upgrade their built environment according to the new building regulation for ‘social and environmental’ upgrading.

Following lists of action plan refers to a dynamic urban development framework that requires regular scrutiny and changes to combat emerging crises. Therefore, these action plans will work as framework for formulating detaled area plan.

A. Social Qualities in Shelter Design and Development

By Orgainsational Changes to enhance social inclusion

In order to limit the growth of unauthorized housing decelopment in the city; to make city management accessible to the people living in squatter; and to make these people living in squatters part of the urban decision making process, it is necessary to initiate changes in organisations involved actively or passively in solving housing crisis as demonstrated by Landaeta (2006). For instance, avoiding occasional voting

power creations and allowing these people act as stakeholders will encourage these transiet people to become more accountable and concered about urban management and eventually this means incentives for them to avoid violance and self-management responsible for a harmonious urban environment.

B. Environmental Qualities in Shelter Design and Development

By Sustainable Design Framework

Rosenlund (2006) refers to a holistic approach to create a sustaibale design framework where climate, biolclimatic, passive/active, ecology, and environmental friendly componenets are pre-requisites to a sustainable shelter design.

By setback rules in the new building regulation 2006, Dhaka city will liely to have a chance to accommodate buffer spaces for natural sir flow and ventiallation as passive methods of cooling and reduce dependency in active (air-conditioning). Although hybrid system may need to apply depending on the variation in density profile (Resenlund, 2006). By passive cooling methods, smaller lots of residential development will subsequently create greater chances of generating less urban heat island in the long-run, especially at night; and in turn enhance comfort, energy efficiency and economy and reduce disease caused by discomfort.

Energy efficiency in building is essential to maintain as this effects environment in short and long term. Environment impact of construction industry by way of auditing building material and its energy to produce and to create waste is far more important than mere construction management (Den-Petrossian and Jhansson, 2000). Low energy building design for Dhaka city requires to be taken seriously as energy crisis is a regular phenomenon in the city where load shading and financial losses are severly effecting productivity of the population.

Passive techniques should be sought to resolve energy crises in building as demonstrated in Rosenlund (2000) and Adamson (1991). Urban surroundings should be carefully studied before master planning and placement of building footprint. Building forms and its footprint should be appropriate addressing the micro-climatic conditions that will allow building to have good indoor lighting (Küller, 2004). Locality and its advantages should not be neglected as there are ranges of passive environmental elements available for designers.

C. Integration of User Need into Housing Design and Development Process

This will reduce greatly the disjointed approach to housing design. The new building regulation has potential to respond to social criteria into design process provided

designers use the social criteria as strategic reponses to social crises. This is a sustaibale strategy as demonstrated in Åstrand N. (2006c), where it is arguably established that housing is a multi-faceted field involving political, economical and technical aspects of producing housing units without ignoring the cultural and social needs of the end users.

D. Appropriate Density Measures

Appropriate housing density has positive effects on overall social and environmental qualities of a city. Dhaka city needs a sustainable approach to solve density problems. Acioly Jr. and Davidson (1996) has described the pros and cons of high and low density in various regions, where social interactions and micro-climatic benefits can be achieved through a rigorous calculations of density profile for various parts of a city. Other wise spontaneous settlement cannot geneate a balanced growth with social and environmental qualities at risks (Appasamy, 1994). To do that regularization of spontaneous settlements need to be tested in the city (Mercado and Uzin, 1996).

E. People-centred Approach to serve Urban Poor

McRobie (1996) demonstrated several approach to create a people-centered approach to serve urban poor which has symbiotic effects on improving overall livelihood of urbanites. There are seceral measures studied: community-based programme, organized self-help as in Sri Lanka; community development by UNICEF's Urban Basic Services Programme in Guatemala City; Credit Schemes of CHF and UNICEF targeting peri-urban sanitation problems; and lastly the Grameen Bank which can be tested in urban area also.

F. Solving Water Table Depletion and Water Supply

Innovative methods should be learnt from other countries. Chattopadhyay (2001), generated a baic understanding of practical methods of water supply and sanitation in Asian cities where detailed research is available on appropriate standards and technological choice; methods of extraction, conveyance and treatment; use and maninatenance; environmental impact ; water supply and consumption options; etc.

G. Capacity Building and Public Awareness for ALL

Since the common notion of a) preventive strategy (school expansion and reform would bring solution to adult education and b) 'children first-adults later' strategy have proven false (Torres, 2004), 'children_adult'-imbeded educational and capacity building program can help work better for both children and their parents. These

work symbiotically which has been proven through a consistent effort of capacity building program Arch.KIDS (Architecture and Environment for Kids at BRAC University (Mahtab-uz-Zaman, 2005). This is based on question and answer platform as an effective methods (Gustafsson, 2006) cater for children. Capacity building refers to good governance provided civil society are involved into urban development decision making process. Bangladesh should move ahead with this notion in line with other 60% of the world's cities where civil society is active in a formal particiopatory process prior to the implementation of major public projects (Åstrand J., 2006a).

H. Institutional Exercise of the Benefits of New Building Regulations

My involvement in the undergraduate design studio allows me to work with students to new building regulations by ways of seeking alterative shelter problem solutions. These students will become urban managers to apply their experiences.

SWOT Analysis

City should incorporate strategic planning by layering the values of aesthetics; land use patterns; populations and building densities; transoportation and ease of access for all to basic goods, services and public amenities; since all these have crucial bearing on the liveability of settlement (Åstrand J., 2006a). Thus responding to the

'Global Plan of Action in line with the Human Rights Act 1948' (Åstrand J., 2006a) becomes prime objective of any strategic change to be expected in the development strategies and action plan. But scrutiny of any action plan needs to be done. Following **SWOT** analysis is done to assess the pros and cons of action plans:

Strength: The Floor Area Ratio has flexibility to generate various building foot print, which will allow architects to look for innovative shelter design taking into considerations the social spaces within the shelter development. Other strength is the process of new building regulation where maximum accountability can be maintained by ways of issuing 'occupancy certificates' after being satisfying any shelter design the related by-laws.

Weaknesses: The Building Regulatory Authority (RAJUK) has little apacity to control the new building regulation. Therefore, there should be continuous capacity building of the housing managers.

Opportunity: Given the urban development scenario, the old part of Dhaka city requires mmediate redevelopment, where new building regulation can be applied to rejuvenate the social open spaces, which was once a practice.

Threat: For smaller plots, the new building regulation brings little advantages. By land pooling it is possible to fully utilize the benefits of the Floor Area Ratio. Land Pooling or Land Readjustment is possible since many potential developers look for this opportunity to maximize their 'return on investment'.

Conclusion

The exercise of this kind has given a new impetus to look into shelter problem in Bangladesh in an alternative way. It is important to mention here the assistance of Housing Development and Management of Lund University with generous help through the International Training Program assisted by SIDA that has helped to compare various international shelter situations with the home country. Moreover, the well designed courses of Shelter Design and Development (SDD) has also exposed to various interpretations, theories and methods of solving shelter problems. This study is the combination of the SDD course and the experience of shelter situation from the home country. FAR (Floor Area Ratio) is a new kind of building regulation which has been shared by the faculty and participants of SDD and later the findings of this paper has been verified and refined during the course.

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