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Analysis of growing cities around the world their problems and strategies/policies implemented for their solution

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Abstract

The problems due to urbanization are ever increasing especially in developing and developed countries. Population all over the world is expanding rapidly and so that urbanization is one of the biggest challenges faced by humans. There are 5 major problems of urbanization in rapidly growing cities such as unemployment, provision of amenities service, urban sprawl, traffic congestion and pollution. The unplanned urban growth has brought traffic problem in urban areas. To reduce the traffic problems constructing a new road or widening a road is not a proper solution. It is a temporary way to reduce traffic for some days. For this serious problem there is need of practical and long life solution. For providing such solution it is required to study in detail the growth pattern of the city along with demand and supply of transportation, pace of transportation, transportation infra development, transportation habit of people etc. Small and medium sized cities face a variety of transportation planning challenges around the country. Road traffic is a major problem faced in developed and growing cities. Because of that many other problem are created. Currently lot of effort are been taken to solve these problems in metro cities and reduced traffic problem in developed cities up-to some extent. But the growing cities of today are moving towards becoming metro cities of future. The traffic problems in these growing cities are at initial level. If solve these problems at this initial stage and proper strategies are proposed for their future the city will not face such problems in future.

***Keywords*: Growing Cities, Urban Growth, Problems of Growing cities, Strategies and Policies for growing cities**

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1. Introduction

In cultural evolution the man had come from mainly 3 stages such as Stone, Bronze and Iron ages according to the type of material and weapons used at that time. The ages had different periods in different parts of the world. The earliest forms of dwellings of Savage hunter were rock caves. A next man was change the face of the jungle and creates the hunts of reeds and tents, to protect against weather, wind, beasts and enemies. He started living a settled life mostly on the bank of the river, which he found life-giving source- water for drinking and rich fertile land for cultivation.

Man is primarily a social creature. On account of this nature, he always preferred to live in groups, forming camps, hamlets, villages. Human settlements like these as the population increased expanded into towns and towns into cities and finally cities turned into highly metropolitans.

1.1 The urban growth process

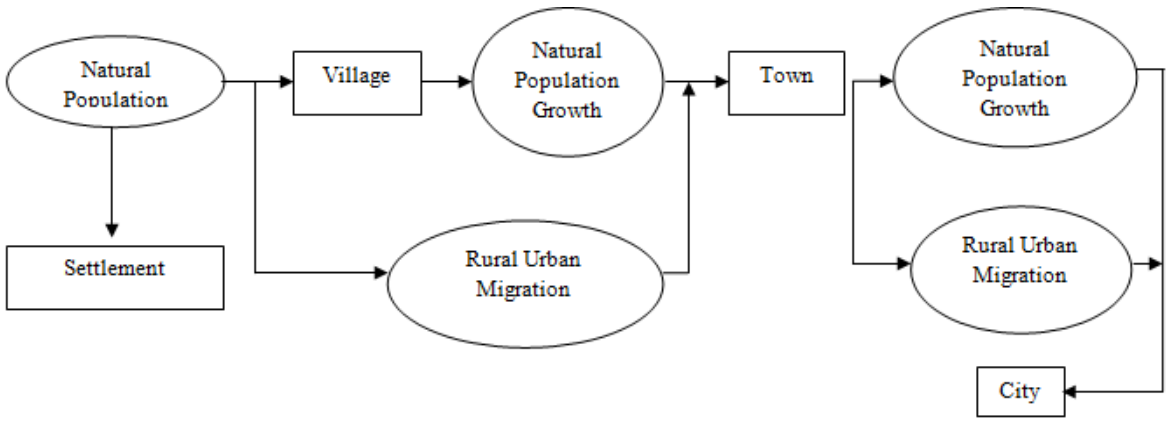

Figure No. 1 The urban growth process

The urban growth process entails the process from human settlements becoming villages, villages growing into towns, and towns being transformed into cities. First, when the urban sector is relatively small (e.g. village) – rural-to-urban migration is the principal contributor to urban growth. However, as the urban sector becomes larger, urban natural population increase tends to play the greater role for urban growth (unlike urbanization).

1.2 Key Concepts of Urbanization

The term urbanization refers to the process whereby an increasing percentage of a country's population comes to live in urban areas (i.e. towns or cities). Urbanization occurs when the urban population grows at a faster rate than the rural population. In other words, if the rural population and the urban population grow at the same pace, the rate of urbanization will not change. The principal source of this process of urbanization is people migrating out of rural areas to come to live and work in urban areas.

Urban growth is defined as the rate at which the population of an urban area increases. This result from urbanization which is the movement of people from rural areas to urban areas. Urban growth may lead to a rise in the economic development of a country. Urban growth is also referred to as the expansion of a metropolitan or suburban area into the surrounding environment. It can be considered as an indicator of the state of a country's economic condition as the effect of urban growth directly impacts the country's economic development. With the rise in urbanization, some events like rapid population growth because of natural increase, migration from rural areas to urban areas, classification of the rural regions as towns because of the changing demographic character of the rural regions pose a challenge.

2. The world's fastest growing cities and urban areas from 2006 to 2020

The tables provide assumed annual growth rates for cities and urban areas between 2006 and 2020. The assumptions are based on past growth/decline and forecasts by international and national statistics organizations (http://www.citymayors.com).

Table No. 1 Fasted growing cities and urban area in the world

Rank	City/ Urban Area	Country	Average Annual Growth 2006 to 2020 in %
1	Beihai	China	10.58
2	Ghaziabad	India	5.20
3	Sana'a	Yeman	5.00
4	Surat	India	4.99
5	Kabul	Afghanistan	4.74
6	Bamko	Mali	4.45
7	Lagos	Nigeria	4.44
8	Faridabad	India	4.44
9	Dar es Salaam	Tanzania	4.39
10	Chittagong	Bangladesh	4.29
11	Toluca	Mexico	4.25
12	Lubumbashi	Congo	4.10
13	Kampala	Uganda	4.03
14	Santa Cruz	Bolivia	3.98
15	Luanda	Angola	3.96
16	Nashik	India	3.90
17	Kinshasa	Congo	3.89
18	Nairobi	Kenya	3.87
19	Dhaka	Bangladesh	3.79
20	Antananarivo	Madagascar	3.73
21	Patna	India	3.72

22	Rajkot	India	3.63
23	Conakry	Guinea	3.61
24	Jaipur	India	3.60
25	Maputo	Mozambique	3.55
26	Mogadishu	Somalia	3.52
27	Gujranwala	Pakistan	3.49
28	Delhi	India	3.48
29	Pune	India	3.46
30	Las Vegas	USA	3.45

Table No. 2 From above table cities are classified as per continents such as follows.

Continental			
Asia (15)	**Africa (12)**	**South America (1)**	**North America (1)**
Pune**,** Gujranwala, Jaipur, Rajkot, Patna, Dhaka, Nashik, Chittanong, Faridabad, Kabul, Surat, Ghaziabad, Beihai, Sana's, Delhi	Mogadishu, Maputo, Conakry, Antanarivo, Nairobi, Kinshaha, Kampala, Lubumbashi, Dar es Salaam, Lagos, Bamko, Luanda	Santa Cruz	Las Vegas Toluca

After classification we know that most of the fasted growing cities come in Asia and Africa continent. The growth rate depends on overall average annual growth from 2006 to 2020. Most of the Indian and Chinese cities are find out in growing cities criteria. There are 9 Indian cities in this table. The growth rate of Indian cities is in between 5.20 to 3.46. Because of that for study of growing cities we choose Indian cities.

These are the 20 most rapidly expanding cities (in terms of population) with at least five million residents, according to the United Nations 2010-2020 rates (data supplied by demographia.com).

Table No. 3 Fasted growing cities in the world

Sr. No.	**City**	**Country**	**Population (m)**	**Annual growth (%)**
1	Sazhou	China	5.25 m	5.57
2	Guangzhou	China	20.6 m	4.66
3	Surat	India	5.44	4.4
4	Luanda	Angola	5.9	4.25
5	Kinshasa	Congo	1.58	4.17
6	Logos	Nigeria	13.12	4.14
7	Beijing	China	21.1	4.1

8	Hanghou	China	7.28	4.10
9	Quanzhou	China	6.71	3.68
10	Banglore	India	9.81	3.64
11	Dhaka	Bangladesh	15.67	3.6
12	Chengdu	China	10.38	3.47
13	Nanjing	China	6.15	3.24
14	Karachi	Pakistan	22.12	3.17
15	Riyadh	Saudi Arbia	5.67	3.16
16	Ahmedabad	India	7.19	3.13
17	Shanghai	China	23.42	3.11
18	Hydrabad	India	8.75	3.10
19	Tianjin	China	10.92	3.09
20	Chongging	China	7.22	3.08

Table No. 4 From above tables the cities are classified as per their continentals.

Continental	
Asia (17)	**Africa (3)**
Chinese Cities (10) Sazhou, Guangzhou, Beijing, Hanghou, Quanhou, Shanghai, Chengdu, Tianjin, Chongging, Nanjing **Indian Cities (4)** Surat, Banglore, Ahmadabad, Hydrabad **Other cities (3)** Riyadh, Karachi, Dhaka	Luanda Kinshaha Logos

As per the classification of continents most of the growing cities comes under Asia and Africa. In above table most of the Chinese and Indian cities available in growing cities criteria. This growing cities criteria based on population and annual growth rate. There are 10 Chinese, 4 Indian and 3 other cities in Asian continent and 3 African cities come in fastest growing cities.

From above 2 tables there are total 13 Indian cities comes in under growing cities. There is lot of problem of growing cities is mentioned as follows. So we first require need a study of growing cities. Because of that for study purpose we choose Indian growing cities.

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Case Study 1 - Dar es Salaam city

3. Detailed case study of Dar es Salaam city:-

Dar es Salaam is the commercial city and main port of Tanzania is characterized by hot and humid climate throughout the year. The average temperature of the City is 29°C with maximum and minimum temperatures of 35°C and 25°C respectively. The urban structure of the city Dar es Salaam is mono-centric as is has only one central business district (CBD). The major urban functions and activities are concentrated in the CBD and along the major arterial road. The city can be characterized as sprawling low rise city. Dar es Salaam has a total area 1691.6 sq.km out of that only 21.7 percent is a built up area. The remaining proportion that is 78.3 percent covered by both natural or semi-natural vegetation and agriculture land mostly in peri-urban areas

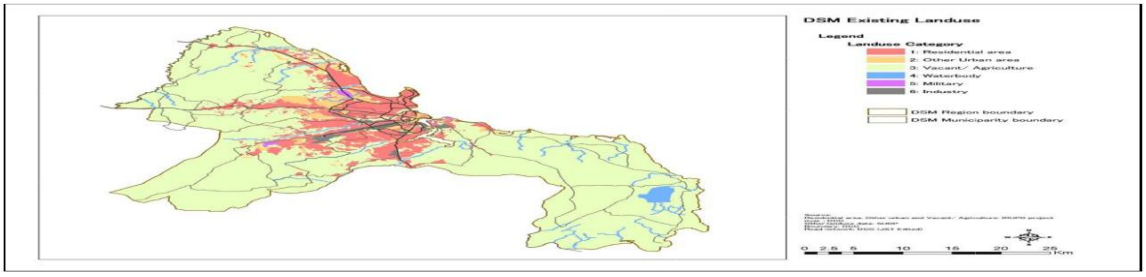

Figure No. 2 Main land uses in Dar es Salaam City (2007)

Figure shows the main land uses in Dar es Salaam. The residential houses in Dar es Salaam are dominated by single storey houses both in planned and in unplanned areas. It is estimated that currently population of 4 million people out of which 60% are employed in the informal sector. About 65 to 70 percent of the resident lives in unplanned settlements. Compared to population densities to other cities the city has a low population density of an average 15 persons/ha. In other areas near the city and some unplanned settlement density has 303 and 533 person per hectare.

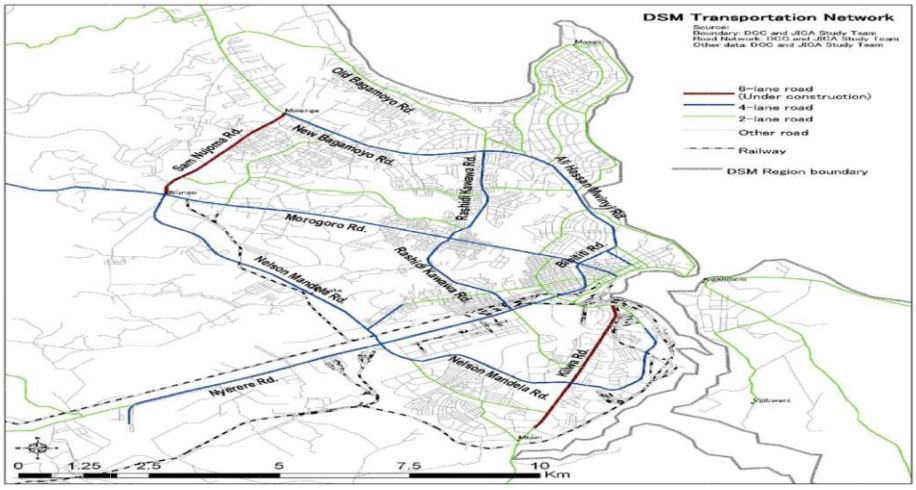

Figure No. 3 Road of Dar es Salaam city

The city development is partly influenced by the arterial road network consisting five main radial roads and one ring road all terminating in the Central Business District. The five radial roads are Kilwa road, Nyerere road, Morogoro road and Old Bagamoyo road and the main ring road is the Mandela road. The total length of the road is 1717 km out of which 395 or 23 % are paved. The condition of the roads in many areas are not paved and poorly maintained. In recent year there is rapid increase in different types of car. Based on Tanzania Revenue Authority records between 2003 an 2011 a total 1010732 cars are registered by the authority. In addition a total 245180 motorcycles and 7408 tricycles were registered by TRA in 2010 and 2011.

3.1 Traffic congestion in Dar es Salaam

Traffic congestion is one of the major problem in Dar es Salaam city. The congestion is more serious in morning and evening peak hours. Traffic congestion in the city has both socio-economic and environmental impact. Congestion is major source of air pollution. The main pollutants are sulfur dioxide (SO_2), nitrogen oxide (NOx), carbon monoxide (CO) suspended particles matter (SPM), hydrocarbons (HCs) and atmospheric lead (Pb). The concentration of SO2, SPM and atmospheric Pb were found to be higher than World Health Organization.

3.2 Factors contributing to traffic congestio

There are number of problems contributing to traffic congestion in the city including city structure, population increase, lack of overall plan to guide city development rapid increase in number of motor vehicles and inadequate and poor road condition.

3.2.1 Population increase

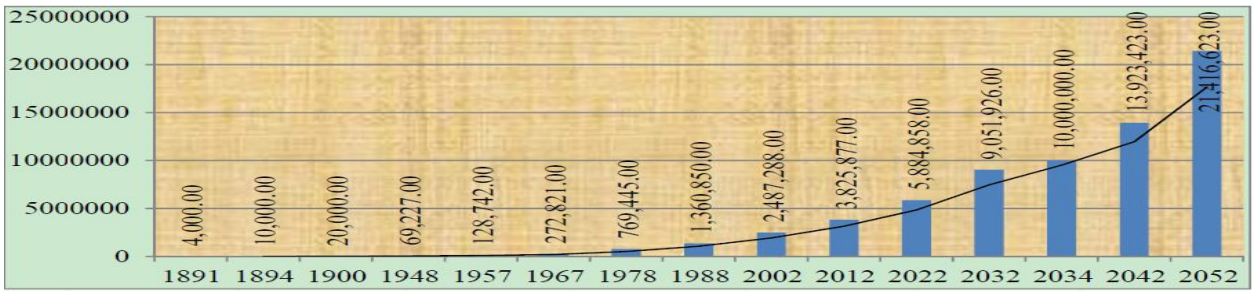

Figure No. 4 Trends of population growth for the Dar es Salaam city (1891-2052)

Figure shows the trend of population growth in the city from 1891 to 2052. The current growth rate is estimated to be 8% per annum to 9.7% (1967-1978), 4.8% (1978-1988) and 4.4% (1988-2002). The growth rate of Dar es Salaam is one of the highest in Sub Sahara Africa. The increase in population will continue to exert pressure on road infrastructure and other social and economic service.

3.2.2 Urban sprawl

Dar es Salaam is low rising sprawling city. Due to resource constrains it has been difficulty to provide adequate basic service including road infrastructure to new areas. The result of urban sprawl in the city is the poor and inadequate provision of service infrastructure including roads. Because of that dwellers use motorized transport to travel long distances to work places and other part of the city to obtain good services and goods. The two factors of poor road infrastructure and the necessity to use motorized transport contributes to congestion in the city.

3.2.3 Mono centric city structure

Dar es Salaam city has only one CBD with arterial roads originating from centre. Because of this lot of city services and institutions are located at one major point. This has led traffic from residential areas to CBD in the morning and vice versa in the evenings.

3.2.4 Lack of overall Physical Plan and Development Control

The first master plan for Dar es Salaam City, after independence, was made in 1968 and the second one in 1979 covering A period of 20 years up to 1999. Since then Dar es Salaam has not had an overall plan to guide its development. The master plan clearly pointed out that such urban structure would reduce the daily need to travel to the city centre for common services. Unfortunately, this was not fully implemented as evidence by many large residential areas in the Dar es Salaam not having basic facility and services. Consequently, their residents in these areas have to travel regularly to the CBD to obtain basic services and therefore contributing to traffic congestion.

3.2.5 Inadequate Road Infrastructure and parking facilities

The city has inadequate capacity of roads to cope with increasing the number of cars due to four main factors. Firstly, that spatial road coverage is low, covering only 2.5 % of land. Secondly many of roads in the city are not in good condition due to lack of regular maintenance. Thirdly, all main road intersections do not have overpasses or underpasses to facilitate smooth flow of traffic. Fourthly, there is a limited parking space especially in CBD. These forces some people to park on roadside does reducing the road capacity much narrower. All these factors impact on congestion problem in the City.

3.2.5 Poor public transport

Public transport in the city is poor due to low quality of services provided by mini buses tricycles and motorcycles. Public service is poor due to number of factors including limited spatial coverage provided by minibuses, lack of fixed bus time schedule, long waiting hours at bus stop and overcrowding. Service provided by cyclist is poor because of rough riding leading to high rate of accident. In addition poor public transport is

contributed by the city being predominantly by served by minibuses instead of regular buses, which are not comfortable. Poor public transport forces number of city dwellers who have cars to use private vehicles instead of public transport.

3.3 Efforts for decongesting Dar es Salaam City

The City is taking some actions to minimize traffic congestion such as increasing road capacity, reducing the number of private cars in road. Action taken to improve road capacity, increasing the number of lanes for the main road, building new roads, improving access roads in residential areas. To further increase road capacities in the city new ring roads and underpass or overpass for main road intersection have been proposed. Actions to improve traffic management include increasing the number of traffic signals, deploying traffic police at the main road intersections, introduction of one way road mainly in the city centre and reversible lane.

In order to reduce private cars in the roads number of actions has been taken. This includes the improvement of public transport through rapid transit system. The necessary infrastructure for phase one the rapid transport system including dedicated lanes and stations along under Construction. The train movement trips increased. Numbers of trips are expected to increase in future. The city authorities have also prohibited Mini buses with capacity less than 25% to transport passenger from the city centre.

In terms physical planning the city is currently preparing a new master plan which addresses congestion problem. In order to minimize traffic congestion in the city the master plan has proposed for new satellite towns. It is hoped that the introduction of satellite towns will reconfigure land use in the city and therefore redistributing traffic.

3.4 Discussion

Traffic congestion is one of key and growing problem in the city. The city authorities are implementing a number of strategies such as increasing the capacity of roads, improving traffic management and improving public transport including introduction of urban train in order to reduce private cars in the roads. In addition the new master plan, still under preparation, has proposed developing of satellite towns. In recent years the CBD has continued to rapidly grow in terms of high rise building for office accommodation, hotels and commercial use. Therefore the CBD will continue to attract more and more traffic. The rate of increase of car is higher than the increase of load capacity. Population growth rate of the Dar es Salaam is high. Therefore in order to minimize traffic congestion in the city, strategies for improving road capacity should strongly be supported by efforts of reconfiguring land uses through physical planning. The introduction of satellite towns as proposed in the new master plan is the move in the right Direction. This however should be supported by the actual implementation of the satellite town.

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Table No. 5 Overview of the Case Study

Country	Problems	Suggested strategies and policies
African cities Dar es Salaam	• Rapid unplanned urbanization • Traffic congestion • Rapid population increase • Inadequate and poor road infrastructure • City structure • Air and noise pollution • Urban sprawl and mono centric city structure • Lack of physical plan	• Improving capacity of road • Increasing number of lane • Proposing new overpasses and underpasses at main intersection • Improving public transport

Case Study 2

4. Detailed case study of Shanghai City:-

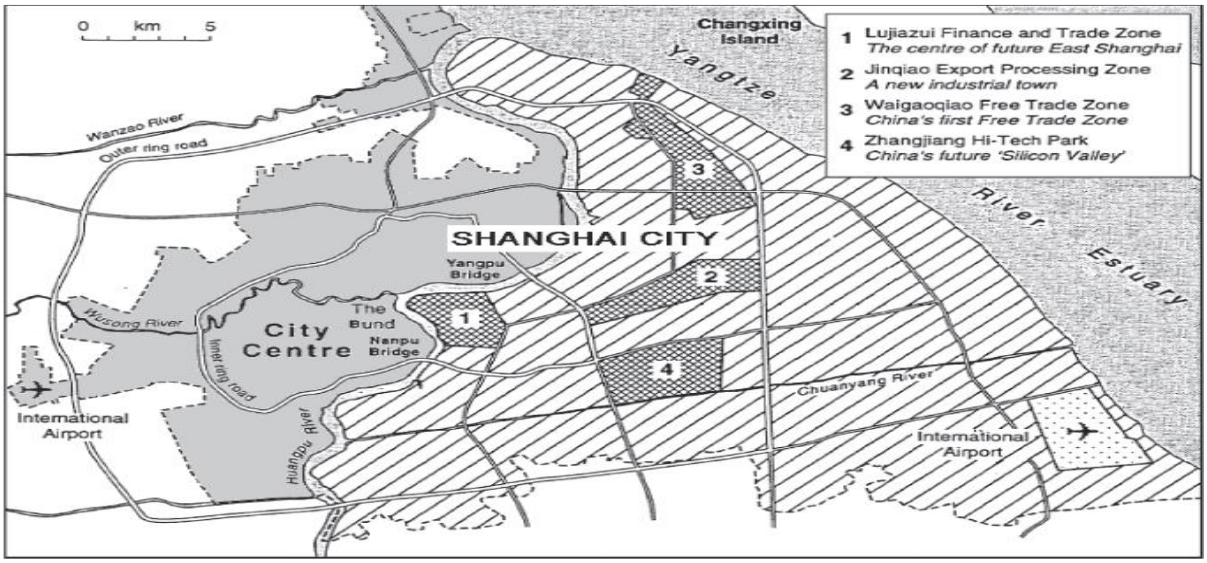

Figure No. 5 Shanghai Map

4.1Shanghai city in transition

16 million people reside in the 6340 km square of Shanghai, located on the eastern cost of China in Yangtze River Delta. The population density of the central city currently averages 22700 persons per square kilometer. Densest area exceeds 60000 persons per square kilometer.

Much of the total land area is ruler. The older urban area comprises 280 square kilometer and a newly urbanized area on the opposite side of the Huangpu River covers another 130 km square. The urban areas Shanghai is thus about twice the size of Washington, D. C. As a result of market forces and deliberate planning policies, city authorities expect the urban area to expand from 410 km square today to 1100 square kilometer in 2010.

4.2 Shanghai transportation picture

Shanghai development has been shaped by its historical role as China's largest seaport. Railways, highways, inland canals, and ocean shipping lines meet in Shanghai to exchange freight and passenger. Since 1970 economic activity and intercity movement of passengers and goods have sharply increased. Shanghai port handles 18% of the nation exports and ranks sixth in the world in capacity. With the booming economy, the sea port is becoming busier. Land delivery of goods through Shanghai urban transport system also is increasing. Like almost everywhere else in the world, highways transport of passenger and freight has increased faster than railway and seaport and airline transport has increased fastest of all.

Over the last two decades, bicycles have gradually assumed larger roll replacing walking, and buses have continued to account for a large share of passenger travel. By the end of 1980 Shanghai reportedly had the largest urban bus system in the world and the number of riders was still increasing. But limited funding was a leading to lagging investment in network expansion, bus amenities and service frequency. As a result this deterioration of service combined with higher personal income or more personalized moods became relatively more attractive.

In Shanghai the municipal bus company was deregulated, and several independent operating companies where created to compete for operating concession. Bus data from different sources conflict, but all agreed that Shanghai continued to have the largest bus system in China through the 1990, through passenger volume were shrinking. Shanghai planners anticipate renewed growth in bus travel in the coming decade, with ridership doubling by 2020.

Planners expect the doubling of bus ridership in part because of large overall increasing passenger in travel. Resident started travelling more and father in 1980 and increasingly so in the 1990 not only because of income growth but also because of industry relocation. The movement of factories from the central city to the periphery created long commute for many workers. Because the newly developed the area where are densely populated and therefore not profitable to serve, companies provide it limited service.

Automobile population in Shanghai is well below the world average for cities of similar income levels. The vehicle population began to expand rapidly in 1990 increasing from 300000 to 600000 between 1990 and 1998 and reaching about 650000 in 2000.Business and government owned most of these vehicles. About 40000 are taxis. Individuals own only about 15000 to 50000. The city government controlled new vehicle registration with high vehicle registration fee through 1998. The city has used an auction system for vehicle registration since then.

The scooter and motorcycle population is declining in the central city area because of new restriction on the registration of new scooters and other vehicles with two stroke engine. This decline may be temporary, however. As income increase, travel pattern disperse and cleaner burning four stroke engine become available, sales of motorcycle and scooters are likely to surge.

4.3 Transport infrastructure- Plans and investment

Shanghai has responded to pressure on the urban transport system with massive infrastructure investment. In 1993 Shanghai spend 3 times more money on urban construction and maintenance than any other Chinese city about half on roads, bridges and mass transit. From 1991 to 1996 Shanghai spent approximately RMB83 billion (10 billion) on transport infrastructure, including two major bridges, a tunnel an inner ring road,65 km of elevated freeways, and the first line of its new subway system.

The second phase of the urban transport planning effort began in 1995. It is aimed at moving housing and industry outside the city centre to decentralize the metropolitan region. Shanghai land use master plan predicts for 2020 a population increase of 2-3 million, a multicenter Metropolitan with strong central business district, a new city centre and eleven satellite towns, all liked by an efficient by an efficient transport networks.

The second plan also calls for 3 Huangpu river crossing facilities, a second runway for the new international airport, a new deep water harbor for container ships, 200 km of rail, 6 elevated bus ways and 650 km of divided highway in suburban area, of which 520 km will be new. Road serving as part of the intercity network will charge tolls. The new rail system will be largely underground and is forecast to carry 8 million passengers a day by 2020.

4.4 Vehicle ownership in Shanghai

The most striking aspect of Shanghai transport system is the small number of cars and the rarity of private vehicle ownership. As noted earlier, Shanghai has about 15000 to 50000 privately owned vehicles. Beijing, with similar income and population, has perhaps 10 times more. Even in terms of the number of total vehicles, Shanghai has several fewer than most cities of comparable wealth. Shanghai has several times the income of Delhi, for example, but less than half the number of private vehicles.

Table No.6 Cars per 1000 Inhabitants, Seven cities

City	Population	Cars per 1000 Inhabitants
Santiago	5500000	129
Delhi	13418000	63
Shanghai	16000000	22
London	6852000	340
New York city	7497000	230
Tokyo	8164000	210
Paris	8791000	340

The scarcity of privately owned cars is related to issue of access, cost, ease of use and quality, and quality. First it is expensive and time consuming to acquire a driver license. One must enrolled in an official driving school at a cost of RMB4150($500), a significant expenses for the typical Shanghai residents. The course consists of three weeks of classroom session more than a month of behind the wheel training and three separate road test. Second it is very expensive to own and operate a car in Shanghai. Fuel prices are similar to those in United States but parking cost $1-3 per hour in downtown Shanghai. A taxes of approximately 10% and large local registration fee must be paid at the time of purchase vehicle. For imported cars the cost is even higher because of extremely high tariffs. Car ownership is limited due to road infrastructure and severe traffic congestion. Land use pattern in Shanghai evolved before motorized transport. The city grew in a very densely developed radial pattern with narrow streets conductive to bicycles use and pedestrians. Services, schools and jobs are well mixed with housing and within easy bicycling distance for most people. Because trips are generally short and bicycles and public transit both are widely available. Road touring vacations are rare in China. The fourth explanation for low private vehicle ownership rates is the relatively low quality of vehicle that has been available for sale.

4.5Policies and strategies

This section examine current and prospective transportation and environmental strategies

4.5.1 Air quality and energy

Now a substantial portion of Shanghai air quality problem is produced by the transport sector despite relatively few motorized vehicle in the City. Among the new pollution regulation implemented in China vehicle emission standard, mandatory inspection and maintenance program for vehicle in certain cities, and gasoline quality standards. The new vehicle emission standards are ambitious equivalent to the standard that first took effect in Europe in October 1993 (known as European Emission Standard I) and in the United States in the early 1980. In July 1999, again ahead of national requirements, the city promulgated new emission standard for other

pollutants and in the late 1990 began switching many vehicle two cleaner burning liquefied Petroleum gas (LPG) and compressed natural gas natural gas (CNG).

An important target of air pollution control efforts in Shanghai and the largest source of the pollution are two stroke scooters and motorcycles. New regulation for these vehicles have not been granted scene 1996, but their pollution remains high because old registration can be transferred to new vehicles. The city recently began to promote electric scooter as an option for residence who want to the convenience of new scooter.

4.5.2 Bicycle infrastructure

The presence of bicycles greatly slows motorized traffic if they share road space. On most streets in Shanghai, bicycles and small scooters are separated from the flow of buses and cars with wide bicycle lanes. These lanes are used heavily, improved safety and lessening traffic congestion. At some intersection in Beijing separate traffic signals have been installed for the two set of vehicles, but it is not clear that signals improve traffic flow in this case.

4.5.3 Information Technologies for traffic management

Minor accident or adverse weather conditions can be highly disruptive. Low cost in information technologies now makes it possible to monitor and manage traffic flow in real time. Unfortunately these systems are not efficiently linked and traffic information is not shared among different systems. The city is planning to correct this situation within the next 5 years to development and implementation of an integrated traffic coordination system

4.5.4 Restraining use of full size private cars

To restrain use of full size private cars policymakers must focus on car purchases the fixed cost of using a private car for transport are much higher than the associated variable cost, such as tolls and parking fees. The car owner obtain choose to drive even when convenient and inexpensive alternatives exist. The most effective way to avoid this situation is to offer attractive transportation alternatives and raise the variable cost of vehicles use to reflect environmental associated costs. Shanghai is already planning to charge substantial tolls for highways being built to serve the new satellite cities. At least one car free zone is an operation is downtown Shanghai, and most cargo trucks travel is banned during the daytime. Parking in Downtown Shanghai expensive and taxi services is reasonably priced. A relatively inexpensive but effective option to restrain vehicle used is already being pursed in Shanghai. Car traffic would be banned in designated areas during peak travel period. Another policy might be charge high parking fees with fees highest in the densest area.Coupled with limitation on parking space.

Table No. 7 Overview of case study

• **Shanghai**	• Environment problem like air pollution • Increased population • Transport congestion • Integration of urban rural development • Motorization	• Pollution- Implement stringent regulation • Implement new pollution regulation • New and updated urban road • Bicycle infrastructure Balancing and integrating urban and rural development.

Case study 3

5. Detailed case study of Beijing city

Beijing has undergone a rapid economic growth and motorization in the last several decades. The average rate of increase of the motor vehicle population was 50% since 1970. In August 2003 the motor vehicle population in Beijing exceeds 2 million and it is estimated that this number will rise to 3.5 million in 2008 when the 24 Olympic Games will be held. The rapid development and motorization put a heavy pressure on the urban atmosphere of Beijing. In the 1990, it was listed among the world's top 10 most polluted cities and suffers from the mix-source air pollution caused by coal consumption, vehicle exhaust, fugitive dust and other source.

At the political, economic, cultural, and educational centre of China, Beijing cannot avoid rapid geographical expansion and economic growth in the near future. Beijing is most important centre in China for international trade and communications. Air quality in Beijing is very important for the benefit of its inhabitants for the image of country. Air pollution has been a high profile issue to the local and national government and to the people living in the city especially because it was selected to host the 2008 Olympics. Beijing will face a considerable challenge to improve its air quality while its economic development and vehicle population rapidly increase

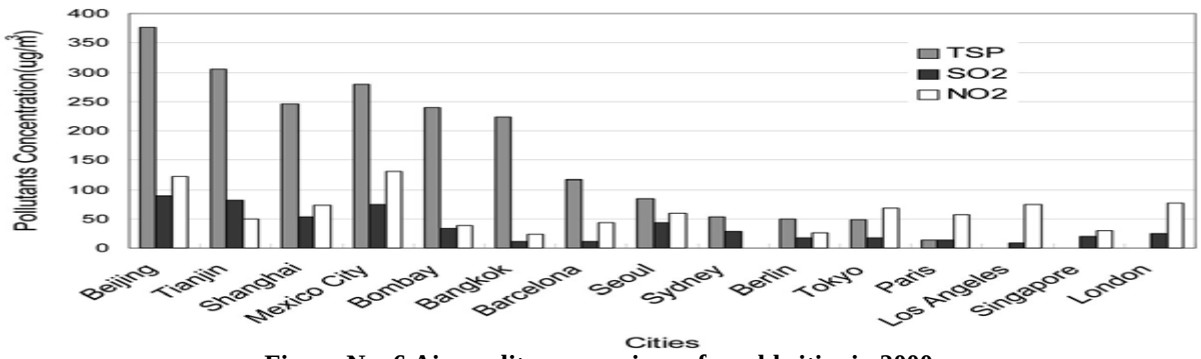

Figure No. 6 Air quality comparison of world cities in 2000

5.1 Measure and effects

To achieve this goal, the Beijing municipal government has implemented 10 stages of comprehensive emergency control measure since December 1998.

Ten stages of comprehensive emergency control measures in Beijing.

The first six stages of control were mainly aimed at So2, NOx, and PM pollution control from coal burning, industry, vehicle exhaust, and fugitive dust. The impact of these measures result in lowering the emission of So2, NOx, and PM by 22.15, 21.42 and 6.27% respectively and a reduction in the atmospheric concentration by 36.3, 18.7, and 5.3% respectively, by the end of 4th stage in October 2000. The seventh to tenth stages of emergency control measure from November 2000 to the present mainly focus on PM pollution, total emission control, and ecological protection and development.

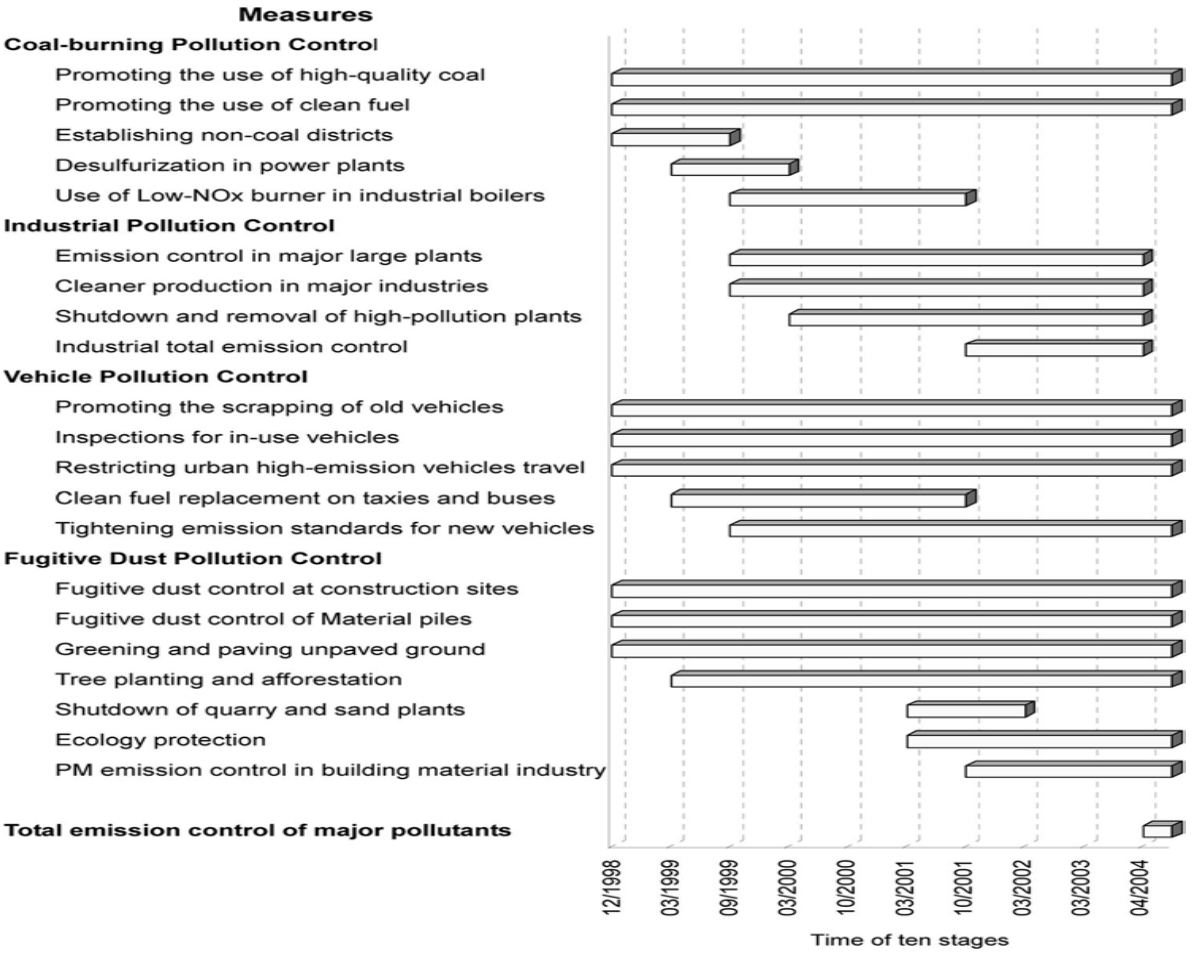

Figure No.7 Ten stages of comprehensive emergency control measure

Table No. 8 Overview of case study

Chinese cities • **Beijing city**	• Sanitation and slums • Waste problems • Air Pollution • Traffic congestion • Population growth • Poverty and wealth	• Pollution- Ban loose burning of coal • Industrial pollution control • Restricting urban high-emission vehicle travel

6. Growing Cities in India

As mentioned in Table No. 1 and Table No. 2 there are total 13 cities comes under growing cities criteria based on average annual growth and population.

Case study 4

6.1 Detailed case study of Pune city

Pune city lies between 18° 25' to 18° 37' N latitude and 73° 44' to 73° 57' E longitude. Pune is one of the outstanding cities of India situated at an latitude of 570 m on the Sahyadri Hills in western Maharashtra. Pune city has been established on the bank of the river Mula-mutha. The municipal corporation of Pune having area of 141.11sq.km. After adding 23 villages in Pune Corporation the area was 237.04 sq.km.

The importance of Pune as an industrial Centre has grown rapidly since the 1960 when industrial expansion of Mumbai region curtailed. Consequently Pune has become a major centre in the state having attracted engineering industries such as motor vehicle manufacturing plants. In addition to this a number of multinational companies have manufacturing base within the city. Much of the local industry is concentrated along the main Pune Bombay highway. In recent times Pune Metropolitan region was successful to capitalize on its knowledge base, good climate and strategic location near financial capital of India. Within a short span it has attracted prestigious InfoTech and communication industries. Today Pune competes with cities like Bangalore and Hyderabad for acquiring larger stake in IT sector. The state government is keen on the industrial expansion of Pune and utilizes incentives to encourage industrial growth and innovative proposals like Mumbai-Pune knowledge corridor.

To study the growing traffic and transportation problem in the City following causes are followed.

Traffic congestion- This is a major problem in Pune city during the peak hour of the day, roads are congested. After 9:00 a.m. to 5 p.m. traffic congestion can be takes place on major roads like Karve Road, Shivaji Road,

JM road, Fergusson College Road, Dhole Patil Road, Tilak Road, L B Shastri Road, Bajirao Road, Kumthekar Road, Laxmi road, S.B. Road, Katraj Road, Hadapsar Road Pune station and other highways. It has come out very clearly that increasing population, existence of poor public transport, growing economic activity and increasing student population are the four tops reason for congestion on the roads.

Increasing vehicles- In Pune city due to excessive growth of vehicle on the road add to the problem of road blocking. Growths of vehicles are increased day by day in the Pune city causing serve effect on urban transportation. There are many types of vehicle in the Pune city causing traffic congestion and extra burden of road flowing capacity. Another very important factor to be considered the is the rapidly growing population of motor vehicle and increasing commerce in Pune city.

Environmental problem- Emission from industries and vehicles created serious pollution hazardous in almost all the big urban areas. The automobile has revolution the entire scenario of commercial, industrial, public and personalized transport system. However, it has also introduced environmental problem. It is an apparent that urban area and industrial centers are the most significant contributors of monoxide (CO) because they account for the largest number of automobiles and industries. Air and noise pollution are responsible for a remarkable impact on environmental and human health.

Parking problem- In Pune city, a large number of vehicles are parked in haphazard manners causing obstruction to the traffic flow. Because of that traffic congestion are obtained also lowering the speed of the traffic flows in busy roads. Two wheelers have the highest share among all the vehicles parked on the road. The parking of the vehicle is allowed on one of the side of the section.

Public transport- Various studies have proved that in order to meet the growing transportation demand of the chief and Rapid Public Transport system. Public transport system plays an important role in particular cities growth. In Pune city, Public Transportation not proper, regular and no management plan to fulfill its growing need of the population. PMPML services are not sufficient to growing population.

Improper planning of City Development- City Development planning is not proper. Roads, Highways and service roads are not preplanned.

Lane management- Lane management is an important factor in managing the traffic in Pune. Many type of the vehicle try to overtake the vehicles even in the single undivided road. This is the main reason that the city roads are equipped with the lane dividers which divides the lane into incoming and outing traffic.

Table No. 9 Overview of case study

Country	Problems	Suggested strategies and policies
India **Pune**	• Unplanned city structure • Transport problem • Water management • Air pollution • Lack of amenities and facilities	• Operational immediately with clear jurisdictional with civic bodies • Clear definition of funding lines and control over implementation • Upgrade public transport • No road side parking

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