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Prospect And Exigency For Regenerating Natural Waterways Of Urban Bangladesh : Focusing The Case Of Buriganga

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Abstract

Rivers set the stage that helped Bengali society and culture to flourish. Presently the rivers especially near urban centres are to face relentless intimidation since the insistent thrust of present days' urban reality makes things more intricate. Issues like unplanned development, rapid urbanization, ecological hazards, unlawful encroachment and overall negligence are sufficient to challenge the very origin of both the socio-cultural and ecological foundation once laid by these rivers. This situation demands immediate response, utmost concern and offers ample scope of study to help ensure sustainability of these already disrupted urban settlements.

The contribution of rivers in shaping the character of urban areas in Bangladesh thus needs to be re-thought. Rivers are expected to be in their natural shape and composure; they need to be re-acclaimed, re-generated, their state re-vitalized and role re-defined in light of the historic contribution they made through ages. This paper specifically aims to identify the impacts caused by degeneration of rivers in urban Bangladesh mentioning a number of cases of degradation. This shocking revelation has further been elaborated by looking closely into the case of river *Buriganga* in Dhaka city.

Key words

Waterways, urban Bangladesh, re-generation, Buriganga

Introduction

As evident in history, almost all civilizations flourished alongside rivers for the purposes of useable water, better communication and agriculture. Bangladesh is a large delta positioned in the womb of the great *Ganges-Yamuna* basin criss-crossed by numerous waterways, both large and small to form an arterial network. There is no such land in the world that is comprised of so many rivers, ditches, ponds, creeks and low floodplains[1] defining the way of life of its inhabitants. This is why Bangladesh is better known as a *riverine* country – *'nadi matrik'* as locally called i.e. rivers playing the role of a mother (life giver) for the entire civilization. In course of time, these rivers gave birth to numerous ports (*ghat*), market places (*bazaars*), newer settlements, administrative/political centres, military stations etc. Simultaneously, businesses flourished in some locations, many centres declined and some got time-honoured as rivers determined their fate. Over the years, the songs, verses, poems - the elements of literature, have been enriched and surely influenced by this way of *riverine* life. Here, rivers laid the very foundation for an agrarian society and are responsible for most cases of well and woe of each individual residing. Rivers, therefore, helped formulate the culture for Bangladeshi population and could easily be termed as one of the most important element of its heritage; surely they kept hold of the sustainability[2] for human settlements in this country.

Meanwhile, the prevailing scenario in urban Bangladesh is not very promising since the role of rivers both as 'elements of cultural heritage and of nature' is under serious threat. Following the path of economic development, its major cities like Dhaka (and also minor ones) are unceasingly growing. To accommodate this rapid urbanization, supporting infrastructure (like buildings, streets, water pumps, sewer lines etc.) is growing at a quick pace as

well. Shear insensitivity in the name of development adds to this situation and waterways which once helped grow these towns and cities are being invaded, filled in, and encroached; those which are still surviving at a dismal state are now used as mere drains to carry off all the pollutants and waste that these very towns and cities produce. Natural events like sedimentation and manmade affairs like withdrawal of upstream water at the border have additionally affected the already disrupted waterways and aggravated the scenario further. This is how these 'elements of cultural heritage and nature' have turned down at established urban centres like Dhaka to put sustainability at stake. Keeping the prediction of the World Health Organization (WHO) in mind that over half of the world's entire population is going to live in cities by year 2005 (WHO, 2000) and also the fact that at this rate Dhaka will grow to become the world's second largest metropolis (UNHABITAT, 2005), it is of utmost concern that this natural heritage need to be immediately looked after. As this hyper-urbanization trend has already taken toll of these waterways, the issue of regeneration evidently comes into the scene and demands this catastrophe to be taken into immediate considerations.

From 'Urban Regeneration' To 'Regeneration of Waterways'

Regeneration is a combination of institutional, economic and social enhancements through physical rehabilitation. It combines the analytical and practical skills of environmental, engineering, transportation, planning and design professionals to assess the constraints and opportunities of a site (Wikipedia, 2006). Synonymous terms like redevelopment, restoration, preservation, revitalization etc. often accompany regeneration as they are considered essential parts of it. On the other hand, urban regeneration is considered as the transformation of an urban precinct or community that has displayed the symptoms of environmental, social and/or economic decline. It imparts new life and vitality into an ailing community or area to ensure sustainable and long term improvements to local quality of life that includes economic, social and environmental aspects (Evans et. al., 2004). In biologists' perspective, typical restoration goals for waterways include pollution remediation, improvement of habitat for specific species, aesthetics and increased productivity of fisheries (Casagrande, 1996). On the other hand, US Environmental Protection Agency (EPA) describes 'waterways' regeneration' as promotion of partnerships among all organizations to reduce pollution loads, restoration of ecological integrity (improvement of events like fish passage, water quality, brown fields, sedimentation, forest coverage, flood damage and wetland acreage), improvement of access to rivers, enhancement of public and private participation, and development for recreational use (Anon, 2006). The definition of urban river regeneration, therefore, aims to address the previously discussed 'symptoms of environmental, social and economic decline' and also 'long term improvements to quality of life' considering all urban realities of present day.

In the 1992 Rio Declaration, one of the key policies stated, *"Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature"* (WHO, 2000). It is true that the rivers and waterways are not the primary means of communication anymore these days; neither do they supply that much they used to. But, it is not sensible for today's towns and cities to turn their back to 'once life-givers' and disregard their contributions. There is nothing we are doing to conform to the Rio declaration - the sheer negligence for waterways is already showing us signs of both ecological and social degradation (flooding or fall of ground water level, dilapidation of river front's spatial quality etc.). At this defining moment, as the definition suggests, regeneration 'is' the rational way out. It is time now to appreciate, scrutinize and contemplate on what we already have, followed by a sensitive, well thought-out and logical clarification regarding anew appraisal and improved use of waterways; only such a situation is likely to bring in an affable atmosphere for a sustainable urban development.

Objective And Methodology

In light of the discussions made above, the author wishes to find out the following:
- Current state of Bangladeshi rivers (especially urban) by identifying problem areas that threat regeneration.
- Potential policy framework that might come beneficial in this particular form of regeneration.

This work is based mainly on literature survey; the subsequent discussions will try to assess the degree of impact on rivers with reference to three broad areas: society, economy and environment[3] followed by problems that threat regeneration. Here, the specific case of *Buriganga* River will be elaborated to check on these three areas. Newspaper references will be frequently conferred to find out the latest on rivers and other waterways. Additional information on similar rivers and waterways in other areas of Bangladesh will also come up wherever they will be felt necessary.

Fig.1 : Pollution in Buriganga
Source: Ahmed, 2007

Fig.2 : Encroachment (south of first bridge)Source: Ahmed, 2007

Fig.3 : Road on Dholai Khal, 2006
Source: Ahmed, 2007

Identifying Problem Grounds : Social Impacts And Management

Dhaka is now the capital and the largest city in Bangladesh. It became a tactically important place for the *Mughals* for being beside a river network including the *Buriganga*. Like many other cities, Dhaka played the part of a transitional point for many business ventures as history suggests. Not to mention times earlier than the 1960's, 50 canals (*khal*), both natural and man made, with a combined length of 256 km criss-crossed the city (Tawhid, 2004). Presently, it is difficult to think of *Dhanmondi, Gulshan, Baridhara,* or *Uttara*[4] areas as being anything other than absolute jungles of residential apartment blocks swarming with schools, coaching centres, private universities and clinics. There were once lakes and canals running through the city areas like *Segunbagicha, Purana Paltan, Gandaria, Narinda, Rampura* and *Bashabo*[5] which can only be traced on maps these days (See fig. 4 & 5 to compare) [6]. To put a count to it, about 250km^2 of watersheds around the city surrounded by the rivers *Buriganga* and *Shitalakhya* have either been encroached upon or dried up (Khan, 2005). These waterways used to be as well as channels for natural drainage of surface water. *Buriganga*, concurrently, established the active frontage for all kinds of public activities and development to take place. The riverfront, thus, constituted the cultural and economic corridor of Dhaka; it used to be a vibrating waterfront delighting the citizen as an incessant source of aspiration. At present, these seem more like fairy tales.

The sad interpretation of the true contribution of waterways and their value as components of heritage is possibly the most prized ground that we are fast losing. We are probably hiding from our future generation. Most of the children, youth and even adults living in the comparatively newer parts of the city are utterly unaware of the fact about which might be the historical part of the city that marked the beginning of the city they are living in. It is very much impossible for them to grasp by noticing *Buriganga's* overall composure, surrounding environment, its present size and even by the colour or smell of the water (fig. 1& 2) that merely flows through. As time went by, *Buriganga* became a meagre entity and turned out to be the backyard of the city. Now, amongst the domination of machine in our prevailing society, in the midst of all these artificialities, we are restraining our young ones from this truth – it is near, yet it is so far away!

The need to understand values associated with natural resources is another phenomenon which is frequently overlooked during the process of policy development (Kellert and Clark, 1991). In Bangladesh, equity in use, impartiality in benefit sharing and justice in maintaining partnerships have been seldom present during this process. In addition, the opinions of people who live near the area questionable were seldom taken into consideration because most of the decisions are made on a table, usually from a considerable distance away from the actual scene. A project taken by Dhaka WASA (Water and Sanitation Authority) in 2000 titled 'Rehabilitation of *Dholai Khal*' describes that in 1964, *Dholai khal* was filled in for carrying out development works without really considering its overall effect on socio-cultural environment (Tawhid, 2004). Nobody was asked for, no questionnaire was prepared to conduct any survey - it has been a prime example of what has just been discussed above (see fig. 3). Development of public policy thus always demands an understanding of human perceptions and values in order to ensure that policies are effective and justified; it is particularly important for restoration projects in urban areas where many people are likely to be affected.

Management is another vital aspect for every urban development scheme; it defines the role of various users and designates responsibilities to each of them. The

Fig.4, Buriganga, 1914
Source: www.bdix.net, 2007

Fig.5, Buriganga, 2006
Source: www.bdix.net, 2007

Fig : .6, Waste dumping, Sadarghat
Source: Ahmed, 2007

major players for management are undoubtedly local authorities that work in a collaborative manner and put rules and into practice. In the case of *Buriganga*, these agencies have failed significantly even in the presence of written rules where it is prohibits any change in nature without prior approval of the government (Ferdousi, 2004). Again, groups of scholars and environmentalists (BAPA, 2002) and even foreign researchers (Mark, et. al. 1996) often point fingers towards the lack of co-ordination between the agencies like Dhaka City Corporation and WASA for failing to prevent the unlawful or execute tasks protected by laws and regulations. These groups also found that the potential stakeholders to the rivers have often been bypassed, neglected and usually kept apart from active participation in the areas like policy development or impact assessment (BAPA, 2002). The tragedy remains that the decisions have always been implemented on those bunch of people, who without knowing or contributing anything, are to face the harms of the scenario; over the years, in this manner, these people have been suffering the consequences of the fallacy.

Impacts On Health and Economy

Rivers historically played and still plays a lion's share in building up and support the economy of Bangladesh. Over the years, four major sectors are being blessed with contributions from these waterways namely agriculture, fishery, useable water and navigation (Rahman et. al., 1994). If agriculture is excluded from this discussion as being secondary component not affecting an urban scene directly, the program for regeneration of urban rivers must still take the remaining three sectors into account. Now, to commence with fisheries, like many other rivers in the country, the *Buriganga* also used to produce a considable amount of protein that the citizens of Dhaka would possibly require (Khan, 2007). Presently, the river has reached a stagnant position with black, slimy, stinking water due to continuous dumping of untreated wastes; the flow of water is now almost non-existent. Similar stories have also been recorded of rivers like the *Shitalakhya* at Narayanganj (Anon, 2001) and *Rupsha* in Khulna (Khan, 1993). The following table : 1 shows cases of degradation associated with the water quality of *Buriganga* River:

Transport accounts for about 8% of GDP and water navigation for about 15% of total transport GDP (WB, 2005). Transportation using river route is still cheaper than carrying loads using a land route (Islam, 2007). But it is still felt that the full toll has not been taken from the river navigation sector. For an urban area like Dhaka, waterways have never really been thought of as an alternative means of mass transit as observed in European cities like Amsterdam or Venice. There have been talks of circular waterways around Dhaka city to lower the traffic loads on streets and add to mass rapid transit system in order to cut down travel time and expenses (Anon, 2007); but, it never really took any effect in reality. In addition, the required depth for navigation has also condensed alarmingly. According to the classification prepared by Bangladesh Inland Transport Authority (BIWTA), class-I routes should have the least available depth of 3.9m; but their surveyors found depths lower than that at various navigation points in river-ways surrounding Dhaka city (Islam, et. al., 2006) to challenge regeneration.

Environmental Impacts

Buriganga is getting polluted over the years causing serious environmental degradation affecting the capital. The pollution problem is the outcome of both natural events and human interventions. Lack of adequate pollution control measures has played its part too. The natural reasons include hydraulic and morphological changes in the rivers around Dhaka (and also with the whole country). For Dhaka, gradual sedimentation in the *Buriganga-Turag-Balu-Lakhya* river systems reduced the carrying capacity of the channels, causing no-flow condition during the dry season. Besides, the Feeder Rivers from the source do

Table, 1: Showing various types of risks associated with degradation of water status in Buriganga River.

Types of degradation	Status
Fall of subsurface water level	Tube wells are dug up to a depth of over 100m in various regions of Dhaka; pumps are being sunken 10 to 20m deeper every year (Khan, 2005). In the Dhaka City Corporation Area, ground water level has fallen by 20m in the last decade alone. Water is now essentially being mined from the aquifer underlying Dhaka city (BBS, 2004) and creating vacuums beneath the subsurface to leave buildings vulnerable to earthquake.
Deficit of water supply	Invariable deficit of 18-20% from actual demand through the years 2000-2003; situation is not to change a great deal since replenishment is virtually impossible due to fall of water flow in *Buriganga* (WASA, 2005).
Health hazards	Skin rashes and diarrhoea are common for the inhabitants living by the river *Buriganga* (Khan, 2007).
Level of Oxygen	Oxygen in the river is close to zero for which its marine life has depleted (Hossain, 2005).

not receive flow due to drying up of the off-takes in the dry season. Heavy sedimentation at the off-take and river reaches is the major environmental problem impeding sustainable development regarding *Buriganga* (Hossain, 2005). On another hand, human activities and interventions include encroachment on the river beds, floodplains and low lying areas, sewage and solid waste disposal, unsatisfactory sanitation condition, industrial waste disposal and scattered development of slum areas in Dhaka city. In July 2001, BIWTA prepared a list of 309 illegal establishments by *Buriganga*. However, environmental activists asserted that the illegal structures might be as high as 5,000 (Tawhid, 2004). Recent information shows that the encroachers have reconstructed about 200 new structures, demolished previously (Alam, 2006). The following table: 2 shows some facts on waste/toxic disposal scene into *Buriganga*:

Seasonal inundation or water logging due to heavy rainfall is a regular calamity that our cities and towns face rather frequently; it is hard to forget the devastating floods of 1998 or the water logging of September 2004 in Dhaka (See fig. 9) (Tawhid, 2004). Since the *Buriganga* has been intruded, canals within the city already being claimed or encroached and natural water bodies at the city fringes gradually eaten up, Dhaka has certainly became a big basin with no outlet. The presence of circular embankments around the city also added to this situation and rather curious means like pumps are now used to remove water from this basin in times of water logging. This is only a makeshift solution and at the same time quite insensible one which clearly overlooks the root cause to this situation.

Keeping *Buriganga* in mind and looking at other rivers in Bangladesh, there awaits a shocking picture; researchers warn that the river system of Bangladesh might die out (Rashid, 1998). Water Development Board (WDB) officials inform that 25 rivers, parts of which have already turned stagnant, will dry up completely in a few years since their route length shrank from 24,000km to 3,800km. The rivers declared dead are *Narasunda* (Kishoreganj), *Bhubaneswar* (Rajbari, Faridpur), *Bibiyana* and *Shakha Barak* (Habiganj), *Palang* (Shariatpur), *Burinadi* (Comilla, Brahmanbaria), *Harihar* and *Mukteswari* (Jessore), *Hamkura* (Khulna), *Morichap* (Satkhira), *Bamni* (Lakshmipur, Noakhali), *Manos* (Bogra), *Baral* and *Chiknai* (Natore, Pabna), *Hisna* (Kushtia), *Musakhan* (Rajshahi, Natore) and *Bhairab* (Kushtia, Meherpur, Chuadanga, Jhenidah, Jessore, Khulna, Bagerhat). The rivers marked as near-dead are *Karatoa* (Panchagarh, Nilphamari, Rangpur, Bogra, Sirajganj), *Ichhamati* (Pabna, Manikganj, Dhaka, Munshiganj), *Kaliganga* (Kushtia, Jhenidah, Magura, Narail, Pirojpur), *Kumar* (Kushtia, Magura, Faridpur, Jhenidah, Madaripur), *Chitra* (Narail, Chuadanga, (Jhenidah), *Bhadra* (Jessore, Khulna), *Someshwari* (Netrokona) and *Nabaganga* (Narail) (Roy, 2005). The zone wise evaluation also conforms to this statistics; in north, the *Mahananda* basin is frequently flooded and

Table, 2: Various types of toxic/waste disposed into the Buriganga

Types of waste	Statistics
Tannery industries	21,600m^3 of liquid toxic, dumped everyday from the 185 tannery industries of *Hazaribagh* (Hossain, 2005).
Other industries	12000m^3 of untreated waste, dumped from the *Tejgaon* industrial area; in addition, 35,000m^3 of untreated highly toxic industrial waste, dumped daily from industries other than *Hazaribagh* (Hossain, 2005).
Heavy metal	On any given day, presence of heavy metal near the first China -Bangladesh friendship bridge measures like this (tolerable limit for drinking pr escribed by DoE is presented within bracket) , Al: 3.27(0.2), Cd: 0.014(0.005), Cr: 0.036(0.05), Hg: 0.0021(0.001), Se: 0.001(0.01), Zn: 0.56(5) (Anon, 2007).
Sewer lines	40% of total untreated waste , from the 500km long sewerage lines produced by more tha n 12.5 million people of Dhaka city, dumped in the river each day (Hossain, 2005).
Oil spills	Spilling out of oil from hundreds of vessels navigating the river(Hossain, 2005).
Human waste	Human waste is thrown from the 46.5% of the total latrines in Dhaka city hanging by the river (Anon, 2007).

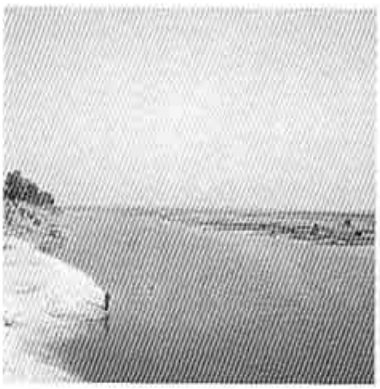

Fig.7, Padma, recent picture
Source: www.photoeye.com, 2007

Fig.8, Gorai, recent picture
Source: www.deme.be, 2007

Fig.9, Dhaka floods, 200
Source: images.google.com.bd, 2007

also subject to droughts (Rashid, 1991); the mighty *Padma* is also drying up fast alongside small rivers and tributaries (fig. 7). At present, more than 40, out of 53 rivers and tributaries totally dry up in January every year in the northern region (BSS, 2006). In south, once major rivers, the *Gorai* (Anon, 2001) and *Kapotakhya* (Kabir, 2005) are drying and many others are in the process (fig. 8). In south-west, four rivers have already dried up and 20 others are destined to this fate (Das, 2005). In the east, rivers are under threat of facing desertification (Anon, 2005).

Indication On Policies

Despite all the degenerating consequence of rivers, a sustainable city is deserved in the end. Such a city must be multifaceted, sympathetic to nature and well designed in terms of public spaces and buildings. Responsive regeneration, that is why, would only help raise the quality of sustainable environment within the city. In a similar accent, Simonds (1983) states, *"We human beings need and must have once again in our cities a rich variety of spaces....we also must have order....an order as organic as that of the living cell, the leaf, and the tree....and combines the best of the old with the best of the new....such a city will not ignore nature."* But it is tragedy that the natural waterways have been neglected over the years at many urban scenes like Dhaka although they held and still holds tremendous potential of becoming resources for both community and economy. If harnessed, they are certain to present significant opportunities for neighbourhoods to grow around them. Against all these conditions, a plan could be aimed at the creation of an *Ecopolis*[8] towards the policy framework for a safe environment with more recreational space, presence of nature and commerce to pertain overall economic development:

Social Well-Being And Governance

Appreciation of river as an element of heritage and a maker of history through advocacy, education and participation in various demonstrations on awareness raising.
Sustainable environment for the future generation; a cityscape abandoned with natural features that reminds citizens of its culture and heritage.
Psychological development through recreation; harness potentials of river(water)fronts for socialization of citizens.
Ensuring river for everyone; people adjacent, general citizens, businesspeople depending on rivers.
Inter-sector and co-ordinated approach towards addressing the problem of regeneration.
Partnership development (involvement of stakeholders in the policy making process).
Overall management to look after the consistency and continuity of adopted policies and their implementation.

River Related Economy

Development of prosperous harbour near CBD without hampering any stakeholders' interest (range will vary from the interest of a small child to the fisherman or boatman who earns his living using the river).
Use river for income generation and poverty eradication (incorporation of people living around the waterways).
Enhanced use of river both as sources of fish and as route for waterborne navigation and transportation.

Environmental and ecological issues

Remediation[9] and immediate restoration of waterways with environmental significance; illegal establishments, encroached banks are to be retained; silted up beds to be dredged.
Raise awareness level of citizens towards a clean and healthy river.
Implication of urban forestry[10] as counter measure

against erosion and to hold back soil humidity.
Refurbishment of previous connections to other rivers and streams and set up new ones if possible.

Design Aims[11]

Vibrant waterfront districts and neighbourhoods with activities.

Permeability[12] of the area (both visual and physical) to relate to surrounding districts.

Priority for pedestrian movement and good traffic control.

Extension and treatment of public open spaces adjacent and connected with river(water)fronts.

Encouraging movement and activities around public areas.

Sympathetic landscape to fit and serve specific context.

Conclusion

Today, rivers and wetlands are amongst the most threatened ecosystems worldwide. As an effect, restoration of rivers and wetlands has emerged as a global concern as well as a flourishing business venture. Bangladeshi rivers especially deserve regeneration and re-appraisal simply because they would not only bring in monetary benefits but would also ensure a touch of 'green' also in our already 'brown' urban precincts. Now, we are on the verge of asking ourselves, would we rather have cities that we treasure as the progenitor of our civilization, as engines of economic development, and as culturally rich habitat for man or cities that are no less than ongoing nightmares for anyone who would reside or visit there, or even contemplate from apart? The above study tried to depict the current state of natural waterways near Bangladeshi urban centres like Dhaka. The study shows that we are at complete denial about what is currently happening to them, to our 'mega-cities' and also about the fact that the situation is not getting better by any means anywhere. We have accepted our cities as places which help earn money at the expense of heritage; but we probably failed to recall the value of the term 'heritage' and its contribution in making of a 'humane-society'. Probably we have not done our best yet since we have not used up or looked into all that is available around us. If we acknowledge the need for 'living' cities, and identify the resources of our historic environment, many of our urban problems are sure to be resolved. This is the moment of truth, this is our preference – we can actually choose to turn our urban nightmares into treasured dreams once and for all.

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End Notes :

[1] Bangladesh has 700 rivers and major canals covering 6% of the country's entire area which have a combined length of 22,755km.

In addition, major standing water bodies cover 1,922km^2 of land area let alone other privately owned water bodies (BBS, 2002).

[2] Sustainability means using the existing resources in the finest possible way. It is, economising of all resources including material,

economic, human and cultural. A sustainable development should be able to meet the requirements of the present without compromising the ability of future generations to meet their own needs.

[3] According to United Nations, society, economy and environment are the basic components for a liveable habitat (UN, 1998).

[4] Prime residential areas of the city – *Dhanmondi* is the older residential area while the rest are comparatively new. The similarity

lies in all of them being crowded now with commercial & other developments and devoid of the sanctity they used to have initially.

[5] These areas are mainly adjacent or beside the older part of the city.

[6] The circles on maps mark *Bangshal* in old Dhaka. Arrows in fig. 4 used to be the canal excavated by the *Mughals*, absent in fig. 5.

[7] According to the Environmental Quality Standard (EQS) of DoE, a minimum value of dissolved oxygen (DO) 4mg/l is considered

acceptable for fisheries and aquatic life to sustain.

[1] Concept of settlements where urban agriculture, urban forestry, urban bio-diversity conservation, and building design to save

energy and material and these become important considerations.

[2] Removal of pollution or contaminants from waterways for the general protection of environment.

[8] Care and management of tree populations in urban settings for the purpose of improving the urban environment

[9] Intent or purpose; efforts towards achieving a goal in an urban scenario as defined by the social scientists (UN, 1998).

[5] Relates to the way that a design suggests where people can and cannot access within a city.