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on
Planning and Assessment of Urban Transportation Systems
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Country Report

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Introduction

A) Background and Status of National and Urban transport Systems in Pakistan

Pakistan is the sixth most populous country of the world with highest fertility rate in the South Asian region. It has a population of about 192 million people with 796,095 Sq. Km of area. The country is facing rapid urbanization due to social, economic and demographic reasons. The share of urban population has increased from 35% in 2010 to 40% in 2016. The urbanization is growing rapidly in the country, while industrialization is now picking up pace.

Transport is an important sector of the economy of Pakistan contributing 10 per cent of the GDP and over 17 per cent of the Gross Capital Formation. The sector consumes 35 per cent of the total energy annually and is recipient of 20 per cent to 25 per cent of the annual federal public sector development program. The transport sector covers roads, road transport, railways, ports and shipping and aviation. The sector generates a large number of employment opportunities, currently estimated at 2.3 million jobs (5.9 per cent of employed labour force). The Urban Transport Sector in Pakistan, however, is characterized by a high growth in private vehicles (Motorcycles and Cars), major reliance on small public transport vehicles (wagons), and lack of investment in large size buses and under investment in urban infrastructure. This has resulted in a poor urban transport service besides increasing congestion and environmental problems in the urban cities

The total inland traffic by road and rail transport is currently estimated at 239 billion passenger-km of passenger traffic and 153 billion ton-km of freight traffic. Freight and passenger traffic has been growing at 3 per cent and 4.5 per cent per annum respectively. Road transport accounts for 91 per cent of passenger traffic and 96 per cent of freight traffic. The deregulation of the road transport services in the 70s has resulted in development of a competitive and vibrant private sector for goods and passenger transport.

The number of vehicles on road has increased drastically over the past decade. The factors contributing to such a rapid growth of vehicles on road are:

- i) Diminishing role of Pakistan Railways
- ii) Lack of decent public transport facilities for urban commuters
- iii) Rapid urban sprawl.
- iv) The absence of mass transit facilities in major cities of Pakistan.

The road network is about 263,942 km with on-road vehicles at about 9.7 million. The broad national data of Pakistan is as given below:

- | | | |
|--|---|--------------------|
| i) Area | = | 796,096 Sq- km |
| ii) Population | = | 192 million |
| iii) Total Road Network | = | 263,942 kilometers |
| iv) National Highways & Motorways | = | 11,500 Kms |
| v) Roads have dominant share in both transport of passengers (94%) and the Goods (97%) followed by rail. | | |
| vi) Total Number of Vehicles more than 9 million | | |

- vii) 55.4% are two Wheelers and 44% four Wheelers (including Cars)
- viii) Annual growth rate is 4 %
- ix) The country offers the most attractive transit route to the Central Asian countries.

B) Institutional Arrangement and Agencies Involved

The subject of transport falls in provincial domain as per constitution of Pakistan. Urban transport policies and plans are formulated and executed by City district Government / provincial Governments. A Transport department exists in each Province to look after the matters related to urban transport. However, at the Federal level Ministry of Communications deals with overall transportation affairs of the country. The National Highway Authority (NHA), functioning under the administrative control of the Ministry, maintains the national highway network while the Provincial Communications and Works Departments are responsible for the provincial road network. Various agencies concerned with different aspects of the urban transport operate independent of each other and without essential coordination. For example, roads are built by Highway Departments of Local Bodies, e.g. Municipal Corporation, Cantonment Boards and Development Authorities; permits for buses and public service vehicles are granted by Transport Authorities; Taxes are imposed and collected by Excise and Taxation Departments

Following the implementation of the devolution plan, a majority of the intra- district provincial networks have been devolved to the districts. The road transport services are regulated by the provincial governments through the Provincial Transport Departments. The Provincial Transport Authorities (PTAs) and Regional Transport Authorities (RTAs) plan, allocate routes, regulate, enforce and assert day-to-day control over inter- and intra-city passenger transport services, which are dominated by the private sector

At present, public transport is mostly operated by the private sector in Pakistan. These services are administered by the Provincial Governments. In each Province, there is a Provincial Transport Authority (RTA) with several Regional Transport Authorities (RTAs) which administer the public transport service by private operators. Vehicles are registered as stage carriage (like Buses, Wagons etc.) or as contract carriage (like Motor Cabs). Route permits are granted to stage carriage and renewed by these agencies on the receipt of annual fee. The Provincial Transport Authority administers the Inter-Provincial routes, while the RTA/Local Government administer the urban transport system within the cities and its area of jurisdiction. Route determination, fleet allocation, fare rates etc are determined by the respective Province through the RTA and RTA/Local Government. Vehicle fitness certificates are issued by the Motor Vehicle Examiners in the Provinces.

With the dissolution of the of the Road Transport Corporation in the mid nineties like the Punjab Road Transport Corporation (PRTC), the Karachi Transport Corporation (TTC), the KPK GTS, major reliance shifted on small vehicles like the Wagons and Suzukies. However, for introducing large size buses in the major cities, the concept of franchise buses on major urban routes has been implemented by the Provinces. The private sector has now introduced large size buses for urban transportation.

2 Urban Transport Policies

A) National Urban Transport Policies and Plans in Pakistan

The fact of the matter is that there is as yet no comprehensive transport plan dealing with urban transport problem as a whole. During 1960s Master Plans were prepared for number of major cities by the Physical Planners but these plans were lacking in many components which resulted in deterioration of transportation services over the years. In 1970s Provincial Governments took initiatives and started Bus services in some major cities side by side the private sector but due to mismanagement and inefficiency of the public sector this plan could not sustain very long. In 1990s it was realized at the National level to devise solutions for growing urban transportation problems. Accordingly National Research Centre (NTRC) was established to collect data for urban transportation planning and Urban Transport Units were also established in major cities by the respective provinces. A comprehensive transport planning study was carried for Rawalpindi-Islamabad with the help of Norwegian Consultant in mid 90s by the NTRC. A detailed urban transport study for Karachi was also carried out with the help of the world Bank.

Transport Policy: National Transport Research Centre has recently prepared a draft National Transport Policy for consultation, giving due consideration to the increasing urban road congestion and its associated air pollution. The strategy of the document puts primary emphasis on the need to increase the efficiency of use of road space by favoring public transport and by the use of traffic management instruments to improve traffic performance and by restraining the growth of private vehicular traffic.

Pakistan Transport Plan Study (PTPS): It is a comprehensive transportation master plan for Pakistan for the period from 2005 to 2025. JICA prepared the plan while NTRC played the role of local counterpart during the study. The Plan covers all modes of transportation including road, rail, air transport, inland water transport and ports and shipping. Along with other aspects the document also suggests the initiatives required to counter the environmental adverse effects of transport. The plan identified priority projects to be undertaken by the GoP. One of such identified projects was feasibility of second Kohat Tunnel. The identification is mainly based on environmental considerations.

National Environment Quality Standards: Ministry of Environment, prepared national environment quality standards for motor vehicle exhausts and noise. These standards were incorporated in Pakistan Environment protection Act 1997. These standards for “in use vehicles” are as produced below:

S. No.	Parameter	Standards (Maximum permissible limit)	Measuring Method	Applicability
1	Smoke	40% or 2 on Ringlemann Scale during Engine acceleration mode.	To be compared with Ringlemann Chart at a distance of 6 m or more	Immediate effect
2	Carbon Monoxide	6%	Under idling condition: non-dispersive infra red detection through gas analyzer	
3	Noise	85 db (A)	Sound meter at 9.5 m from source	

B) Current Status of Urban Transport Systems in major Cities and Secondary Cities

The Urban Passenger Transport Sector in Pakistan is characterized by a high growth in private vehicles (Motorcycles and Cars), major reliance on small public transport vehicles (wagons), lack of investment in large size buses and under investment in urban infrastructure. This has resulted in a poor urban transport service besides increasing congestion and environmental problems in the urban cities. This calls for modal shift in favor of high capacity vehicles.

The Federal Government, National Highway Authority has completed a network of bypasses around the major cities so that the road network in these cities is not overcrowded with the traffic. Bypasses are also under construction near small towns and cities. The development of sustainable urban transport is one of the priority agenda of present government. The government is actively pursuing this agenda; mass transit systems in the form of BRT called “METRO”. In Lahore and Islamabad/ Rawalpindi, Mass Transit system in the form of BRT called ‘METRO’ has become operational. Lahore Metro is reported to carry over 150,000 passengers per day. Over 120,000 passengers travel daily by Islamabad Metro Bus. Several new flyovers have been constructed in recent years

C) Ongoing and Planned Major Urban Transportation Projects

The Government of Pakistan and many city authorities are dealing with the urban transport issue on many fronts. Some mass transit projects are in the construction phase like Orange Line in Lahore and Green line in Karachi while a few transportation projects are in the planning stage.. In Karachi, the government is investing in a number of urban roads and suburban rail projects. A number of ring roads have been completed and urban expressway construction planned

On the environmental front, several measures have been taken to mitigate adverse effects of urban transport on air quality. Pakistan now has switched to unleaded fuel. In Islamabad at least the sulfur content of diesel has been reduced to levels at which Euro 3 standards for vehicle emissions can be set. Pakistan set an example by undertaking a comprehensive and far-reaching program of measures, due to which the conversion of a huge number of vehicles to compressed natural gas (CNG) in 2000-2002 took place under the incentive of price differential. This clearly reduced the visual impact of “black smoke” in the major public transport corridors. But much remains to be done.

3 Data Availability on urban Transport indicators

Pakistan like many developing countries lack availability of proper data. The basic data concerning population, zoning, housing and land uses was not maintained by a single agency. Various agencies concerned with different aspects of the urban transport operate independent of each other and without essential coordination. For example, roads are built by Highway Departments of Local Bodies, e.g. Municipal Corporation, Cantonment Boards and Development Authorities; permits for buses and public service vehicles are granted by Transport Authorities. Taxes are imposed and collected by Excise and Taxation Departments. There is no systematic study or analysis of where and when to build a road, where and how many route permits are needed and comprehensive data bank could not be established.

The institutions developed for transport planning and development has however started acquisition of necessary data. Different authorities use different approaches for collection of data. The primary data is collected both through manual and electronic devices. Most of the data regarding traffic volumes on various sections of road is collected manually. Appropriate equipments are used to collect data regarding air quality and other indicators. Given below are few glimpses of data relevant to Pakistan in pertaining to the transport sector.

a) Traffic Volume (Roads)

Mode	Total Traffic	Urban Traffic	Urban Share (%)
Passenger (Million Passenger Kms)	227,000	94,227	42
Freight (Million Tons Kms)	118,000	14,403	12

b) Population of various cities of Pakistan:

POPULATION OF MAJOR CITIES OF PAKISTAN				
CITY	1998 CENSUS	1981 CENSUS	ACGR(%)	Estd. 2016
KARACHI	9,339,023	5,208,132	3.49	17,316,990
LAHORE	5,143,495	2,952,689	3.32	9,259,286
FAISAL ABAD	2,008,861	1,104,209	3.58	3,783,696
RAWALPINDI	1,409,768	794,834	3.43	2,586,932
MULTAN	1,197,384	732,070	2.93	2,013,673
HYDERABAD	1,166,894	751,529	2.62	1,858,693
PESHAWAR	1,132,509	600,993	3.79	2,212,284
GUJRANWALA	982,816	566,248	3.29	1,760,035
QUETTA	565,137	265,719	4.09	1,162,829
ISLAMABAD	529,180	204,364	5.7	1,435,335

c) PSVs in Different Cities of Punjab

City	Population in 1998	Growth rate	Estimated Population 2006	Required No of Buses	Existing Equivalent Buses	Short Fall
Lahore	5143465	3.32	6679300	4453	3558	895
Gujranwala	1132509	3.79	1525056	1017	470	546
Rawalpindi	1409768	5.19	2113213	1409	900	509
Islamabad	805235	3.43	1054617	703	401	302
Sargodha	458440	2.7	567343	378	177	201
Faisalabad	2008861	3.58	2661688	1774	2171	-396
Multan	1197384	2.93	1508583	1006	646	360
Bahawalpur	408395	4.93	600175	400	198	202
DG Khan	188149	3.51	247948	165	66	100

d) Use of CNG, as cleaner fuel, in Road Transport Sector in Pakistan

Name of sector	Physical Targets of MTFD Period			Achievement of Target
	Year 2004-05	Targets 2009-10	MDG Targets 2015	
No. of Petrol & Diesel vehicles using CNG	380,000	800,000	920,000	2,400,000

e) Suspended Particulate levels in various cities of Pakistan as surveyed by Pak EPI in 2010

Average Suspended Particulate Matter (PM2.5)		
S. N	City	Level
1.	Islamabad	73.0
2.	Lahore	121.8
3.	Karachi	53.2
4.	Peshawar	70.2
5.	Quetta	47.1
	Safe Limit	35.0

f) Emissions from Transport Sector

According to GHG inventory 2008 for Pakistan prepared by Global Change impact studies centre, Ministry of Environment Total emissions from Transport Sector amount to 18,584.4Gg, with road transport accounting for 87 % of all emissions from the sector. Within road transport, diesel oil is the most polluting fuel accounting for 77 % of the total emissions from road transport. For the transport sector diesel oil used in road transport comprised 67% of total fuels thus highlighting the disproportionately large impact of emissions from fuel. Emissions from air transport constitute the second largest group of emissions by sub-sector, but these constitute only 7% of total transport emissions. Rail transport accounts for 3 % of total transport emissions.-- Shifted

4 Issues and Challenges Faced by Urban Transport Systems

A. Use of Low Occupancy Vehicles/Personal Modes of Transport

During a traffic count survey carried out by NTRC at five Selected locations in Islamabad/Rawalpindi it was revealed that in terms of average vehicular composition, Buses and Mini-buses constituted about 4.6%, while cars (61%) and motor cycles (20.4%) constituted more than 81 per cent of the total number of vehicles. The pattern is similar for other cities of Pakistan. It is this factor, which has created the congestion and most of the environmental problems in urban Pakistan. There is a mindset that achieving sustainable and environment friendly transportation is too costly, difficult, and will threaten our affordability and lifestyle. Congestion is mainly caused by personal modes of transport notably by cars.

B. Weak Vehicles Inspection System

Inspection of vehicles is normally carried out at the time of registration. The inspectors of Registration Authorities working under Excise and Taxation Offices, carry out inspection of the vehicles and certify the engine and chases number. The Vehicles Registration Authority is functioning in every district of Pakistan, where vehicle Inspectors is employed to check the road worthiness and ownership of the vehicles. However, there is no workshop established in the public sector specifically for the purpose of vehicle inspection

C. Lack of Equipment and Inspection Method

Generally vehicles inspection is carried out visually on the basis of standards set for various components. However, some equipment like axle weigh machine, smoke emission tester and engine efficiency tester are used for detail inspection of vehicle at very few places. Rest of the vehicle components are checked by visual inspection by the motor vehicle examiner or registration supervisor. The equipments for this purpose, however, are either not available or very rarely used in the country. The manpower available for the purpose falls far short of the requirement.

D. Financial Issues

Transport Sector is highly cost extensive sector. For example, in the case of Karachi Mass Transit System, the unit cost of a Busway was estimated at Rs 160 million/Km at the 1989 prices and for a network of 87 Kms amounted to about Rs 14 billion. For Lahore, the unit cost of a Light Rail Transit System was estimated at Rs. 477 million per Km (1991) with the total cost for a length of 12.5 Kms in the neighborhood as Rs 6 billion. The capital cost of 65 Kms of Delhi Metro Rail System has been estimated at Indian Rs 106 billion, which comes to about US \$ 36 Million per Km. This is a colossal amount for a country like Pakistan where the total annual public sector development programme is Rs 202 billion for all sectors including health, education, agriculture, etc. This poses a severe problem of financing for the government specially in the context of the fact that transport sector is highly fragmented sector with whole operation of transport in the private sector.

E. Environmental Problems and Implementation of Regulatory Framework

Only recently we have been able to develop clean air regulations for Pakistan and National Environment Quality Standards relating to transport emissions. The effective implementation of this regulatory framework is still a big question mark.

Combustion of low-cost oil provides more than 99 per cent of the energy for motorized transportation and creates many of the environmental problems that result from transportation. Harnessing renewable alternatives will be a major challenge. The share of Iranian diesel in the transport sector consumption is estimated to be around 10 %. Mechanisms for identifying improvements in environment friendly transportation, and disseminating resulting success stories, and beneficial trends are inadequate

There remains a need to address the content of sulfur in diesel more generally. With the dramatic increase in use of two-wheelers there is a need to introduce measures to ensure the switch of motorcycles from two-stroke to four-strokes.

F. Lack of Proper Data.

The most critical element in the way of preparing comprehensive Urban Transport Plan is lack of proper data. The basic data concerning zoning, population, housing and other land uses is not maintained by the local bodies in the form which could be used for transport planning purposes. Besides, there is complete lack of awareness and application of traffic engineering techniques. Decisions about location of housing and business activities are being made without proper consideration of their effect on transport. Efforts are being made by various departments concerned with the problem in their own way. However, such efforts are disjointed and lack any cohesion.

G. Overpopulation and Poor Implementation

Mostly the cities and towns are thickly populated. The roads are misused by the encroachers and usually there is rush and road block due to mismanagement, excesses of public transporters carelessness of the traffic police and public demonstrations. The people mostly do not show responsible behavior, causing unnecessary obstruction in the flow of traffic. Evils of smoking in the public transport, wrong parking and blowing of horns are common due to poor implementation and lack of awareness among the public

5 Way Forward

A. Integrated Land Use Planning

The concept of integrated land use planning has a very limited scope in the already developed cities. However, there is a need to adopt this concept in newly developed Urban settlements e.g. Bahria Town, Defence Housing Authority. The location of housing and business activities layout of roads and transport network, operation of services, their organization, planning, etc. should be considered as an organic whole. The housing and business activities should be located so as to make minimum demand on transport, the layout of net work should be in line with the location of housing and business activities so that traffic circulation is possible without friction,

B Shifting towards more sustainable modes

Shift towards mass transit systems such as metros in an integrated manner can be an effective solution to the urban transportation system. Mass transit system has become un-avoidable specially in large metropolitan cities. The introduction of urban mass transit systems requiring dedicated infrastructure should be considered once the level of traffic along an urban travel corridor in one direction exceeds 20 thousand persons. All cities with a population of more than 500,000 should have proper urban transport system. The requirement of equivalent number of buses in 14 cities of Pakistan needs to be worked out. To encourage urban bus/mass transit, adequate finances should be made available especially to the corporate sector. Creation of special credit line at low rate of interest may be considered by the Bank in preference to the present car financing schemes.

The urban transport system should meet the collective and individual transport needs at the least possible cost to the national economy and the users. The various public transport options are not mutually exclusive while buses are the most basic and flexible form of urban mass transit making an efficient use of the existing road infrastructure. The buses being the most basic form of mass transit are, the most cost-effective and flexible mode capable of meeting most of the demand for urban transport at various levels of quality and quantity.

C Improving Fuel Quality & Minimizing Emissions

- Conversion of two stroke engines to four stroke engines.
- Replacement of Diesel/Petrol by CNG which has lower emissions than Diesel/Petrol driven cars and vehicles

D Package Approach

There is a need to adopt an integrated 'Package Approach' with priority to public transport modes over the personal modes of transport. Some kind of regulatory/restraint measures are also un-avoidable for dealing with traffic problems. Package approach can be adopted on the following lines:

- a. Different modes of urban transport & allied infrastructure.
- b. Priority to be given to public transport modes

- c. Regulatory/restraint measures and conscious decision to increase the urban infrastructure to 'cope for car demand'
- d City / District Governments to prepare Transport Master Plans and allocate adequate land for parking facilities for public transport vehicles on a nominal rental basis

E Formation of Proper data bank

Mechanism for proper data collection/maintenance needs to be put in place through coordination among the concerned stakeholders. For example road accident data is available with District Traffic Police, similarly Roads Transport Authorities, local governments CDA, LDA Excise and Taxation Department etc have the relevant data which can be shared for formation of a proper data bank for planning a better transportation system.

F Improvement of Roads and Proper Implementation of Rules

Local Governments should work for proper geometry of roads, signs, signals, road marking, footpaths and efficient road drainage which are essential components of the urban road network. Traffic police needs to be more efficient in curbing the rampant violations of traffic rules and regulations and promoting awareness among the masses to minimize misuse and encroachment of roads.