

SUSTAINABLE URBAN
MOBILITY PLANNING
FOR COPING
CHALLENGES OF
URBAN
TRANSPORTATION IN
THE FAST
URBANIZING
ETHIOPIA

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The role of urban mobility in (re)shaping cities
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Sustainable Urban Mobility Planning for Coping Challenges of Urban Transportation in the Fast Urbanizing Ethiopia

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Abstract

Urban transportation has been one of the major ingredients in the formation of cities and their morphological setup. It is a critical element of urban life in the dynamically growing and urbanizing World.

One of the major urban problem the African cities facing today is related to urban mobility with high congestion, high traffic accident and air pollution increasing at alarming rate. These problems emanate at planning and urban management levels of cities. The issue of urban mobility is today a cross cutting issue which affects socio-economic development, the environment and the climatic conditions of not only cities but the world especially due to the carbon emission and the effect on climate change.

Urbanization in Ethiopia has been longtime characterized by low level of planning. However, the country currently knows high urban growth rate. Ethiopia, still being one of the least urbanized countries in the world (17%), has one of the fastest rates of urbanization (4.34%) higher than the average growth rates of the Sub-Saharan Africa (3.95%). Planning as a tool and processes of anticipating, predicting, ameliorating and guiding future development has critical role in the future development of the country and the living condition of the population. One of the major areas that appeals for improvement is urban transportation.

In light of this fast urbanization, the demand for well planned urban transportation is becoming tremendous. Given the rapid growth of towns, the complexity of urban problems and the limited capacity, due and rapid consideration should be given for efficient urban mobility planning.

The main focus of this paper is to show the high urban growth and its implication on mobility. It analyzes the current and future mobility features and problems of Ethiopian cities. The paper provides elements for sustainable urban mobility planning which are urgently required for coping the growing challenges of urban transport in Ethiopia.

Keywords: Sustainable mobility; Mobility planning; Urban transportation; Urbanization and Ethiopia.

1. Introduction

Sustainable urban transportation is a current and critical urban issue all over the world. It aims to ensure better and healthier means of transportations meeting the individual and community mobility needs by reducing the social and environmental impacts of the mobility (Schiller et al, 2010). Sustainable urban transportation planning provides not only a good mobility of transport but also play decisive role in reducing the climate change by minimizing the emission of carbon to the atmosphere.

In developing countries, cities are growing fast and their development is determined by the level of the interaction they can have at inter-urban and intra- urban levels. These interactions are facilitated by means of urban transportation. If there is no transportation there is no activity and economic development. Hence, whether planned or not the needs of urban transportation has been be catered by the available means and types (big capacity bus /articulated bus, minibus, three wheel, two wheel, etc). The major question once should ask is that whether this way of responding to the urban transportation is improving or aggravating the mobility problem? Most of the time responses are given on the infrastructure development level than on the planning. What are the planning responses which can bring sustainable urban mobility?

Ethiopia is the second largely populated African country with an estimated population of 84.7 million inhabitants in 2011 (UN, 2012). However, the country currently knows high urban growth rate. Ethiopia, still being one of the least urbanized countries in the world (17%), has one of the fastest rates of urbanization (4.34%) higher than the average growth rates of the Sub-Saharan Africa (3.95%).

Urbanization in Ethiopia has been longtime characterized by low level of planning. Planning as a tool and processes of anticipating, predicting, ameliorating and guiding future development has critical role in the future development of the country and the living condition of the population. One of the major areas that appeals for improvement is urban transportation.

Urbanization in Ethiopia is getting out of its infant stage with the fast urban growth. However Ethiopian cities exhibits still highly poverty stricken neighborhoods, poor housing condition, homelessness, severe lack of infrastructure, environmental pollution as well as urban transportation suffered by the inhabitants of the urban centers in their day to day life: congestion, high rate of accident, high time consumed for one mobility, lack of inclusiveness specially for the disabled etc.

The main focus of this paper is to analyze the consideration of sustainable urban mobility and its challenges in the fast growing Ethiopia cities. In line with this, the paper will make a rapid overview of the urbanization features, mobility demand, and mode of transport, major urban mobility features and problems of Ethiopia. The paper will conclude on the elements for sustainable urban mobility planning which are urgently required for coping the growing challenges of urban transportation in Ethiopia.

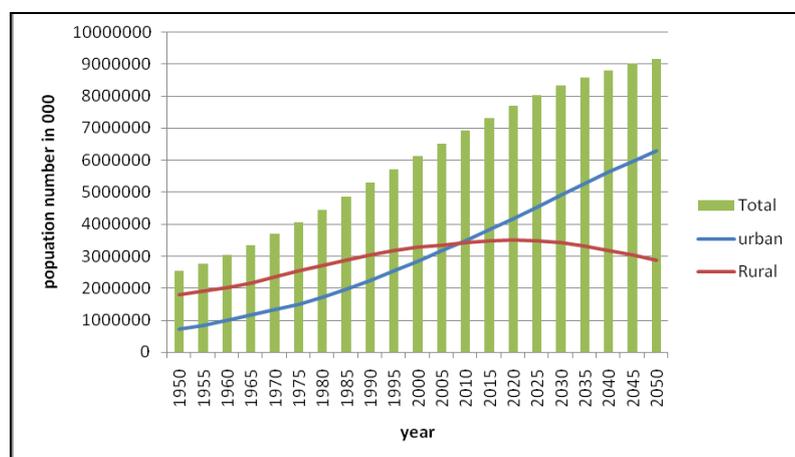
2. Urbanization and urban growth: an opportunity to be seized

2.1 Ethiopia: less urbanized but rapidly urbanizing

Today, the urban world population accounts 52% of the total world population (UN 2012) after exceeding for the first time in world history the rural population in 2008. This urban phenomena

happened half a century ago for the developed countries and it will happen around 2050 to the sub-Saharan Africa after half a century lag time.

Figure 1: The crossing of the world urban population over the rural population in 2008¹



Ethiopia is the second largely populated country in African with an estimated population of 84.7 million inhabitants in 2011 next to Nigeria. However, with its 17% of urbanization rate, is one of the least urbanized African countries only before Burundi (10.9%), Malawi (15.7) and Uganda (15.6%) (UN, 2012). Ethiopia is estimated to have about 15 million urban dwellers.

Table 1: Urbanization rate in the world and in Ethiopia in 2011

Major area, region, country or area	Population (thousands)			Percent age urban
	Urban	Rural	Total	
World	3,632,457	3,341,579	6,974,036	52.1
More developed regions	964,240	276,140	1,240,380	77.7
Less developed regions	2,668,217	3,065,439	5,733,657	46.5
Least developed countries	242,686	608,418	851,103	28.5
Less developed regions, excluding least developed countries	2,425,532	2,457,022	4,882,553	49.7
Less developed regions, excluding China	1,962,022	2,393,128	4,355,151	45.1
Sub-Saharan Africa	309,463	533,786	843,249	36.7
Africa	413,880	632,043	1,045,923	39.6
Eastern Africa	81,172	261,679	342,850	23.7
Ethiopia	14,402	70,332	84,734	17.0

Source; UN (2012). World Urbanization Prospects: The 2011 Revision, United Nations, Department of Economic and Social Affairs, Population Division (2012). CD-ROM Edition.

¹ (Source: UN, World urbanization prospects, 2009 cited in Tegegne, 2010)

This low rate of urbanization, though partially explained also by the big size of its total population², shows the future endeavors of the country in handling urban issues especially when one considers the high urbanization growth (4.86% in 2007) higher than the average growth rates of the Sub-Saharan Africa (3.95%).

Urbanization in Ethiopia is getting out of its infant stage with the fast urban growth. Except, Addis Ababa (about 3 million inhabitants), the capital city of Ethiopia the seat for African and international organizations, most of Ethiopian cities have a population size of below quarter of a million (see table 2). It is therefore high time to address the major urban problems including transportation before these cities become big and unmanageable.

Table 2: Cities in Ethiopia by region in 2012

No	Region /Administration	Regional city	Number of Population of the city/town	Number of urban centers
1	Addis Ababa	Addis Ababa	3 040 740	1
2	Dire Dawa	Dire Dawa	387 000 (urban= 262884)	1
3	Tigray	Mekelle special zone	273 459	58
4	Amhara	Bahirdar special zone	266 432 (urban woreda =191 016)	204
5	Oromyia	Adama special zone	271562	366
6	Southern	Hawassa	212 665	176
7	Somalie	Jijiga	147,482	82
8	Harari	Harar	110,457	1
9	Gambela	Gambela	59,393	12
10	Benishangul-Gumz	Assosa	37 365	23
11	Afar	Asayta Semera	22548 3687	47
	Total urban centers			973

Source: CSA projection for July 2012

It is expected that the coming couple of decades will be the period of urban phenomena. We can consider the current low urbanization rate as positive when we compare the challenges of Ethiopian cities if they were with bigger population size. It is therefore high time to accompany the high urbanization rate of with a proper planning. Urbanization in Ethiopia has been longtime characterized by low level of planning. Planning as a tool and processes of anticipating, predicting, ameliorating and guiding future development has critical role in the future development of the country and the living condition of the population. One of the major areas that appeals for improvement is urban transportation.

2.2 High urban growth: high mobility demand

Though Ethiopia is still rural, its urbanization growth (nearly close to 5%) is one of the fastest in the world (see table 3). This growth should be seen as opportunity to introduce sustainable concept of development. It is high time for urban Ethiopia to follow sustainable way of development at this

² The low rate of urbanization shouldn't mask the occurring urban phenomena and one should also consider the number of urban population.. For example., India has 300 million urban population but It has only 30% urbanization rate as compared to the prevalent rural population.

young stage of urbanization to avoid wrong or environmentally and socially costly development. Ethiopian in the 21st century has, and estimated to have in the coming years too, economic growth which is to be planned also from urban perspective as input and impact.

Table 3: Total, urban and rural population in Ethiopia and their growth rates

Census years	Total population (000)	Rural population (000)	Urban population (000)	% urban	Growth rate of the total population	Growth rate of the rural population	Growth rate of the urban population
1984	42616.9	37747.6	4869.3	11.4			
1994	53477.3	46154.1	7323.2	13.6	2.54	2.22	5.03
2007	73918.5	61962.3	11956.2	16.2	2.94	2.63	4.86

Source: CSA (cited in Tegegne , 2010)

The positive impact of this growth is the development of cities with infrastructure, housing and services as witnessed in the last 5 years. The growth has also an implication in creating a stress in the management of cities by high demand of services and infrastructure. One of the areas where this stress is created and will continue to happen is urban transportation. Most of Ethiopian cities are facing these problems though the magnitude is not comparable with the case of Addis Ababa. Addis Ababa, as a city which will have to accommodate the nucleus of the Ethiopian development, should strive to respond and manage the urban mobility in a sustainable manner to have a quality of better living area and to sustain its development. One of the critical factor which determine the development a city is means of urban transportation.

Cities are engine of development as innovation center. They are also the major source of carbon emission causing climate change. One of the sources of carbon emission is urban mobility. Cities are blamed to be responsible for around two thirds of the energy used and 70 percent of all greenhouse gases (GHG) produced worldwide. According to UN-HABITAT report, “Hot Cities: battle-ground for climate change”, while the world’s cities only cover 2 percent of global land coverage , they are cause for production of 70 percent of greenhouse-gas emissions³.

It is obvious that the share of unsustainable urban mobility practice is significant in this green gases emission. Though currently developing countries like Ethiopia are comparatively victim than producer of carbon emission, their future development may cause significant GHG emission and may aggravate global and local warming if sustainable solution are not devised at their young stage of urban development.

Cities should therefore strive to accompany their fast growth with sustainable urban mobility to bring about efficient development without compromising the environment. This should be thought in the full process of cities development from their planning to their development.

2.3 Corridor born cities

Ethiopian cities are mainly located along the transportation corridors of the country, Addis Ababa, being the central node of the corridor. This is mainly because of the corridor born history with the establishment of cities following the transportation corridors as service and business centers.

³ Cited by SmartPlanet In: <http://www.smartplanet.com/blog/cities/>.

Most of cities like Bahirdar, Adama, and the majority of small towns are symmetrically bisected by the national high way. Their economic existence is highly determined by the corridor activity. Their urban mobility is also highly affected. This special feature of the cities and towns requires due attention by well integrated planning to sustain their economic viability and safe intra-urban mobility.

3. Urban transportation and mobility in urban Ethiopia

3.1 Mode of transport and the neglected pedestrians

Urban mobility in Ethiopia is mainly committed by walk mode. If we take the case of Addis Ababa, where the availability of motorized transport is relatively higher, the mode of transport of is dominantly by walk with the following modal spilt (AATBO, 2004):

- 60.5% the travel is committed by walking,
- 10.9 % by bus
- 20.6% by taxi and
- 5% by private cars

The high rate of walk mode can be explained by:

- unemployment especially before 2005
- the proximity and mixity of the activities which is one of the qualities of Addis Ababa and many Ethiopian cities
- Low income and poverty

The case in other cities will be higher for walk mode since the availability of mass transport is generally lower than Addis Ababa. In cities with lower slope such as Bahirdar, Awassa and Dire Dawa, the use of bicycle covers also an important share. If we take the case of Bahirdar, the walking mode took 43.7% followed by the cycle (40.8%), the car , taxi , minibus and city bus accounts only for 3.7%, 7.6%, 3.3% and 0.9 % respectively (ERA, 2005).

In the coming years, the proportion will increase in the favor of motorized transport since one of the effects of the economic growth will be creation of employment and high mobility of the population within and out of the cities. The projection of travel demand for Addis Ababa for the year 2020 increases by 15% the vehicular mode and the walk mode accounts for 45% (See table 4).

This calls therefore for well thought planning in consideration of the mixity potential and the proximity of services as well as the regional integration. Moreover, the walk mode of transport will continue to take the important share and should be encouraged especially for short distance.

Table 4: projection of travel demand in 2020 in Addis Ababa

Mode	%	Remark
Walk mode	45	
Vehicular Modes	55	
- Private modes	9%	
- Public transport	46%	The share of public transport is projected to be 58% for minibus and 42% for City bus
Source: (ERA, 2005)		

However the streets of Ethiopian cities are very poor to accommodate this high traffic of pedestrian movement (except in the recently built streets). Neglecting pedestrian movement in Ethiopia would mean neglecting the majority of the urban traffic and mobility. Very short distance of less than 1km is

inviting people to take taxi because of the pedestrian discomfort (congestion, accident, obstacles, lack of green, etc). In this pedestrian unsafe street environment, pedestrians are at high risk of accident claiming their lives: 50-70% of the victims of urban accidents are pedestrians (see figures in 3.2). The lack of pedestrian consideration lowers also the inclusiveness of the urban streets creating unsupportable burden for the disabled, aged and children.

A street system which cannot respond for the majority of its traffic cannot be sustainable. It is therefore high time for the proper consideration of the local facts in the mobility planning processes to achieve sustainability and responsiveness.

3.2 Mobility: congestion and accident

The major backbone of urban mobility is road. One of the characterizing features of cities in Ethiopia is the low level of road coverage due to the lack of planning, gap in plan implementation and slum prevailing settlement urban history. The recent efforts, as seen in most of Ethiopian cities with asphalt and cobble stone development, have certainly brought important improvement for the urban mobility. The road coverage of Addis Ababa has been improved to 13 % with remarkable increase from 7% in 2006. On the other hand, the number of cars is also growing from year to years (see table 5).

Table 5 : Growth of motorized transport between 2004-2011 in Addis Ababa

		Addis Ababa	
No	Category	2011	2005
1	Taxi (1) including bajaja, minibuses, small taxies	20,441.00	13665
2	Private (2)	91,315.00	54336
3	Commercial (3)	109,094.00	15299
4	Government	13,128.00	6916
5	Non Government Organizations	7,820.00	3612
6	Civic Organizations	2,682.00	1555
7	Diplomatic and international organization	3758	2222
8	Unspecified	9,698.00	
Total		257,936	97605

Source: for 2011, Addis Ababa Transport Branch Office, IT department, for 2004 (AATBO, 2005)

However, congestion in cities like Addis Ababa and in regional capitals is less improved and rather aggravated affecting the economic efficiency and quality of urban life as well as causing accident and pollution.

The high accident rate, which gave the “don’t drive in Ethiopia” stigma to the country, is serious and fatal. The following two examples can illustrate the fatal consequences of urban traffic accident in Ethiopia. In Addis Ababa in the years 2000-2005, 39987 accidents have been recorded with an average of 8000 accidents per year and with annual casualties of above 13 million birr (AATBO, 2005). 1/3 of the accidents account for death and 67% of the victims are pedestrians (ERA, 2005). In Dire Dawa, 1246 accidents have been recorded between 2001 and 2007, among which 562 accidents (44%) occurred on pedestrians (Wondimu Cosnult, 2008).

The above mentioned reality shows that improving road network alone cannot improve mobility. The solution should be integrated by responding to the mobility demand in sustainable manner addressing the critical paths of sustainable mobility planning such as planning, infrastructure development, mass

transits facilities and traffic management.

3.3 Public transport

Public transport is one of the indispensable elements for efficient mobility in a city. When a city has a mass transit system its efficiency increases and the contribution for economic development is of paramount importance.

In Addis Ababa, public transport is provided mainly through 789 city buses (including the recently added of which some with articulated types), 475 privately owned mid-buses⁴ and 20 441 shared taxis (of mainly 11 seats). There are also institutional buses providing transport services for their employees without which the transportation problems would have been worst.

All these are still inadequate for a city which had 3.4 million trip per day in 2005 (AATBO, 2006) and is expected to have 7.73 million trip per day in 2020 (ERA, 2005). The mismatch between the travel demand and the available public transport is creating high transportation problem during peak hours. One should spend up to 2 hours to cross the city. The recent projects of mass transit are expected to respond to the overdue huge demand.

Other cities of important size don't have or have only couple of city buses which have started in recent years: Awassa, Bahirdar, Gonder. In cities like Dire Dawa, and Mekele, the largest city of Ethiopia after Addis Ababa, the bus services is inexistent and the urban transportation services is mainly given by minibus taxis and three wheeled taxis locally named Bajaja: 1700 bajas were registered in 2008 in Dire Dawa (Wondimu Consult, 2008). These bajajs, though fast and flexible and mainly appropriate for small towns, hot climate and peri-urban movement, are inefficient because of their size. They are blamed to be part of the congestion and high accident registered in the city as indicated earlier.

3.4 Major cause of urban mobility problems

Among the major causes of mobility problems of Ethiopian cities, the following can be mentioned especially in the case of big and medium size cities:

- **Planning level:** urban planning deficiencies with lack of adequate mobility planning, lack of translation at local level, lack of planning enforcement, lack of pedestrian responsive planning
- **Infrastructure level:** inadequate road network, lack of pedestrian way and facility, drainage problems damaging road surface and causing congestion and accident, street lights blackout, lack of parking,
- **Facility level:** low level of mass transport, lack of coordination of taxis, inefficiency of three wheeled taxis (currently highly operating in regional capitals and giving important services though inefficient in terms of carrying capacity)
- **Traffic management level:** deficiencies in traffic management.

4. Towards sustainable urban mobility planning

Sustainable mobility requires several measures and continuous action: planning, infrastructure development, modal integration, traffic management, economic sustainability of infrastructures and efficient fleet managements, etc. Mobility planning is one of the key steps which determine many other implementation and management factors in the cycle of sustainable mobility.

⁴ Source; Transport Bureau, Anbessa Bus enterprise, 2012

Urban planning is an important tool to respond to the diverse urban problems and the immense challenge of cities in the 21st century. The recent booming urban phenomena in developing world should take into account the mobility pattern which determines the urban living conditions and activity (Godard, 2002). One of these considerations is to be done at the phase of planning.

Ethiopia is still rural but with fast urban growth. This growth should be seen as opportunity to introduce sustainable concept of development. There are planning elements that can help cities to have sustainable mobility at city wide or local level planning as well as the implementation levels. One of the important anchors for the sustainable and feasible urban mobility planning is the consideration of the local features of the city and devising the appropriate planning response from the state of the art.

The following points can be explored as part of the efforts towards sustainable mobility planning in the context of Ethiopian and African cities:

- **Planning of cities should comprise “integrated urban mobility planning”** to achieve inclusiveness, sustainability, equity, environmental qualities and efficiency as well as efficient and mobility sensitive land use planning;
- **Environmental responsive Planning** for low carbon emissions technologies: right of way, curvature, road lay out.
- **Enhancing the existing sustainable mobility practice and opportunities:** bicycle riding can be easily encouraged by providing bicycle lanes in low gradient cities where this sustainable and healthy mobility mode exist
- **Planning attention for corridor cities** crossed by the high ways with proper separation and integration vis avis the high way road
- **Planning for efficient mobility in CBD:** to encourage environmentally friendly mobility (walk and bicycle) within CBD. In the case of Addis Ababa, the CBD contains most of the services and commercial centers in closer distance. This quality of efficient CBD is worth to be preserved by curbing the current trend of diffused CBD of business corridor.
- **Mobility planning with local level planning translation:** mobility planning mostly remains at structure plan level without local translation causing many implementation deficiencies. Mainstreaming of the structural level urban mobility and transportation provisions with local and detail level planning(LDP, urban design, building regulation) is urgent and indispensable to solve the current problems : parking, unsafe and inadequate pedestrian way, etc
- **Pedestrian responsive Planning:** Neglecting pedestrian movement in Ethiopia should be understood as neglecting the majority of the urban traffic and mobility. A planning system which cannot respond for the majority of its traffic cannot be sustainable. Pedestrian ways should be well designed with urban design solutions for safe, efficient and inclusive mobility (including the disabled, the aged and children).

5. Conclusion

Sustainable urban mobility is the attribute of efficient and inclusive cities. At this era of urbanized world, the issue of sustainable mobility is a critical factor of urban life. Competitiveness, efficiency and attractiveness of cities are embodied in the quality of urban their transportation system.

A planning system which cannot respond for the majority of its traffic cannot be sustainable. Neglecting pedestrian movement in Ethiopia would mean as neglecting the majority of the urban traffic and mobility. This repaid analysis of mobility problem has shown that improving road network alone cannot improve mobility. Sustainable mobility requires integrated planning and action.

At this important stage of high urban growth, the issue of sustainable mobility planning should be an important agenda. Urbanization in Ethiopia is getting out of its infant stage and the future manageability as well as competitiveness, efficiency and attractiveness of our cities will be determined by the level of their transportation.

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