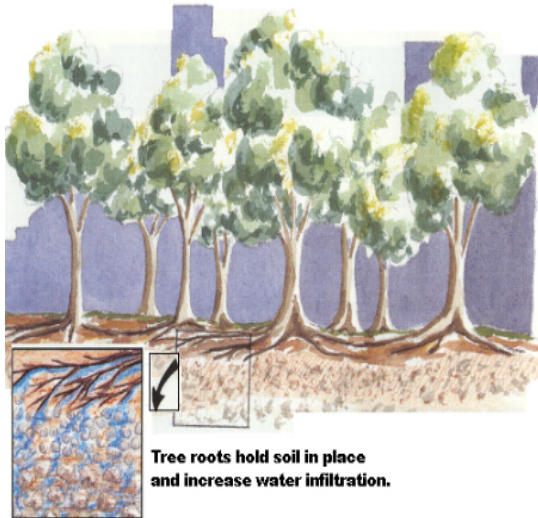
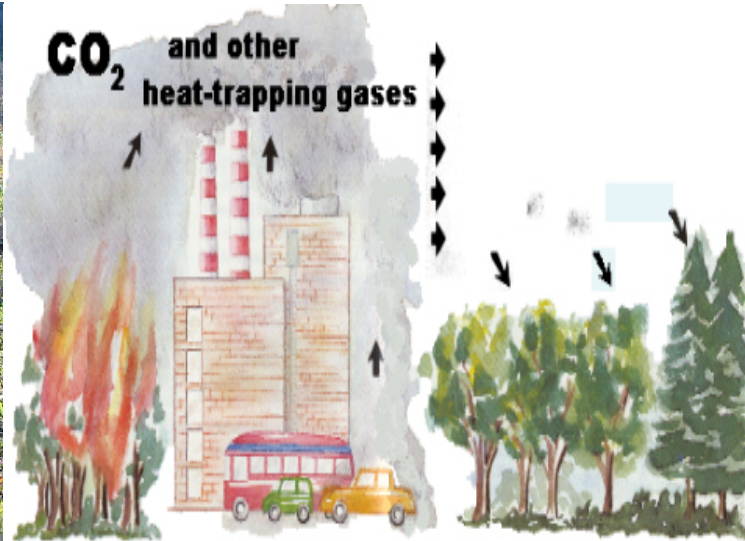


# The relationship between Urban Forestry and Poverty Alleviation

## -Dhaka as a case study



**By : Mohammad Nasir Uddin**

**Supervisor: Dr. Thomas B. Randrup (KVL)**

Degree project within Urban Forestry and Urban Greening (P0401), 2006  
 Dept. of Landscape Management & Horticultural Technology  
 Swedish University of Agricultural Sciences, Alnarp, Sweden

## Preface

### **Foreword :**

**Course :** This is written as the degree project of Masters programme of Urban Forestry and Urban Greening at SLU, Swedish University of Agricultural Sciences, Alnarp and KVL, Royal Veterinary and Agricultural University of Denmark, Copenhagen.

**Subject :** Forestry ,Landscape Architecture/ Management

**Credit:** 15 ECTS/10 Swedish University Credit.

**Level:** C

**Tutor :** Prof. Thomas B Randrup, Danish Centre for Forest ,Landscape and Planning, KVL, Copenhagen.

**Examiner:** Prof. Bengt Persson, Dept. of Landscape Management and Horticultural Technology, SLU, Alnarp.

### **Acknowledgement :**

I would like to give my thanks and gratitude to the following persons who were involved in different ways to complete the course and writing the degree project:

**Prof. Thomas B Randrup, KVL** whose guidance and encouragement help me to complete the work within proper time and getting information materials from FAO of United Nations.

**Prof. Ronald Gustavsson, SLU** from whom I have learnt to think about urban forest in a special points of view in life. Moreover his poetic personality impressed me so much during the programme to appreciate the study on urban forestry.

**MS Michelle Gauthier, FAO** for her wonderful cooperation to get information on poverty, urban forestry related issues and information materials on FAO's Urban /Peri-urban Forestry activities.

**Ulrika Åkerlund,SLU** for acting as an expert course coordinator and enjoy the programme with fun and happiness with all of the people.

**Angelika Blom** who helped me in different ways by giving support to write the project within short time frame .

Moreover, thanks to Prof. Ola Sallnas (SLU), Prof. Jørgen Bo Larsen(KVL),Jasper Schipperijn (KVL),Prof Christian Norgoord (SLU),Prof Bengt Persson(SLU) for their all ideas and suggestions during course work .I am also grateful to my all colleagues in UFUG programme ,all SLU,KVL academic and not academic staffs including NOVA university network and my parents for giving me the mental ,economic ,social or institutional support to complete the degree project and UFUG programme .Special thanks to the KVL & SLU computer labs and library authorities for their services. Thanks also to Rasmus Bartholdy ,one of my colleague of UFUG programme for the presentation of my degree project in a seminar at SLU.

## Table of Contents:

Subjects	Page No.
<b>Preface</b>	02
<b>Summary</b>	04
<b>1. Introduction</b>	05
1.1. Background & problem formulations:	05
1.2. Hypothesis :	06
1.3. Objectives & Research Questions	06
1.4. Delimitations:	06
1.5. Definitions:	06
<b>2. Methodology</b>	07
Data Collection	08
Data Analysis	08
<b>2.1 Geography and Climate</b>	12
<b>2.2. History and urbanization</b>	14
<b>2.3. Analysis of present green resources of Dhaka</b>	20
<b>2.4. Analysis of present poverty situation in Dhaka</b>	23
2.5. Benefits of Urban Forestry for the poor	
<b>2.5.1 Direct benefits for the poor</b>	23
2.5.1.1. Creating Employments	23
2.5.1.1.2. Employment in Nursery Industry	24
2.5.1.1.3. Employment by Gardening and food production	25
2.5.1.1.4. Employment in Timber and Bamboo industry	25
2.5.1.1.5. others	25
2.5.1.2. Providing fuel and energy	26
2.5.1.3. Sources of Food and medicine	27
2.5.1.4. Source of Fodder	27
2.5.1.5. Providing Housing materials	28
<b>2.5.2) Indirect benefits of UF for the poor</b>	
2.5.2.1. Health and environmental benefit	29
2.5.2.2. Shelter & Cooling at working place in summer	30
2.5.2.3. Increasing pure water supply and protection from pollution	31
2.5.2.4. Protect from air pollutions and diseases	33
2.5.2.5. Reduce Noise Pollutions	36
2.5.2.6. Social & recreational aspects	35
<b>3. Results</b>	36
<b>4. Discussions</b>	
How can Urban Forestry address the poverty in Dhaka?	37
<b>5. Conclusions</b>	40
<b>6. References</b>	41
<b>7. Appendix-1</b>	
List of pictures ,tables and figures of the report	

## **Summary:**

Among different benefits of urban forestry, economic benefits can be given more priority in the developing parts of the world. This report described how the poor people of Dhaka can be benefited by well planned Urban Forestry Programme. By analysing the present green resources and poverty situation in Dhaka & using more practical and life experienced example, this project gave overall ideas of major direct and indirect benefits of Urban Forestry programme.

Poor people in Dhaka have already a relation in daily life for their livelihood in the cities green spaces. The standard life quality of the poor can be increased by getting them more urban forestry benefits. Industry on nursery and other forest products are creating employment opportunities to the poor and give them extra earning sources. As most of the poor in Dhaka can not get electricity, pure drinking water or other services from the city corporation, urban forestry can increase the possibility to give those services by giving fuel wood, purified water, air etc. Most of the poor inhabitants in Dhaka are working in the outdoor environment and facing environmental hazardous situations due to the continuous pollutions. City forests and trees will decrease pollutions and create a nice working environment for the poor. Moreover getting shelter during day and night poor are saving money from their different expenditure and getting security mentally or economically. Creating recreational places for street children give them the same right to grown up their children in a healthy environment. Also involving the poor in the decision making process will decrease the powerless situation of poor in the society.

This report also analyzes the data of current urban green resources in Dhaka and possibility of getting those benefits in practical real life situations .In a final discussions this report shows a possible model to address the poverty by urban forestry in a practical life situations in Dhaka.

## **Key Words:**

Poverty, Urban forestry, Poverty Alleviations, Relationships, Dhaka, Developing country, Opportunity, Empowerment, Security, Green Resources, Open Spaces, Analysis , Peri-urban, Urban Areas.

## **1. Introduction:**

It may be a linear thinking that urban parks, trees and other natural resources are playing a great role for giving pleasure for the elite class in a society. Moreover the green resources of the city are using for leisure time activities for children, pensioners and other user groups who have enough spare time to use these benefits. But more than recreational activities what other things urban forest can give to the people who are living below the poverty line in a country? In a developing country can urban forest act like other natural resources to give benefit for sustainable livelihood of the city dwellers? In the industrialized countries urban forestry is concerned primarily with environmental enhancement, landscape development or amenity provision (FAO, 1995). But a city like Dhaka as a capital of an extremely poor country like Bangladesh, the approach of urban forestry may contain other issues.

### **1.1. Background & problem formulations:**

A research shows that 54.85% of the population of Dhaka are living below the poverty line with 31.88% below the hard-core poverty line (SDNP, 2005). But poverty is not a simple phenomenon that yields to simple solutions. Poverty is an outcome for more than economic process (Visser, undated). It is an outcome of social economic, special, environmental and political factors. The means to overcome poverty cut across the whole spectrum of developing challenges such as increasing economic production, developing human resources, creating jobs and improving governance. (World Bank 1993). So may be it is not possible to alleviate poverty solely by urban forestry. But the benefit of urban forestry can help poor people to reduce poverty one step forward. For example, the parks and other green spaces have been used to give shelter during days and nights for homeless and working class people of the city. There are thousands of street children directly involved in the nursery business, (selling flowers, trees etc.) in Dhaka. Also continuous demand of furniture and non-wood forest products of the city can be a great income source for the people living in the peri-urban areas surrounding Dhaka. Moreover, 5.58 million people living in the slum areas in Dhaka ( SDNP,2005) where 60% of those inhabitants use only firewood for their daily cooking, in that case street and park trees of Dhaka can be a great source of the firewood for those people if any intensive forestry programme can be taken immediately. Moreover, the protection of catchments areas for urban water supplies; and the productive use or safe disposal of urban wastes can save a huge municipality budgets from different sources.

A lot of research has been done on the benefits of urban forestry but most of them are related to in the case developed countries or to rural areas in the developing part of the world. At present FAO has a new focus on urban areas although most of the works are not showing the link between Urban Forestry benefits and poverty alleviation. Also little research on this matter has been produced in Bangladesh.

### **1.2.Hypothesis :**

Considering some benefits of urban forestry the following hypothesis were made

- There have benefits of Urban Forestry for developing countries.
- Some benefits can be applicable to alleviate poverty in Dhaka.

**1.3. Objectives & Research Questions:** The main objective of the report is analysis the benefit of Urban Forest for the poor people in Dhaka.

So the research questions are:

1. **What** possible ways people can get benefit from Urban Forestry in a developing country like Bangladesh?
2. **How** can these benefits be applicable to poverty alleviation in the City of Dhaka?

**1.4. Delimitations:** Due to the limited time frame and resources I did not analyse all of the benefits of UF which can be applicable in Dhaka. Also I have avoided the elaborate discussions of any specific model which need more technical knowledge such as water purification engineering, atmospheric evaluations etc .This report will give only an overall idea of implementations of UF benefits in the situation of Dhaka.

### **1.5 Definitions:**

**Poor People and Poverty:** People who are living in poverty situation can be counted as poor people. Two basic “levels” or “types” of poverty are identified in the development literature: *absolute poverty* and *relative poverty*. Simply put, absolute poverty is defined as the cost of the minimum necessities needed to sustain human life. The World Bank currently regards people earning less than US\$ 1 a day (in 1993 purchasing power parity) to be absolutely poor. Relative poverty is defined as the minimum economic, social, political and cultural goods needed to maintain an acceptable way of life in a particular society. The European Union defines the relatively poor as “... persons, families and groups of persons whose resources (material, cultural, social) are so limited as to exclude them from the minimum acceptable way of life in the member state in which

they live.”(UNESCAP, 2000). In this paper the word ‘Poverty’ has used in general sense both in the absolute and relative situation of people’s living status in Dhaka.

**Poverty Alleviations:** Alleviate or reduce the vulnerable life situations of the poor can be defined as poverty alleviation. It can be done by giving them empowerment, security and opportunity in a society. This paper, while addressing both absolute and relative poverty, focuses more on relative poverty because it is expected that by getting benefit of urban forestry poor people can increase the quality of life which can help them to alleviate poverty situation.

**Urban Forestry:** Forestry considering in the urban areas can defined as urban forestry .It includes the management & creation of green areas such as plantations in parks and street, agricultural or production activities of trees, flowers or any other crops in the cities. But in this paper I have used the following definition of urban forestry from the text book, *Urban Forests and Trees*.

*“Urban forestry is the art, science and technology of managing trees and forest resources in and around urban community ecosystems for the physiological, sociological, economic, and aesthetic benefits trees provide society.(Konijnendijk et al ,2005)”*

Moreover, urban forestry should be seen as only one of a series of strategic , interdisciplinary, and participatory approaches aimed at optimizing planning and management of urban green structures in order to provide multiple benefits to urban societies .( Randrup et al, 2005)

**Urban and Peri-urban Area :** Small or big town or city where density of the populations is higher than country side and getting more service facilities than villages can be considered as Urban Areas. The area around the city or town where most of all this urban services or activities can be found are considered peri-urban areas. For example in this paper Dhaka city can be counted as urban areas and some areas very near to Dhaka such as Tongi, Gazipur, Keranigonj, Norsingdhi etc can be counted as peri-urban areas .

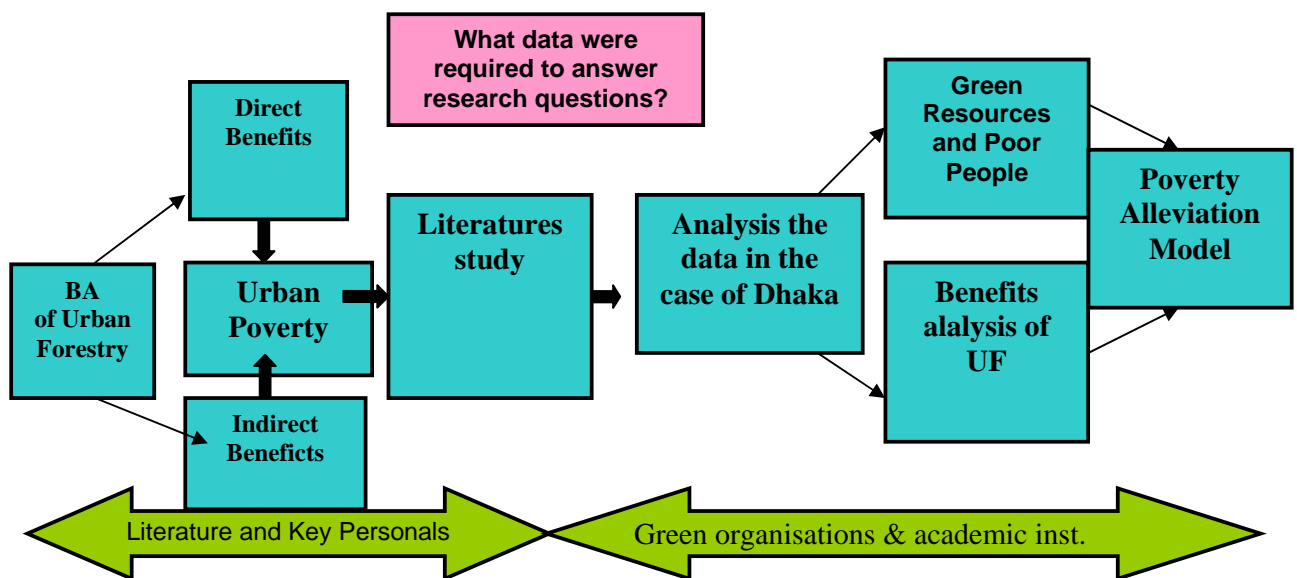
## **2. Methodology:**

**Data Collection:** Methods for this project were literature study, and information collecting from key personal in Dhaka city & various research resources on Benefit Analysis (BA) of Urban Forestry from the developed countries. Existing text book on urban forestry (Konijnendijk et al.2005. *Urban Forests and Trees*. Springer Berlin Heidelberg New York) and natural resources economics were the key resources of data on Benefit Analysis. As UFUG course literature were not enough for

my data collection, to get new literature list I did the follow up reference searching from the reference list of any books or articles after reading any specific literature.

To answer the research questions and tasks, following possible analysis have done considering present green resources and poverty situation of Dhaka

- Analysis the direct relationship of urban forestry and poverty alleviation. eg. Poverty alleviation by forest products, employment etc
- Analysis the indirect relationship of urban forestry and poverty alleviation. eg. Poverty alleviation by giving mental, environmental benefit etc.



**Fig.1 Methods of data collections and analysis**

### **Data Analysis :**

Before getting details analysis of benefits we have to know the History of Settlement and geographic condition of Dhaka.

### **2.1 Geography & Climate :**

Dhaka is located in the geographic centre of the Bangladesh in the great deltaic region of the *Ganges* and *Brahmaputra* rivers. Dhaka is served by the port of *Narayanganj*, located 16 km to the southeast. The city is within the monsoon climate zone, with an annual average temperature of 25 deg C (77 deg F) and monthly means varying between 18 deg C (64 deg F) in January and 29 deg C (84 deg F) in August. Nearly 80% of the annual average rainfall of 1.854 mm (73 in) occurs between May and June.



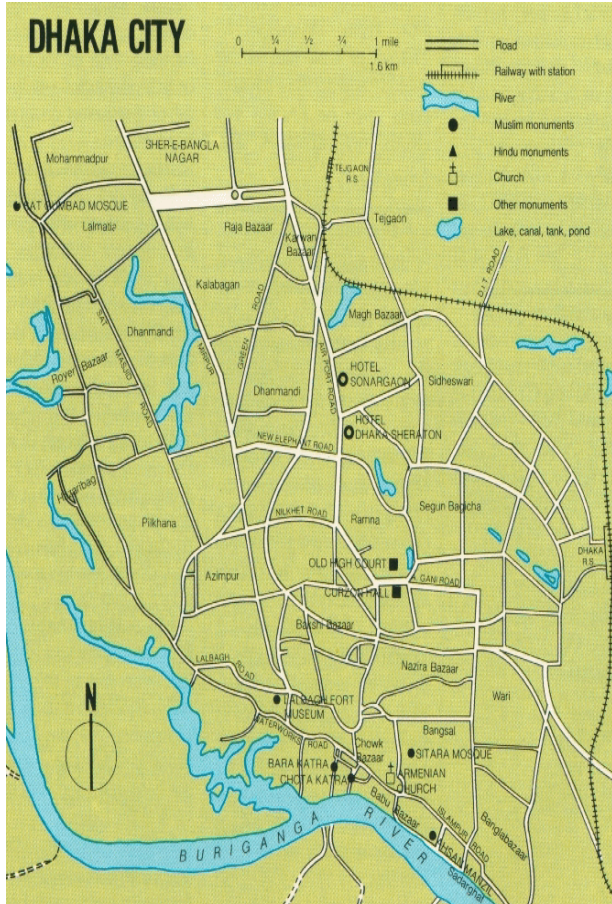


Map No. 3711 Rev. 2 UNITED NATIONS  
January 2004

Department of Peacekeeping Operations  
Cartographic Section

**Map1. Location of Dhaka in Bangladesh**

Sources: <http://www.un.org/Depts/Cartographic/map/profile/banglade.pdf>



**Map.2: Dhaka City**

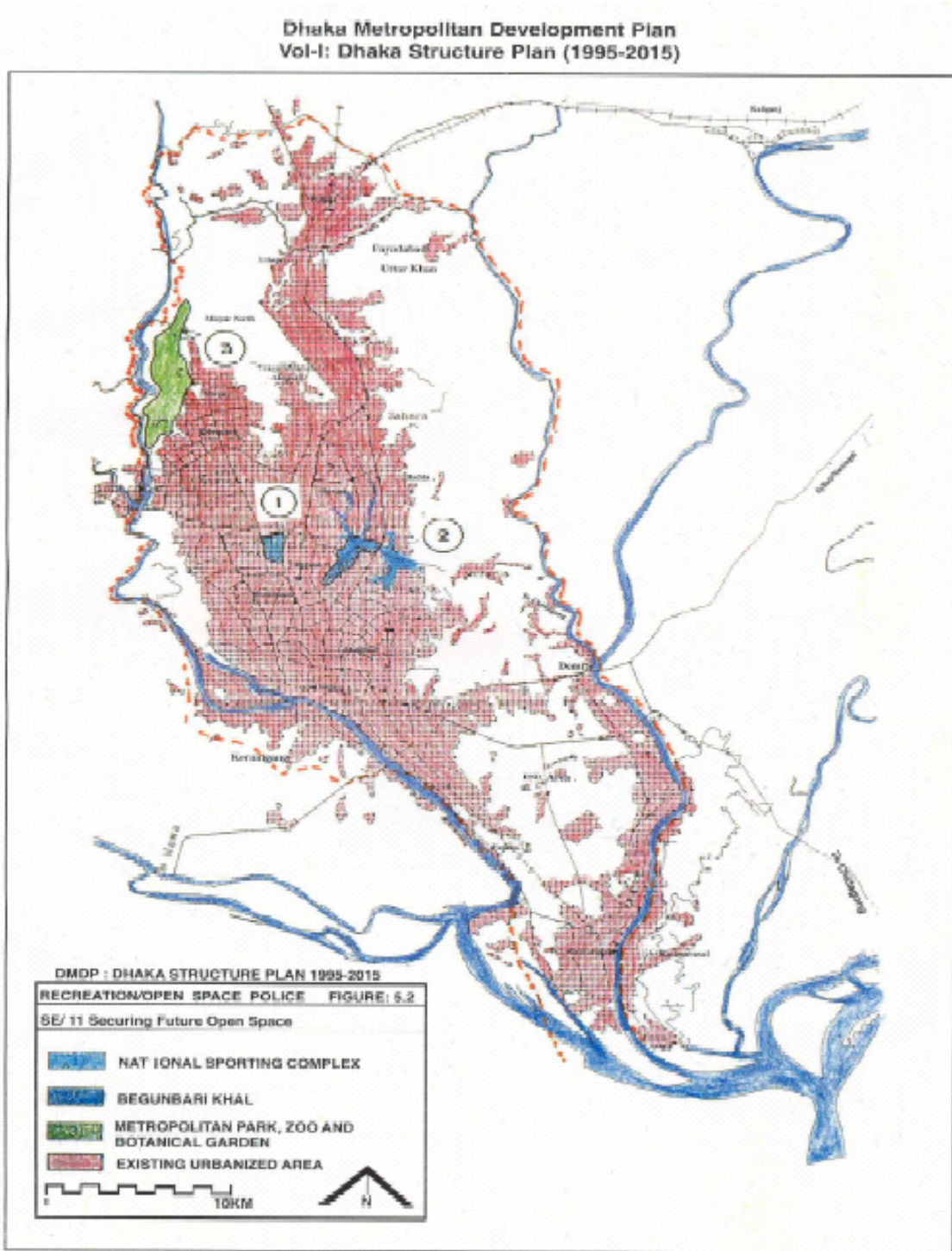


**Map.3: Forest Area in Bangladesh**

**Sources :**

2. [http://www.virtualbangladesh.com/images/dhaka/dhaka\\_map.gif](http://www.virtualbangladesh.com/images/dhaka/dhaka_map.gif)
3. [http://www.lonelyplanet.com/mapshells/indian\\_subcontinent/bangladesh/bangladesh.htm](http://www.lonelyplanet.com/mapshells/indian_subcontinent/bangladesh/bangladesh.htm)

According to Bangladesh Bureau of Statistics (BBS), city having more than 5 million population has been defined as mega city . Dhaka, the capital city is the only mega city of Bangladesh. Dhaka mega city comprises of Dhaka city corporation, whole of Narayanganj, Bandar, Keraniganj, Uttara, Savar and Gazipur thanas. The area of Dhaka City Corporation is 276 Sq Km and Dhaka mega city area is 1353 Sq. Km( BBS,1991).



Map 4, Dhaka City Development Plan by RAJUK(Capital Development Authority)

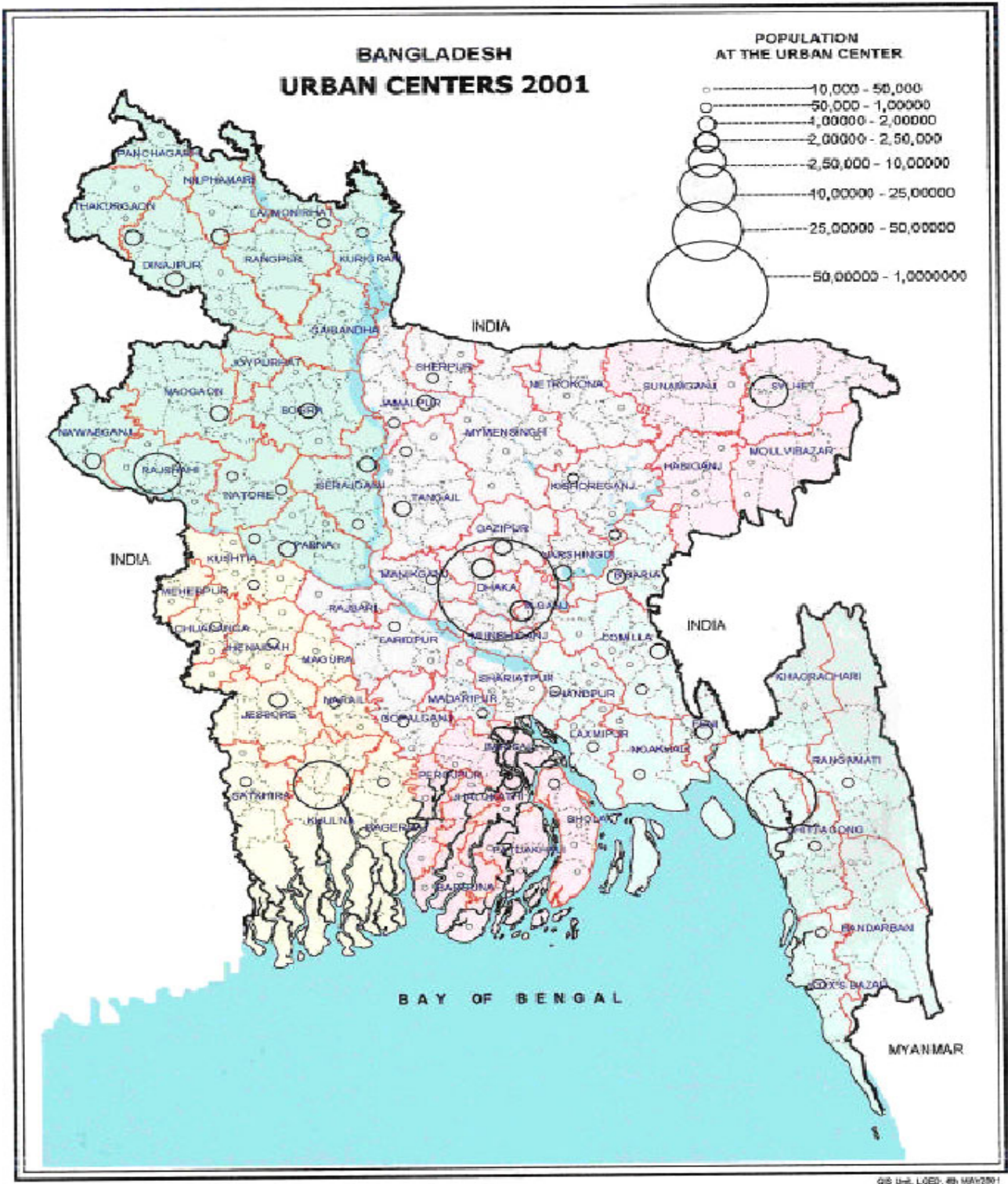
Sources: <http://www.sdnpsd.org>

## **2.2. History and urbanization :**

According to the information from the Dhaka City Corporation (DCC) websites, Dhaka is an old town and is known to be in existence since the 7<sup>th</sup> century A.D. It was under the Buddhist Kingdom of Kamrup in the 7<sup>th</sup> and 8<sup>th</sup> centuries. From about the 9<sup>th</sup> century A.D. it was governed by the Sena Kings of Vikrampur. After the Buddhist and Hindu rulers, Dhaka was successively under the Turks and Pathans for a long time (1299 to 1608) before the arrival of the Mughals. After the Pathans, Dhaka went under the rulers of Sonargaon from whom the sovereignty of the area was acquired by the Mughals. During the Mughal rule of Ibrahim Khan (1616-1620), Dhaka attained great commercial importance and became a trading centre of the whole of South East Asia. The European traders started to come to the city from 1616. However the greatest development of the city took place under the Mughal rule of Shaista Khan (1662-1677 and 1679-1689). The city then stretched for 12 miles in length and 8 miles in breadth and is said to have nearly a million people. The European settlers came in the late 17<sup>th</sup> century. They were largely Portuguese, Dutch, English and French traders. At the tail end of the Mughal rule and the inception of British power around 1765, Dhaka began to decline in importance and contract in size. The city experienced disastrous famines, floods and fires. Calcutta (at present in India) was growing in importance and it was difficult for Dhaka to compete with Calcutta, which as the Capital of British India enjoyed the patronage of the rulers. (DCC, 2002)

The fate of Dhaka was determined as a declining urban centre under the control of the East India Company after the decisive battle of Plassey in 1757. During that time (1757-1864), being an old centre of trade, Dhaka witnessed a tremendous decrease in population and its area. The population of Dhaka which was estimated to be nearly 200,000 in 1800 dropped to about 67,000 in 1873 and 51,000 in 1873 (DCC,2002). Finally with the transfer of power from the East India Company to the Crown in 1858, Dhaka started to grow more rapidly until 1947. (DCC, 2002)

From 1947 to 1991 Dhaka was the capital of the province of East Pakistan (at present, Bangladesh). After the independence of Bangladesh from Pakistan on December 16, 1971, the city's population rose suddenly to about 15,00,000 and in 1974 it was about 16,100,000. The urbanization activities have been achieving tremendous growth for the needs of the newly independent country's capital. The city began to expand in all directions including over the low-lying areas on the eastern side, such as in Jurain, Goran, Badda, Khilgaon,



**Map 5. Distribution of Urban Population in Bangladesh**

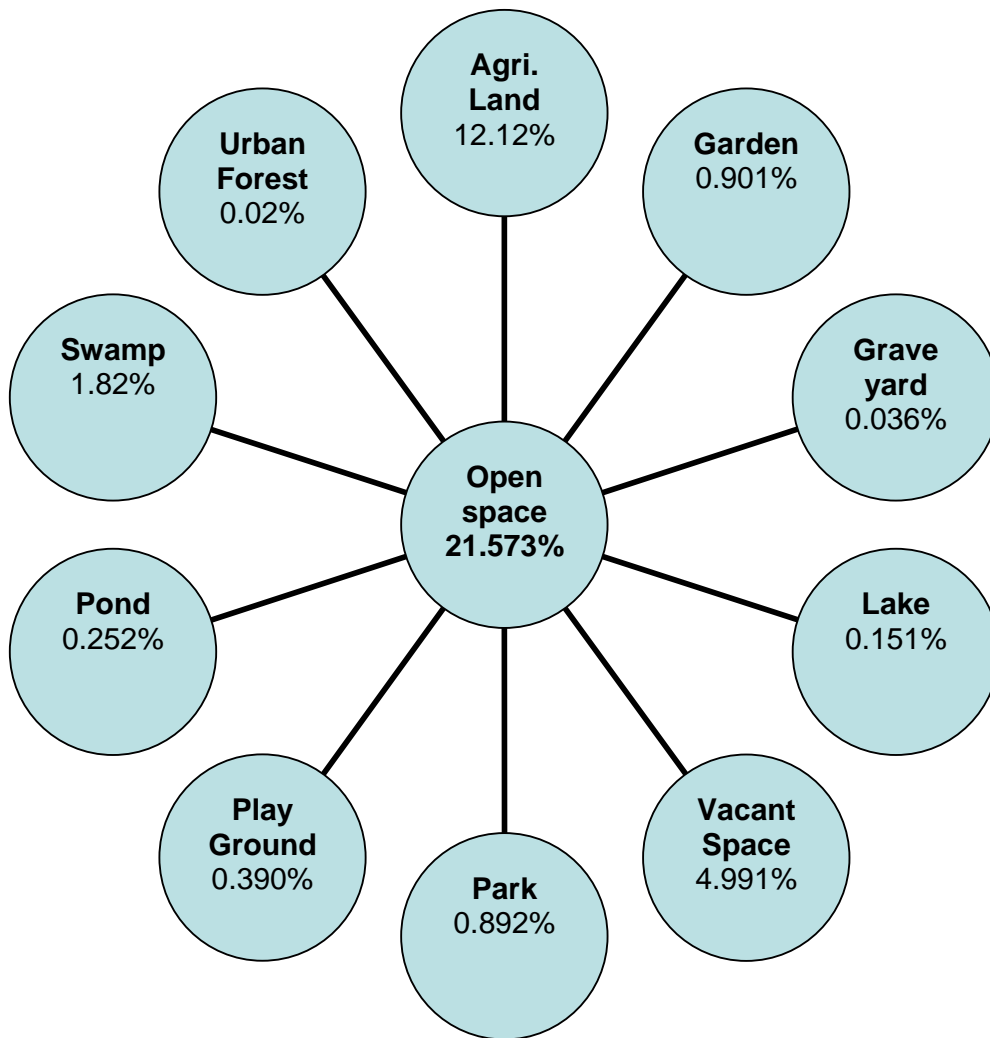
Sources: [http://www.sdnbd.org/sdi/international\\_days/wed/2005/bangladesh/index.htm](http://www.sdnbd.org/sdi/international_days/wed/2005/bangladesh/index.htm)

Rampura, and in the western side, areas like Kamrangirchar, Shyamoli, Western Mohammadpur, Kallyanpur through the earth filling (DCC,2002).In 1995, The new Master Plan for Dhaka was prepared for the further development of Dhaka City. As very rapid urban growth along with the fast increase in population and structural development started to take place in the city, this new structure plan was a must. The population had leapt to 3 million within one decade of the independence of the country and the city covered an area of about 70 sq. km. in 1980. The swamps and wetlands of the city started to disappear fast. New areas of residential, administrative, business and commercial importance began to develop. At the same time, numerous slums and unplanned low-income residential areas or squatters also grew up in different areas of the city. Keeping pace with the magnitudes of this urban growth, the new urbanized areas were being encroached in the low-lying areas in the city and even in some of the adjacent distant areas. (DCC, 2002)

The present population of Dhaka mega city is estimated at 11.3 million while that of Dhaka City Corporation (DCC) area at 5.94 million in the year 2004.(SDNPBD,2005)

### **2.3. Analysis of present green resources :**

The professional concept of urban forestry is completely new in Dhaka. Also as a city of developing country city authorities are busy most of the time to give service facilities (electricity, water, medical support, transport, communication etc.) to the people rather than think about green resources. At present I did not find any tree inventory or long term planning about park and green resources of the city .Most of the time different green institutions in the city and government deal with big urban greening programme by tree plantation activities. There are no exact area wise statistics for the percentage of trees in the city and also no area wise planning for tree plantation. From my personal observation as an inhabitant of Dhaka, only *Ramna Thana* (Ramna Police Station) is considered to have a good no. of trees. *Ramna Udyan* ( Ramna Park) *Suhrawardy Udyan* (A famous Park in Dhaka) and Dhaka University campus, all planned in the British era are the most important green spaces considering the tree density . Moreover, city has some tourist spots such as *National Parliament Bhaban*, *Chandrima Park*,*Bahadur Sah Park*,*Botanic garden and Zoo* etc. which can be considered as important urban green resources.



**Fig.2 Open Space distributions in Dhaka**

In 2002 Dhaka City Corporation (DCC) were able to plant only 29 thousand trees out of the targeted 45 thousand because of lack of empty space, according to engineer Md. Abdus Salam, the project director of the Infrastructure Development & Environmental Improvement Project of DCC. In 2003, DCC has planned to plant six thousand trees to replace those that have been uprooted, and a further ten thousand in whatever empty space is available in Uttara and Mirpur area of Dhaka..According to Mr. Tapan Kumar Das Gupta, the Chief Town Planner of DCC, an ideal city needs 20 percent areas covered by trees but there is only eight percent trees in the city. ([www.thedailystar.net/2003/06/11](http://www.thedailystar.net/2003/06/11)).



Pic1. Creating open spaces for the millions of people is a big challenge.



Pic.2. A park close to the national parliament area.



But adequate open spaces are needed for the sustainable development of a city. The following table shows that the city have only 21.573 % open spaces where 12.12% consider as agricultural land.

<b>Table1. Distribution of Open Spaces in Dhaka City</b>					
Type of Open Space	Area in acres	Area in Sq. Metre (About)	Area per 1000 People		Percent of Total Area
			Acre	Sq. Metre (About)	
Agricultural	4871.00	19712237.633	1.15	4653.884	12.12
Garden	362.00	1464962.024	0.086	348.029	0.901
Graveyard	14.50	58679.418	0.003	12.140	0.036
Lake	60.71	245684.653	0.014	56.655	0.151
Vacant Space	2004.63	8112449.790	0.470	1902.022	4.991
Park	358.46	1450636.153	0.082	331.842	0.892
Playground	156.46	633171.155	0.037	149.733	0.390
Pond	101.12	409218.121	0.024	97.124	0.252
Swamp	731.00	2958252.044	0.173	700.106	1.82
Urban Forest	8.00	32374.851	0.002	8.0937	0.02
<b>Total</b>	<b>8668.23</b>	<b>35079082.246</b>	<b>2.040</b>	<b>8255.587</b>	<b>21.573</b>

Source: SDNPBD, 2005 .Green Cities Plan for the Planet, CD publication on World Environment Day, 5 June, 2005.

**website:**[http://www.sdnxbd.org/sdi/international\\_days/wed/2005/data/human\\_stlmnt/distribution.htm](http://www.sdnxbd.org/sdi/international_days/wed/2005/data/human_stlmnt/distribution.htm)

Note: 1Acre = 4046.85642m<sup>2</sup> (Data converted into Sq. metre by using (<http://www.digitaldutch.com/unitconverter/> websites)

From the above table it can be assume that one person can get only approximately 8 Sq. metre open space in Dhaka city which is really inadequate for living in a city. Moreover The distribution of open spaces of the city per 1000 people is considered as only official statistics. Probably if we count the people living in illegally in the slum areas and floating people around the city then the distribution of open spaces will be less than this amount.

However, if we consider the official statistics of Bangladesh and also include the area outside the Dhaka City Corporation we will get different data.

**Table2. Dhaka District Land Use Statistics**

Sl. No.	Land Use	Area (in Acre)	Area in Sq metre
01	Total Land Area	355703	1439478970.016
02	Cultivable Area	186525	754839894.188
03	Fallow Land	8293	33560580.310
04	Area Under Forest	45	182108.539
05	Area Irrigated	90743	367223892.337
06	Area Under River	18999	76886225.169178

Sources: Bangladesh Bureau of Statistics, 98 (<http://www.bbsgov.org/>)

Note: 1 Acre = 4 046.85642 m<sup>2</sup>

Considering the area including the outside of municipality land there is a big possibility to develop urban forestry in the different land use pattern .

**Table3. Dhaka District Land Utilities pattern.**

Name	Total No	Length in km
01.River	18	328
02.Metal Road (Built with bricks, stone, concrete etc)	535	941
03.Semi Metal Road (Built only with raw bricks)	100	420
04.Kutchha Road (Only soil no bricks )	601	1949
05.Rail Road	4	25

Sources: Bangladesh Bureau of Statistics, 98 (<http://www.bbsgov.org/>)

For example, as city is surrounded by rivers and canals there is a possibility for the plantation of trees around the river bank. There have 16 rivers with 328 km lengths is flowing inside and outside

the district (BBS,98) which can be consider under greening programme.. Moreover area under forest and fellow land can be included new forest development plan.

However, according to Dhaka Metropolitan Development Plan (DMDP), RAJUK (Capital Development Authority) for 1995-2015 there have wide range of possibility in peri-urban area utilizing some wetland and open spaces under greening programme. According this Dhaka city structure plan 1995-2015 policy 10 &11 demands the augmenting of city open space and securing the future open space. (SDNP,2005) although there have no specific policy which can support sustainable livelihood of poor inhabitant of the city.

From the above discussion following important matters can be considered for Urban forestry programme in Dhaka

- Although it may not be possible to create any new green spaces or forest 276 Sq Km land under Dhaka city corporation, existing green spaces can be utilized by proper green space policy.
- Considering the area of Dhaka mega city (1353 Sq. Km) which is included the area of some parts of few districts like Dhaka, Gazipur, Manikgonj,Narayangonj,Munshigonj etc, there have a possibility to create new woodland around the peri-urban areas.

**Table 4. Districts around Dhaka mega city.**

Sl. No	Name of the Zila /District	Area in Sq. km
01	Dhaka	1464
02	Gazipur	1741
03	Manikgonj	1379
04	Narayangonj	759
05	Munshigonj	955
06	Narsingdhi	1141
	Total	7439

Source :-Census 1991 & SVR, BBS. Provisional,1998p(<http://www.bbsgov.org/>)

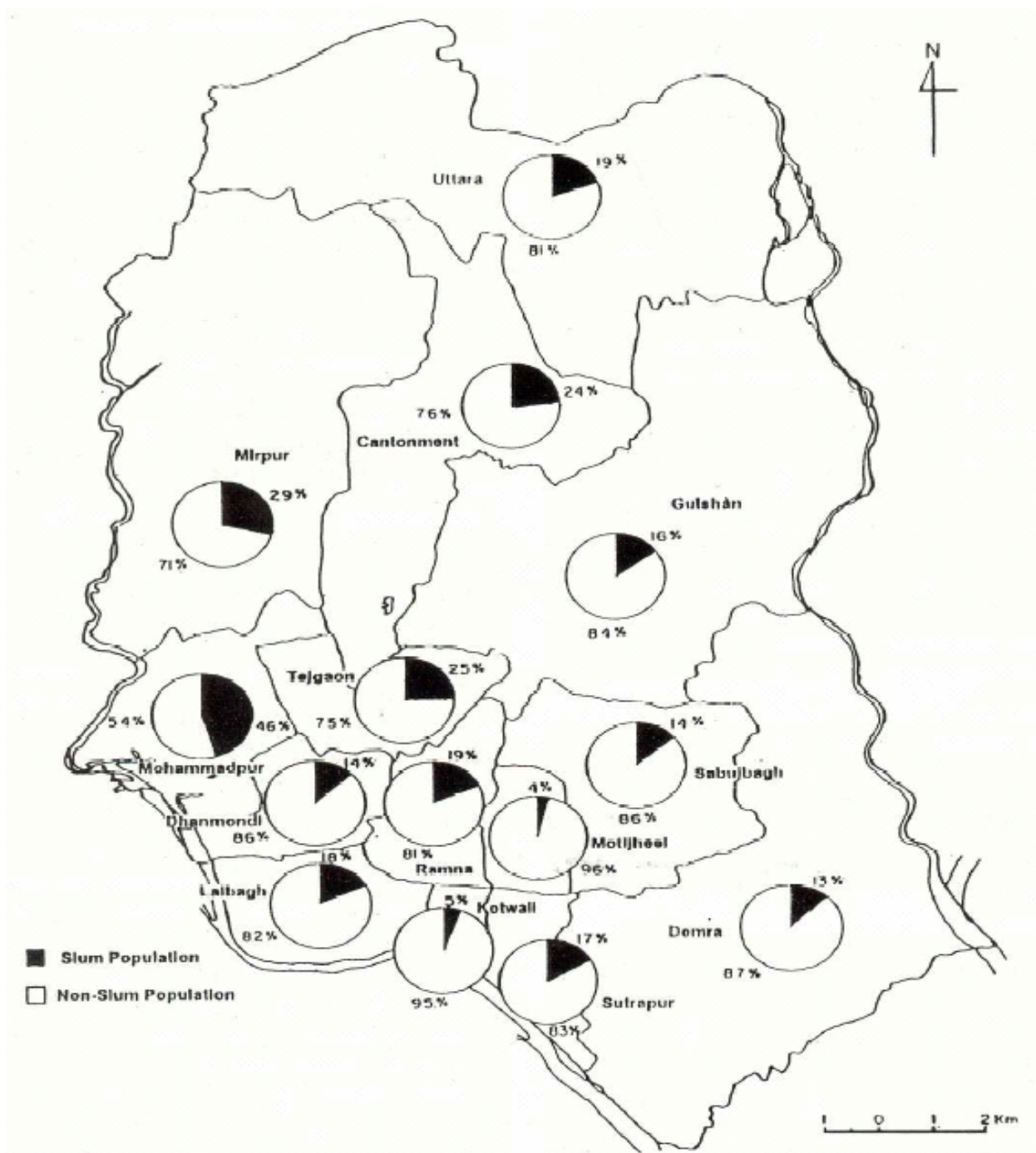
From the above table we can assume that present area of Dhaka mega city (1353 sq km) will extend in future to its surrounding districts. In that case total area about 7439sq km land can be considered as peri-urban area of Dhaka. Although this paper will not discuss about the land use pattern of those districts , it can be expected that any urban/peri-urban forestry programme in those peri-urban areas can also give the benefit of Dhaka mega city .

#### **2.4. Analysis of present poverty situation in Dhaka:**

Poverty is by definition extremely complex, multidimensional, and linked to a variety of variables. It has generally been defined as having insufficient food, income, and other inputs to maintain an adequate standard of living, with the latter sometimes defined to include consideration of quality of life. The definition and assessment of poverty has evolved from a classical income-based measure (the typical below 1\$ per day or any other officially established income criteria) to a multidimensional perspective that includes income, health, cultural and social resilience, self-esteem and other parameters.

The World Bank (1998) in a study of poverty in Bangladesh noted that more than 2 million will live below the poverty line of income at one dollar per day per person . Another study shows that 61% urban population in Bangladesh falling below official poverty lines (UNICEF, 2002) Also another research has found that health condition in Bangladesh urban slums are estimated to be 38% worse than in the rural areas ( Harpham and Tanner,1995).

In 1991 among the thirty-four mega cities of the world having a population of more than five millions, Dhaka ranked twenty-fifth (SDNP,2005) while in 2000 it ranked eleventh and it is predicted to be the world's fourth largest city by the year 2015 with an estimated population of 21.1 million The present population of Dhaka is estimated at 11.3 million while that of Dhaka City Corporation (DCC) area at 5.94 million in the year 2004. Moreover 54.85% of the population of this city are below the poverty line with 31.88% below the hard-core poverty line. (SDNP,2005).



Map.6 .Dhaka Metropolitan Area: Proportion of Slums & Squatters Population by Thana, 1996

Sources: <http://www.sdnpsbd.org>

In 1996 the Centre for Urban Studies (CUS) conducted a survey on the slum population of Dhaka Metropolitan Area (DMA). According to that survey, the total slum population in DMA was

estimated at 1.1 million. The same survey found the number of slum clusters with 10 or more households each to be 3,007. The survey in 1996 estimated the population of Dhaka Metropolitan Area at 5.58 million with 19.8 per cent living in the slums and squatter settlements. The total area or land covered by slums and squatter settlements in Dhaka city was roughly estimated at 1,038 acres or about 4.2 sq-km and on an average a slum cluster occupied 345 acre. However, according to the 1991 survey of CUS, the number of slums and squatters in DMA was 2,156 occupying an area of about 3.2 sq km.(SDNP,2005). The major slums of Dhaka city are located in areas like Islambagh, Shahidnagar, Maurertek, Rahmatgonj, Kamrangirchar, Hajaribagh, Rayerbazar, Mohammadpur, Zingatola, Agargaon, Mirpur, Pallabi, Badda, Karwanbazar, Tejgaon, Mohakhali, Mirertek, Nayatola, Rampura, Ulan, Khilgaon, Shahjahanpur, Meradia, Goran, Mothertek, Mugdapara, Maniknagar, Rupgonj, Golapbag, Gendaria, Sutrapur, Sayedabad, Faridabad, Shantibag, Gulbag, Babupura, Bangshal, Ganaktuli, Gopibag, Narinda and Lalbag.

Those who end up living in slums which are located in or close to the municipality areas, have little access to the city utility services like electricity, gas and drinking water. The major sources of drinking water, both in public and private slums are municipal taps and tube wells. In case of bathing a considerable portion of slum dwellers use rivers, ponds, wells, lakes and ditches. Slum dwellers collect water from municipal taps located either along the public streets or in public places while private slums often get their water from the landlords' house. Besides tap water, tube wells within the slum or neighbouring areas also play an important role in supplying drinking water to slum dwellers. Slum dwellers are most exposed to the water borne diseases and heavy metals found in water in the city.

In addition to problems coupled with unsafe water, some other basic problems in the slums are: in most slums drainage is almost universally absent; garbage, thrown around, is not collected in most instances; toilet facilities are absolutely inadequate and sewer connections to latrines are non-existent. Because of poor environmental condition and malnutrition the slum dwellers suffer from different skin diseases, RTI problems, diarrhoea, etc. Women suffering from menstrual irregularities, anaemia, gastritis and skin diseases are found in great many numbers. Children are also susceptible to most of these common diseases. The slum dwellers have little access to health services enjoyed by the middle class. (SDNP, 2005)

## **2.5. Benefits of Urban Forestry for the poor:**

Benefits of urban woodland can trees can differ widely among different cities due their different environmental and socio-cultural background. The recreational and aesthetic benefits are traditionally important especially in the Nordic countries, whereas the protective and climatic uses of vegetation are more emphasized elsewhere in Europe .( Konijneddijk et al ,2005).However, considering those socio-economic matter benefits of urban forests in Dhaka can be describe in the following ways:

**2.5.1 Direct benefits for the poor:** These can be counted by monetary values or have direct impact to the poor people in Dhaka. Most of them can generate income sources or giving products for livelihood.

**2.5.1.1. Creating Employments:** Employment can be consider as one of the most important factor for sustainable livelihood for a poor country like Bangladesh. Following employment sectors can be highlighted by in this case.

**2.5.1.1.2. Employment in Nursery Industry :** Today the nursery industry is one of the rapidly growing industry in Dhaka. It is providing employment to a growing army of waged poor people lucky enough to find their way into the nursery industry workplace. Nurseries have also been an avenue to profitable self-employment for a significant number of poor people in Dhaka and to regular wage employment for an even greater number. These nurseries represent a new industry that would not have arisen in the absence of urban growth.( Remenyi,2000).

In a survey among 168 nurseries have found that almost half of the nurseries had been established within last 6 years, and 20% in the last three years. Almost 40% of operate from footpath locations, 12% of nurseries operate from low lying waste land. These surveys also indicate that the number of nurseries in Dhaka is growing at more than 5% per annum. Given that all operators indicated that their annual sales are increasing ,it is possible to presume that total nursery sales is growing at significantly more then 5% per anum.



Pic.4 Nursery industry can give a support to alleviate poverty.

Some important data from the survey can be shown the greater prospects of this business (Remenyi, 2000)

- Nursery activity is an important entrepreneurial outlet for the poor people. 14% of nursery owner surveyed indicated that they are illiterate, while another 54% indicated that they had not done any secondary education. The 32% of nursery owners who indicated that they had either completed secondary school (20%) or were university graduates (12%) were employers of poor people in their nurseries.
- 78% of nursery owners indicated that the management of their nursery is their only employment.
- Two thirds of nurseries need a working capital budget of only TK 20000-60000 (USD 400-1200)
- The average daily sales of the nurseries surveyed exceeded USD 130, the biggest and most successful one third of nurseries, however, have average daily sales in excess of USD 190.

Considering among data it can be assume that most of the beneficiary of this industry are low income groups of the urban area .If this industry will explore rapidly, more poor people will get benefit from that sector.



#### **2.5.1.1.3. Employment by Gardening and food production:**

Most of the poor inhabitants in Dhaka are migrated from rural areas where they were skilled on food production or agriculture activities. Some of them are using these skills while staying in Dhaka. A survey conducted among 400 people have found that in Dhaka food production and gardening generated an annual output valued at not less than 30 million Taka. ( Mayeed and Choudhory,1996 ) If this estimate is taken as true measure, it implies that the per capita gross output of the average urban food producers is somewhere in the vicinity of US\$2,000 per anum. Assuming a gross margin of 30% above cost, this implies that Dhaka's urban food producers are earning a net per person income of not less than US\$500 from their urban food production activities, well above the poverty line of US\$1 per person per day. (Remenyi, 2000).

#### **2.5.1.1.4. Employment in Timber and Bamboo industry:**

Specific statistics can be hardly found related to people who are dependent in Dhaka on wood or non wood forest products. But there have some statistics on national forest resources on overall Bangladesh. There are 57000 wood industry production units with 0.21 million employees in Bangladesh Primary industries include sawmilling and pulp and paper, plywood/veneer, match and panel board. Secondary industries are furniture, seasoning, treatment and preservation.. Including all aspects, estimated total forestry employment today is 0.8 million persons. However, considering its seasonal nature, possibly up to 1.5 million people benefit from forestry related work directly.( REIN, 2005) . Moreover, Dhaka as a capital has a great demand of furniture and wood products. In peri-urban fringe there are a lot of saw mills where several thousand people are working on there. From my personal observation while living in Dhaka, I found several thousand of poor family in slum areas depending on bamboo collecting from some districts around Dhaka such as Gazipur, Norsinghdi, Keraniganj etc.

**2.5.1.1.5. Others :** Moreover, city parks ,nursery, furniture industry operators employ part-time casual labour for maintenance, security and transport. In addition, city nurseries generate employment for the enterprises that supply them with stock, pots, compost, packaging materials, labels and pest management supplies. Besides these several thousand of street children and hawkers are dependent on collecting leaves, branches of trees and wastes which make them involving on fuel and waste management activities.

### 2.5.1.2. Providing fuel and energy :

In Dhaka about sixty percent of poor households use firewood and straw for cooking, which are mostly collected by them. They sometime get electricity connections from informal sources and their access to electricity is inadequate and irregular. (Hossain,2005). Probably most of the sources of firewood they collected from peri-urban area such as Gazipur, Norsinghdi etc. From my observation as a former resident of Dhaka, I found everyday several thousand of street children and women to collect firewood or dry leaves from city's famous parks in Ramna ,Osmani, Shahbag areas. Although adequate data is absent on this matter, statistics on overall county's fuel wood and bio-energy consumption can shows the demand of urban or peri-urban forest products as a source of energy in big city's like Dhaka.

Biomass in the most significant energy source in Bangladesh which accounts for 70% of the total final energy consumption in Bangladesh . The main sources of biomass fuels are –

- Trees (wood fuels, twigs, leaves, plant residues)
- Agricultural Residues (paddy husk, bran, bagasse, jute stick etc.) and
- Livestock (animal dung).

Total wood fuel consumption of the country is 8 million m<sup>3</sup> where domestic cooking accounts for estimated 5.1 million m<sup>3</sup> (63%) annually and the industrial and commercial sectors 2.9 million m<sup>3</sup> annually(37%). Overall, tree and fuels provide 48%, agriculture residues 36%, dung 13% and Peat 3% (REIN, 2005).At present there is acute shortages of wood fuel in Bangladesh, due to which poor people opt for other inferior type (not compact, difficult to handle) of biomasses like agricultural residues or animal dung.(REIN,LGED 2005) The future projection of demand and supply of wood fuel by Forestry Master Plan (FMP) 1993 is bleak which is shown in Table5.

**Table.5 .Wood fuel demand-supply projections up to 2013 (in 1000 m<sup>3</sup> per annum)**

<b>Year</b>	<b>1993</b>	<b>1998</b>	<b>2003</b>	<b>2008</b>	<b>2013</b>
Estimated Demand	8272	9045	9847	10682	11553
Estimated Supply	6135	6450	6787	7212	7742
Balance	-2137	-2595	-3060	-3470	-3811

Sources : Renewable Energy Information Network ( REIN), Local Government Engineering Department(LGED),2005;Projection of Wood fuel Supply in 1000 m<sup>3</sup> (<http://www.lged-rein.org>)

As in Bangladesh electricity is very limited largely to urban areas and upazila (Police Stations) headquarters and it has few resources of coal or oil to draw on, most of the inhabitant in urban areas are dependent on fuel wood for their daily cooking or heating in winter. A FAO study revealed that the fuel wood consumption is comparatively higher in poor countries though it varies from country to country. Wood fuel and charcoal are used as an alternative source of high cost of energy in urban centres. The landless people move to urban centres where they get fuel wood collection as a lucrative enterprise for their survival.(SDNP,2005).Considering all this aspects it can be assume that pressure of continues urbanization in Dhaka and demand of energy crisis make a great potential sector of the peri-urban forestry to livelihood support of lower income groups in Dhaka.

### **2.5.1.3. Sources of Food and medicine :**

In Dhaka city 21.57% open space is found where agricultural land ( 12.12%.) and garden (0.901% ( See Fig.2.) can be considered for food production. Moreover planting fruit crops in the city parks ( 0.89%) urban forest (.02%) and grave yard (.003%) will expand urban agriculture .Besides this few districts around the Dhaka mega city (See table 4) can also be counted as peri-urban area of which can be considered for greening programme.

According to FAO some of the trees most commonly reported to be grown by Third World urban dwellers are those which provide food - particularly fruits, but also edible leaves, shoots and even flowers In such situations that food-producing trees are often found combined with other food crops in agro forestry systems. For example in Panama, agricultural shantytowns produce forest and vegetable crops just across the bridge over the Panama Canal from downtown Panama City.(FAO,1995). Although Dhaka is in continuous pressure by housing demand which will not allow to give more land for crop production, roof top gardening and multipurpose tree plantation around the park and river, canal valleys can be one possible way to initiate this programme. Plantation of several types of multipurpose local tree species such as Mango ,Jackfruit, Tamarid etc can be selected for this purpose.

Some medicinal plant such as Neem (*Azadirachta indica*) can be planted around suburb areas which have economic values for the people. Beside this some integrated farming system can be allowed in periurban area by apiculture ,aquaculture, livestock farming and poultry industry. Gazipur district

which is very near to Dhaka already there have hundreds of agricultural farms who are giving continues service to feed the people of Dhaka city .For the well and fast communication system with Dhaka a lot of people are living in those areas but most of the time have business in metropolitan areas . .If we consider periurban forest on this case the opportunity will be in better condition than few decades before in Bangladesh.

#### **2.5.1.4.Source of Fodder :**

At present livestock farming is considering an important sector in Bangladesh. To fulfil the demand of fodder for the livestock several areas can be considers as grazing land. Although at this moment there is no specific statistics at my hand about grazing land and fodder crop production in the metropolitan areas, my personal experience have found several fellow lands or some govt. institutional lands are using as temporary grazing land .At some residential areas for the govt. staffs in Dhaka like Motijheel,Azimpur,Agargaon,Shere Bangla Nagar, Pallabi, Mirpur, Mohammadpur ,Khilgaon ,Rampura,Badda and Uttara can be found some vacant places are using same time as children playground and grazing land. Some parks and govt. fellow lands are also using as grazing land in Dhaka. Also some area which are illegally occupied by different groups are using by grazing land .However, from my personal observations I found some places which are very near to metropolitan location such as Tongi, Keranigonj, Narayangonj can be used for fodder cultivation.

#### **2.5.1.5. Providing Housing materials :**

Urban forestry can be a great source of housing materials for the poorest population in Dhaka. At present most of the houses in slum areas of Dhaka are made from forest and agricultural products which are collected by them from city's peri-urban areas.. Following table can shows the types of housing structures of total 185,917 no. slum households in Dhaka.

**Table.6. Percentage Distribution of Households by Type of Structures .**

Sl. No	Categories	Characteristics and materials	Percentages of total household
01	<i>Jhupri</i>	It has a ceiling which is less than 4 feet and is made of Bamboo, Chhan (grass),Golpata(leaves),polythene sheet, gunny bags etc	29.90
02	<i>Tong</i>	A purely temporary structure built on bamboo pillars in lowlands with the cheapest construction materials.	13.18
03	<i>Chhai</i>	A half arch shaped small structure open in front and rear sides. It has very low height so that the inhabitants enter it by scrawling and can hardly sit upright inside it.	23.92
04	<i>Tinshed</i>	A structure of normal height and its roof is made of corrugated /plain tin sheets but it does not have wall of made of bricks.	29.94
05	<i>Semi-pucca</i>	A structure of normal height and has walls made of bricks. The roof is made of any material other than cement/concrete.	2.56
06	<i>Pucca</i>	<i>The structure which has its roof and wall made of bricks and mortar.</i>	0.50

Sources : Bangladesh Bureau of Statistics,1997(<http://www.bbsgov.org/>)

So most of the common house types such as *Jhupri* ,*Tong* and *Chaai* are built of Bamboo,grass,leaves which represents more than two-third of total household types. Also some districts near to Dhaka such as Gazipur, Narsingdhi, keranigonj can be great sources of those housing materials .

#### **2.5.2) Indirect benefits of UF for the poor:**

Dhaka city and around areas green resources giving some benefits which may not be related directly to reduce poverty but indirectly those benefits saving money to the poor from their health budget or giving them security for sustainable livelihood. They can be counted as health, environmental or social benefits for the people.

**2.5.2.1.Health and environmental benefit:** Providing shelter during hot summer or night, protecting the air and water from pollution can make a nice environment for the poor to live in the city. Although they are living in slum areas, enjoying those benefits will increase the quality of life like other higher income group in the society. Here some example can be given in the case of Dhaka.

### 2.5.2.2. Shelter & Cooling at working place in summer:

Parks and street trees are giving shelter for the poor both during staying at home or working in the outdoor environment. The city is located in the tropical region where almost more than 8 months can be consider as summer. When in the hot summer temperature arises more than 35°C poor people take shelter in the parks or under street trees. Moreover, working place for most of the poor inhabitants of Dhaka can be considered in outdoor environment. In a research found that the urban poor in Dhaka are mostly employed in self managed low paid jobs in the informal urban sectors like rickshaw pulling street vending and selling etc. Following table can shows the employment categories of poor people in Dhaka.

**Table.7. Employment Categories of Urban Poor in Dhaka**

SL.No	Employment Categories	Total (%)
01	Rickshaw Pulling	29.4
02	Street Vending and Selling	22.8
03	Construction work	6.4
04	Driving and Transport work	4.6
05	Factory work	5.2
06	Personal Servicing	7.6
07	Service in Govt/Semi. Govt. Organization	4.8

Sources :Hossain, 2005.Bangladesh e-Journal of Sociology,Vol.2,No.1.

From the above table it can assume that except factory, construction or service jobs most of the poor population's working environments are on the open spaces. From my personal observation during staying in Dhaka I have seen rickshaw puller, hawkers or drivers like to take rest every few hours in the city's green spaces. It is natural that trees in the parks or street give shading and reducing temperature what makes poor people to take shelter during works. As most of the poor can not buy fan or air cooler. But in any city an increase of tree canopy cover by 10% reduced surface temperatures on average by 1.4°C during day time of hot summer day (Konijnenklijk et al 2005).Moreover, a research in the US found that a 25 foot tree reduces annual heating and cooling costs of typical residence by 8-12% ,producing an average \$10 savings per American household. Also building and paving in city centres create a heat island effect. A mature tree canopy reduces air temperatures by about 5-10°F, influencing the internal temperatures of nearby building.(Wolf

1998). Although there have no research data specially on Dhaka about temperature effects of green area, continuous increasing of high stored building and no. of populations have a great demands for the green spaces to reduce the temperature. Cities green places in the Ramna, Shahbag, Mirpur and Uttara areas are playing great role on this matter as probably higher amount of trees can be found those places.

### **2.5.2.3. Increasing pure water supply and protection from pollution:**

Lack of access to clean water and proper sanitation is a major cause of ill health among the poor in Dhaka. At present, the major sources of drinking water, both in public and private slums are municipal taps and tube wells. In case of bathing a considerable portion of slum dwellers use rivers, ponds, wells, lakes and ditches. Dhaka Water and Sewerage Authority (DWASA) is solely responsible for providing water and disposal of sewage to the inhabitants of Dhaka City. But they can not supply sufficient water for the inhabitant. In 1997, the peak shortage of water was 490 million litres per day, which came down to 470 million litres per day in 1999.(SDNP,2005) Also groundwater level of this city has fallen by 20 meters in the last decade alone. Dhaka is also rely on Shitalakhya and Buriganga river for collecting surface water. Moreover city has also problem for the Arsenic contamination in ground water. According to the Dhaka Water and Sewerage Authorities, the source of drinking water for one third of this city's 10 million people has become contaminated with harmful bacteria.(SDNP,2005)



Pic.4. Tree can purify and protect water in Dhaka.

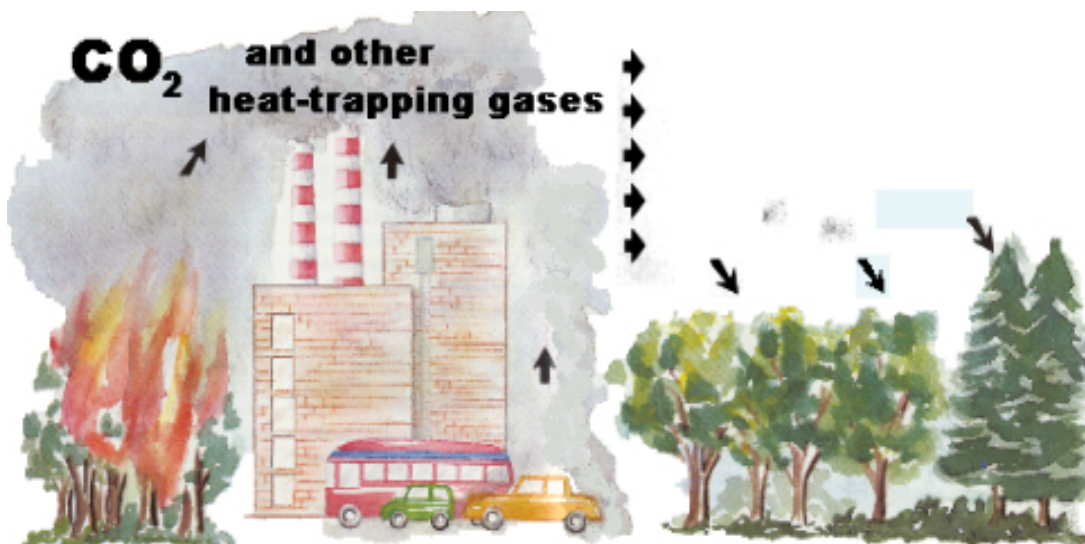
Several research in developed countries has found that urban forest and trees can reduce surface runoff and thus alleviate the strain from the urban sewage system and dampen peak flows of the streams.(Konijnenkdijk et al 2005).If it is true then increasing the area of green space will increase the volume of pure water of city authority .Annual average rainfall in the city area is calculated to be approximately 2060mm (SDNP,2005). Trees in the parks and street in Dhaka are enable to infiltrate and recharge of this rainwater. The hydrological function of urban woodland and trees is increasingly stressed as protection of drinking water resources. For example, in Denmark new woodland established close to cities consider this function. (Konijnenkdijk et al 2005). This model can be follow in the case of Dhaka by establishing new woodland around the city such as Gazipur, Keranigonj, Norsingdhi and Savar areas. Trees and forest in this areas can act as filter removing nutrients and sediments while increasing ground water recharge. A research in US found that approximately 47% surface pollutants are removed in first 15 minutes of storm-this includes pesticides, fertilizers, and biologically derived materials and litter (Coder, 1996).Another research found that the canopy of a street tree intercepts rain, possibly reducing the amount of water that will fall on pavement and then must be removed by storm water drainage system. In one study, 32ft tall street trees intercepted rainfall, reducing storm water runoff by 327 gallons (Hastie,2003). Saving is possible since cities can install surface water management systems that handle smaller amount of runoff. So we can easily say that if the Dhaka City Corporation(DCC) and Dhaka Water and Sewerage Authority (DWASA) will make any collaborate plan to increase the high quality of drinking water supply, poor inhabitants can get save money from health budget by reducing the



possibility of diseases which spreads from unsafe water. Moreover Dhaka is also facing problem of for flooding and water logging. Flooding and stagnant water can both be reduced by establishing well drained green areas, where water is able to infiltrate the soil, and reach the water table without causing run-off or pounding

#### **2.5.2.4. Protect from air pollutions and diseases:**

In Dhaka according to Bangladesh Environment Movement (BAPA), suspended particulate matter (SPM), carbon monoxide (CO), sulphur dioxide (SO<sub>2</sub>), and air-borne lead are mainly responsible for air pollution problems. Industries and vehicular traffic, among others, contribute mainly to these pollutants. In 1996 the lead pollution level in the air of Dhaka was higher than that of Mexico City (463 nanograms/cubic meter vs. 383 nanograms/cubic meter.) Local studies show that SPM and ambient SO<sub>2</sub> levels in Dhaka are about 4 times and 5 times higher than the levels prescribed in Bangladesh Air Quality Standard, respectively. These pollutant concentrations are 12 times and 10 times higher than the WHO Standards, respectively. These air pollution causes headache, burning of eyes, and pain in throat, bronchitis, breathing problems, heart disease, anemia, mental problems, kidney disease and even cancer.(BAPA 2002) A recent World Bank report claims that the four major cities in Bangladesh, namely Dhaka, Chittagong, Khulna and Rajshahi, lose about 15,000 lives each year due to air pollution. An estimated 6.5 million people in these cities suffer from acute respiratory infections caused by air pollution. An ADB sponsored report shows that 3,850 premature deaths could be avoided had there been a reduction of SPM concentrations in Dhaka to the level of Bangladesh Air Quality Standard. Economic cost, because of such deaths and illnesses in Bangladesh, may reach US \$800 Millions a year. (BAPA,2002).



Pic.5 UF in Dhaka can save air from pollution by taking C in the wood and SPM by the leaves.

Possible one of the most effective way to control air pollution is creating more woodland around the city and increasing the no. of trees in the parks and street in Dhaka. The Suspended Particulate Matter (SPM) can be captured by the leaves of evergreen tree species .Several research in US shows that trees can remove pollution by intercepting airborne particles. In 1994, trees in New York City removed an estimated 1,821 metric tons of air pollution at an estimated value to society of \$ 9.5 million. Air quality improvement in New York City due to pollution by trees during day time of the in leaf season averaged 0.47% for particulate matter,0.45% for ozone,0.43% for sulphur dioxide,0.3% for nitrogen dioxide ,and 0.002% carbon monoxide. (Hastie,2003).Another study found that a woodland in Nottingham was estimated to reduce concentrations of sulphur dioxide and nitrogen oxides in the air by 4-5% (Konijnenklijk et al 2005.It is also well known that ,in common with all vegetation, absorb carbon dioxide(one of the principal green houses gases) and release oxygen during the process of photosynthesis. In Dhaka the Environment Department in Bangladesh found nearly zero levels of oxygen in the rivers Buriganga, Shitalakhya and Turag in recent times.(SDNP 2005).Considering these data and research it can be assume that Dhaka need more plan wise greening programme to reduce air pollution and diseases. Specially I will suggest for tree plantation around the river bank of Buriganga, Shitalakhya and Turag due to the environmental benefits of the city. Although some of those places are temporary occupied by the illegal landlords, huge areas can be found as a fellow land for greening programme.

#### **2.5.2.5.Reduce Noise Pollutions:**

In survey conducted by an NGO in Dhaka found that 33% inhabitants experience hearing problems from noise pollution (WBB,2002) .Moreover poor people in Dhaka who work outdoors, for example the rickshaw-pullers, street vendors, small shopkeepers etc. are affecting a lot by noise pollutions. But increasing trees and other vegetation can play an important role in attenuating noise through and absorbing sound energy. In US one research estimate suggests that 7db noise reduction is achieved for every 33m of forest (Coder,1996) which other reported field tests show apparent loudness reduced by 50% by wide belts of trees and soft ground (Hastie,2003).

So, considering some of this health and environmental benefits of Urban Forests in Dhaka ,it can be expected that lower income group of the city can save money from health budget due to the problem of environmental pollution as they are primary effected for all pollutions .But increasing the quality of their home and working environment , a standard life can be given to them which is also considerable as primary steps of reducing poverty.

#### **2.5.2.6. Social & recreational aspects:**

Trees in the parks and street can be great place for both adults and children recreation. In Dhaka at present some parks are not safe for the poor as those places are occupied by criminal and drug addicted people. Moreover some recreational places have no environment to entrance for the lower income generating people as those are situated in the elite areas of the city.. A recent survey found that due to poverty the poor can hardly think about recreation and socialising.(Hossain,2005) They rarely participate in the city's cultural activities despite living in the city over a long period of time. They typically pass their leisure time by gossiping with family members as well as community members. They have little access to out door game facilities in the city and they pass their time by playing few indoor games like Carom ,Ludo and Cards. Some of them pass their leisure time only by watching television at their homes or in some communal places. Only 21,6% of the poor in the city go to parks, zoos and museums for recreation.( Hossain,2005). However, law enforcement authority can create a safe environment for the poor by controlling crime and drug addiction.



Pic.6. Giving more green space for poor children can be another address of poverty alleviation.

But in the case of children in slum the situation is different. Most of them are like to spend time in the street and parks for employment and recreation. Moreover, there are a huge no. of street children are living in Dhaka where they do not have any indoor recreation. According to CSKS (Cinnamul-Shishu Kishore Sangstha) ,a small non-government organisation in Dhaka , there are up to 1 million street children living and working on the streets of Dhaka. They found following two types of children :

**Some of the children are on the street** - they work, play and spend most of their day with other children on the street but have families to return to at night. These children often help the family earn money by working on the streets.

**Other children are of the street** - they survive without family, entirely on their own, except for the company of other street children or those willing to help and support them.

(Sources: <http://www.globalfootprints.org/partners/csks.htm>)

City parks are playing a great place for the out door recreation of those street children. Considering those situation it can be recommended that giving the facilities in the green space for the poor people and their children will increase the standard of life.

### **3. Results**

Results From the above benefit analysis it is found that urban poor in Dhaka have already a relationship with the cities green resources for their livelihood demand. More benefits can be given indirectly or directly if we consider the present green resources and poverty condition of Dhaka Generally it seems that by giving more direct benefit of UF to the poor can be the first step to

alleviate poverty .But considering the hazardous environmental situations in Dhaka it can assume, without protecting the environment of Dhaka by proper UF programme poor population will be affected more seriously. The standard of living quality can be increased by getting direct and indirect benefits of Urban Forest in Dhaka

#### **4. Discussions :**

##### **How can Urban Forestry address the poverty in Dhaka?**

According to World Development Report 2000/2001, poor people in a country live without fundamental freedoms of action and choice that the better-off take for granted. They often lack adequate food and shelter, education and health, deprivations that keep them from leading the kind of life that everyone values. They also face extreme vulnerability to ill health, economic dislocation and natural disasters. And they are often exposed to ill treatment by institutions if state and society and are powerless to influence key decisions affecting their lives. These all are dimensions of poverty (World Bank 2000).

Considering the above statement of the World Bank we can identify three characteristics of poor people:

- i) Poor are **powerless** in a society as they are not involved in the decision making process generally with the authority.
- ii) They are **insecure** as they can not recover easily any vulnerable shock in their livelihood .Even sometimes they have no secure future to get shelter, food, fuel or any other basic human needs.
- iii) They do not have enough **opportunity** for earning sources or employment.

So it is possible to attack poverty by creating opportunity, empowerment and security to the poor in a society. Can Urban forestry in Dhaka give those benefits to the poor?

**Creating Opportunity:** From previous discussion about the benefit of UF we got an idea that nursery industries ,Bamboo, wood and furniture industry are giving employment opportunity to the people who are living under absolute poverty line .But some people are dependent indirectly in the nursery ,bamboo or any green industry by doing vegetable production, roof gardening etc and these

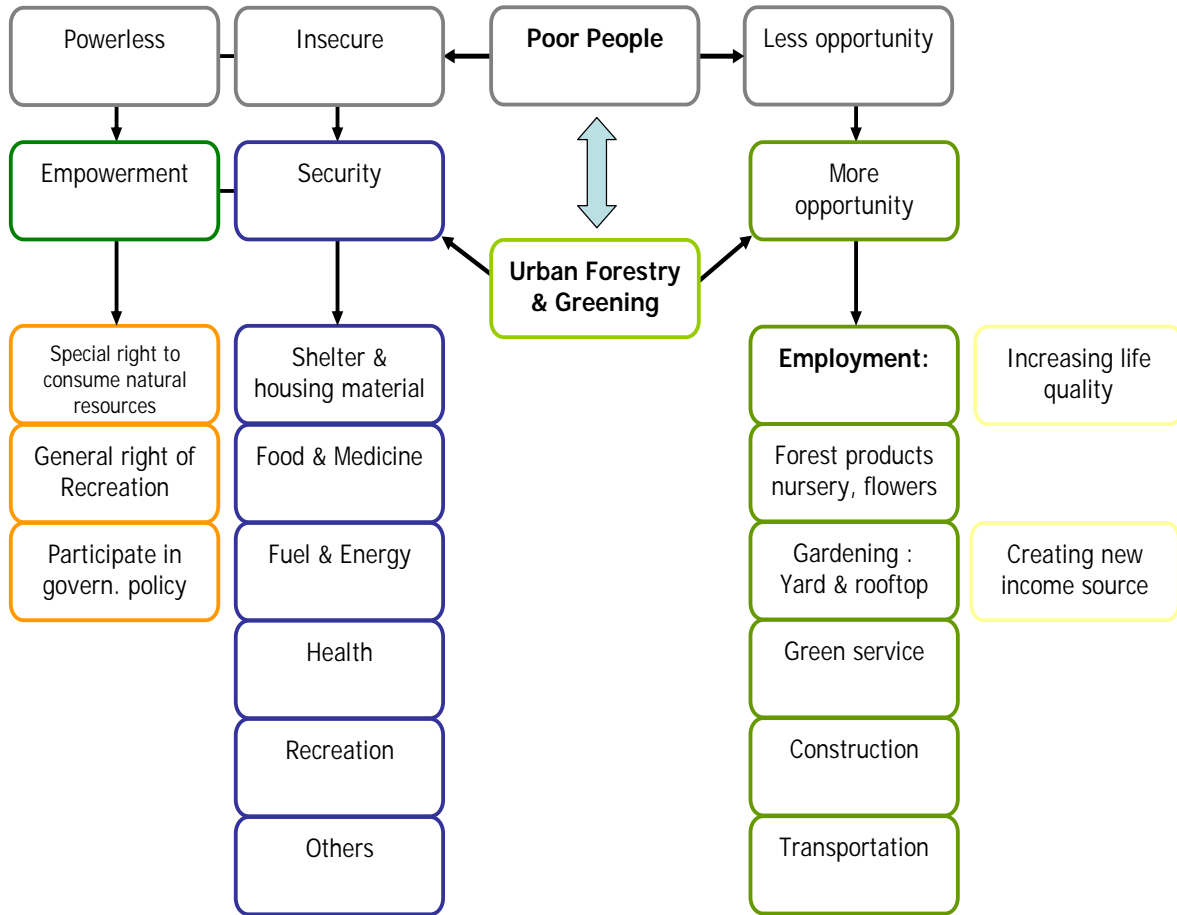
ways they are getting extra money although not fully dependent on those business. Some people are also getting employments by servicing ,construction ,transpiration of nursery, forest or agricultural products from peri-urban to urban areas. So Urban forest resources of the Dhaka mega city are helping people to increase the quality of life by giving economic support which can be considered as the opportunity to alleviate relative and absolute poverty .

**Giving Security:** Security can be found from the urban forest by mentally or physically. For example people living in slum areas can be considered as temporary residence in a place .If they do not have any place to live in any accidental condition ,city parks or trees give them shelter and security. Sometimes most of the poor have to change their residence frequently due to the legal/illegal eradication of slum houses from different owners. They take shelter under the trees or parks. They get minimum security of life from the urban forest by getting shelter, food, fuel etc. They are getting mental security by exchange their feelings each other in the parks and green spaces. People who are homeless, floating permanently or temporary one place to another when gather together and share their sorrows or happiness, feel more secure in mentally than elite class of the society who can be consider higher income group .Poor may be do not have enough money but this feelings can make them rich mentally although it can not be evaluate by money. Besides this trees can create healthy environment for the poor which will decrease the possibility of getting diseases due to the environmental pollutions. Most of the slum areas have not enough places for recreations of both adults and children. City's green spaces provide them adequate places to gown up their children in a secure environment. In such ways urban forest resources give security by providing basic human needs such as food, fuel shelter and optional needs like recreations and pleasures.

**Giving empowerment:** Like any other inhabitant in a society urban poor have the right to enjoy pleasurable life and give a healthy environment to their children. Their children can grow up in an environment with adequate play ground and green places. Poor feel powerless when they are no allowed to stay in some parks due to the drug addicted people or criminals and sometimes unnecessary harassment of police. Providing more security from the law enforcement authority and giving them opportunity in the decision making process about creating new green areas or management of parks can increase the empowerment For example to make any policy about creating any recreational places or implementing of greening programme, generally poor populations are not involved in the decision making process as most of the slum dwellers are illegal

in the metropolitan areas. But if poor people are involved beginning of the programme such as planting trees or take care of the trees after plantation etc, they can not feel themselves in powerless

## Possible model for addressing Poverty by Urban Forestry in developing world



**Fig.3. Possible model for addressing Poverty by Urban Forestry in developing world**

situations in the society. Moreover providing some special entrance free opportunity in the whole year to the poor people or their children in some recreational places including botanic gardens, zoos or children parks will make them to feel the right consuming all public or natural resources as a global citizen. In those possible ways urban forestry can address poverty and help the poor in Dhaka to forward poverty alleviation one step more.



Pic.7 Can UF gives her more opportunity, security & empowerment?

### **5.Conclusion:**

Although a lot benefits can be enlisted supporting to urban forestry programme, no specific improvement will be found to get those benefits without identifying the characters and demand of specific city by doing extended research. For example in the Nordic cities such as Oslo, Copenhagen or Stockholm, city authorities give more priority to protect environment rather than production. It may be possible for those cities where labour cost is higher than that production values and main economic reliability of the country is not agricultural/forest production .But in case of creating new woodland around Dhaka, production values should have an important factors. In those situations multipurpose tree species (fruit, timber, medicine, wood etc) will play a great role. At present there is no tree inventory specially related to Dhaka. It shows the lack of professional approach of urban forestry in Bangladesh to develop this new field. Moreover due to the population demand and continuous pressure of urbanization it makes some conflicts among different user groups on housing, green space etc issues. Some government land areas are occupied by the influential god fathers of the country without caring the peoples demand and need of green spaces. May be those groups in the society can not realise the benefits of urban forestry in such a poor county like Bangladesh. In conclusion it is expected that more research and extension works should be done to implement the urban forestry benefit especially to the poor population of the country.



## 6. References :

### Bibliography

BBS (Bangladesh Bureau of Statistics) last updated 2002 <http://www.bbsgov.org/>

BAPA (Bangladesh Environment Movement) 2002-2003, Bangladesh Poribesh Andolon (<http://www.bapa.info/>)

DCC (Dhaka City Corporation), 2002. ( <http://www.dhakacity.org/>)

Coder, KD, 1996. Identified Benefits of Community Trees and Forests ,University of Georgia Cooperative Extension Service-Forest Resources Publication FOR 96-39

FAO, 1995. The Potential of Urban Forestry in Developing country: A concept Paper. Food and Agriculture Organization of the United Nations, Rome, Italy

FAO, 2001, Expert Consultation on enhancing the contribution of trees outside forests to sustainable livelihoods. Urban Forestry -13 City Profile , Unasylva, Vol,39,1987/1

Harpham, Trudy and M Tanner, eds., 1995, Urban Health in Developing Countries, Earthscan, London

Hossain, Shahadat 2005. Poverty, Household Strategies and Coping with Urban Life: Examining 'Livelihood Framework' in Dhaka, City, Bangladesh e-Journal of Sociology, Vol.2, No.1. (<http://www.bangladeshsociology.org/BEJS%20-%202.1.1-%20Shahadat.pdf>)

Hastie, C. 2003. The Benefits of Urban Trees. A summary of the benefits of Urban trees accompanied by a selection of research papers and pamphlets, Warwick District Council ,UK

Hossain, Shahadat. 2000. Social Life of Slum Dwellers in Dhaka City. Journal of the Institute of Bangladesh Studies. xxiii:99-111

Konijendijk et al. 2005 Urban Forests and Trees. Springer Berlin Heidelberg New York

Mayeed, Maliha and Choudhury N, Y ., 1996 Agriculture in urban Context: A case Study of Dhaka City, Oriental Geographer, Vol 40 ,P.2235

Randrup et al, 2005. The Concept of Urban Forestry in Europe, Urban Forests and Trees. Springer Berlin Heidelberg New York, pp 13-20

Remenyi, J.2000.Poverty Reduction and Urban Renewal Through Urban Agriculture and Microfinance: A case Study of Dhaka, Bangladesh ,School of Australian and International Studies, Deakin University,Geelong,Vic,3217,Australia

Remenyi, Joe, 1999, The poverty of urban agriculture: a neglected domain of smallholder agriculture, Development Bulletin,No. 49,July.P.95-97

REIN (Renewable Energy Information Network), 2005, Sustainable Environment Management Programme(SEMP) under Ministry of Environment & Forest(MoEF),Local Government Engineering Department(LGED),Bangladesh . ([www.lged-rein.org/](http://www.lged-rein.org/))

SDNP (Sustainable Development Networking Programme),2005 ,Green Cities Plan for the planet, World Environment Day , 5 June 2005, CD publication .E-17 Agargaon BIDS, Sher-e-Bangla Nagar Dhaka-1207, Bangladesh ([http://www.sdnpsd.org/sdi/international\\_days/wed/2005/](http://www.sdnpsd.org/sdi/international_days/wed/2005/))

UNDP, 1996, Urban Agriculture : Food ,Jobs and Sustainable Cities UNDP Habitat ii .Volume 1,NY

UNICEF, 2002.Poverty and Exclusion among Urban Children, Innocenti Digest No 10, United Nations Children Fund Innocenti Research Centre, Florence ,Italy.

UNESCAP, 2000. Human Settlements - Urban Poverty Alleviation, Paper presented at the Regional High-level Meeting in preparation for Istanbul+5 for Asia and the Pacific,19 to 23 October 2000, Hangzhou, People's Republic of China.. United Nations Economic and Social Commission for Asia & the Pacific ([http://www.unescap.org/huset/hangzhou/urban\\_poverty.htm](http://www.unescap.org/huset/hangzhou/urban_poverty.htm))

Visser,S,. Undated, Poverty Alleviation: The contribution of Urban Agriculture. (<http://www.capetown.gov.za/econdev/downloads/Poverty1.pdf>)

World Bank, 2000, World Development Report 2000/2001: Attacking Poverty. World Bank, Washington DC

World Bank,1993.Overcoming Global Hunger. Proceedings of Conference on Actions to Reduce Hunger Worldwide (November 20-December 1,1993),World Bank Washington,DC

Wolf , K 1998. Urban Forest Values: Economic Benefits of Trees in Cities, University of Washington College of Forest Resources,Factsheet-29

WBB (Work for a better Bangladesh ) 2002.Noise Pollution, Research and Action ,Work For better Bangladesh, House 49,Road 4/A, Dhanmondi, Dhaka,Bangladesh ([http://www.wbbtrust.org/program/environment/sound/eng\\_sound\\_pol.pdf](http://www.wbbtrust.org/program/environment/sound/eng_sound_pol.pdf))

## Concept Literature

**Following literature were not used directly in the text of the paper but helped me to make the structure and concept of the thesis in different ways.**

Arnold JEM 1987. Economic considerations in agro forestry. In: Stepper HA and Nair PKR (eds) Agro forestry: A Decade of Development, pp 173–190. ICRAF, Nairobi, Kenya

Ahmed, Mohiuddin, 1999, Bottom UP: NGO Sector in Bangladesh, Community Development Library, Dhaka.

Ahmed, S. 1986, Dacca: A Case Study in Urban History and Development, Curzan Press, Riverdale.

Asaduzzan M & Rahman, H., Green Cities Plan for the Planet (Digital Publication). World Environment Day, 2005, SDNP, Dhaka, Bangladesh.

Dembner SA .1987. Forest sector planning in Bangladesh. Forestry Project Profiles No. 3, FAO Forestry Department, Rome.

Drescher, A.W. 2002. Urban and Periurban Agriculture and Urban Planning. A paper contributed to the Electronic Conference on Urban Agriculture and Periurban Agriculture. Resource Centre on Urban Agriculture and Forestry-September 2000

Field Berry .C 2001. Natural Resources Economics. McGraw-Hill Publishing Company, Berkshire.  
Alberts et al. 1996. Valuation of tropical forests: implications of uncertainty and irreversibility. Environmental and Resource Economics

Islam, Nazrul, 1990. The Urban Poor in Bangladesh, Dhaka Centre for Urban Studies

Islam, Nazrul & Amanatullah Khan, 1996. Community Based Programme for Urban Poverty Alleviation in Bangladesh, in Schubert, 1996, pp 25-44

Slater R & Twyman C. 2003. Hidden Livelihoods? Natural Resource-Dependent Livelihoods and Urban Development Policy.

UNDP, 1996, Urban Agriculture : Food, Jobs and Sustainable Cities UNDP Habitat ii .Vollume 1, NY

World Bank, 1998, Bangladesh Poverty Assessment, Poverty Reduction and Economic Management Network, The World Bank, April 29, Washington, DC  
<http://www.worldbank.org/html/extdr/offrep/sas/Bangladesh-poverty/eseccsum.html>

WHO, 2001. Urban and Peri-urban Food and Nutrition Action Plan. WHO regional Office for Europe Programme for Nutrition and Food Security, ETC, The Netherlands, WHO Centre for Urban Health .Scherfigsvej 8, DK-2100, Copenhagen Ø, Denmark

**Including all literature selected for the MSc UFUG programme at KVL, Denmark and SLU, Sweden**

### **Websites**

<http://www.moef.gov.bd/>( ministry of Environment and Forest, Bangladesh)

<http://www.bangladesh.gov.bd/moa/moa.html>(Ministry of Agriculture, Bangladesh)

<http://www.ngoab.gov.bd/> ( NGO Affairs Bureau )

<http://www.rajukdhaka.gov.bd/new/index.htm> (RAJUK -Rajdhani Unnayan Kartripakkha/Capital City Development Authority)

[http://www.lged-rein.org/rein/\\_home/index.php](http://www.lged-rein.org/rein/_home/index.php)(Renewable energy information network Dhaka )

[www.fao.org](http://www.fao.org) ( Food and Agriculture Organization)

<http://www.bbsgov.org/> ( Bangladesh Bureau of Statistics)

<http://www.bapa.info> (Bangladesh Environment Movement)

<http://www.ben-center.org> ( Bangladesh Environment Network)

<http://www.treelink.org> /(Urban Forestry Portal)

<http://www.urbanforestry.co.uk/> (UK based Urban Forestry group)

[www.cpd-bangladesh.org](http://www.cpd-bangladesh.org) ( Centre for Policy Dialogue)

<http://www.dhakacity.org/> ( Dhaka City Corporation)

<http://www.globalfootprints.org/partners/csks.htm> (Cinnamul-Shishu Kishore Sangstha)

[www.slu.se](http://www.slu.se) (Swedish University of Agricultural Sciences,Sweden)

[www.kvl.dk](http://www.kvl.dk) ( The Royal Veterinary and Agricultural University of Denmark)

## 7.Appendix-1

### List of Maps, Tables, Figures and pictures of the report

Name	Page No.
<b>Maps</b>	
Map1. Location of Dhaka in Bangladesh	09
Map.2 Dhaka City	10
Map 3. Forest Area in Bangladesh	10
Map 4.Dhaka City Development Plan	11
Map 5.Distribution of Urban Population in Bangladesh	13
Map.6.Dhaka Metropolitan Area: Proportion of Slums & Squatters Population by Thaana, 1996	21
<b>Tables</b>	
Table 1. Distribution of Open Spaces in Dhaka City	17
Table 2. Dhaka District Land Use Statistics	18
Table 3. Dhaka District Land Utilities pattern.	18
Table 4. Districts around Dhaka mega city.	19
Table 5 .Wood fuel demand-supply projections up to 2013 (in 1000 m3 per annum)	26
Table 6. Percentage Distribution of Households by Type of Structures	29
Table 7. Employment Categories of Urban Poor in Dhaka	30
<b>Figures</b>	
Fig.1 Methods of data collections and analysis	08
Fig.2 Open Space distributions in Dhaka	15
Fig.3. Possible model for addressing Poverty by Urban Forestry in developing world	39
<b>Picture</b>	
Pic1. Creating open spaces for the millions of people is a big challenge	16
Pic.2. A park close to the national parliament area.	16
Pic.3. Nursery industry can give a support to alleviate poverty.	24
Pic.4.Tree can purify and protect water in Dhaka	32
Pic.5.UF in Dhaka can save air from pollution by C in the wood and SPM by the leaves	34
Pic.6. Giving more green space for poor children can be another address of poverty alleviation	35
Pic.7. Can UF give her more opportunity, security & empowerment?	40
Sources of picture : <a href="http://www.flickr.com/photos">http://www.flickr.com/photos</a> <a href="http://www.state.sc.us/forest/urbben.htm">http://www.state.sc.us/forest/urbben.htm</a>	40

