

Contents lists available at Sjournals



Journal homepage: [www.Sjournals.com](http://www.Sjournals.com)



**Original article**

## **The significance and issues of motorcycle transport in the Urban areas in northern Ghana**

**R.D. Dinye**

*Centre for Settlements Studies Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.*

\*Corresponding author; Centre for Settlements Studies Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

### ARTICLE INFO

*Article history:*

Received 11 September 2013

Accepted 22 September 2013

Available online 29 October 2013

*Keywords:*

Motorcycle

Motor traffic

Development

### ABSTRACT

In many developing countries, motorcycles are increasingly becoming the common means of transport especially among low-income urban dwellers (urban poor) and many rural people. The high ownership and use of motorcycle in the urban areas in northern Ghana has come with its accompanying challenges like motorcycle accidents involving fatalities; environmental and public health concerns from the emissions; non-compliance to motor traffic regulations-for instance helmet use is generally low in Ghana among others among other things. The high incidence of motorcycle ownership and use has also been contributing significantly in the betterment of many livelihoods of urban residents in northern Ghana and at the instance of Wa. The increasing growth in the number of motorcycles has come to solve the mobility needs of many urban residents in the light of poor and inadequate public transport system, poor road conditions particularly those leading into the peri-urban areas where many people in Wa reside as a result of urban sprawl. It also comes along with a host of opportunities including employment to motorcycle mechanics and motorcycle spare parts dealers, local revenue generating sources through taxes/levies on motorcycle owners/riders as well as motorcycle registration and licensing. This paper examines the effects of motorcycle growth in the social and economic development or livelihoods of Wa, the regional capital of the Upper West Region of Ghana.

---

## 1. Introduction

Transport is an important element in development and it affords the social, economic and political interaction that most people take for granted (Button and Hensher, 2001). The provision of transport infrastructure has grown extensively across the globe through a range of networks of modes which have undergone technological improvements cutting across the motive power, the tracks and the means that serve as compartment for passengers and goods. Personal mobility is one of democracy's most valued freedoms and it is, therefore, not surprising that a high proportion of man's income is devoted to the movement of the goods and transactions. The importance to the socio economic, political and cultural development of any nation is underscored by Munby's (1968) statement that "there is no escape from transport".

In developing countries, vehicle ownership is low, dependency on public transport is high. However the financial conditions and performance of all forms of government-organized public transport ineffective and are in decline (Kumar, 2011). This situation has forced people and the market to develop creative solutions to address daily travel needs-hence a resort to motorcycles either for personal mobility in addition public transport.

The resort to motorcycles as an alternative mode of transport in savaging urban mobility problems of towns in northern Ghana has introduced varying dimensions of issues including traffic accidents and safety on the roads, registration issues and the repair and maintenance activities around these motorcycles. Various researches have been conducted on the issues of motorcycle traffic accidents, motorcycle traffic management in motorcycle dependent cities, commercial motorcycle operations among others. This paper assesses the effects of motorcycles growth, use and ownership in the socio-economic development of Wa a fast growing secondary city in northern Ghana. The past decade has seen significant growth in the use of motorcycle and ownership in the Wa town which has significant impacts on the social and economic facets on the people's lives.

The paper sought to examine i) the socio-economic effects of motorcycle ownership and use on livelihoods in Wa; ii) To establish the trend of motorcycle growth and use in the Wa township. iii) To assess the prospects of Wa as an urban center becoming a motorcycle dependent city. iv)To recommend possible measures pertinent to planning policy implication of motorcycle growth within the context of urban planning and management in Wa and Ghana at large.

## 2. Review of literature

In developing countries, motorcycles are the most essential and effective means of transport in daily life and overall livelihood. The region is characterized by underdeveloped and synchronous infrastructure, the largest population and high concentration of low income groups. The motorcycle consumption each year in this market accounts for 90% of the world motorcycle consumption. The consumption trends in the market are various. However, due to the underdeveloped infrastructure, the volume of consumption of high capacity motorcycles is small, and motorcycle there are mainly small sizes with low capacity (50 - 150 cc) at prices ranging from several hundred to several thousand USD (Nguyen, 2007).

### 2.1. Typology of motorcycles

Visit any country in Asia, and elsewhere around the globe, and you will see a colorful assortment of motorized vehicles in different varieties. The pictures in figure 2.1 are typical two- wheeled motorcycle vehicles. These vehicles typically carry up to two adult passengers for their own personal mobility. But they can also be used to carry small freight or to convey passengers for commercial purposes.



**Fig. 1.** Two-wheeled motorcycles.  
Source: Kamakate and Gordon, 2009.

Beyond the two-wheeled motorcycles is the three-wheelers also known as “tricycles”. Three wheelers do not abide by strict definitions, but are generally used for passenger and good commercial transportation. Names vary widely by country and by the type of transportation service provided. In India and Sri Lanka, three passenger three-wheelers operating as taxis are known as autorickshaws. Baby taxis are commonly known as three-wheelers in Bangladesh. Diesel three-wheelers with six-passenger or goods movement capacity are called tempos in India, Sri Lanka, and Bangladesh. Three wheelers can be made by well-established manufacturers, such as Bajaj that dominates the market for three-passenger three-wheelers in the Indian subcontinent. But in some countries, small local vehicle assemblers make most three-wheelers; this is the case of tuk-tuks in Thailand or the tricycles in Philippines. The tricycles further distinguish themselves from the rest of the three-wheelers because they are essentially two-wheelers outfitted with a sidecar for passenger transportation (Kamakate and Gordon, 2009).

Tricycles in Ghana, to the larger extent, are used for freight transportation except in some few cases where they used to convey passengers in rural areas. Motorised three-wheelers or tricycles in Ghana have different names in different localities. They are called Lion Motto in Accra, Motto Kia in Kumasi, Motto King in Tamale and Nyaaba -Lorry in Wa.



**Fig. 2.** Three-wheeler motorcycles.  
Source: Kamakate and Gordon, 2009.

## **2.2. Motorcycle and related issues**

### **2.2.1. Traffic accidents, health and safety**

There has been an alarming increase in traffic fatalities in developing countries over the past three decades. While there is considerable debate in all countries about the exact number of traffic injuries, the main point here is that the full extent of the traffic safety problem is far greater than the number of fatalities indicates. All studies agree that injuries are many times more numerous than fatalities, and do cause social and economic problems that rival those of death.

Clearly, the sharp rise in motorization is one of the main reasons for the alarming increase in traffic fatalities. The likelihood of death in traffic crashes increases sharply with increased speed, and motor vehicles can obviously travel much faster than non-motorized modes. The rising danger posed by increased motorization is compounded by inadequate road supply, unsafe vehicles and driving behavior, sharing of roads by motorized and non-motorized vehicles, overcrowding of vehicles, and inadequate or non-existent traffic signals, signs, and traffic management. Whatever the safety problem encountered by car occupants, it is far exceeded by the much more dangerous situation facing motorcyclists, bicyclists, and pedestrians.

Most of the world's accidents occurred in low-income and middle-income countries of the world whereby public transport vehicles, private cars, three and two-wheeled vehicles and pedestrians significantly contributed to road accidents in one way or the other (WHO, 2009). It was projected that by the year 2030, the road traffic injuries will be ranked fifth overall in deaths globally up from ninth position in 2004 (WHO, 2009). The annual costs of road traffic crashes in low income and middle-income countries are estimated to be between US\$65-100 billion, more than the total annual amount received in development aid. The estimated costs as a percentage of the Gross National Product (GNP) in most African countries range from about 0.8% in Ethiopia and 1% in South Africa to 2.3% in Zambia and 2.7% in Botswana to almost 5% in Kenya. In 2007, the National Road Safety Commission of Ghana estimated road traffic accidents to cost 1.6% of Gross Domestic Product (GDP) which translated to US\$ 165 million. However, the contribution of the various vehicles including motorcycle is not indicated in the report. The report also notes that motorcycle accidents accounted for 4% of all road traffic accidents in the country.

Motorcycle transport is one of the most dangerous forms of motorized transportation. Due to small size of their vehicles, motorcycle riders represent a vulnerable group of road users. Motorcyclists are about three times more likely than car occupants to be injured in a crash, and 16 times more likely to die. Contrary to a car crash, in a motorcycle crash, the riders often absorb all kinetic and compressive energy resulting from the crash. According to WHO (2009), even in developed countries where morbidity and mortality rates from motor-cycle accidents are low, the risk of dying from a motorcycle crash is twenty times higher than a motor vehicle crash. Another study noted that riders often ignore safety measures, making them more vulnerable to accidents. Studies in Ghana have also shown that road traffic crashes were a leading cause of death and injuries, and that majority of road traffic fatalities and injuries occurred on roads in rural areas. Ironically, motorcycle can be said to be one of the main types of vehicles in most rural areas. However helmet use by motorcyclists in Ghana is generally low.

### **2.2.2. Motorcycle and traffic rules**

It is common for a motorcyclist to share the lateral lane space with other vehicles because the width of a motorcycle (0.75 m) accounts for only around 25% of the lane width (3 m). A motorcycle can follow another vehicle at an oblique position due to their narrowness and small size. As the typical width of a lane is far larger than the need of motorcycles, they do not necessarily keep to the center of a lane. As a result, when following a vehicle, motorcycles enjoy the freedom to choose the lateral positions in a lane. Thus, it is often to observe that a motorcycle follows a vehicle at an oblique position. By doing so, the motorcyclist can get a better field of view and have a better chance to filter, overtake or avoid a potential collision. Such short headways could be due to motorcycles' oblique following or lateral following.

Filtering is the behaviour of moving through the lateral clearances between slow moving or stationary vehicles. It can be considered as a series of overtaking movements by using dynamic virtual lanes. Due to the narrowness of motorcycles, they enjoy the advantage of filtering through the traffic under the situations that cars cannot. Swerving or weaving is a typical behaviour pattern of motorcycles which mixed longitudinal and lateral movements. When a motorcyclist is weaving in and out of the traffic, it seems that the vehicles in his surroundings are able to cooperate with this particular behavioural pattern. Apparently, motorcycles have a higher tolerance for a small following distance.

### 2.2.3. Urban traffic

The motorcycle transport system has suffered a dip with increasing urbanization, and this presents a clear challenge to the city authorities. This includes congested central areas, poor level of service from public operators and high exposure to road accidents (Kwakye and Fouracre, 1998). Reasons for this development are varied but not limited to the concentric and centripetal form and structure of Ghanaian cities which has led to the concentration of high density activities at the hub and the limited amount of road space. Additionally, large proportion of personal means of transport, the simultaneous use of carriage ways by vehicles and pedestrians, the limited number of high capacity buses for mass movement as well as inefficient management and policing of traffic have further worsened the situation (Tamakloe, 1993; Addo, 2005; Agyemang, 2009). Congestion has thus become a major problem on arterial routes with 70 percent of major roads operating at an unacceptable level of service of less than 20 km per hour (Armah et al., 2010). The deficiencies in the current system and their attendant frustrations in the face of growing urban youth unemployment (Oteng-Ababio, 2011; Grant and Oteng-Ababio, 2011) have given birth to the use of motorcycles for commercial services, a practice popularly referred to as "Okada". This practice is in contravention of the existing transport legal regime and a section of the population also sees the operators as "rude and indisciplined".

### 2.2.4. Environmental pollution and public health

Reliable, affordable and safe transport is a prerequisite for development. However, transport is also a major source of air pollution and contributes to greenhouse gas emissions that cause climate change. Motorcycles and three-wheelers offer quick, affordable and flexible transport for many people around the globe. However, the less sophisticated engine technology of motorcycles and the lack of strict emission regulations in many parts of the world have resulted in high emissions of pollutants by motorcycles. In many cities in developing countries they are among the main sources of urban air pollution. The main pollutants in motorcycle exhaust fumes depending on several factors, such as the fuel used. These include particulate matter (PM), hydrocarbons (HC), volatile organic compounds (VOCs), nitrogen oxides (NOx) and lead (Pb). In addition, emissions of carbon dioxide (CO<sub>2</sub>) are contributing to climate change. Together, these pollutants seriously affect human health and the environment including but not limited to the following; respiratory diseases, cardiovascular disease (diseases of the heart and lungs) and climate change.

## 3. Research methodology

### 3.1. The study area

The area to which this paper refers to is Wa, which is a secondary city and the capital of the Wa Municipality and the Upper West Region in Ghana (Figures 1, 2 and 3). A considerable number of motorcycle owners and riders are concentrated in the Wa Township. Wa has an estimated population of 96,818 people (UN-HABITAT 2010). Its population is growing at a rate of 2.7 per cent per annum (Ghana Statistical Service 2000). The Wa municipal Assembly Area shares boundary to the North-East with Wa East District, North-West with Nadowli District and South-West with Wa West District as shown in figure.3.1. The Wa Municipal Assembly shares administrative boundaries with the Nadowli District to the north, the Wa East District to the south-east and the Wa West District to the south-west. It lies within latitudes 1 40' N to 2 45' N and longitudes 9 32' to 10 20'W. Wa is serves as commercial hub for the Upper West region and some of parts of northern region including Bole, Sawla, and Tuna. It has a land mass area of approximately 234.74 square kilometres which is about 6.4% of the region (Wa Municipal Medium Term Development Plan-2008-2010). The town serves as a transportation hub for the northwestern part of Ghana with major roads leading south to Kumasi, north to Hamile and Burkina Faso and northeast through Tumu to Navrango and Bolgatanga in the Upper East Region.

The increasing growth of motorcycles in the municipality can be attributed partly to its location proximity to neighboring Burkina Faso and Cote D'Ivoire where they are imported cheaply and sometimes illegally. Howe and Barwell (1987) affirms this by attributing the higher incidence of motorbikes in the northern regions as a logical extension of the bicycle's popularity in the area to the proximity to Burkina Faso where motorbikes are popular and from which they could be imported unofficially relatively easily.

The terrain in the Wa town is generally low lying and more or less flat. That coupled with the climatic conditions-characterized by long, windy and hot dry season followed by the short and stormy wet season can



partly be attributed to the higher incidence of motorbikes as it is much more comfortable riding in such circumstances or situations than driving.

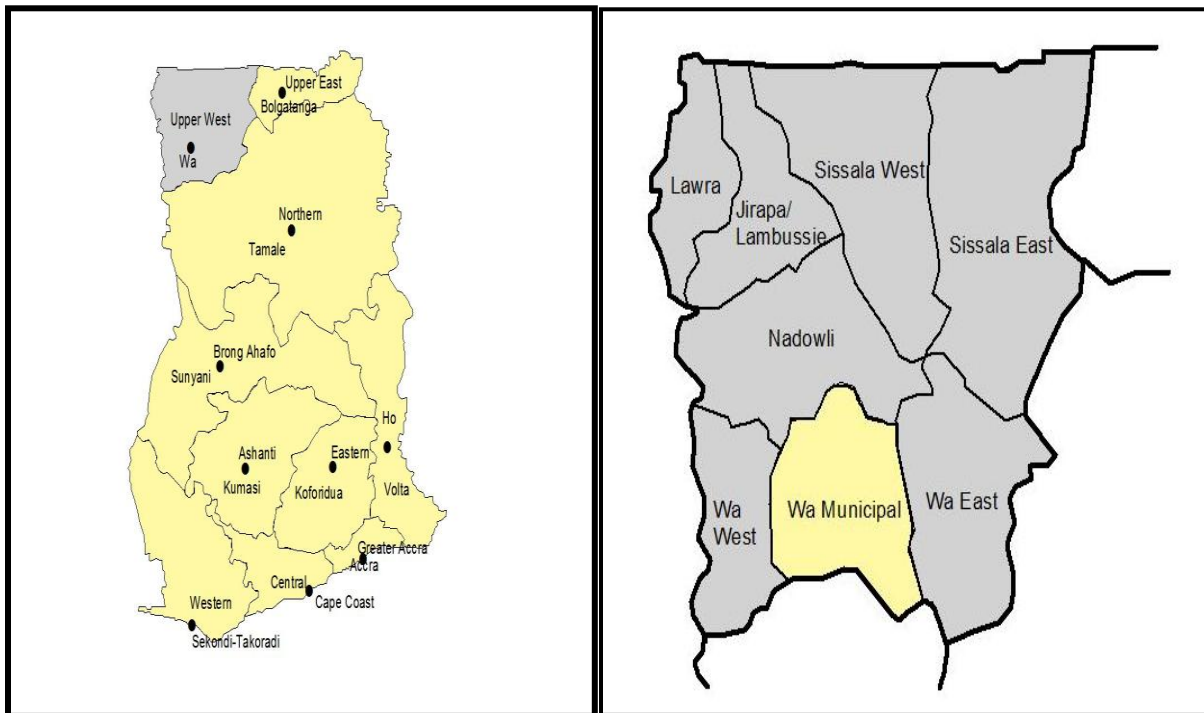


Fig. 3. Wa in national and regional context.  
Source: Ghana districts.com.



Fig. 3. Map of Wa.  
Source: Adapted from Ahmed, 2011.

### 3.2. Research design

The research was carried out in multiple and carefully sequenced phases. It began by exploring the magnitude of the problem which served as a basis for the formulation of objectives and research questions. The geographical and conceptual contexts of the research have been defined. This then led to a review of literature underpinning the subject matter. This facilitated the development of the data collection instruments, the conduct of fieldwork and the analysis and discussion of the results. Ultimately, findings and implications have been made and conclusions drawn. The detail process design is as set out in figure 4.

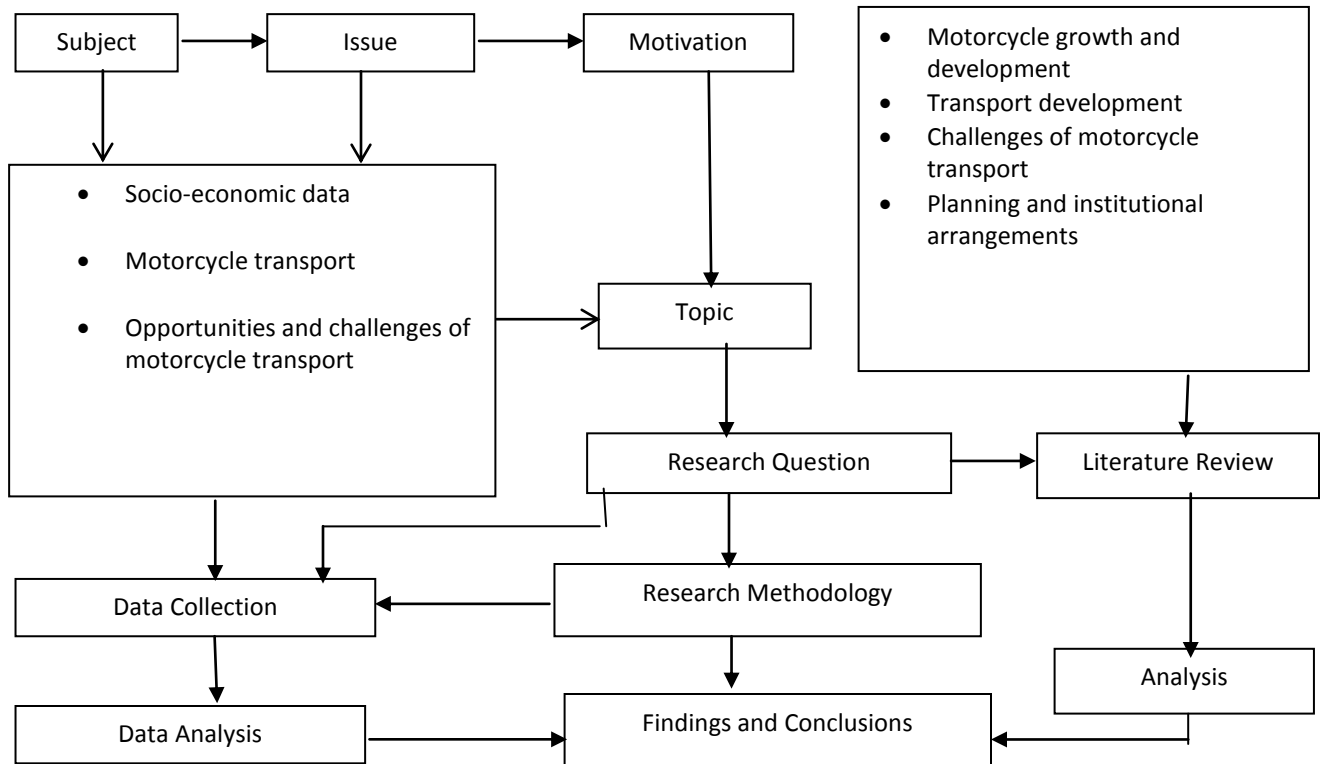


Fig. 4. Research design process.  
Source: Author Construct 2013.

### 3.3. Sampling

Motorcycle owners were interviewed as the basic unit of observation. Stationary or parked motorcycle owners were purposively selected because it was found convenient for both the researchers and respondents for the interviews engagement. A sample size of two hundred and fifty-three (253) motorcycle owners and riders had been determined. Institutional interviews covered the Municipal Development Planning Unit; Driver Vehicle and Licensing Authority (DVLA); and the Motor Traffic and Transport Unit (MTTU) of the Ghana Police Service.

### 3.4. Data collection and source

Data were gathered from both primary and secondary sources for the study. Primary data were obtained through questionnaire administration, interview guides, and observation. Secondary data, on the other hand, was obtained from relevant publications and magazines, newspapers, institutional reports, journals, national level documents and the internet.

Interviews by questionnaire administration were carried out through field visits to the study area during which motorcyclists and the various relevant institutions within the study area were selected based on the sampling techniques discussed above. Photographs were taken where necessary to lend evidence to collected data

and to enrich the content of the research findings. Table 3.1 shows an outline of the data requirements, sources of data and the tools or instruments used for data collection.

**Table 1**  
Data requirement and sources.

Issue	Data required	Source of data	Mode of collection
Factors influencing motorcycle growth	Nature of public transport, nature of urban environment and income	Motorcycle owners Planning authorities and other agencies	Questionnaire and interviews
Effects of motorcycle growth	Urban mobility, socio-economic impacts	Motorcycle owners Planning authorities and other agencies	Questionnaire and interviews Focused group discussion
Threats/ challenges of motorcycle growth	Traffic safety, urban environment and public health	Planning authorities and other agencies	Questionnaire and interviews
Regulatory and institutional framework for motorcycle growth	Planning authorities, roles and policies	Planning authorities and Municipal Assembly	Questionnaire and interviews
Prospects and recommendation	Sustainable motorcycle transport city and institutional capacities	Motorcycle owners Planning authorities and other agencies	Questionnaire and interviews

Source: Author's Construct, 2013.

## 4. Results and discussion

### 4.1. Motorcycle traffic safety and security

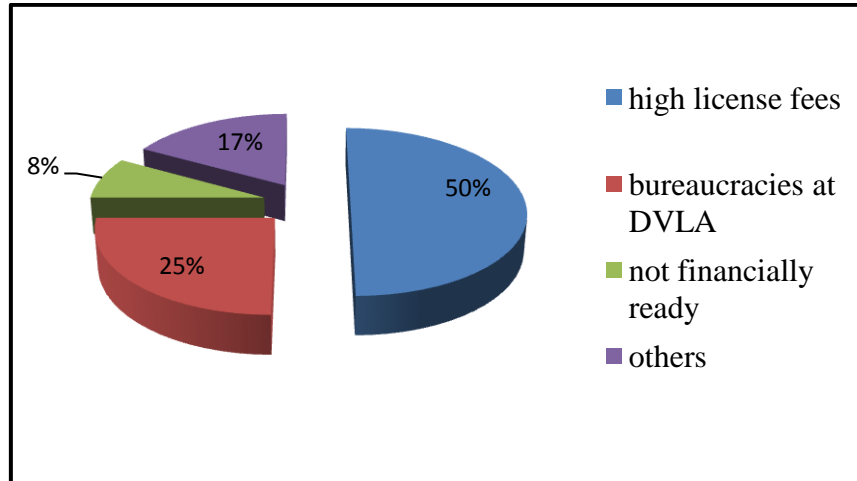
There has been an alarming increase in traffic fatalities in developing countries over the past three decades. While there is considerable debate in all countries about the exact number of traffic injuries, the full extent of the traffic safety problem is far greater than the number of fatalities indicates. Injuries are many times more numerous than fatalities, and tend to cause social and economic problems that rival those of death. There is an increase in the incidence of theft cases involving motorcycles. This insecurity can be a source of deterrent to potential riders from purchasing motorcycles which undoubtedly is the major mode of transport in Wa influencing the socio-economic livelihoods of the people.

#### 4.1.1. Motorcycle registration

In 2009, the Wa Regional office of the Driver and Vehicle Licensing Authority (DVLA) in collaboration with the Upper West Regional Coordinating Council (RCC) embarked on an outreach programme to register motor vehicles and educate motor vehicle owners on the dangers of using motor vehicles without valid documentation. This came as a result of two important issues; low motor vehicle registration of which motorcycles were the worst offenders and the Authority's responsibility of generating revenue (GNA, 2009). The Upper West Regional Licensing Officer who disclosed this in an interview with the Ghana News Agency (GNA) at Wa indicated that the move was to encourage more people to register their vehicles in the region and to generate more revenue for the Authority. He said the Authority had, from January to June this year registered about 2,500 motorcycles and hoped to register more than 3000 motorcycles by the end of the year 2009. The officer noted that while owners of four wheel vehicles were more compliant, most owners of motorbikes were not ready to either renew their registration or register them at the first instance.



Reasons for non-registration include high license fees, bureaucracies at the Authority (DVLA) and financial inability. Figure 5 shows the responses of non-registered motorcyclists.



**Fig.5.** Reasons for Non-Registration.  
Source: Author’s field survey, 2013.

**4.1.2. Motorcycle helmet use**

The Road Traffic Act, 2004 (Act 683), section 16, sub-sections 1 and 2 stipulates;

“A person who rides or is ridden on a motorcycle on a road shall wear a protective crash helmet of a type prescribed by Regulation”

“A person who fails to wear a prescribed crash helmet in contravention of sub-section one (1) commits an offense and is liable on summary conviction to a fine not less than 100 penalty units and not exceeding 200 penalty units”

The Act, Act 683 as amended in 2008 by another act of parliament, Act 761 (Road Traffic Act, 2008 amended) reducing the penalty units of at least 100 penalty units and at most 200 penalty units each by ninety percent (90%) making them 10 penalty units and 20 penalty units respectively.

According to the National Road Safety Commission, an annual distribution of fatalities by road user class, 3.5% of motorcyclists were involved in fatalities. These fatalities were reportedly mostly due to head injuries which could have been preventable if motorcyclist were wearing crash helmets. The table 2 indicates responses with regards to crash helmet use during the field survey.

**Table 2**  
Motorcycle Helmet Use.

Helmet use	Frequency	Percentage (%)
All the time	76	30
When travelling Long Distance	97	38
When there is Police Operation	63	25
Others	17	7

Source: Author’s field survey, 2013.

In table 2, only thirty percent (30%) of respondents fully comply with the helmet law without the influence of any external factors. Thirty-eight percent (38%) of respondents only wear motorcycle crash helmet when travelling long distances- outside the boundaries of Wa and twenty-five percent (25%) of respondents wear crash helmets only when the Motor Traffic and Transport Unit (MTTU) of the Ghana Police Service in Wa are on operation arresting non-compliance of section 15, sub-section 2 of the Road Traffic (Amendment) Act, 2008 (Act 761). The low patronage of crash helmet use or the non-compliance of section 15, sub-section 2 of the Road Traffic Act, 2008

(Act 761) can be attributed to the relaxation of the law which offending motorcyclists continue to commit offenses since they can quite comfortably afford the fine minimum of 10 penalty units, GHc 120 equivalent and a maximum of 20 penalty units, GHc 240 equivalent. Another reason for low usage of motorcycle crash helmet in Wa is due to the harsh weather conditions prevailing.

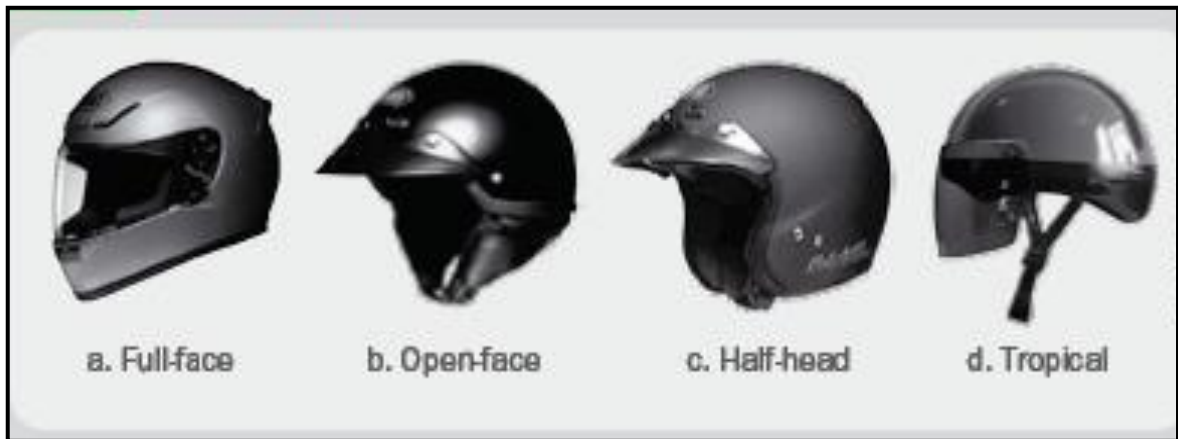


Fig. 6. Universally prescribed type of Crash Helmets.  
Source: WHO (2002).

#### 4. 1.3. Motorcycle accidents

Road traffic injuries and deaths are a growing public health concern worldwide. Road crashes are the second leading cause of death globally among young people (WHO, 2004). The annual costs of road traffic crashes in low income and middle-income countries are estimated to be between US\$65–100 billion, more than the total annual amount received in development aid (UN, 2008). The estimated costs as a percentage of the Gross National Product (GNP) in most African countries range from about 0.8% in Ethiopia and 1% in South Africa to 2.3% in Zambia and 2.7% in Botswana to almost 5% in Kenya (Odero et al, 2003). In 2007, the National Road Safety Commission of Ghana estimated road traffic accidents to cost 1.6% of Gross Domestic Product (GDP) which translated to US\$ 165 million (NRSC, 2007). However, the contribution of the various vehicles including motorcycle was not indicated in the report. The report also noted that motorcycle accidents accounted for 4% of all road traffic accidents in the country.

Motorcycles are one of the most dangerous forms of motorized transportation. Due to small size of their vehicles, motorcycle riders represent a vulnerable group of road users. Motorcyclists are about three times more likely than car occupants to be injured in a crash, and 16 times more likely to die (NRSC, 2007). Contrary to a car crash, in a motorcycle crash, the riders often absorb all kinetic and compressive energy resulting from the crash (Janmohammadi et al, 2009). According to W.H.O (2004) even in developed countries where morbidity and mortality rates from motorcycle accidents are low, the risk of dying from a motorcycle crash is twenty times higher than a motor vehicle crash. Another study noted that riders often ignore safety measures, making them more vulnerable to accidents (Okemiya et al, 2003). Studies in Ghana have also shown that road traffic crashes were a leading cause of death and injuries, and that majority of road traffic fatalities and injuries occurred on roads in rural areas (Afukaar et al, 2003). Ironically, motorcycles constitute one of the main types of vehicles used in most rural areas. However helmet use by motorcyclists in Ghana is generally low.

Statistics from the field survey indicates that thirty percent (30%) have been involved in a motorcycle accident before and seventy percent (70%) of respondents have not as yet been involved in a motorcycle accident. This means that twenty-five persons (25) out every one thousand persons are involve in motorcycle accidents every year in Wa. This is quite a significant figure as the loss of one live has significant social and economic implications.



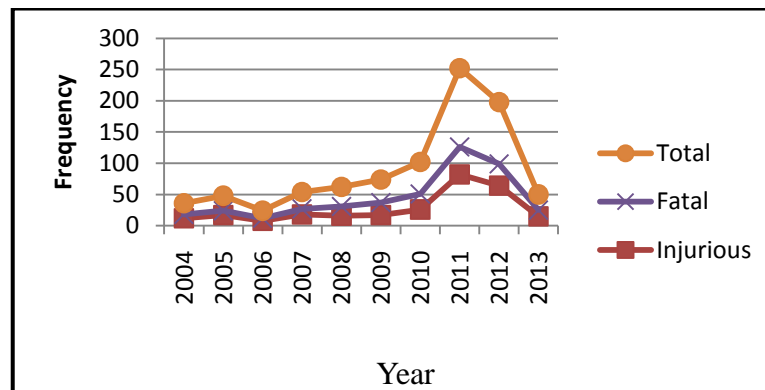
**Fig. 4. 3.** Motorcycle traffic accident.  
Source: Hung, 2006.

Statistics drawn from the Motor Traffic and Transport Unit (MTTU) of the Ghana Police Service regional office as shown in table....indicate the accidents rates including those injurious and fatal from the year 2004 to the first-quarter of 2013.

**Table 3**  
Motorcycle accidents in Wa.

Year	Motorcycle Accident				Total
	Injurious	Percentage (%)	Fatal	Percentage (%)	
2004	12	67	6	33	18
2005	17	71	7	29	24
2006	8	67	4	33	12
2007	18	67	9	33	27
2008	16	52	15	48	31
2009	17	46	20	54	37
2010	26	51	25	49	51
2011	82	65	44	35	126
2012	64	65	35	35	99
2013*	15	60	10	40	25

Source: MTTU, 2013. \* Figures are for the first quarter of 2013 (January-March).



**Fig.4.4.** Trend of motorcycle accidents.  
Source: Field survey, 2013.

The statistics in table ....show a trend as represented in the figure... of motorcycle accidents in Wa over years.

As shown in figure..., the total number of motorcycle accidents in 2004 increased steadily and thereafter fell at a decreasing rate in the year 2005. It, however, started to increase again steadily from the year 2006 through to the year 2010 and thereafter rose sharply till the year 2011. In 2011, motorcycle accidents rate started to decrease in an increasing manner or relatively steeply till the first-quarter of 2013.

The steady growth of motorcycle accidents from the year 2004 till the year 2009 was due to the low reportage of motorcycle accident cases. The situation improved in the year 2009 after an intensive educational program jointly carried out by the National Road Safety Commission (NRSC) and the Motor Traffic and Traffic Unit (MTTU) of the Ghana Police Service. The figures of reported accident cases rose sharply in 2009 till 2011 and started to decrease when the traffic education programme carried out in the earlier years slowed down.

#### **4.2. Motorcycle and livelihood effects**

Like many economic activities that are capital intensive in infrastructures, the transport sector is an important component of the economy impacting on development and the welfare of populations. When transport systems are efficient, they provide economic and social opportunities and benefits that result in positive multipliers effects such as better accessibility to markets, employment and additional investments. When transport systems are deficient in terms of capacity or reliability, they can have an economic cost such as reduced or missed opportunities.

##### **4.2.1. Social effects of motorcycle growth**

The lifestyles of the people of Wa Municipality have greatly changed with modification in the means of transport within and around Wa with respect to movement. Before the coming of motorcycles movement, the town was basically dominated by walking, bicycling and a few taxi- caps. The motorcycle growth in Wa has indeed enhanced and improved the mobility needs and social relations or networking of people in many and varying ways. Qualitative analysis of data from the field survey indicate that the growth of motorcycles growth in Wa have affected the livelihoods of the populace in many respects including the following: i) family heads especially the men use motorcycles to transport their wives and children to the market place and school respectively; ii) both men and women particularly the young ones use motorcycles to visit friends, entertainment centers like nightclubs and the sport stadium as well as wedding ceremonies; iii) motorcycles are also used by respondents to attend social gatherings like funerals, children's birth ceremonies, churches and mosques; iv) motorcycles provide the fastest and most flexible mode of transport to respondents; v) Motorcycles also add to the social standing (status) of respondents as motorcycles are seen as symbols of economic success and honor by the Waala people; vi) motorcycles offer easy opportunities to respondents to visit friends or relatives in sick bed either at hometowns or at the hospital.

Flexibility of Use: Considering the nature of roads especially those that extent into peri-urban areas which are in bad state make transportation by other modes of transport like cars or the minibuses (trotros) quite uneasy. Motorcycles are, therefore, the most patronized vehicular means of transport in the peri-urban areas. Also, the highly inaccessible areas within the settlements of Wa give motorcycle growth more prosperity since they (motorcycles) can easily manoeuvre their way in and out of the highly built up areas.

Accidents: The growth of motorcycles has undoubtedly cost many families, friends, relatives and love ones a great deal through motorcycle accidents. Some of these accidents lead to the loss of lives of dear ones like family members, relatives among others from which mentors, role models, household heads, wives, husbands and even children. Child delinquency, social vices like prostitution and armed robbery, madness, hopelessness among others become the price individuals and society has to pay through fatalities and very serious injuries obtained from motorcycle accidents.

##### **4.2.2. Effects on economic livelihoods**

The following are some benefits or dis-benefits respondents from the field survey indicated. These include among other things the following: i) Motorcycle respondents indicated that they move to their places of work fast and in a much convenient manner. This therefore increases working hours hence increase in productivity which subsequently lead to better economic livelihoods; ii) Analysis of field data indicates that motorcycle offer cheaper and affordable means of transport. As indicated by one respondent:

“Even now that there is increment in fuel prices, you just need GHc 2.00 worth of petrol and you can move about town for at least twenty-four hours (24 hrs). When even you travel from Wa to a place like Tuna, Jirapa and Bulenga, a gallon of petrol will do”

The responses also indicated that there are no more worries about long queues at trotro terminals or having to pay for high taxi fares.

#### **4.2.3. Effects on the local economy**

The Driver and Vehicle Licensing Authority (DVLA) through the registration and licensing of motorcycles generate revenue from which some percentage is given to the local authorities-the Wa Municipal Assembly for the development of the Municipality. Motorcycle registration in the Municipality cost about GHc 85.00 plus what is known as “agent’s fees” which are not fixed but averagely is GHc 30.00. The DVLA in the issuance of licenses to motorcycle owners charged approximately GHc 70.00 plus an additional fee of GHc 7.00 which is paid to the Ghana Red Cross Society. In effect the local economy in one way or the other benefit from the growth of motorcycles in the Municipality.

The Wa Municipal Assembly in its quest to raise revenues for the development of the Municipality device a tax rate system for motorcycles called motorcycle levy where special stickers are designed purposely for motorcycles. The Assembly’s bye-laws require that all motorcycle owners buy and stick (a sticker costs GHc 2.00) these stickers on their motorbikes. Additionally, court fines from deviant motorcyclists also contribute to the revenue pot of local authorities for the development of Wa.

Afukaar (2009) indicated that Northern region accounts for the most (20%) motorcycle fatalities in Ghana followed by the Upper West region with 14.7% motorcyclist. The annual costs of road traffic crashes in low income and middle-income countries are estimated to be between US\$65-100 billion, more than the total annual amount received in development aid. The estimated costs as a percentage of the Gross National Product (GNP) in most African countries range from about 0.8% in Ethiopia and 1% in South Africa to 2.3% in Zambia and 2.7% in Botswana to almost 5% in Kenya. In 2007, the National Road Safety Commission of Ghana report estimated road traffic accidents to cost 1.6% of Gross Domestic Product (GDP) which translated to US\$ 165 million. However, the contribution of the various vehicles including motorcycle was not indicated in the report. The report also noted that motorcycle accidents accounted for 4% of all road traffic accidents in the country.

#### **4.2.4. Effects on employment**

The growth of motorcycles has ripple or spillover effects with regards employment. They range from motorcycle mechanics (popularly known as motor fitters), spare parts dealers, increase in number of fuel filling stations as a result of continuous increase in demand for fuel. As many as eighty-six (86) motor fitters, over thirty (30) spare parts shops and about ten-to-fifteen fuel (10-15) filling stations were counted during head count of the above mentioned employment centres. It must also be added that on average motorcycle repair shops employ on average three (3) persons, motorcycle spare parts shop two (2) persons and the fuel filling stations four (4) persons, thereby increasing the ratio employment to unemployment among the youth.

It must, however, be noted here that this paper is not wholly attributing the apparent existence of fuel filling stations to motorcycle growth. However, the share of motorcycle population which constitute over a third of all vehicular population in Wa as compared to that of cars and other motorized-vehicle population is what has been taken into consideration.

#### **4.3. Challenges of motorcycles growth**

The growth of motorcycles in Wa has itself encountered a myriad of challenges including those encountered by motorcyclists themselves, those encountered through motorcycle traffic control, those encountered by the local planning authorities and other safety and security concerns of motorcycle transport. The challenges included the following:

Motorcyclists are faced continually with increases in the prices and shortages of fuel coupled with high cost of motorcycle spare parts.

Ironically, respondents from the field survey saw the persistent operation on helmet use as harassment and unnecessary especially within the town.

There is an increase in the theft cases of motorcycles. This, in recent times, is becoming more and more rampant making many respondents insecure with ownership of their respective motorcycles.



Motorcyclists in Wa also have the challenge of competing with animals like sheep and goats loitering everywhere even on the narrow road surface for motor vehicles.

The key institutional challenges comprised:

Inadequate human resource to implement motorcycle bye-laws and enforce motor traffic regulation especially the helmet Law by the Municipal Assembly and the Motor Traffic and Transport Unit (MTTU) of the Ghana Police Service respectively.

Interference from all quarters including that from the politicians, the civil and local services as well as the local traditional authorities in the work of the institutions. This makes operations of such institutions very cumbersome.

Another challenging worth mentioning that is faced across board by all relevant institutions in the research study is bribery and corruption among some officers of these institutions.

Institutions also face the challenge of uncoordinated work and efforts towards motorcycle growth within the Municipality. This leads to duplication of efforts, inefficiencies, resource waste and/or under-utilization and sometimes unnecessary and unhealthy competition for responsibilities and credit.

#### **4.4. Prospects of wa as motorcycle dependent city**

Hung, (2006) outlined the following as indicators for motorcycle dependent cities. The motorcycle dependence of city is defined by examining three groups of indicators: vehicle ownership, availability of transport alternatives, and use of motorcycle. The results indicate that in a typical motorcycle dependent city the urban traffic is presented as follows:

High motorcycle ownership, higher than 350 MCs/1000 inhabitants,

Lack of public transport alternatives (less than 1 buses /1000 inhabitants) and incompetent NMT compared with the motorcycle,

Very high share of motorcycle in the traffic flow (more than 50%)

High modal split of motorcycle (more than 40%) and extremely low modal split of public transport (less than 20%) while the percentage of NMT trips is still significant (about 20 to 40%).

The field survey indicates that in the foreseeable future and with the increasing growth of motorcycles, Wa is more likely to become a motorcycle city like Hanoi in Vietnam, and some other motorcycle dependent cities in China. Sixty-eight percent (68%) responses from the field indicates that Wa is a potential motorcycle city while thirty-two percent (32%) of respondents see otherwise. Judging from the above indicators, one can say that Wa is in the situation of captive motorcycle dependent.

With this prospect of Wa becoming a motorcycle city, the following suggestions were given by both motorcycle respondents and the relevant institutions to sustain it.

Existing bad roads should be improved expand into the peri-urban areas and roads designs should special lanes for motorcycles.

Capacities of relevant institutions should be improved to effectively carry out their responsibilities.

Massive education should be carried out by relevant authorities on the need for motorcycle owners to register their bikes, wear crash helmets, follow traffic regulations and pay levies put on motorcycles.

All motorcyclists should acquire license before going onto the roads. It was also suggested that motorcycles license fees and procedures should be reduced to the barest point.

## **5. Key findings**

5.1.Despite provision in the Motor Traffic Act, 2004 (Act 683) as amended 2008, Act 761 requiring motorcycle riders and the one ridden to wear crash helmets as prescribed by Regulations, motorcyclists in Wa see helmet wearing especially within urban center as unwarranted and unnecessary. From the field survey, a cumulative percentage of seventy (70) motorcycle respondents would only wear crash helmets when there is police operations or when they are travelling outside the boundaries of Wa even on long distance basis. As indicated by one respondent a the major challenge he faces as a motorcyclist; he said

“The consistent and persistent harassment by the police must be seriously stop especially when we are riding in town”

5.2. Motorcycles in Wa are seen beyond as modes or means of personal transport. The social attachment and/or the economic value placed on them is quite amazing. In simple terms, motorcycles are seen as symbols or elements of pride and honor as people who own motorcycles are greatly honored and respected in society.

5.3. It is hypocritical that the public outcry in recent times that the institutions in the country must be allowed to work and work with full autonomy. One critical finding from this research was the negative interference from all quarters-ranging from the politicians (the major culprits), the civil and public servants (including administrators and directors), the clergy and even the traditional authorities in the work of relevant institutions in the development of the settlements.

5.4. Economically, the introduction of motorcycles has created ripples of job opportunities for the jobless in town and some rural youth who have refused to undertake agriculture. It has also rekindled the local economy and even the Municipal Assembly derives money from motorcycle operations to realize its projects. Motorcycle growth has also created accessory jobs such as motorcycle repairers, motorcycle spare parts retailers and fuel retailers. The revenue accrued from these activities goes a long way to sustain the livelihoods of many families.

5.5. The three-wheeler motorcycles also called tricycles are used for the transportation of goods within the urban center and as public means of transport for the rural folks. It must be that the flexibility in use and adaptability to the rural setting is one of the main determinants for the preference of this mode of public transport as compared to the others. This is particularly true in the rainy seasons where some road networks are practically inaccessible for the other modes of public transport but for the tricycles which parades the mud and uses short cuts in the forest to get to destination. This has greatly contributed in opening road-locked villages. More so, the prices they offer are far more suitable for the peasants than the monopoly enjoyed by the other means of transport which dictated the prices to the passengers. Today, a wider variety of choice is available and general prices have dropped thanks to the introduction of tricycles. Furthermore, some destinations are becoming the monopoly of the tricycles.

## **6. Recommendations**

As the prospects of are quite in becoming motorcycle dependent town/city, the following recommendations when taken into consideration can help in the sustainability of such a city. These are outlined below.

### **6.1. Ensuring compliance and enforcement of motor traffic law**

For this to be achieved the relevant institutions should be empowered in terms of both human and material logistics. The Motor Traffic and Transport Unit (MTTU) should be empowered to enforce compliance of especially the helmet law to avoid further fatalities and injuries sustained through motorcycle accidents; the Driver and Vehicle Licensing Authority (DVLA) should make sure that the right motorcycle and the right person (rider) are on the roads through motorcycle registration and licensing. Additionally, the National Road Safety Commission (NRSC) should continue educating the public on road safety measures and the Municipal Assembly should device more revenue generating tools from the growth of motorcycle in Wa.

### **6.2. Road designs should be harmonious with motorcycle use**

Many roads in Ghana were designed typically to the exclusion of two-wheelers and even pedestrians but mainly for car and other four-wheelers. This has many drivers the disrespect many other road users motorcycle riders inclusive. It therefore recommended that future road designs should provide specific lanes for motorcyclists since they even dominate the urban landscape of Wa in terms of transport.

### **6.3. Exhaust emission regulation standards**

With regards environment successful policy reform must be geared toward both conventional and next generation two- and three-wheeled vehicle technologies. Improving the performance and monitoring the use of conventional vehicles is key. Pushing cleaner and more fuel efficient next generation technologies is also necessary. The first policy priority is establishing emission standards and certifying new motorcycles equipped with both conventional and next generation technologies. This entails overseeing the activities of a handful of manufacturers, verifying that their products meet the most up-to-date national and local standards. Incentives can be employed to shift consumer preferences to cleaner models. The next crucial step is controlling in-use emissions. Controlling emissions from vehicles once they are on the road is often the most challenging part of a

comprehensive emission control program. This requires dealing with the use and maintenance practices of each motorcycle owner, a necessary endeavor fraught with difficulties. The final step is advancing technological innovations to produce next generation two and three wheeler motorcycles with a smaller energy and environmental footprint.

#### **6.4. Fiscal policies for clean, efficient new motorcycles**

In order to transition from conventional to cleaner technologies, governments often get involved to provide incentives for the manufacture, purchase, and use of clean, efficient new motorcycles. Such fiscal policies are complements to standards discussed previously. Financial policies support strategies to improve new vehicle and engine technologies, low-carbon alternative fuels development, and clean motorcycle retrofit programs. These can include favorable loans, financial incentives, and grants. Other tax mechanisms can be used to penalize or reward low-emission vehicle purchase and use. Fiscal policies are more sustainable when developed to fit local conditions. Several specific examples follow. In the Philippines' San Fernando City, economic incentives drove the transition from two-stroke to four-stroke (less polluting) tricycles. Interest free loans have been made available for the purchase of four-stroke three-wheelers (Roychowdhury et al. 2006). In 2001, three quarters of the city's 1,600 registered tricycles ran on two stroke engines. But after a city council mandate to totally phase out the vehicles by 2004, and offers of interest free loans for down-payments on four-stroke models, more than 400 four-stroke tricycles had replaced the older two-stroke models.

#### **7. Conclusion**

Transport plays a crucial role in urban development by providing access for people to education, markets, employment, recreation, health care and other key services by way of facilitating movement. Especially in cities of the developing world, enhanced mobility for the poor and vulnerable groups is one of the most important preconditions towards the achieving the Millennium Development Goals. However, there is evidence currently of integration of motorcycle transport into the larger urban transport planning system in Ghana especially the three northern regions where motorcycles dominate the transportation environment. The current situation demands a better integration of the activities of the motorcycle operations as part of the large urban transport system. It is important to make the operation of the motorcycles more refined considering the poverty level of urban residents coupled with the restriction of their choice as result of non-availability of reliable public transport service. Inadequate planning of urban transport systems, without due consideration to the social, economic, environmental and cultural elements of the city, can result in physical breaks in the fabric of communities and reinforce social exclusion. The impact on the quality of life and the environment is desirably termed Sustainable Urban Transport Development.

#### **References**

- Button K.J., Hensher., 2001. Handbook of Transport Systems and Traffic control. Pergamon, U. K.
- Charles, M., 2011. The Effects of the Revolution of Motorcycle Transport on the Economic Growth of Kenya. A Case Study of Thika District. MBA Thesis submitted to the School of Business, KCA University, Kenya.
- Dawson, C., 2009. An Introduction to Research Methods; A Practical Guide to anyone undertaking a Research Project, Fourth edition, How To Books Ltd, U.K.
- Department of Environment., Transport and the Regions (DETR)., 2000. Tomorrow's Roads – Safer for Everyone: The Government's road safety strategy and casualty reduction targets for 2010. DETR Report. London. HMSO.
- Gauthier, A. & Hook, W. (2005):Tapping the market for quality bicycles in Africa. *Sustain. Transport.*, 19, 8-11, 30.
- Gauthier, A., 2005. Scaling up for Healthcare Mobility in Africa. *Sustain. Transport.*, 19, 20-23, 25.
- Gbadamosi, K.T., 2002. The Emergence of Motorcycle in Urban Transportation in Nigeria and its implication on Traffic Safety; Center for Transport Studies, Department of Geography and Regional Planning, Olabisi Onabanjo University, P.M.B 2002; Ago-Iwoye, Ogun State, Nigeria.
- Ghana Statistical Service., 2000. Population and Housing Census 2000, Ghana, Accra.
- Gina, P., 2002. Intermediate Means of Transport; A Review Paper with Special Reference to Ghana, Depart. Anthropol., University of Durham, U. K.
- GSS., 2008. Ghana living standards Survey; report of the Fifth Round (V). Accra.

- Howe, J., Barwell, I., 1987. Study of Potential of Intermediate Means of Transport, Vol.2. I.T Transport. <http://en.wikipedia.org/wiki/file> assessed in March, 2013.
- International Council for Clean Transportation (ICCT)., 2009. Two –and-Three Wheelers in India. Innovative Transport Solutions (iTrans). Pvt.Ltd., TBIU, IITDehli, New Dehli.
- Kamakate, F., et al., 2009. Managing Motorcycles: Opportunities to Reduce Pollution and Fuel Use from Two-and-Three wheeled Vehicle. Int. Council on Clean Tran(ICCT)., USA.
- Kumar, A., World, B., 2011. Understanding the Emerging Role of Motorcycles in African Cities: A Political Economy Perspective. SSATP Discussion Paper No. 13. Urban Transport Services. Int. Bank Reconstr. Dev., / The World Bank.
- Leinbach, T.R., 2000. Mobility in development context: changing perspectives, new interpretations, and the real issues. *J. Tran. Geogr.*, 8, 1-9.
- Luci, A., 2010. Res. Des. Methodol. Wits University Graduate School of Public and Development Management.
- Munby, D., 1968. Transport. Harmondo North. Middlesex. England.
- Nguyen, A., Nam., 2007. Master Plan for the Development of Vietnams Motorcycle Industry in the Period of 2006-2013 with a Vision to 2020. Ministry of Industry and Institute of Industry Policy and Strategy. Vietnam.
- Mohan, D., et al., 2002., Traffic safety and health in Indian cities. *J. Tran. Infrastruct.*, 9, 79–94.
- PCFV/UNEP., 2006. Cleaner Motorcycles: Promoting the use of Four-Stroke Engines. Partnership for Clean Fuels and Vehicles under the United Nations' Environment Program, Nairobi, Kenya.
- Perco, P., 2008. Comparison Between Powered Two Wheeler And Passenger Car Free-Flow. Speeds In Urban Areas. In, CD-ROM. Transportation Research Board, National Research Council, Washington, D.C.,
- Starkey, P., Ellis, S., Hine, J., Ternell, A., 2002. Improving Rural Mobility: Options for Developing Motorized and Non-motorized Transport in Rural Areas. World Bank Technical Paper., No. 525.
- Tengey, W.S., et al., 1999. Rural Transport Services and Gender in Ghana; Study Report. Gend. Dev. Inst., Accra, Ghana.
- World Bank., 2002. India's Transport Sector: The Challenges Ahead. The World Bank, Washington, DC.
- World Bank., 2002. Cities on the Move: A World Bank Urban Transport Strategy Review. Washington, D.C., World Bank Publications.
- World Health Organization., Geneva., 2004., World report on road traffic injury prevention. Edited by Peden Margie and others.