

**IMPACT OF ROAD NETWORKS ON THE DEVELOPMENT OF THE
MUNICIPALITY OF COPARGO IN BENIN**

DOVONOU MEHINTO Flore^{1,2}, ANAGONOU Jacob³ and HOUINSOU Tognidè Auguste^{1,4}

¹Department of Geography and Spatial Planning (DGAT), University of Abomey-Calavi (UAC)

²Pierre PAGNEY Laboratory, Climate, Water, Ecosystem and Development (LACEEDE)

³Multidisciplinary Doctoral School, Space, Culture and Development,

⁴Laboratory of Spatial Planning of Environment and Sustainable Development (LATEDD)/University of Abomey-Calavi (UAC)

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ABSTRACT

The constant growth of the population makes the commitment of means of transportation more than necessary.

The objective of this research is to analyze the impact of road networks on the development of the Copargo municipality.

To carry out this research, the methodology adopted consisted firstly in designing survey forms, then in carrying out documentary research, and in conducting field surveys with 176 people using questionnaires and interview guides. The collected data were processed using software such as: Excel spreadsheet and ArcView 3.2 and the results were finally analyzed.

The results of the research showed that the trails are the most used by the populations to access socio-economic services. They are more numerous (95%) followed by paved roads (5%) represented by RNIE3. It should be noted that the existing infrastructure is not only insufficient but also suffers from poor and regular maintenance. 75% of this infrastructure is in poor condition. 55% of the users surveyed are located near the roads to carry out socio-economic activities. So, to ensure the socio-economic development of the commune, it is necessary to subdivide all the districts, provide them with quality roads and ensure their regular maintenance.

Keywords: Copargo, Benin, impacts, road networks, development.

1. INTRODUCTION

Over the past two decades, the reduction of barriers to trade and investment, combined with technological advances in transport and communications, has fostered the globalization of production processes. Businesses are increasingly benefiting from the cost reductions and other benefits of manufacturing or purchasing inputs where they can be produced more efficiently.

Globally, roads, bridges, railways, ports and airports offer economic and social benefits by connecting businesses to markets wherever they are. Indeed, they allow individuals to access water, fuel, schools, medical services, jobs and parents. Without reliable and cost-competitive transport of goods using robust infrastructure, nations are unlikely to exchange their goods under better conditions (Michel and Rémy, 2007, p 98). Similarly, if farmers cannot transport their produce from their rural areas isolated from markets, they will be unable to move out of subsistence farming. If they also can't transport their children to school and the medical center, the next generation won't get any better.

Transport infrastructure remains one of the pillars of development with a view to accelerating growth and reducing poverty (Houinsou A. , 2013, p. 128). Thus, the importance of the road network in the development process of poor countries has long been recognized. These infrastructures are both a finished product offering services directly to consumers and an intermediate product participating in the productivity of the production sectors. A network of low-cost quality infrastructure for users is a decisive factor in improving communication between producers and consumers, between exporters and importers, and is an essential determinant of price and non-price competitiveness on international markets (Asshence B. , 2012, p. 25). Therefore, the installation of the road network must be in line with international standards, the realities of the environment and the needs of the populations. However, the Commune of Copargo, like the other municipalities in Benin, is facing a deficit and poor management of transport infrastructure. This is a limiting factor to the opening of the Commune to the outside world. Intervention by both local and central authorities would be necessary in the regulation, installation and management of transport infrastructure. Hence the need to analyse the impact of road networks on the development of the Municipality of Copargo.

The research environment is located between 9° 44' 06" and 10° 03' 02" north latitude and between 1° 21' 19" and 1° 45' 46" east longitude with an area of 876 km² including 700 km² of cultivable agricultural soils (Figure 1).

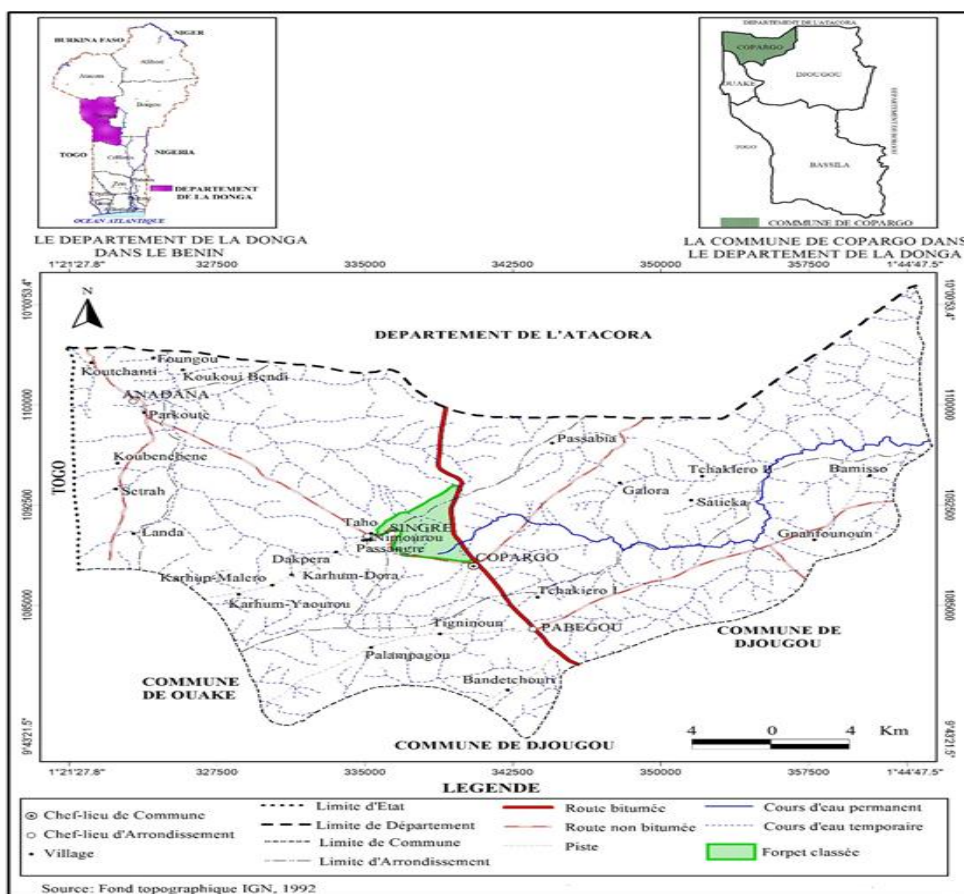


Figure 1: Geographic Location of the Research Community

2. DATA AND METHODS

The data used in this work concern socio-anthropological investigations, agricultural statistics on the Municipality of Copargo from 1995 to 2013 obtained at the INSAE and the SCDA of Copargo from 2004 to 2014, data relating to transport infrastructure in the Municipality of Copargo obtained from the Ministry of Public Works and Transport.

2.1 Sampling

The municipality of Copargo has been the subject of research in order to better understand the impact of road infrastructure on the development of the municipality. The choice is made on farmers , drivers, traders and motorcycle taxi drivers because of their use of the tracks and their participation in the production and transport of agricultural products. The basis of the sample is 165 representatives 5 percent of the total population.

$$E = 5 \times P / 100$$

Table I shows the distribution of the individuals in the sample according to their group of belonging.

Table I: Distribution of individuals in the sample

Actors	Grouped persons (field survey)		
	Selection criteria	Number	Percentage
		Interrogated	(%)
Farmers	having sown at least 5 ha	98	59,39
Motorcycle Taxi Drivers	with at least 3 years of seniority	16	9,70
Merchant	with at least 2 years of activity	43	26,06
Carriers	at least 2 years of seniority and transported at least 3 tonnes	8	4,84
Total		165	100,00

Source: Copargo City Hall and Field Surveys, May 2021

Apart from these actors, the survey took into account the four heads of districts, the planner of the Commune, the head of economic and social affairs of the Town Hall and five SCDA agents. A total of 176 people were surveyed.

The collected data was manually scanned. Thus, the statistical processing was done using Excel 2010 software. This software allowed the realization of tables, figures and graphs.

3 RESULTS AND DISCUSSION

3.1 Distribution of the road network by borough

Figure 2 illustrates the distribution of the road network by district in the municipality of Copargo.

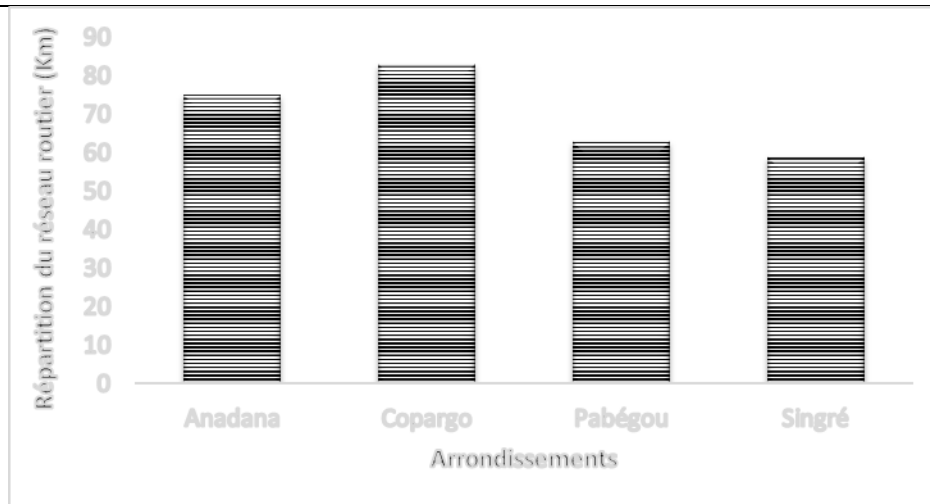


Figure 2: Distribution of the road network by borough

Source: Survey results February 2021

From the observation of Figure 2, it appears that the district of Copargo has more road network (82.9) followed respectively by Anadana (75.1), Pabégou (63), Singré (59). Thus, the inadequacy of the road network is noted in all the districts of the municipality outside the urban districts where an effort is made. They vary from one borough to another and are poorly distributed. According to 80% of those surveyed, road construction takes into account political affiliations instead of common interests.

3.2 Road network and spatial structuring

The road network contributes to the structuring of space in the municipality of Copargo. It should be noted that the acquisition of plots in the Commune depends on the implementation of transport infrastructure. Roadsides are privileged places for the installation of houses, buildings, markets, bus stations, shops, training centers, electrical installations, in short socio-community services. This is what motivates investors to buy plots that they resell at an expensive price as soon as the area is generally serviced or developed.

In addition, in the Commune, the land returns to communities that would have inherited it from the grandparents. The heirs after the distribution of these plots sell most of it to other people, friends or foreigners. Buyers return as many times as possible as soon as the market is launched. Expensive plots are often those that are close to roads or in the process of being serviced.

In general, the cost of plots varies from one municipality to another and according to the realities depending on whether they are urban, peri-urban or rural areas. Similarly, the cost also depends on socio-economic realities. In other words, land management is a guarantee of a good policy for the development of the road network.

3.3 Practicability of roads and tracks

Table II presents the state of practicability of the roads in the Commune.

Table II : General road practicability status

Arrondissements	Length of roads and tracks(in km)/ borough	Condition of Roads and Tracks	
		Bad	Passable
Anadana	75,1	70,1	5
Copargo	82,9	64,04	18,86
Pabégou	63	53,45	9,55
Singré	59	46,12	12,88
TOTAL	280	233,61	46,29

Source: CNSR data and fieldwork, October-December 2021

It appears from the analysis of Table II that almost all the slopes of the Municipality of Copargo are in poor condition. According to 85% of the respondents, the commune remains entirely landlocked due to the very defective condition of the narrow, stony and crevice tracks.

Thus, in the municipality of Copargo, outside the RNIE 2 (passable in all seasons), the communal roads (RC), are not very passable in the rainy season; some are abandoned by users, because they are slippery and muddy. As for the tracks, the majority are invaded by runoff and sand. It should be noted that the degradation of these roads is also due to rain erosion. It should be noted that there are districts that do not even have tracks but alleys that connect villages, markets and boroughs with each other (plate 1).



1.1



1.2

Plate 1 : State of the roads in the municipality of Copargo
Shooting: Anagonou, May 2021

The analysis of plate 1 shows that almost all the slopes of the Municipality of Copargo are in poor condition. As a result, the transport of agricultural and other products to the places of

exchange and consumption during the rainy season becomes not only painful but also very expensive because the journey is made by motorcycle taxis.

3.4 Related Transportation Infrastructure

According to surveys, these are mainly bus stations, car parks and markets. The municipality has a car park where drivers park their vehicles on copargo market day run by a local committee and a bus station. It is a train station that welcomes nearly 10 to 15 vehicles per day of Copargo market that comes alive every 5 days and 5 to 10 vehicles on ordinary days. It is managed by UNACOB and the Town Hall. Motorcycle taxis also have a motorcycle parking which is their point of aggregation. This motorcycle parking is managed by a committee that exists within them and the town hall.

It is noticeable the lack of seats on this station especially on market day; this causes some drivers to load out of the station. It should also be noted that activities such as the sale of bananas, oranges, sugar cane, yams of food of all kinds, fuel exist on this station and motorcycle taxi drivers in large numbers. This further shows the importance of the road network. Plate 2 shows the related transport infrastructure.



Plate 2 : Motorcycle and vehicle parking in the municipality of Copargo
Shooting: Anagonou, May 2021

Plate 2 shows a motorcycle parking (photo2.1) located next to the market and the taxi parking (photo 2.2), available in the Commune. These car parks are important sources of income for the population. However, it should be noted that there is a lack of market infrastructure, markets and bus stations.

3.5 Economic importance of the road network

To facilitate the interconnection between the different districts of the municipality, the town hall proceeds to the opening of the tracks in all the districts of the Commune. Also, the development partners and sometimes the State jointly come to the aid of the town hall for the construction of strategic roads or roads of capital importance. This is the example of the Anandana-Copargo road. It should be noted that the service roads are of right-of-way less than or equal to 20 m. These are tertiary roads with narrow pavements and measure about 06 to 07 meters. They are usually built of earth or laterite by the town hall. These roads are of economic interest and serve the districts and villages they pass through giving rise to new income-generating activities such as the sale of sugar cane, mango, fresh corn and yam by the good ladies. The latter are sold by season. Infrastructures such as electricity poles, school equipment, markets, car garages,

machines, motorcycles, run along these roads, give economic vitality and therefore participate in the development of the municipality (plate 3). These results are in line with those obtained by (Hounisou A., 2013, p189) which showed that roads improve communication and lower transaction costs, and consequently increase job opportunities for women. Transportation improves time management for women and reduces their difficulties with transportation service.



Plate 3 : Economic importance of roads in the municipality of Copargo
Shooting: Anagonou, May 2021

The observation of plate 3 shows the presence of the Copargo market on the edge of the asphalt road (photo 3.1) and the development of economic activities (sugar cane market) along the Copargo – Pabegou section (photo 3.2).

3.6 Road maintenance

To facilitate the free movement of people and goods, the town hall ensures the maintenance of the tracks by reprofiling with its own machines. This operation consists of restoring a profile to the track by filling potholes, and all kinds of pits that disrupt traffic. The gullies are covered to facilitate the drainage of rainwater (plate 4).



Plate 4: Road maintenance in the Commune
Shooting: Anagonou, May 2021

It appears from the observation of plate 4 that the town hall ensures the maintenance of the tracks by proceeding by reprofiling. Also, the roadsides are weeded by the maintenance agents of the town hall in order to facilitate the visibility of drivers on the lanes thus reducing the risk of accident. The surrounding populations also participate in the maintenance of the roads by blocking the way with a wire; they fill puddles in the rainy season and potholes in the dry season for money. What is lamentable in this practice is that the population uses the material means that are within their reach, it is often sands containing garbage, bottle shards, pieces of wood, sachets. It should be noted that none of the roads in the study area have mileage markers or traffic signs. The head of the municipality's technical services raised the problem of the executive's refusal to transfer powers. This lack of resources makes the Commune a landlocked locality, poor in transport infrastructure. The nature of the soils and the fluxes are the main factors of degradation of the routes.

These include difficulties faced by hauliers due to a lack of an adequate road network.

3.7 Road network and economic activities

The municipality of Copargo is one of the Municipalities producing food products such as: Yam, maize, beans, groundnuts and yam cosette. However, its food products come from the countryside which does not have a road network in sufficient quantity and quality to ensure trade between producers and traders or consumers. The inadequacy of the roads and their degraded conditions make the transport and sale of products expensive. It should be noted that access to some districts of the commune is difficult, such as Anandana and Singré, where the roads are degraded. It should be noted that the latter are a major asset for the Communes of Djougou and Natitingou as well as neighbouring countries such as Togo and Burkina Faso in terms of trade and tourism.

3. 8 Access to social services

Transport facilitates the population's access to social services: these are administrative services (the town hall), care (hospitals, maternity wards), education (nursery, primary, secondary schools, and training centres), security (gendarmerie), leisure (playgrounds, places of worship, museums and other public places) and markets, water points, etc. This is the case of the district of Copargo, which benefits from these social services (plate 5).



Plate 5: Socio-community infrastructure in the municipality of Copargo
Shooting: Anagonou, May 2021

Plate 5 presents the socio-community infrastructures in the commune such as classes at the primary school of Pabégou (photo 5.1), the market of Anandana (photo 5.2) and the maternity of Copargo (photo 5.3). Thus, the road network facilitates the population's access to social services.

3.9 Transport flow

The road network is essential for the development of the commercial flow in the Commune. In the present case, it is the distribution channel that connects the various markets of the Municipality. These are places where people meet periodically to exchange their products for money. Road infrastructure is then essential for the transport of people and goods to these markets. Thus, each district of a market is managed by the municipal authorities.

In the markets of Anandana, Copargo, the products of the sale are almost the same items such as food products, manufactured products, fishery products to name but a few. Also, the population of the surrounding Communes frequents the markets of Copargo, as well as neighboring countries such as Togo and Burkina Faso.

In these markets, agricultural, fisheries and manufactured products are exchanged.

3.10 Road network: factors and constraints related to the development of the municipality

The routes of the networks play a decisive role for the economic development of the Municipality in all sectors of activity in the primary, secondary and tertiary sectors.

Asked about the importance of transport in the Commune, users (90%) say that transport infrastructure contributes to the installation of the population. Thus, bus stations, roads, crossroads, markets stimulate people in the choice of their home. To this end, nearly 60% of people have settled because of the roads, while for nearly 25% the presence of the market justifies their installation and for 15% the crossroads. So, the people investigated, justify their choice by the fact that, the edge of the tracks, crossroads, bus stations and markets, allows to exercise activities such as trade, small and medium-sized enterprises, crafts.

Transport is an economic factor in the production of goods and services. Its function in this area is to open markets to products and vice versa. Transport generates trade, trade. An efficient transport system and modern networks bring geographical specialization, large-scale production, increased competitiveness and soil value.

In relation to constraints, it is a question of highlighting anthropogenic activities and the physical factors that prevent the construction of transport facilities. There is among others the subdivision which is one of the constraints since without this operation, the route of the roads in the Commune would be very difficult or even impossible. However, no district of the Commune has been fully subdivided so far. Only Copargo centre has undergone some subdivision operations. The relief, the nature of the soil in place can also be a constraint to the installation of transport facilities. Climate is also an influential factor in the construction of transport infrastructure. It also contributes to their degradation because of the high rainfall of the study area.

Plate 6 shows respectively the nature of the soil in Tanéka béri and the degraded state of a road in Tanéka coco.



Plate 6: Nature of the soil in Tanéka béri and the degraded state of a road in Tanéka coco.
Shooting: Anagonou, May 2021

Plate 6 shows the nature of the soil in Tanéka béri (photo 6.1) and the degraded state of a road in Tanéka coco (photo 6.2). The nature of the soil in the Commune which is sandy clay, tropical ferruginous and hydromorphic ferruginous. It would be very difficult for this type of soil to accommodate the road network or it requires a geological study for the locality; this will require large investments. This degradation is mainly due to the nature of the soil in place.

4. CONCLUSION

The road network in rural areas in Benin in general and in the municipality of Copargo in particular faces natural, technical, financial, socio-cultural and organizational difficulties. The current capacity of the road network in the country does not make it possible to open up all rural communes. The results of the municipality's road network coverage during the study revealed an unfair distribution of transport infrastructure. The factors that explain the poor distribution of the road network are related to the almost total absence of a transport infrastructure management system, but above all to the behaviour of the population and local authorities.

In light of these results, the defective nature of roads, runways and other transport equipment is a handicap for the transport sector despite its leading role. This situation therefore does not allow both populations and users to meet their socio-economic and cultural needs.

REFERENCES

- HOUINSOU Auguste. (2013): Road transport infrastructure and spatial structuring in southern Benin. Unique Doctoral Thesis, EDP/ FLASH /UAC, 270 p
- KPATOUKPA Bienvenu (2012): Road Transport Infrastructure and Space Organization in the Municipality of OUIDAH. Master's thesis in geography. DGAT/ FLASH/UAC, 84 p.
- NASSIHOUNDE Bienvenu (2012): Transport Infrastructure and Space Organization in the Municipalities of Toffo and Lalo. Master's thesis in geography. DGAT/ FLASH/UAC, 86 p.

MICHEL Didier and REMY Prud'homme (2009): Transport infrastructure, mobility and growth. PARIS. French Documentation. 240 p (Council Report).

Marine DE SEYNE, the book "the relocation" "The relocation of companies" Collaborators: Eric Barbaroux, Association Entreprises et territoire (France) <http://www.alternatives-economiques.fr/pourquoi-les-entreprises-delocalisent> [elles fr art 964 51631.html](http://www.alternatives-elles.fr/art_964_51631.html)
<https://fr.wikidia.org/wiki/D%C3%A9localisation> <http://tpedelocalisation1es.e-monsite.com/pages/conclusion/> <http://www.lepoint.fr/actualites-economie> www.wikipedia.org