

RESEARCH ARTICLE

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Conceptualizing Sustainable Transportation for City of Pune, India.

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Abstract

Pune the second largest city of Maharashtra state of Indian union is witnessing large scale urban sprawl and its negative ramifications in last couple of decades. Urban sprawl is defined as dispersed and discontinuous suburban land development associated with low population densities and high auto dependence. This phenomenon is adversely affecting sustainability of the city because of its negative environmental, social and economic impacts. It saps local resources, destroys open space and farmland, and increases the energy consumption of mobility by promoting long travel distances. Another problem is high levels of traffic congestion and harmful emissions causing environmental pollution. There is a plethora of research that sought to address the issue of urban sustainability and combat sprawl; little has been done on developing analytical tools that could be used to assess the future of urban sustainability for Indian cities and for Pune in particular. This paper explores that how particular land use development patterns or the expansion of the current urban transportation infrastructure are likely to impact urban sustainability.

Keywords: *urban transport, fringe, Pune, mobility, mode etc.*

I. Introduction

Transport enables development needs of individuals, companies and societies to be met through the provision of transport services. Here, transport services consist of mobility, quantity of transport opportunities and accessibility, quality of access between origins and destinations.

Transport sustainability indicators include level-of-service, traffic speeds, parking measuring sustainable transport development, many organizations defined their indicators related to economic, social and environmental sustainability, like total vehicle kilometers, total motorized movement of people and use of fossil fuel energy for all transport [1]. Sustainable urban transport need to plan, manage and maintain their transport systems more accurately and take into account the requirements of a growing number of complex aspects like congestion relief, pollution reduction, efficient resource use, equity and accessibility. These problems can be solved by building extra capacity, making better use of existing infrastructure, discouraging and/or promoting other

means of transport or even influence travel patterns of people as well as freight.

II. The urge for sustainable urban transport development

Mobility of people and freight is an essential prerequisite for social-economic development of urban areas. In most of the Indian cities motorized vehicles, notably two wheelers, buses, cars and trucks, have become the most important means of mobility, at the cost of non-motorized transport as well as public transport [2, 3]. This has resulted in congestion, traffic hazards, air and noise pollution, changing land-use patterns, social isolation etc. These problems are proved to be a serious threat for enhancing social-economic opportunities. It calls for a sustainably developed transport system where person transport, accessibility, quality of life, environment, congestion, equity etceteras, have an important role, while at the same time taking care of the generations ahead in terms of financial and environmental capacities.

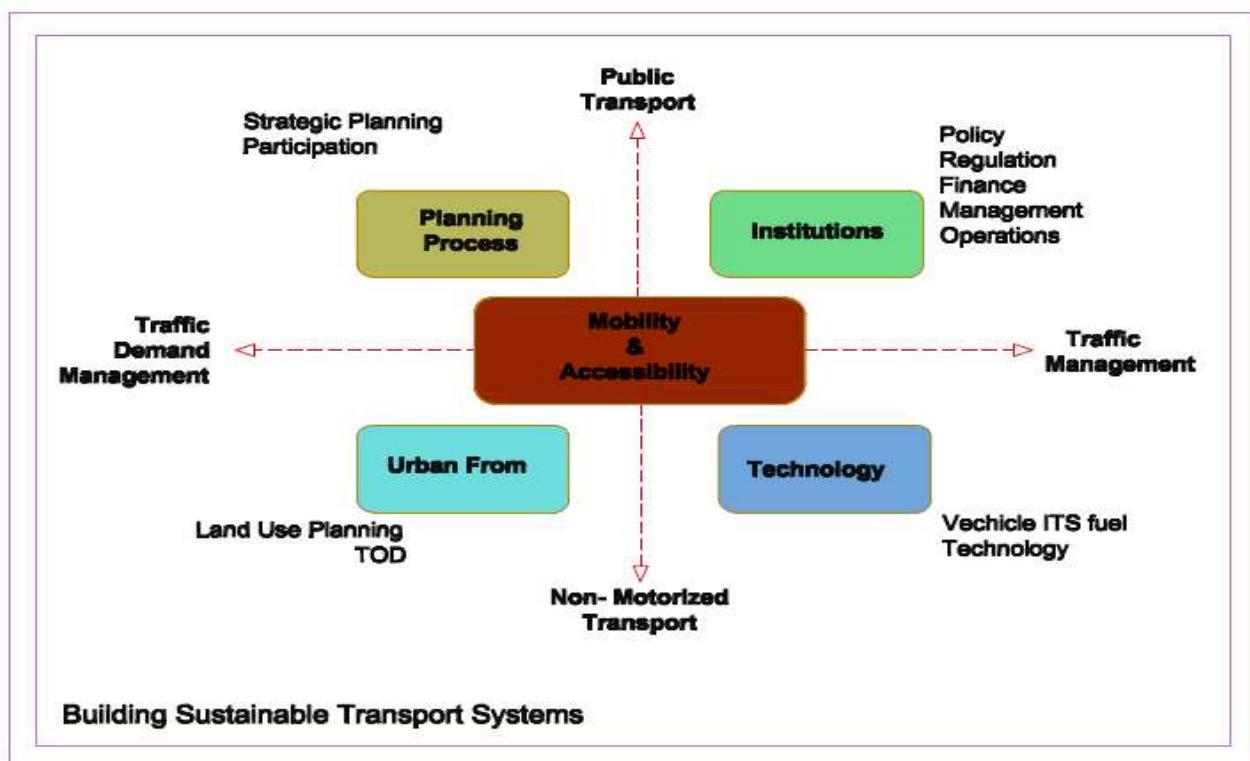


Figure 1: Building sustainable transport system [4]

2.1 Identification of the problem

Current transportation facilities in Pune are causing threats and damages to health and environment disregarding the underlying principle of sustainable development. This research a sustainable and developed urban transport system has been considered as a transport system that meets the people's transport related needs in terms of mobility, accessibility and safety, within limits of available or affordable environmental, financial and social resource capacities. It covers two distinct elements,

that is sustainability as well as development, which include three different dimensions, economic and financial sustainability, environmental and ecological sustainability as well as social sustainability. This research endeavors to explore the way to sustain or enhance basic mobility and accessibility options to people. It is aimed to find strategies for the use of limited transport related resources, that is environmental, social and economic resources capacities to guarantee intergenerational equity.

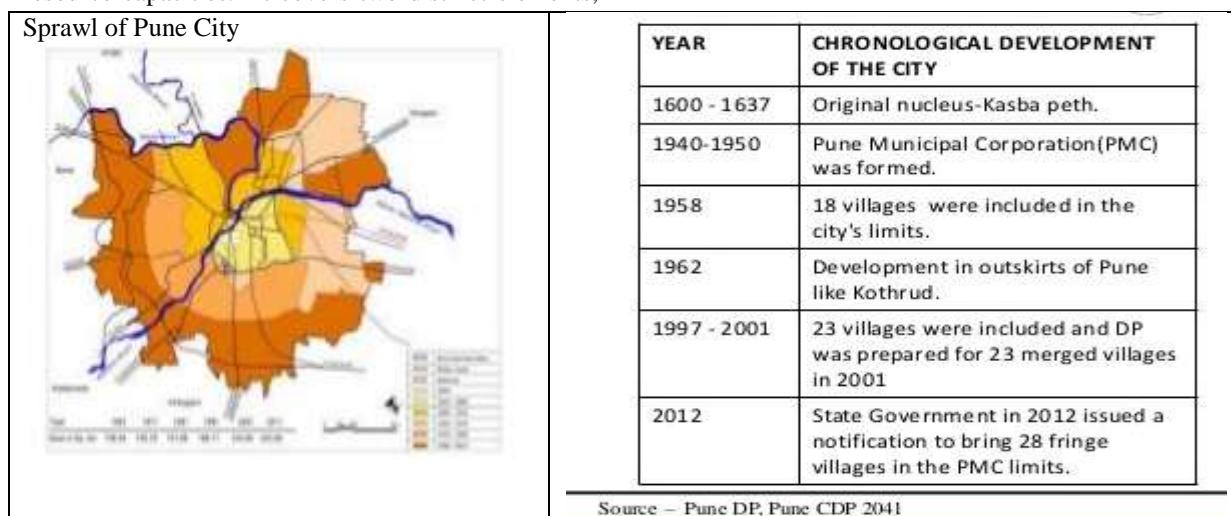


Figure 2: Sprawl of Pune City

III. Urban Travel Behavior

Numerous studies exist that measure the effects of the land use patterns on travel behavior. Literature reviews (e.g., Ewing and Cervero, 2001; van Wee, 2002) distinguish various land use characteristics, ranging from density and diversity measures to neighborhood type and urban design features [1, 2]. Results are generally controlled for socio-economic

differences, and a limited number of studies also take individual perceptions, attitudes and preferences into account. Consequently, key variables in these empirical studies refer to three components: (i) a spatial component, (ii) a socio-economic component and (iii) a personality component. In the next subsections, we summarize some main findings of empirical studies on land use – travel behavior.

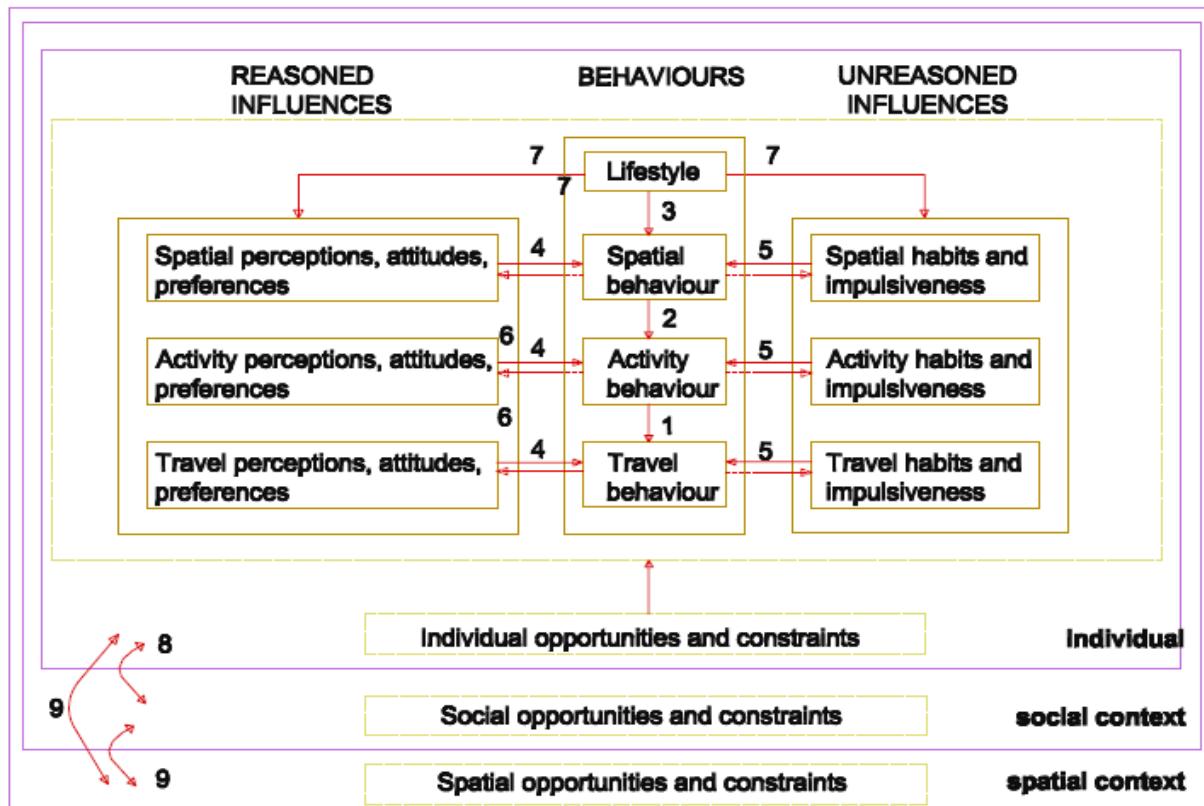


Figure 3: Land use travel behavior [7]

In Indian cities the rapid growth in car ownership has enabled greater personal mobility for many but has also brought traffic congestion, accidents, and air pollution. High density of population in city core resulting in slow and congested transport systems is beginning to stifle the efficiency of the urban economy. The construction of new roads to accommodate traffic leads to urban sprawl in the form of fringe area development and accelerated traffic growth and hampers the mobility of those who do not own a car. At national level excessive conversion of farmland for urban development consumes scarce land resources and inversely impacts the country's ecological systems.

The interaction between land use and transportation composes the land-use/transportation system. A large research body exists on the impact of land-use systems on travel behaviour [1, 2, 3] (for reviews, e.g., Handy, 2002; Stead and Marshall, 2001; Crane, 2000). There are three dimensions in travel behaviour research have been found: (i) a spatial dimension, (ii) a socio-economic dimension, and (iii) a behavioural dimension. Understanding the interaction between land use and travel behaviour involves land-use patterns, the socio-economic background of individuals; and their attitudes, perceptions and preferences toward land use and travel.

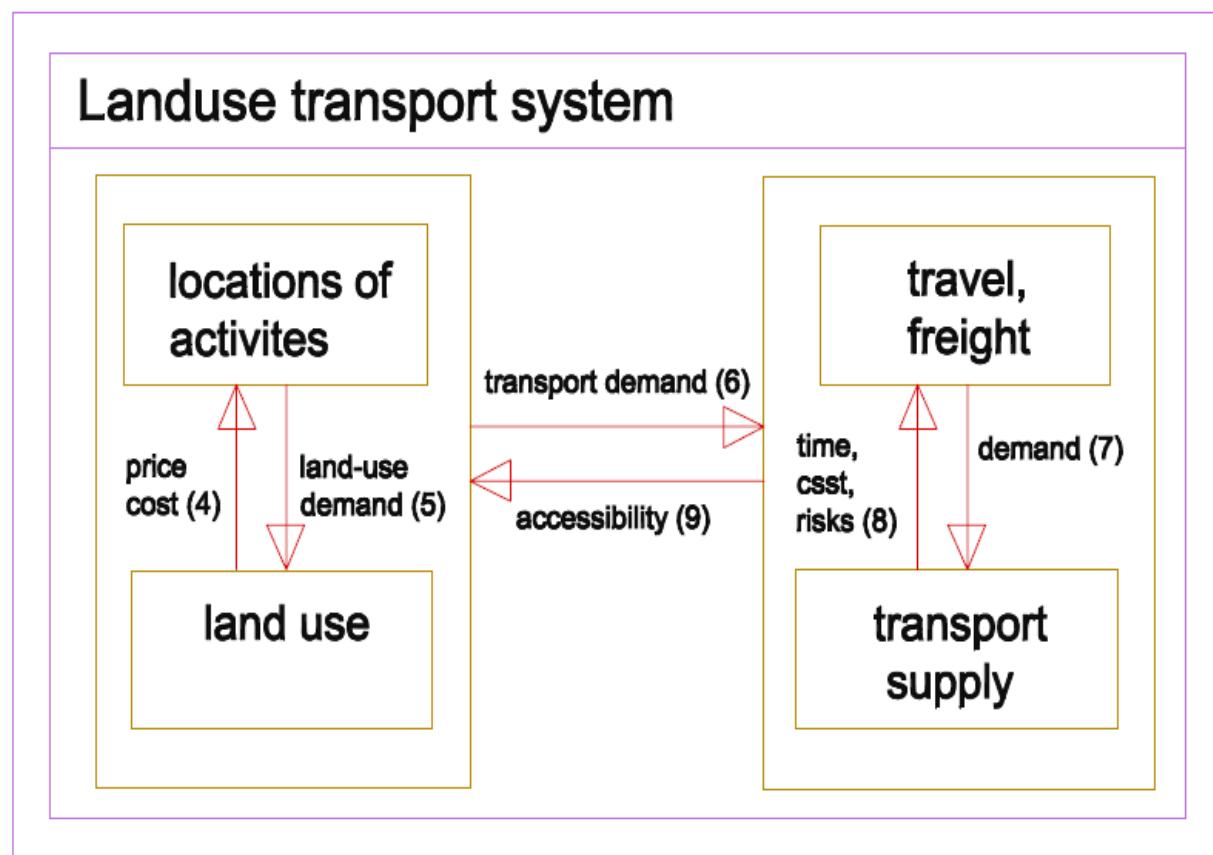


Figure 4: Land use transport system [7]

IV. Transportation Trends : Pune Scenario

Land use according to the existing Development Plan 1987-2007 has only been implemented to a limited extent. Physical development is haphazard and uncontrolled and new residential and commercial areas are being developed uncoordinated with the planning of the transportation system. The traffic situation in general and the mobility is rapidly deteriorating as a result of increasing number of motor vehicles, congestion, increasing commuting times and chaotic traffic conditions. There is a lack of viable alternative transport modes, like public

transport or facilities for walking and cycling. To achieve a common view of visions and objectives in the region the regional transport policy ought to be committed to by all authorities responsible for the transport system in the functional region. Based on such a commitment all recently worked out transport plans could be evaluated and summarized in the Comprehensive Transport Plan for the future developed and tested. Impact assessments concerning socio-economics and sustainability could be the basic indications for choosing a way against a future Pune where quality of life and sustainability are the main objectives.

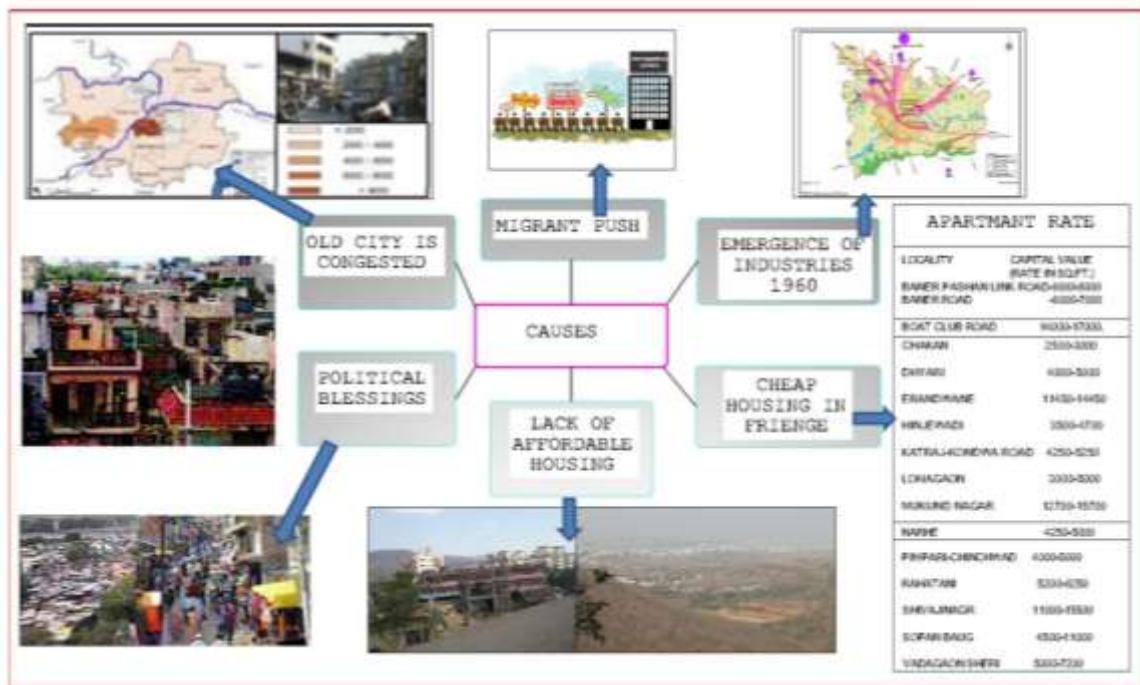


Figure 5: Development-plan-planning-intervention-by-College of Engineering, Pune. (COEP) [5]

Before making a choice of a high capacity public transport system the needs should be further quantified and evaluated. In an area with a population density higher than in most western cities, the preconditions for commuter trains and metro systems could be extremely good in spite of the high investment and operation costs. Bus rapid systems, and also tram systems cannot compete with train or metro when it comes to personal transport capacity.

V. Methodology

This study used focus group discussion methodology to understand more about the factors that influence decision making. In this method a small number of people, usually between six and twelve, are recruited based on a specific set of criteria to exchange their ideas, experiences, and attitudes about sustainable transportation in a guided discussion facilitated by the researchers as a moderator. The discussions are audio and video recorded to ensure an accurate record of the

interactions and enable identification of responses. The concept has been adopted for discussion to identify mobility needs, evaluate programs, identify preferences and attitudes, and assess reactions to different service or policy scenarios. It is aimed to get feedback from participants which is to be used to design sustainable transport systems that are better suited to the needs of users. A series of focus groups was used to discuss the role of transportation where participants representing various stakeholders were convened to identify and discuss their issues. The focus groups enabled the researchers to get at the complexity of their problems and extent of their constraints. It also helped to better understand the factors behind observed travel behaviour and the implications of travel choices for the household.

These qualitative techniques proved valuable in understanding more about the perspectives of the transit riders and how service changes would affect their mobility.

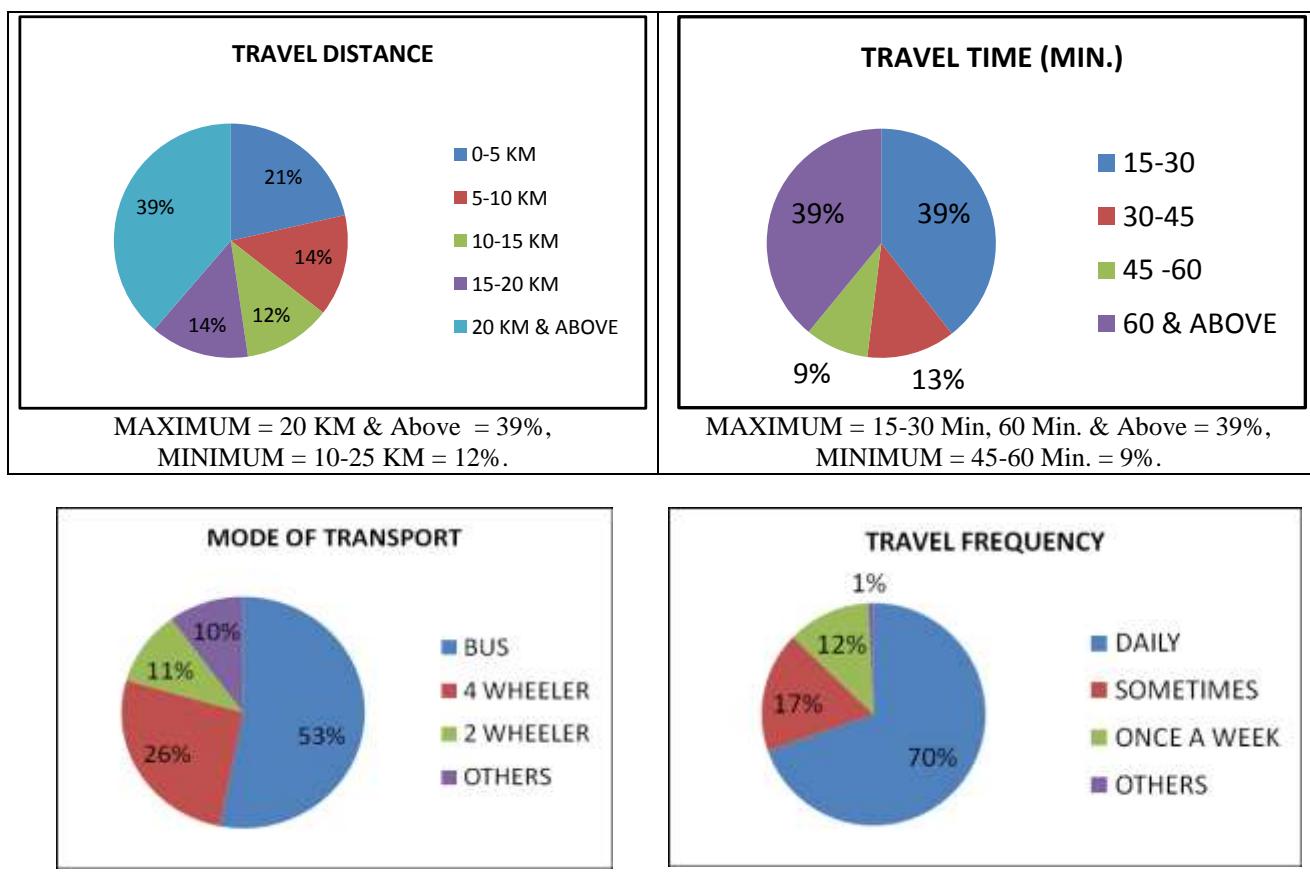


Figure 6: Analysis of survey data of a part of Pune city.

1. **Findings:** The survey resulted in the following findings:

- ♣ Travel is Time consuming
- ♣ Traffic conjunction
- ♣ Bus service is not adequate in terms of frequency
- ♣ Buses are overcrowded resulting many times passengers do not get seat and continue journey In standing posture.
- ♣ Buses avoid stopping at defined stoppages.
- ♣ Buses do not follow schedule and they are mostly late.
- ♣ Delay is caused by ongoing road work.
- ♣ There is a long queue at toll plaza.
- ♣ Absence of official parking spaces.
- ♣ Pollution.
- ♣ Unavailability of emergency services on the highways such as ambulance, emergency calls etc.



Ghat road with 2 way traffic



Incomplete part of the 6 laning



Figure 7: The photographs in survey period to indicate the physical condition of area and road.

The respondents spelled out the need of the rapid public mass transport system for daily travel as it covers approx. 52 km from one side. At the peak hours such as 9-11 am & 5-8pm shortage of transport systems results in crowd on the stoppages. Local people wants PMPML should take the initiative for daily bus routine till Shirwal keeping the district issues aside. Proposed 6 lane highways itself help to reduce the transport problems, such as one of the lane or the central divider used for the metro or any other rapid mass transport. As per them the land acquisition issue should be resolved as soon as possible.

VI. Conclusions

Sustainable transport help to increase the economy in urban areas, walking and cycling, next to the use of public transport, often offers better choices, not only as regards emissions, but also speed since these transport modes could easily replace the high number of journeys covering less than 5 km. Apart from reducing greenhouse gas emissions, it can ensure maximum benefits such as a reduced level of air and phonic pollution, less road space necessities and a reduced level of energy consumption. Urban planning, access regulations, including in the areas with reduced emissions, the stricter control of parking lots, price setting policies and alternative accessibility forms could significantly influence the choice for a mode of transport. Urban planning and a type of proper management for functional urban areas are essential. These should be aimed at creating compact cities favoring good coordination between transport planning, reviving ruined industrial areas and new settlements.

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