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Rural Transport Survey Report

Abor-Avenorpeme-Hatorgodo Road, Volta Region, Ghana

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Cover photo: A rural car taxi in Akatsi South District.

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Abstract

This rural transport study was undertaken in the Akatsi South District, Volta region, in Ghana's coastal savannah ecological zone. The study sought to understand the existing transport systems for the rural communities along and within the catchment area of Abor-Avenorpeme-Hatorgodo road. Using the rapid rural appraisal methodology, the study conducted a limited number of in-depth qualitative interviews of different transport users, operators, regulators and development-related stakeholders. Through this method, reliable 'order of magnitude' estimates were derived, related to movements of people and goods, transport fares, tariffs and preferences of road users for travel distances greater than 5 km. Akatsi, the district capital, served as the major transport and market hub for the communities. The study showed that car taxis and motorcycle taxis are mostly used, while mini-buses serve the road only on the Akatsi market days. Annually, the motorcycle taxis transport over 70% of passengers and nearly 45% of small freight, while the car taxis move about 10% and 15% of passengers and small freight respectively. No larger buses or motor-tricycles serve the road. Generally, transport users were dissatisfied with the high passenger fares and long loading times of cars and mini-buses. Given the contribution of motorcycle taxis in the provision of rural passenger transport services, there is a case to allow their operation, if regulated.

Key words

Rural transport services; Transport operators; Rapid rural appraisal method; Motorcycle taxi; Coastal savannah ecological zone of Ghana; Road catchment area.

Acronyms, Units and Currencies

AfCAP	Africa Community Access Project
AsCAP	Asia Community Access Project
ATM	Automated Teller Machine
BRRI	Building and Road Research Institute
CSIR	Council for Scientific and Industrial Research
DFID	Department for International Development
DFR	Department of Feeder Roads
e.g.	For example
Frt	Freight
GPS	Global Positioning System
HIV	Human Immunodeficiency Virus
Hr	Hour
GHS	Ghana Cedi, currency
GPRTU	Ghana Private Road Transport Union
GSS	Ghana Statistical Service
ICT	Information and Communication Technologies
i.e.	That is
IMT	Intermediate Means of Transport
kg	kilogram
km	kilometre
Ltd	Limited
MMT	Metro mass transit
MoT	Ministry of Transport
N	Number/sample size
n/a	Not applicable or not available
NMT	Non-motorised Transport
Pax	Passengers
PMU	Project Management Unit
ReCAP	Research for Community Access Partnership
RTS	Rural Transport Services
RTSi	Rural Transport Services Indicator
SHS	Senior High School
SSATP	Sub-Saharan Africa Transport Policy Program
STC	State Transport Corporation
t	tonne
TA	Technical Advisor
TRL	Transport Research Laboratory
UK	United Kingdom
USA	United States of America
USD	United States Dollar
USDc	United States Dollar cent

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Executive Summary

This report is the second in a series of three rural transport survey reports prepared under the Rural Transport Diagnostic Study in Ghana. It presents the findings of a study carried out in the coastal savannah ecological zone, focusing on the Abor-Avenorpeme-Hatorgodo bituminous road in the Akatsi South District in the Volta region. The surveyed road, 15.4 km long and 6 m wide, traverses a relatively flat terrain with an elevation difference of about 30 metres. The overall aim of the study is to understand the existing rural transport systems in Ghana based on understanding the transport needs and preferences of rural women, men and children with different ages, occupations, gender and abilities in Ghana. Specifically, it is to understand the needs and perspectives of different road users in the rural communities along and within the catchment area of the selected road, as well as transport operators, regulators and those concerned with socio-economic development. It is also to identify constraining factors and good practices in Ghana's rural transport services, for evidence-based policy suggestions.
The field data collection lasted from 25th January to 1st February, 2017. The rapid rural appraisal methodology was used for the study. A key feature of this is its focus on gaining a deep understanding of the issues under investigation based on a limited number, but in-depth qualitative interviews with local stakeholders and sector experts. Through personal interviews by the transport experts and road traffic counts by trained enumerators some valuable 'order of magnitude' estimates were produced, relating to the movements of people and goods in the rural communities, transport fares, tariffs, trends in transport services and preferences of road users.

This rural transport survey report has highlighted the following:

- road geography and socio-economic situation for the communities along and within the catchment area for the Abor-Avenorpeme-Hatorgodo surveyed road in the Volta region.
- the hubs-and-spokes pattern of the surveyed road.
- the findings from the interviews and classified roadside traffic counts and
- conclusions and recommendations for further research studies and suggestions for possible changes to rural transport services practices, policies and strategies in Ghana.

Results from the study

Transport users

- Thirty (30) road transport users were interviewed of which 15 were males and 15 were females. The respondents included farmers, traders, disabled, elderly, students, nurses, and persons using transport to access health care, maternal healthcare, formal employment, financial services, funerals and the like. Their ages range from 17 to 76 years.
  Akatsi is the main transport hub and a market town which provided most of the essential services for the inhabitants in the catchment area. The Akatsi market takes place on 5-day rotational basis.
- The car taxi and motorcycle taxi are the main modes of rural transport available for the population on daily basis, while mini-buses originating at Avenorpeme serve the road only on the Akatsi market days. No larger buses or motor-tricycles serve the road.
- Motorcycles were the most dominant mode of transport moving 73% of passengers and 44% of small freight on annual basis. The car taxis move 9% and 14% of passengers and small freight respectively. The mini-bus is responsible for 15 % of annual passenger movements and 31% of annual small freight movements.
- All respondents liked the paved road and preferred it to the old gravel road. Passengers were, however, dissatisfied with fares for all means of transport. The fare per passenger kilometre for the car taxi is USDc 6, for the mini-bus USDc 5, and for motorcycle USDc 9.

- Generally, transport users were dissatisfied with overloading of the transport modes, poor service predictability, long loading times and high passenger fares.
- The key priority for rural dwellers in Hatorgodo and Agorvinu was the construction of simple bridges to cross the river to be able to attend Atiavi market and Senior High School.

Transport operators

- Ten (10) transport operators were interviewed, of which three were motorcycle operators, another three were car taxi operators and two were tro-tro operators.
- Tro-tro operators suggested that it is not a viable venture to run a tro-tro service on a non-market day because of the low transport demand and stiff competition from the motorcycle taxis.
- Apart from the tro-tro operators who belong to a credit union and as such have access to credit, the other operators complained about the absence of having access to credit facilities to purchase their own vehicles or boost their businesses.

Transport Regulators

- Three regulators were interviewed. Overall, they were satisfied with the level of compliance of car taxis and mini/midi-buses regarding insurance, road worthiness inspections, and environmental emissions.
- The regulators, however, had limited information on the motorcycles, since these are prohibited (that is de jure, not de facto) from providing commercial services to the public. Despite being responsible for the majority of passenger and freight transport, they are therefore not regulated.

Development

- Three stakeholders concerned with socio-economic development were interviewed. They appreciated the motorcycle taxis for providing jobs for the rural youth, while the car taxis were appreciated for maternal health transport services. Motorcycles, car taxis and car pickups were adjudged to provide nearly good rural transport services to facilitate rural development of the area.
- One school head teacher observed that the low lying terrain and marshes at Hatorgodo, without proper bridges, affect transport of bulky educational supplies and emergency health care needs. The respondents recommended proper bridges to improve accessibility to the hinterlands.

Conclusions and recommendations

- The motorcycle taxi is the most dominant and available mode of transport on the surveyed rural road, contributing annually 73 % of passenger movements and 44% of small freight movements.
- Tro-tro operations are generally not viable on non-market days because of low transport demand and stiff competition from the motorcycle taxis. No large buses or motor-tricycles serve the road.
- The motorcycles are appreciated for their positive socio-economic contributions to the lives of the rural dwellers and for offering employment opportunities for young people. It is recommended that the significant role of motorised two-wheelers in rural passenger transport is recognised by revising the current road traffic regulations 2012 (LI 2180), formally accommodating such services.
- Perhaps not surprisingly, all respondents across the categories preferred the paved road over the old gravel road. But paving a road is expensive, and with limited funds available,

strategic choices of where and when to upgrade gravel roads to paved ones, need to be based on fair, clear and transparent criteria.

1 Introduction

1.1 Introduction to rural transport study in the Coastal Savannah ecological zone

The overall aim of the rural transport diagnostic study in Ghana was to understand the existing rural transport systems and the key issues relating to policies and practices in Ghana. This was based on understanding the needs and perspectives of different transport users with different occupations, ages, gender and abilities, as well as transport operators, transport regulators and those responsible for socio-economic development. Specifically, this study aimed at understanding the needs and perspectives of the different groups of stakeholders including women, men and children in different rural communities along a representative rural road in Akatsi South/Keta District in the Volta region in the coastal savannah ecological zone of Ghana. The surveyed road lies along the boundary between Akatsi South District and Keta Municipality, with some communities being either in the Akatsi South District or in the Keta Municipality. The economic pull effect of Akatsi is felt more than that of Keta in the communities in the catchment area, since Keta is on the other side of the Keta lagoon and thus far away (by road) from the study area. In practice, the surveyed road can be considered to be in the Akatsi South District.

The study was carried out from 25th January to 1st February, 2017 on the Abor-Avenorpeme-Hatorgodo road in Akatsi South District to gather requisite data to help the research team to understand the nature and character of rural transport systems in the coastal savannah ecological zone. The rapid rural appraisal methodology developed by Starkey, et al., 2013 was used for the study. A key feature of the rapid rural appraisal methodology is its focus on gaining a deep understanding of the issues under investigation based on a limited number, but in-depth qualitative interviews involving local stakeholders and sector experts, rather than a large-scale quantitative survey approach. The data collected was derived from the rural communities along the selected study road or within its catchment area to produce some valuable 'order of magnitude' estimates relating to movement of people and goods in the rural communities, the transport fares, tariffs, trends in transport services and preferences of road users. Another criterion we applied was that the rural transport services under consideration are for the medium travel distance range, between 5 km and 75 km.

1.2 Introduction to the rural road transport survey report and statistics

The information and results derived for this rural transport study relate to one specific rural road in the coastal savannah ecological zone, which is the Abor-Avenorpeme-Hatorgodo road in the Akatsi South District. The road is about 15 km long and paved throughout from Abor to Hatorgodo. The research team used the rapid rural appraisal methodology to obtain a 'snapshot' situation of the existing rural transport systems along and around the selected survey road. This methodology is different from large-scale surveys that use enumerators to interview many stakeholders to gain data size that may be statistically significant. Here we conducted about forty five in-depth interviews that provided indicative data on the transport needs and preferences of the local stakeholders and experts. Thirty road users were interviewed, balanced for gender. The road users interviewed included farmers, traders, students, elderly, disabled, and people using transport to access health care, maternal healthcare, employment (formal work), financial services and for socio-cultural reasons such as funerals, church activities and the like. For some of these categories, there were only two people interviewed (one male, one female).

Similarly, in-depth interviews were carried out with a small number of transport operators for the different transport modes plying the route, people familiar with regulatory issues, and those

concerned with development. The people selected for the interviews had clear knowledge and understanding of the relevant issues relating to the transport systems along the study road. Their opinions were respected and formed the basis for understanding the existing transport services regulatory framework, policies and practices applicable to the selected rural road and its catchment area. The data generated, though small, provides a 'snapshot' of the existing rural transport situation. During the data gathering stage, efforts were made to ensure that data obtained were inherently consistent and represented the best possible estimates of the real situation for the study area. Information from the various sources was constantly compared by the researchers in the field to clean the data sets from discrepancies. Follow-up questions were asked to seek a clearer understanding of why a response of an interviewee was different from others already provided, which is crucial for data quality assurance.

In this survey report, traffic counts were carried out on a 'normal' day and on a market day at two different locations. Akatsi and Abor represented two important market hubs which had separate market days patronised by inhabitants within the study catchment area. The larger market was, however, at Akatsi. Each market operated separately on 5-day rotational basis and both were investigated. The traffic counting teams classified the traffic and recorded the counts during the 12-hour daytime period from 6:00 am to 6:00 pm. The classified counts involved conventional vehicles, intermediate means of transport (IMTs) and non-motorised transport (NMTs) such as bicycles and pedestrians.

This survey report presents in eight standardised tables. The first four tables summarise most of the key statistics and the assessments and opinions obtained from the surveys, while the last four tables summarise the opinions of the road users, the operators, the regulators and those concerned with development. Maps and photographs have also been added to the text to provide further information on the surveyed road.

2 Rural transport services: summary tables of key statistics and indicators

RTSi Road Report Table 1. Road information

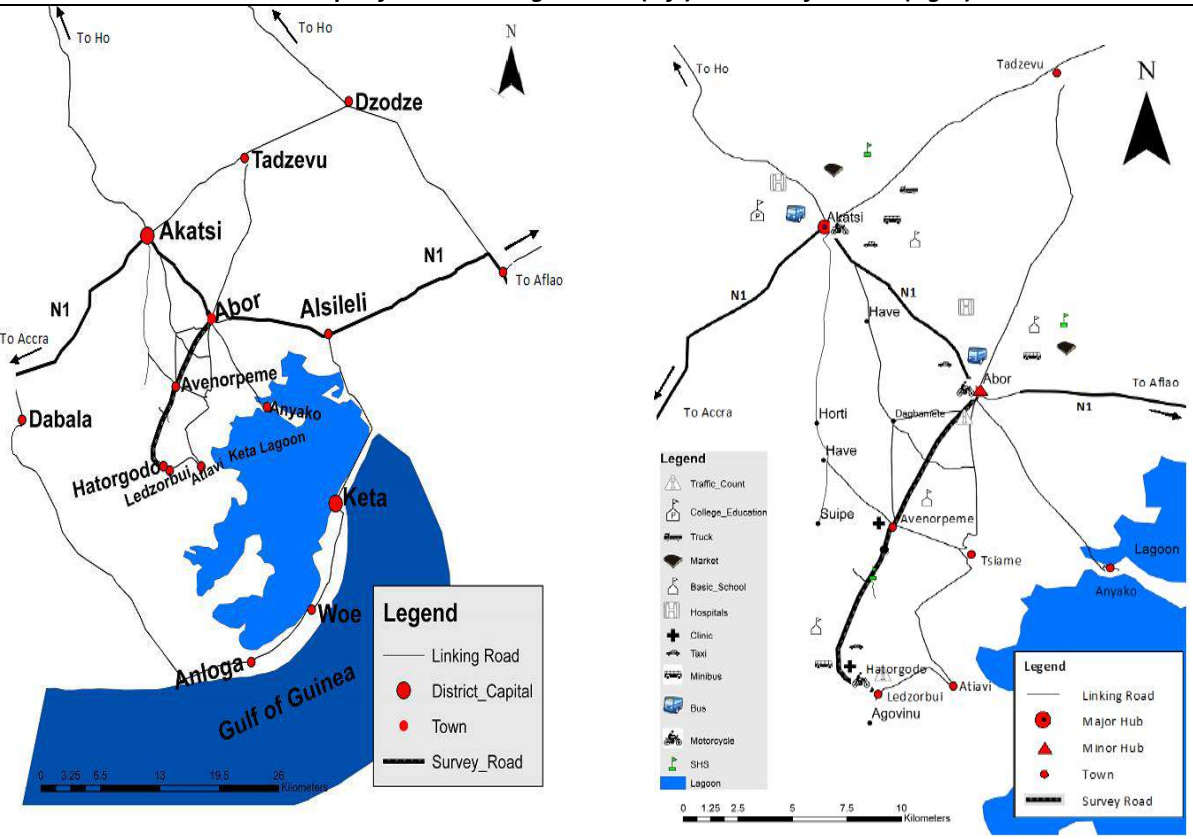
Road name: **Abor–Avenorpeme-Hatorgodo**			
Dates of survey: **25th January to 1st February, 2017**			
District, Region and Country: **Akatsi South, Volta Region, Ghana**			
Road type: **Paved**	*Responsible Authority:* **Department of Feeder Roads**		
Road start location: **Abor**	*Start GPS coordinates:* **Longitude: 0:51 19.53 E; Latitude: 6:03 27.52 N**		
Road finish location: **Hatorgodo**	*Finish GPS coordinates:* **Longitude: 0:48 54.91E; Latitude: 5:56 52.60 N**		
*Road length:***15.44 km**	*Catchment population:* **12,170**		
Road quality and condition from different perspectives			
Road authority	*Operators*	*Development*	*Safety*
	★★★★☆	★★☆☆☆	★★★★☆
Summary of road geography and socio-economic situation			
The surveyed road is paved and runs 15.4 km from Hatorgodo at the farthest end through Avenorpeme to the small hub of Abor. The coastal National Road, N1, which runs from Aflao through Accra to Elubo in the Western region passes through Abor and the outskirts of Akatsi. Though Abor is a sizeable town with a population of 5,193 inhabitants (Ghana Statistical Service (GSS), 2014a), nearly all traffic along the surveyed road continues to Akatsi, the district capital of the Akatsi South district. Akatsi has a population of 31,884 inhabitants (GSS, 2014b). The road from Abor to Akatsi market and lorry station is 9.9 km long and predominately forms part of the paved national coastal road, N1. Generally, the topography around Hatorgodo is low lying and storm drainage is poor. An unpaved track continues from Hatorgodo at the cemetery for another hundred metres or so till it reaches the swamps where a wooden canoe is available for crossing the Hator river/creek to Ledzorbui, located just across the river. At Ledzorbui, one has the option to go left to Atiavi, a distance of about 4 km, or turn right to go to Agorvinu for onward travel to			

Dabala Junction or beyond. It is important to stress that travelling from Hatorgodo to Ledzorbui and onwards to Agorvinu is challenging because of the swamps and the fact that there is no defined connecting road. There is wooden bridge connecting Agorvinu to Ledzorbui, but the bridge can only accommodate motorcycles, bicycles and pedestrians.

There is a Senior High School (SHS) at Atiavi which attracts students from Hatorgodo. These students encounter travel challenges, particularly during the rainy season when the Hator river level swells up and is in high currents. A new Senior High School (E-Block), the Avenor Senior High School, near Avenorpeme and about 6 km away from Hatorgodo has recently been built to cater for the educational needs for the surrounding communities, but is not yet operational.

The study area is located on the coastal flat plains of Ghana with minimal elevation. Roads and villages, however, tend to be built on man-made or natural elevations in the landscape. Hatorgodo is close to the Keta lagoon, the largest lagoon in Ghana, and has a protected status. Fishing is a source of income for the communities. The main cash crop is sugar-cane, predominantly used to brew an alcoholic drink, referred to as 'Akpeteshie'. Black berries grow in the wild and are sold in the local markets or exported to other countries. Food crops cultivated include cassava and maize, while the main vegetable crops grown in the area include onions, tomatoes, pepper and okra.

Maps of road showing context (left) and road features (right)



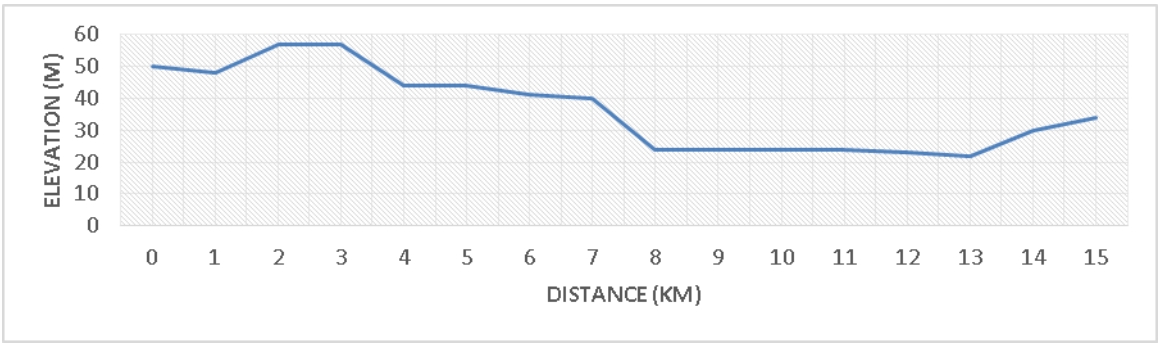
Schematic map of 'straightened' road with features

0 7 15.4

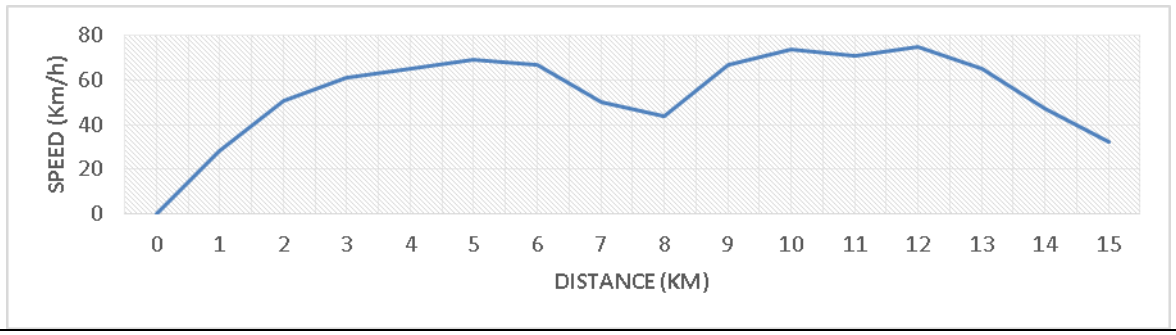
X----------X----------X

Abor	Avenorpeme	Hatorgodo

GPS elevation track



GPS speed track



Description of hub and spoke patterns

The surveyed road starts at Abor, where it is linked to the national coastal road, N1. The N1 runs more or less along the coast from the border with Togo – starting at the outskirts of Lomé at Aflao – to the border with the Ivory Coast at Elubo, meanwhile passing through Accra. For onward travel, the main hub for villagers along the surveyed road, is Akatsi. Here taxis, 'tro-tros' (mini- and midi-buses) and large buses (such as Metro Mass Transit (MMT)) leave either for the border with Togo, for the regional capital Ho or for Tema and Accra.

The surveyed road serves two sizeable communities, namely Hatorgodo at the end of the paved road (with 2,133 inhabitants; GSS, 2014a) and Avenorpeme (1,606 inhabitants; GSS, 2014b), about halfway. In addition, some communities are located off the paved road such as Dagbamate, Havi, and Suipe and are connected to the road via unpaved roads. In Hatorgodo, about five car taxis leave on a daily basis with destination at Akatsi. There are also 15 - 20 motorcycle taxis available in Hatorgodo which transport people to nearby destinations along and off the main road and to Abor, but not onwards to Akatsi. Avenorpeme is about 8 km away from Abor, but does not have a public transport station. Dagbamate (1,063 inhabitants; GSS, 2014b) which is about three kilometres off the survey road is resident to three mini-buses and two pickups (mainly for freight) which commute to Abor on daily basis and to Akatsi on market days. On the Akatsi market day, about four tro-tros, mainly minibuses, start from Avenorpeme to make the Akatsi run using the surveyed road. On other days Avenorpeme depends on either motorcycle taxis solicited from Abor or car taxis originating from Hatorgodo. Mini/midi-buses do not operate from Hatorgodo to Akatsi, not even on market days. The rural dwellers overwhelmingly rely on the motorcycle taxis and car taxis to meet their travel needs.

Intermodal connectivity				
'Feeding' *(getting to the road)*	*User satisfaction*	★★★☆☆	*Development impact*	★★★★☆
'Linking' *(to onward destinations)*	*User satisfaction*	★★★☆☆	*Development impact*	★★★★☆
The more stars (or the higher score) the better. ★☆☆☆☆= Very dissatisfied (= 1). ★★☆☆☆= Dissatisfied (= 2). ★★★☆☆= Medium (=3). ★★★★☆= Satisfied (= 4). ★★★★★= Very satisfied (= 5).				

Table 2. Traffic and transport along road

Daily traffic flows (In both directions)					**Fleet**	**Passengers and small freight**						
	Normal	*Busy*	*Disrupted*	*Impassable **	*No of RTS vehicles operating on road*	***Trip transport*** *normal day per vehicle*		***Daily transport*** *normal day all vehicles*		***Annual transport*** *adjusted for traffic fluctuations*		***Change** in past*
						Pax	*Frt*	*Pax*	*Frt*	*Pax*	*Frt*	
						(no)	*(kg)*	*(no)*	*(kg)*	*(no)*	*(t)*	*-- 0 ++*
Midi-bus	0	2	0	-	1	0		-				
Minibus	20	90	12	-	10	14	300	280	12,000	160,000	5,470	0
Taxi (saloon/estate)	30	65	20	-	15	4	25	120	1,500	97,100	2,310	0
Taxi (4x4/pickup)	0	0	0	-	0	0		-				
Pickup/freight	6	25	2	-	5	3	80	15	400	31,400	2,000	0
Light truck	4	2	0	-	3	3		9				
Medium truck	0	0	0	-	0	0		-				
Motor tricycle	1	4	0	-	1	2		2				
Motorcycle	600	700	420	-	173	2	25	2,000	125,000	800,000	7,700	+
Bicycle	8	11	6	-								
Pedestrians (> 5 km)	37	29	25	-								
Totals	**706**	**928**	**515**	-	**208**	**28**	**430**	**2,426**	**138,900**	**1,088,500**	**17,480**	

*this is not applicable as the road is paved.

Table 3: Rural transport services key operational statistics for major transport modes

	Minibus	Taxi (saloon/estate)	Motorcycle
Contribution to annual passenger transport (% of market)	15	9	73
Contribution to annual small freight transport (% of market)	31	13	44
Fare per km in USDc	5	6	9
Journey time (average speed on normal days) in km/hr	45	64	54
Transport frequency on normal days (number of opportunities to travel per day)	7	5	12
Number of days a year with 'normal service'	167	148	224
Number of busy days a year	78	177	141

Number of days a year with disrupted service	90	30	0
Number of days a year with no transport services	30	10	0
Reliability factor(s) (%)	80	68	77
Men as % of passengers/day	53	58	78
Women as % of passengers/day	45	37	14
Children as % of passengers/day	2	5	8
Cost of 50 kg accompanied freight in USDc per tonne-km	57	80	130
Cost of 200 kg consigned freight in USDc per tonne-km	64	65	85
Safety: Recalled no. of accidents per 100,000 vehicle trip	98	33	163
Security: Recalled no. of incidents per 100,000 vehicle trip	62	0	63
Typical age of vehicle	14	20	7
Typical fuel consumption of vehicles (litres per 100 km)	11	10	4
Typical operating distance per year in km	9,350	15,700	17,000
Daily cost of vehicle ownership/fixed costs (ownership mode)	3	1	n/a
Total revenue per day (USD)	37	25	13
Total revenue per kilometre (USDc)	27	19	8
Total revenue per passenger kilometre (USDc)	2	5	6
Percentage total revenue due to freight (%)	36	54	69
Regulation compliance (overall assessment)	3	3	2
Development impact (overall assessment)	4	4	4

Table 4: User satisfaction with main RTS modes (disaggregated for gender)

	Minibus		Taxi (saloon/estate)		Motorcycle	
	Men	Women	Men	Women	Men	Women
Sample size (N)	6	4	11	10	13	12
Fares	★★★☆☆	★★☆☆☆	★★★☆☆	★★★☆☆	★★☆☆☆	★★☆☆☆
Journey time	★★☆☆☆	★★★☆☆	★★★☆☆	★★★★☆	★★★☆☆	★★★★☆
Operational features	★★☆☆☆	★★☆☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆
Freight	★★★☆☆	★★☆☆☆	★★★★☆	★★★☆☆	★★★☆☆	★★★☆☆
Safety and security	★★☆☆☆	★★☆☆☆	★★★★☆	★★★★☆	★★★☆☆	★★★☆☆
Comfort	★★☆☆☆	★★☆☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆
Universal access	★★★★☆	★★★☆☆	★★★★☆	★★★★☆	★★☆☆☆	★★☆☆☆
Overall satisfaction	**2.6**	**2.3**	**3.4**	**3.4**	**2.6**	**2.9**

The higher the score the better. ★☆☆☆☆*=Very Dissatisfied,* ★★☆☆☆*=Dissatisfied,* ★★★☆☆*=Medium Satisfied,* ★★★★☆*=Satisfied,* ★★★★★*=Very Satisfied*

3 Rural transport services: report on survey findings

3.1 Overview of road situation and issues

The 15.4 km road surveyed runs from Abor to Hatorgodo. At Abor, the surveyed road connects with the N1 which brings one to the district capital Akatsi after another 10 km. The surveyed road is a paved 5.5 m wide road, constructed in 2014-15. Because of its recent construction, and the fact that the road is not intensely used, it is still in good condition, with only the occasional pothole.

According to both users and operators the road can be used without much disruption during the whole year. During the peak of the rainy season some low-lying sections get temporarily flooded but this disrupts traffic rather than bringing it to a complete halt. The surveyed road runs through two districts, Keta and Akatsi South, with some communities falling under the former and some under the latter. However, all communities are oriented towards Akatsi for their economic activities, as the district capital Keta is far away and can only be reached after at least an hour's journey around the Keta Lagoon.

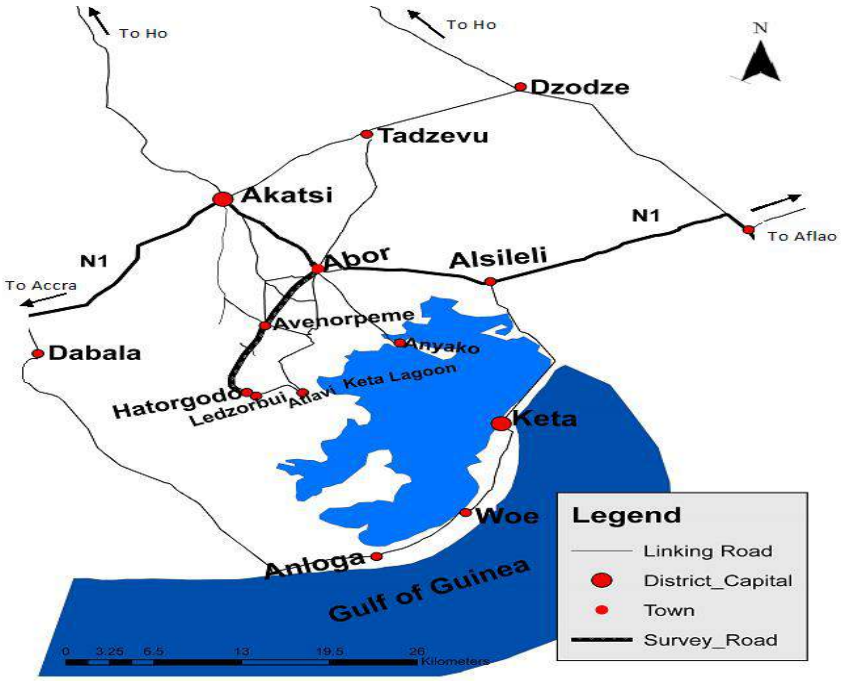


Figure 1 - : The surveyed road, Abor-Hatorgodo, in relation to Akatsi and other towns

Despite the fact that Hatorgodo (with over 2,100 inhabitants) and Avenorpeme (with about 1,600 inhabitants) are sizable villages, there is no obvious economic case, which can justify the construction of a paved road. There is already an older paved road running from Abor to Tsiame and onwards to Atiavi. Avenorpeme is connected to Tsiame via a three-kilometre long gravel road. Hatorgodo too is only about four kilometres away from Atiavi on an unpaved road, although there is a water crossing in between. Meanwhile, two other bitumen roads are planned, which will run more or less parallel to already existing paved roads. One of these will be 20.7 km long connecting Suipe, close to Avenorpeme, with Akatsi via Havi and another one will be 11.85 km long connecting Avenorpeme with Akatsi via Dagbamate. Suipe, Havi and Dagbamate all have small populations.

Figure 2 (left) – View of coastal plain from the road

Figure 3 (right) – A new senior high school between Hatorgodo and Avenorpeme

The market in Akatsi, on a rotational five (5) day basis, is the main focus point for the inhabitants in Hatorgodo, Avenorpeme and surrounding communities. Akatsi, a district capital, offers numerous shops, a bank with an Automated Teller Machine (ATM), a training college, a hospital and administrative services. The Abor market is hardly visited by the communities along the surveyed road, but for the people in Hatorgodo the Atiavi market – again every five days – is of relevance. The problem is that, although it is a walking distance away from Hatorgodo, a creek has to be crossed to reach the hamlet of Ledzorbui, which is along the road from Atiavi to Agorvinu. The creek is passable by foot during the height of the dry season, but during the rainy season and for a few months after it, Atiavi can only be reached from Hatorgodo by a small canoe (see Fig.4). Hence, if larger and heavier loads are being transported to the Atiavi market, then a detour has to be made via Avenorpeme and Tsiame, using public transport such as a car taxi.

Figure 4 (left) – Canoe crossing between Hatorgodo and Atiavi

Figure 5 (centre) – Wooden pedestrian bridge between Atiavi and Agorvinu

Figure 6 (right) – Track to Agorvinu

Meanwhile, the road (or, more appropriately, 'track') from Ledzorbui to Agorvinu ultimately joins the Keta – Dabala road, through an unmotorable road from Agorvinu to Dabala. After less than a kilometre from Ledzorbui, one crosses a wooden bridge (about 30 m long, built with the support of an NGO) to continue to Agorvinu and nearby communities. People living here are dependent on both Atiavi and Hatorgodo, but only motorcycles and bicycles can reach the village because the pedestrian bridge does not support four-wheel vehicles. The start of the bridge acts as a terminal and turning point, not only for a single tro-tro service coming from Atiavi but for other motorists visiting the outlying communities as well.

Figure 7 (left) – Road passing through Avenorpeme

Figure 8 (centre) – "No road, no vote" signboard in Hatorgodo

Figure 9 (right) – Motorcyclist branching off the main road

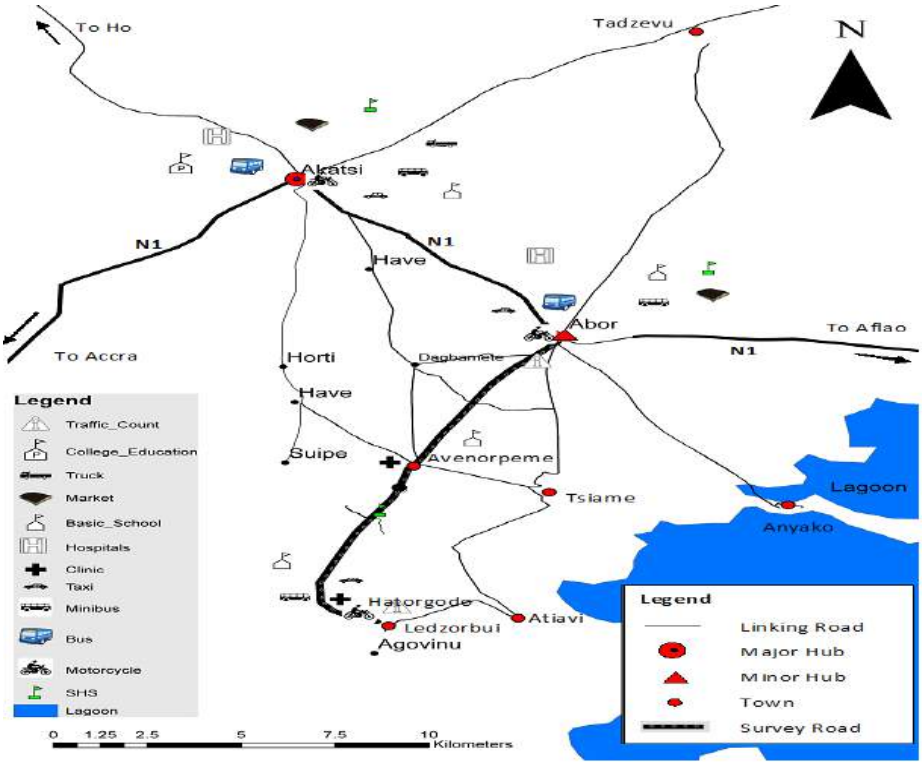


Figure 10 - Map of surveyed road showing transport hubs, services and features of interest

The main cash crop for the communities along the surveyed road and within the catchment area is sugar cane, which is cultivated on the low-lying plains on both sides of the roads and in the vicinity of the lagoon. In Hatorgodo there is a trader, located next to the road, who owns an engine operated sugar cane juice extractor. During the long harvest season the crusher is working throughout the day. The cane juice is the basis for an alcoholic drink which is both domestically consumed as well as sold at Akatsi and as far away as Denu and Aflao. Another source of cash is fishing, done in the creeks and on the lagoon. Staple crops, such as cassava, maize and vegetables are grown for own consumption, with surplus marketed in Akatsi and Atiavi.

3.2 Overview of transport services situation and issues

Transport from Hatorgodo to Abor is provided by motorcycle taxis and car taxis, but only the car taxis make the onward journey to Akatsi, which is nearly always the preferred destination. Taking a motorcycle taxi at Hatorgodo requires the passenger to look for onward travel from Abor to Akatsi, which is not normally difficult to find. The only reason why users are willing to make the journey with a transfer halfway and one that is costlier when adding the two separate fares is because of time. Car taxis at Hatorgodo only leave when they are full and this can easily take one or two hours, if one is unlucky. The taxis do not want to leave half-full, although there is a likelihood that they will find other passengers waiting along the way. However, this is not guaranteed, and if indeed the taxi will make the journey not filled to its full capacity, the driver will incur a financial loss. These long waiting (loading) periods in turn make some passengers – after waiting in vain for an hour or so for the taxi to fill up - decide to pay the extra premium by taking a motorcycle taxi to Abor. This of course makes the situation worse for the remaining car passengers. A similar phenomenon has been observed in other locations in Ghana, where the means of transport with limited capacity – and therefore likely to move sooner – is sometimes preferred over the larger capacity and cheaper form of transport, if the latter means long waiting hours.

Avenorpeme, approximately halfway between Hatorgodo and Abor, does not have a car-taxi station. On non-market days, passing car taxis are allowed to pick up passengers here, but on the market days in Akatsi the car taxis are not allowed to compete with the tro-tros (mini-buses) operating from Avenorpeme. The tro-tros only operate from Avenorpeme during the market days in Akatsi. The population in Avenorpeme heavily depends on motorcycle taxis for its transport needs, as passing car taxis were often full. At Dagbamate, which is about three kilometres off the surveyed road, there are about three to five mini-buses and two pickups (mainly for freight) which commute to Abor on daily basis and to Akatsi on market days.

Figure 11 (left) – Okada rider in front of Hatorgodo GPRTU waiting area

Figure 12 (right) – Hand-pulled cart on the surveyed road

Given the recent construction of the road between Hatorgodo and Abor, users and operators were asked to compare the present situation with the time before the road was paved and was not more than a gravel road. It may come as no surprise that both users and operators preferred the current state of the road. The journey was more comfortable and quicker for the users, while the operators pointed out the reduced strain the road puts on their vehicles, which resulted in lower maintenance costs (but not in lower fares for the passengers). Nevertheless, both groups indicated that there was only a small increase in the number of vehicles and/or the number of trips these vehicles made. This means that upgrading a gravel road to a bitumen road does not automatically increase transport demand to require more transport services. The transport demand is generally low due to the low population and limited economic activities in the catchment area. A rural road upgrading may, therefore, only become economically viable if there is significant untapped economic potential in the area.

Traffic counts were carried out during two days. One traffic count station was positioned just outside Abor on the surveyed road, so to be able to count the traffic from Hatorgodo, Avenorpeme and its feeder villages going to Abor, Akatsi and other destinations, while limiting the chance of counting intra-Abor traffic. The other traffic counting station was positioned at the T-junction just after the canoe crossing at Ledzorbui between Hatorgodo and Atiavi. This allowed us to understand the importance of Atiavi for people in Hatorgodo and vice versa, and to better understand the traffic from and to Agorvinu. One traffic count took place during a quiet, non-market day and the other took place during the Akatsi market day, which according to the interviewees is the most significant market drawing visitors from the whole catchment area. This clearly comes up in the traffic count data with the number of taxis, pick-ups and mini-buses all increasing significantly; in some cases more than four fold. Motorcycle movements also increased but the use of bicycles for personal travels mostly by men (90%) and children (10%), remained more or less the same. Due to the high availability of motorised transport on market days, there was a significant drop in the level of pedestrian movements (over 20%), as presented in Table2.

From the traffic count data it is clear that mini-buses are major people transporters, responsible for 160,000 passenger movements per year. This is followed by taxis, with nearly 100,000 passenger movements annually. However, both means of transport are dwarfed by the number of passengers transported by motorcycle taxis (and private motorcycles): with 800,000 passengers per annum, representing 73% of the total passenger movements. As a result of the sheer amount of motorcycles navigating this road, their part in annual freight movement is also considerable (44%); about one and half times as much as that for the mini-buses (31%) and nearly three and half times as much as that for taxis (13%). The rest of the annual freight movement (12%) is by the pickup taxis. Motor-tricycles are virtually absent on the surveyed road and its environments, perhaps because of the strong presence of the pickup taxis in Dagbamate village which provided freight transport services for the farming communities in the area.

As is usually the case, motorcycle taxis have the highest fare per kilometre, at 9 USDc per kilometre, with mini-buses and taxi respectively 5 and 6 USDc. Transporting freight is the cheapest if using a mini-bus, both for small and larger freights. Again, as can be expected, motorcycles are quite expensive, with people paying nearly twice the price for transporting 50 kg freight as compared to taxis. There is an interesting gender dimension here as well: mini-buses have a nearly 50/50 split in use, while taxis are a bit more used by men (58%) than women (37%). However, motorcycles are overwhelmingly used by men (78%) with women only making up 14% of the passengers. This may be because women usually travel with accompanied goods to transport, and therefore find it more preferable to use either a car taxi which has a boot for their goods or mini-bus with a carrier than to travel by motorcycle with no such facilities.

3.3 User perspectives

A total of 30 users of transport were interviewed. The gender distribution was as follows: 15 men and 15 women. The categories included farmers, traders, disabled, elderly, students, health users, maternal health care and those using transport for formal employment. In a number of cases there was an overlap between the categories, e.g. farmers stating that they were also doing some trading, health users stating that they were farmers, etc. The age distribution ranged from 17 to 76 years. Nearly all of the users in Hatorgodo indicated that they used car taxis and motorcycle taxis. In Avenorpeme, tro-tros (mostly mini-buses) were added to the mix, but only on market days. In Dagbamate, mini-buses and pickup taxis were the main modes of transport for the rural dwellers.

Table 5: Summary of user satisfaction responses (disaggregated for gender)

Means of transport	Minibus		Taxi (saloon/estate)		Motorcycle	
Gender of respondent	M	F	M	F	M	F
Sample size (N)	6	4	11	10	13	12
Passenger fares	★★★☆☆	★★☆☆☆	★★★☆☆	★★★☆☆	★★☆☆☆	★★☆☆☆
Journey times	★★☆☆☆	★★★☆☆	★★★☆☆	★★★★☆	★★★☆☆	★★★★☆
Service frequency	★★☆☆☆	★★★☆☆	★★★★☆	★★★☆☆	★★★☆☆	★★★☆☆
Service predictability	★★☆☆☆	★★☆☆☆	★★★☆☆	★★☆☆☆	★★★☆☆	★★★☆☆
Passenger capacity	★★☆☆☆	★★☆☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆
Small freight availability	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆	★★★☆☆	★★★★☆
Small freight charges	★★★☆☆	★★☆☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆
Small freight handling	★★★★☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★★☆
Medium freight availability	★★★☆☆	★★☆☆☆	★★★★☆	★★★★☆	★★★☆☆	★★★☆☆
Medium freight charges	★★★★☆	★★★☆☆	★★★☆☆	★★☆☆☆	★★★☆☆	★★★☆☆
Medium freight handling	★★★★☆	★★☆☆☆	★★★★☆	★★★★☆	★★★☆☆	★★★★☆
Courier services	★★★☆☆	★★☆☆☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Road safety	★★☆☆☆	★★☆☆☆	★★★★☆	★★★★☆	★★☆☆☆	★★★☆☆
Security	★★☆☆☆	★★☆☆☆	★★★★☆	★★★★☆	★★★☆☆	★★★★☆

Comfort: space	★★☆☆☆	★★☆☆☆	★★☆☆☆	★★☆☆☆	-	★★★☆☆
Comfort: seat type/conditions	★★☆☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★★☆
Comfort: surrounding baggage	★★☆☆☆	★★☆☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★★☆
Comfort: environment	★★☆☆☆	★★☆☆☆	★★★☆☆	★★★☆☆	★★☆☆☆	★★★☆☆
Access for vulnerable people	★★★★☆	★★★☆☆	★★★★☆	★★★★☆	★★☆☆☆	★★☆☆☆
Overall un-weighted	**2.7**	**2.3**	**3.4**	**3.2**	**2.9**	**3.1**
Overall weighted						

Satisfaction for all transport types		
Gender of respondent	**M**	**F**
Facilities at roadside stops	**2**	**2**
Feeding intermodal connectivity	**3**	**3**
Linking intermodal connectivity	**3**	**3**
Overall un-weighted	**2.5**	**2.5**
Overall weighted		

The higher the score the better.

The higher the score the better. ★☆☆☆☆*=Very Dissatisfied,* ★★☆☆☆*=Dissatisfied,* ★★★☆☆*=Medium Satisfied,* ★★★★☆*=Satisfied,* ★★★★★*=Very Satisfied*

In Hatorgodo and Avenorpeme there are a small group of motorcycle taxis present offering their services. In Abor and Akatsi there are significant numbers of motorcycle taxis, about 60 for Abor and over 150 for Akatsi. Most motorcycle taxi users in Avenorpeme call Abor 'on-demand' motorcycle taxi riders if their services are needed. Users indicated that in general they liked the service offered by the motorcycle taxi, as it leaves instantly. The journey from Hatorgodo to Abor, a distance of 15.4 km, costs five (5) cedis (USD 1.25) for one person, but four(4) cedis (USD 1.00) per person if an additional person is taken 'on board'. This is higher than a car taxi fare of three (3) cedis (USD 0.75) to Abor, but people are willing to pay the premium for not having to wait. An additional advantage was having the option of being picked up and dropped off at a specific location, which is particularly appreciated by people travelling with freights.

Mobile phone signal is good along the road, which makes it possible to arrange for the motorcycle to arrive at one's doorstep. Convenience levels for motorcycle taxis, however, dropped during the rainy season, which is when the car taxis make up for any lost income. The motorcycles, seen as somewhat more accident-prone than the car taxis, were still considered safe by its users, or at least on par with the mini-buses. The paved road, although increasing travelling speed because of the good riding surface, is contributing to the fairly good safety record, partly because it is not heavily used by traffic in general and also because the terrain is relatively flat with few curves.

Car taxis were indicated as the preferred means of transport by many users, but long waiting times at Hatorgodo, made many potential passengers opt for the motorcycle taxis. This supports the claim that in transportation, journey time is of essence. Travellers are prepared to pay more for transport modes that will minimise their total travel time. Nonetheless, at Avenorpeme, users often did not have an option other than use the motorcycle, as passing car taxis were often full. The tro-tros leaving at market days were generally well used and appreciated, partly because they tend to fill up quickly because of the high demand during market days.

The above is further confirmed by the data in Table 3. The number of travel opportunities on a normal day if one wants to go by motorcycle taxi is 12, so one per hour on average. This is equal to the combined total of the mini-bus (7x) and taxi (5x). However, from the average speed it is clear that the journey with a car taxi is the fasted, underscoring the observation that one may have to wait a long time for the taxi to fill up, but once it is full it goes without much stopping on the way. Second fastest is the motorcycle taxi, where the somewhat lower speed as compared to the taxi is likely not an indication of stopping to pick up more passengers (which it will not do) but of the

generally slower speed of a motorcycle. Normally, on main paved roads and at low to medium traffic levels, cars travel faster than motorcycles because of their high aerodynamic stability. Motorcycles become less stable when loaded with passengers and/or goods.

If we look at user satisfaction relating to the various means of transport, disaggregated for gender, it can be observed that in general people are medium to being satisfied with the various aspects of the services offered. The fact that transport takes place on a paved road has, without doubt, a positive effect on the user experience, responsible for on average just below one extra full star. It is interesting to notice that mini-buses score on average the lowest, with two stars in a number of categories, awarded by both men and women. Taxis are appreciated the most, with motorcycles somewhere in between. It is also interesting to notice that women are, on average, more satisfied with the services provided by motorcycle taxis than men, although the latter group is the main user. Some women respondents expressed their general satisfaction with the door-to-door services provided by motorcycle taxis. A final point worth highlighting is the dissatisfaction (two stars) regarding road safety for the mini-buses, which is below that of the motorcycle taxis (two to three stars) and taxis (four stars). Table 3 showed that motorcycles are involved in more accidents per 100,000 vehicle trips (163) as compared to mini-buses (98). It seems that people find an accident with a mini-bus, which is likely to involve a dozen or so passengers, less acceptable than a motorcycle accident, which is likely to involve just one passenger.

Finally, users interviewed in Hatorgodo indicated that they crossed the creek to visit the Atiavi market. If few items were to be marketed or bought, this market could be reached by foot in under an hour, head-loading the items. In addition, the Senior High School attended by pupils from Hatorgodo (on average between 20 and 30 in any given year) is located in Atiavi, although construction of a new Senior High has been completed near Avenorpeme. Moreover, a number of farmers from Hatorgodo had land on the other side of the creek. We also interviewed a primary/Junior High School teacher near Agorvinu, who commuted daily from Hatorgodo by bicycle. All the users put a bridge, preferably passable by car, or at least by motorcycle taxi, as their top wished-for road infrastructure intervention. Some even indicated that they would have preferred a bridge connecting them to Atiavi, rather than the road connecting them to Abor, knowing that Atiavi already has a paved road to Abor.

3.4 Operator perspectives

In total, ten (10) operators were interviewed. All of these were males, as no female operators were active. Three (3) operators of motorcycle taxis were interviewed. According to the interviewees some of the Okada riders hire their motorcycle from a business person, paying a daily fee of GHS20.00 (USD 5.00) while a few of the Okada operators own their motorcycles and keep the full profit each day. The respondents indicated that the number of motorcycle taxis operating along the surveyed road has gradually increased over the years, but demand remains somewhat low.

Three (3) operators of car taxis were interviewed. The car taxis were all based in Hatorgodo, which has its own little car station, with a GPRTU representative and a roofed waiting area. Some of the taxis drivers are resident in Hatorgodo while others come from Abor.

Table 6: Summary of operator perspectives

Means of transport	Minibus	Taxi (saloon/estate)	Pickup/freight	Motorcycle
Sample size (N)	*2*	*3*	*2*	*3*
Road condition for operations	★★★★☆	★★★★☆	★★★☆☆	★★★★☆
Adequacy of working capital	★★★★☆	★★☆☆☆	★★☆☆☆	★★☆☆☆
Facilities for formal credit	★★★★☆	★☆☆☆☆	★★☆☆☆	★★☆☆☆

Facilities for informal credit	★★★★☆	★★☆☆☆	★★★☆☆	★★☆☆☆
Adequacy of technical facilities	★★★★★	★★★★☆	★★★☆☆	★★★☆☆
Regulatory disincentives	★★★★☆	★★★★☆	★★★☆☆	★★★☆☆
Regulatory incentives	★★★☆☆	★☆☆☆☆	★★☆☆☆	★★☆☆☆
Active associations	★★★☆☆	★★★★☆	★★★☆☆	★☆☆☆☆
Security risks	★★★★★	★★★★★	★★★★☆	★★★★☆
Un-weighted average [2]	**4.0**	**3.0**	**2.8**	**2.5**
Weighted average [3]				
The higher the score the better. ★☆☆☆☆*=Very Dissatisfied,* ★★☆☆☆*=Dissatisfied,* ★★★☆☆*=Medium Satisfied,* ★★★★☆*=Satisfied,* ★★★★★*=Very Satisfied*				

Two (2) operators of tro-tros were interviewed. Tro-tros only run between Avenorpeme and Akatsi (via Abor) and do so only on the Akatsi market day running six trips (three in the morning and three in the afternoon). The tro-tro owners are based in Avenorpeme, so an early service to Akatsi market is guaranteed. The operators indicated that running a tro-tro service on non-market days is just not financially viable. This is due to the low transport demand and stiff competition from the motorcycle taxis. Whereas, it requires only one passenger to make the motorcycle taxi full for it to move, the mini-bus has to wait for 14 passengers before it becomes full. This takes much time on a non-market day when passenger supply is quite low. The mini-bus operators, therefore, do rent out their tro-tro for other transport services such as chartered trips for funerals outside the locality, for extra income.

Table 6, showing the operator perspectives, presents somewhat mixed results, with one star (very dissatisfied) to five stars (very satisfied). It is surprising that the road condition does not receive five stars by all transport operators, as the road is in an excellent condition. The particularly low score for the pick-up (medium) may be influenced by the fact that they often go off-road to pick up freights and respondents may have this in mind as well, despite the request to comment on the road surveyed. Another interesting outcome is the difference between mini-buses on the one side, and car taxis, pick-ups and motorcycle taxis on the other, regarding access to formal and informal credit and working capital. This is available for mini-buses but difficult to obtain for the other forms of transport. Most tro-tro operators are members of a credit union, making it easy to obtain credit facilities for their operations. The motorcycle taxi operators hardly belong to any active associations. The unionised operators were full of praise for their association which normally provides welfare support in times of loss of job or bereavement. Finally, there is universal agreement about the security risks, which is non-existent on the surveyed road. This is contrary to, for instance the Upper West region where they had a problem with armed robbery.

Whereas, the Okada operators were emphatic about the financial rewards of operating their motorcycle taxis (thereby making it more appealing to the youth), the same could not be said about some of the car taxi and tro-tro operators. The respondents indicated that it was profitable running transport on the market days when demand from passengers and goods was high, and that on the normal days, without loading full, it was difficult to break-even. In this regard, the transport unions ensured that buses or taxis loaded full before leaving the stations. The unionised operators were, among others, very satisfied with the principle of first come first serve, practiced by their unions at the various terminals. This brings about order and sanity in their daily operations.

3.5 Regulator perspectives

To obtain the perspective of the regulators a GPRTU officer was interviewed at Hatorgodo and a police officer at Abor. The GPRTU officer was a retired teacher and now spends his days sitting at the tiny Hatorgodo station. Part of his task was to make sure that no conflicts developed between the motorcycle taxi operators and the car taxi operators, whenever passengers decided to abandon the

latter in favour of the first. According to the GPRTU officer, the car taxis met most of their regulations and paid their transport related taxes. For the motorcycle taxis this was not the case, since by law paid-passenger transport by two and three wheel vehicles is prohibited. Therefore, there are no regulations or taxes to be paid. The police officer was from the Motor Traffic and Transport Department (MTTD), and mentioned that it is the responsibility of their department to ensure that all vehicles on the road are roadworthy, properly licensed and insured. Motor operators running transport services are also expected to abide by transport regulations relating to taxes and safety. Meanwhile, they are not enforcing the operation of okadas in the rural communities because it was perceived to be the only available job for the rural youth who dominated the okada operations. It would be confrontational to stop the practice but the police will arrest the reckless riders.

Table 7, which gathers regulator perspectives, more or less confirms the above: technical, fiscal and insurance compliance is medium to being satisfying across the range of transport modes (except for motorcycles which do not have requirements for this). However, operational compliance is remarkably low for the midi and mini-bus and for the light truck. Safety compliance is even worst: unsatisfactory for all modes of transport, and for the mini-bus it is rated as very unsatisfactory. The police officer, for example, alluded to the fact that apart from speeding which was prevalent on the tarred road, the mini-buses were noted for overloading, particularly on the Akatsi market days. Sometimes a recalcitrant driver was arrested and brought before the law. As expected, the safety of the road is deemed to be satisfactory, for this is a good quality road with relatively low numbers of traffic movements, which together make driving not as unsafe as perhaps can be expected by vehicles with poor safety compliance.

Table 7: Summary of regulator perspectives

Means of transport	Midi-bus	Minibus	Taxi (saloon/estate)	Pickup/freight	Light truck	Motorcycle
Vehicle technical compliance	★★★☆☆	★★★☆☆	★★★☆☆	★★★★☆	★★★☆☆	★★★☆☆
Vehicle fiscal compliance	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	n.a
Insurance compliance	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆	★★★☆☆	n.a
Operational compliance	★★☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★☆☆☆	★★★☆☆
Safety compliance	★★☆☆☆	★☆☆☆☆	★★☆☆☆	★★☆☆☆	★★☆☆☆	★★☆☆☆
Environmental compliance	★★★★☆	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★☆☆
Regulatory planning framework	★★★☆☆	★★★☆☆	★★★☆☆	★★☆☆☆		★★☆☆☆
Safety of the road	★★★★☆	★★★★☆	★★★★☆	★★★★☆		★★★☆☆
Un-weighted average	**3.1**	**3.0**	**3.3**	**3.4**	**3.0**	**2.7**
Number of people interviewed	3					

The higher the score the better. ★☆☆☆☆*=Very Dissatisfied,* ★★☆☆☆*=Dissatisfied,* ★★★☆☆*=Medium Satisfied,* ★★★★☆*=Satisfied,* ★★★★★*=Very Satisfied*

3.6 Development perspectives

One of the persons interviewed for a development perspective was the head teacher of the primary and junior high school near Agorvinu. This allowed the team to better understand the difficulties and problems experienced by some of the feeder communities to the surveyed road. Agorvinu is predominately relying on Atiavi, since this place can be reached without crossing by canoe, but some contact between Agorvinu and Hatorgodo takes places since, as indicated, farmers from Hatorgodo have land near Agorvinu and some who live in Hatorgodo work in Agorvinu and vice versa. Agorvinu, and the villages further down the path, could only be reached by motorcycle taxi, bicycle or on foot.

Figure 13 (left) – Visually impaired transport user

Figure 14 (right) – Health centre at Hatorgodo

The wooden bridge between Agorvinu and Atiavi cannot be crossed by cars, as it is not wide enough. While this is not a problem in most cases, the head teacher gave two examples where it did cause problems: one was whenever the schools needed bulkier supplies (e.g. new benches and cupboards) and another example was related to times when emergency health transport was needed. It can be questioned if widening and reinforcing the bridge is the only answer to overcome these issues. The terrain is generally low lying and crossing of rivers to the hinterlands is a major challenge for the rural dwellers. Indeed, a concrete or steel bridge would be needed to effectively address the inaccessibility challenge. There would also be the need to widen some sections of the existing tracks to allow the movements of four-wheelers to the communities, particularly for emergency medical services and supplies, unless emergency transport can be provided by using two or three-wheeled modes of transport.

Another development interview was conducted with a long-serving male health worker in the Hatorgodo health post. Both the motorcycle taxi and the car taxi have made positive contributions to development issues, according to the interviewee. However, for agricultural development the health worker indicated that the few pick-up trucks operating in Hatorgodo and its surroundings were really making a difference. In addition, there are the hand-pulled carts (locally called 'trucks') which enable freights to be transported from the farm to the roadside. The paved road obviously was appreciated, but again, a bridge at the water crossing between Hatorgodo and Atiavi, would have been equally, if not more, appreciated.

Table 8: Summary of development perspectives

Means of transport	Mini bus	Taxi (saloon/estate)	Pickup/freight	Motorcycle
Agricultural facilitation	★★★☆☆	★★★★☆	★★★★☆	★★★☆☆
Enterprise/trade facilitation	★★★☆☆	★★★★☆	★★★★★	★★★★☆
Women's empowerment	★★★☆☆	★★★★☆	★★★★☆	★★★★☆
Minority group empowerment	n.a	n.a	n.a	n.a
Disabled people's empowerment		★★★★☆	★★★☆☆	★★★☆☆
Young people's empowerment		★★★☆☆	★★★★☆	★★★★★
Maternal health needs	★★★★☆	★★★★★	★★★☆☆	★★★★☆
Medical service transport	★★★★★	★★★★☆	★★★☆☆	★★★★☆
Education-related transport	★★★☆☆	★★★★☆	★★★★★	★★★★☆
Mobile phone and ICT integration	★★★★☆	★★★★☆	★★★★★	★★★★☆
Un-weighted average	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Cultural impact	★★★★★	★★★★☆	★★★★☆	★★★★☆

Environment impact	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆
HIV/Aids impact	★★☆☆☆	★★★☆☆	★★★☆☆	★★★☆☆
Un-weighted average	**3.5**	**3.8**	**3.8**	**3.8**
Weighted average				
Integration with feeder transport		**4**		
Integration with external transport		**4**		
Road maintenance adequacy		**2**		
Final weighted average				
Number of interviews (people answer questions relevant to their experience)		4		
The higher the score the better, from the development perspective. For example, the contribution of each mode of transport to the achievement of development goals in that area of concern by the people interviewed as: ★☆☆☆☆=Very Poor, ★★☆☆☆=Poor, ★★★☆☆=Medium, ★★★★☆=Good, ★★★★★=Very Good				

Table 8 summarises the views of four development-oriented people interviewed. The car taxi, pickup and motorcycle all score an average of 3.8, which is very close to satisfied, while mini-buses score a 3.5, despite including a 5 star score for its cultural impact. This is likely to refer to the opportunity to charter a mini-bus to attend funerals, which are important social events. The motorcycle taxis are appreciated for providing jobs for the teeming youth, while car taxis are particularly appreciated for maternal health needs. The respondents mentioned that the car taxis can be called upon in case of emergency (with Hatorgodo having its resident taxi drivers) by mobile phone as well as the fact that the road is passable throughout the year. The medium score on the impact regarding HIV/Aids for all modes of transport indicates that the respondents saw some very positive aspects (dissemination of knowledge and making areas more accessible to health workers) as well as some negative impacts: people (both passengers and operators) moving around more easily, which may increase the chance of HIV/Aids spreading more easily.

3.7 Conclusions

An important reason for selecting the Hatorgodo–Abor road was due to it being recently paved. This made it possible to gain some understanding of the socio-economic impact of paving feeder roads and how it affects and is experienced by both users and operators.

At the moment, it looks like the public transport needs of the people along the surveyed road are met. Motorcycle taxis do play an important role in rural transport services in the Akatsi South District. There are no large buses and the motor-tricycle is virtually absent from the surveyed area. Pickup taxis provide the possibility of moving larger quantities of agricultural produce around. Arguably, if the ban on motorcycle taxi would be strictly executed, transport users will become solely depending on car taxis and the occasional tro-tro, resulting in more trips and possibly reduced waiting times, but only for the busier times of the day. Moreover, rural communities off the main road may no longer be served by motorised transport. If the main reason behind banning two and three wheeled taxi services is safety, it would be difficult to make that case for the surveyed road, or for that matter, for most rural roads in Ghana. Yes, road traffic crashes (accidents) seem to happen quite often with motorcycles, but there are so many motorcycles in the first place and so many kilometres are made each day, that the accident per kilometre rate may not even be that high. Moreover, in most cases, the injuries are limited to bruises and scratches. This is because of the low speeds of motorcycle taxis on rural roads, with traffic crashes being painful, but seldom deadly. With low volumes of other traffic, the motorcycle taxis are hardly a nuisance to other road users – something which they can be in the more urban areas, where a ban may indeed make more sense. Allowing motorcycles taxis and passenger and cargo tricycles to operate – something which they already do anyway across Ghana - means that it becomes possible to regulate these public transport

providers and work with them, rather than against them, to improve their road use and safety record. Also, if two and three-wheeled taxis will again become a legal form of public transport, concerted efforts to change the attitude of operators of cars, tro-tros, buses and trucks towards the motorcycle riders can be taken. It is likely that for a good proportion of the traffic crashes involving Okadas, the operator of a four or more wheeled vehicle is as much to blame as the Okada rider. The tro-tro operations are generally not financially viable on non-market days because of the low transport demand and stiff competition from the motorcycle taxis in the area. The motorcycle taxis are appreciated very much for providing jobs for the teeming rural youth, while the car taxis are appreciated for the transport services they provide to support maternal health care in the rural communities.

Every person interviewed liked the paved road and preferred it to the old gravel road. However, this can only be a valid justification if it is economically viable for the feeder road to be paved. If this is not the case, strategic choices have to be made in what to do with the limited funds available for improving rural transport. These choices should not be solely economically guided since access to health and education are basic human rights and a government should do all in its power to provide these to its citizens. A multi-criteria approach is needed in order to make the right choices. Nevertheless, where needs are equal, a strong economic case for one particular location rather than another, carries significant weight. Current economic activities, economic potential for the future and the size of the population benefiting from the intervention have to be key factors in this decision process.

From the perspective of the above factors the case for paving the Hatorgodo–Abor road was not obvious to the team. While both Hatorgodo and Avenorpeme are fairly large villages, there are only few communities in between. Moreover, the data collected does not suggest a significant increase in economic activity (and travel movements) since the paving of the road was completed. At the very least, it makes us question if indeed the two other road paving projects currently in the pipeline - which will end up running more or less parallel to the Hatorgodo– Abor – Akatsi road, but just a few kilometres to the West - represent the best use of limited resources? For sure, during our travels through Ghana we have seen other places such as the Wechiau - Wa road, where an equal if not better case for upgrading a gravel road to a paved road can be made.

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