

MOTORIZED TRANSPORTATION IN THE URBAN AREAS IN NORTHERN GHANA: THE CASE OF MOTORCYCLE WA TOWNSHIP

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Abstract

In many developing countries, motorcycles are increasingly becoming the common means of transport especially among low-income urban dwellers and the poor. In the wake of the unsatisfactory state of affairs regarding public transport, private motorcycles have been a panacea to urban transport in Ghana. This paper examines the effects of motorcycle use on the social and economic development of Wa. The high incidence of motorcycle ownership presents both challenges as well as opportunities to improve livelihood, employment, transport innovation and investments. 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. The phenomenon has come with its accompanying challenges like motorcycle accidents involving fatalities, environmental and public health concerns from the emissions and non-compliance to motor traffic regulations. It is imperative for transport authorities to enforce compliance with motor traffic law, improve road designs, adopt exhaust emission regulation standards and implement fiscal policies for clean and efficient new motorcycles.

Key words: Motorcycle, urban, transport, motor traffic, development, Ghana

Introduction

Transport is an important element in development and it affords the social, economic and political interaction (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 (Gbadamosi, 2006). Personal mobility is one of democracy's most valued freedoms and it is, therefore, not surprising that a high proportion of households' 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 except China, vehicle ownership is low and dependency on public transport is high, however the financial conditions and performance of all forms of government-organized public transport are 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 for personal mobility in addition public transport.

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). Related to the defects in transport management is the accidents that occur in low-income and middle-income countries and the associated environmental crisis like pollution. 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 (UNGA, 2008; Oduro, 2012). In Ghana, estimated road traffic accidents cost 1.6% of Gross Domestic Product (GDP) which translated to US\$ 165 million (NRSC, 2007; Oduro, 2012).

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, 2012) have given way to the use of personal motorcycles and commercial motorcycle services, a practice popularly referred to as "Okada". The commercial practice is in contravention of the existing transport legal regime, road design and a section of the population also associate the practice with urban crime.

The resort to motorcycles as an alternative means 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, employment, 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

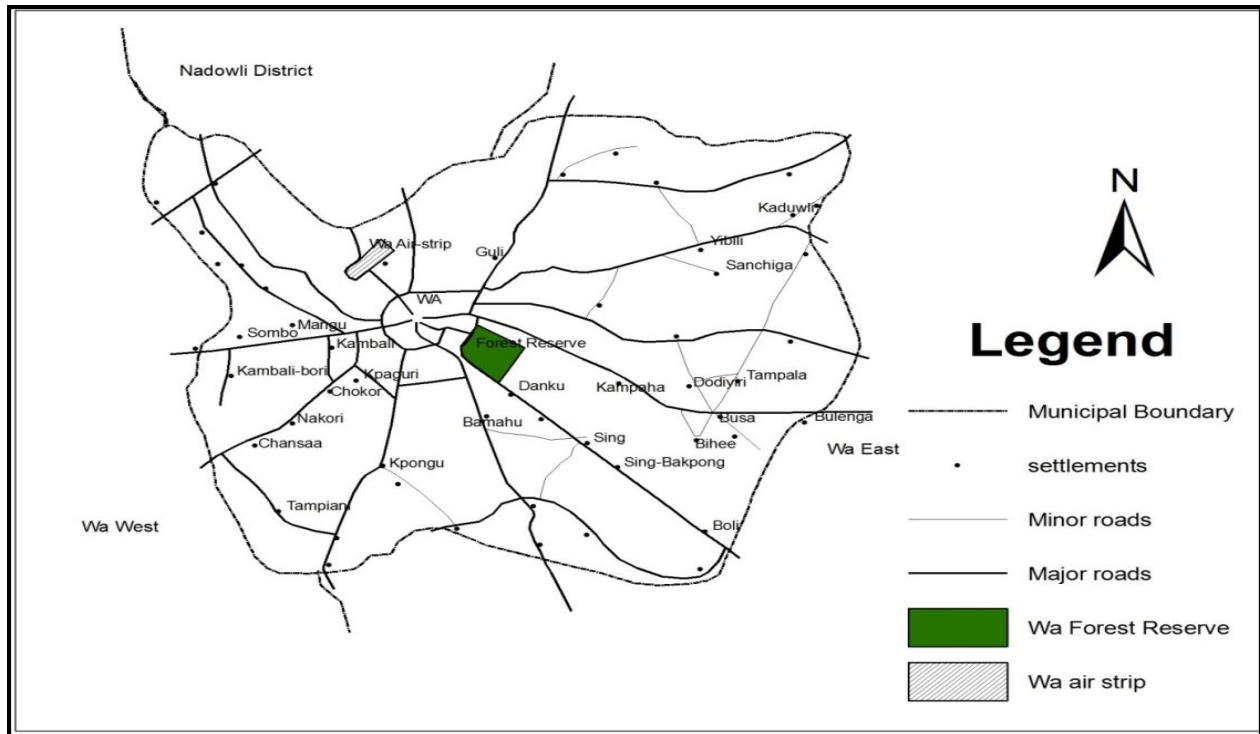
motorcycle operations among others (e.g. Armstrong-Wright, 1987; Meakin, 1989; Adesanya, 1998; Fasakin, 1990; Banthia, *et al* 2006). This paper nonetheless assessed the effects of motorcycles growth, use and ownership in the socio-economic development of Wa a fast growing secondary city in northern 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.

Study Area

The area to which this paper refers to is Wa ($9^{\circ} 56' N - 10^{\circ} 15' N$ and $2^{\circ} 18' W - 2^{\circ} 37' W$), which is a secondary city and the capital of the Wa Municipality and the Upper West Region in Ghana (Figures 1). A considerable number of motorcycle owners and riders are concentrated in the Wa Township. Wa Municipal has an estimated population of 107, 214 people (Ghana Statistical Service, 2012). Its population is growing at a rate of 2.7 per cent per annum with 71,051 people living in urban area (Ghana Statistical Service 2012). It has a land mass area of approximately 234.74 square kilometres which is about 6.4% of the region (Wa Municipal Assembly 2008). 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.

Figure 1: Map of Wa Municipal with major roads



Source: Ahmed, (2011)

Data and Method

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 purposively.

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 were interviewed regarding the socio-economic effects of motorcycle ownership and use on livelihoods in Wa. 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 were also conducted. The method of administration of the questionnaires was by hand delivery whereby field investigators

read the questions to respondents and in most cases waited to collect answered questionnaires. For motorcycle owners and user, trained field staff translates the questions from English to local language (Waale). Analysis was carried out through both in quantitative and qualitative terms by triangulation of data from various interviewees.

Results

Motorcycle Registration

In 2012, the Upper West Regional office (in Wa) 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. The Upper West Regional Licensing Office indicated that the move was to encourage more people to register their vehicles in the region and to generate more revenue for the Authority. The Authority had, from January to June of 2012 registered about 2,500 motorcycles and hoped to register more than 3000 motorcycles by the end of the year 2013. The office 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. Major reasons for non-registration include high license fees (50% of respondents), bureaucracies at the Authority (DVLA) (25%) and financial inability (17%). Non-registration provides the avenue for urban crime in terms of theft.

Road Safety

The Road Traffic Act, 2004 (Act 683), section 16, sub-sections 1 and 2 stipulates helmet use and sanctions. Act 683 as amended in 2008 by another act of parliament, Act 761 (Road Traffic Act, 2008 amended) reduces the penalty units by 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 mostly due to

head injuries which could have been preventable if motorcyclists were wearing crash helmets. The table 1 indicates responses with regards to crash helmet use during the field survey.

Table 1: 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: Field survey, 2013.

In table 1, 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). It therefore implies that over 70% of riders are at risk of fatal injuries during accidents. 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) is 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, GH¢ 120 equivalent and a maximum of 20 penalty units, GH¢ 240 equivalent. Low usage of motorcycle crash helmet in Wa is also due to the harsh weather conditions prevailing (average temperature of 32°C) which produces much heat to the head of those who wear helmets.

As much as thirty percent (30%) of respondents 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 of every one thousand persons are involved in motorcycle accidents every year in Wa. This is quite a significant figure as the loss of one life has significant social and economic implications.

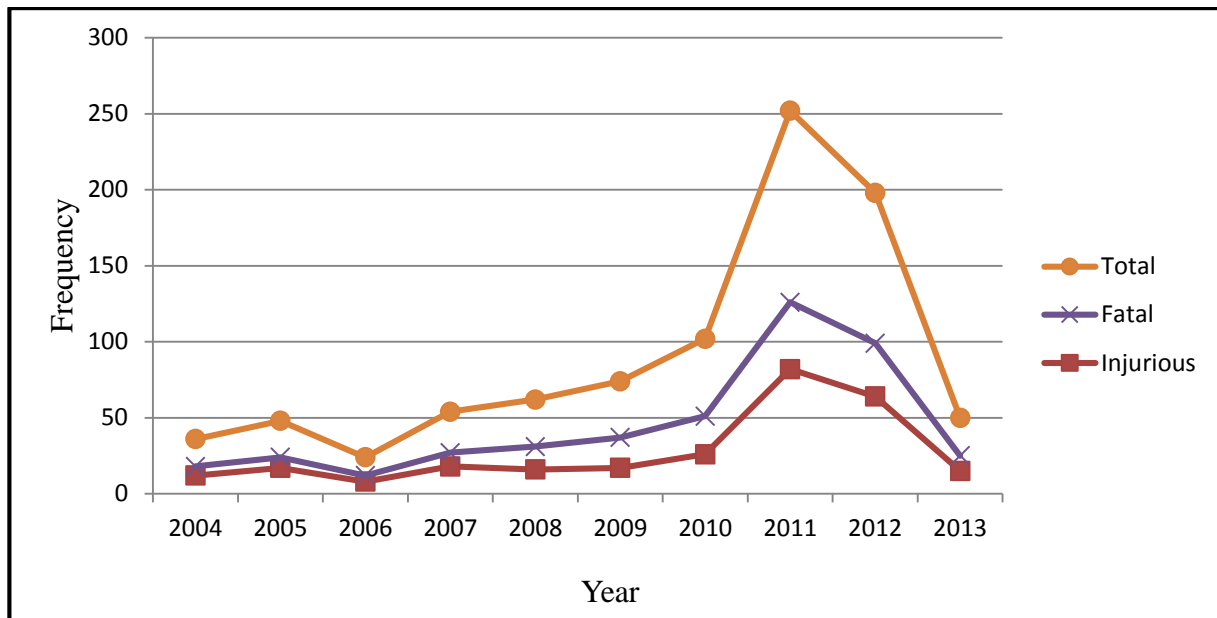
Drawing from the Motor Traffic and Transport Unit (MTTU) of the Ghana Police Service regional office as shown in table 2 indicate the accidents rates including those injurious and fatal from the year 2004 to the first-quarter of 2013.

Table 2: 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)

Figure: 2 Trend of motorcycle accidents



Source: Field survey, 2013.

As shown in figure 2, 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.

Motorcycle Growth, Social 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. On the contrary, deficiencies in terms of capacity or reliability produce an economic cost such as reduced or missed opportunities.

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 growth of motorcycle in Wa has enhanced and improved the mobility needs and social relations or networking of people in many and varying ways. Motorcycles add to the social standing (status) of respondents as motorcycles are seen as symbols of economic success and honor by the Waala people.

Considering the nature of roads especially those that extend 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 (80%) 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 maneuver their way in and out of the highly built up areas. The growth of motorcycles has undoubtedly cost many families, friends, relatives and love ones a great deal through motorcycle accidents. Some of these accidents led 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.

Effects on economic livelihoods 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 GH¢ 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.

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 GH¢ 85.00 plus what is known as “agent’s fees” which are not fixed but averagely is GH¢ 30.00. The DVLA in the issuance of licenses to motorcycle owners charged approximately GH¢ 70.00 plus an additional fee of GH¢ 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 GH¢ 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.

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) fuel filling stations were counted during head count of the above mentioned employment centres. It must also be added that motorcycle repair shops employ approximately 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.

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. 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 (80%) 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 rampant making many respondents (72%) 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.

In terms of institutional challenges, 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 compromises the work of MTTU in road safety management.

Hung, (2006) outlined the 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 Wa is a typical motorcycle dependent city and urban traffic is presented as follows:

- High motorcycle ownership, higher than 350 MCs/1000 inhabitants (currently 408 Motorcycle/1000 inhabitant in Wa),
- Lack of public transport alternatives (less than 1 buses /1000 inhabitants) and incompetent NMT compared with the motorcycle, (currently 1/ 1072 inhabitants)
- Very high share of motorcycle in the traffic flow (more than 50%) (Currently 80%)
- 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%). Currently Motorcycle accounts for 81%.

In the foreseeable future and with the increasing growth of motorcycles, Wa is more likely to become a very high motorcycle dependent city. Sixty-eight percent (68%) responses 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. This implies that the existing poor roads conditions should be improved expand into the peri-urban areas and roads designs should special lanes for motorcycles. It also prompts massive education 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.

Discussion

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 possible 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. Afukaar (2003) indicated that Northern region accounts for the most (20%) motorcycle fatalities in Ghana followed by the Upper West region with 14.7% being motorcyclists.

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 World Health Organization (WHO) (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 (Okeniyi 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, 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.

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 (fieldwork, 2013)”

Motorcycles in Wa are seen beyond means of personal transport. The social attachment and/or the economic value placed on them are 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.

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.

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 motorcycles 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.

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.

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.

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. It is therefore imperative for transport authorities to:

Ensure 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.

Improve road designs to 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.

Adopt 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 very important. 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.

References

Addo, S. T. (2005). Urban transport in Ghana and Africa: Problems and solutions. *Journal of the Ghana Geographical Association*, 24, 104-109.

Adesanya, A. (1998). *The use of motorcycles for public transport. The Situation in Ibadan*. NISER Monography series, No 6. NISER Ibadan 57 pp.

Afukaar, S. K. (2003). Speed control in LMICs: issues, challenges and opportunities in reducing road traffic injuries. *Injury Control and Safety Promotion*, 10, 77-81.

Agyemang, E. (2009). *Traffic Congestion: The bane of a bus rapid transit system in Accra, Ghana?* Published Mphil Thesis (Monograph), Department of Geography, Norwegian University of Science and Technology, Trondheim.

Ahmed, A. (2011). University students' residential accommodation and rental housing in Ghana. A thesis submitted to the department of planning, KNUST.

Armah, F. A., Yawson, D. O., & Pappoe, A. A. N. M. (2010). A Systems dynamics approach to explore traffic congestion and air pollution link in the city of Accra, Ghana. *Sustainability*, 2, 252-265.

Armstrong-Wright, A., (1987). Urban transport—the World Bank, a view. In: Heraty, M.J. (Ed.). *Developing World Transport*. Grosvenor Press International, London, pp. 302-305.

Banthia P, Koirala B, Rauniyar A, Chaudhary D, Kharel T and Khadka S.B. (2006). An epidemiological study of road traffic accident cases attending emergency department of teaching hospital. *J Nepal Med Assoc*;45(162): 238-243.

Button K. J and Hensher (2001). *Handbook of Transport Systems and Traffic control*, Pergamon, U. K

Fasakin, J.O. (1990). Structural adjustment Programme and the Kabukabu challenge to Nigeria's Transport Policy. *Research and Technical Journal OSPO*. 2 (1), 1-5.

Gbadamosi, K.T. (2006) . *The emergence of motorcycle in urban transportation in Nigeria and its implication on traffic safety*. Association for European Transport and contributors.

Ghana Statistical Service (2012). *Population and Housing Census 2010*. Ghana Accra

Grant, R., and Oteng-Ababio, M. (2012). Mapping the invisible and real “African” economy: urban e-waste circuitry. *Urban Geography* 33 (1), 1-21.

Howe J. and I. Barwell (1987). *Study of Potential of Intermediate Means of Transport*, Vol.2; I.T Transport.

Hung, K.V. (2006). *Traffic Management in Motorcycle Dependent Cities*. A dissertation submitted in fulfilment of the requirements for the Degree, Department of Civil Engineering and Geodesy, Darmstadt University of Technology.

Janmohammadi, N., Pourhossein, M., and Hashemi, S.R. (2009). Pattern of Motorcyclist's Mortality in Mazandran Province, Northern Iran. *International Journal of Iranian Red Crescent Medical Society*. 11(1):81–84

Kumar, A. (2011). *Understanding the Emerging Role of Motorcycles in African Cities: A Political Economy Perspective*. SSATP Discussion Paper No. 13.

Meakin, R.T. (1989). The development and regulation of Hong Kong's public transport system. In: Heraty, M.J. (Ed.). *Developing World Transport*. Grosvenor Press, London, pp. 156-159.

Munby D.L. (1968). *Transport: Selected Readings*. Harmondsworth: Penguin.

National Road Safety Commission (NRSC). (2007) *Annual Report 2006*. Ministry of Transportation, Ghana, Accra

Oduro, S. D. (2012). Brake failure and its effect on road traffic accident in Kumasi Metropolis, Ghana. *International Journal of Science and Technology*, 1 (9) 448-454

Okeniyi, J.A., Oluwadiya, K.S., Ogunlesi, T.A., Oyedeji, O.A., Oyelami, O.A., Oyedeji, G.A, and Oginni, L.M (2005). Motorcycle Injury: An Emerging Menace to child Health in Nigeria. *Internet Journal of Paediatrics and Neonatology*. 5(1),

Oteng-Ababio, M. (2010). Private sector involvement in solid waste management in Ghana: The case of the Greater Accra Metropolitan Area (GAMA). *Waste Management and Research*, 28, 322-329.

Roychowdhury, A., Chattopadhyaya, V., Shah, C., and Chandola, P. (2006). *The Leapfrog Factor- Clearing the Air in Asian Cities*. Centre for Science and Environment (CSE). New Delhi, India.

Tamakloe, E. K. A. (1993). *Transport: The future of our cities. Proceedings of the Ghana Academy of Arts and Sciences*, 30, pp. 31-37.

United Nations General Assembly (2008). General Assembly Adopts Resolution on Easing Global Road Safety Crisis, *Sixty-Second General Assembly Plenary 87th Meeting*, United Nations, New York.

Wa Municipal Assembly (2008). *Wa Municipal Medium Term Development Plan-2008-2010*. Wa, Ghana.

World Health Organization. (2004) *World Report on Road Traffic Injury Prevention: Summary*. Geneva, World Health Organization.