Republic of Cameroon
Direction des Études Techniques, Ministry of Public Works
Communauté Urbaine de Douala
Ministry of Housing and Urban Development
Ministry of Economy, Planning and Regional Development

Data Collection Survey on the Transport Network Development in Douala, Republic of Cameroon

Final Report

February, 2017

Japan International Cooperation Agency (JICA)

INGÉROSEC Corporation
Metropolitan Expressway Company Limited
Nippon Koei Co., Ltd.

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Data Collection Survey on the Transport Network Development in Douala, Republic of Cameroon

Final Report

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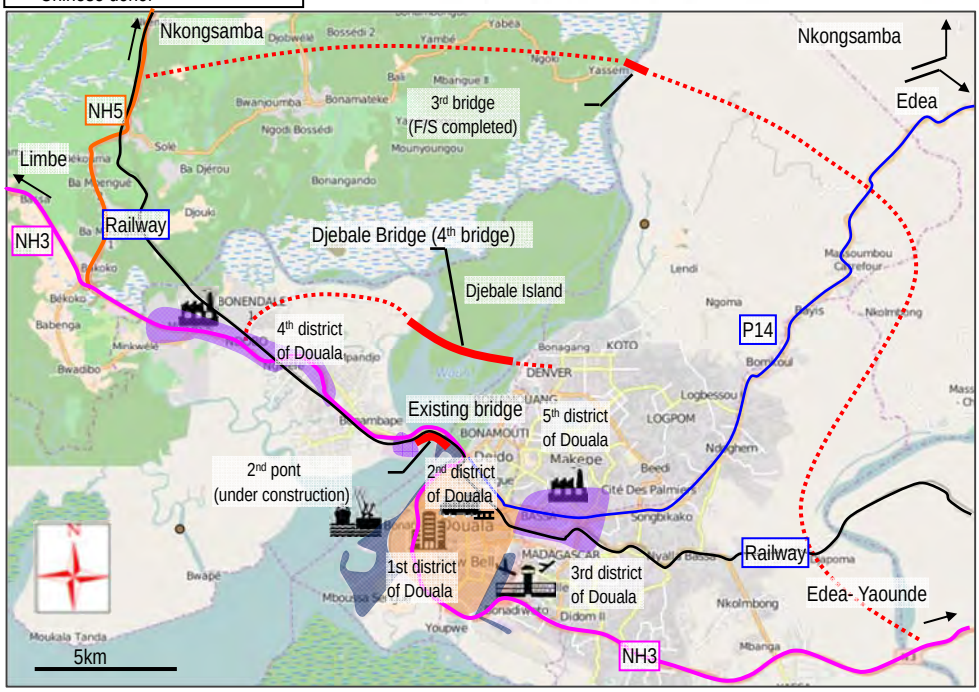
Area Map

Republic of Cameroon

Capital: Yaoundé
Area: 475,000 km^2
Population: 22.25M (2013, World Bank)
GNI per capita: 1,270 USD (2013, World Bank)
Ethnic group: Douala, Bamileke, Bamoun, Fulani, etc.
Language: French and English (both official languages) and other tribal languages
Religion: Catholic, Protestant, Islam and other traditional religions
Currency: CFA Franc
Source: Website of the Ministry of Foreign Affairs of Japan



Source : Open Street Map

List of Abbreviations (French)

Abbreviation	Proper Name
AFD	Agence Française de Développement
ADC	Aéroports du Cameroun
ADF	Association Dentaire Français
ARP	Aménagement des Routes Principales
BADEA	Banque Arabe pour le Développement Economique en Afrique
BEAC	Banque des Etats de l'Afrique Centrale
BDEAC	Banque de Développement des Etats de l'Afrique Centrale
BHNS	Bus à Haut Niveau de Service
BID	Banque Islamique de Developpement
BUCREP	Bureau Central des Recensements et des Etudes de Population
CCE	Commission de Constat et d'Evaluation
CEBTP	Centre d'Expertise du Bâtiment et des Travaux Publics
CEMAC	Communauté Économique et Monétaire de l' Afrique Centrale
CEREMA	Centre d'Etudes et d'Expertise sur les Risques, l'Environnement, la Mobilité et l'Aménagement.
CERTU	Centre d'Etudes sur les Réseaux, les Transports, l'Urbanisme et les constructions publiques
CUD	Communauté Urbaine de Douala
DEPIDD	Direction des Etudes, de la Planification, des Investissements et du Developpement Durable（CUD）
DIREM	Direction de l'Entretien des Infrastructures Routieres,des Reseaux et de la Mobilite
DSCE	Document de Stratégie pour la Croissance et l'Emploi
DSRP	Document de Stratégie de Réduction de la Pauvreté
ECAM	Enquête Camerounaise Aupres des Menages
FCFA	Franc de la Coopération Financière en Afrique Centrale
ICTAVRU	Instruction sur les Conditions Techniques d'Aménagement des Voies Rapides Urbaines
INS	Institut National de la Statistique du Cameroun
MINFOF	Ministère des Forêts et de la Faune
MINDCAF	Ministère des Domaines, du Cadastre et des Affaires Foncières
MINEPAT	Ministère de l'Economie, de la Planification et de l'Aménagement du Territoire
MINEPDED	Ministère de l'Environnement, de la Protection de la nature et du Développement Durable
MINEPIA	Ministère de l'Elevage, des Pêches et des Industries Animales
MINHDU	Ministère de l'Habitat et du Développement Urbain
MINT	Ministre des Transports

List of Abbreviations (French)

Abréviation	Terme
MINTP	Ministère des Travaux Publics
NGC	Nivellement Général du Cameroun
PK	Point Kilométrique
RN	Route Nationale
SAD	Société d'Aménagement de Douala
SETRA	Service d'Études Techniques des Routes et Autoroutes
SOCATUR	Société Camerounaise de Transports Urbains
SONARA	Société Nationale de Raffinage

List of Abbreviations (English)

Abbreviation	Proper Name
AfDB	African Development Bank
BH	Bore Hole
BMS	Bridge Management System
BOT	Build Operate Transfer
BRT	Bus Rapid Transit
CAIC	Cameroon Automobile Industry Company
CCAA	Cameroon Civil Aviation Authority
C2D	Contract on Development of Debt reduction
C/P	Counter Part
DL	Datum Line
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EU	European Union
FMU	Forest Management Unit
F/S	Feasibility Study
GDP	Gross Domestic Product
GESP	Growth and Employment Strategy Paper
GIS	Geographic Information System
GPS	Global Positioning System
HIPC	Heavily Indebted Poor Countries
IC/R	Inception Report
IDA	International Development Association
IFAD	International Fund for Agricultural Development
IMF	International Monetary Fund
ISO	International Organization for Standardization
IUCN	International Union for Conservation of Nature
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
KOTI	Korea Transport Institute
LAT	Lowest Astronomical Tide
LC	Least Concern
LCC	Life Cycle Cost
M/P	Master Plan
MSL	Mean Sea Level
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
NT	Near threatened

List of Abbreviations (English)

Abbreviation	Proper Name
OD	Origin Destination
OECD	Organisation for Economic Co-operation and Development
OJT	On-the-Job Training
OPEC	Organization of the Petroleum Exporting Countries
PC	Prestressed Concrete
PCU	Passenger Car Unit
PDV	Prefabricated Vertical Drain
PHC	Prestressed High-strength Concrete
PPP	Public Private Partnership
PRSP	Poverty Reduction Strategy Papers
SATREPS	Science and Technology Research Partnership for Sustainable Development
SC	Steel Composite Concrete Piles
STEP	Special Terms for Economic Partnership
UK	United Kingdom of Great Britain and Northern Ireland
TOR	Terms of Reference
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
US	United States of America
USD	United States Dollar
UTC	Coordinated Universal Time
UTM	Universal Transverse Mercator
VAT	Value Added Tax
VU	Vulnerable
WEO	World Economic Outlook
WGS	World Geodetic System
WHO	World Health Organization

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Summary

1. Cameroon: An Overview

The Republic of Cameroon (hereinafter referred to as "Cameroon") is the biggest economy in the Economic and Monetary Community of Central Africa (CEMAC comprising Cameroon, Republic of Chad, Central African Republic, Republic of Equatorial Guinea, Gabonese Republic and Republic of Congo). The country covers an area of 475,442km^2, which is bigger than Japan by 30%. The tropical rainforests extend in the coastal plain in the southern region, Adamawa highlands lie on the central region, the savanna to steppe plain extends toward the north, the area around Lake Chad is covered with marshes, and the western region is a forested volcanic mountainous region with one of Africa's biggest volcanic Mt. Cameroon (4,095m). It is sometimes described as "Africa in miniature" because of the diversity of the natural environment.

The climate of Cameroon is mostly tropical. The savanna Adamawa highlands lying in the central region divide the climate significantly between the north and south. The climate of the coastal region at a high altitude facing the Guinea Bay also differs from that of other regions.

The population until 2035 is projected based on the third national census in 2005. The figures of 2005 in the complete survey are the most recent actual figures and all figures after 2005 are estimates/forecast. The total population in 2016 is estimated to be 22.71 million and it is forecast to reach 33.96 million in 2035, which is 30% and 94% increase from 2005 (approx. 17.46 million) in 2016 and 2035, respectively.

Cameroon maintained an economic growth rate of approximately 7-9% until 1986, after which it fell into negative territory. The export revenues, derived mainly from primary products such as oil, coffee, cocoa, and cotton[1], were shrinking significantly due to the slow economic recovery in developed countries, the end of inflation, the declining export prices caused by the shrinking demand as a result of the expansion of production in other countries, and the weak dollar. The negative growth continued through 1994. During this recession, the nominal GDP dropped from its peak at 4,673,254 million FCFA (approx. 12,088 million USD) in 1986 to 3,590,985 million FCFA (approx. 13,532 million USD[2]) in 1993. It was a 23.2% decrease. In other words, a quarter of the national income was lost during that decade. In order to recover from this unprecedented economic crisis, the Government of Cameroon adopted an austerity budget that shrank 34% compared to that of 1986 and started discussions with the International Monetary Fund (IMF) and the World Bank for structural adjustment. The FCFA was devalued by 50% in January 1994 to boost export competitiveness. As a result, the GDP growth rate bounced back to positive territory in 1995. Since then, Cameroon has maintained steady economic growth, despite global recessions, such as the US financial crisis in 2008 and the European sovereign debt crisis starting in 2009, the low oil price since mid-2014, and the deteriorated security situation. The average annual GDP growth rate hovered at 3.7% during the decade between 2005 and 2014.

As for the GDP sector composition of Cameroon in 2015, the primary, secondary and tertiary sectors comprise 21.0, 26.2 and 35.7%, respectively. Of the primary sector, agriculture and fisheries comprise 15.6% of GDP, whereas forestry comprises only 1.8%. Of the secondary industry, other manufacturing (textile, clothing and handicrafts) accounts for the majority of GDP at 7.2%, followed by construction

[1] Paragraph 80, Poverty Reduction Strategy Paper (DSRP)
[2] The dollar-based nominal GDP increased due to the exchange rate.

and public works at 6.9%, food at 5.7%, mining and extraction at approx. 5.4% and electricity and water at 1.0%. In the tertiary sector, commerce, hotels and restaurants comprise a large portion of 18.6%, followed by other commercial services (9.5%), transportation (7.0%) and financial services (1.2%).

2. Background of the Survey

With the Port of Douala, which handles 99% of all the cargo in the country, Douala city is an interregional distribution base and has developed as a gateway for internal and international trade with neighboring landlocked countries against the background of a relatively stable political and economic situation. However, while traffic volume is rapidly rising with industry expansion and population increase caused by economic growth, the Wouri River, which divides the city into eastern and western parts, has only one bridge, which has one lane in each direction, and this causes massive traffic congestion on the bridge and surrounding roads as well as in industrial zones and residential and other densely populated areas on the east and west banks of the river and also in the northern area. It has become a major hindrance to efficient distribution of goods, the flow of people and revitalization of economic activities in the whole city of Douala, including the Port of Douala.

The survey is conducted to collect and confirm basic information in view of yen loan project formulation using Japan's technology (STEP) for the Djebale Bridge. The target areas of the survey are traffic congestion points in the Douala urban area, including the route from the National Highway 3, the existing bridge (the 1st bridge) and the surrounding access roads, as well as the area from the north of Douala (the 5th district of Douala / the Bonamoussadi district - the Djebale island - the 4th district / the Bonamatoumbe district) to the possible connection point to the National Highway 3.The bridge that is referred to as the 4th Bridge in the particular specifications is identified as the Djebale Bridge in this report to prevent concerned parties from being confused with the 3rd Bridge due to the timing of their project implementation.

The survey is summarized below.

- Confirmation of the government's implementation of its development strategies and development master plan in Douala and its surrounding urban area
- Collection and analysis of the latest information on donor assistance
- Organization of future development challenges
- Traffic volume survey to analyze traffic features and future demand forecast of the current road network
- Ground survey and confirmation of river condition to organize design conditions
- Collection of information for outline plan and rough project cost estimation of the road and bridge

3. An Overview of Transport Sector and Development Plan in Survey Target Area

(1) Road and bridge

According to "Urban Development Master Plan for Douala City 2025" (2012), the total road length in Douala City is 1,800km, of which 460km (26%) have been paved: This figure indicates low level of road development as 0.72km per 1, 000 persons are paved (Reference: Kinshasa=0.93km, Lomé=1.7km). Among these roads, the total length of major arterial roads connecting major areas in Douala is

about110km, which are administrated by the Communauté Urbaine de Douala (CUD) or the Ministry of public works (MINTP).

Construction of the 2nd Bridge next to the existing bridge to cross the Wouri River and technical survey of the 3rd Bridge over the upstream of the river are underway as the road and bridge development projects around the survey target area. The 2nd Bridge is staled to be completed in 2018 with the access road and it will greatly contribute to easing traffic congestion around the existing bridge. There is an expressway network plan connecting the biggest city, Douala, capital of Yaoundé, and new Limbé and Kribi ports. Yaoundé-Douala expressway Phase 1 and Edéa-Kribi expressway Phase 1 construction projects were launched with Chinese assistance and technical survey or F/S are conducted for other projects as intercity arterial roads. A road development project of an outer rim of the city including the 3rd Bridge is planned in Douala that is the survey target area to be connected with expressways.

(2) Bus and taxi

There are three types of bus services--local bus and mini-bus in the city and intercity bus—and the local bus service is operated by private company Société Camerounaise de Transport Urbain (SOCATUR). The fares vary from 150 to 200 FCFA according to the distance and they are less expensive than taxi. However, there are not so may users yet as there is no time schedule and the waiting time depends on the operation condition. Although the mini-bus service was banned recently, it is still operated without government permission. The taxi is not equipped with a fare meter and the fares are negotiated. According to the master plan, a daily average of 357,000 people use the taxi, accounting for 20% of city transport.

The BRT project by the Ministry of housing and urban development (MINDHU) and CUD is becoming concrete as a bus transport development project with three routes in Douala. It is planned to be launched in 2017 and completed in 2019. Along with the BRT project, the CUD is considering the introduction of BHNS (Bus à Haut Niveau de Service) with 2020 as the project target year.

(3) Railway

The railway in Cameroon is operated by CAMRAIL and the railway network has three lines: TRANSCAM I (Douala -- Yaoundé (262.9km), TRANSCAM II (Yaoundé -- Ngaoundéré (884.3km) and LINGNE OUEST (Douala -- Mbanga (65.2km) and Mbanga – Kumba (27.0km)). There are three to four services a day between Douala and Yaoundé.

The Ministry of economy, planning and regional development (MINEPAT) outsourced the railway development plan to a consortium led by the Korea Transport Institute (KOTI) and short- to mid-to-long-term railway development master plan was announced in 2012 for expanding trades with its neighboring counties. In a short term, development is underway for exporting iron ores and other mineral resources from the southern region and utilizing the deepsea port (Kribi and Limbé ports) under development, which is described later.

(4) Ports

The Port of Douala that is the largest port in Cameroon handles more than 95% of port cargo in Cameroon. The freight for imports (mainly petroleum, minerals and foodstuff, etc.) and exports (mainly timber, agricultural products and aluminum, etc.) goes mostly via the Port of Douala. The transport

volume has increased annually and almost doubled within a decade, in line with national economic growth. Under the circumstances, the volume of the port is almost exceeding its handling capacity. Conversely, the handling volume of domestic freight at the port has been declining annually, although increasing slightly at the Ports of Kribi and Limbé.

The Port of Douala faces such problems as no entry of large vessels due to the insufficient water depth, ageing of port facilities and long-hour stay in the port due to capacity shortage and port development projects of the Ports of Kribi and Limbé situated in the west and south of the city, respectively, are implemented by Korea and China.

(5) Air transport

There are eight airports in Cameroon, four of which are international airports. They are operated by the Aéroports Du Cameroun (ADC) and managed by Cameroon Civil Aviation Authority (CCAA). The nation's largest airport, Douala International Airport, is situated in Douala. More than 700,000 passengers get on and off there annually and it handles 70% of international transport and 40% of domestic transport of the country.

The capacity of the airport is around two million passengers and it is reported that it will not be saturated for the following 15 years. However, due to recent demand increase and the hosting of the 2019 Africa Cup of Nations, a renovation project for the runway, access road and parking, etc., was launched with AFD funding to enhance its function as a hub airport in Central Africa.

4. Future Traffic Demand Forecast

The travel speed survey, traffic count survey and roadside OD interview survey were carried out to grasp the current traffic condition and gather basic data for future traffic demand forecast in Douala and the traffic condition below in the survey target area was found out.

- Particularly severe congestion around the bridge crossing Wouri River is considered to be influenced largely by improvement work of NR3.
- Besides the neighboring area of the existing bridge, congestion was observed chronically at intersections where market is situated or that are used as taxi stands and area where there is some structural network problem (near Marche PK 10).
- On holidays, there is much less congestion than on weekdays. Rainfalls are also likely to affect the traffic to some degree.
- The daily traffic volume at each survey spot increases gradually from 3 a.m. when it is the lowest until it hits the peak at 8 a.m. at most spots. However, it continues to increase until 10 a.m. at the river crossing point of the existing bridge where the traffic volume was largest in the survey and it continues until shortly after noon.
- Particularly severe congestion occurred at the roundabout near the bridge on the day of the survey.
- Traffic of cargo vehicles accounts for 25% to 30% on NR3, which is higher than other roads. It shows the trend that large cargo vehicles tend to travel NR3 avoiding the inland city center.

The future traffic demand of surrounding roads was forecast based on the above traffic survey count survey and future development plans. The traffic volume, congestion, mean travel speed and demand rate of major intersections in the major road networks were projected. The traffic demand of the access road on both sides of the river after the construction of Djebale Bridge as well as changes of traffic flow in Douala was calculated for effect analysis. The traffic demand forecast results and observations are summarized below.

- The traffic demand 10 years later (in 2035) is forecast to increase by 58% from 2016 and the traffic condition in Douala is forecast to deteriorate significantly when road improvement is limited to that which is currently underway or studied concretely.
- Djebale Bridge development will significantly improve the traffic condition around Akwa including Deïdo where the roundabout is situated 10 years later from now (in 2025). The improvement work will also result in further improvement of areas around Ndokotti and NR 3 in addition to the area around the bridge.
- Traffic of the Intersection 2 (Ndokotti) that is congested with the intersection demand rate exceeding 0.9 will improve to be below 0.9 in the future when the Djebale Bridge is constructed.
- Djebale Bridge development is the minimum requirement. Drastic measures to improve the urban structure and traffic convenience, which include improvement of congested intersections, traffic control and public transportation and review of land use plan, are also necessary. Without such measures, the traffic condition of Douala is forecast to deteriorate seriously.

5. Reveiw of Assumable Infrastructure Development

The survey team studied the scope, scale and cost of the Djebale Bridge construction project as it is deemed to be most effective for traffic improvement in the survey target area. As the access road development on both sides of the river is essential for the bridge construction to have impacts, multiple routes are compared and summarized as the scope of the project. Primary comparison of bridge types was conducted in the survey after collecting and organizing information on crossing conditions in the river and waterway, social and environmental considerations and geographical and geological information and setting up the bridge length, span divisions and items and criteria of assessment. As for the bridge type, two proposals—a proposal that focuses on the financial efficiency and another that focuses on the landscape to also contribute to local tourism development, requested by the Government of Cameroon, were studied in terms of their overview, number of interferences and project cost. As for the scale of the project, a four-lane bridge is deemed appropriate based on the traffic demand forecast result. Although the access road on the right bank can be coped with by a two-lane road for the time being for the estimated traffic demand, it will become necessary to be expanded to a four-lane road in the long run.

6. Japan's Course of Cooperation

The projects that are effective in traffic improvement in the survey target area and that are preferred as the course of Japan's cooperation based on the information gathered and confirmed in the survey and review are proposed as shown in Table 1. The implementation time is divided into three terms of short, mid- and long terms and the survey team also selected projects that are more prioritized from the survey result. The Djebale Bridge construction project and Access road improvement project on the right bank of the Djebale Bridge are more prioritized and urgently needed.

Table 1 List of Proposed Projects

No.	Project Title	Assistance Scheme	Priority determined by the Survey Team
Short-term (to be initiated in about five years from now)			
1	Djebale Bridge Construction Project	Yen loan	High
2	Project to Improve Access Roads on the Right Bank of Djebale Bridge	Grant aid Yen loan (including joint financing)	High
Mid-term (to be initiated in about 5-10 years from now)			
3	Douala City Traffic Control Capacity-Building Project	Technical assistance	High
4	Project to Improve Congested Intersections in Douala	Grant aid	Moderate
Long-term (to be initiated in about 10 years from now)			
5	Bridge Maintenance Capacity-Building Project	Technical assistance	High
6	Public Bus Corporation Operation Capacity-Building Project	Technical assistance	Moderate

Source: JICA survey team

1. Project Overview

1.1 Background and purpose of the Survey

1.1.1 Background of the Survey

The Republic of Cameroon (hereinafter referred to as Cameroon) has the largest economy in the Economic and Monetary Community of Central Africa (CEMAC, member countries are Cameroon, Republic of Chad, Central African Republic, Republic of Equatorial Guinea, Gabonese Republic and Republic of Congo). With the Port of Douala, which handles 99% of all the cargo in the country, Douala city is an interregional distribution base and has developed as a gateway for internal and international trade with neighboring landlocked countries against the background of a relatively stable political and economic situation. However, while traffic volume is rapidly rising with industry expansion and population increase caused by economic growth, the Wouri River, which divides the city into eastern and western parts, has only one bridge, which has one lane in each direction, and this causes massive traffic congestion on the bridge and surrounding roads as well as in industrial zones and residential and other densely populated areas on the east and west banks of the river and also in the northern area. It has become a major hindrance to efficient distribution of goods, the flow of people and revitalization of economic activities in the whole city of Douala, including the Port of Douala. Under such circumstances, in 2009, the government of Cameroon established the “Growth and Employment Strategy (DSDE)” and decided to decentralize port functions through the development of Kribi Deep Seaport in the south (for which China committed to a loan in January 2016) and Limbe Deep Seaport in the west (for which Korea cooperates with the port master plan) as major infrastructure development projects to reduce overconcentration of cargo in the Port of Douala. Concerning the development strategy for the traffic network in Douala city and its urban area, the Urban Community of Douala (CUD) has established the “Douala and Its Urban Area Development Strategy” and the “Douala City Development Master Plan 2025” with support from the World Bank and the French Develop Agency (AFD) and started actions to achieve smooth traffic flows and reduce congestion in the large urban area as well as to improve efficiency of the urban transportation system.

Construction of three bridges over the Wouri River - in the southern area (2nd Bridge), northern area (3rd Bridge) and central area (the Djebale Bridge) of Douala City - is proposed in the Master Plan in addition to the existing bridge over the river. The Government of Cameroon requested that JICA conduct a survey to gather and confirm basic information in view of yen loan project formulation using Japan’s technology for the bridge in the central area (the Djebale Bridge). The bridge that is referred to as the 4th Bridge in the particular specifications is identified as the Djebale Bridge in this report to prevent concerned parties from being confused with the 3rd Bridge due to the timing of their project implementation.

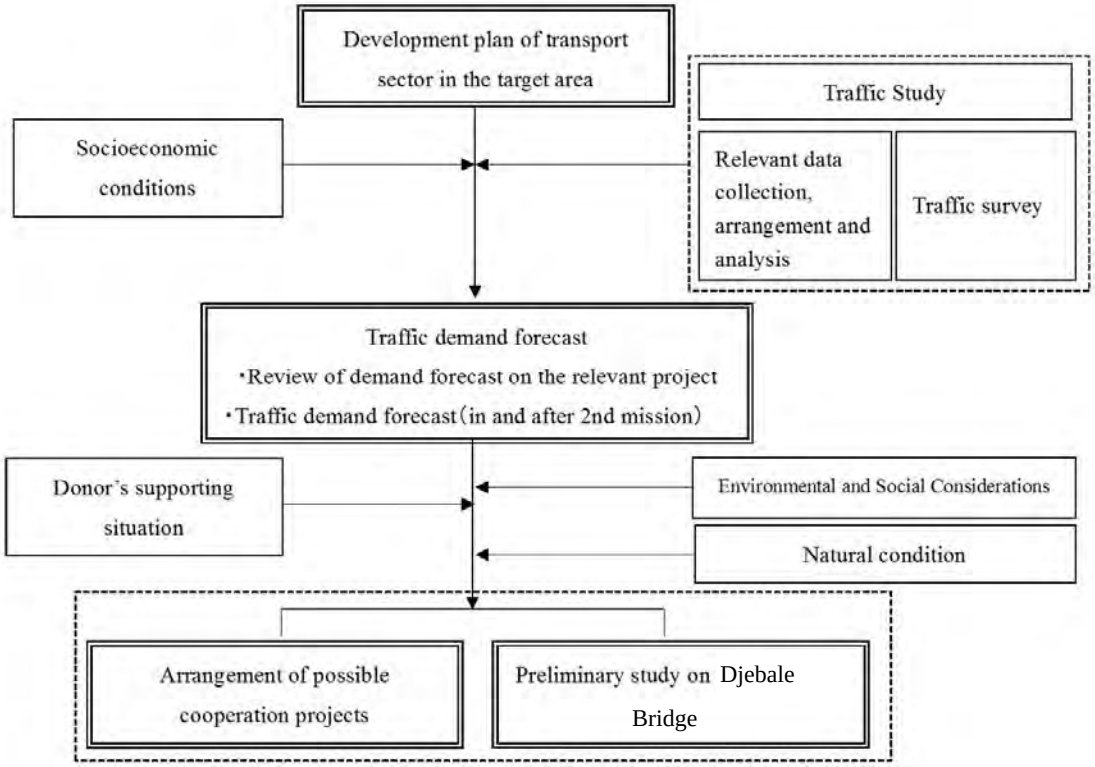
1.1.2 Purpose of the survey

The survey was conducted to gather and analyze the latest information on the government’s implementation of its development strategies and development master plan in Douala and its surrounding urban area and donor assistance for the same, organize future development challenges and examine the relevance of the Djebale Bridge construction plan proposed in the Master Plan, based on an analysis of traffic features and future demand forecast of the current road network to propose the potential for future JICA assistance in view of yen loan project formulation. Other assistance schemes of grant aid, technical

assistance and their combination with a yen loan are also studied with access roads, surrounding infrastructure development and bridge maintenance projects as required.

1.2 Survey approach

The survey is conducted in accordance with the survey flow in Figure 1.1. The survey team gathers information on the transport sector development plans in and around Douala City and determines the current situation and future infrastructure development plan in the target area to forecast future traffic volume; based on socioeconomic information and the current traffic volume. The Djebale Bridge construction is examined based on environmental and social survey and a natural condition survey to identify the course of assistance with other donor assistance in mind.



Source: JICA survey team

Figure 1.1 Survey Flow

1.3 Survey Team

The survey is conducted by the members listed in the following table.

Table 1.1 Survey Team Members

Area	Team Member	Company
Leader / Road Traffic Planning 1	Junji OGATA	INGÉROSEC Corporation
Sub-Leader / Road Traffic Planning 2	Makoto MATSUURA	INGÉROSEC Corporation
Bridge Design	Shinichi NII	INGÉROSEC Corporation
Road Design	Tsuyoshi IWAMARU	Nippon Koei Co., Ltd.
Traffic Demand Forecast	Kiichiro NAKAMURA	Metropolitan Expressway Company Limited
Economic and Financial Analysis and Cost Calculation	Hiroshi KAMITSUJI	INGÉROSEC Corporation
Environmental and Social Considerations	Kyoto YASUI	INGÉROSEC Corporation (support)
Hydraulics and Hydrology	Tatsuya MOCHIZUKI	INGÉROSEC Corporation
Natural Condition Survey 1	Isao INUZUKA	Nippon Koei Co., Ltd.
Work Coordination / Natural Condition Survey 2	Haruka SAITO	INGÉROSEC Corporation

Source: JICA survey team

1.4 Field Survey Schedule

The schedule of the first and second field surveys is provided below.

Table 1.2 First Field Survey Schedule (1/2)【from July 2nd to September 1st 2016】

	Month	Day		Leader / Road Traffic Planning	Sub-Leader / Road Traffic Planning	Bridge Design	Road Design	Traffic Demand Forecast	Economic and Financial Analysis and Cost Calculation	Environmental and Social Considerations	Hydraulics and Hydrology	Natural Condition Survey 1	Work Coordination / Natural Condition Survey 2
				Junji OGATA	Makoto MATSUURA	Shinichi NII	Tsuyoshi IWAMARU	Kiichiro NAKAMURA	Hiroshi KAMITSUJI	Kyoko YASUI	Tatsuya MOCHIZUKI	Isao INUZUKA	Haruka SAITO
1		2	Sat	Travel (by air) : Haneda ⇒Paris		Travel (by air) : Haneda ⇒Paris					Travel (by air) : Haneda ⇒Paris	Travel (by air) : Haneda ⇒Paris	
2		3	Sun	Travel (by air) : Paris⇒Yaoundé		Travel (by air) : Paris⇒Yaoundé					Travel (by air) : Paris⇒Yaoundé	Travel (by air) : Paris⇒Yaoundé	
3		4	Mon	15:00- Courtesy visit to Embassy 16:30- Courtesy visit to JICA		15:00- Courtesy visit to Embassy 16:30- Courtesy visit to JICA					15:00- Courtesy visit to Embassy 16:30- Courtesy visit to JICA	15:00- Courtesy visit to Embassy 16:30- Courtesy visit to JICA	
4		5	Tue	10:00- Courtesy visit to MINTP 12:00- Courtesy visit to MINEPAT 15:00- Courtesy visit to MINDUH		10:00- Courtesy visit to MINTP 12:00- Courtesy visit to MINEPAT 15:00- Courtesy visit to MINDUH		Travel (by air) : Haneda ⇒Paris			10:00- Courtesy visit to MINTP 12:00- Courtesy visit to MINEPAT 15:00- Courtesy visit to MINDUH	10:00- Courtesy visit to MINTP 12:00- Courtesy visit to MINEPAT 15:00- Courtesy visit to MINDUH	
5		6	Wed	Travel (by land) : Yaoundé⇒Douala		Travel (by land) : Yaoundé⇒Douala		Travel (by air) : Paris⇒Douala			Travel (by land) : Yaoundé⇒Douala	Travel (by land) : Yaoundé⇒Douala	
6		7	Thu	City tour 14:00- Courtesy visit to CUD, ICR briefing		City tour 14:00- Courtesy visit to CUD, ICR briefing		City tour 14:00- Courtesy visit to CUD, ICR briefing			City tour 14:00- Courtesy visit to CUD, ICR briefing	City tour 14:00- Courtesy visit to CUD, ICR briefing	
7		8	Fri	Office opens in CUD Visit to geological survey firm, etc.		Office opens in CUD Visit to geological survey firm, etc.		Office opens in CUD Visit to geological survey firm, etc.			Office opens in CUD Visit to geological survey firm, etc.	Office opens in CUD Visit to geological survey firm, etc.	
8		9	Sat	Survey of 3rd bridge location on right bank Study of travel speed survey route		Survey of 3rd bridge location on right bank Study of travel speed survey route		Survey of 3rd bridge location on right bank Study of travel speed survey route			Survey of 3rd bridge location on right bank Study of travel speed survey route	Survey of 3rd bridge location on right bank Study of travel speed survey route	
9		10	Sun	Travel speed survey (holiday)		Travel speed survey (holiday)		Travel speed survey (holiday)			Travel speed survey (holiday)	Travel speed survey (holiday)	
10		11	Mon	Discussions on ground survey/survey/traffic count survey policies with C/P		Discussions on ground survey/survey/traffic count survey policies with C/P		Discussions on ground survey/survey/traffic count survey policies with C/P			Discussions on ground survey/survey/traffic count survey policies with C/P	Discussions on ground survey/survey/traffic count survey policies with C/P	
11		12	Tue	Discussions on traffic count survey policies with C/P		Discussions on traffic count survey policies with C/P		Discussions on traffic count survey policies with C/P			Discussions on traffic count survey policies with C/P	Discussions on traffic count survey policies with C/P	
12		13	Wed	9:00- Douala Port Office (Interview with Tech Dept.) 10:00- Douala Port Office (Interview with Survey Dept.) Collection/Data arrangement		9:00- Douala Port Office (Interview with Tech Dept.) 10:00- Douala Port Office (Interview with Survey Dept.) Collection/Data arrangement		9:00- Douala Port Office (Interview with Tech Dept.) 10:00- Douala Port Office (Interview with Survey Dept.) Collection/Data arrangement			9:00- Douala Port Office (Interview with Tech Dept.) 10:00- Douala Port Office (Interview with Survey Dept.) Collection/Data arrangement	9:00- Douala Port Office (Interview with Tech Dept.) 10:00- Douala Port Office (Interview with Survey Dept.) Collection/Data arrangement	
13		14	Thu	9:00- Courtesy visit to MINTP Collection/Data arrangement		9:00- Courtesy visit to MINTP Collection/Data arrangement		9:00- Courtesy visit to MINTP Collection/Data arrangement			9:00- Courtesy visit to MINTP Collection/Data arrangement	9:00- Courtesy visit to MINTP Collection/Data arrangement	
14		15	Fri	10:00- Douala Port Office (Data acquisition) Right-side survey/Bridge inspection in city		10:00- Douala Port Office (Data acquisition) Right-side survey/Bridge inspection in city		10:00- Douala Port Office (Data acquisition) Right-side survey/Bridge inspection in city			10:00- Douala Port Office (Data acquisition) Right-side survey/Bridge inspection in city	10:00- Douala Port Office (Data acquisition) Right-side survey/Bridge inspection in city	
15	7	16	Sat	Travel speed survey (holiday) Bonabéri survey		Travel speed survey (holiday) Bonabéri survey		Travel speed survey (holiday) Bonabéri survey			Travel speed survey (holiday) Bonabéri survey	Travel speed survey (holiday) Bonabéri survey	
16		17	Sun	Internal Meeting		Internal Meeting		Internal Meeting			Internal Meeting	Internal Meeting	
17		18	Mon	Wouri River/Djebale Island Survey (by boat)		Wouri River/Djebale Island Survey (by boat)		Wouri River/Djebale Island Survey (by boat)			Wouri River/Djebale Island Survey (by boat)	Wouri River/Djebale Island Survey (by boat)	
18		19	Tue	10:00- 2nd Bridge site visit (VINCI/LABOGENTA, etc.) Information collection/Data arrangement		10:00- 2nd Bridge site visit (VINCI/LABOGENTA, etc.) Information collection/Data arrangement		10:00- 2nd Bridge site visit (VINCI/LABOGENTA, etc.) Information collection/Data arrangement			10:00- 2nd Bridge site visit (VINCI/LABOGENTA, etc.) Information collection/Data arrangement	10:00- 2nd Bridge site visit (VINCI/LABOGENTA, etc.) Information collection/Data arrangement	
19		20	Wed	Information collection/Data arrangement Preparation for subcontracting		Information collection/Data arrangement Preparation for subcontracting		Information collection/Data arrangement Preparation for subcontracting			Travel (by air) : Douala⇒Paris	Information collection/Data arrangement Preparation for subcontracting	
20		21	Thu	Traffic/survey subcontracting agreement		Limbé Port survey		Limbé Port survey			Travel (by air) : Paris⇒Narita	Traffic/survey subcontracting agreement	
21		22	Fri	Information collection/Data arrangement		Information collection/Data arrangement		Information collection/Data arrangement			Arrive in Japan	Information collection/Data arrangement	
22		23	Sat	Bridge survey in city		Bridge survey in city		Bridge survey in city				Bridge survey in city	
23		24	Sun	Internal Meeting		Internal Meeting		Internal Meeting				Internal Meeting	
24		25	Mon	Ground subcontracting agreement		Kribi Port survey		Kribi Port survey				Ground subcontracting agreement	
25		26	Tue	Travel (by air) : Douala⇒Paris		Interview with 2nd Bridge contractor Information collection/Data arrangement	Travel (by air) : Haneda ⇒Paris	Interview with 2nd Bridge contractor Information collection/Data arrangement	Travel (by air) : Haneda ⇒Paris			Interview with 2nd Bridge contractor Information collection/Data arrangement	Travel (by air) : Haneda ⇒Paris
26		27	Wed	Travel (by air) : Paris⇒Narita		Information collection/Data arrangement	Travel (by air) : Paris⇒Douala	Information collection/Data arrangement	Travel (by air) : Paris⇒Douala			Information collection/Data arrangement	Travel (by air) : Paris⇒Douala
27		28	Thu	Arrive in Japan		Field survey in city	Field survey in city	Field survey in city	Field survey in city			Preparation for ground survey/survey	Field survey in city
28		29	Fri			Preparation for traffic count survey (briefing/preliminary survey)	Preparation for traffic count survey (briefing/preliminary survey)	Preparation for traffic count survey (briefing/preliminary survey)	Information collection/Data arrangement				Preparation for traffic count survey (briefing/preliminary survey)
29		30	Sat			Field survey of 3rd Bridge/intersections in city	Field survey of 3rd Bridge/intersections in city		Field survey of 3rd Bridge/intersections in city				Field survey of 3rd Bridge/intersections in city
30		31	Sun			Internal Meeting	Internal Meeting	Internal Meeting	Internal Meeting			Internal Meeting	Internal Meeting
31		1	Mon			Information collection/Data arrangement	Information collection/Data arrangement	Preparation for traffic count survey (briefing/preliminary survey)	Information collection/Data arrangement			Ground survey/Survey management	Information collection/Data arrangement
32		2	Tue		Travel (by air) : Haneda ⇒Paris	Traffic count survey Travel speed survey (weekday)	Traffic count survey Travel speed survey (weekday)	Traffic count survey Travel speed survey (weekday)	Traffic count survey Travel speed survey (weekday)			Traffic count survey Travel speed survey (weekday)	Traffic count survey Travel speed survey (weekday)
33		3	Wed		Travel (by air) : Paris⇒Douala	Information collection/Data arrangement	Interview with 3rd Bridge contractor (procurement)	Information collection/Data arrangement	Interview with 3rd Bridge contractor (procurement)			Ground survey/Survey management	Ground survey/Survey management
34		4	Thu		City survey (2nd Bridge/Main intersections)	City survey (eastern development)	City survey (eastern development)	City survey (eastern development)	Information collection/Data arrangement				City survey (2nd Bridge/Main intersections)
35		5	Fri		Information collection/Data arrangement	Information collection/Data arrangement	Information collection/Data arrangement	Information collection/Data arrangement					Information collection/Data arrangement
36		6	Sat		Provincial road 14 field survey	Provincial road 14 field survey	Provincial road 14 field survey	Provincial road 14 field survey	Provincial road 14 field survey				Provincial road 14 field survey
37		7	Sun		Travel speed survey (holiday)	Travel speed survey (holiday)	Travel speed survey (holiday)	Travel speed survey (holiday)	Travel speed survey (holiday)			Travel speed survey (holiday)	Travel speed survey (holiday)
38		8	Mon		Information collection/Data arrangement	Transfer of survey to other team member	Information collection/Data arrangement	Transfer of survey to other team member	Information collection/Data arrangement			Ground survey/Survey management	Information collection/Data arrangement
39		9	Tue		Travel (by land) : Yaoundé⇒Douala	Travel (by air) : Douala⇒Paris		Travel (by air) : Douala⇒Paris	Travel (by land) : Yaoundé⇒Douala				
40		10	Wed		Courtesy visit to JICA 14:00- Interview with MINTP (Tech Dept.) 15:30- Interview with donor (EU)	Travel (by air) : Paris⇒Narita		Travel (by air) : Paris⇒Narita	Courtesy visit to JICA 14:00- Interview with MINTP (Tech Dept.) 15:30- Interview with donor (EU)				
41		11	Thu		11:00- Interview with donor (AdDB) Interview with MINEPAT	Arrive in Japan		Arrive in Japan	11:00- Interview with donor (AdDB) Interview with MINEPAT				
42		12	Fri		Collection/Data arrangement		Information collection/Data arrangement Field survey of roads in city		Collection/Data arrangement	Travel (by air) : Haneda ⇒Paris			Information collection/Data arrangement Field survey of roads in city
43		13	Sat		Travel (by land) : Douala⇒Yaoundé		Information collection/Data arrangement		Travel (by land) : Douala⇒Yaoundé	Travel (by air) : Paris⇒Douala			Ground survey/Survey management
44		14	Sun		Internal Meeting		Internal Meeting		Internal Meeting	Internal Meeting		Internal Meeting	Internal Meeting
45		15	Mon		Field survey of right- and left-side roads		Field survey of right- and left-side roads		Information collection/Data arrangement	Field survey of right- and left-side roads		Ground survey/Survey management	Field survey of right- and left-side roads
46		16	Tue		10:00-Interview with MINTP (Axle load data) 14:00- Interview with CUD (Maintenance Dep)		10:00-Interview with MINTP (Axle load data) 14:00- Interview with CUD (Maintenance Dep)			Information collection/Data arrangement			Information collection/Data arrangement
47	8	17	Wed		Information collection/Data arrangement		Information collection/Data arrangement			9:30- Interview with MINEPDD 10:30- Interview with MINFOF 11:00- Interview with MINCAF			9:30- Interview with MINEPDD 10:30- Interview with MINFOF 11:00- Interview with MINCAF

Table 1.3　First Field Survey Schedule (2/2)【from July 2nd to September 1st 2016】

	Month	Day		Leader / Road Traffic Planning	Sub-Leader / Road Traffic Planning	Bridge Design	Road Design	Traffic Demand Forecast	Economic and Financial Analysis and Cost Calculation	Environmental and Social Considerations	Hydraulics and Hydrology	Natural Condition Survey 1	Work Coordination / Natural Condition Survey 2
				Junji OGATA	Makoto MATSUURA	Shinichi Nil	Tsuyoshi IWAMARU	Kiichiro NAKAMURA	Hiroshi KAMITSUJI	Kyoko YASUI	Tatsuya MOCHIZUKI	Isao INUZUKA	Haruka SAITO
48		18	Thu	Travel (by air) : Narita⇒Paris	Information collection/Data arrangement Report on survey progress to CUD		Information collection/Data arrangement Report on survey progress to CUD		Information collection/Data arrangement Report on survey progress to CUD	Information collection/Data arrangement Report on survey progress to CUD		Information collection/Data arrangement Report on survey progress to CUD	Information collection/Data arrangement Report on survey progress to CUD
49		19	Fri	Travel (by air) : Paris⇒Douala	Information collection/Data arrangement		Information collection/Data arrangement		Information collection/Data arrangement	Information collection/Data arrangement		Ground survey/Survey management	Information collection/Data arrangement
50		20	Sat	Information collection/Data arrangement									
51		21	Sun	Internal Meeting	Internal Meeting		Internal Meeting		Internal Meeting	Internal Meeting		Internal Meeting	Internal Meeting
52		22	Mon	【JICA Mission】 9:00- Courtesy visit to MINTP 10:30- Courtesy visit to CUD 14:00- Discussions with relevant organizations	【JICA Mission】 9:00- Courtesy visit to MINTP (Littoral) 10:30- Courtesy visit to CUD 14:00- Discussions with relevant organizations		10:00- Interview with MINCAF 14:00- Discussions with relevant organizations		Information collection/Data arrangement 14:00- Discussions with relevant organizations	10:00- Interview with MINCAF 14:00- Discussions with relevant organizations		Ground survey/Survey management	Information collection/Data arrangement 14:00- Discussions with relevant organizations
53		23	Tue	AM Study of major roads (left bank) in city PM Tour of 2nd Bridge construction site	AM Study of major roads (left bank) in city PM Tour of 2nd Bridge construction site		AM Study of major roads (left bank) in city PM Tour of 2nd Bridge construction site		AM Information collection/Data arrangement PM Tour of 2nd Bridge construction site	AM Information collection/Data arrangement PM Tour of 2nd Bridge construction site			AM Study of major roads (left bank) in city PM Tour of 2nd Bridge construction site
54	8	24	Wed	AM Study of major roads (right bank) in city PM Wouri River/Djebale Island	AM Study of major roads (right bank) in city PM Wouri River/Djebale Island		AM Study of major roads (right bank) in city PM Wouri River/Djebale Island		AM Information collection/Data arrangement PM Wouri River/Djebale Island	AM Information collection/Data arrangement PM Wouri River/Djebale Island			AM Study of major roads (right bank) in city PM Wouri River/Djebale Island
55		25	Thu	Travel (by land) : Douala⇒Yaoundé 15:00-Discussions with JICA 16:00-Interview with donor (AFD)	Travel (by land) : Douala⇒Yaoundé 15:00-Discussions with JICA 16:00-Interview with donor (AFD)		Information collection/Data arrangement		Travel (by land): Douala⇒Yaoundé 15:00-Discussions with JICA 16:00-Interview with donor (AFD)	Information collection/Data arrangement			Information collection/Data arrangement
56		26	Fri	9:40-Interview with MINTP 12:00-Interview with MINEPAT Data arrangement	9:40-Interview with MINTP 12:00-Interview with MINEPAT Data arrangement				9:40-Interview with MINTP 12:00-Interview with MINEPAT Data arrangement	9:00- Interview with CADASTRE Information collection/Data arrangement			
57		27	Sat	Data arrangement	Data arrangement		Field survey of access road on right side ((Preliminary inspection of environmental survey)		Data arrangement	Field survey of access road on right side (Preliminary inspection of environmental survey)			Field survey of access road on right side (Preliminary inspection of environmental survey)
58		28	Sun	Internal Meeting	Internal Meeting		Internal Meeting		Internal Meeting	Internal Meeting		Internal Meeting	Internal Meeting
59		29	Mon	Report to JICA	Report to JICA		Information collection/Data arrangement		Report to JICA	Information collection/Data arrangement		Ground survey/Survey management	Information collection/Data arrangement
60		30	Tue	Travel (by air) : Yaoundé⇒Paris	Travel (by air) : Yaoundé⇒Paris		Travel (by land): Douala⇒Yaoundé Travel (by air) : Yaoundé⇒Paris		Travel (by air) : Yaoundé⇒Paris	Travel (by air) : Douala⇒Paris		Travel (by air) : Douala⇒Paris	Travel (by air) : Douala⇒Paris
61		31	Wed	Travel (by air) : Paris⇒Narita	Travel (by air) : Paris⇒Narita		Travel (by air) : Paris⇒Narita		Travel (by air) : Paris⇒Narita	Travel (by air) : Paris⇒Narita		Travel (by air) : Paris⇒Narita	Travel (by air) : Paris⇒Narita
62	9	1	Thu	Arrive in Japan	Arrive in Japan		Arrive in Japan		Arrive in Japan	Arrive in Japan		Arrive in Japan	Arrive in Japan

Source: JICA survey team

Table 1.4 Second Field Survey Schedule【from November 7th to December 3rd 2016】

	Month	Day		Leader / Road Traffic Planning	Sub-Leader / Road Traffic Planning 2	Bridge Design	Traffic Demand Forecast	Economic and Financial Analysis and Cost Calculation	Environmental and Social Considerations
				Junji OGATA	Makoto MATSUURA	Shinichi NII	Kiichiro NAKAMURA	Hiroshi KAMITSUJI	Kyoko YASUI
1		7	Mon	Travel (by air) : Haneda ⇒Paris Travel (by air) : Paris⇒Yaoundé	Travel (by air) : Haneda ⇒Paris Travel (by air) : Paris⇒Yaoundé	Travel (by air) : Haneda ⇒Paris Travel (by air) : Paris⇒Douala	Travel (by air) : Haneda ⇒Paris Travel (by air) : Paris⇒Douala	Travel (by air) : Haneda ⇒Paris Travel (by air) : Paris⇒Yaoundé	Travel (by air) : Haneda ⇒Paris Travel (by air) : Paris⇒Douala
2		8	Tue	10:00- Courtesy visit to JICA 15:00- Courtesy visit to MINTP	10:00- Courtesy visit to JICA 15:00- Courtesy visit to MINTP	CUD office opens	CUD office opens	10:00- Courtesy visit to JICA 15:00- Courtesy visit to MINTP	CUD office opens PM Discussions with MINEPIA
3		9	Wed	16:30- Courtesy visit to MINEPAT	16:30- Courtesy visit to MINEPAT	Schedule coordination Preparation for seminar	Schedule coordination Preparation for seminar	16:30- Courtesy visit to MINEPAT	Schedule coordination Preparation for seminar
4		10	Thu	15:00- Interview with WB 16:00- Discussions with MINTP	15:00- Interview with WB 16:00- Discussions with MINTP	PM Discussions with MINTP (Wouri River salinity measurement)	PM Discussions with MINTP (Wouri River salinity measurement)	15:00- Interview with WB 16:00- Discussions with MINTP	Discussions with MINFOF Discussions with MINDEPED
5		11	Fri	11:00- Courtesy visit to Embassy	11:00- Courtesy visit to Embassy	Participation in seminar	Participation in seminar	11:00- Courtesy visit to Embassy	Participation in seminar Discussions on environmental subcontracting
6		12	Sat	Travel (by land) : Yaoundé⇒Douala	Travel (by land) : Yaoundé⇒Douala	Travel speed survey (holiday)	Travel speed survey (holiday)	Information collection/Data arrangement	Travel speed survey (holiday)
7		13	Sun	Internal Meeting	Internal Meeting	Internal Meeting	Internal Meeting	Information collection/Data arrangement	Site survey of right-side access road
8		14	Mon	9:00- Courtesy visit to MINTP 12:00-Courtesy visit to vice mayor	9:00- Courtesy visit to MINTP 12:00-Courtesy visit to vice mayor	9:00- Courtesy visit to MINTP 12:00-Courtesy visit to vice mayor	9:00- Courtesy visit to MINTP 12:00-Courtesy visit to vice mayor	14:00- Interview with EU 15:00-Interview with MINTP	
9		15	Tue	Travel speed survey (weekday) Information collection/Data arrangement	Travel speed survey (weekday) Information collection/Data arrangement	Travel speed survey (weekday) Information collection/Data arrangement	Travel speed survey (weekday) Information collection/Data arrangement	11:00-Interview with MINEPAT 15:00- Interview with AFD	
10		16	Wed	9:00- Discussions with entities involved in seminar 10:30- 2nd Bridge on-site office Interview	9:00- Discussions with entities involved in seminar 10:30- 2nd Bridge on-site office Interview	9:00- Discussions with entities involved in seminar 10:30- 2nd Bridge on-site office Interview	9:00- Discussions with entities involved in seminar 10:30- 2nd Bridge on-site office Interview	Information collection/Data arrangement	
11	11	17	Thu	Preparation for salinity measurement Information collection/Data arrangement	Preparation for salinity measurement Information collection/Data arrangement	Preparation for salinity measurement Information collection/Data arrangement	Preparation for salinity measurement Information collection/Data arrangement	14:30- Courtesy visit to Chinese Embassy	
12		18	Fri	Participation in seminar	Travel (by air) : Douala⇒Paris	Participation in seminar	Participation in seminar	Information collection/Data arrangement	Djebale Island Mangrove survey
13		19	Sat	Limbé Port survey	Travel (by air) : Paris⇒Narita	Limbé Port survey	Limbé Port survey	Travel (by land) : Yaoundé⇒Douala	
14		20	Sun	Internal Meeting	Arrive in Japan	Internal Meeting	Internal Meeting	Internal Meeting	Internal Meeting Confirmation of environmental subcontracting
15		21	Mon	Information collection/Data arrangement		Bridge study	Traffic analysis	Economic analysis	Site survey/Interview with head
16		22	Tue	Field survey of main intersections		Field survey of main intersections	Field survey of main intersections	Field survey of main intersections	
17		23	Wed	2nd Bridge on-site office Interview (bridge type)		2nd Bridge on-site office Interview (bridge type)	Traffic analysis	Economic analysis	Site survey/INS Interview
18		24	Thu	Djebale Island survey		Djebale Island survey	Djebale Island survey	Djebale Island survey	Djebale Island survey
19		25	Fri	Survey summarization		Bridge study	Traffic analysis	Economic analysis	Summarization of environmental survey
20		26	Sat	Limbé Port survey		Limbé Port survey	Limbé Port survey	Limbé Port survey	Site survey/Interview with head
21		27	Sun	Travel (by land) : Douala⇒Yaoundé		Bridge study	Traffic analysis	Travel (by land) : Douala⇒Yaoundé	Summarization of environmental survey
22		28	Mon	15:00- Report to MINTP 16:00- Report to JICA				15:00- Report to MINTP 16:00- Report to JICA	
23		29	Tue	10:00- Interview with EIB				10:00- Interview with EIB	
24		30	Wed	16:30- Discussions with JICA		Travel (by land) : Douala⇒Yaoundé 16:30- Discussions with JICA	Travel (by land) : Douala⇒Yaoundé 16:30-Discussions with JICA	16:30- Discussions with JICA	Travel (by land) : Douala⇒Yaoundé 16:30- Discussions with JICA
25		1	Thu	Travel (by air) : Yaoundé⇒Paris	Travel (by air) : Yaoundé⇒Paris	Travel (by air) : Yaoundé⇒Paris	Travel (by air) : Yaoundé⇒Paris	Travel (by air) : Yaoundé⇒Paris	Travel (by air) : Yaoundé⇒Paris
26	12	2	Fri	Travel (by air) : Paris⇒Narita	Travel (by air) : Paris⇒Narita	Travel (by air) : Paris⇒Narita	Travel (by air) : Paris⇒Narita	Travel (by air) : Paris⇒Narita	Travel (by air) : Paris⇒Narita
27		3	Sat	Arrive in Japan	Arrive in Japan	Arrive in Japan	Arrive in Japan	Arrive in Japan	Arrive in Japan

Source: JICA survey team

Table 1.5 Third Field Survey Schedule【from January 22th to 29th 2017】

	Month	Day		Leader / Road Traffic Planning
				Junji OGATA
1	1	22	Sun	Travel (by air): Haneda ⇒Paris Travel (by air):Paris⇒Douala
2		23	Mon	9: 30 Explication of the DFR to CUD (Akwa)
3		24	Tue	11: 00 Explication of the DFR to CUD (head office at Bonanjo)
4		25	Wed	AM: Travel (by land): Douala⇒Yaoundé 15:30 Report to JICA
5		26	Thu	11:00 Explicatoin of the DFR to MINTP
6		27	Fri	14:00 Report to Embassy Travel (by air): Yaoundé⇒Paris
7		28	Sat	Travel (by air): Paris⇒Narita
8		29	Sun	Arrive in Japan

Source: JICA survey team

1.5 Main Survey Areas

(1) Extended Douala City

Photo A: Current bridge road

Photo B: Rt. 3 (right bank)

Photo C: National Highway 5

Photo D: 3rd Bridge route (right bank)

Photo E: Planned 3rd Bridge location (from right bank)
Note: River width: approx. 500 meters

Photo F: Regional Road 14 (north bound)

Source: JICA survey team

Figure 1.2 Douala Wide Area Map and Photographs

(2) Right-side bank of Douala

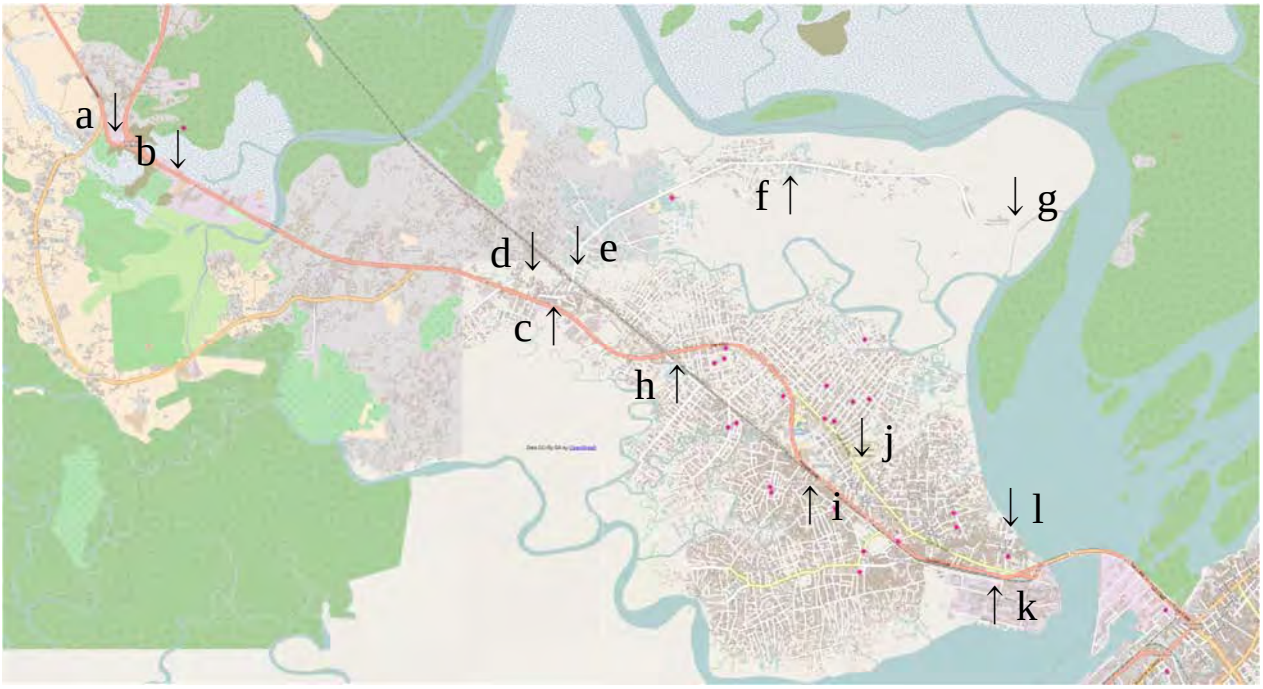


Photo a: Intersection of National Highways 3 and 5

Photo b: Weigh Station (National Highway 3 west)

Photo c: Connecting point of the Djebale Bridge route (M/P) and National Highway 3

Source: JICA survey team

Figure 1.3 Right-side Bank of Douala City and Photographs (1/2)

Photo d: Building to be destroyed to expand of National Highway 3

Photo e: Crossing point of the Djebale Bridge route (M/P) and railroad

Photo f: Current road of the Djebale Bridge route (M/P)

Photo g: A view from the road end toward Wouri River

Photo h: Crossing point of National Highway 3 and railroad
Note: congestion point

Photo i: National Highway 3
Note: under improvement work

Photo j: Old road * In parallel with National Highway 3

Photo k: Crossing point of National Highway 3 and old road
Note: under improvement work

Photo l: A view of the Wouri River from a dock
Note: Starting point of the Wouri River survey

Source: JICA survey team

Figure 1.4 Right-side Bank of Douala City and Photographs (2/2)

(3) Left-side bank of Douala City (urban area)

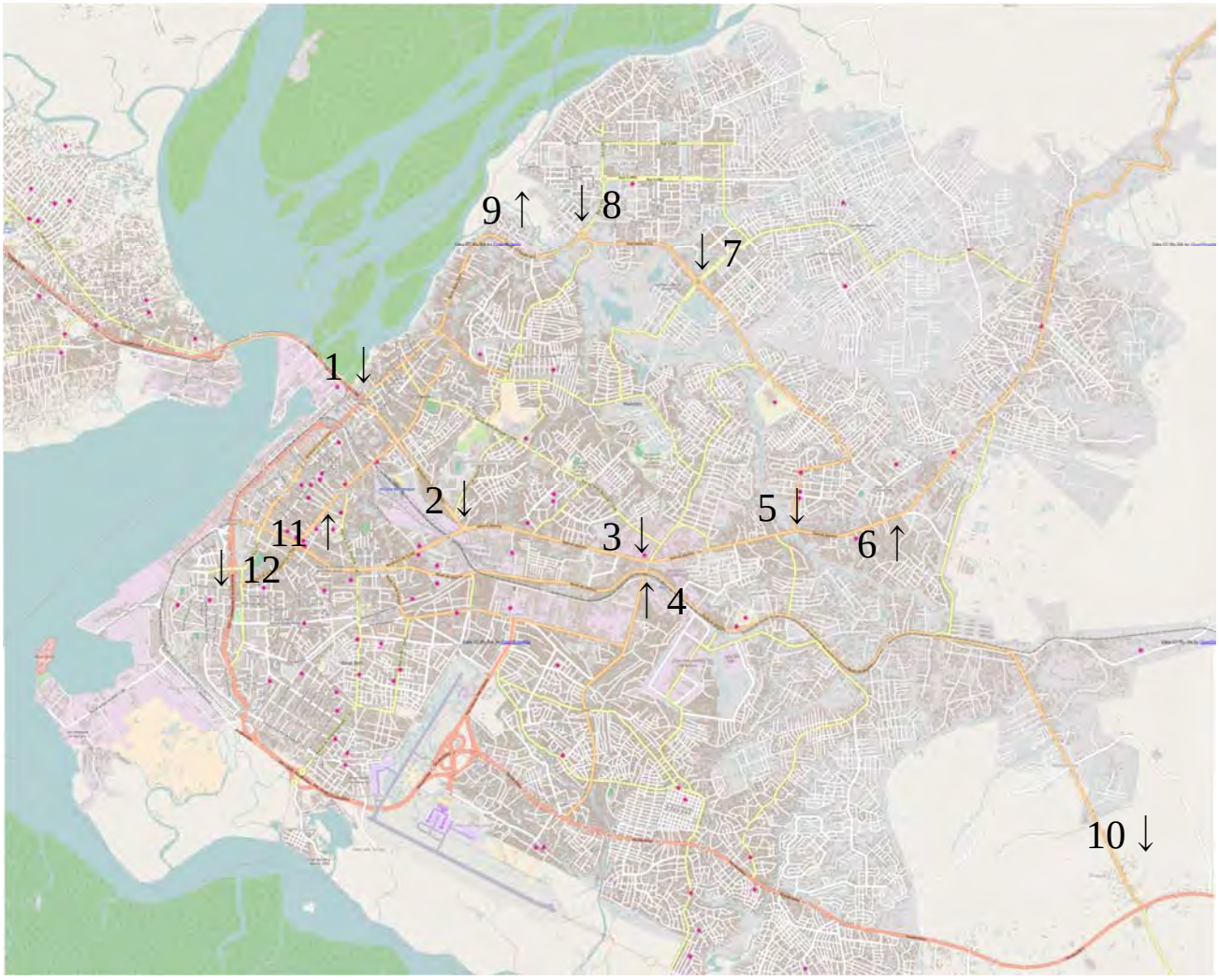


Photo 1: Deido crossing

Photo 2: Agip crossing

Photo 3: Ndokotti crossing

Photo 4: Tunnnel Ndokotti crossing

Photo 5: Cité des palmiers crossing

Photo 6: Connecting point of new route

Source: JICA survey team

Figure 1.5 Left-side Bank of Douala City and Photographs (1/2)

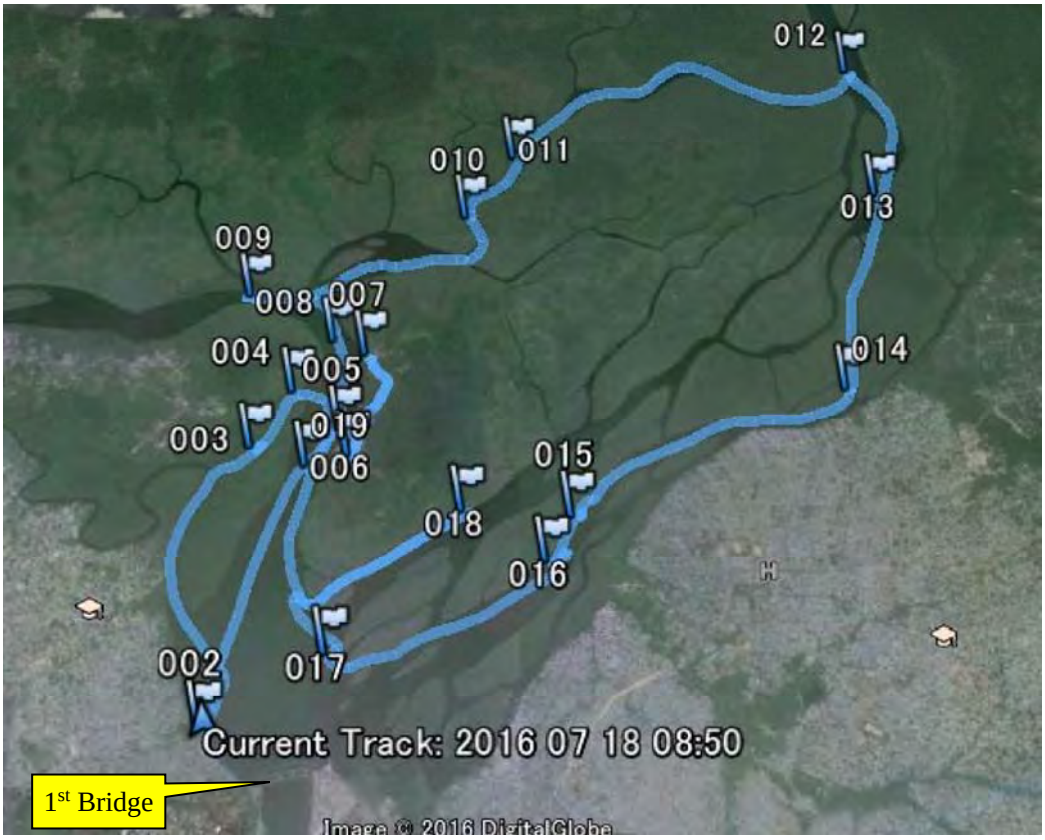
		
Photo 7: Bépanda crossing	Photo 8: Maëtur crossing	Photo 9: Connecting point of the Djebale Bridge (M/P) Note: Land alredy acquired
		
Photo 10: Weigh Station (east of National Highway 3)	Photo 11: CUD Note: Survey team office is set up.	Photo 12: MINTP in Douala

Source: JICA survey team

Figure 1.6 Left-side Bank of Douala City and Photographs (2/2)

(4) Wouri River

The Wouri River survey was conducted from a boat accompanied by C/P. The survey route and main survey points (002-019) are shown below.



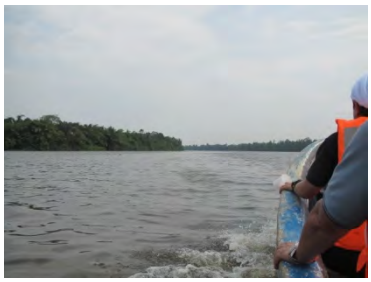
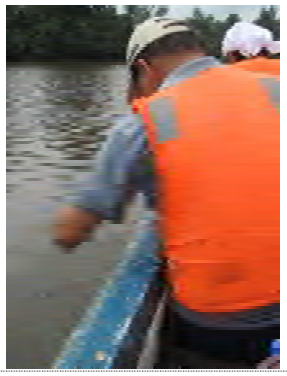
Source: JICA survey team

Figure 1.7 Wouri River Survey

		
002: A dock	003: A small river on the right bank Note: M/P route	004: A small river on the right bank Note: Upper reach of the distributary
		
005: A dock on Djebale Island	005: Village 1 on Djebale Island Note: Interview scene with islanders	006: Boring on the island
		
007: Village 2 on Djebale Island	008: Large river on right the bank side	009: A tributary
		
010: A large river on the right bank side	011: Sand extraction in the river	012: Separation point
		
013: A large river on the left bank Note: A distributary point	014: A sand collection site	015: A large river on the left bank

Source: JICA survey team

Figure 1.8 Wouri River Condition (1/2)

		
016: A large river on left bank Note: M/P route	017: A view of the existing bridge and 2nd Bridges	
		
018: A large river in the center Note: M/P route	019: A large river on the right bank Note: M/P route	Others: Simple water depth measurement Water depth was surveyed using a rope separately from the surveying (to be described later)

Source: JICA survey team

Figure 1.9 Wouri River Condition (2/2)

1.6 List of Interviewees

The people interviewed during the first and second surveys are listed below.

Table 1.6 List of Interviewees (1/2)

Organization	Title	Name
Central Ministries (Yaounde)		
MINTP	Director General	Guy Daniel ABOUNA ZOA
	Direction Generale des Etudes Techniques (Directeur General)	Virginie Lekeufack Metangm
		Theophile Kihenga
	Direction Generale des Travaux d'infrastructures (Chef de Cellule)	Mathurin langa
		Vitalis Olinga Olinga
	(Chef de Service)	ABDOU MOUMINI Cherif
MINDHU	Direction des operations urbaines Directeur	Ndjiba bami Armand Romuald
MINEPAT	Director of North-South Cooperation and Multilateral Organizations	NJIE Thomas KINGE
Regional Authorities (Douala City, Littoral Region)		
MINTP	Director Regional	MBOUSNOVM Simon Pierre
	Cabinet du Delegue Regional	Ndzana BomoJoseph Bertrand
		Damo Dourandi
	Comite Interministeriel de Suivi des Operations de Pesage Routier Station de Pesage Mobile du Littoral	Belebenie Natanael
MINCAF	Director Regional	Ewane Andre Marie
	Ingenieur des Travaux Assermente du Cadastre (Chef Service)	Ndjemba Alain Claude
	CADASTRE (surveyor)	ABENA Josiane
MINEPDED	Director Regional	Sibi BARE
	Déléguée de Douala	Babeth Epse Elondou
	Chef de bureau des Inspections et des Evaluations environnementales	Reine DJEUMEN
	Chef de bureau de développement durable	Robert ACHIL
	Chef de service du Developpement durebale	MBOGNING Diendoune
MINFOF	Director Regional	Djogo TOUMOUKSALA
	Chef de Service Regionale des forets	OMBOLO Tassi Engels
MINEPIA	Délégué Départemental de Douala	MIMBANG Guy Iréné
	Chef service	Isma-il Abd-el Nasser Faïçal
CUD	5th deputy to the Government Delegate	Gilbert NDOUKA MOUNDO
	Direction des Etudes, de la Planification, des Investissements et du Developpement Durable（DEPIDD)(Directeur)	Jean YANGO
	DEPIDD	TENE MBIMI Prisca Lablonde
	DEPIDD	Tune Gerald
	DEPIDD	ZOSSIE Hans
	DEPIDD	MBELLA Oscar
	Analyste des Questions Environnementales et Développement	Willy HEUKOUA
		GUIDIO MBELLA David
	Officer in charge of tourism development in Djebale Island	AGWALA Simon
	Officer in charge of land development and improvement planning	Olinga Moseph Maglerie
	Direction de l'Entretien des Infrastruvtures Routieres des Reseaux et de la Mobilite Departement de l'Entretien de la Voirie(DIREM)(Chef de Department)	Ngob Bonog Jean Georges
	DIREM	Essome John
		Jibia PALO Armelle

Source: JICA survey team

Table 1.7 List of Interviewees (2/2)

Organization	Title	Name
Village Representatives		
Ndobo	Chef de Ndobo (village chief)	ETOGO Druolla
Bonamatoumbe	Chef de Bonamatoumbe (village chief)	Kotto YETIA
Bonendale	Chef de Bonendale (village chief)	NDOUMBE Emmanuel
	Président de la commission (committee chairman)	EBOUMBOU Sammuel
	Secrétaire (secretary)	Jean Njoh ETANE
	Consultant en Immobilier (real estate consultant)	EYANE Michel Rene
	Notable de Bonendale (landowner)	BELLE BEBE Juin
Djebale	Chef de Djebale (village chief)	DIBOBE Issac
	Chef adjoint de Djebale (deputy village chief)	DOUMBE Philip
	Staff du chefferie (village officer)	DOUMBE Essobe
Bonamoussadi	Notable (landowner)	EBAKISSSE Mbene Jonas
		MPONGO Essiben
		NYAME Epée
		NEN Samuez
		MOOH Mouna Martin
		EBOA Kingue Cyrille
	Représentant (representative)	KANGUE Moukoury
		BAONDO Elhollo
Sodiko	Notable/Secrétaire du chefferie (landowner / village cheif's secretary)	Pepin Narcisse MAYIBA
Others		
Port Authority of Douala	Chief of Department des Estudes et dela Prospective	Mekia Cyrille
	Direction Study	Tune Gerald
	Direction Technique	Nkomo Ngbwa Jean-Claude
		Mbongo Ellom Andre
Akwa-nord Landing Center (sand collection)	Manager of Akwa-nord Fish Landing Center	Essesse NCOC
Limbe port	Port Controller Bota	Molonga Epraim
Kribi port	KRIBI port	Munongo Aboko Peter
		Nganmo Garga
University of Douala	gestion des écosystèmes forestières côtiers (Coastal Ecosystem Management Professor and Representative of NGO WCS)	Gordon Ajonami
Donor		
EU (EU Representative Office in Cameroon)	Charge de Programmes / Section Infrastractures Delegation de l'Union europeenne au Cameroun	Juan FERNANDEZ OSUNA
AfDB	Chief Transport Engineer	Joseph Kouassi N'GUESSAN
AFD	Directeur Adjoint	Sylvain Clement
	Charge de Mission Infrastructures	Benjamin Fouin
JICA Cameroon Office		
	Resident Representative	Shinji UMEMOTO
	Assistant Resident Representative	Saki ITO
		Saori CONAN
		Olivia Diane NOWOU epse BELE

Source: JICA survey team

2. Cameroon: An Overview

2.1 Natural Conditions

2.1.1 Location

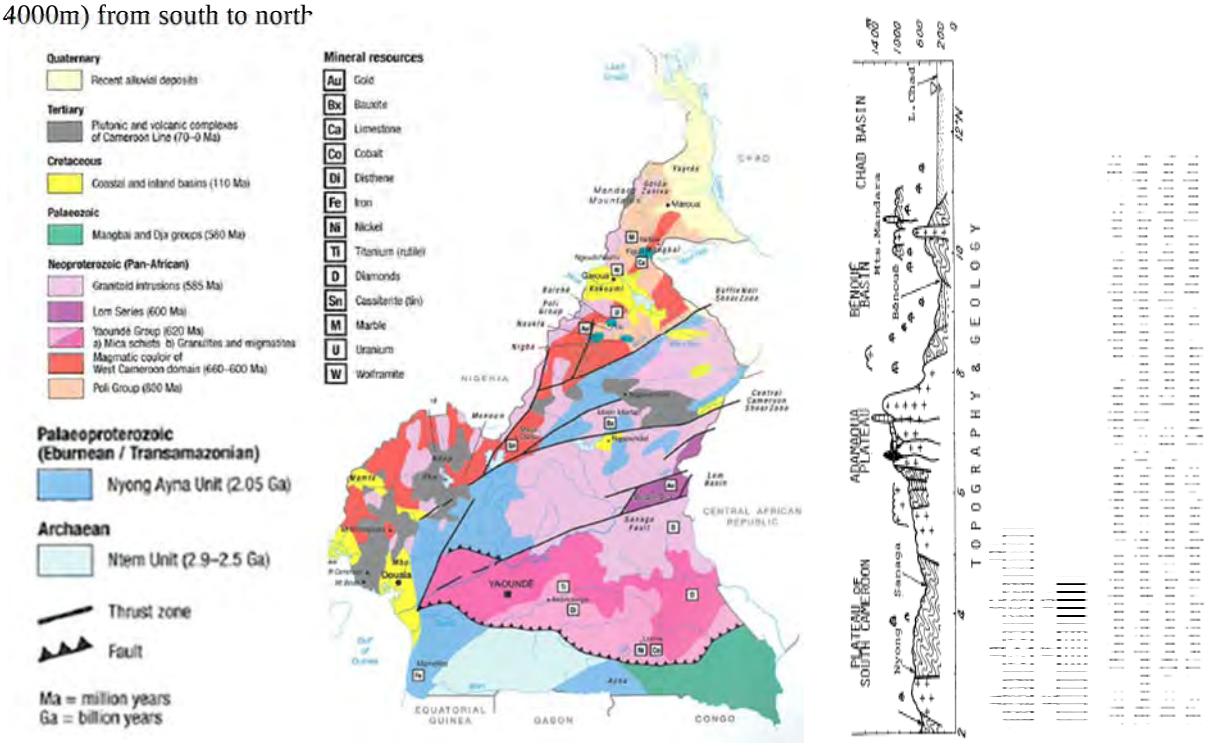
Cameroon is a republic facing the Gulf of Guinea in Central Africa and categorized Zone32N of the Universal Transverse Mercator UTM), situated 2° to 13° north and 8° to 16° east of the World Geodetic System (WGS84). The time zone is Coordinated Universal Time (UTC) +1, with an 8-hour time difference with Japan. It is bordered by Nigeria to the west, Chad to the northeast, the Central African Republic to the east, the Republic of the Congo to the southeast, Gabon to the south and Equatorial Guinea to the southwest.

It covers an area of 475,442km^2, approximately 30% bigger than Japan. A coastal plain with rainforest spreads over the southern region, Adamawa Plateau is situated centrally and the plain of savannas and steppes spreads northerly. Wetlands are situated around Lake Chad and Mt. Cameroon (4,095m), the largest active volcano in the African Continent, is located in the western region and a volcanic mountainous area covered in forest. With such diverse natural features, Cameroon is sometimes referred to as African in miniature.

2.1.2 Topography and Geology

(1) Topograpy and Geology of Cameroon

The inland area is generally plateau and the basement geology mainly comprises crystalline rocks of granite, etc., in the Precambrian time. Due to the undulating landscape, it is largely divided into four geomorphic regions: the South Cameroon Plateau (600 to 800m), Adamawa Plateau (1,000 to 1,400m), the low-relief region in the Bénoué River basin (200 to 500m) and the lowland area around Lake Chad (280 to 4000m) from south to north

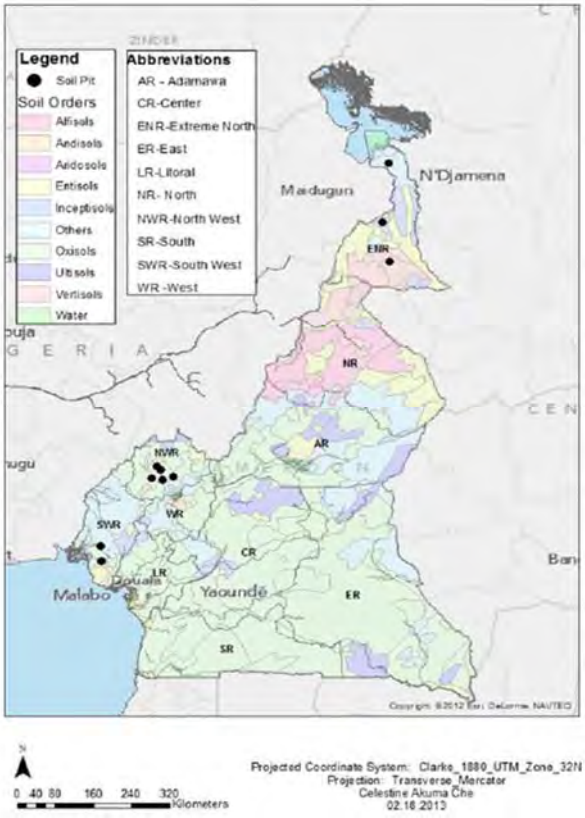


Source: Topography of forests and savannas and features of surface layer substances in inland Cameroon, Journal of Geography,
AFRICA ATLASES CAMEROON

Figure 2.1 Terrain Distribution Map

As for the geological age, its origin dates back to the Archaeozoic era; 2.5 to 3.5 billion years ago and today's terrain was formed after the three mountain-building activities in the Precambrian time and extension activities after the following Paleozoic age and Cretaceous, Tertiary and Quaternary periods.

The most dominant soil in Cameroon is lateritic red soil, which is also referred to as latosol or ferralsols classified as oxisols. Minerals prone to weathering in the hot and humid environment in a tropical environment are mostly dissolved and soil comprises ferric oxides and alumina; making it red to yellow. This type of soil is particularly prevalent in most areas of the southern and eastern provinces, where tropical forests are formed. The distribution of nitisols with relatively high active iron content as well as ferrasols is reported in Adamawa at altitudes of around 1,000 meters. Conversely, distribution of andisols is reported in the relatively hot western volcanic areas at high altitudes, while the distribution of luvisols and vertisols is reported in the arid zone north of Adamawa, where the precipitation is below 600mm.



Source: Regional Representative Soil Project for Cameroon : Incorporation of Cultural Identity into Earth Science

Figure 2.2 Soil Distribution Map

(2) Ground and Geological Conditions

The survey area is situated at the Wouri River mouth and there is concern that the ground is soft. Boring survey and indoor soil tests were locally subcontracted to review the Djebale Bridge and access road. The boring sites and test items are provided below.

No.	BH-1	BH-2	BH-3	BH-4
Area	Bonamoussadi	Bonamatoumbe	Wouri (surface)	Djebale
Test Item	Boring (50m) Standard penetration test Indoor soil test*	Boring (50m) Standard penetration test Indoor soil test*	Boring (54m) Standard penetration test Borehole lateral load test Indoor soil test*	Boring (51m) Standard penetration test Borehole lateral load test
Survey scene				

* Seven items listed below are tested in the indoor soil test.

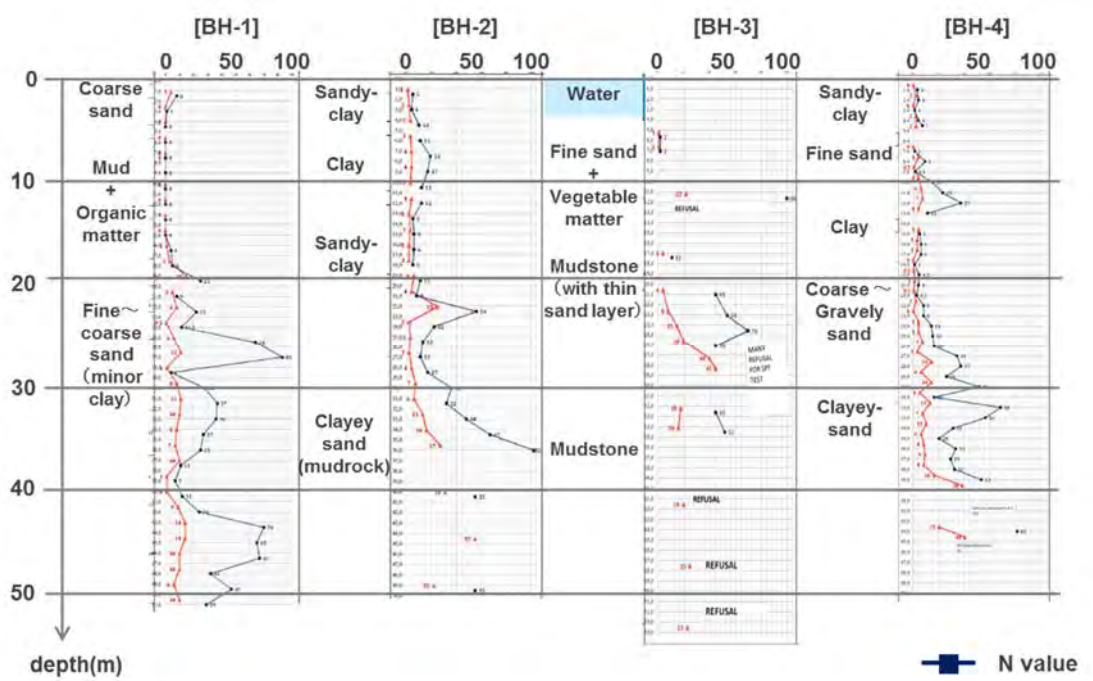
① Soil grain size test (sieve analysis/sedimentation analysis)
② Liquid and plastic limit test of the soil
③ Water content test of the soil
④ Dry/wet density test of the soil
⑤ Soil grain density test
⑥ Direct shear test of the soil (consolidated-drained (CD) test)
⑦ Ignition loss test (organic matter content)

Source: JICA survey team

Figure 2.3 Overview of Ground and Geological Survey

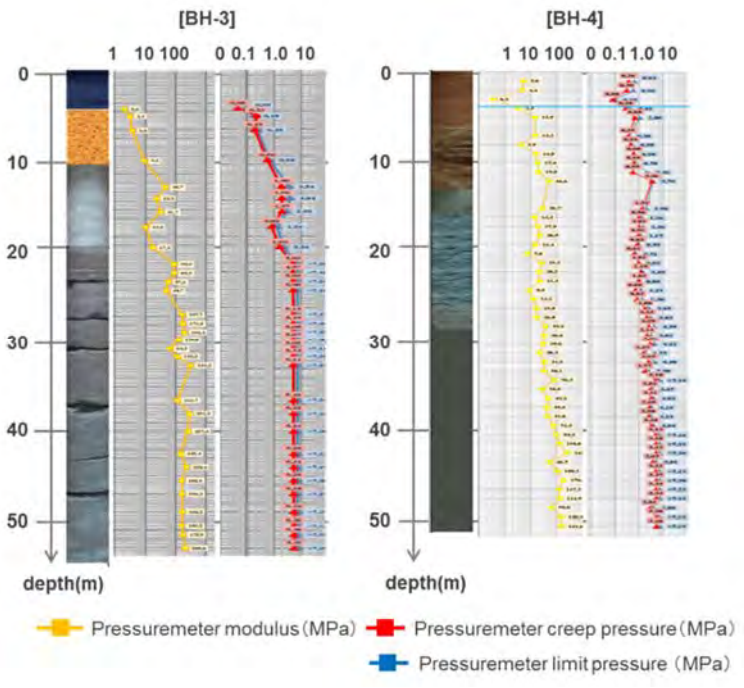
The standard penetration test is used to determine the relative stiffness and density of soil in-situ. These properties of soil are indicated by the N-value, the number of hammer blows required to drive the sampler into the ground.

The survey results are provided below. They show distribution of soft soil layers with low N value until 20 to 30 meters from the surface. The strength is unstable even at deeper places at some points and thus consideration needs to be given to the bearing ground and substructure in studying the bridge zone. As the groundwater level is also high, measures against the soft ground need to be studied in the embankment zone.



Source: JICA survey team

Figure 2.4 Standard Penetration Test Result



Source: JICA survey team

Figure 2.5 Borehole Lateral Load Test Result

Table 2.1 Indoor Soil Test Result

No. BH	Depth (m)	Soil Property	Grain Size Distribution (mm)			Liquid/Plastic Property*1			Water Content	Unit Weight※2 (t/m³)			Adhesion (Kpa)	Internal Friction Angle (°)
			%< 2.0	%< 0.5	%< 0.08	W_L (%)	W_P (%)	PI	W (%)	γ_d	γ_h	γ_s	C	ϕ
1 BH-1	4.5-5.5	Silty peat	-	-	99.2	56.0	33.1	22.9	103.8	0.66	1.37	2.6	-	-
2 BH-1	19.5-20.5	Sandy clay	81.2	58.8	38.2	Nm	Nm	Nm	8.6	1.88	2.06	2.71	-	-
3 BH-1	22.05-22.5	Silty coarse sand	99.2	73.8	7.5	Nm	Nm	Nm	28.3	1.45	1.86	2.72	11.5	16.5
4 BH-2	4.5-5.5	Sandy silt	98.6	97.6	93.0	75.6	34.4	41.3	47.6	1.31	1.82	2.69	6.4	12.5
5 BH-2	10.5-11.5	Clay	99.8	98.6	92.6	65.5	32.6	32.9	29.85	1.48	1.92	2.61	10.4	15.2
6 BH-3	9.1-10.1	Silty gravel	81.7	73.5	65.9	43.5	31.2	12.3	34.1	1.18	1.63	2.65	16.3	16.5
7 BH-3	19.0-19.45	Sandy silt	97.7	77.7	47.6	50.5	33.7	16.8	33.5	1.58	2.15	2.74	15.8	9.7

*1 W_L: liquid limit, W_P: plastic limit, PL: plasticity index

*2 γ_d: dry density, γ_h : wet density, γ_s: soil grain density

Source: JICA survey team

2.1.3 Weather

(1) Weather in Cameroon

Cameroon almost the entire area belongs to the tropical climate zone. The Adamawa plateau,the climate of which belongs to Savannah climate, spreads on the center of Cameroon. The climate of Cameroon is roughly divided into northern area and southern area by the Adamawa plateau. Furthermore, there is the coastal area spreading on low land along the Guinea bay, the climate of which is different from other areas.

The northern area from the Adamawa plateau belongs to a step climate, there is a large difference in temperature between day and night and there is a small amount of rain throughout the year other than rainy season. On the other hand, the southern Cameroon highland located in southern part from the Adamawa plateau belongs to a tropical rainforest climate zone. The average altitude of the area is at 650m. The area is covered with tropical rainforest and has a rainy season in September. Humidity of the area is slightly lower than the coastal area because of being away from the coastal plain.

The averaged monthly precipitation and temperature of Ngaoundere which represents the climate of the northern area, are shown in Figure2.6, the averaged monthly precipitation and temperature of Bertoua and Younde which represent the climate of the southern area are shown in Figure2.7 and Figure2.8. The altitude of Douala is about 90 m, and the climate of Douala which represents the coastal area is different from that of two areas mentioned above. This area spreads up to 15km -150km back from the Guinea Bay and is covered with tropical rain forest. Since the average altitude is in the 90m, it is very hot through a year. There is the most humid area in the world. The averaged monthly precipitation and temperature are shown in Figure2.9. The location of each city is shown in Figure2.11.

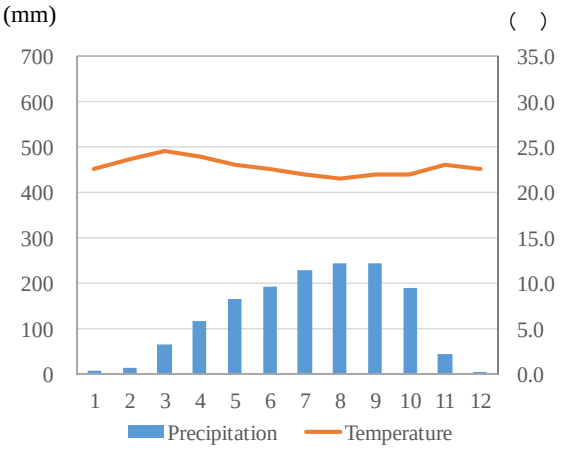


Figure 2.6 Averaged Monthly Precipitation & Averaged Monthly Temperature in Ngaoundere

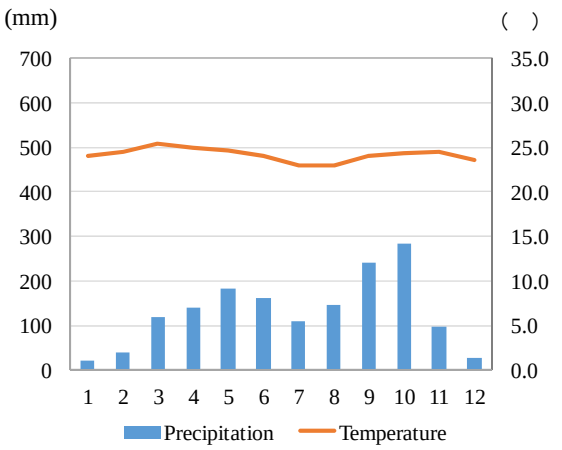


Figure 2.7 Averaged Monthly Precipitation & Averaged Monthly Temperature in Beltoua

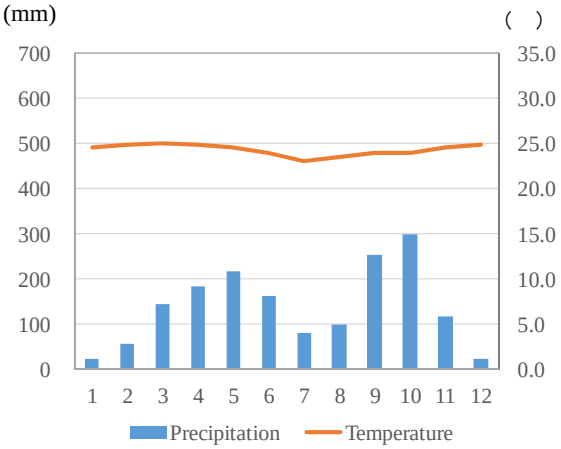


Figure 2.8 Averaged Monthly Precipitation & Averaged monthly Temperature in Younde

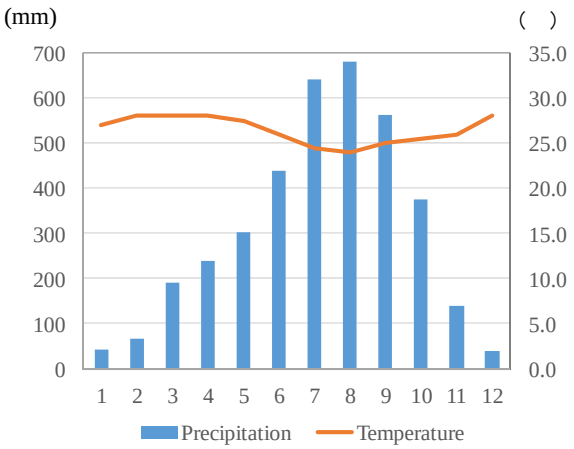
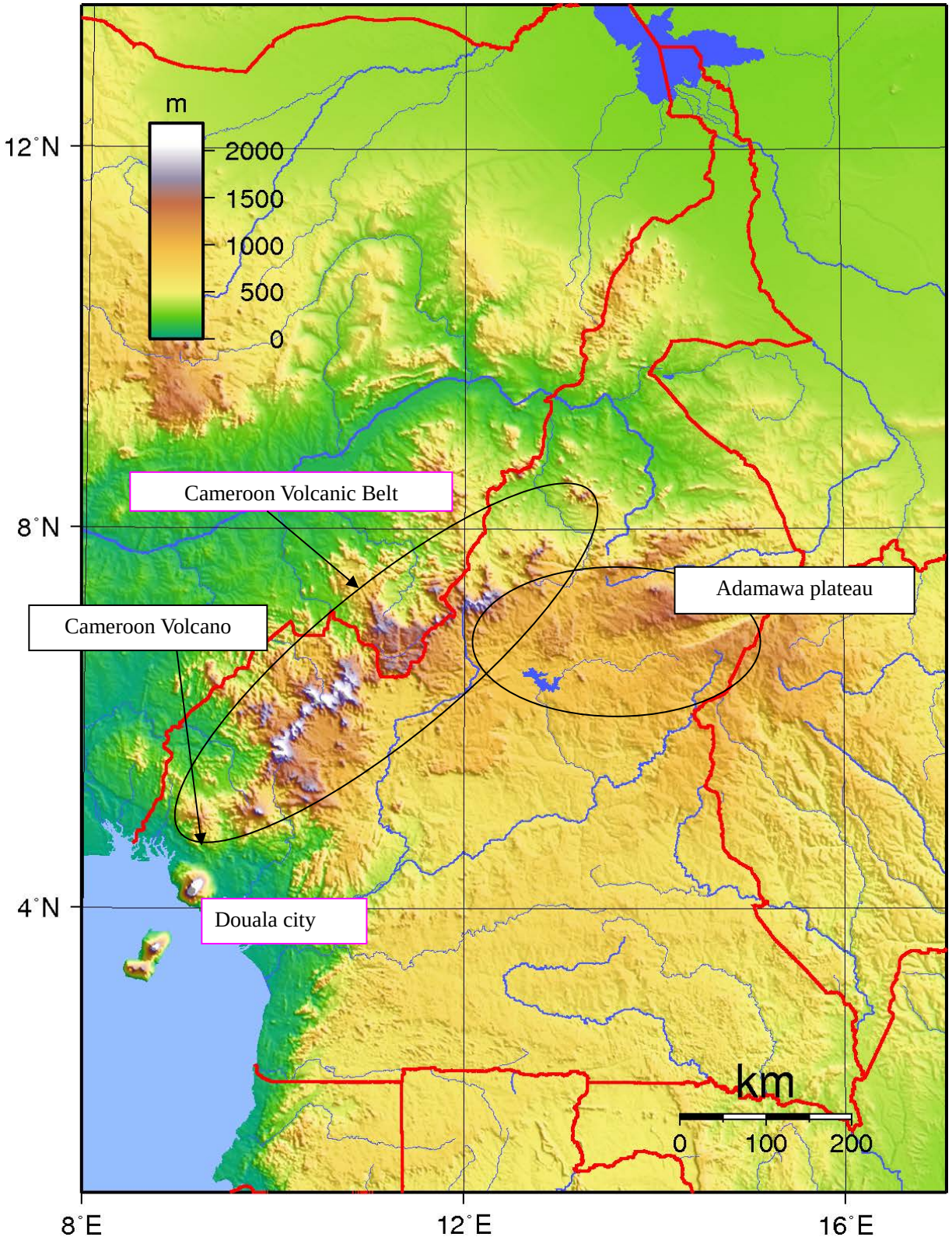


Figure 2.9 Averaged Monthly Precipitation & Averaged monthly Temperature in Douala

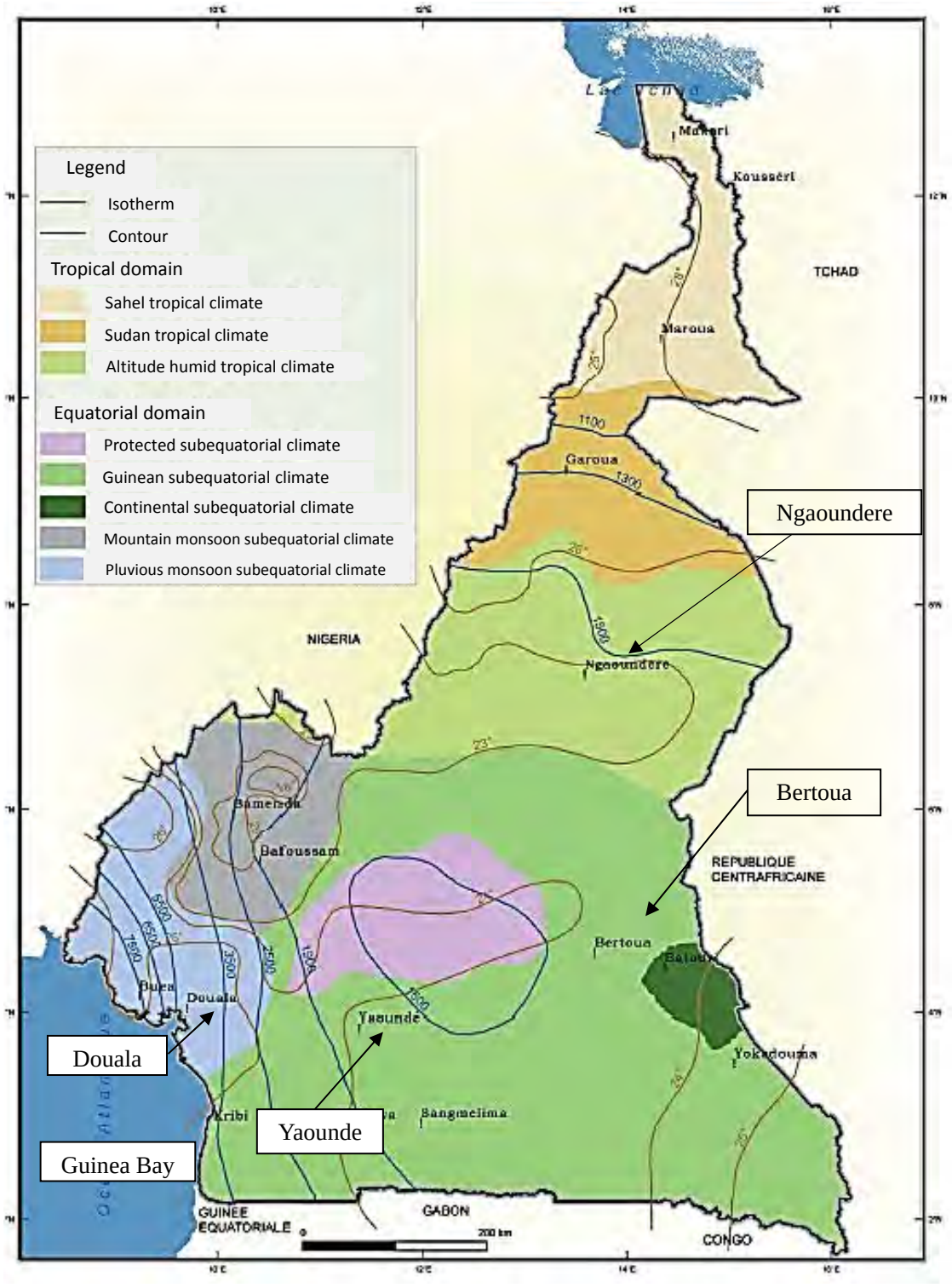
Source: Climate-Data.org（https://ja.climate-data.org）

The southwest slopes of Mount Cameroon, which belongs to the Cameroon volcanic belt running near the border with Nigeria (altitude 4,095m), has much special rain. There is also a place where annual rainfall reaches 10,680mm / year.



Source: lahistoria con mapas (https://en.wikipedia.org/wiki/Geography_of_Cameroon)

Figure 2.10 Cameroon Topograghic Map



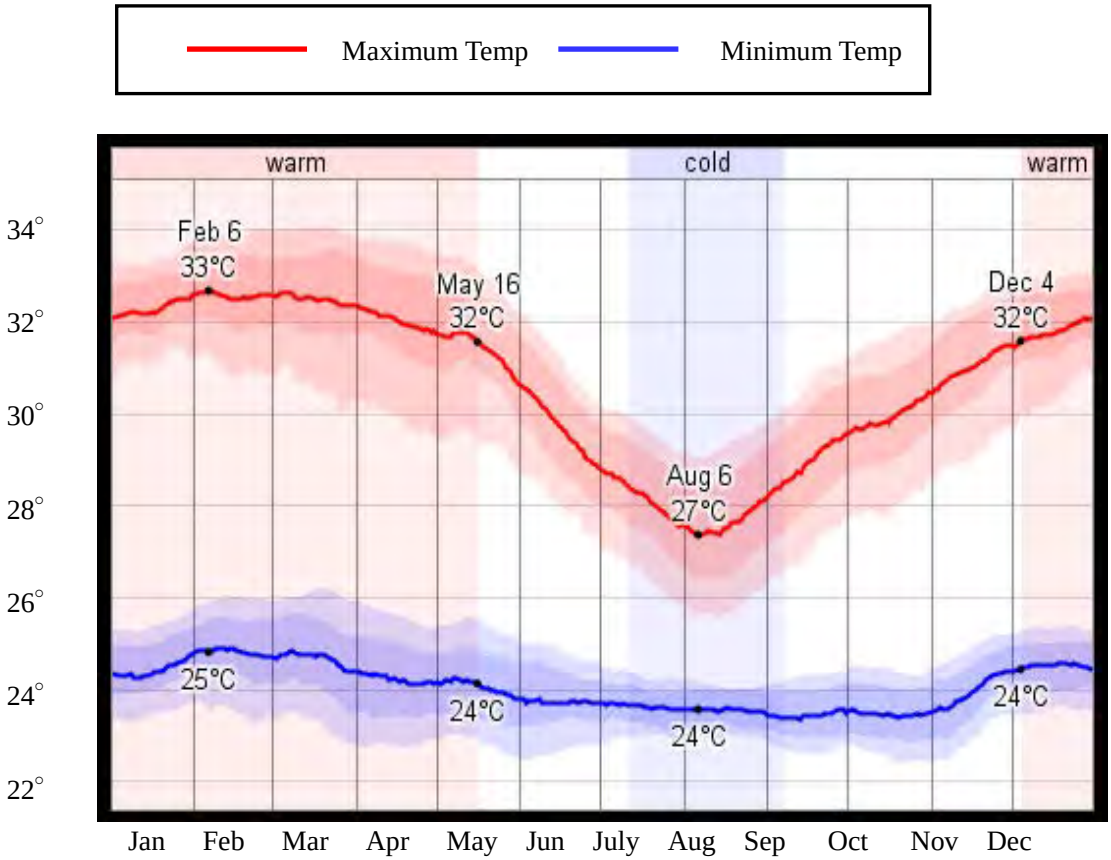
Source: Realisation des estudes de contournement de la ville de Douala, avec la construction d'un 3eme pont sur le fleuve Wouri

Figure 2.11 Isohyetal line and Isothermal line in Cameroon

(2) Climate in Douala (Temperature, Rainfall)

1) Temperature

The climate of Douala City belongs to the tropical monsoon climate with a short dry season, air temperature of which is from 23 degrees to 33 degrees throughout the year. Temperature in Douala is over 32 degrees from the beginning of December until middle of May. In particular, it is the hottest season in February. On the other hand, the coolest season of the year, temperature of which is less than 23 degrees, is in the middle of August.



Source: Weather Spark Beta

Figure 2.12 Yearly Temperature Change based on the historical records from 2000 to 2012 at Douala International Airport Weather Station

2) Rainfall

Rainfall of Cameroon has been observed in both the international airport of Yaunde and Douala on a daily basis. However, the observations of short-time rainfall amount such as rainfall per 10 minutes, 30 minutes and hour have not been performed.

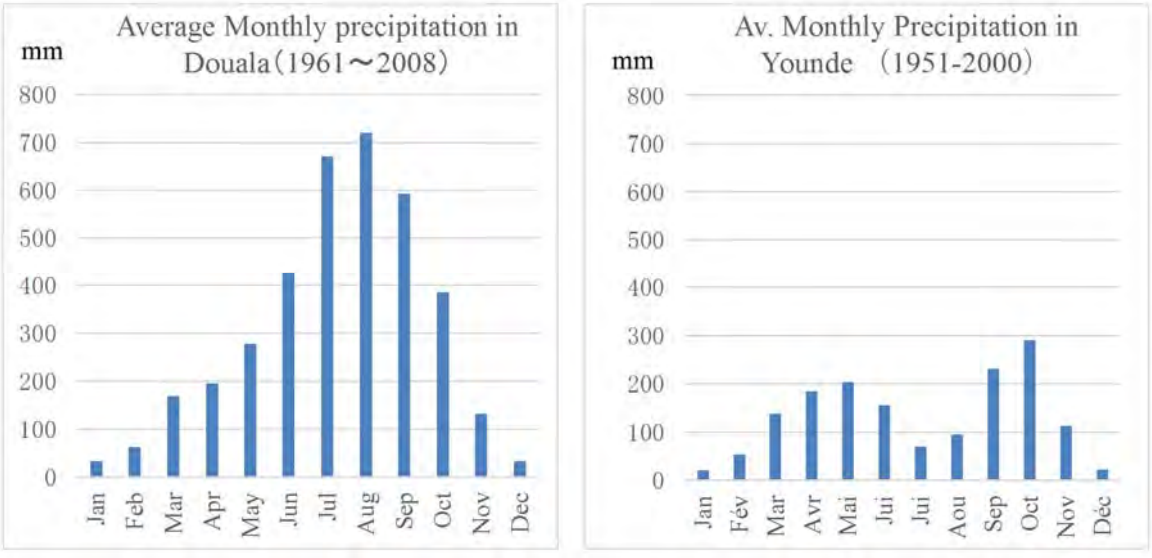
The annual rainfall of Douala in Coastal area is approximately from 3,500 until 4,300mm / year, the annual rainfall of mountainous region such as upstream of the Wouri River is generally from 2,500mm / year until 3,000mm / year.

Table 2.2 Average annual rainfall changes

Observation period	Average annual rainfall of every 10years
1961-1970	4,220.9 mm/year
1971-1980	3,812.0 mm/year
1981-1990	3,481.8 mm/year（Data missing for 1 year ）
1991-2000	3,480.5 mm/year（Data missing for 3 years）

Source: JICA Expert Team prepared based on the rainfall data of Douala airport

The Figures 2.13 and 2.14 show average monthly precipitation through a year from 1961 until 2008 in Douala. Douala city has much rain in July and August. In special, the rainfall amount in August exceeds more than 700mm per month. On the other hand, the rightside Figure2.14 shows the average annual rainfall of Yaunde, located in Cameroon highland is 1,575mm / year from 1951 until 2000. It is less than half of that in Douala City, and is quite different from that in Douala.

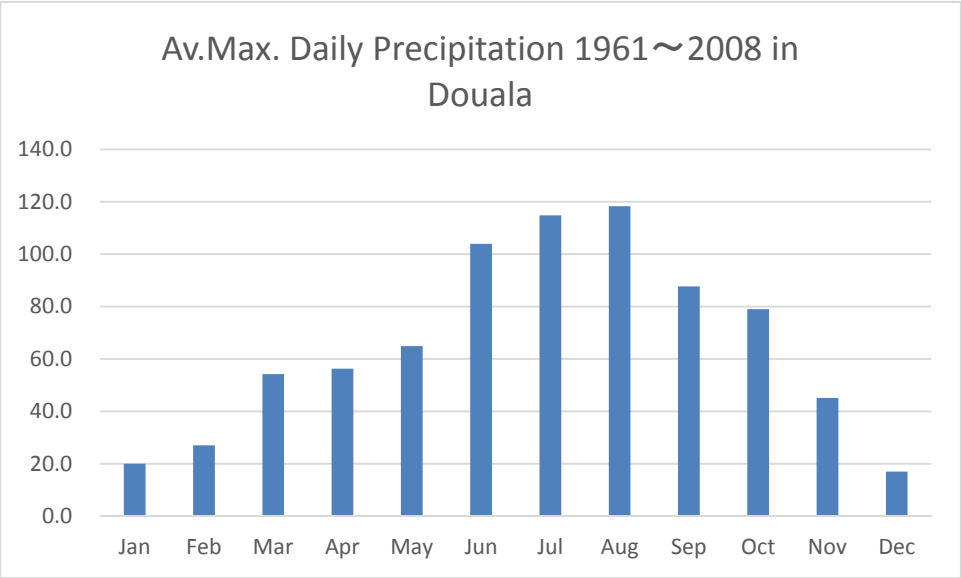


Source; JICA expert team prepared based on Douala airport record

Figure 2.13 Averaged monthly rainfall in Douala (mm/month)

Figure 2.14 Averaged monthly rainfall in Younde (mm/month)

Figure2.15 shows the Averaged maximum daily rainfall of each month from 1961until 2008 in Douala City. The averaged maximum daily rainfall in July and August is about 120mm / day.



Source: JICA expert team prepared based on the Younde airport rainfall record

Figure 2.15 Average monthly rainfall in Younde City from 1961until 2008

2.1.4 River / hydrology

(1) Classification of River basin in Cameroon

Many rivers in Cameroon flow down to the other neighboring countries, thus greatly can be classified into the following 5 river basin categories

1) The Chad Basin (Rivers flow into Chad)
→ The Logone River, The Vina River

2) The Nigeria Basin (Rivers flow into Nigeria)
→ The Mayo Kebi River, The Benue River, The Faro River

3) The Sanaga Basin (Rivere flow into Cameroon)
→ The Noun River, The Sanaga River

4) The Congo Basin (Rivers flow into Congo)
→ The Bok River, The Lobo River, The Sangha River, The Dja River

5) The coastal rivers basin (Rivers except the Sanaga River flow into the coast in Cameroon)
→ The Wouri River, The Nkam River etc.

The main rivers of Cameroon are the Benoe River, the Logone River and the Sanaga River.

The Sanaga River is the largest river, the length of which is 890km, flow into the Gulf of Guinea in the south of Douala City. The river head of the Sanaga River is the Mubakau Lake located at the central part of Cameroon.

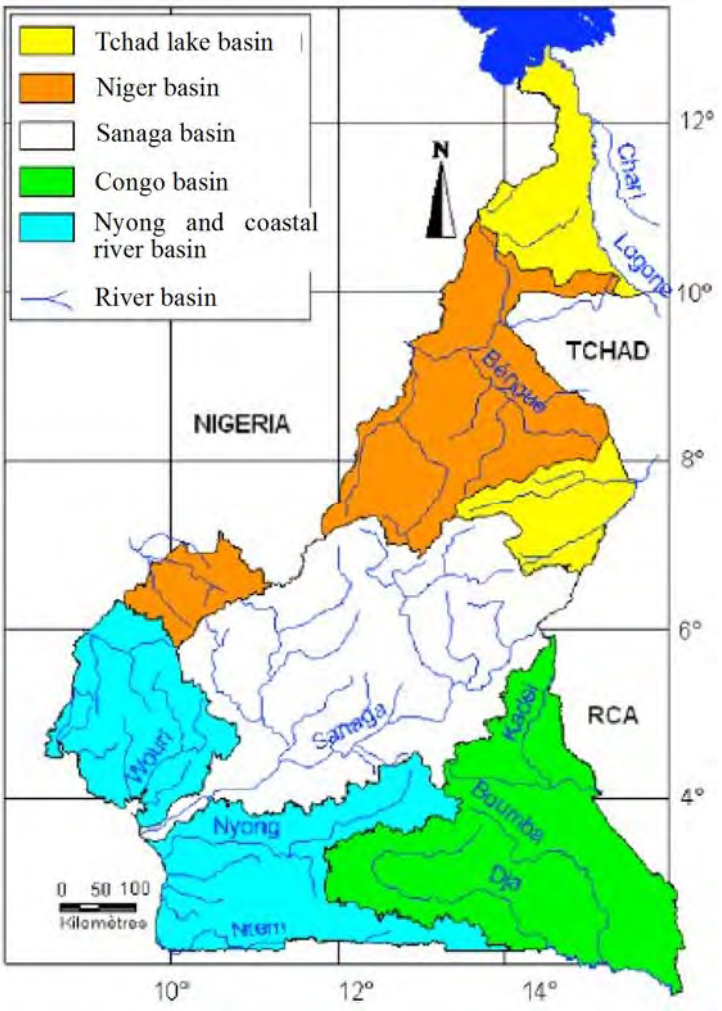


Figure 2.16 Classification of River Basins in Cameroon
(Source : Realisation des estudes de contournement de la ville de Douala,
avec la construction D'un 3eme pont sur le fleuve Wouri)

(2) Profile of the Wouli River

The basin of the Wouri River is located in the southwest of Cameroon. The Wouli River flows through the Northwest Province and the West Province, and flows in the Guinea Bay (Atlantic Ocean) at the Littoral Province in Douala.

The watershed area is estimated around 23,000km^2 by a simple measurement based on the Google Earth (Annotation; The basin boundaries is not necessarily clear). Water source is the mountains belonging to the Cameroon volcanic zone which locate in Bamenda region of southern area of the Northwest province about 200km upstream in the straight-line distance to the north from the estuary of the Wouri River. The altitude is assumed about 2,400m based on the Google Earth.

Two tributaries of the Makombe river and the Nkom River flow through the upstream of the Wouri River basin, and confluent at upstream of Yabassi and become the Wouri River there.

The width of the Wouri River is around 600 m at the point where the 3rd Bridge is considered at 17km upstream from the existing bridge. After passing through the point of the 3rd Bridge, the Wouri River is separated into 3 branch rivers, flow down the wetland of downstream of the Wouri River. The width of

wetland is around 6 km. The river inclination is very gentle. These branch rivers confluent at the current bridge and confluent again. The width of the Wouri River at the existing bridge (Where the 2nd bridge is under construction now) is around 720m.

Some islands are formed between the branches in the wetland. A constant width surrounding the islands is covered with mangroves, some hundreds fishermen live and are engaged in the fishery in the Djebale Island which is the largest island in the wetland.

Douala city have developed at both sides of the wetland. The current central part of Douala city is spreading on the terrace at the left bank of the wetland, the altitude of which is over 10m. The right side of the wetland is lowland area where has been developed rapidly due to economic growth in recent years. Although the altitude is low, there is a slight inundation at the upstream of the right tributary flowing to the wetland.

According to the simple measurement by Google Earth, the extension of the wetlands (corresponding to the river extension from the existing bridge to the planned 3rd bridge) is about 17km. Since the water surface elevation of the existing bridge is 1m, the water surface elevation at the planned 3rd bridge is around 6m. The river gradient of this section is estimated roughly 1 / 3,400 (about 3 / 10,000), it is very gentle slope.

For this reason, this section (the wetland area) is greatly affected by the tidal fluctuations of Guinea Bay, the flows of the 3 tributaries in the wetland to the upstream or downstream are caused by the ebb and flow tide several times a day. According to the field survey, the flow velocity flowing downstream toward the time of low tide was about 0.5m / s, the flow velocity toward the upstream at high tide was from 0.2m/s to 0.3m/s.

The existing bridge at the Wouri River Mouth was constructed in December 1951, it is the combined bridge of road and railway, railway runs at the middle of the bridge. This bridge was repaired and reinforced in 2007. Now, the new bridge (The 2nd Bridge) is under construction as a combined bridge of road and railway. The span of the existing bridge is approx. 40 meters with three spans. The 2nd Bridge is designed with a span of 130 meters with one pier.

Furthermore, there is the water pipe bridge at the upper side of the existing bridge. The elevation of pipe is higher than that of the girder of the existing bridge.

We had the interview with the residents living near the river bank and in Djebale Island which is the largest island in the wetland. According to the interview with the residents in Djebale Island, the resident who is more than 70 years old told us that the river water level at flood has not risen up to the threshold of their house in the past (about altitude less than 10m).

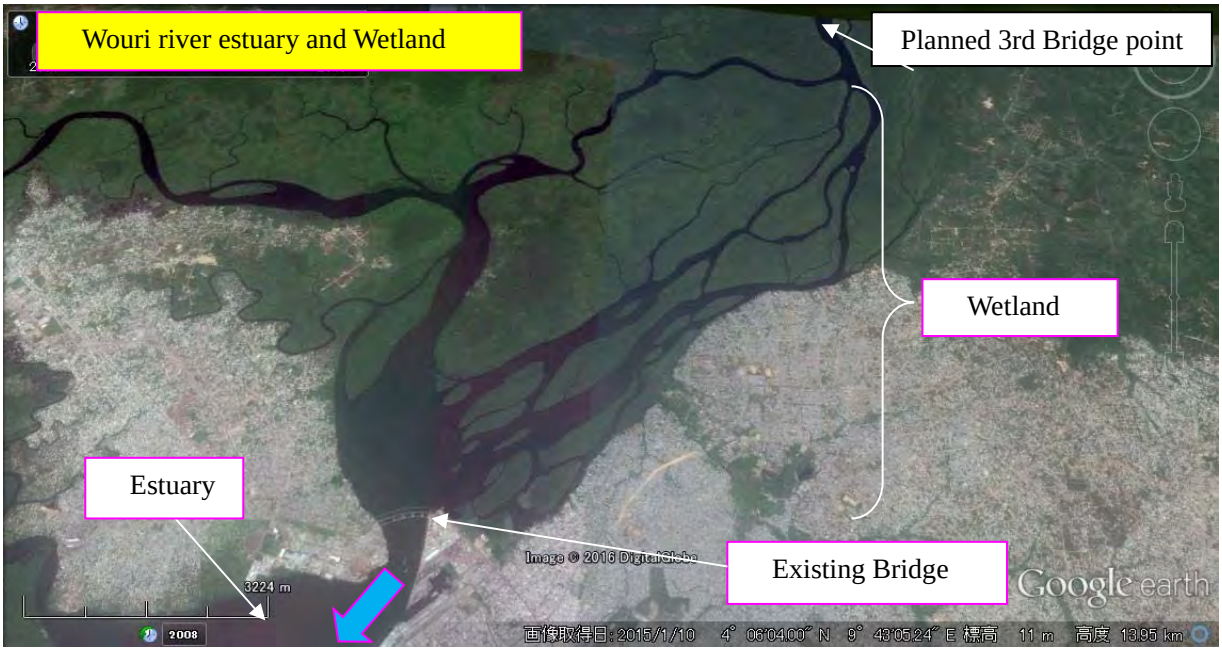
Since there is almost no flood damage, the river embankment has not been constructed as far as we can see the lower reach of the Wouri River, especially not only river maintenance but also management of rivers for flood has not been carried out.

Moreover, it should be noted that, in this section, because the river gradient is very gentle and flow rate is very slow, there is a large amount of river sand on river bed, river sand harvest is actively conducted here.

It was told by the CUD officer that when planning the facility development in the river, such as the bridge, "Environmental Impact Study" is done on a case-by-case basis and if environment impact is predicted, the measures to remove or lessen will be conducted.

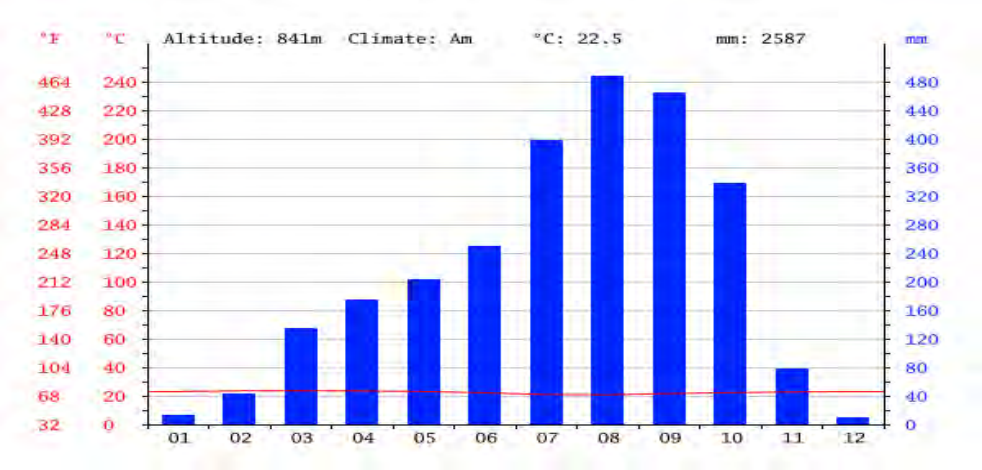
A large inlet is formed in the downstream of the existing bridge to lead to the Guinea Bay. It is about 36 kilometers in a straight line from the Guinea Bay to the inlet.

The precipitation around the Wouri River is compared with that of some regions. In the comparison of the monthly average precipitation of Nkongsamba (Figure 2.18) and Bafang (Figure 2.19) in a mountainous area in the upstream with that of the coastal city of Douala (Figure 2.13), the monthly average of Nkongsamba and Bafang from August and September is approx. 30% and 50% less than that of Doula, respectively. (See Figure 2.20 for their location.)



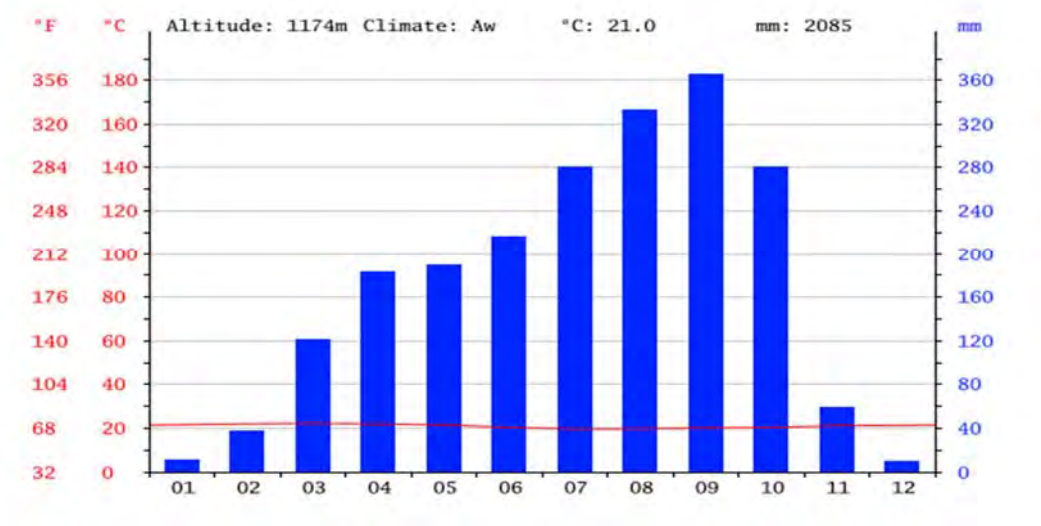
Source: JICA survey team

Figure 2.17 Satellite Image of the Wouri River estuary and the Wetland



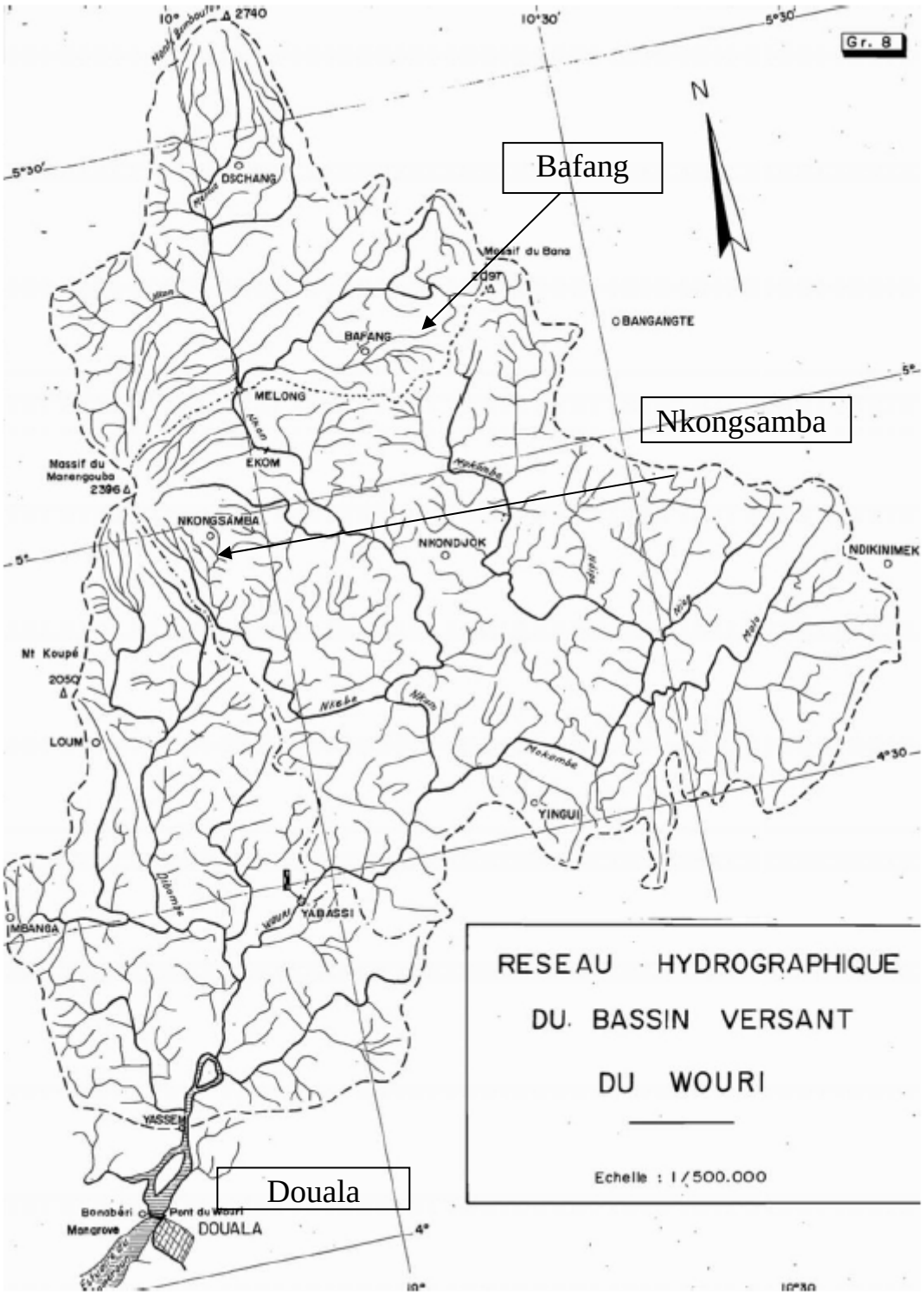
Source: Climate-Data.org

Figure 2.18 Averaged Monthly Precipitation & Temperature in Nkongsamba



Source: Climate-Data.org

Figure 2.19 Averaged Monthly Precipitation & Temperature in Bafang



Source: Realisation des estudes de contournement de la ville de Douala, avec la construction d'un 3eme pont sur le fleuve Wouri

Figure 2.20 The Wouli River Basin map

(3) Salinity Concentration of the Wouri River marshlands

The electric conductivity of the Wouri River water was measured in the filed survey and the results are provided below. In the August survey (1st field survey), surface water was collected from the river immediately after rain in the wet season and thus the values might have been lower than usual. However, in the November survey (2nd field survey) in the fry season, water was collected from the middle depth and the values were also low and thus it is reasonable to say that the salinity concentration around Djebale Island is low. It is mainly likely to be because the island is situated in the river approx. 40 kilometers from the Guinea Bay.

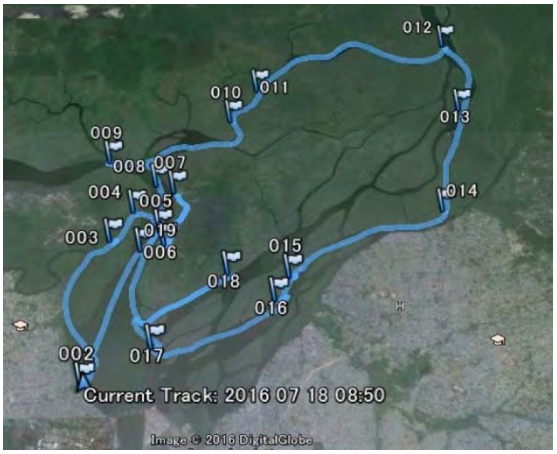
Taking water samples

Sample water (Nov. 24, 2016)

Measurement example

Source: JICA Survey Team

Photo 2.1 Measurement of Salinity Concentration around Djebale Island



Sample Collection Point	Date of Sample Collection	Depth	Electric Conductivity* (μS/cm)
002	2016/8/24	Surface	105
006,011 012,015	2016/8/24	Surface	30-31
016	2016/11/24	2m	70-72
018	2016/11/24	1m	85-98
019	2016/11/24	3m	59-77

* The value of ordinary tap water is 100 to 200 μS/cm and seawater is around 50mS/cm.
There is a consistent relationship betwneen solution concentration and electric conductivity at certain temprature and the concentration can be estimated from the electric conductivity
(0.1% (NaCl concentration) ≒ 2.0 mS/cm (electric conductivity)).
:Horiba Ltd. website (relationship between electric conductivity and salinity concentration)

Source: JICA Survey Team

Figure 2.21 Estimation of Salinity Concentration around Djebale Island

(4) Outline of Douala Port (The river mouth of the Wouri River)

Douala port, the largest port in Cameroon, had been constructed at the lower reach on the left side of the existing bridge which is located around the Wouri River mouth. Portuguese arrived here for the first time in the 15th century, after that Douala port became the important spot of Slavery Trade. When Cameroon became the German colony of Germany, the capital of Cameroon was placed in Douala. After the First World War in 1919, French was the colony owner in place of German. During this time, Douala Port is first developed on the right bank and after that the current Douala port area seems to have been formed in the shape of spreading of left bank to the Wouri River by reclaiming left bank.

Source: USC Digital Libraries, University of Southern California

Figure 2.22 Map of Douala port in 1884

Source: USC Digital Libraries, University of Southern California

Figure 2.23 Map of Douala port in 1913

Source: USC Digital Libraries, USC University of Southern California

Figure 2.24 Map of Douala Port in 1919

Source: Geo Atlas.com

Figure 2.25 Map of Douala Port-Now

Source: USC Digital Libraries, USC University of Southern California

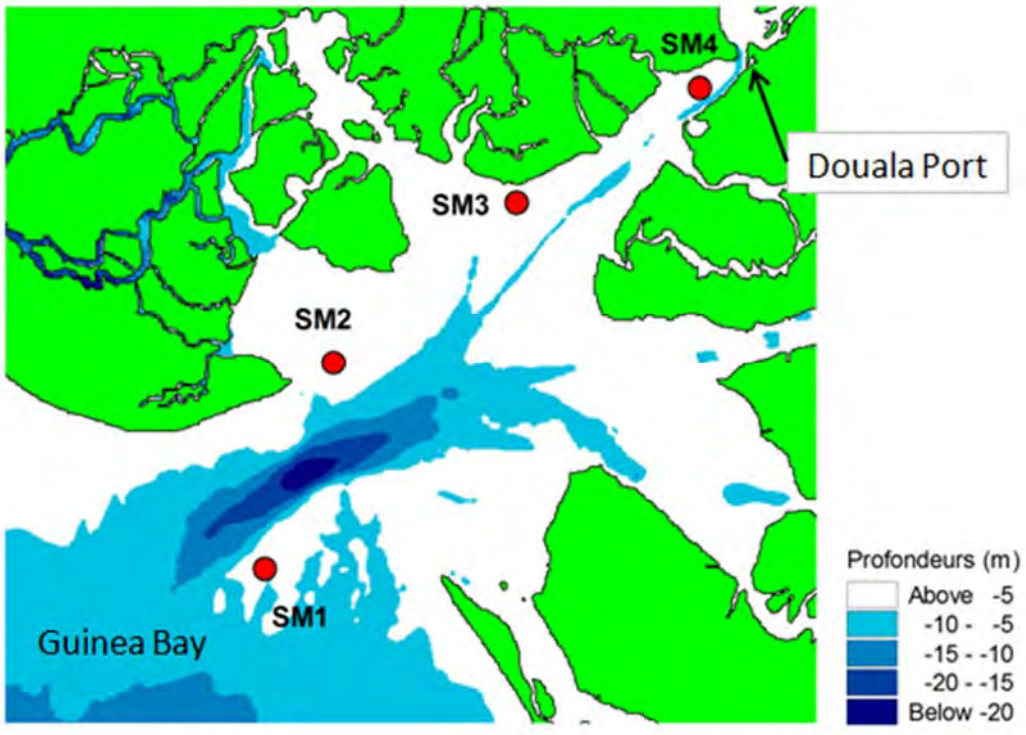
The maps in the previous page are those of old Douala Port.

According to the interview with the port authority, the water design depth of the port is 7 meters. However, the water depth increases by 2 meters to 9 meters at high tide and ships with a draft of 9 meters can enter the port at high tide. The mean high sea level of the port is 2.25 meters and the highest sea level for the last 10 years is 3 meters according to the interview.

(5) Tidal level of Douala port

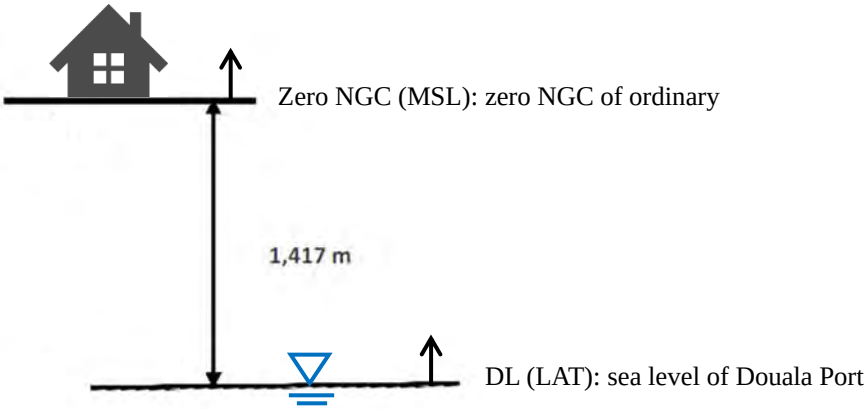
The Douala Port is managed by the Doula Port Authority. The sea level is measured at four observation points in the inlet between the Guinea Bay and Douala Port. The points (SM-1 to SM-4) are shown in Figure 2.25. SM-1 was in the Guinea Bay and SM-4 was on the opposite side of the Douala Port. However, currently, only SM-2 and SM-4 are actually functioning. The sea level record of the two points is available from 1984 to the present. However, the record of the port we obtained from the port authority is that from 1990 to 2012 and the record of several years during the time is missing.

According to the interview, the sea level of the Douala Port is indicated in the height from the datum line (hereinafter referred to as “DL”) that is 1.417 meters below the mean sea level (hereinafter referred to as “MSL”) (See Figure 2.27.). The height of DL is identical with the lowest astronomical tide (hereinafter referred to as “LAT”), according to the interviewee. The altitude of ordinary facilities is indicated in the standard Cameroon line (Zero Nivellement Général du Cameroun, hereinafter referred to as “Zero NGC”) that is DL plus 1.417 meters.



Source : CAPTEURS OCÉANOGRAPHIQUES POUR LE SYSTÈME DE MONITORAGE ENVIRONNEMENTAL DU PORT AUTONOME DE DOUALA, CAMEROUN, 2005

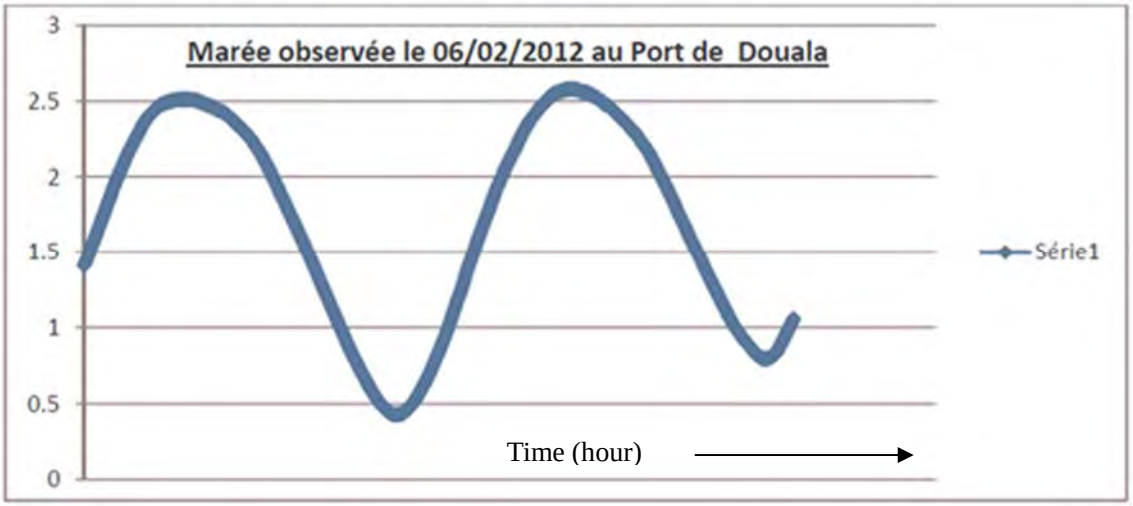
Figure 2.26 Positions of measuring stations



Source: Douala Port Authority

Figure 2.27 Sea Level DL of Douala Port

The Douala Port is situated 7 kilometers upstream from the Wouri River mouth and much affected by the sea level of the tide of the Guinea Bay. The gap of the sea level is around 2 meters on average. The record of February 6, 2012, is shown as an example in Figure 2.28.



Source: Douala Port Authority

Figure 2.28 General Tidal Curve at Douala port

(6) Water level at the Djebale Bridge

The water level at the bridge when the Wouri River is flooded needs to be estimated in the planning of the Djebale Bridge. However, there is no water level observation point in the river. As a result, it is estimated from the record of the sea level observation point (SM-4) on the opposite side of the Douala Port 2.3 kilometers downstream of the bridge construction site.

The annual highest sea level at SM-4 is shown in Table 2.3. It is between 2.70 meters and 2.90 meters from 1990 to 2012. (However, the record for 12 years in the period is not obtained.) As the record for those years is not obtained, the highest level at the Douala Port is assumed to be around 3.0 meters and the level at the Djebale Bridge can be estimated from it. In the estimation, the slope of water surface from the water level to the bridge construction site needs to be taken into consideration.

Table 2.3 Yearly Maximum Tidal Level at SM-4 Tidal Station in Douala Port

Unit: m

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998
Tidal level	2.80	No Data	No Data	2.90	2.90	2.80	No Data	No Data	No Data
Year	1999	2000	2001	2002	2003	2004	2005	2006	2007
Tidal level	No Data	No Data	No Data	No Data	No Data	No Data	2.70	2.80	2.80
Year	2008	2009	2010	2011	2012	2013	2014	—	—
Tidal level	No Data	2.75	2.80	2.80	2.80	2.75	2.80		

Source: Douala Port Authority

(7) Changes in the river channel (The Wouri River marshlands reach)

Not only securing river cross-section for the design flood discharge but also determining the range that river channel will change is requested in bridge design. It is necessary to confirm whether the river channel at construction site of bridge is stable or not, because river channel is not fixed, and likely to change especially if the river improvement has not been performed.

Because the river channel is likely to vary over the years, it is desirable to predict the river channel change in future by comparison with the difference between the recent river channel and satellite image of as much as possible old river.

The satellite images used as reference materials in the survey were from satellite Landsat that has taken images of the globe for the longest time since the National Aeronautics and Scape Administration (NASA) launched it in 1972 as the world's first earth observatory satellite.

However, since there is a noise and the impact of the cloud in images, images that can be compared with the current image (2016) is only 4 images in 1975, 1986, 2014, and in 2015.

The change of the river channel during the period (the difference of position) was confirmed by comparing the current satellite image of 2016 and the satellite image of 1975 which is the oldest image.

Superimposing the coordinates of the satellite image in 1975 on the coordinates of the satellite image in 2016 was tried to confirm the change of the river course. However, the both coordinates could not be coincided accurately, because the location information of the image in 1975 must be wrong due to the old airframe of the satellite. Therefore, the image in 1975 was superimposed on the current image (2016) by tracing manually for comparison. Consequently, it was judged that there is hardly change of two river channels overall.

Source: Landsat Satellite Image by NASA

Figure 2.29 Satellite Image of the river mouth of Wouri Riverat taken in 1975

Source: Landsat Satellite Image by NASA

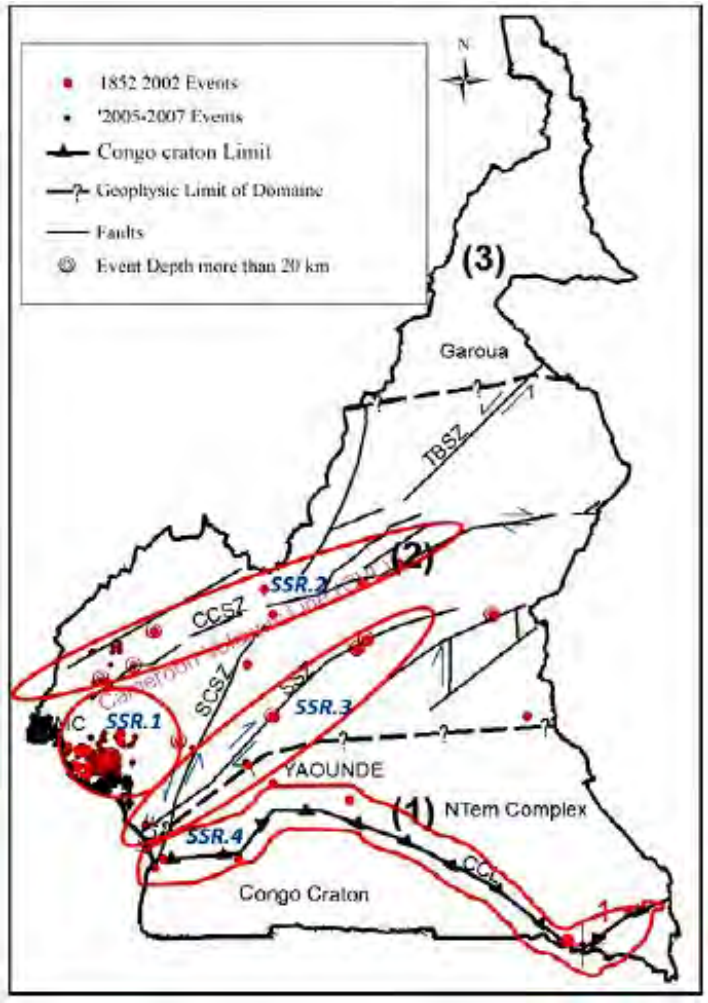
Figure 2.30 Satellite Image of the river mouth of Wouri River taken in 2016

According to the field investigation in the marshland of the Wouri river mouse by boat, some width around the island is covered so thickly with mangrove that the edge of the water seems to be stable.

The inhabitants in DJebale Island were not aware of disappear and evasion of mangrove around the island. It can be judged that there are not any changes of the river channels in the marshland during past some 40 years.

2.1.5 Earthquake

Earthquakes that occur in Cameroon are mainly categorized into four zones. It is believed that they derive from faults in three zones (SSR.2 to 4) and are caused by volcanic activities of Mt. Cameroon in one zone (SSR.1). According to recent observation results, more than 90% are caused by volcanic activities of the mountain with seismic intensity peaking at magnitude 4.4 in SSR.1.



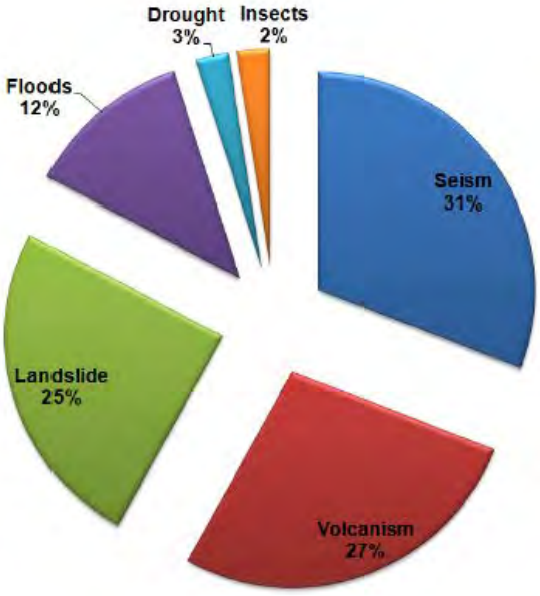
Seismic Source Regions (SSR.) : SSR.1 Mount Cameroon Seismic Source
SSR.2 Central Cameroon Seismic Source
SSR.3 Sanaga Seismic Source
SSR.4 Congo Craton Seismic Source

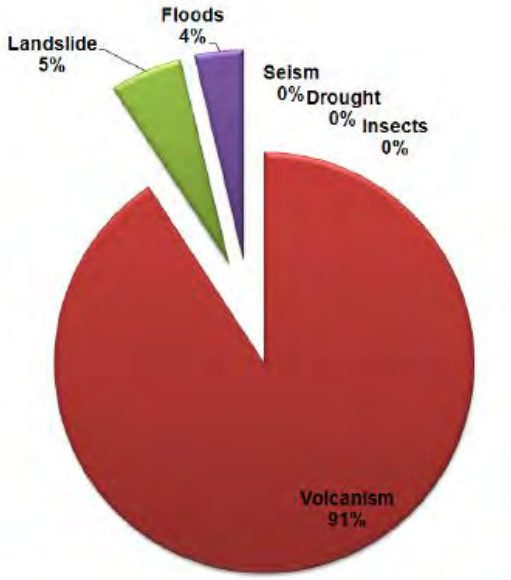
Source: Crustal Structure and Seismogenic Zone of Cameroon : Integrated Seismic, Geological and Geophysical Data

Figure 2.31 Earthquake Distribution Map

2.1.6 Natural disasters

Natural disasters in Cameroon include earthquakes, volcanic activities, floods, landslides, droughts and insect damage.





Source: Mapping of natural hazards in Cameroon

Figure 2.32 Ratio of Natural Disasters

Figure 2.33 Ratio of Victims of Natural Disasters

Mt. Cameroon continue to erupt every 10 to 20 years; causing earthquakes as described above. A large volume of CO2 was also released in the limnic eruptions of Lakes Nyos and Manoun of Mt. Cameroon that occurred in the mid-1980s, causing approx. 1,800 fatalities. In response to the recent increase in CO2 concentration in the area, the SATREPS program, comprehensive measures and human resources development to prevent gas disasters involving volcanic lakes in Cameroon (2011-2016), was implemented to analyze the phenomena and take countermeasures.

Major disasters around Douala City in the survey area include floods, which permanently affect the Wouri River and its surrounding wetlands. Although they are caused by rainfall during the wet season and lowland topography, bad drainage development and waste left in the drainage channel are also said to be problematic.

Table 2.4 Floods in Douala City (2009 to 2013)

N°	Dates	Affected neighbourhood
1	13 September 2009	Bonanjo, Bonapriso, Akwa, New-Bell
2	13 July 2010	Bonapriso Bali, Bépanda
3	6 August 2011	Cité des palmiers
4	22 August 2011	Maképé Missoké, Bépanda, Bonapriso,Bonanajo, Deido ,New-Bell
5	26 June 2012	Youpwé, Mabanda
6	30 June 2012	Mabanda, Bépanda Missoké, Bonapriso
7	16 April 2013	Maképé missoké, Ndogpassi

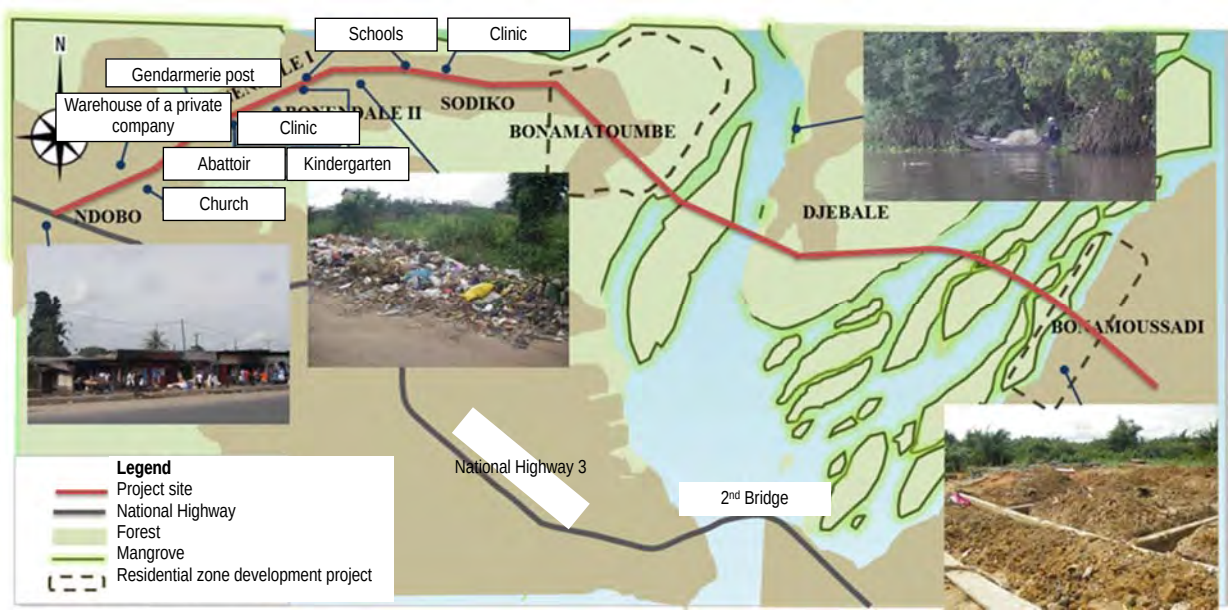
Source: FLOOD DETERMINANTS IN EQUATORIAL COASTAL CITIES: CASE STUDY OF DOUALA (CAMEROON)

2.1.7 Land use

Land use in Cameroon differs significantly between the south and north bordered by Adamawa Plateau that runs east to west in the central region, while livestock farming is mainly conducted in the northern region, where low steppe highland spreads. Farming of cacao, Plantain banana, cassava and corn combined with economic activities of gathering, hunting and fishing utilizing abundant natural resources is performed in the southern region; covered in tropical rainforest.

Littoral Province, where the project site is situated, is a coastal province facing the Gulf of Guinea. The large Wouri River runs through it and extensive mangrove forests (103,817 ha) are formed at the river mouth. While abundant natural environment remains, the area around the Wouri River mouth includes the Douala autonomous port that is the only commercial port facing the Atlantic in the neighboring countries and the commercial city of Douala is formed.

The Douala bridge and access road planned for the project traverse Djebale Island from the fifth district of Douana (Bonamoussadi) on the left bank of the Wouri River; connecting the fourth district (Bonamatoumbe Sodico, Bonendale I・II and Ndobo) on the right bank and linking with National Highway 3.



Source: JICA survey team

Figure 2.34 Surroundings of the Project Site

The communities, number of households and population on the project site are summarized in the following table.

Table 2.5 Population and Households in Communities on the Project Site

Community	Population	Household	Average family size per household (persons)
Bonamoussadi Cité*[1]	34,767	7,379	4.71
Village Djebale	314	104	3.02
Bonamatoumbe village*[2]	127	36	3.50
Village Sodico *[2]	462	103	4.50
Bonendale II	3,500	606	5.78
Bonendale I	3,520	605	5.82
Ndobo	39,905	10,695	3.73

*1 : Population in 2010
*2 : Estimated based on 2005 data (Draft of road development plan around Douala City)

Source: Monographie de la ville de Douala (phases I, II)

Bonamoussadi is a residential area near central Douala. Although temporary fishing shelters used to stand side by side, a residential development plan is underway and modern separate houses and housing complexes are being built.

Djebale Island on the Wouri River is an isolated community with boat the only means of transport and 57% of houses simple temporary shelters. As young people leave the island for continuing education and to find employment, the population is aging with an unemployment rate of 80%. A residential zone development project is underway to reduce illegal residents and develop a modern residential area that matches the nation’s biggest commercial city in Bonamatoumbe on the right bank of the Wouri River. On completion, 2,249 households are expected to move into the area.

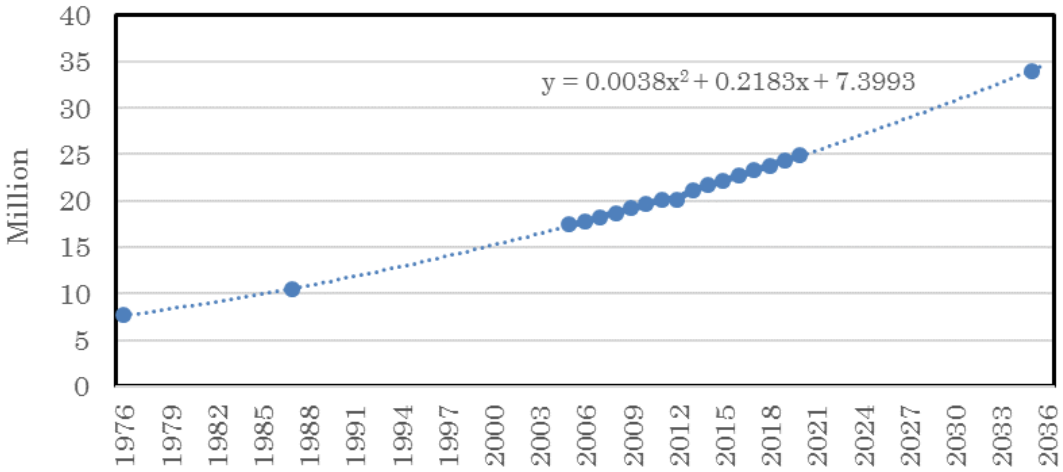
2.2 Social condition

2.2.1 Population

The demographic trend until 2035 is projected based on the third national census in 2005. It is the most recent survey as the complete census and the post 2005 population is all estimate/projection. National censuses were conducted in 1976 and 1987, while third in 2005 was carried out with technical assistance from the United Nations Population Fund (UNFPA)[1]. The future population projection is provided in 3e RGPH Volume III-Tome 03 "Projections Demographiques[2] in the third national census report. Although the UN recommends a national census every decade, President Biya decided to conduct the fourth one (2015) in September that year and the method and financial sources are currently studied. Accordingly, the timing remained unconfirmed at the time this report was produced.

As shown in Figure 2.35, the total population in 2016 was estimated at 22.71 million and it is projected to reach about 33.96 million in 2035. When they are compared with actual figures (approx. 17.46 million) in 2005 when the third national census was carried out, increases of 30 and 94% emerged in 2016 and 2035, respectively. As shown by the quadric approximation formula, the population is projected to increase at very high speed[3] (approximation formula: y-0.0038x2+0.2183x+7.3993)).

However, the population growth rate has begun to decline, despite remaining high. The rate of increase, which was 5.7% in 1987, dropped to an annual average of 4.2% in 2005 and is projected to drop to 4.1% thereafter (RAPPORT NATIONAL SUR L'ETAT DE LA POPULATION Édition 2011). Although government reports provide no reason for the decline in the population growth rate, it could be a sign that Cameroon will also see demographic changes that have started to take place in other regions. The slowdown of the population growth rate can be attributed to urbanization, the decrease in the infant mortality rate, the improved access of women to education, and the increase in the opportunity cost of child rearing.

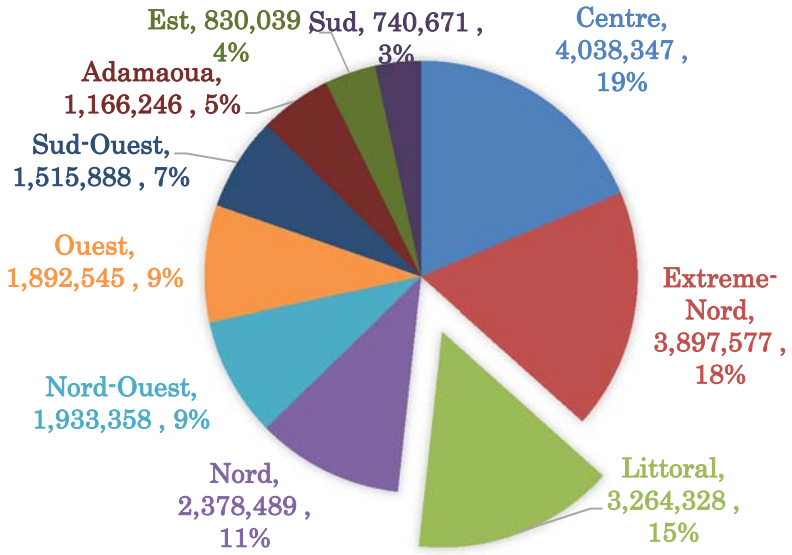


Source: Produced by the JICA survey team based on 1st to 3rd National Census of Cameroon and BUCREP projection

Figure 2.35 Demographic Trend

[1] BUCREP website: http://www.bucrep.cm/index.php/fr/recensements/3eme-rgph/20-3eme-rgph/presentation
[2] BUCREP website: http://www.bucrep.cm/index.php/fr/ressources-et-documentations/telechargement/category/82-projections-demographiques?download=86:projections-dmographiques
[3] BUCREP website: http://bucrep.cm/index.php/fr/activites/projets-a-moyen-terme/311-realisation-du-4eme-recensement-demographique-du-cameroun

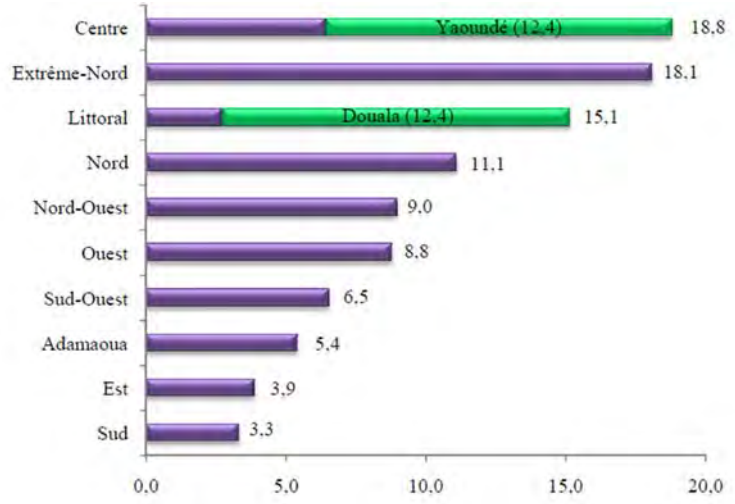
The statistical yearbook 2014 provides projected population by province in Chapter 4, while Figure 2.36 shows the population of each province. The center, which includes the state capital, Yaoundé, has the biggest population, comprising 19% of the total (12.4% of which is that of Yaoundé). The population of Littoral Province home survey target area of Douala, comprises 15% of the total population, making it he the third biggest.



Source: Produced by the JICA survey team based on projected population by province in Chapter 4 in the Statistical Yearbook 2014 of Cameroon

Figure 2.36 Population by Province (projected in 2014)

No statistical data on the Douala population is regularly disclosed. According to an INS poverty report issued in December 2015, approx. 12.4% of the total population (about 268.6 million people) resides in each of the major cities of Yaoundé and Douala in 2014.



Source: INS, Quatrieme Enquete Camerounaise Aupres des Menages -Tendances, Profil et Determinants de la Pauvrete au Cameroun entre 2001-2014-

Figure 2.37 Percentage of Population of Each Province and Major Cities to Total Population (estimate in 2014)

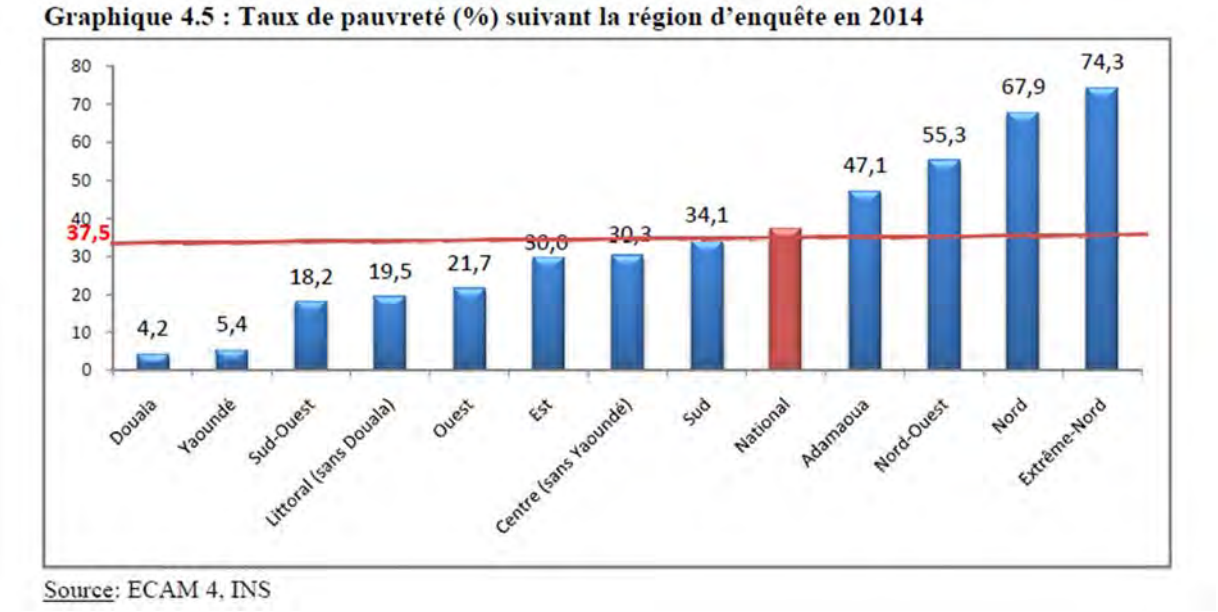
The national poverty rate is on the decrease. It actually fell to 37.5% in 2014. However, this trend is not consistent across the country. On the contrary to the national trend, the poverty rate in provincial areas rose from 52.1% in 2001 to 56.8% in 2014. Meanwhile, it dropped in urban areas, reaching 8.9% in 2014. Thus, the gap between rural and urban areas is growing, which is driving migration to cities.

Table 2.6 Poverty rate in Cameroon

	2001	2007	2014
National average	40.2	39.9	37.5
Urban areas	17.9	12.2	8.9
Provincial areas	52.1	55.0	56.8

Source: INS, Quatrieme Enquete Camerounaise Aupres des Menages -Tendances, Profil et Determinants de la Pauvrete au Cameroun entre 2001-2014-

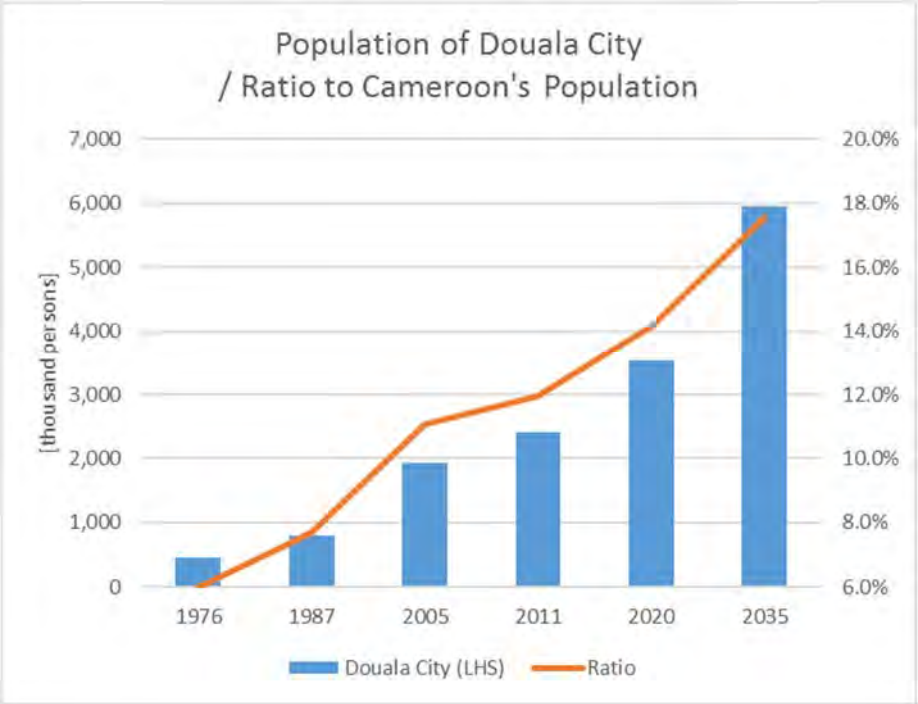
The poverty rate in Douala is 4.2%. The comparison with those of Yaounde and the Region allows us to consider the city of Douala one of the areas with the lowest poverty rate in Cameroon.



Source: INS, Quatrieme Enquete Camerounaise Aupres des Menages -Tendances, Profil et Determinants de la Pauvrete au Cameroun entre 2001-2014-

Figure 2.38 Comparison of poverty rates between regions and cities

According to the Etude-Preliminaire sur l'Economie Local de la Ville de Doula that was made public in August 2011, the population of Douala was 1,931,977 (11.1% of the national population) in 2005 and was and is projected to rise to 2,409,459 (12.0%), 3,527,243 (14.2%) and 5,965,650 (17.6%) in 2011, 2020 and 2035, respectively. Compared to the 2005 population, it is forecast to increase by 80% in 2020 and 210% in 2035 respectively.



Source : INS, Etude-Preliminaire sur l'Economie Local de la Ville de Douala (2014.8)

Figure 2.39 Trend of Douala Population

As shown in Table 2.7, the population data by district in 2005 is obtained from the previous national census 2005. Douala has only just started ascertaining the population of the smallest administrative unit of village and quartier and only fragmentary information is available. A survey was conducted in Douala Districts 3 and 5 in 2010 and Districts 1, 2 and 4 in 2015 and data from both surveys is provided in the following table.

Table 2.7 Trend of Douala Population

Population of Douala City by District

[Persons]

	2005	2010	2015
Douala I	223,214		253,761
Douala II	261,407		350,481
Douala III	646,347	653,649	
Douala IV	250,626		441,615
Douala V	544,919	424,182	
Douala VI	5,464		

Source: BUCREP, 3e RGPH Volume III-Tome 03 "Projections Demographiques"; CUD, Monograph of the city of Douala (Phase I & II)

2.2.2 Ethnic groups

There are more than 240 ethnic groups in Cameroon, which can be largely divided into three groups: i) Bantu in the southern region (Beti, Bassa, Maka, Douala and Pygmy), ii) Semi-Bantu in the western region (Bamileke, Gbaya, Bamum and Tikar) and iii) Sudanese in the northern region (Peul, Mafa, Toupouri and Massa)

Douala of the Bantu group and Bamileke of the Semi-Bantu group dominate in Douala, where the project site is located.

As for religion in Cameroon, Christian religions (Catholic: 38.4%, Protestant: 26.3% and others: 4.0%), Islam and Aminism comprise 68.7, 21 and 6%, respectively and fewer than 5% of the population have no specific religion.

2.2.3 Language

Although Cameroon comprises ten provinces, eight in the eastern region are French-speaking, while two that share the border with Nigeria (Northwest and Southwest provinces) are English-speaking. Although both French and English are official languages, 44.7% of the population speaks only French. The illiteracy rate varies among provinces; at a low level of under 10% in Central and Littoral provinces, while exceeding 60% in the Far-North and North provinces. The overall illiteracy rate is 29.6%, which is lower than neighboring countries (Democratic Republic of the Congo at 33.2%, Nigeria at 33.4% and the Central African Republic at 44.8%).

Table 2.8 Literacy Rate of Official Language by Province

Province (Provincial Capital)	Both English and French	English only	French only	Illiterate	No Response	Total
Adamawa (Ngaoundéré)	6.68%	1.69%	32.90%	56.51%	2.21%	100.00%
Centre (Yaoundé)	20.05%	3.05%	67.92%	8.60%	0.38%	100.00%
East (Bertoua)	6.63%	0.71%	58.19%	33.79%	0.69%	100.00%
Far-North (Maroua)	4.15%	0.55%	25.65%	68.40%	1.25%	100.00%
Littoral (Douala)	18.37%	5.44%	69.04%	6.83%	0.32%	100.00%
North (Garoua)	4.66%	0.52%	29.10%	63.16%	2.57%	100.00%
Northwest (Bamenda)	8.49%	60.27%	4.17%	26.61%	0.45%	100.00%
West (Bafoussam)	10.68%	2.54%	63.03%	22.98%	0.77%	100.00%
South (Ebolowa)	12.18%	2.84%	73.82%	11.02%	0.14%	100.00%
Southwest (Buea)	12.35%	64.05%	5.62%	17.11%	0.88%	100.00%
Total	11.83%	13.04%	44.70%	29.55%	0.87%	100.00%

English-speaking

Source: Recensement Général de la Population et de l'Habitat 2005

On the target area of the project, those who speak only French account for the majority of approx. 67.0%. However, the ratio of those bilingual in English and French and those who speak only English exceeds the average of Littoral Province, reflecting the movement of many people from Northwest Province, which is English-speaking.

Table 2.9 Literacy Rate of Official Language on Project Site

Community	Both English and French	English only	French only	Illiterate	No Response	Total
Bonamoussadi	38.0%	1.0%	61.0%	0	0	100.0%
Djebale Island	9.1%	0.0%	90.1%	0	0	100.0%
Bonamatoumbe	31.3%	6.2%	62.5%	0	0	100.0%
Sodico	21.1%	18.3%	59.2%	1.4%	0	100.0%
Bonendale	19.7%	14.8%	64.8%	0	0.7%	100.0%
Ndobo	19.6%	8.8%	70.8%	0.4%	0.4%	100.0%
Total	22.9%	9.5%	67.0%	0.3%	0.3%	100.0%

Source: Produced by the JICA Survey Team based on an interview survey

In addition to the official languages, over 240 tribal languages are spoken in Cameroon, which are largely divided into three groups: Afro-Asiatic, Nilo-Saharan and Niger-Congo languages.

Bamum, Ewondo, Douala and Bamileke languages in the Niger-Congo language group and Hausa and Mafa languages in the Afro-Asiatic language group as well as other languages are widely spoken in the southern region, while Peul in the Niger-Congo language group is widely used in the northern region.

2.2.4 Administrative divisions

Cameroon, comprising former French and British territories, is a constitutional republic governed by the President. The separation of powers was introduced following the constitutional revision of January 18, 1996.

The head of state is President Paul BIYA (coming to power on November 6, 1982) and the Prime Minister is Philemon YANG (on June 30, 2009). The President is directly elected and the term is seven years. The last election was held on October 9, 2011 and the next is scheduled for October 2018. The prime minister is appointed by the President and forms the Cabinet. Central government ministries and the agencies governed by the Cabinet. There are 37 ministries and their responsibilities are broken down into detail. Referring only to the transportation network that is the survey target, various ministries are involved -- (No. 11) MINEPAT, (No. 21) MINDUH, (No. 35) MINT and (No. 37) MINTP.

The parliament is bicameral — the upper house comprises 70 members elected by regional councilor and 30 members appointed by the President (for five-year terms). The lower house (Assemblee Nationale) has 180 members elected in multiple election systems. The multiparty system was instituted in December 1990. The last upper house election was held on April 14, 2013 (the next one is scheduled for 2018) and the last lower house election was held on September 30, 2013 (with the next scheduled for 2018). 2018 is an election year for Cameroon.

The Supreme Court judge is appointed by the President based on advice from the Higher Judicial Council, which he/she chairs and is a tenured post[4].

Cameroon comprises 10 provinces, which are subdivided into 58 departments and 360 arrondissements, as shown below. Each department is governed by the governor. The arrondissement is the basic local government, which is further broken down into cantons, and, in turn, villages and quartiers. Each arrondissement selects the Maires (mayor) in accordance with the government decree on November 12, 2008.

Littoral Province, which is the target area of the project, comprises four departments and 34 arrondissements as shown in Table 2.10.

Table 2.10 Administrative Divisions of Littoral Province

LITTORAL (Douala)			
Départements (Chef lieux)	**Arrondissements**	**Départements (Chef lieux)**	**Arrondissements**
MOUNGO (Nkongsamba)	Nkongsamba I	SANAGA-MARITIME (Edéa)	Edéa I
	Nkongsamba II		Edéa II
	Nkongsamba III		Dizangué
	Nlonako		Mouanko
	Dibombari		Ndom
	Fiko		Nyanon
	Loum		Ngampé
	Njombé-Penja		Massock-Songloulou
	Manjo		Pouma
	Mbanga		Dibamba
	Mombo		Ngwei
	Melong	WOURI (Douala)	Douala I
	Bare-Bakem		Douala II
NKAM (Yabassi)	Yabassi		Douala III
	Nkondjock		Douala IV
	Nord-Makombé		Douala V
	Yingui		Douala VI
			Manoka

SOURCE : MINATD

Source: Chapter 2 Administrative Organization, Statistical Yearbook2014, INS

The Communauté Urbaine de Douala (CUD) was established on September 24, in accordance with the government decree (No. 87/1366) on its establishment. In Cameroon, the “Communauté Urbaine” is regarded as a special form of urban administrative organization and a wide-area administrative body that is established when the population increases and economic activities are conducted beyond the conventional administrative unit. Globally, the Communauté Urbaine was first set up as Bordeaux, Lille, Lyon and Strasbourg in December 1966, which were also established as wide-area administrative bodies to cope with economic activities that transcended conventional administrative organizations. The Communauté Urbaine, including the CUD, is governed by the Delegate appointed by the President. As a mayor is elected in each arrondissement, there are six mayors in the area under CUD jurisdiction.

[4] Source: CIA, The World Fact Book

Table 2.11 Number of Communauté Urbaine and other Local Governments in each Province

Province	Communauté Urbaine	Other Local Government
Adamawa	1	21
Centre	1	70
East	1	33
Far-North	1	47
Littoral	3	34
North	1	21
Northwest	1	34
West	1	40
South	2	29
Southwest	2	31
Total	14	360

Source: Chapter 2 Administrative Organization, Statistical Yearbook 2014, INS

2.3 Economic condition

Given its rich natural environment, abundant resources and favorable climate, cash crops as cassava and other root vegetables, cacao, sugar, banana and coffee thrive in Cameroon. It is also the seventh-biggest oil producer (77,000 barrels/day in 2014) in Sub-Saharan Africa and petroleum products constitute the majority of all export values (Crude oil and refined oil comprised 51% of total export values in 2014.)[5]. It is also a strategic transportation hub located at a point where West, East and South Africas intersect as well as a regional transport hub with Douala Port; the sole trading port for Chad and the Central Africa Republic.

The scale of the national economy is 16.71 trillion CFAF in local currency (approx. 3.4 trillion yen in 2015, National accounting 2015, INS). In US dollar-terms, to facilitate comparison with other countries, it was approx. 32.101 billion USD in 2014 (IMF and WEO), which is almost the same as Ghana (38.616 billion USD in 2014) and Ivory Coast (33.74 billion USD in 2014 IMF estimate) in Sub-Saharan Africa and Bolivia (33.237 billion USD in 2014) and Latvia (31.3403 billion USD in 2014) outside it. Compared with Japanese prefectures, it is equivalent to the scale of Yamanashi Prefecture (3.13 trillion yen in FY2013).

Cameroon is categorized as a low-income economy (GNI between 1,046 and 1,985 USD) in the classification of major economies by income category for yen loans in FY2016 and as a lower-middle-income-economy (1,026 to 4,035 USD) in the World Bank classification. Per-capita GDP (purchasing power parity conversion) was 2543.531 USD in 2010 in the most recent real figures available (IMD) and 3,260.965 USD in 2016 according to the IMF forecast (IMF and WEO). Per-capita GNI (purchasing power parity conversion) was 3,080 USD (2015, World Bank and WDI). Cameroon's social indicators are very fragile: The human development index disclosed by the UNDP was 0.512 in 2014, ranking it 153rd worldwide. The indexes of Ghana and Ivory Coast, that have economies of similar scale in Sub-Saharan Africa, are 0.579 and 0.467 (both in 2014), respectively, which shows that Cameroon is not particularly low in the region.

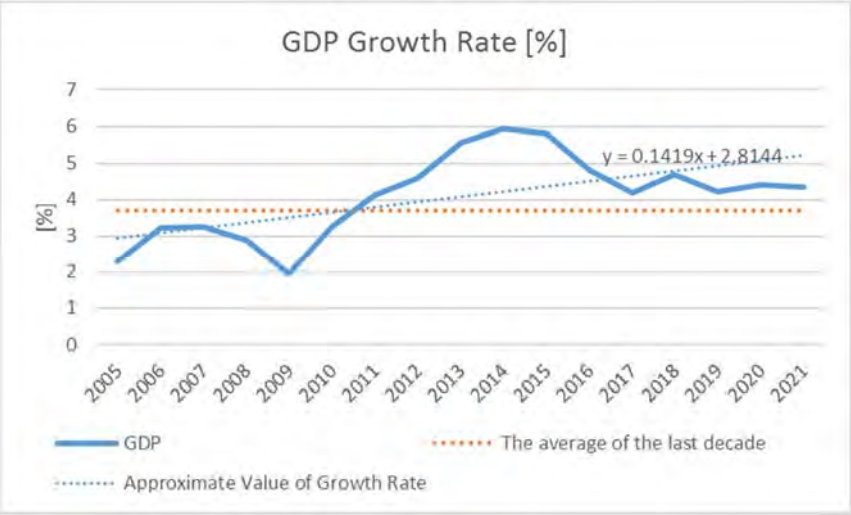
[5] MIT, OEC

The national economy maintained growth of around 7 to 9% until 1986, when growth declined due to the sharp drop in demand for exports from Cameroon; caused by the economic crisis the same year. The negative growth continued to 1994. The GDP peaked at 4673.254 billion CFA (12.088 billion USD) in 1986 and then continued to decline to 3590.985 CFA in 1993. The decline rate is 23.2%, which means approx. a quarter of national wealth was lost during the period. It then began to rebound positively, achieving an annual average rate of 3.7% in the decade up to 2014, despite the stagnant global economy, weak crude oil prices since the second half of 2014 and deterioration of the security situation. Particularly since 2011, it has maintained a growth rate of 4 to 5%, at 5.9% in 2014 according to the most recent actual figures available. The IMF forecasts steady and continued growth at a rate of 4% level until 2021 that is the final year of the forecast (peaking at 5.8% in 2015 and minimum of 4.196% in 2017) despite the weak crude oil prices and deteriorating security situation[6].

Cameroon maintained an economic growth rate of approximately 7-9% until 1986, after which it fell into negative territory[7] [8]. The export revenues, derived mainly from primary products such as oil, coffee, cocoa, and cotton[9], were shrinking significantly due to the slow economic recovery in developed countries, the end of inflation, the declining export prices caused by the shrinking demand as a result of the expansion of production in other countries, and the weak dollar. The negative growth continued through 1994. During this recession, the nominal GDP dropped from its peak at 4,673,254 million FCFA (approx. 12,088 million USD) in 1986 to 3,590,985 million FCFA (approx. 13,532 million USD[10]) in 1993. It was a 23.2% decrease. In other words, a quarter of the national income was lost during that decade. In order to recover from this unprecedented economic crisis, the Government of Cameroon adopted an austerity budget that shrank 34% compared to that of 1986 and started discussions with the International Monetary Fund (IMF) and the World Bank for structural adjustment. The FCFA was devalued by 50% in January 1994 to boost export competitiveness. As a result, the GDP growth rate bounced back to positive territory in 1995. Since then, Cameroon has maintained steady economic growth, despite global recessions, such as the US financial crisis in 2008 and the European sovereign debt crisis starting in 2009, the low oil price since mid-2014, and the deteriorated security situation. The average annual GDP growth rate hovered at 3.7% during the decade between 2005 and 2014.

Particularly since 2011, it has maintained the growth rate of 4% to 5%, at 5.9% in 2014 that is the most recent actual figures available. The IMF forecasts steady continued growth at a rate of 4% level until 2021 that is the final year of the forecast (maximum of 5.8% in 2015 and minimum of 4.196% in 2017) despite the weak crude oil prices and deterioration of the security situation[11].

6 IMF, WEO (2016.10)
7 Annual World Economic Report FY 1986, Economic Planning Agency
8 Cameroonian Economy after Structural Adjustment, Monthly Report 2000 No.2, Ministry of Foreign Affairs
9 Paragraph 80, Poverty Reduction Strategy Paper (DSRP)
10 The dollar-based nominal GDP increased due to the exchange rate.
11 IMF, WEO (2016.10)

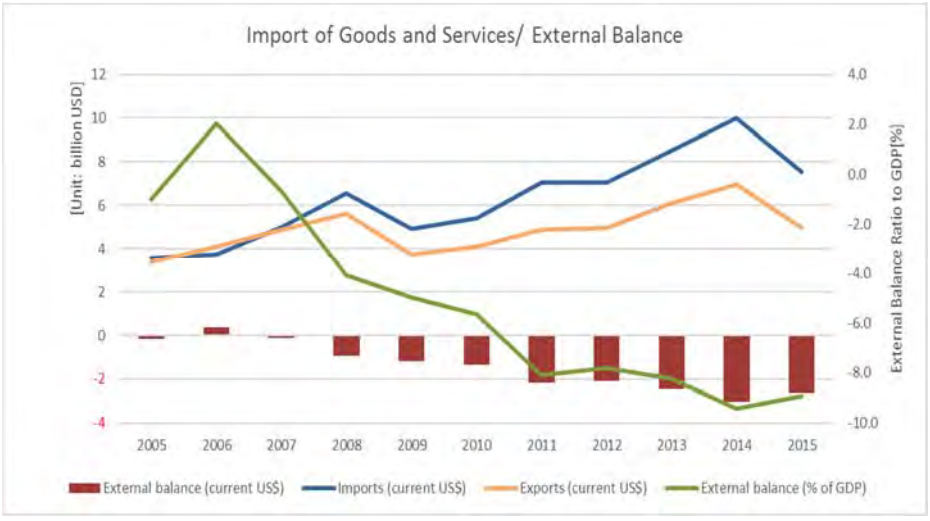


Source: International Monetary Fund, World Economic Outlook Database, October 2016

Figure 2.40 Real and Forecast GDP Growth Rate of Cameroon

Continued economic growth is forecast; consolidated by the rise in domestic demand following port and harbor development, dam construction, submarine communication cable installation with Nigeria and improved public transportation and other large-scale public works projects as well as cacao prices that have remained high, despite weakening recently[12], crude oil production increase since 2014 and crude oil price having increased since autumn 2016 (Sources include Nasdaq, Nikkei Shimbun and JETRO Sensor June 2016 (Area Report).). Long term, Cameroon has significant potential in the agriculture, fisheries and energy sectors, including hydro and thermal power generation. Efforts to promote agriculture, fisheries and the food industry as well as develop hydro and gas-fired power generation are expected to continue apace.

As for trade, imports exceed exports by approx. 2.6 billion USD, with exports valued at approx. 5.0 billion UDS and imports at 7.55 billion USD according to the nation's trade statistics of goods and services in 2015. Imports have exceeded exports since 2007 and the trade deficits are also increasing year on year.

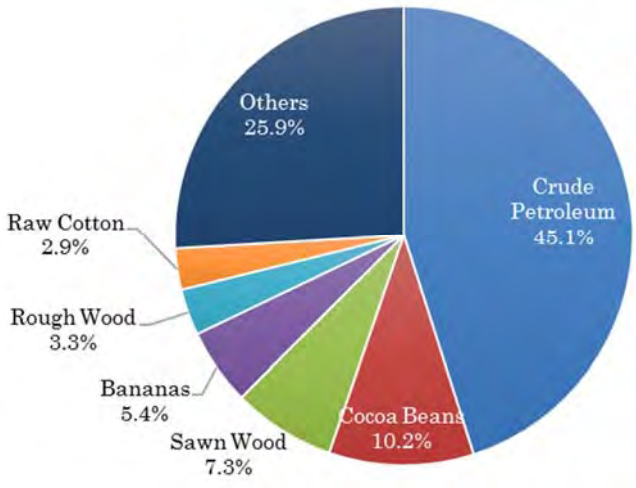


Source: World Bank and WDI

Figure 2.41 Trade Statistics of Cameroon (Goods and Services)

[12] Nihon Keizai Shimbun, cacao bean prices positioned high for the first time in six years; affected by supply shortages caused by the poor harvest in major producing countries (July 7, 2016).

According to the latest trade statistics of goods, export values of 2014 were approx. 558 million USD, ranking it 108th in the world. They have grown at an annual average rate of 9.2% over the last 5 years (3.79 billion USD in 2009 to 5.88 billion USD in 2014). Crude oil is the largest export commodity, comprising 45.1% of exports in 2014, followed by cacao beans at 10.2%, sawn wood at 7.3%, bananas at 5.4% and rough wood at 3.3%.

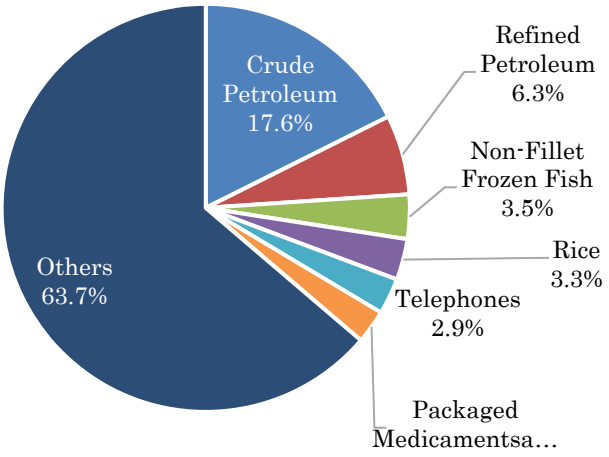


Source: OEC, MIT

Figure 2.42 Cameroon Trade Statistics (Exports)

Total imports of 2014 were valued at 8.06 billion USD, ranking it 111th worldwide. They also increased from 4.55 billion USD in 2009 to 8.06 billion USD in 2014, namely 12.1%. The main imported commodities are crude oil, comprising 17.7%, followed by refined oil at 6.3%, frozen fish at 3.5%, rice at 3.2%, telephone at 2.9% and packaged medicaments at 2.7%.

Cameroon's imported goods exceeded exports from 2009 to 2014, posting trade deficits of 2.18 billion USD in 2014.



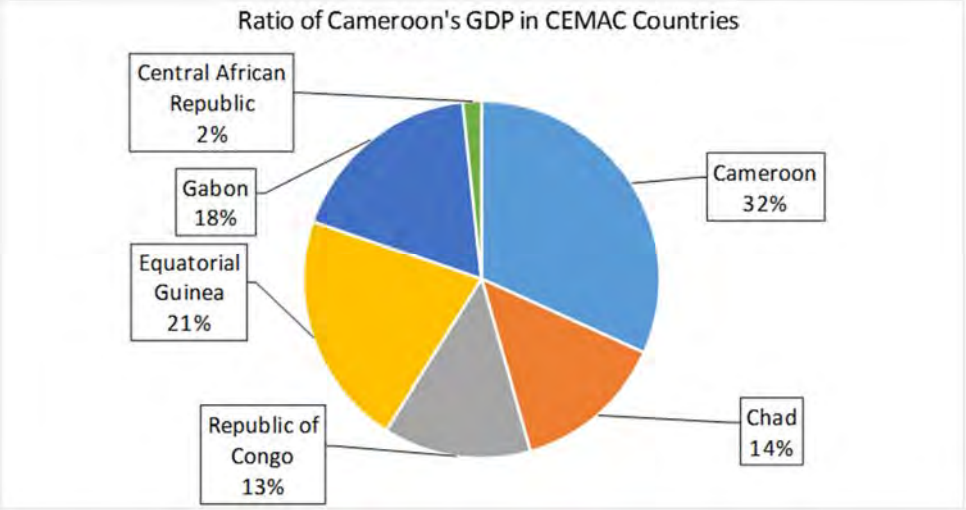
Source: MIT, OEC

Figure 2.43 Cameroon Trade Statistics (Imports)

The main trading partners of Cameroon are Spain (814 million USD, 14%), China (721 million USD, 12%), India (520 million USD, 8.8%), the Netherlands (488 million USD, 8.3%) and Italy (474 million USD, 8.1%) as destinations of goods from Cameroon. Export values to Norway increased recently (225 million USD, 295% annual increase). Export values to Japan are merely 3.86 million USD, comprising just 0.066%, of which wood products account for 51%.

Importers to Cameroon are China (1.53 billion USD, 19% of total), Nigeria (1.36 billion USD, 17%), France (789 million USD, 9.8%), the US (292 million USD, 3.6%) and Thailand (253 million USD, 3.1%). Imports of goods from Togo (2.1%, 169 million USD, annual increase of 140% (over the last 5 years) are rocketing. Import values from Japan are merely 148 million USD, which comprises only 1.8% of imports and vehicles and other transportation equipment account for 79%.

Cameroon is a gateway to the Economic and Monetary Community of Central Africa (CEMAC) facing the Atlantic, which comprises approx. 32% of intraregional GDP. Although it is a net exporter to CEMAC member nations and the Republic of the Congo (2014) [13], trade with them comprises only 5.4% of the overall total trade volume, which indicates that the geographical advantage is not optimally utilized (JETRO).



Source: International Monetary Fund, World Economic Outlook Database, October 2016

Figure 2.44 Ratio of Cameroon's GDP in CEMEC Countries

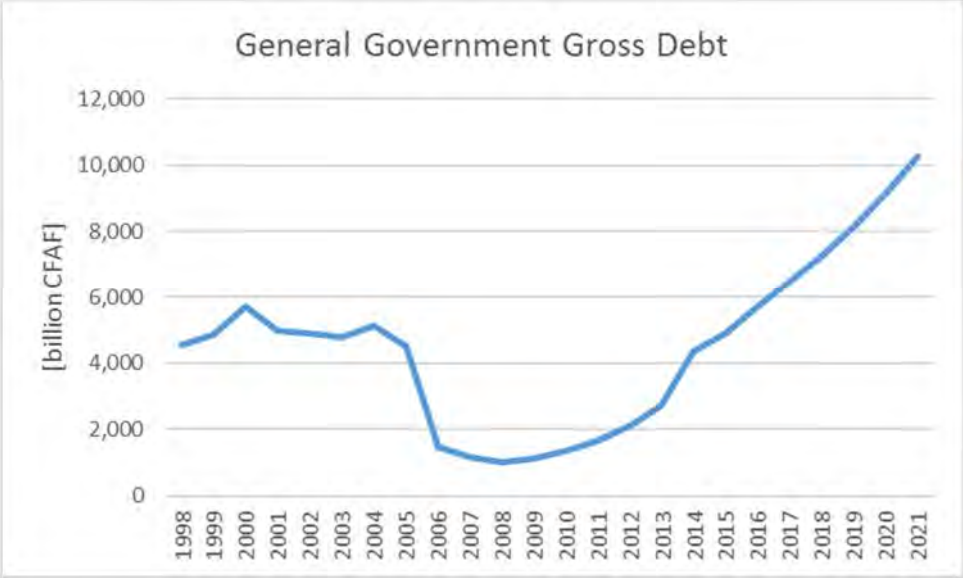
Cameroon uses CFA franc (ISO 4217code: XAF) issued by the Bank of Central African States (BEAC) that was established together with Chad, Central African Republic, Equatorial Guinea, Gabon and the Republic of the Congo (established in 1972, headquarters located in Yaunde) [14]. "Economic and Monetary Community of Central Africa"). As the CFA franc has been pegged to the French franc (and euro since 1999), some criticize it as having lost the freedom of monetary policies, while the EU defends it, claiming

[13] MIT, OEC

[14] Cameroon, Chad, Central African Republic, Equatorial Guinea, Gabon and the Republic of the Congo concurrently formed an alliance that is the former body of the CEMAC (Central African Economic and Monetary Community). The treaty to establish the CEMAC was signed on March 16, 1994 and it went into effect on July 5, 1996. The CEMAC is equipped with a court and an assembly is planned to open in the near future. However, member nations need to conclude an agreement before it is established and it will take several years. (Central African Economic and Monetary Community (CEMAC) in the monthly survey report of the Ministry of Foreign Affairs No. 2)

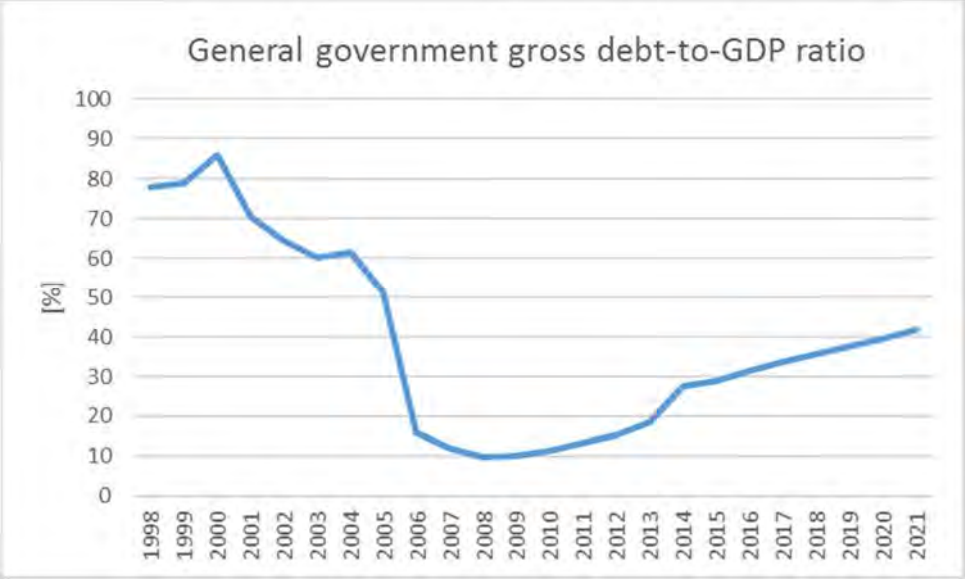
that macroeconomic stability is maintained in the CFA franc zone as it is pegged to the Euro[15].

The gross government debts varied between 4.5 and 6 trillion CFAF until 2005 after 1998, from which time data can be obtained. Following the debt waiver in 2006, they declined by three trillion CFAF. However, they have soared since 2009 after bottoming out (1.01 trillion CFAF, 9.7% of GDP) in 2008. The most recent observation for 2014 saw the figure reach 4.36 trillion CFAF, which is nearly 28.0% of GDP. According to the IMF forecast, they are likely to increase to approx. 10.3 trillion CFAF in the final year forecast for 2021, namely 41.7% of GDP.



Source: International Monetary Fund, World Economic Outlook Database, October 2016

Figure 2.45 Gross Government Debt: Actual and Forecast



Source: International Monetary Fund, World Economic Outlook Database, October 2016

Figure 2.46 Gross Government Debt: Actual and Forecast (Debt-to-GDP Ratio)

[15] The role of Euro in Sub Saharan Africa, Economic papers 347, November 2008, http://ec.europa.eu/economy_finance/publications/publication13478_en.pdf

Responding to the glowing debt, the Government of Cameroon established the Autonomous Sinking Fund of Cameroon (la Caisse Autonome d'Amortissement du Cameroun; CAA) based on the Decree No. 85/1176 of August 28, 1985 (it commenced its operations on January 2, 1990). The missions of the CAA include debt management for the central and local governments, reporting of liabilities to formulate debt management policies, research for fundraising, negotiations with internal and external debtors, participation in financial and capital markets, monitoring of debt repayment, and debt liquidization. Placed under the control of the Ministry of Finance (MINFI), the CAA actively discloses information on the debt situation of Cameroon[16].

Cameroon reached the decision point of the Initiative for Heavily Indebted Poor Countries (HIPC Initiative that is designed to convert funds for debt relief to generate funds for development projects) in October 2000. As it reached the completion point in June 2006, (bilateral) creditors of the Paris Club (bilateral creditors) and multilateral creditors provided debt relief of 3.475 billion USD. As a result, France that oversaw 40% of the bilateral debt (1.7 billion USD) of Cameroon to the Paris Club became capable of implementing the Contract on Development of Debt Reduction (C2D) and it was decided that approx. 100 million euro would be provided for the country annually for 10 years. C2D is subject to the priority issues approved in the Strategic Document for Poverty Reduction (PRSP).

[16] CAA website: http://www.caa.cm/EN/home.html

2.3.1 State budget

Government revenues and expenditures and fiscal balance from 2013 to 2020 are provided below. The figures of 2013 are the latest actual figures, those of 2014 are IMF estimates and those from 2015 to 2020 are IMF projections.

Table 2.12 Government Revenues and Expenditures and Fiscal Balance

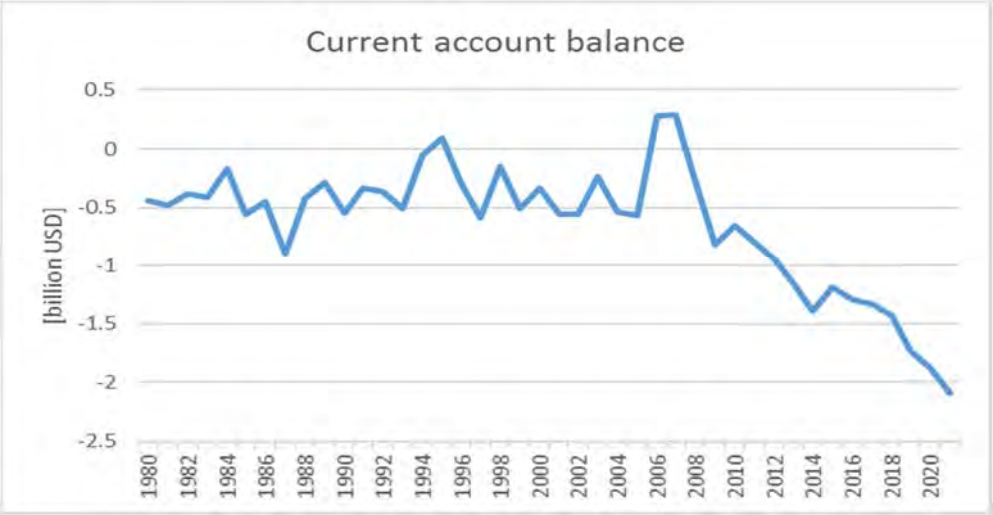
CFAF billions

	2013	2014	2015	2016	2017	2018	2019	2020
Revenue	2,623	2,870	2,989	3,022	3,235	3,499	3,761	4,018
Taxes	1,935	2,188	2,377	2,531	2,710	2,919	3,142	3,381
Social Contributions	37	41	42	43	44	45	46	47
Grants	46	45	64	51	47	43	38	37
Other Revenue	605	595	546	396	434	492	534	553
of which: royalites from crude oi	530	517	301	280	307	353	382	386
Total Expenditure	3,200	3,604	3,876	4,315	4,347	4,958	4,681	4,955
Expenditure	2,193	2,335	2,391	2,569	2,736	2,948	3,161	3,402
Compensation of employees	790	852	909	966	1,027	1,091	1,160	1,233
Use of goods and services	677	768	891	960	1,030	1,107	1,194	1,287
Interest	58	69	89	118	121	156	174	206
External	47	56	66	88	76	101	103	115
Internal	11	13	23	30	46	55	71	91
Subsidies	454	427	266	274	291	311	333	357
of which: fuel subsidies	187	220	40	30	30	30	30	30
Social Benefits	154	171	187	201	216	232	250	270
Other expenditure	60	49	49	50	50	50	50	50
Net acquisition of nonfinancial asse	1,007	1,270	1,486	1,746	1,611	1,650	1,520	1,553
Domestically financed	514	615	721	861	726	765	805	838
Foreign financed	493	655	765	885	885	885	715	715
Net lending/borrowing (fiscal balance	-595	-748	-903	-1,249	-1,112	-1,100	-921	-937

Source: Fourth Consultation Report on Cameroon by IMF

2.3.2 Balance of current account

Current account deficits (financial outflow) have been posted since 1980, since which time data has been available, excluding 1995, 2006 and 2007. It deteriorated sharply since 2008 following the financial crisis triggered by the bankruptcy of Lehman Brothers in 2008. The most recent actual figures for 2013 show deficits of 1.15 billion USD (negative 3.9% to GDP) (IMF and WEO). The IMF predicts that the balance of current accounts will continue to deteriorate after 2014 to reach deficits of 2.09 billion USD (negative -4.8% to GDP) in the final year forecast of 2021.



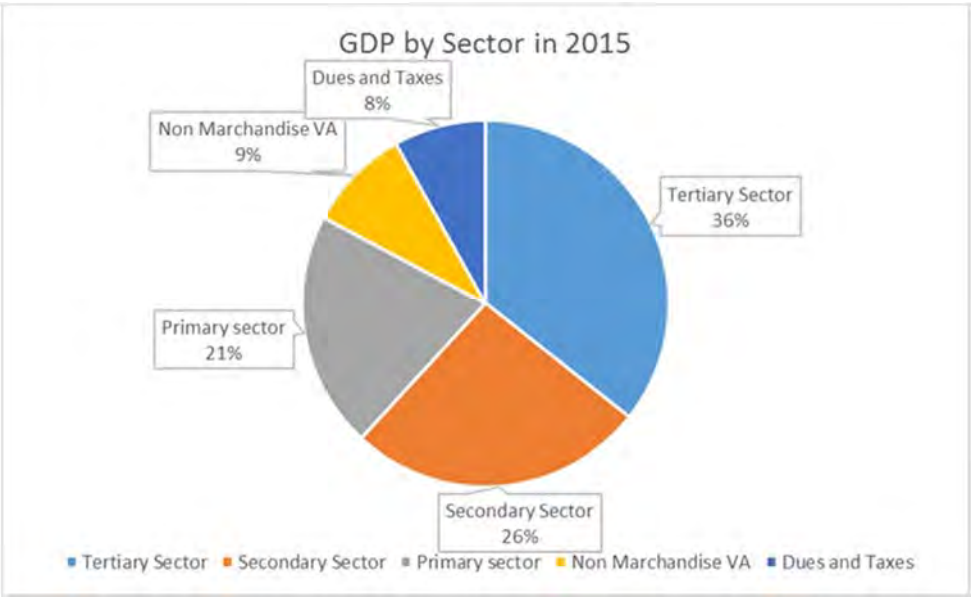
Note: Figures after 2014 Forecast

Source: International Monetary Fund, World Economic Outlook Database, April 2016

Figure 2.47 Actual and Projected Balance of Current Account of Cameroon

2.3.3 GDP by sector

As for the GDP sector composition of Cameroon in 2015, the primary, secondary and tertiary sectors comprise 21.0, 26.2 and 35.7%, respectively. Of the primary sector, agriculture and fisheries comprise 15.6% of GDP, whereas forestry comprises only 1.8%. Of the secondary industry, other manufacturing accounts for the majority of GDP at 7.2%, followed by construction and public works at 6.9%, food at 5.7%, mining and extraction at approx. 5.4% and electricity and water at 1.0%. Most of the mining and extraction (5.4%) is for oil (5.2%). In the tertiary sector, commerce, hotels and restaurants comprise a large portion of 18.6%, followed by other commercial services (9.5%), transportation (7.0%) and financial services (1.2%).



Source: INS, Les Comptes Nationaux de 2015

Figure 2.48 GDP of Cameroon by Sector (2015)

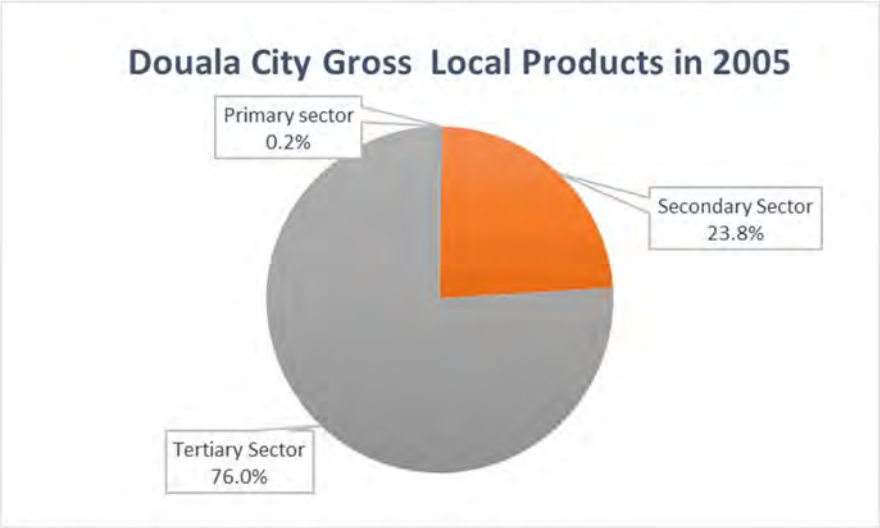
Table 2.13 GDP of Cameroon by Sector (2010 to 2015)

Nominal GDP by Sector [Unit: billion CFAF]

Item	2010	2011	2012	2013	2014	2015	*Ratio*
Primary sector	2,534.9	2,727.8	2,894.1	3,088.9	3,228.4	3,523.5	*21.0%*
Agriculture for Food Products	1643.5	1,817.9	1,953.7	2,102.0	2,202.6	2,382.3	*14.2%*
Industrial and Exporting Agriculture	187.5	177.6	165.1	178.7	205.0	243.4	*1.4%*
Breeding, Hunting	329.1	346.2	373.4	398.4	409.2	445.2	*2.6%*
Forestry and Logging	235.7	244.9	253.3	254.9	250.4	282.2	*1.7%*
Fisheries	139.1	141.2	148.7	155.0	161.2	170.3	*1.0%*
Secondary Sector	3,241.7	3,422.8	3,775.1	4,031.8	4,379.7	4,395.9	*26.2%*
Mining and Quarrying	777.5	960.8	1,099.5	1,090.2	1,118.8	913.2	*5.4%*
of Which extraction of hydrocarbons	757.1	940.6	1,074.5	1,060.4	1,085.6	875.6	*5.2%*
Agri-Food Industry	730.7	787.2	811.2	845.7	906.6	955.4	*5.7%*
Other Manufacturing	1,025.8	891.8	1,034.1	1,096.4	1,178.5	1,208.7	*7.2%*
Electricity, Gas and Water	110.06	120.0	120.6	135.0	154.0	160.0	*1.0%*
Construction and Public Works	597.5	662.8	709.7	864.6	1,021.8	1,158.8	*6.9%*
Tertiary Sector	4,045.8	4,338.0	4,635.2	5,091.5	5,550.4	5,995.8	*35.7%*
Commerce, Restaurants and Hotels	2.107.2	2,254.8	2,438.7	2,690.6	2.896.1	3,127.0	*18.6%*
Transportation, Warehousing, Communications	757.7	818.7	862.6	964.5	1,077.7	1,171.8	*7.0%*
Banks and Financial Institutions	101.0	123.4	130.9	151.6	176.3	195.1	*1.2%*
Other Merchant Services	1,143.8	1,209.4	1,277.1	1,366.2	1,490.9	1,604.9	*9.5%*
FISIM	-64.0	-68.2	-74.1	-81.4	-90.6	-103.0	*-0.6%*
Non Marchandise VA	1,013.3	1,083.8	1,180.2	1,285.4	1,407.7	1,526.6	*9.1%*
Total Value Added	10,835.6	11,572.5	12,484.5	13,497.6	14,566.1	15,441.7	*91.9%*
Dues and Taxes	864.1	973.2	1,030.2	1,109.9	1,280.3	1,364.9	*8.1%*
Nominal GDP	11,699.7	12,545.7	13,514.7	14,607.5	15,846.4	16,806.6	*100.0%*

Source: INS, Les Comptes Nationaux de 2015

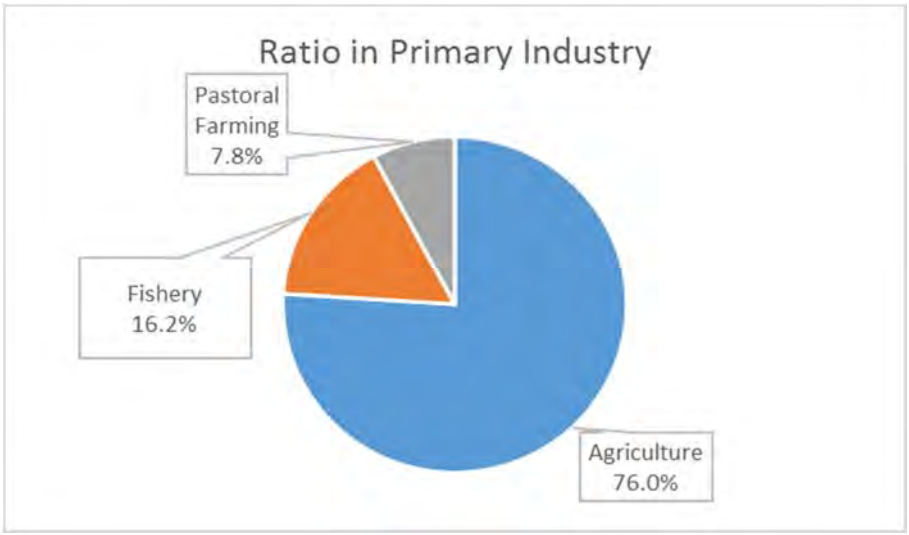
Douala is the hub of a distribution network and economic capital and one of the biggest industrial clusters in Central Africa. According to the Etude-Preliminaire sur l'Economie Local de la Ville de Doula disclosed in August 2011, gross local products of Douala in 2005 were approx. 3.92 trillion CFAF (31.2% of Cameroon's GDP). Per-capita GDP was approx. 1.6 million CFAF, which exceeds the per-capita GDP of Cameroon by 180%. As for the gross local products by sector, the primary sector was 6.1 million CFAF (0.2 of Douala's gross local products), the secondary sector 2.33729 billion CFAF (23.8% of gross local products) and the tertiary sector is 2.3505 CFAF (76.0% of gross local products), which shows that the tertiary sector is generating much of the added value.



Source: INS, Etude-Preliminaire sur l'Economie Local de la Ville de Doula

Figure 2.49 Douala's Gross Local Products by Sector (2005)

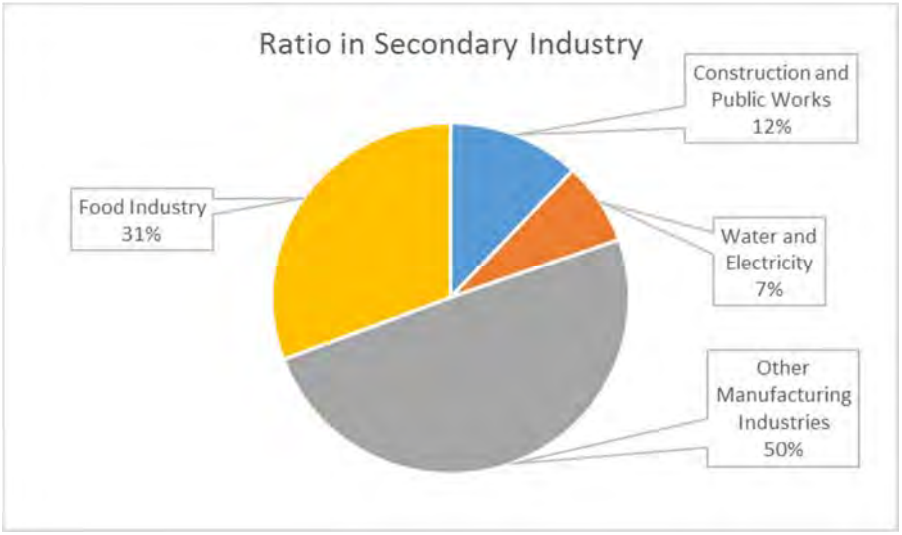
The primary industry comprises agriculture (76%), fisheries (16.2%) and pastoral farming (7.8%).



Source: INS, Etude-Preliminaire sur l'Economie Local de la Ville de Doula

Figure 2.50 Composition of Primary Industry of Douala (2005)

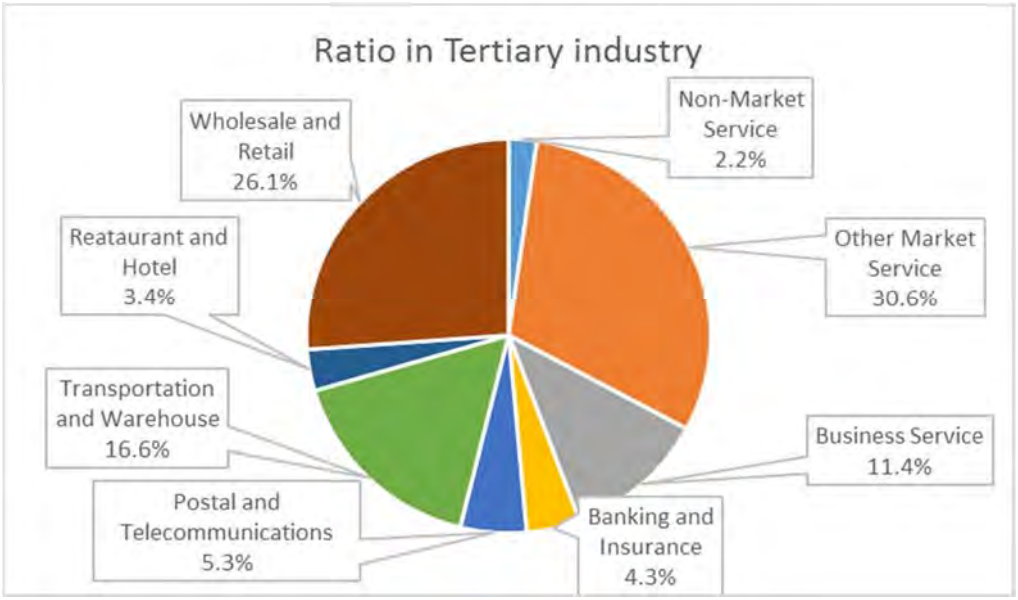
As for the secondary sector, manufacturing excluding food industry is 365.4 billion CFAF(49.7%), food industry is 226.2 billion CFAF (30.7%), construction and public works, 88.1 CFAF(12.0%) and water and power, 56.0 billion CFAF (7.6%).



Source: INS, Etude-Preliminaire sur l'Economie Local de la Ville de Doula

Figure 2.51 Composition of the Secondary Industry of Douala (2005)

The breakdown of the tertiary industry is as follows: repair work, real estate, health, education, entertainment and other market services including the informal sector are 719.9 billion CFAF(30.6%), wholesale and retailing are 614.6 billion CFAD (26.1%), transportation and warehousing, 390.1 billion CFAF (16.6%), services including legal, accounting and lease services, 268.4 billion CFAF (11.4%), postal and telecommunication services, 124.2 billion CFAF (5.3%), banking and insurance, 100.7 billion CFAF (4.3%), hotels and restaurants, 79.9 billion CFAF (3.4%) and administrative and other market services, 52.8 billion CFAF (2.2%).



Source: INS, Etude-Preliminaire sur l'Economie Local de la Ville de Doula

Figure 2.52 Composition of Tertiary Industry in Douala (2005)

2.3.4 Economic condition by sector

(1) Agriculture and fisheries

Agriculture and fisheries comprise 15.7% of GDP. Agriculture is the major rural industry; comprising 60% of employment, mainly in the form of family-run farming. Crops such as cassava and other root vegetables, cacao, sugar, bananas and coffee are actively grown as cash crops, exploiting its climate.

Corn, millet, sorghum and rice production declined by 3% for the first three crops and 1% for rice from 2010 to 2011. Maize and millet are mainly produced in West Province, while sorghum and rice are produced in the North and Far-North provinces. The most widely produced root vegetables are cassava, cocoyam, taro, yams, sweet potatoes and potatoes.

Fruit and vegetables such as pineapple, watermelons, bananas, okra, tomatoes and onions are produced more widely, with acreage soaring from 190,831 ha in 2010 to 214,473 ha in 2011.

As for agriculture in Douala[17], cassava, lemons and bananas are produced in suburban Douala. They are for markets in Douala and self-consumption and no agricultural business is conducted on a large scale. In Wouri Department, where Douala is situated, agriculture is conducted on a business scale and the banana plantations in Moungo Department and those for the penja pepper and oil palm in Sanaga-Maritime Department are well known.

As for fisheries in Douala[18], both traditional and modern fishing is performed. Local residents engage in traditional net fishing in the Wouri River and it is mainly foreigners who fish in the modern manner in Guinea Bay. The catch is landed mainly on the banks of the Youpwé, Bonanjo and Wouri rivers. As for marine products, sole and shrimp from which the name Cameroon itself is derived are the main catches.

(2) Forestry

Although forestry and logging comprises a mere 1.6% of GDP, it is a major income source in forest areas where agriculture can be hardly operated and an important industry given its impact on socioeconomic factors.

The Government of Cameroon i) established the forest management unit (FMU) and ii) banned exports of round timber of rare species such as iroko, moabi, bibolo, wenge and bubinga in the 1990s to make forestry sustainable.

The logging permit requires proposals from responsible ministries and the approval of the relevant commissions. The permit is given to bid winners by the Ministry of Forests and Wildlife (MINFOF) after discussions by the relevant inter-ministry committee and in accordance with bidding procedures.

Cameroon is the biggest timber exporter in Africa with an annual export volume of approx. 2 million m3. As for lumber destinations, 80% goes to EU countries, particularly Italy and Spain and round timber not subject to export restrictions goes to China, Vietnam and other Asian countries. Plywood and its materials are exported to Italy. The dependence of Cameroon on the European market is clearly indicated in the export values, comprising 74% of total timber export values, or 265.1 million USD. Most of the exported timber is round timber, lumber, plywood and other low value-added products and there are few exports of high value-added products.

[17] 3rd Bridge F/S report (society and economy), page 35.
[18] As above, page 36.

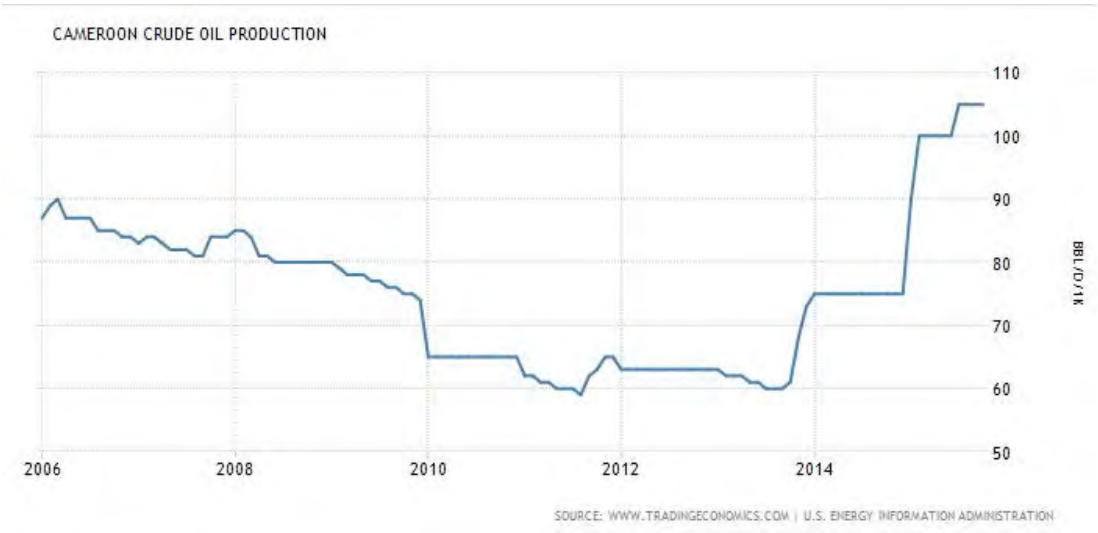
Timber of approx. 80 species is produced in Cameroon, the main species of which include Ayous (Obeche), Sapelli, Tali, Azobe (Bongossi), Iroko, Okan (Adoum), Frake (Limba), Movingi, Kossipo and Padouk rouge. White and light Ayous and red and heavy sapele comprise one-third of exported timber from Cameroon, while premium timbers such as mahogany, moabi and azobé are also produced.

More than 90% of round timber is processed by 60 lumber mills in the country and approx. 13,000 workers are formally engaged in the forestry sector. Forestry work creates approx. 8,000 jobs in rural areas, as a major income source of the rural economy. Although forestry for domestic consumption creates 45,000 jobs, 75% are illegally operated and it is a serious problem as securing its legality is called for under an agreement with the EU.

Source: Forest Legality Initiative website (http://www.forestlegality.org/risk-tool/country/cameroon-0#tab-products)/

(3) Mining and extraction

Cameroon is the seventh-biggest crude oil producer in Sub-Saharan Africa[19] and started producing offshore oil in 1977. The production volume decreased after 1985 and some experts believed that crude oil deposits were being depleted. However, the daily production volume recovered to 105,000 barrels in October 2015. Daily production peaked at 124,000 barrels in January 1997, whereas the smallest was 59,000 barrels in August 2011 for the period for which data is available.



Source: Trade Economics/ US Energy Information Administration

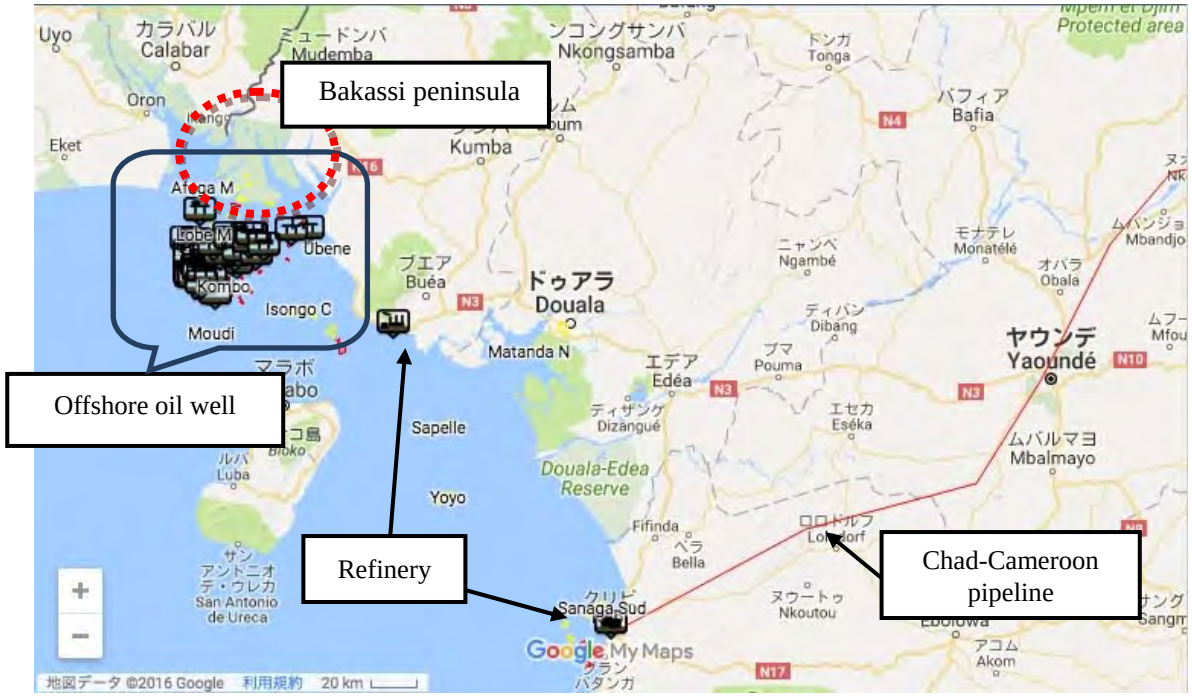
Figure 2.53 Trend of Daily Crude Oil Production of Cameroon

The pipeline between Chad and Cameroon was constructed with 93 million USD of World Bank funding. Nigeria and Cameroon disputed the sovereignty of the Bakassi Peninsula, which may have crude oil reserves and the International Court of Justice ruled that Cameroon had sovereignty as of October 2002.

The state-run SONARA, the only oil refinery in the country, is newly building a reserve tank for crude oil and petroleum products and replacing the refinery equipment with funds from local banks/multinational financial institutions and donors (The total project cost is estimated to be 350 billion FCF francs.).

[19] Saoga South African Oil & Gas Alliance

SONARA aims to explore overseas markets with strong demand such as Nigeria and the Central African Republic. (JETRO manual for company establishment).



Note: Oil wells are located offshore near the border with Nigeria and refineries are located at Limber and Kribi ports.

Source: http://www.oilandgasinfrastructure.com/home/oilandgasafrica/cameroon

Figure 2.54 Oil Production Facilities in Cameroon

Although there is no modern mining in Wouri Department, where Douala is situated, sand, laterite and gravel are produced as part of a traditional approach. Workers taking sand from the Wouri riverbed are observed around Djebale Island. There are reportedly about 50 businesses that take sand via this traditional approach in Wouri Department (Littoral Province, Rapport sur le Development Economique du Cameroun Region du Littoral 2015). There are also head offices of 18 modern mining companies in Douala, including TOTAL Cameroon and PERENCO, for example.

(4) Manufacturing

The manufacturing industry accounted for 12.9% of the GDP of Cameroon in 2015 — 5.7% of which for the food industry and 7.2% for other manufacturing. Of all 12.154 secondary-industry enterprises, 767 (6.3%) were food-related and 10,456 (86%) other manufacturers or enterprises in the secondary-industry. This shows how the food industry capitalizes on the nation's natural environment.

Table 2.14 Location of Head Office by Industry and Area of Secondary-Industry Enterprises

Establishment of Enterprises by area

[number of enterprises]

	Food Industry	Manufacturing Industry, Other Industry	Extracting Industry	Electricity, Water, Gas	Constraction	Total
Douala City	212	3,319	18	52	281	3,882
Litoral Region other than Douala City	29	123	2	18	10	182
Yaounde City	179	2,810	5	25	229	3,248
Other than above	347	4,204	5	100	186	4,842
Total	767	10,456	30	195	706	12,154

Source: Chapter 14 Industry in Statistical Yearbook 2014, INS

Exploiting the rich natural environment, many European and American food manufacturers (including Nestle and Panzani) have a presence in Cameroon and European and American beverages are also actively produced under license (Breweries Cameroon, etc.). However, such food manufacturers tend to target the domestic market and few export their products.

Another development in the secondary industry was that Dangote Cement, a Nigerian cement manufacturer, announced in August 2015 that it will invest 250 million dollars to expand its cement plant, anticipating large-scale public investment. Moreover, preparations are being made for creating an automobile industry. GAC GONOW, a Chinese automobile maker, announced in June 2015 that it agreed with the Government of Cameroon to produce passenger and commercial vehicles along with two bus makers, one from China and the other from India. The investment in this project is estimated at 92 billion CFAF (approx. 158 million USD). Cameroon Automobile Industry Company (CAIC), a subsidiary company established for this purpose, will be constructing Cameroon's first automobile assembly plants in Douala and Kribi, respectively (Reuters.com, EconomicTimes). It was reported in March 2016 that the Government of Cameroon is developing 15ha of land for the construction of the CAIC plants (Business in Cameroon).

Meanwhile, Japanese companies are also setting up or expanding their operations in Cameroon. Ajinomoto established a local office in 2013 (African Development Bank, a list of Japanese companies operating in Africa in 2016). Moreover, Toyota Tsusho started general agency operations for Makita (electric tools) along with a subsidiary company established in Cameroon by CFAO, France's leading trading company which is engaged in automobile sales, mainly in Western Africa, and 97.4% of whose stake is held by Toyota Tsusho (Toyota Tsusho website).

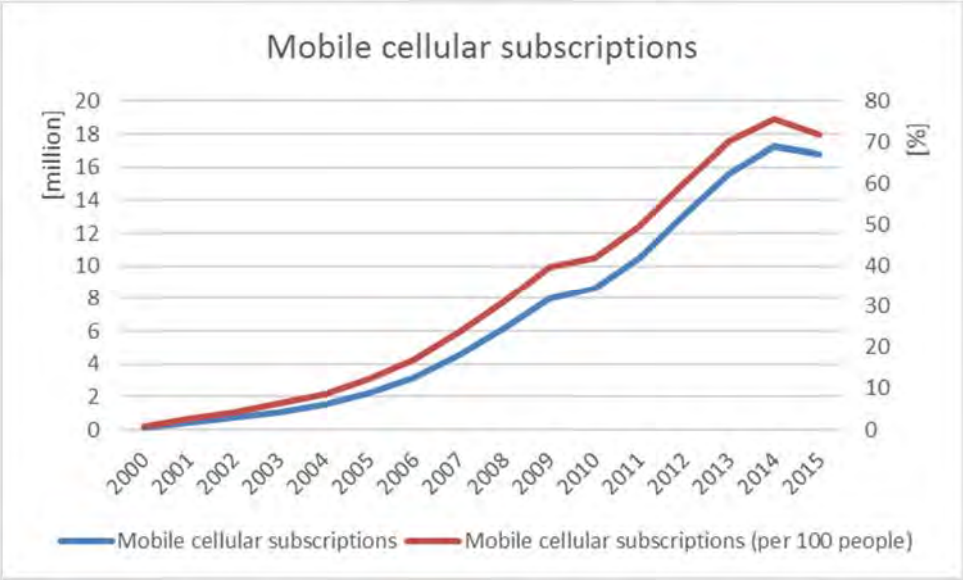
Douala industry[20] has expanded; backed up by the Douala Port, development of the railway and automobile network and increasing population. Douala is deemed the biggest consumer of industrial products nationwide. There are two industrial zones in Douala — Bassa and Bonabéri industrial zones. Plants tend to move outside Douala due to urbanization and excessive urban concentration. Major destinations populate the road between Douala and Yaoundé and Douala and Limbé and major enterprises are listed below.

[20] 3rd Bridge F/S report, pages 34-36.

- Food industry: Camlait (established in 1972, general food manufacturer (beverages, dairy products, etc., 65 billion CFAF sales in 2010), Nestle Dolait (Swiss brand, manufacturer of Maggi, etc.), Panzani (based in Paris, manufacturer of pasta, etc.), Fermencam (canned tomato manufacturer), Breweries Cameroon (beverage maker of 33 and Heineken, etc., Indonesian Les Brasseries et Glaceries d'Indochine (BGI) holds 75% of shares), Guinness Cameroon (manufacturer of Guiness, etc.), Chococam (established in 1965, chocolate manufacturer, sales of 19 billion CFAF)
- Chemical, petrochemical and cosmetics industry: CCC, AZUR (manufacturing of soap, edible oil, etc.), Biopharma (medical device and agricultural)
- Textile industry: CICAM (established in 1965, located in the Bassa Industrial Zone), SOLICAM (publicly-run enterprise that monopolizes the cotton industry)
- Cement industry: Dangote (Nigerian enterprise, constructed a plant equipped with a pier for exclusive use near the 2nd Bridge in March 2015 (1.5Mta)), Cimenteries (established in1963, subsidiary of French building material manufacturer, Lafarge)

(5) Telecommunications

Mobile phones users are increasing and the total number of subscriptions in 2014 was 17,270,312, equating to 76 of every 100 persons (World Bank and WEO). Money can be transferred with mobile phones in Cameroon as with Kenyan MPESA and they have become indispensable tools for everyday life.



Source: World Bank and WDI

Figure 2.55 Number of Mobile Phone Subscriptions in Cameroon

Technology is also helping to innovate postal services. China-based Huawei Technologies constructed a data center of e-post in Cameroon in 2013. The construction was the result of a bilateral agreement concluded between President Paul Biya and then President Hu Jintao and part of Cameroon's post office digitalization project. The fund source is a loan of 32 billion FCFA provided by EXIMBANK of China. The purpose of the project is to interconnect 234 post offices via satellite communication nationwide: 134 of them are connected via optical fiber and 100 via satellite communication. Its completion is expected to

significantly improve the transmission and receiving of mails, money transfers and other postal services.

Postage and other services charges are expected to be lowered. In particular, the postal service digitalization project is also expected to improve the business efficiency of Cameroon Postal Services (CAMPOST), increase its competitiveness, expand the domestic delivery network and secure balance between regions. (Source: JETRO Censor June 2016 (Area Report)

(6) Energy

The Government of Cameroon has launched multiple projects since early 2012 to construct hydroelectric dams — particularly, Memve'ele dam (total capital: 420 billion FCFA), Lom Pangar dam (total capital: 238 billion FCFA) and Mekin dam (total capital: 25 billion FCFA). All the projects are intended to help increase hydroelectric power generation capacity and ease the national energy shortage. Cameroon's hydropower potential that can be developed is behind that of the Democratic Republic of the Congo in Sub-Saharan Africa and is said to use only 5% of its potential or 1,000MW.

Large-scale power generation plant construction projects under PPP are also underway. Natchigal Hydro Power Compagnes (NHPC), established in July 2016 by the Government of Cameroon, Electricité de France and IFC, with investment ratios of 30, 40 and 30%, respectively, plan to start constructing the Natchigal Dam and hydropower plant (at 420MW, one of the biggest nationwide) in the Sanaga River 70 kilometers northwest of Yaoundé and a high-voltage power grid development project. The management rights (including securing profit) for the hydropower station for 35 years were transferred to NHPC and thus it claims that it can secure profits that meet this investment during the years. The power plant is expected to supply one-third of domestic power demand upon completion.

The construction of a dam at Song Mbengue (1080MW) is under study by a Hong Kong investment group and a plan to construct two dams (Dja, 460MW + Bounma 140MW, in total 600 MW) in the eastern basin of Dia has been announced by a government hydroelectric company (HYDRO MEKIN) established by the Chinese capital. The basin where these dams are to be built is located in the Cameroonian part of the Congo Basin and is expected to produce 3,000 MW in future.

A US electric power company, AES, that sells electricity has expanded power plant capacity since 2001 by building a thermal power generation plant in Yassa and a gas plant in Kribi.

ENEO is an electricity supplier headquartered in Douala. Taking over the business from SONEL (Société Nationale d'Électricité), a former state-owned company privatized in 2001, ENEO operates based on a concession agreement with the Government of Cameroon. ENEO's major stakeholders are the British investment fund ACTIS (56%) and the Cameroonian Government (44%). Allegedly, ENEO supplies electricity to 973,250 users, which account for approximately 45% of the population in Yaoundé and Douala. In addition, Electricity Development Company (EDC) was established based on the Decree No. 2006/406 of November 29, 2006 as a state-owned company for the development of electricity supply infrastructure such as hydroelectric power station, and regarding international cooperation, it is in charge of, for example, the Lom Pangar Hydropower Project.

The introduction of public-private partnership (PPP) increased investment in power generation. Meanwhile, due to the lack of investment in power distribution networks, the limited grid capacity has become an increasingly serious bottleneck in the 2010s. Responding to this issue, the Government of Cameroon enacted the Law No. 2011/022 of December 14, 2011 Governing the Electricity Sector in

Cameroon to take the following three actions: (i) transfer of the management of power distribution networks from ENEO to the SONATREL (Société Nationale de Transport de l'Électricité), newly-established state-owned company; (ii) transfer of the management of reservoirs in the Sanaga Basin to EDC; and (iii) introduction of penalty charges that will be imposed when ENEO cannot achieve the performance targets agreed in advance. The establishment of SONATREL, in charge of the development and management of Cameroon's power distribution networks, being delayed due to the inadequacy of the law, its creation was carried out in October 2015 with the support of the World Bank. The latter has assured a provision of approximately 1.2 billion USD for the SONATREL to develop the power distribution networks.

In 2014, the Government of Cameroon formulated the Electricity Sector Development Plan (Plan de Développement du Secteur de l'Electricité; PDSE) for the 35 years between 2015 and 2050 in order to fill the demand-supply gap of 500MW.

2.4 Donor Assistance

(1) An Overview

The amount of loans extended to Cameroon and its foreign debts released by the National Institute of Statistics of Cameroon are examined to confirm the moves of all donors, including China (Source: Chapter 24 Currency and Credit, Statistical Yearbook 2014, INS and Caisse Autonome D'amortissement (CAA), Note de Conjoncture Trimestrielle de la Dette Publique du Cameroun). The trend of loan assistance (executed amount) for Cameroon from 2007 to 2015, based on the two sources, is shown in Table 2.15. An annual average of 435 billion CFAF in loans was extended during the period.

Table 2.15 Loans to Cameroon (executed loan amount)

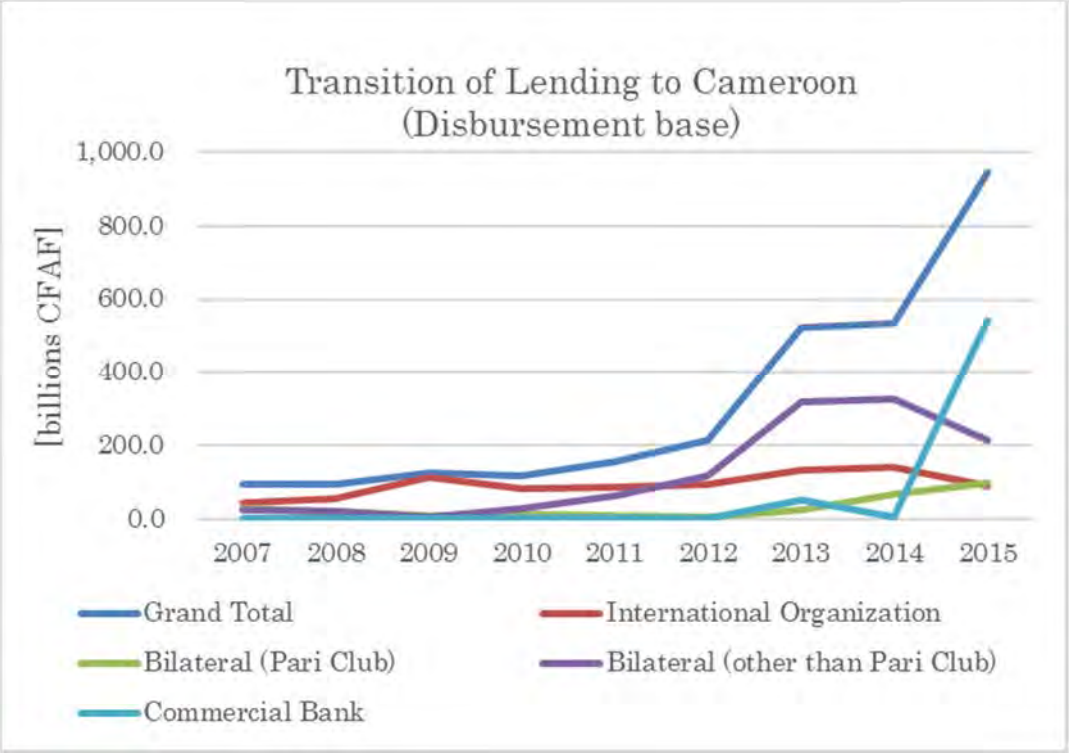
[billions CFAF]

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Grand Total	92.6	92.9	126.2	118.0	155.8	213.9	524.0	536.1	943.1
International Organization	43.0	54.3	112.0	80.2	85.6	94.8	132.2	138.1	91.3
Bilateral (Pari Club)	27.2	19.5	10.4	10.9	7.5	3.8	22.4	68.3	98.8
Bilateral (other than Pari Club)	22.4	19.1	3.8	26.9	62.7	115.3	318.5	325.9	212.2
Commercial Bank	0.0	0.0	0.0	0.0	0.0	0.0	50.9	3.9	540.9

Remark: Bilateral (other than Pari Club) includes EXIMBANK china.

Source: INS, Statistical Yearbook 2014, Chapter 24 Currency and Credit,
CAA, Note de Conjoncture Trimestrielle de la Dette Publique du Cameroun

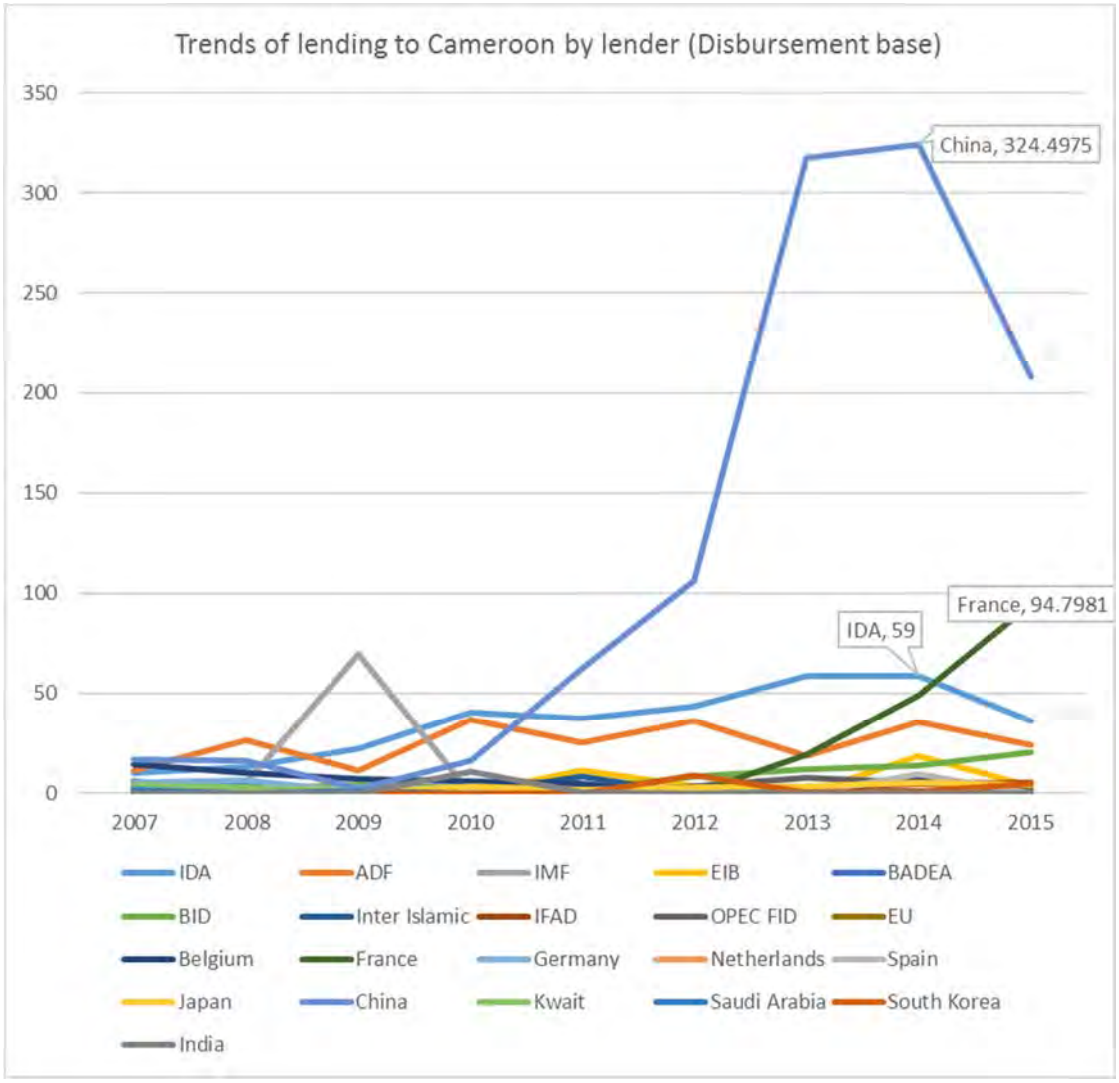
The loan amount began to increase in around 2011 and bilateral assistance other than international organizations and non-Paris Club members is increasing significantly. The sharp increase in loans from commercial banks is due to the issuance of Eurobonds.



Source: INS, Statistical Yearbook 2014, Chapter 24 Currency and Credit, CAA, Note de Conjoncture Trimestrielle de la Dette Publique du Cameroun

Figure 2.56 Transition of Lending to Cameroon (Disbursement base)

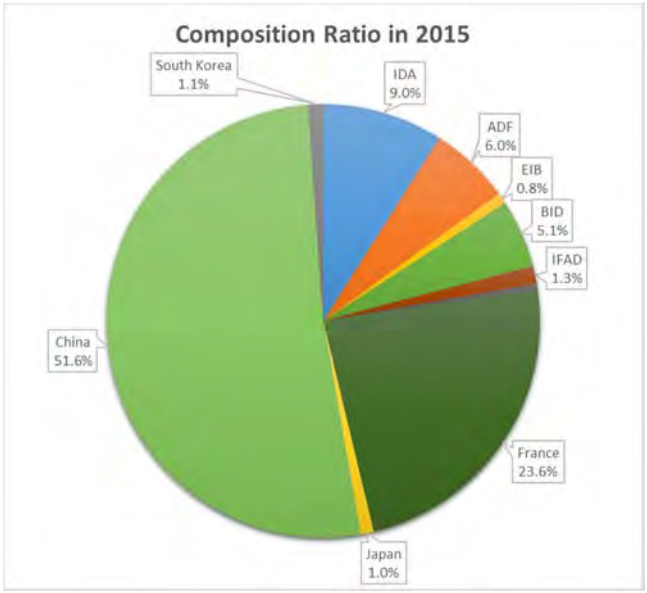
The trend of the executed loan amount by international organization and country is shown in Figure 2.57.Although the increase from China was the sharpest, the amount decreased significantly in 2015 from the previous year. The amount in 2007 was 16.9 billion CFAF based on the available data and China was already the biggest loan provider. However, the amount did not significantly exceed that of Belgium (14.4 billion CFAF) or the International Development Association (10.1 billion CFAF). Then the executed increased every year to reach 324.5 billion CFAF in 2014, a 20-fold increase over seven years. The amount in 2015 declined from the previous year to 207.73 billion CFAF to approx. 12-fold of the 2007 figure. Meanwhile, the amount executed by France increased significantly in 2014 and 2015.



Source: INS, Statistical Yearbook 2014, Chapter 24 Currency and Credit,
CAA, Note de Conjoncture Trimestrielle de la Dette Publique du Cameroun

Figure 2.57 Trends of lending to Cameroon
(Amount of Loan Disbursed by Multilateral and Bilateral Donors)

Figure 2.58 provides the composition ratio of loans extended in 2015 by international organizations and donors. China comprises 51.6%, followed by France at 23.6% the World Bank (IDA) at 9.0% and ADF at 6%. Japan extended 3.95 billion CFAF, comprising 1%, making it the 10th biggest donor and the 4th biggest bilaterally.



Source: INS, Statistical Yearbook 2014, Chapter 24 Currency and Credit,
CAA, Note de Conjoncture Trimestrielle de la Dette Publique du Cameroun

Figure 2.58 Composition Ratio Extended of 2015, by International Organization and Donors

Although the Paris Club members used to be the credit provider for Cameroon, the foreign debt also changed significantly as the flow changed. As shown in Table 2.16, the foreign debts totaled 932.3 billion CFAF in 2008 and they sharply increased to 3,480 billion CFAF in 2015. During this period, the weight of the Paris Club that used to be in charge of credit offering to Cameroon decreased gradually, while credit offered by international organizations, followed slightly later by non Paris Club members, increased. Loans from commercial banks are also increasing. Although this indicates that Cameroon is diversifying the lenders and it returned to the international financial market, it needs to be examined further.

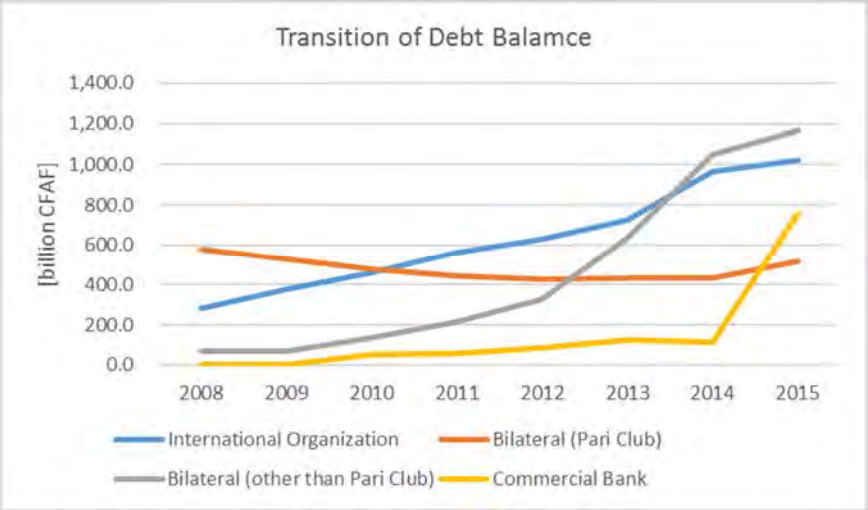
Table 2.16 Foreign Debt of Cameroon

[billions CFAF]

	2008	2009	2010	2011	2012	2013	2014	2015
Grand Total	932.3	974.8	1,123.0	1,280.4	1,471.0	1,920.0	2,560.0	3,480.0
International Organization	282.7	376.8	461.0	561.1	629.7	721.4	964.0	1,022.0
Bilateral (Pari Club)	580.5	527.6	476.0	445.6	428.2	435.4	433.2	518.0
Bilateral (other than Pari Club)	68.5	69.8	133.0	214.3	325.3	635.2	1,050.1	1,165.0
Commercial Bank	0.6	0.6	52.6	59.4	87.8	125.1	113.2	759.0

Remark: Bilateral (other than Pari Club) includes EXIMBANK china.

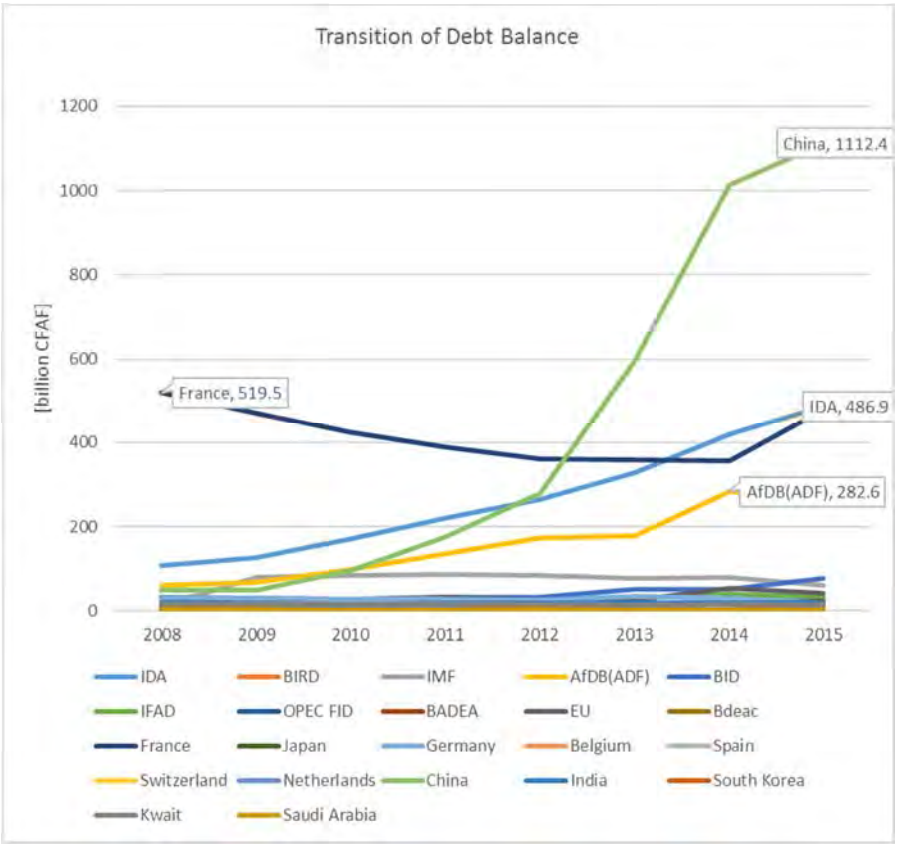
Source: INS, Statistical Yearbook 2014, Chapter 24 Currency and Credit, CAA, Note de Conjoncture Trimestrielle de la Dette Publique du Cameroun



Source: INS, Statistical Yearbook 2014, Chapter 24 Currency and Credit,
CAA, Note de Conjoncture Trimestrielle de la Dette Publique du Cameroun

Figure 2.59 Foreign Debt of Cameroon

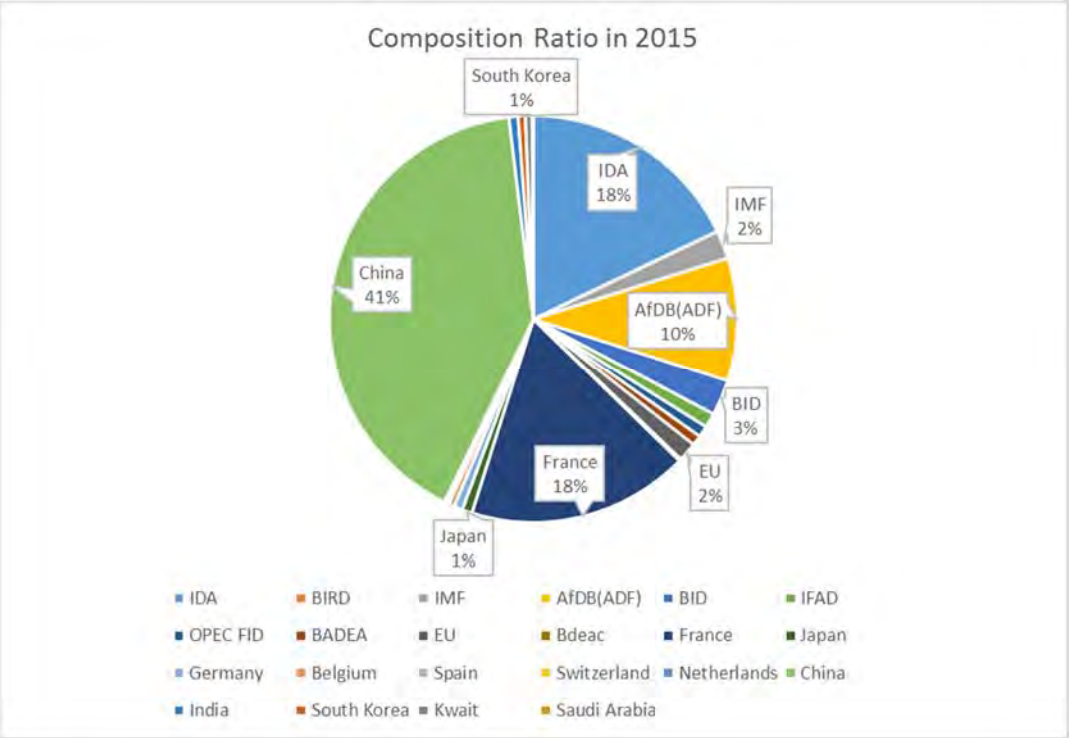
The foreign debt by international organization and country is shown in Figure 2.60. It shows that the debt to China has increased sharply while debt to France has decreased. The credit offered by commercial banks increased sharply in 2015.



Source: INS, Statistical Yearbook 2014, Chapter 24 Currency and Credit, CAA, Note de Conjoncture Trimestrielle de la Dette Publique du Cameroun

Figure 2.60 Foreign Debt of Cameroon (by Institution and Country)

It also shows that the foreign debt to France comprise 18% of all debt as of 2015, whereas the figure to China was 36%. The levels of debt to the International Development Association, ADF and IMF[21] were 18, 10 and 4%, respectively.



Source: INS, Statistical Yearbook 2014, Chapter 24 Currency and Credit,
CAA, Note de Conjoncture Trimestrielle de la Dette Publique du Cameroun

Figure 2.61 Composition Ratio of Debt to each International Organizations and Donor (2015)

The trend by sector is studied by referencing the statistics of assistance (including grant aid and technical assistance) announced by the OECD. Table 2.17 specifies the distribution ratio of assistance executed from 2006, data from which is available to 2014 by sector[22]. It should be noted that the table contains only organizations and donors that extended assistance of 10 million USD or over annually in recent years (approx. 73% of all assistance). It should be also noted that it does not contain information of non Paris Club members including China that has sharply increased the amount of loans to Cameroon.

France and Germany played major roles in social infrastructures, including education, health and population policies, comprising 18.8 and 28.4%, respectively. The World Bank (IDA) (33.6%), EU (29.1%) and ADF (13.6%) are major assistance providers in economic infrastructures that include transport

[21] Cameroon has no debt to IMF when the report is produced according to the IMF website.

[22] The sectors are categorized by the OECD as follows:
Social Infrastructures: Education, Health, Population Policies, Water Supply and Sanitation, Government and Civil Society, Welfare, Housing, Culture, Drug Control
Economic Infrastructures: Transport and Storage, Communication, Energy, Banking and Financial Services, Business and Other Services
Production Sectors: agriculture, forestry, fishing, mining, constructions, trade policies and regulations, tourism
Multi-Sectors: General Environment Protection and Research
Commodity Aid: Developmental Food/Food security Assistance, General Budget Support
Debt-relative Action:
Humanitarian Aid:
Other Sectors: including Refugees, Administrative Costs of Donors

including this project, telecommunications and energy. France is a major player in all sectors (excluding humanitarian aid) and particularly significant in commodity aid (84.2%). Germany is significantly active in debt-relative action in addition to social infrastructures. The US concentrates almost exclusively on humanitarian aid.

Table 2.17 Assistance by Sector Executed from 2006 to 2014 (by country)

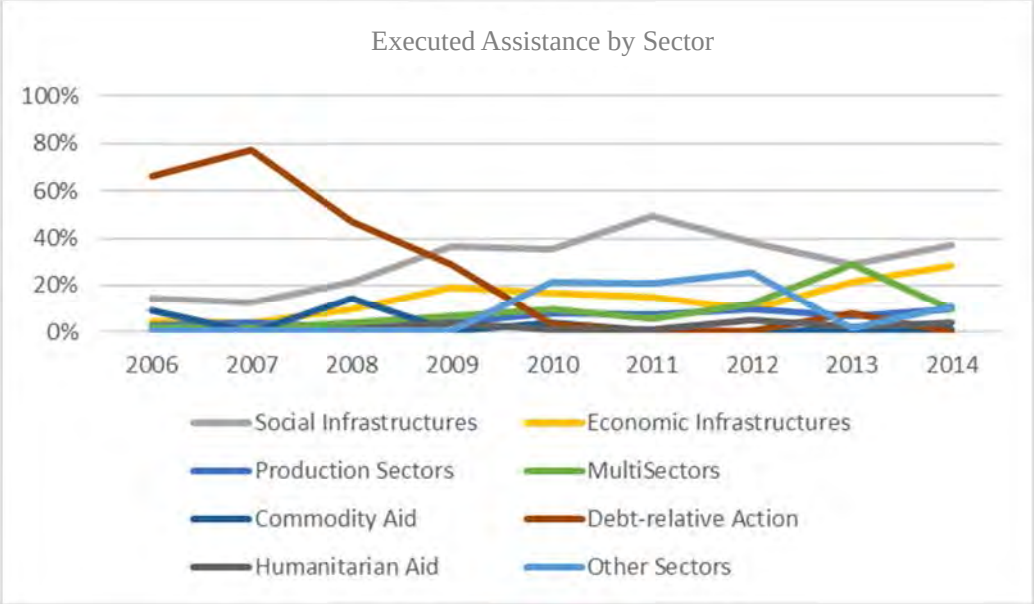
[redacted] Year / Sector / Donor [redacted]	2006-2014: overall share of total contribution of each country by sector								
	Social Infrastructures	Economic Infrastructures	Production Sectors	MultiSectors	Commodity Aid	Debt-relative Action	Humanitarian Aid	Other Sectors	Overall country contribution
Belgium	1.4%	2.2%	1.6%	0.6%	0.0%	4.9%	1.2%	0.1%	2.6%
France	18.8%	6.5%	22.9%	25.4%	84.2%	33.6%	0.3%	89.4%	30.2%
Germany	28.4%	4.2%	8.5%	19.5%	2.4%	40.3%	0.7%	0.1%	25.3%
Japan	4.0%	3.6%	6.6%	2.9%	3.7%	5.3%	4.9%	0.4%	4.3%
Korea	1.0%	0.3%	0.8%	1.3%	0.0%	0.0%	0.0%	0.0%	0.4%
UK	0.2%	6.7%	2.4%	0.2%	0.0%	6.5%	12.8%	0.6%	3.7%
US	4.2%	0.3%	0.3%	7.5%	3.0%	1.0%	47.4%	0.0%	2.9%
Af. Dvpt Fund	8.0%	13.6%	5.6%	5.6%	5.6%	8.5%	0.0%	0.0%	7.9%
EU Institutions	8.4%	29.1%	29.4%	10.6%	1.1%	0.0%	30.2%	0.9%	8.5%
Global Alliance for Vaccine and Immunization	4.7%	0.0%	0.0%	3.4%	0.0%	0.0%	0.0%	0.0%	1.4%
Global Fund	11.3%	0.0%	0.0%	5.8%	0.0%	0.0%	0.0%	0.0%	3.3%
International Development Association	8.4%	33.6%	22.0%	13.2%	0.0%	0.0%	0.0%	0.0%	8.3%
Islamic Dvpt Bank	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.3%	0.5%
UNICEF	1.2%	0.0%	0.0%	4.1%	0.0%	0.0%	2.4%	0.0%	0.6%
Total ODA Prime Donors by Sector	2,244.73	1,066.23	458.95	673.19	354.87	3,421.79	128.47	509.52	8,857.74
Overall Sectoral Weight	25.3%	12.0%	5.2%	7.6%	4.0%	38.6%	1.5%	5.8%	100.0%

Read : EU Institutions contributed to 30.2% of overall (selected) humanitarian aid from 2006 to 2014

"Other Sectors" includes Refugees, Administrative Costs of Donors.

Source: Produced by JICA survey team based on OECD statistics[23]

Figure 2.62 provides the ratio of assistance by sector from 2006 to 2014. As shown, assistance for debt-relative action accounted for a large portion initially, whereupon the ratio of social infrastructures increased from 2009 and the ratio of economic infrastructures has also grown since 2013.



Source: Produced by JICA survey team based on OECD statistics

Figure 2.62 Executed Assistance by Sector (2006 to 2014)

[23] OECD website, http://stats.oecd.org/Index.aspx?datasetcode=TABLE2A# (obtained on Sep. 26, 2016)

(2) Trend of aid coordination

Aid coordination has emerged as a major development assistance trend recently and been actively used in Cameroon. It is mainly carried out by local donor meetings organized by the MINEPAT and France (AFD), WB, African Development Bank and EU among other parties are actively exchanging their views on economic infrastructures.

(3) Trend of major donors

1) World Bank

The World Bank is currently implementing 18 projects in Cameroon. The approved loans total 617 million USD. The ongoing projects are listed below.

Table 2.18 World Bank's Projects

Project title	Electricity Transmission and Reform Project
Approval	November 2016
Commitment amount	325 million USD
Co-financing partner	None
Project title	Cameroon Transport Sector Development Project
Approval	October 2016
Commitment amount	192 million USD
Co-financing partner	None
Project title	Livestock Development Project
Approval	October 2016
Commitment amount	100 million USD
Co-financing partner	None
Project title	Health System Performance Reinforcement Project
Approval	May 2016 年
Commitment amount	100 million USD
Co-financing partner	Global Financing Facility: 27 million USD
Project title	Community Development Program Support Project-Phase III
Approval	September 2015
Commitment amount	70 million USD
Co-financing partner	None
Project title	Agriculture Investment and Market Development Project
Approval	September 2014
Commitment amount	100 million USD
Co-financing partner	Policy and Human Resources Development: Fund PHRD Grant: 3 million USD
Project title	Additional Financing to Cameroon Health Sector Support Project
Approval	June 2014
Commitment amount	20 million USD
Co-financing partner	Health Results Innovation Trust Fund (HRITF): 20 million USD (Grant)
Project title	Cameroon - Multimodal Transport Project
Approval	May 2014
Commitment amount	71 million USD
Co-financing partner	None
Project title	CAMEROON--Equity and Quality for Improved Learning Project
Approval	February 2014

Commitment amount	Education for All - Fast Track Initiative (EFA-FTI): 53.3 million USD
Co-financing partner	None
Project title	Cameroon Flood Emergency Project
Approval	June 2013
Commitment amount	108 million USD
Co-financing partner	None
Project title	Cameroon Social Safety Nets
Approval	March 2013
Commitment amount	50 million USD
Co-financing partner	None
Project title	Cameroon:NGOYLA MINTOM PROJECT
Approval	April 2012
Commitment amount	Global Environment Facility (GEF): 3.5 million USD
Co-financing partner	None
Project title	CM - Lom Pangar Hydropower Project (FY12)
Approval	March 2012
Commitment amount	132 million USD
Co-financing partner	AfDB: 29 million USD; EIB: 40 million USD; AFD: 79 million USD; BEAC: 15 million USD
Project title	Cameroon Mining Sector Technical Assistance Project
Approval	December 2011
Commitment amount	30 million USD
Co-financing partner	None
Project title	CM-Sanitation Project
Approval	June 2011
Commitment amount	30 million USD
Co-financing partner	None
Project title	Cameroon - Competitive Value Chains
Approval	June 2010
Commitment amount	30 million USD
Co-financing partner	None
Project title	CM-Energy Sector Development Specific Investment Loan (FY08)
Approval	June 2008
Commitment amount	65 million USD
Co-financing partner	None
Project title	Cameroon Health Sector Support Investment (SWAP)
Approval	June 2008
Commitment amount	25 million USD
Co-financing partner	Health Results Innovation Trust Fund (HRITF): 20 million USD (Grant)

Source: World Bank website

① Road projects

The World Bank is implementing the transport-related projects listed below.

(a) CEMAC member countries – Transport-Transit Facilitation Project, total amount of loans extended to Cameroon by the WB: 407 million USD)

A project to improve the automobile and railway transport among Cameroon, Central African Republic and Chad. It is to eliminate the physical and non-physical barriers of the Douala-N'Djamena

Corridor (1,850km in total) and the Douala-Bangui Corridor (1,450km in total). It is also to increase the capacity of the CEMAC Customs Union. The main project components are ① road and railway improvement, ② investment to improve communications capacity during railway operation and ③ building the capacity of the customs and transportation sector (ICT capacity and boosting the security of Douala Port). Donors other than the World Bank (including the ADB, EC, France and Japan) also participated in the project. The total loans extended by the World Bank to Cameroon originally amounted to 147 million USD (project appraisal report (May 25, 2007). The loan period was 30 years and the original grace period was for 10 years with 0.75% interest.

Additional loans were provided several times for the project and those extended to Cameroon were as follows:

- 1st additional loan (approved on November 5, 2009): amount to Cameroon: 150 billion USD
- 2nd additional loan (approved on June 23, 2011): amount to Cameroon: 112 billion USD)

(b) Cameroon – Multimodal Transport Project, amount of loans extended to Cameroon by the WB: 71 million USD)

The project comprises the following two components:

- Component 1: improving road infrastructure for the Yaounde-Kousseri Corridor (57 million USD), improvement work between Maroua and Mora (61km) and maintenance agreement and technical supervision between Maroua and Kousseri (270km)
- Component 2: improving railway infrastructure, modernizing signaling (between Yaounde and Kousseri) and improving bridges having passed their service life

The project is to complement the 220-million USD project by ADB/ BDEAC to improve the section between Yaoundé and Bafoussam (approx. 241.20km).

(c) Cameroon Transport Sector Development Project (amount of loans extended to Cameroon by the WB: 192 million USD)

The project comprises the following three components:

- Component 1: Transport planning and capacity building (83,000 USD)
  1.8 million USD to develop Multimodal Transport Benchmarks (MTBs) and produce modeling tools, 1.2 million USD for technical assistance to establish transportation regulatory authority, 2.9 million USD for technical assistance to introduce Transport Priority Investment Program (TPIP), 1.7 million USD for selection of Pilot Transport Infrastructure PPP Projects (two roads and one airport) and 700,000 USD for climate change adaption project, etc.
- Component 2 (131.4 million USD)
  107.7 million USD to repair and reconstruct road between Babadjou and Bamenda, 10 million USD to improve access road to the road between Babadjou and Bamenda, 7 million USD for road safety improvement and 67 million USD for road asset management capacity improvement (technical assistance) (The road improvement works are scheduled for completion by 2019 when the Africa Cup of Nations is scheduled.)
- Component 3: Air transport safety and security improvement (45.7 million USD)

efforts to improve the ICAO compliance of Yaoundé International Airport, Douala International airport, Garoua International Airport and Maroua International Airport

② World Bank strategies in Cameroon

As an integrated transport policy is needed in the sector, planning, tool development and other technical assistance is mainly provided to improve the multimodal policy formulation capacity. Meanwhile, traditional road improvement projects are also implemented.

The World Bank focuses on Far-North, North, Northwest and West provinces and hopes to further enhance cooperation with Japan. It is expecting technical cooperation with JICA as part of an Integrated Intermodal Transport Strategy (IITS) it is promoting. It also said it hopes for active cooperation in transport projects led by JICA.

③ Project currently under preparation for implementation

The World Bank is currently preparing for the Cameroon Inclusive Cities Project. According to a senior transport specialist of the World Bank, the project will include transport development and cover cities across the country, including Douala. The project document open to the public24 indicates that the project is to cover the Districts III and V of Douala in addition to other cities in Cameroon. The project cost is estimated at 130 million USD, and the World Bank is planning to provide a loan of 80 million USD. Approximately 20% of the project investment is planned to be used for the development of urban social infrastructure, including community roads, sidewalks, street lamps, and water supply and sewage systems.

④ Possibility of co-financing

A WB senior transport specialist said that they hope for active cooperation in transport projects with Japan.

2) African Development Bank

The African Development Bank is currently implementing 21 projects in Cameroon. The ongoing projects are listed below.

Table 2.19 African Development Bank's Projects

Project title	KRIBI II: Expansion of Kribi Gas Power Plant Project
Approval	December 2015
Commitment amount	Approx. 19.2 million Euro
Co-financing partner	None
Project title	GARANTIE PARTIELLE DE CREDIT DB
Approval	July 2015
Commitment amount	91.3 million Euro
Co-financing partner	None
Project title	GARANTIE PARTIELLE DE CREDIT SG
Approval	July 2015
Commitment amount	127.9 million Euro
Co-financing partner	None
Project title	PROJET CENTRAL AFRICA BACKBONE – COMPOSANTE CAMEROUN -

[24] World Bank website (http://documents.worldbank.org/curated/en/490741468238499424/pdf/PIDISDS-CON-Print-P156210-01-20-2016-1453322685750.pdf)

	PRET BAD
Approval	July 2015
Commitment amount	32.9 million Euro
Co-financing partner	Committed: Approx. 1.4 million Euro
Project title	PROJET DE GARANTIE AUX RÉFORMES POUR LA COUVERTURE DU RISQUE DE CHANGE
Approval	July 2015
Commitment amount	54.8 million Euro
Co-financing partner	None
Project title	KRIBI POWER PROJECT
Approval	July 2011
Commitment amount	Approx. 40 million Euro
Co-financing partner	Committed: 74.4 million Euro
Project title	Programme de développement des chaines de valeurs agricoles (PD-CVA)
Approval	January 2016
Commitment amount	71.3 million USD
Co-financing partner	None
Project title	The Development of the Bachenga -Ntui – Yoko - Lenar
Approval	November 2014
Commitment amount	146.9 million UAC (including ADF)
Co-financing partner	None
Project title	DIBAMBA POWER PROJECT
Approval	April 2010
Commitment amount	22.9 million Euro
Co-financing partner	Committed: 67.9 million Euro
Project title	PROJET D'AIDE D'URGENCE HUMANITAIRE AUX REFUGIES AU CAMEROUN
Approval	January 2015
Commitment amount	Approx. 667 thousand USD
Co-financing partner	Committed:
Project title	Projet d'appui à la modernisation du cadastre et au climat des affaires - prêt additionnel
Approval	December 2013
Commitment amount	5 million UAC
Co-financing partner	None
Project title	Projet de développement rural participatif et décentralisé de Grassfield（PHASE II）
Approval	April 2012
Commitment amount	16.8 million UAC
Co-financing partner	None
Project title	Assainissement de Yaoundé（Phase II）
Approval	March 2012
Commitment amount	Approx. 21 million UAC
Co-financing partner	Committed: Approx. 71 million UAC
Project title	Projet de route Kumba-Mamfe
Approval	November 2012
Commitment amount	47.3 million UAC
Co-financing partner	Committed: Approx. 31.6 million UAC
Project title	Aménagement hydroélèctrique de Lom Pangar

Approval	November 2011
Commitment amount	45 million UAC
Co-financing partner	Committed: Approx. 170.3 million UAC
Project title	AEPA en milieu rural
Approval	May 2010
Commitment amount	15 million UAC (including RWSSI: 5 million UAC)
Co-financing partner	None
Project title	Renforcement des infrastructures élèctriques et élèctrification rurale
Approval	March 2011
Commitment amount	31.6 million UAC
Co-financing partner	Committed: ACFA 20.9UAC
Project title	Projet de modernisation du Cadastre
Approval	November 2010
Commitment amount	7 million USD
Co-financing partner	None
Project title	Projet d'alimentation en eau potable et d'assainissement en milieu semi urbain
Approval	January 2009
Commitment amount	40 million USD
Co-financing partner	None
Project title	Chantier naval et industriel du Cameroun CNIC
Approval	December 2002
Commitment amount	35.2 million USD
Co-financing partner	Committed: 58.5 million USD
Project title	Growth-Oriented Women Enterprises Development Programme
Approval	December 2006
Commitment amount	8.5 million UAC
Co-financing partner	Committed: Fund for African Private Sector Assistance (FAPA): Approx. 0.36 million USD

Source: AfDB website

① Road projects

The transport sector projects the African Development Bank is implementing are summarized in the following table.

Table 2.20 Road Projects by the African Development Bank

Approval	November 2016	Expected completion	December 2021
Project title	Transport Sector Support Programme Phase 2: Rehabilitation of the Yaoundé-Bafoussam-Babadjou Road		
Project outline	Rehabilitation of the Maroua-Bogo-Pouss Road and the Zambi-Kribi Road		
Cost	Total: 455.982 million Euro; AfDB: 270.155 million Euro; ADF (country allocation): 16.153 million Euro; BDEAC: 76.165 million Euro		
Implementing agency	MINTP (Cellele BM-BAD)		
Approval	November 2014	Expected completion	December 2019
Project title	Transport Sector Support Programme Phase 1: Development of the Batchenga-Ntui-Yoko-Lena Road		
Project outline	Development of the Batchenga-Yoko-Lena Road		
Cost	Total: 514.866 million USD; AfDB: 210.404 million USD; ADF (country allocation): 19.257 million USD; JICA: 54.543 million USD		
Implementing agency	MINTP (Cellele BM-BAD)		

Approval	November 2012	Expected completion	December 2017
Project title	Kumba-Mamfe Road Development Project		
Project outline	Development of the Kumba-Mamfe Road (National Road No. 8), which connects with a corridor to Nigeria through Bamenda		
Cost	Total: 108.45 million UA; ADF loan 47.26 million UA (UA 1 = USD 1.517)		
Implementing agency	MINTP (Cellele BM-BAD)		
Approval	November 2008	Expected completion	June 2013
Project title	Transport Facilitation Programme for the Bamenda-Mamfe-Ekok/Mfum-Abakaliki-Enugu Corridor		
Project outline	Development of an international corridor between Cameroon and Nigeria		
Cost	Total: 276.73 million UA; ADF Loan (multi-allocation): 125.76 million UA; ADF Loan (country allocation): 62.88 million UA; JBIC (ODA loan for Cameroon): 27.36 million UA (UA 1 = US$ 1.6445)		
Implementing agency	MINTP (Cellele BM-BAD)		
Approval	October 2015	Expected completion	December 2019
Project title	Ketta-Djoum Road Transport Facilitation Project Phase 2		
Project outline	Development of international roads connecting Cameroon and the Republic of Congo		
Cost	Total: 513,706 million USD; AfDB: 255,851 million USD; JICA: 100,109 million USD		
Implementing agency	MINTP (Cellele BM-BAD)		
Approval	September 2009	Expected completion	March 2014
Project title	Ketta-Djoum Road Transport Facilitation Project Phase 1		
Project outline	Development of international roads connecting Cameroon and the Republic of Congo		
Cost	Total: 208.64 million UA; ADF Grant: 61 9 million UA; ADF Loan: 59.27 million UA (UA 1 = FCFA 761.251)		
Implementing agency	MINTP (Cellele BM-BAD)		
Approval	June 2007	Expected completion	
Project title	Transport Facilitation Programme on the Douala-Bangui and Douala-Ndjamena Corridors		
Project outline	Development of the Douala-Bangui and Douala-Ndjamena Corridors		
Cost	Total: 409.2 million UA; ADF Grant: 60.8 million UA; ADF Loan: 48 million UA		
Implementing agency	MINTP (Cellele BM-BAD)		
Approval	October 2006	Expected completion	
Project title	Numba-Bachuo-Akagbe Road Development Project		
Project outline	Development of the Douala-Bangui and Douala-Ndjamena Corridors		
Cost	Total: 53.8 million UA; ADF Loan: 44.7 million UA (UA1 = US$ 1.45250)		
Implementing agency	MINTP (Cellele BM-BAD)		

Source: produced by the JICA survey team based on the ADB website

② African Development Bank strategies in Cameroon

(a) Infrastructure enhancement for sustainable growth taking the poor into consideration

・ Improvement of infrastructure in rural areas and value chain of agricultural products, strengthening competitiveness of Cameroon products in CEMAC member nations and Nigeria as promising destinations for agricultural exports

(b) Enhancement of governance to cope with challenges facing Cameroon

- Assistance to improve finances, reform transport and energy sectors and promote sustainable urban development
- To achieve the above, the African Development Bank is focusing on infrastructure, energy, agriculture, rural development and governance.

③ Future projects

The African Development Bank is currently preparing for a national urban development project that will cover major cities around the country, including Douala, the biggest city of Cameroon. The project cost is estimated at 200 million USD (according to the interview with the African Development Bank). Meanwhile, the World Bank's project document indicates that it is seeking for co-financing partners for the Cameroon Inclusive Cities Project, which is under preparation. These two projects are likely to complement each other. The 2015-2020 Country Strategy Paper of the African Development Bank states that one of the outcomes it will pursue in Cameroon is to strengthen urban development management capacity. The African Development Bank is committed to supporting pilot projects for sustainable urban development in Douala and Yaoundé during the target period of the Country Strategy Paper.

④ Possibility of co-financing

The African Development Bank has considerable interest in co-financing transportation network projects with JICA and has expressed its intention to promote it aggressively.

⑤ Others

The World Bank said in the interview with the survey team that financial assistance from China has a significant impact in Cameroon and it hopes Japan will participate in promoting diversification. They also said that Japan has high development survey standards, expressed their interest in the survey report it is preparing; adding that the division of responsibilities of relevant ministries, including MINTP, MINDUH, MINEPAT and MINMAP, was unclear and the structure was complicated and so other donors should also be careful.

3) AFD (Agence Francaise de Development)

The Agence Française de Developpement (AFD) is responsible for executing the ODA of the Government of France and concluded an operational cooperation agreement with JICA in 2003, with which it has a close relationship. When President Hollande visited Japan as a state guest in 2013, for example, it was confirmed that France and JICA would jointly implement cooperation projects in Africa, etc. The AFD has implemented projects in Cameroon since 1960 and has provided assistance equivalent to 150 billion CFAF (€ 230.75 million) almost every year since 2002. The assistance activities of the AFD in Cameroon vary from agriculture, forestry, forests, infrastructure, education, health and energy to the private sector. The assistance schemes also vary (AFD).

① Projects being implemented by AFD in and around Douala

(a) Construction project of the 2nd Bridge on the Wouri in Douala

This is a project to complement the only bridge (which opened in 1954) that links the right and left banks of the Wouri River. It includes the construction of a new rail-road bridge eight kilometers

downstream of the bridge now in use and a connecting road (2km) on both sides of the river. There are plans to keep the original bridge for motorcycles and pedestrians after the second bridge is constructed. The AFD will provide 150 million euros and the Government of Cameroon 17 million euros. The project was launched on July 13, 2013 and is scheduled to be completed on March 31, 2017. Its social impacts include improved access of residents on the right bank to commute to the other side, enhanced communication between both sides of the river, accelerated economic division and concentration and improved traffic safety.

(b) NR 3 expansion project

This project aims to widen the National Road No.3 (NR3), which runs in the east and west directions from Douala. The NR3 plays a very important role as a main artery of the Cameroonian economy. In the east of Douala, the road runs to the Capital City of Yaoundé and other inland cities and further stretches to Chad and other Central African countries. In the west side, the road connects the metropolitan city of Douala with its sources of food supply in western Cameroon. The NR3 has also generated dynamic economic activities along the route. The details of the project are provided below.

- (East side of NR 3) total of 20km: The middle lanes are allocated to trucks and other long-distance transport vehicles and the side lanes for city transport. It opened partially in November and a further extension to the east is scheduled for Phase II. It comes complete with sidewalks and bumps for pedestrian safety.
- (West side of NR 3) total of 13km: There are also plans to build and install roundabouts, connecting roads, parking and drop-off spaces, crossings for pedestrians, sidewalks and street lights. The counterpart is the MINTP. However, given that it is a project in a city, a joint committee was established with the CUD and MINDUH and the progress is managed monthly. The AFD provided 65.7 million euros on the eastern side and 75 million on the western side of the river respectively.

(c) Douala International Airport improvement project

Douala Airport, which opened in 1977, is a gateway to Cameroon, handling one million passengers and accommodating 70 and 40% of international and domestic flights nationwide, respectively. (operated by publicly-run enterprise ADC).

There are plans to finance ADC via the AFD to improve the runway, construct a ramp and parking lot in Phase I, then improve the terminal in Phase II. The project is scheduled for completion before the African Cup of Nations in 2019 and the AFD will extend a loan of 46 million euros. The loan agreement between the two entities was concluded on February 19, 2016. It is a non-sovereign loan with no guarantee from the Government of Cameroon.

(d) Douala flood management project

Douala, situated on flat land once covered in mangrove forests, is at very high risk of flooding, with annual precipitation exceeding 4,000 millimeters. (The risk of spreading disease via drinking water increases in July and August given the increased precipitation.) The project comprises the following components: ① construction of a total of 39km drainage to improve drainage capacity, ② enhancing the quality of life of residents around water channels and ③ building capacity of the CUD. Implementing the project helps improve the sanitary condition by preventing waterborne diseases and reducing damage to road infrastructure. The AFD provides a loan of 130 million euros for the CUD, which was launched in August 2012 and is scheduled for completion on October 31, 2017.

② AFD strategies in Cameroon

The AFD prioritizes ① poverty measures, ② international public goods management (biodiversity protection and climate change strategies, etc.), ③ economic growth and ④ support for peace and democracy. Its priority regions and countries are the Sub-Saharan Africa and Mediterranean region, which includes Cameroon. Approx. 55% of the ODA budget was for the African target region and 41% was allocated to the Sub-Saharan Africa in 2011. (It aims to allocate 60% of the budget to the Sub-Saharan Arica.) The ranking of ODA recipients in 2011 are Ivory Coast, the Republic of the Congo, China, Morocco, Indonesia, Vietnam, Tunisia, Cameroon and Egypt; Cameroon is ranked 8th (Source: House of Councilors).

The automobile transport AFD prioritizes is city transport rather than intercity transport.

③ Future projects:

It is preparing for city projects with sustainability potential in Douala.

④ Possibility of co-financing

According to an interview with the AFD, it is willing to cooperate with Japan. However, given its rule preventing it from extending loans to countries assessed as having a high risk of financial instability as per IMF Article 4 Consultation, it cannot extend a new loan to Cameroon. However, it can provide grant aid or technical assistance for some projects and thus cooperate with various schemes, according to the interview. Because it cannot extend a loan to a project tied to Japan, it must adopt a different form, including a project divided into some sections, according to them.

4) European Union

The EU has paved a total of 1,000 kilometers of road over the past 20 years in transport infrastructure. Its interest has shifted to rural development and improved governance.

① Road projects

An F/S of a ring road in the capital of Yaoundé is conducted (funded by the EU and survey conducted by Slovakian TiEG). Preparation of the final report is scheduled for completion by the end of this fiscal year. No fund provider in the implementation stage has yet been decided.

② EU strategies in Cameroon

The EU prioritizes (a) improving governance capacity and (b) rural development. The budget for assistance via the 11th European Development Fund (2014-2020) to be extended to Cameroon is shown in the following table:

Table 2.21 Priority Sector and Aid Budget of 11th European Development Fund

Priority Sector	Amount
Governance capacity improvement	84 million euros
Rural development	178 million euros
Fund assistance projects	20 million euros
Total	282 million Euro

Source: Produced by the JICA Survey Team based on materials provided by the EU

③ Future projects

(a) The EU is considering the establishment of a financial assistance fund of around 100 million euros for road development on a municipal level.

(b) The EU is considering the establishment of a grant aid fund of around 185 million euros to develop infrastructure.

(c) The EU has separately set up an assistance category of 350 million euros for CEMEC nations (2014-2020). Of this fund, 155 million euros can be used de develop roads and other economic infrastructure. However it has yet to be utilized as Cameroon has not proposed any promising project.

④ Possibility of co-financing

The EU also hopes for closer cooperation with Japan. However, it mainly provides assistance in the form of grant aid and its priority sectors are (a) improving governance capacity and (b) rural development. Accordingly, the key is how the needs of both parties can be met in cooperation in a transport network project.

5) European Investment Bank (EIB)

The EIB extends loans mainly for infrastructure, whereas the EU mainly provides grant aid. The EIB set up an office in October to oversee Cameroon, Chad and the Central African Republic.

① Projects currently underway

- Participation in the Lom Pangar hydropower plant construction project as a fund provider
- Agreement to participate in the Nachtigal amont hydropower plant construction project
- Agreement to participate in the Douala NR 3 improvement project (east side) Phase II

② EIB strategies in Cameroon

The EIB prioritises energy and sustainable transport (railway and urban public transportation).

(a) It is interested in the energy sector and extended loans to the ENEO (former SONEL) and Lom Pangar hydropower plant project. It plans to increase loans.
(b) Sustainable transport (railway and urban public transportation): It can extend loans to ports, dry ports, airports, agriculture, rural development, forest conservation and school and hospital construction. It does not intend to finance intercity transport projects.

Other priority sectors include: (c) loans for PPP projects, (d) water (has extended loans to CAMWATER), (e) loans to SMEs, (f) provision of a credit line for commercial banks to enhance microfinancing and (g) telecommunications.

③ Future projects

The EIB is considering a rehabilitation project of railway between Yaoundé and Douala. It is co-financing with the WB and provides related technical assistance. It also complements with the EU that provides grant aid.

The EIB is considering a project to rehabilitate the railway between Yaoundé and Douala. It is co-financing work with the WB and provides related technical assistance. It also complements assistance provided by the EU as grant aid.

④ Possibility of co-financing

The director of the local office emphasized that it has co-financed the construction of a hydropower plant in Nepal with JICA and ADB and expressed its willingness to enhance future cooperation. The EIB is subject to restrictions which mean it cannot extend loans that exceed 50% of a project budget and where the scale of a loan exceeds 50 million euros. Other restrictions need to be confirmed.

6) China

China has invested a massive amount of aid in Cameroon since 2011 (940 million USD in 2011, 840 million USD in 2012, 320 million USD in 2013, 330 million USD in 2014 and 860 million USD in 2015). It continues to invest at a similar pace in 2016 with 1,010 million USD in the first quarter. Assistance and investment from China for Cameroon is focused on economic infrastructures including ports and harbors, bridges and expressway development in general and it does not seem to have much interest in education or health. The major projects are listed below.

① Kribi deepsea port development project (Phases 1 to 3)

Chinese Eximbank agreed to extend a loan of 423 million USD to the port development project with Cameroon on January 12, 2011. The contractors are China National Electric Equipment Corporation and China Harbour Engineering Company Limited. With a water depth of 16 meters, 100,000-ton-level cargo vessels can be moored. The development work was launched in 2010 and completed in 2014. Although China originally agreed to finance 85% and Cameroon would bear the rest, the latter did not provide any funds following renegotiations. China has already executed 169 million USD of its commitment. Phases 2 and 3 are implemented as PPP projects in the BOT scheme, according to some sources.

Source: Produced by the JICA survey team based on the French Ministry for the Economy and Finance website and Aid Data.org.

② Douala-Yaoundé expressway Phase 1 (451 million USD)

Chinese Eximbank agreed to extend a loan of 241.4 billion CFAF (451 million USD) to the expressway development project with Cameroon in June 2012. The nation's first six-lane expressway will have a total length of 215km and the distance of approx. 50km between Douala and Yaoundé will be shortened. The total project cost is 284 billion CFAF, of which China financed 85%. The China First Highway Engineering Company was chosen as the contractor in 2012 and construction is scheduled for completion in 2017.

- 75MW hydraulic power plant and dam development project in Adamoua Province
- Public housing development project (budget unknown)
- Hydraulic power plant and dam development project in Mem'velé (220MW) (budget unknown)
- Drinking water supply network development project in Yaunde City (budget unknown)
- Provincial stadium development and renewal project (340 million USD)

It is an 8-year PPP development and renewal projects of stadiums(60,000 seats) located in each province in the BOT scheme to be launched in 2007. The contractors are China National Machinery and Equipment Import and Export Corporation.

The Government established the AGTF (African Growing Together Fund) and concluded a memorandum of understanding with the Government of Cameroon to contribute 2 billion USD to projects for the next decade (according to an interview with the World Bank). The survey team visited the Embassy of China on November 17 and the counselor for the economy said that the government would extend loans to develop the road between Yaoundé and Douala via the EXIMBANK but would not be involved in other road projects, including the road between Edéa and Kribi; Chinese construction companies simply receive orders. It is said that 20 China-based construction companies engage in business activities in Cameroon and 20,000 Chinese nationals have been dispatched to the country.

(Reference data)

Table 2.22 Assistance for Cameroon (executed)

[billions CFAF]

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Grand Total	92.60	92.90	126.20	118.00	155.80	213.90	523.95	536.13	943.12
International Organization	43.00	54.30	112.00	80.20	85.60	94.80	132.20	138.10	91.27
IDA	10.10	13.10	22.00	40.50	37.70	43.30	58.96	59.00	36.24
ADF	11.50	26.60	11.20	36.80	25.20	36.00	18.50	35.66	24.17
IMF	3.90	5.20	70.00	0.00	0.00	0.00	0.00	0.00	0.00
EIB	0.00	0.00	0.00	0.00	11.20	3.30	0.00	18.63	3.35
BADEA	4.30	3.60	0.30	0.20	0.00	0.40	1.50	1.22	0.00
BID	4.00	1.90	4.20	2.20	1.50	8.00	12.00	13.99	20.41
Inter Islamic	0.00	0.00	0.00	0.00	8.50	0.00	0.00	0.00	0.00
IFAD	2.80	0.90	2.10	0.30	1.50	0.30	3.00	4.73	5.32
OPEC FID	4.60	3.00	2.20	0.20	0.00	3.50	7.90	4.90	1.77
EU	1.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bilateral (Pari Club)	27.20	19.50	10.40	10.90	7.50	3.80	22.35	68.29	98.75
Belgium	14.40	9.80	7.00	5.90	4.50	0.00	0.00	7.86	0.00
France	5.70	1.40	0.00	0.00	0.00	0.00	18.90	48.80	94.80
Germany	5.30	6.40	0.50	0.10	0.80	1.00	0.05	0.00	0.00
Netherlands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spain	1.80	1.90	2.90	1.70	0.50	0.00	0.00	9.27	0.00
Japan	0.00	0.00	0.00	3.20	1.70	2.80	3.40	5.19	3.95
USA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.44	0.00
Bilateral (other than Pari Club)	22.40	19.10	3.80	26.90	62.70	115.30	318.50	325.87	212.24
China	16.90	16.10	2.40	16.40	62.30	106.20	317.70	324.50	207.73
Kwait	3.80	3.00	0.70	0.00	0.00	0.00	0.20	0.37	0.00
Saudi Arabia	1.70	0.00	0.70	0.00	0.00	0.00	0.10	0.00	0.00
South Korea	0.00	0.00	0.00	0.00	0.00	9.10	0.50	1.01	4.51
India	0.00	0.00	0.00	10.50	0.40	0.00	0.00	0.00	0.00
Commercial Bank	0.00	0.00	0.00	0.00	0.00	0.00	50.90	3.87	540.86
Dexia	0.00	0.00	0.00	0.00	0.00	0.00	0.50	3.87	18.76
Deutsch Bank	0.00	0.00	0.00	0.00	0.00	0.00	31.10	9.27	5.83
France/USA Societe generale	0.00	0.00	0.00	0.00	0.00	0.00	19.30	0.00	17.32
Inter Islamic TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.50	0.00
Commerz Bank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.17
Eurobond	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	452.92

Remark1 : China includes EXIM BANK china.

Remarks : South Korea became a Pari Club member in 2016.

Source: INS, Statistical Yearbook 2014, Chapter 24 Currency and Credit,
CAA, Note de Conjoncture Trimestrielle de la Dette Publique du Cameroun

(Reference data)

Table 2.23 Assistance for Cameroon (balance based)

[billions CFAF]

	2008	2009	2010	2011	2012	2013	2014	2015
Grand Total	932.30	974.80	1,123.00	1,280.40	1,471.00	1,920.00	2,560.00	3,480.00
International Organization	282.70	376.80	461.00	561.10	629.70	721.40	964.00	1,022.00
IDA	106.40	125.50	172.00	220.40	264.50	327.50	419.00	486.90
BIRD	16.60	13.80	15.00	9.70	6.60	4.20	0.80	0.00
IMF	11.40	79.90	84.00	85.70	83.40	77.90	80.30	60.90
AfDB (ADF)	59.70	67.00	99.00	136.50	172.40	177.60	282.60	266.70
BID	20.00	21.40	22.00	31.30	32.70	51.70	52.30	77.30
IFAD	12.40	14.10	15.00	19.20	20.50	29.60	39.50	31.40
OPEC FID	10.00	10.50	11.00	10.60	10.20	18.20	21.20	24.20
BADEA	13.70	13.70	15.00	14.60	13.10	12.40	14.30	21.90
EU	32.50	30.80	28.00	32.70	26.30	25.60	54.10	41.20
Bdeac	0.00	0.00	0.00	0.40	0.03	0.03	0.03	4.50
Bilateral (Pari Club)	580.50	527.60	476.00	445.60	428.20	435.40	433.20	518.00
France	519.50	471.10	424.00	389.50	360.70	359.60	355.40	478.20
Japan	0.00	0.00	3.00	5.60	7.50	9.30	13.30	21.80
Germany	31.60	30.30	28.00	27.10	26.50	35.80	29.60	18.70
Belgium	5.80	9.50	5.00	3.90	15.00	15.00	15.00	12.20
Spain	12.40	6.60	7.00	11.30	11.50	10.20	9.10	7.50
Switzerland	2.80	2.70	3.00	2.80	2.60	2.00	1.90	1.70
Netherlands	8.30	7.40	6.00	5.40	4.40	3.40	2.40	1.00
Bilateral (other than Pari Club)	68.50	69.80	133.00	214.30	325.30	635.20	1,050.10	1,165.00
China	48.40	50.00	96.00	175.50	278.90	596.40	1,012.30	1,112.40
India	0.00	0.00	17.00	18.30	17.50	17.20	18.30	19.80
South Korea	0.00	0.00	0.00	0.80	9.60	4.30	1.60	15.70
Kwait	16.20	16.10	17.00	17.10	15.50	14.30	14.90	14.60
Saudi Arabia	3.90	3.70	3.00	2.60	3.80	3.00	2.60	2.30
Commercial Bank	0.60	0.60	52.60	59.40	87.80	125.10	113.20	759.00
Emprunt obligataire	0.00	0.00	42.00	42.00	31.50	21.00	10.50	452.90
Polytechnologie/Chine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	144.90
Espagne Deutsche Bank	0.00	0.00	0.00	0.00	21.60	50.80	55.00	52.40
Belgique Dexia	0.00	0.00	10.00	16.80	21.80	20.80	22.70	39.90
Generale/Exim USA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.50
Commezbank	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.50
France/USA Societe generale	0.00	0.00	0.00	0.00	3.70	23.30	16.40	14.20
BTP Banque	0.20	0.20	0.20	0.20	0.30	0.30	0.00	0.00
Non Commercial Bank	0.40	0.40	0.40	0.40	0.40	0.40	0.00	0.00
IFTC	0.00	0.00	0.00	0.00	8.50	8.50	8.50	0.00

Remark1: China includes EXIM BANK china.

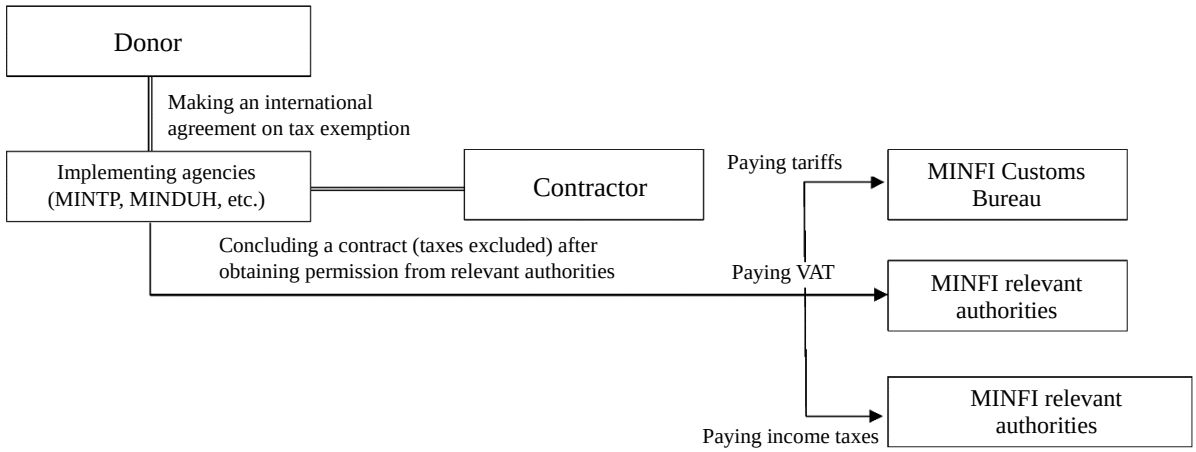
Remarks: South Korea became a Pari Club member in 2016.

Source: INS, Statistical Yearbook 2014, Chapter 24 Currency and Credit,
CAA, Note de Conjoncture Trimestrielle de la Dette Publique du Cameroun

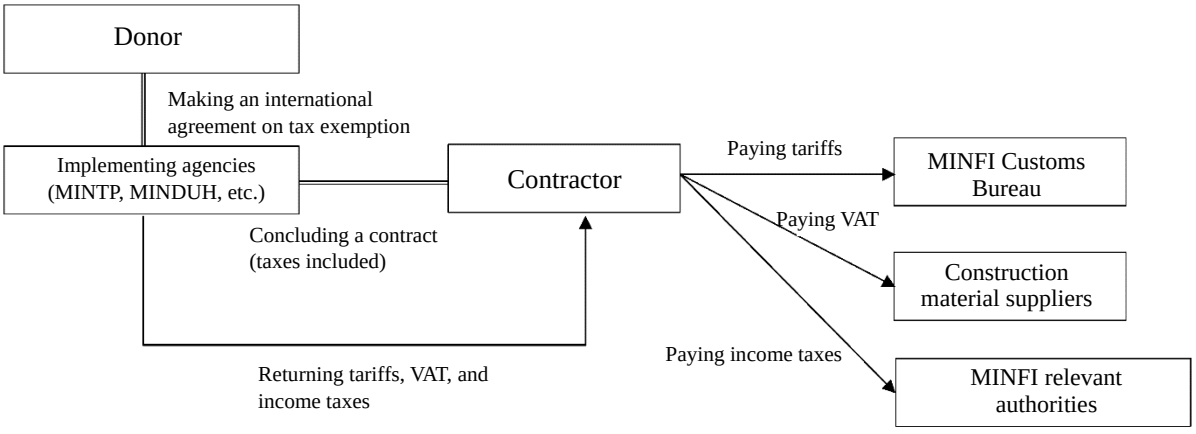
2.5 Tax Imposition and Exemption of Public Works Projects

Value-added tax (VAT), customs and income tax are imposed on goods procured domestically, goods procured abroad and workers' income, respectively, in public works projects in Cameroon, as in other countries. The taxation was notified in DECREE No. 2003/651 PM/DU 16 April, 2003 by the President in 2003. It stipulates that VAT shall be borne by the owner and donors will not bear any of the above tax in donor projects. In the case of the second bridge, the (construction cost without tax – income tax) is the contracted amount of the contractor and VAT, excluding customs or income tax. The VAT and customs are borne by the government in some cases and returned after the contractor paid once in others and depends on the project, according to the interview with the MINTP. According to the interview with the EU, it takes the executing agency time to issue a permit required to procure goods at a price when the VAT is withdrawn and thus it is returned after having been paid once.

【Case 1. Duties and Taxes Borne by the Government】



【Case 2. Duties and Taxes Returned to the Contractor】



Source: JICA survey team

Figure 2.63 Flow of Tax Exemption Procedures

3. Transport Sector in the Survey Target Area: An Overview

3.1 Road Sector

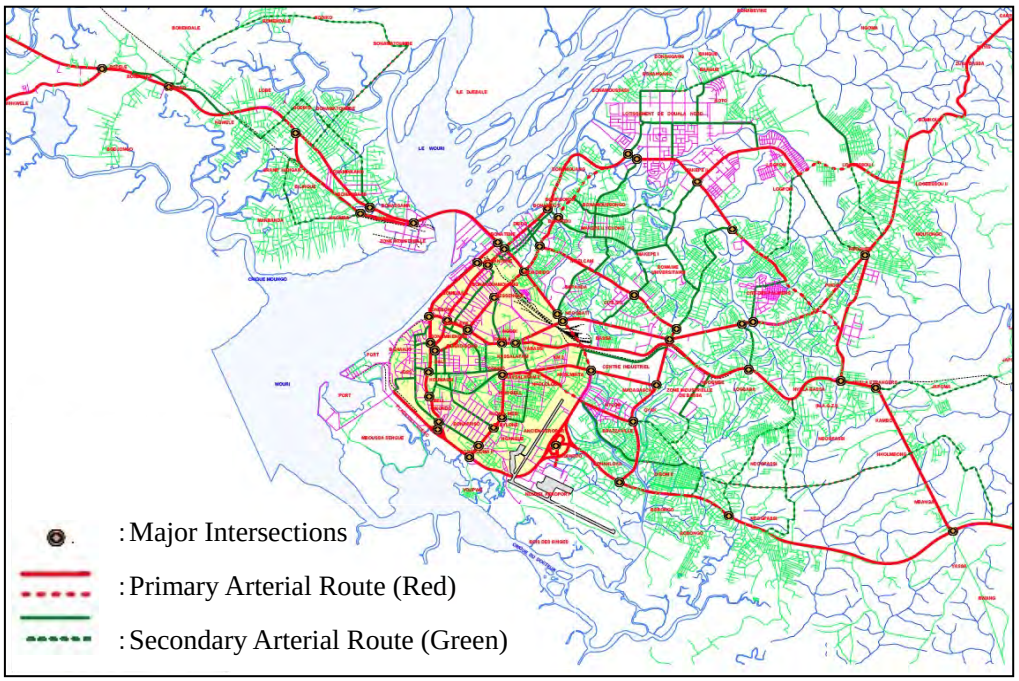
3.1.1 Current condition of roads in Douala City

According to *"Urban Development Master Plan for Douala City 2025"* (2012), the total road length in Douala City is 1,800km, of which 460km (26%) have been paved: this figure indicates low level of road development as 0.72km per 1, 000 persons are paved (Reference: Kinshasa=0.93km, Lomé=1.7km).

Among these roads, the total length of major arterial roads connecting major areas in Douala city is about110km, which are administrated by CUD or MINTP.

- National Road No.3: Traversal line of the city in east-west direction, including the existing bridge crossing Wouri River: the western section is linked to Limbe via Bonaberi Area on the right bank and the eastern section linked to Yaoundé via Edea.

- Prefectural Road No.14: Line, which starts at Deïdo Roundabout on the left bank of existing bridge and extends to the northeast via the east side of the city: Traffic are concentrated major intersections such as Deïdo and Ndokotti, where markets and taxi stands exist. In these area, taxis which wait customers, shops which use public road area become major reasons of congestion there.



Source: Urban Development Master Plan for Douala City 2025

Figure 3.1 Road Network of Douala City (Major arterial road and crossing point)

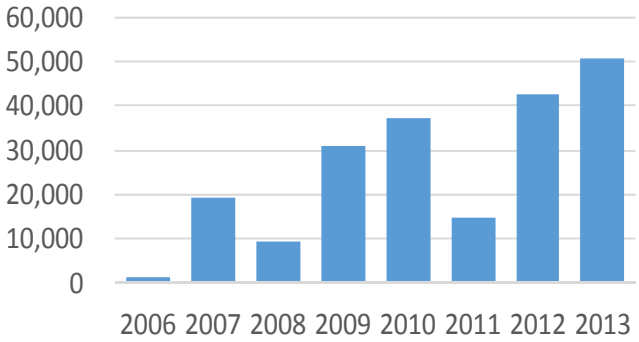
3.1.2 Traffic Transport

As the following figure and table show, the nationwide number of vehicle registration in 2010 is 443,000 (including motorbikes) and newly registered vehicles are increasing every year.

Table 3.1 Vehicle Registration in Cameroon (2010)

	Amount	Rate
Passenger car/ light truck	199,741	45%
Two/three wheeled	224,992	51%
Truck	10,144	2%
Large Bus	4,487	1%
Others	3,654	1%
Total	443,018	100%

Source: WHO



Source: Transtat 2014(Ministry of Transport)

Figure 3-2 Transition of Annual Number of Newly Registered Vehicles in Cameroon

Traffic survey on Douala City was conducted in 2008, which can give characteristics of traffic in Douala City, even though traffic volume of vehicles and motorcycles has been increased afterward drastically.

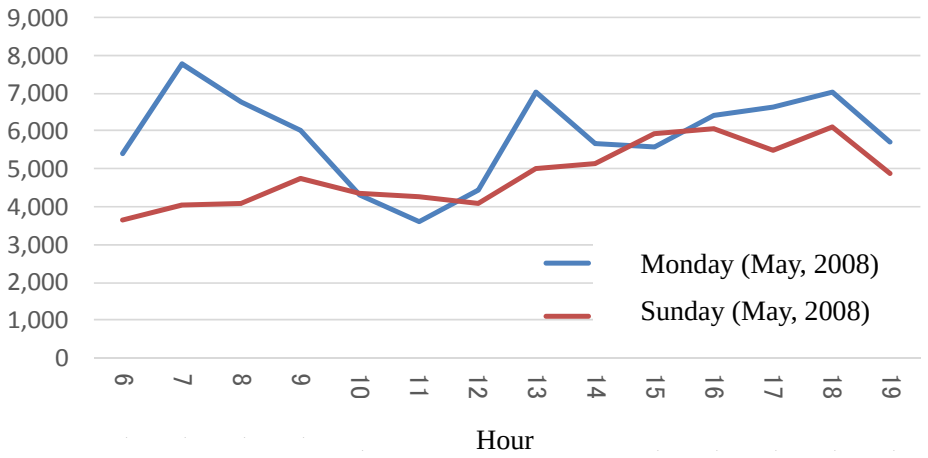
Component of vehicle type shows that two wheeled vehicles (motorbikes) occupy 55% or more and nearly half of 4 wheeled vehicles are taxies: as many of them are used cars and with defective maintenance, broken cars on the road cause congestions frequently.

Table 3.2 Component Ratio of Vehicle Types in Douala City, 2008

Type	Two wheeled	Passenger vehicle	Taxi	Minibus	Coach	Light truck	Truck (2 axles)	Truck (above 3 axles)	Semi-trailer	Others	Total
Component Ratio	55.3%	19.3%	19.6%	1.9%	0.2%	1.8%	0.8%	0.1%	0.5%	0.5%	100%

Source: Prepared by JICA study team based on data of PROJET D'INFRASTRUTURE DE DOUALA (CUD)

Hourly traffic volume at Deïdo (roundabout), which connects to the existing bridge, where concentrate traffic in the city and has the heaviest congestion, shows peaks on weekdays around 7 in the morning and 6 in the evening. Comparing weekdays, traffic volume on holidays (Sundays) decreases by 18% per day, but has considerable amount around 4 pm to 6 pm.



Source: Data prepared by Study Team based on data of PROJET D'INFRASTRUTURE DE DOUALA (CUD)

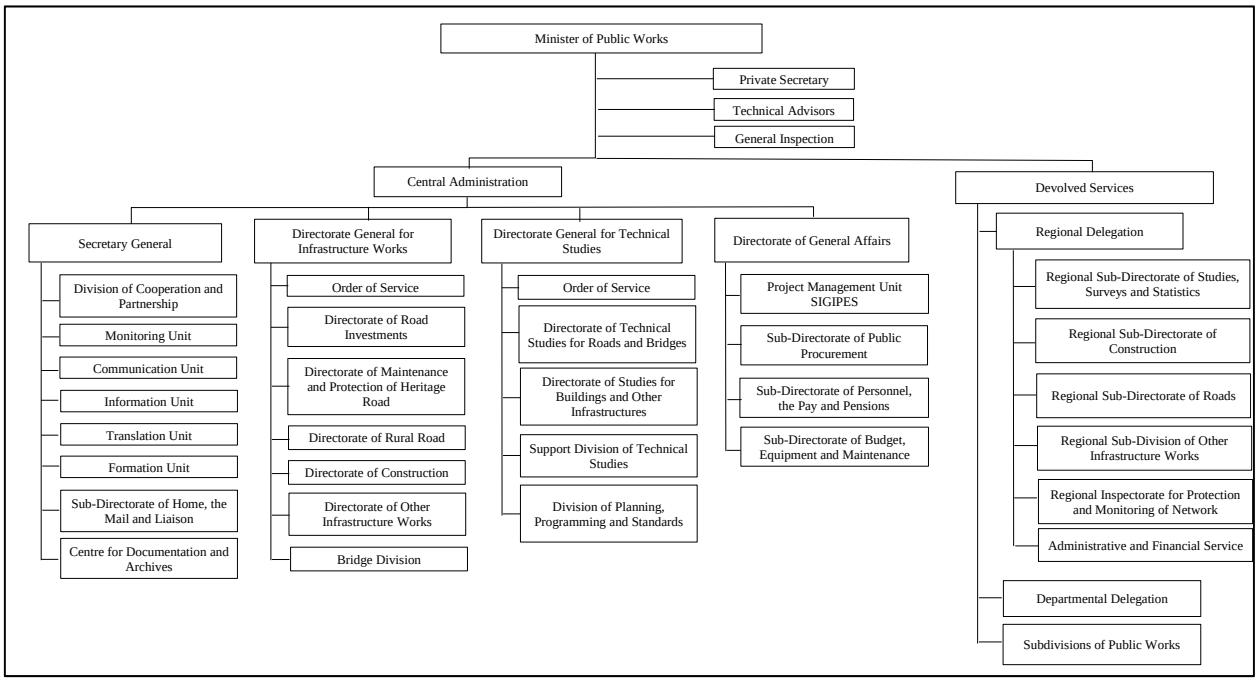
Figure 3.3 Hourly Traffic Volume at Deïdo (Round About) in May, 2008

3.1.3 Road administration and budget

(1) Road administration

Multiple ministries and agencies including the MINTP, MINDUH, MINT, MINEPAT and MINMAP are involved in transport and traffic administration of Cameroon. The MINTP oversees the survey, planning, design, construction and operation and maintenance of national roads, while roads other than national roads are administered by the CUD in Douala City that is the target area of the survey. The MINDUH sometimes serves as the agency implementing the construction of urban arterial roads, the implementing agency is decided for each project. The MINEPAT, MINMAP, MINFI and MINCAF are in charge of cooperation and coordination with donors, procurement and contract of public works projects, tax issues and project land issues, respectively. As this shows, road projects require collaboration and coordination with multiple government organizations. The MINTP and CUD that are most involved in road administration of the survey target area are described in the section. Figures 3.4 and 3.5 provide the organizational chart of the MINTP and CUD, respectively. As such, multiple government organizations are involved in road administration. Figures 3-4 and 3-5 provide the organizational chart of the MINTP and CUD, respectively.

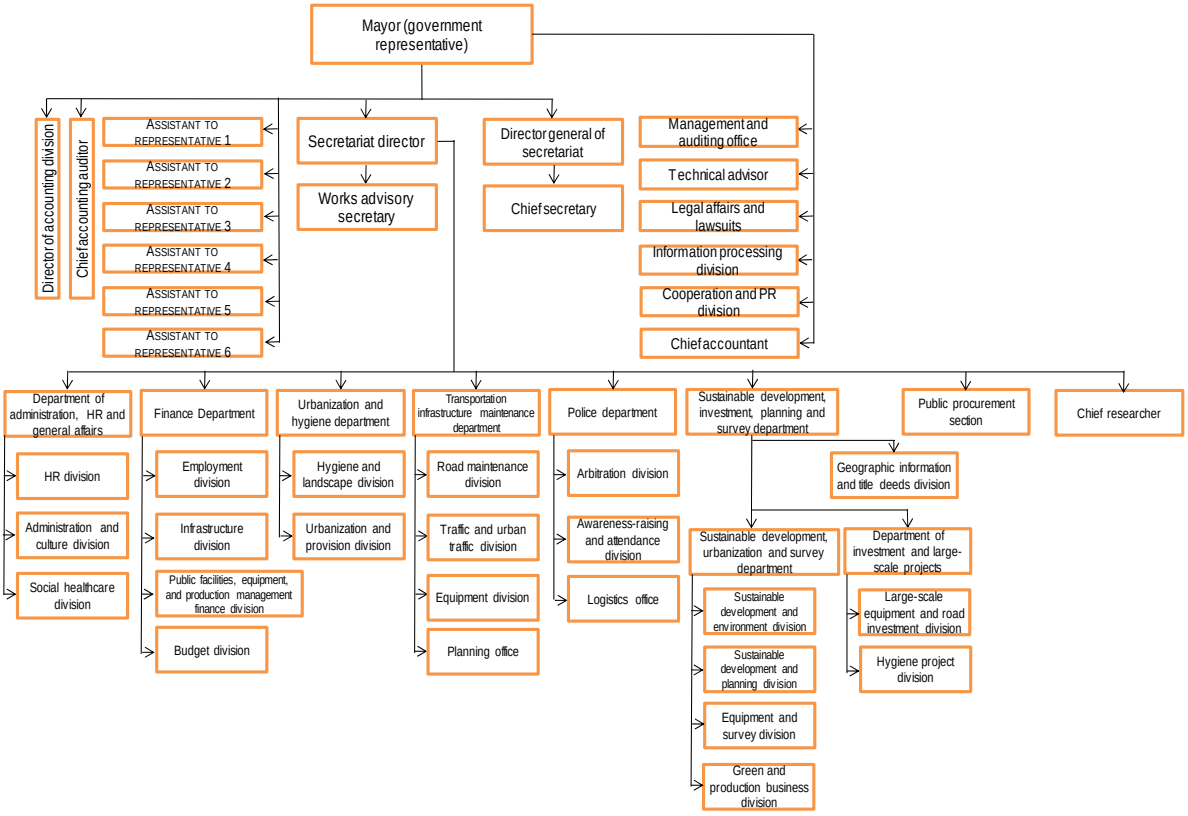
Within the MINTP, the General Directorate of Technical Survey oversees the survey, planning and design and the General Directorate of Infrastructure oversees construction and maintenance. On-site construction supervision, maintenance and axle load measurement are entrusted to each regional office. The Road and Bridge Technical Survey Division is under the General Directorate of Technical Survey and the Bridge Structure Division is under the General Directorate of Infrastructure and thus they have engineers who are capable of handling the design and construction of large-scale bridges. According to the interview with the MINTP equipped with a well-developed supervisory structure and engineers, it serves as the implementing agency of bridges that are more technically difficult and large-scale road projects even when they are non-national roads administered by the CUD.



Source: Produced by the JICA survey team based on Decree N. 2013/334 of 13 September, 2013

Figure 3.4 MINTP Organization

Within the CUD, the DEPIDD (division of sustainable development, investment, planning and study) oversees the survey, planning and design and the DIREM (division of transportation infrastructure maintenance) oversees construction and maintenance. The DEPIDD also oversees public transportation planning and urban planning of Douala City in addition to road administration. The DIREM is responsible for maintenance of traffic lights and signs in Douala City and the DEPIDD is in charge of survey and planning of new installation and repair.



Source: CUD (CUD Organization, as of May 2016)

Figure 3.5 CUD Organization

(2) Budget

The total budget of the MINTP has been increasing for the last three years - -252.734 billion FCFA in 2013, 262.6 billion FCFA in 2014 and 344.983 billion FCFA in 2015. The breakdown into construction, maintenance, survey and design and organizational enhancement in 2014 and 2015 is shown in Table 3.3. The budget for construction, maintenance and survey and design in 2015 increased from that of 2014 and that of construction increased significantly by 52%.

Table 3.3 MINTP Budget Breakdown

(Unit: billion FCFA)

Item	2014	2015	2015/2014
Construction	132.594	201.578	152%
Maintenance	96.811	108.197	112%
Survey and design	7.196	9.322	126%
Organizational enhancement	25.989	25.886	99%
Total	262.59	344.983	131%

Source: Civil Engineering (January-March 2015), MINTP

The total budget of the CUD increased from 2014 to 2016--48.4 billion FCFA in 2014, 52.65 billion FCFA in 2015 and 65.0 billion FCFA in 2016. The breakdown into survey and design, construction and repair and maintenance over the three years is shown in Table 3.4. Although the total road project budget is flat at around 13 billion FCFA from 2014 to 2015, it increased to approx. 19 billion FCFA in 2016 due to a sharp increase in the road construction and repair budget. The maintenance and survey and design budget peaked in 2014. The maintenance budget in 2015 and 2016 was almost flat and the survey and design budget decreased slightly. The road maintenance budget in 2014 is bigger than other years because part of maintenance projects in 2011 and 2013 was postponed to 2014. The budget of each project for multiple years is distributed to multiple years and that for each year is added so it varies in accordance with project progress.

Table-3.4 CUD Road Budget Breakdown

(Unit: billion FCFA)

Item	2014	2015	2016
Construction and repair	7.877	9.798	17.487
Maintenance	4.633	2.656	2.729
Survey and design	1.147	0.969	0.806
Total	13.657	13.423	21.022

Source: CUD Budget Programme

3.1.4 Road and bridge maintenance

(1) Road maintenance structure

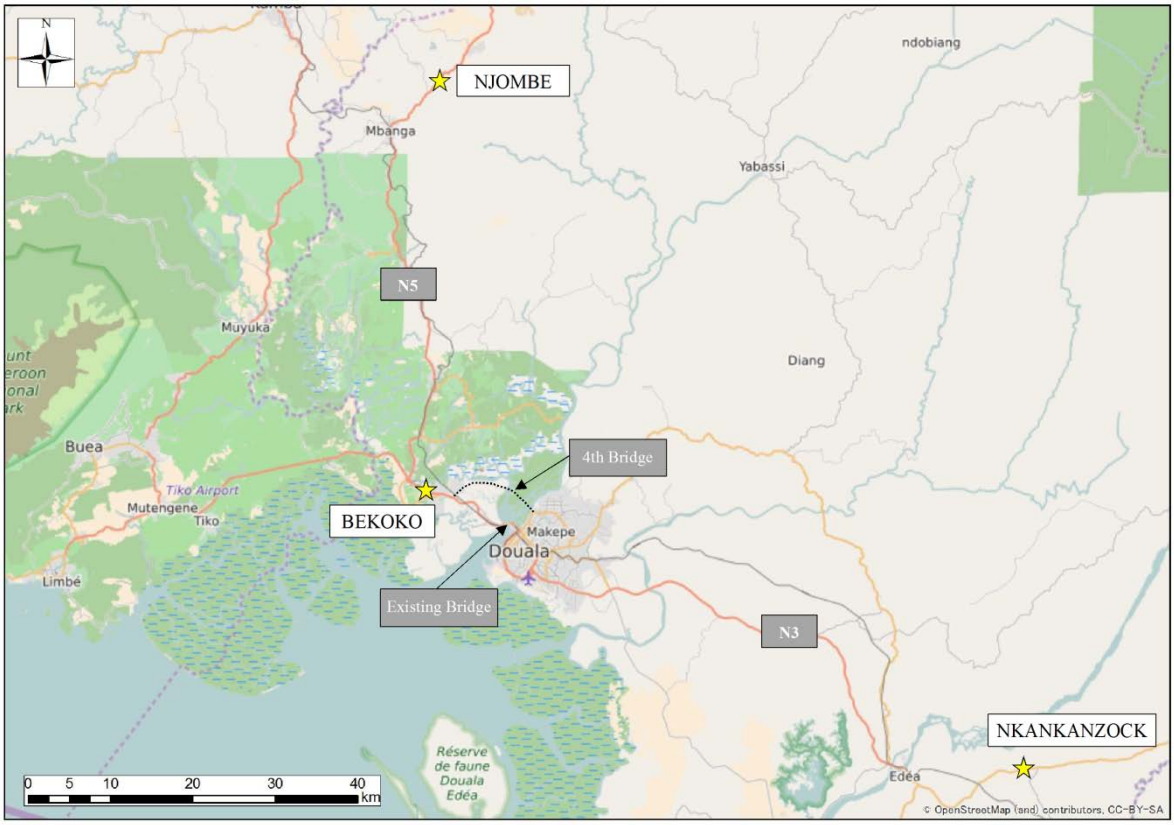
In Douala City, roads that are not national highways (including small bridges) are managed by the CUD and national highways and large bridges are managed by the MINTP. Inspections and maintenance planning and maintenance work of roads under the jurisdiction of the CUD are financed with in-house budgets. Small-scale road maintenance and repair work is directly performed by the CUD and large-scale work is outsourced to private construction companies, etc. The CUD's budget year begins in February and ends in January of the following year. The maintenance and repair plan is considered from June to October and repair contract packages, etc., are decided to estimate the necessary budget. Budget meetings are held from December to January of the following year for approval.

(2) Axle load regulation and loading situation

The axle load standards of Cameroon are stipulated in the Texts on the Protection of Road Property that are issued by the MINTP. They are 13 tons for the single axle, 21 tons for the tandem axle and 27 tons for the tridem axle and 13 tons per axle and gross vehicle weight of 50 tons. Although 1 ton or less over the each standard weight is allowed, fines are imposed when the excess weight exceeds it (For example, 50,000 FCFA is imposed per ton for an excess of 5 to 10 tons.).

The axle load and vehicle weight are measured at the axle weighing station and cargo vehicles are required to be weighed there on the transportation route. The weighing station is managed and operated by the MINTP and measurement is outsourced to a private entity. The MINTP collects fines from the carrier when the excess load is found out at the axle weighing station. There are checkpoints on major national roads and the police stop vehicles, confirm whether they were checked at the weighing station to control violating vehicles.

There are three axle weighing stations on NRs 3 and 5 in Littoral Province where the survey target area is situated, as shown in Figure 3.6. In the survey, axle measurement data (May to October 2016) of the three measuring stations was gathered. Table 3.5 provides the summary. The axle weight of an approximate average of 350 cargo vehicles was measured per day in Bekoko that is the closest to the target area; approx.26% of which were overloaded. Although the average gross vehicle weight is slightly below 40 tons, there were vehicles that weighed 70 tons to 90 tons, by far exceeding the standard of 50 tons. Although the average axle load is also slightly below 9 tons, there were vehicles that exceed 20 tons beyond the standard of 13 tons. This is a likely cause of deterioration and damage of pavement.



Source: JICA survey team

Figure 3.6 Axle Weighing Stations in Littoral Province (☆)

Table 3.5 Axle Load Measurement Data

May to October 2016 (6 months)

Item	Unit	BEKOKO	[1)] NJOMBE*	NKANKANZOCK
Vehicles whose axle is measured	Vehicle	64512	35434	128094
Daily average measurement	Vehicle/day	351	232	696
Average Gross Vehicle Weight	Ton	33.64	32.02	38.64
Maximum Gross Vehicle Weight	Ton	72.07	91.50	86.92
Average Axle Load	Ton	8.91	8.59	8.33
Maximum Axle Load	Ton	21.81	20.32	21.43
Overloaded vehicles	Vehicle	16809	7822	15854
Overloaded vehicle ratio	%	26.1	22.1	12.4

* The data of NJOMBE is for five months from May to September

Source: JICA survey team

BEKOKO

NJOMBE

Source: JICA survey team

Photo3.1 Axle weighing station on NR3

3.2 Public Transportation

3.2.1 Bus and taxi

There are local and mini buses in the city and intercity buses that connect cities.

(1) Local bus

The local bus service in Douala is operated by private company SOCATUR. It concluded partnership in 2007 with the CUD, which is the biggest shareholder. According to the interview with the CUD, there are 15 routes starting and ending at such densely populated areas as markets and industrial and residential districts. There are Classique and Express types. Large buses with approx. 90 seats are used for the Classique and small buses are used for the recently introduced Express. The large buses used are from France and SOCATUR owns about 70 of them. The service is operated regularly between 5:30 and 21:00 and there are areas where bus stops are installed. The bus fare is lower than the taxi at between 150 to 200

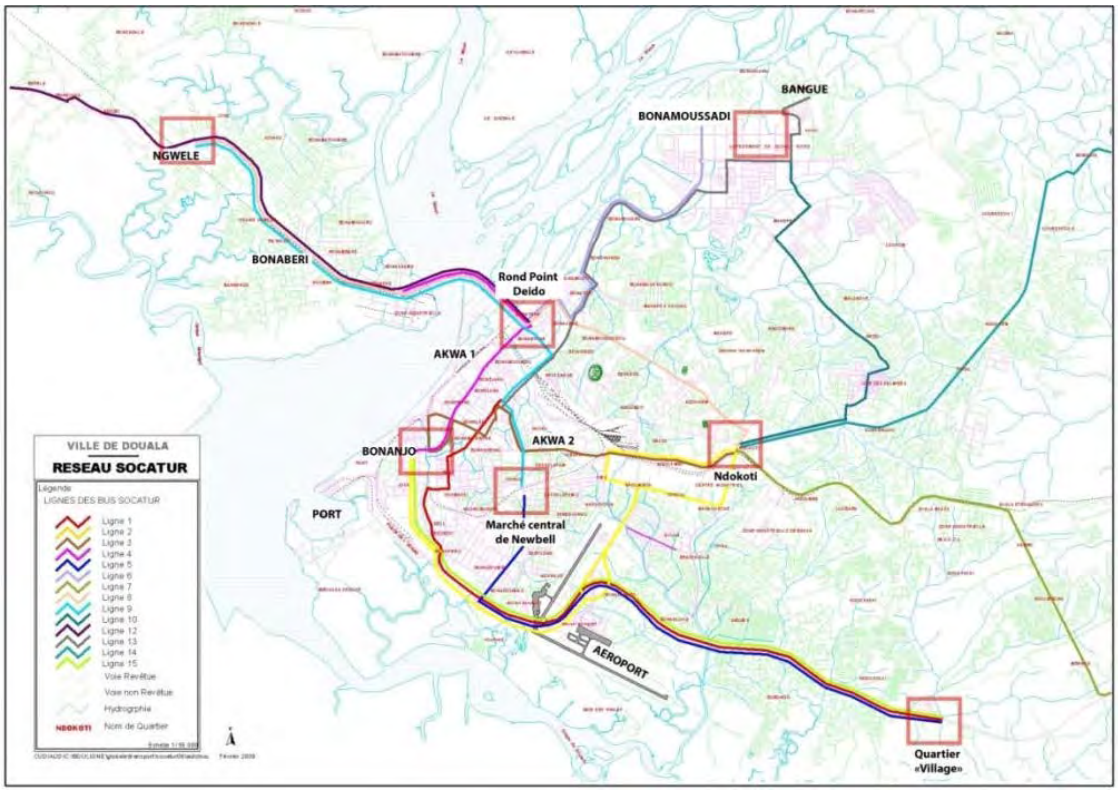
FCFA depending on the distance. However, not so many people use the bus as there is no timetable and the waiting time depends on the operation condition. The total of daily average is around 11,000, which comprises less than 1% of city traffic, according to the Master Plan.


Source: JICA survey team

Photo 3.2 SOCATUR Classique (left), SOCATUR Express (right)


Source: JICA survey team

Photo 3.3 Bus stop



Source: CUD

Figure 3.7 CATUR Bus Route Map

(2) Mini bus

Although they were prohibited recently, they are still operated without government business licenses; based in densely populated areas such as Marché Central and Ndokoti; particularly Bonaberi on the right bank. Users get and off the bus at specified bus stops and the fare is low at around 100 FCFA. However, the service level is also low as the vehicle is improperly maintained and passenger overloading prevails. According to the Master Plan, the daily average users are around 29,000, which comprises approx. 2% of city traffic.

(3) Intercity bus

The bus service between cities is operated by many private companies and the bus departs from and arrives at bus terminals scattered around cities. Although there are routes toward the northwest and south, the route between Douala and Yaounde is the main route. The one-way fare is between 2,500 and 5,000 FCFA.

Source: JICA survey team

Photo 3.4 Intercity bus terminal

Photo 3.5 Ticket stand

(4) Taxi

Taxis can be categorized into the following three operation types.

1)Taxi users can get on and off at certain places mainly at roundabout toward certain directions and sections.

2)Taxi users can get on and off at certain places mainly at roundabout and designate the destination freely.

3)Chartered taxi users can use the taxi freely for an extended period (cruising taxi with no certain taxi stand)

There is no meter and the fare is decided by negotiating with the driver. When a user gets on at a certain taxi stand as in 1) and 2), the basic fee for one section is 250 FCFA per person. However, it goes up to 300 to 400 FCFA on rainy days and when the road is heavily congested. As the capacity is five—two in the front seat and three in the back seat, an additional charge may be demanded when there are fewer passengers. In the case of 3), it is around 2,500 FCFA although it varies by time and route.

A business license issued by the MINT is required to operate taxi services and the registration number is painted on vehicles. There are many taxi associations and they usually belong to one of them. According to the Master Plan, the daily average users are around 357,000, which comprises approx. 20% of city traffic.

(5) Motor-bike taxi (motos-taxis)

Like the taxi, users get on the motorbike taxi at certain places like roundabouts and they can designate the destination freely. Although the fare is decided through negotiations, it is often higher than the taxi fare (approx. 300 to 400 FCFA and more expensive with roof). They exceed the taxi fare and often overtake them as they go by the pedestrian road and center median when they traverse congested areas. In other words, their driving behavior is bad. According to the Master Plan, the daily average users are around 334,000, which comprises approx. 18.5% of city traffic.

Photo 3.6 Motos-taxis on the road

Source: JICA survey team

Photo 3.7 Taxies in the city

Photo 3.8 A scene on a rainy day

3.2.2 Railway

The railway in Cameroon is operated by CAMRAIL and there are three railway networks including three lines: TRANSCAM I (Douala -- Yaounde (262.9km), TRANSCAM II (Yaounde -- Ngaoundere (884.3km) and LINGNE OUEST (Douala -- Mbanga (65.2km), Mbanga – Kumba (27.0km)). Although there are three to four passenger train services a day between Douala and Yaoundé, there is no regular service toward the west and freight trains and railway maintenance vehicles are operated irregularly as the railway condition on the right bank is deteriorating due to the construction of 2nd Bridge and National Highway 3. The railway service contributes little to the city traffic according to the Master Plan.

Source: JICA survey team

Photo 3.9 Train from Douala to Yaoundé

Photo 3.10 Railway condition on the right river bank

3.3 Port transportation

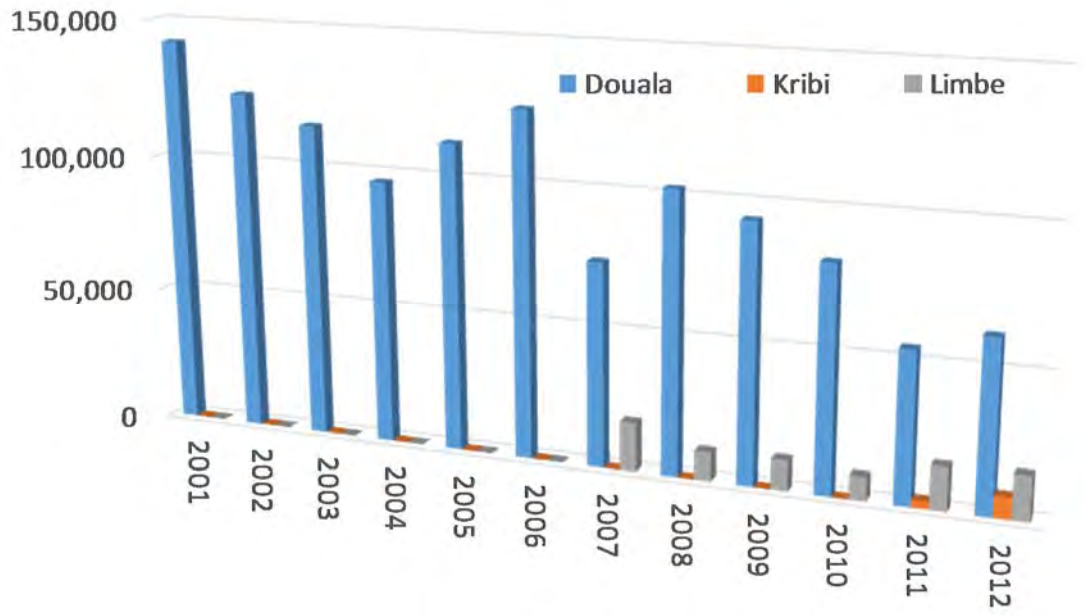
The Port of Douala handles more than 95% of port cargo in Cameroon. The annual transportation volume for each port (Ports of Douala, Kribi and Limbe) is shown in Figure 3.7.

The freight for imports (mainly petroleum, minerals and foodstuff, etc.) and exports (mainly timber, agricultural products and aluminum, etc.) goes mostly via the Port of Douala. The transport volume increases annually and has almost doubled within a decade, in line with national economic growth. Under the circumstances, the capacity of the Port of Douala is almost exceeding its handling capacity. Conversely, the handling volume of domestic freight at the port has been declining annually, although increasing slightly at the Ports of Kribi and Limbe.

As explained in the next chapter, new port development projects of the Ports of Kribi and Limbe are underway. In particular, the port facility scale of Kribi will exceed that of the current Port of Douala when the development project is completed, which will ease the concentrated use of the Port of Douala.

Long-distance transportation volume (tons)

Domestic (intraregional) transportation volume (tons)



Source: Produced by the JICA survey team based on Transtat 2014 (Ministry of Transport)

Figure 3.8 Annual Transportation Volume (tons) by Port in Cameroon

3.4 Air transport

There are 8 airports in Cameroon, four of which are international airports. They are operated by the ADC and managed by CCAA. There is one airline company (Cameair-Co).

Recent utilization of main airports is shown in Table 3.6. The nation's largest airport, Douala International Airport is situated in Douala. It has more than 700,000 users annually and handles 70% of international transport and 40% of domestic transport. The capacity of the airport is around 2 million and it is reported that it will not be saturated for the following 15 years, according to the Master Plan (2012). However, due to recent increased demand and the hosting of the 2019 Africa Cup of Nations, a renovation project for the runway, access road and parking, etc., was launched with AFD funding to enhance its function as a hub airport in Central Africa.

Table 3.6 Passenger Volume at Main Airports in Cameroon

Nature		2006	2007	2008	2009	2010	2011	2012	2013
EN NOMBRE DE PASSAGERS									
Douala	Arr.	212 944	228 261	251 145	241 899	265 963	305 889	359 027	381 458
	Dép.	235 091	269 948	268 546	262 693	283 073	323 896	382 536	384 402
Yaoundé	Arr.	64 851	70 449	68 962	81 088	91 105	125 436	159 417	178 849
	Dép.	65 705	71 578	72 502	85 346	90 228	129 467	162 452	181 460
Garoua	Arr.	22 172	23 870	14 396	11 597	13 247	18 505	19 685	19 178
	Dép.	24 775	25 223	14 946	12 057	13 685	19 109	20 791	19 648
Maroua	Arr.	270	2 676	4 568	7 435	8 475	10 418	13 879	14 882
	Dép.	462	3 194	4 057	7 257	8 170	10 343	13 473	14 839
Ngaoundéré	Arr.	322	1215	572	218	116	301	101	343
	Dép.	375	1298	544	430	395	434	101	406
Total	Arr.	**300 559**	**326 671**	**339 643**	**342 237**	**378 956**	**460 549**	**552 109**	**594 710**
	Dép.	**326 408**	**371 241**	**360 595**	**367 783**	**395 551**	**483 249**	**579 353**	**600 755**
	Transit	**155 691**	**193 668**	**240 680**	**242 950**	**227 628**	**238 105**	**212 394**	**209 631**

Source: Transtat 2014(Ministry of Transport)

4. Transportation Sector Development Plans in the Survey Target Areas

4.1 Overall Plans

4.1.1 Poverty Reduction Strategy Paper (Document de Stratégie de Réduction de la Pauvreté (DSRP): august 2003

In August 2003, Cameroon prepared poverty reduction strategy paper whose formulation and implementation is used as criteria to judge whether the country is qualified to receive reduction or exemption of heavy debts jointly performed by the IMF and World Bank.

It describes seven growth and poverty reduction strategies and the scheme and structure for their implementation. The below is the contents.

Contents

1. Promoting a stable macroeconomic framework
2. Strengthening growth by diversifying the economy
3. Revitalizing the private sector as the main engine of growth and a partner in delivering social services
4. Developing basic infrastructures and natural resources while protecting the environment;
5. Accelerating regional integration in the framework of CEMAC;
6. Strengthening human resources and the social sector and facilitating the integration of vulnerable groups into the economy;
7. Improving the institutional framework, administrative management, and governance.

Source: Poverty Reduction Strategy Paper

4.1.2 Cameroon Vision 2035: February 2009

The Government of Cameroon announced its long-term development vision 2025-2035 based on the DSRP to be used for formulating aggressive long-term development vision.

It regards the country as an intersection of Central Africa and one of the visions is economic growth led by new infrastructure development of expressways, airports, ports and harbors, gas and petroleum pipelines and power grid. It does not touch upon any specific infrastructure development project.

4.1.3 Growth and Employment Strategy Paper (GESP): August 2009

It is prepared as a revision of the 2003 Poverty Reduction Strategy Paper (PRSP), which summarizes the employment measures and the growth strategy of the government. The GESP is a medium-term plan, while "Vision Cameroon 2035" consists of a long-term plan. In this document, infrastructure development, including the construction of the 2nd bridge and the development of the Limbe and Kribi ports, as well as the railway plan, are described as a growth strategy.

In addition, among the projects presented in the GESP, developed as a medium-term plan following the "Cameroon Vision", those that are of high priority are included in the 2015-2018 emergency plan (Plan d’Urgence).

4.1.4 Transportation Sector Strategy Paper: March 2010

The Government of Cameroon announced the transportation sector vision 2035 as a long-term plan based on the DSRP. It contains specific descriptions of major national projects including the below.

Table 4.1 Infrastructure Projects in Transportation Sector Strategy Paper

Category	Project
Road Infrastructure	Expressway of Yaounde—Douala
	Road paving of Kribi—Mbalam
	Expressway of Yaounde—Nsimalen airport
	2nd Bridge over Wouri River
Oceanic Infrastructure	Kribi Port
	Petroleum yard in Limbe
Transportation Sector (long-term vision)	Paving of 4,900km earth roads
	Enhancement of 4,200km road pavement
	Repair of 15,500km earth roads
	2x2 lane development of 1,000km roads (RN3, RN4, RN5, arterial access road in Yaounde, expressway for Nsimalen airport, etc.)
	North Douala bypass and 2nd Bridge over Wouri River
	New 700km roads

Source: Transportation Sector Strategy Paper

4.1.5 Development Strategies of Douala and Urban Zone: December 2009

The Development Strategies of Douala and Urban Zone prepared in 2009 by the CUD based on the DSRP describes short-, mid- and long-term development strategies of the urban zone including Douala. Projects in the below table are planned as specific urban development in Douala and its surrounding urban zone.

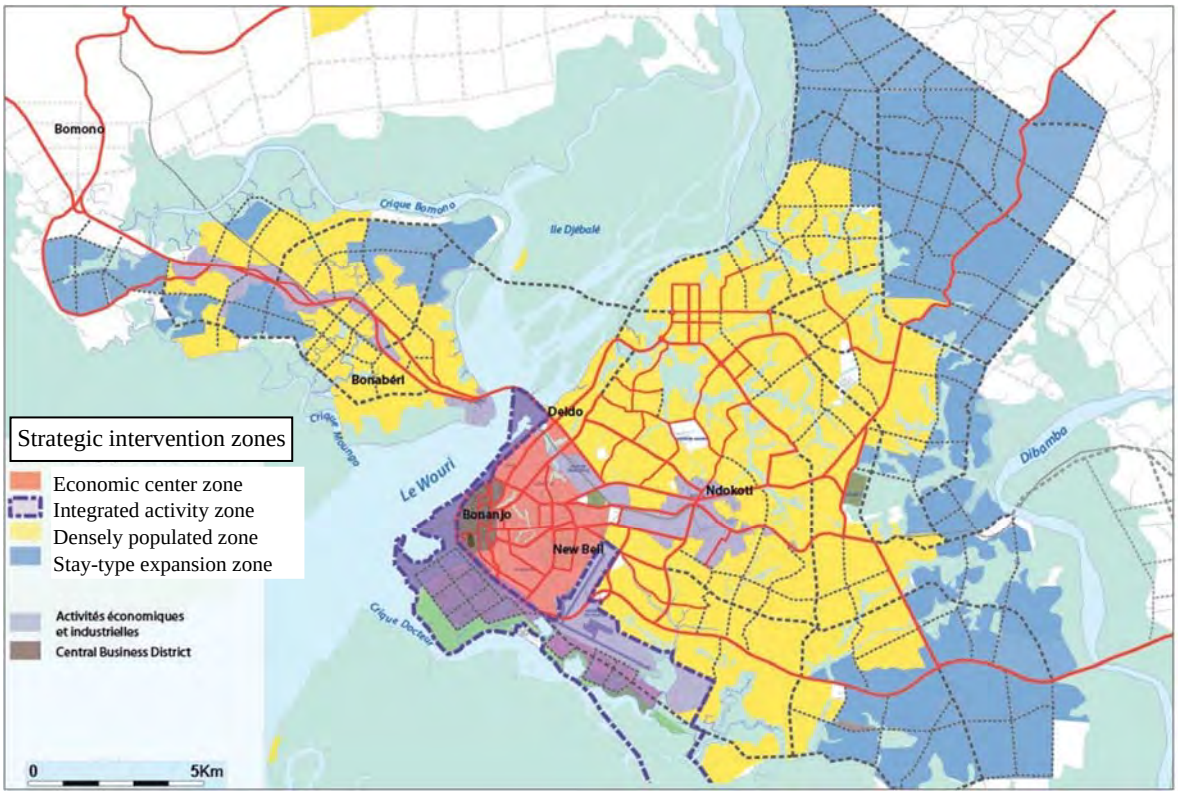
Table 4.2 Projects in Douala and Its Surrounding Urban Zone

Project	Note
Eastern and western entrance development in Douala	
2nd Bridge construction	
Road infrastructure	Edea-- Kribi
	Douala—Limbe
Bypass road to go round Douala	
Douala Airport	
Ports	Limbe Port
	Kribi Port
Extension of railway to connect to ports	

Source: Development Strategies of Douala and Urban Zone

4.1.6 Douala City Master Plan

The CUD formulated the Douala City Development Master Plan 2025 in 2012 based on such documents as the Cameroon Vision 2035, GESP, and Development Strategies of Douala and Urban Zone. The master plan provides three basic scenarios of expansion toward the west, expansion toward the east and expansion of the city center. Based on these scenarios, four strategic intervention zones of the economic center zone, integrated activity zone (port, airport, platform, logistics, etc.), densely populated zone and stay-type expansion zone and development plans in line with the characteristics of each zone are provided.



Source: Douala City Development Master Plan

Figure 4.1 Strategic Intervention Zones

Major development plans have seven items — large road network development, enhancement of the economic center function, creation and reinforcement of seven sub-central areas, improvement of organization and facilities of the residential zone, increase in the supply of industrial and business zones, green zone development and proposal of leisure and tourism spaces. It provides five main development items and specific facilities in the investment plan into specific public transportation and residential and other public services facilities as shown in the following table.

Table 4.3 Major Development Items of Douala City

1	Main facilities	Hospital and other medical facilities, university and other educational facilities, stadium, swimming pool and other sports facilities, park and other green space, city market and other commercial facilities, truck terminal and other structures
2	Neighboring facilities	Administrative facilities, elementary educational facilities, secondary educational facilities, occupational training facilities, healthcare facilities, commercial facilities, parks and sports facilities
3	Transportation	Targets for 2015 and 2025
4	Other infrastructure	Waste treatment facilities, drainage facilities, water and sewage facilities and electricity facilities
5	Residences and land development	Planning on residences and land development in expanded zones, overpopulated areas, and economic hubs

Note) Main facilities: facilities whose target users are residents of Douala

Neighboring facilities: facilities whose target users are limited to residents of one or several neighboring communities)

Source: Douala City Development Master Plan

4.1.7 Transportation sector: an overview

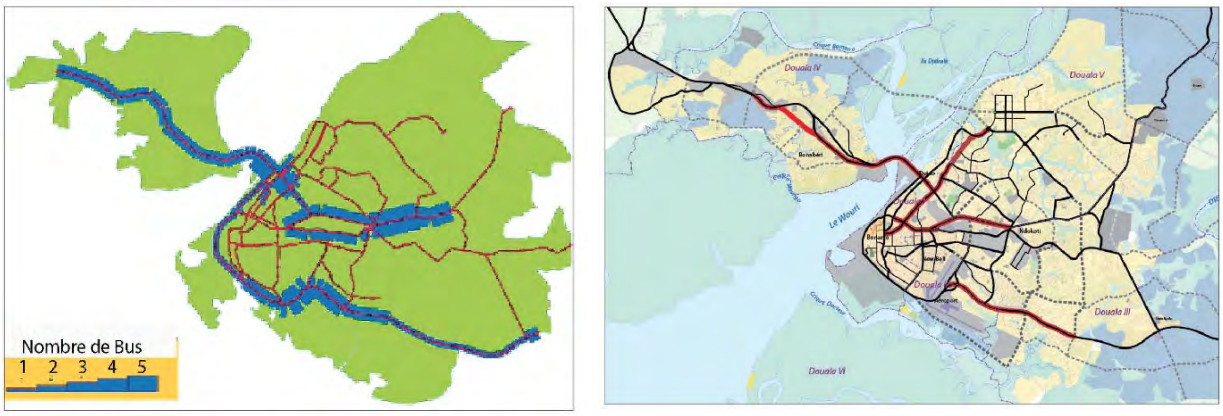
The Douala City Development Master Plan 2025 formulated in 2012 by the Urban Community of Douala (CUD) provides a plan for smooth traffic flow, easing congestion and improving the efficiency of the urban transport system in the Douala urban zone (See Table 4.4.).

The transportation infrastructure development plan has a development plan targeting 2015 and 2025. However, there is no action plan to implement the master plan and most of the plans have yet to be undertaken.

Table 4.4 Transportation Infrastructure Development Plan
in Douala City Urban Development Master Plan 2025

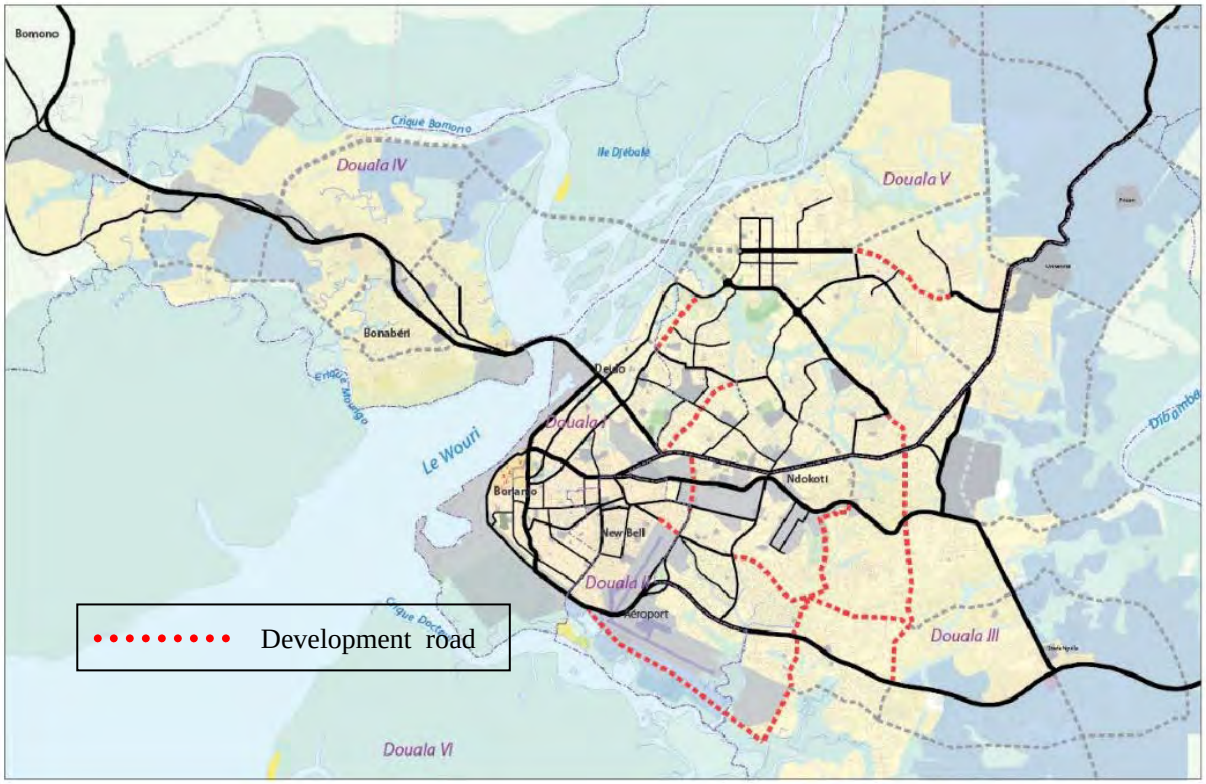
Transportation Infrastructure Development Plan	Overview
Expansion of bus network	2015: Development plan of 12 routes and bus stops (See Figure4.2.)
Securing bus lane	2015: Bus lane concept (See Figure 4.2.) * Part of the RN3 expansion is underway for 2019 African Cup of Nations. 2025: Further network expansion
Development of major roads in densely populated residential areas	2015: Expansion of city roads and networking (See figure 4.3.) 2025: Further expansion and construction of the Djebale Bridge
Road expansion	2015: 2×2 car lane expansion plan (See figure 4.4.) ・ Ndokotti - Logbaba = 4km ・ Ndokotti - PK14 =7km
Improvement of priority intersection	2015: Improvement of eight intersections (See Figure 4.4.) * Deïdo intersection under construction for the 2nd Bridge construction
Connection of industrial and logistics zones	2015: ・ 8-km-long bypass toward La Crique du Docteur ・ 5.5km-long access road toward the south of the airport from the rotary of the entrance of Youpwe ・ Extension of railway in parallel with the south bypass airport road (8.5km)
Road land acquisition in expansion area	City road expansion
River transport development	2015: Docks that connect Douala IV and points in cities 2025: Water bus plan on Wouri River and tributaries

Source: JICA survey team



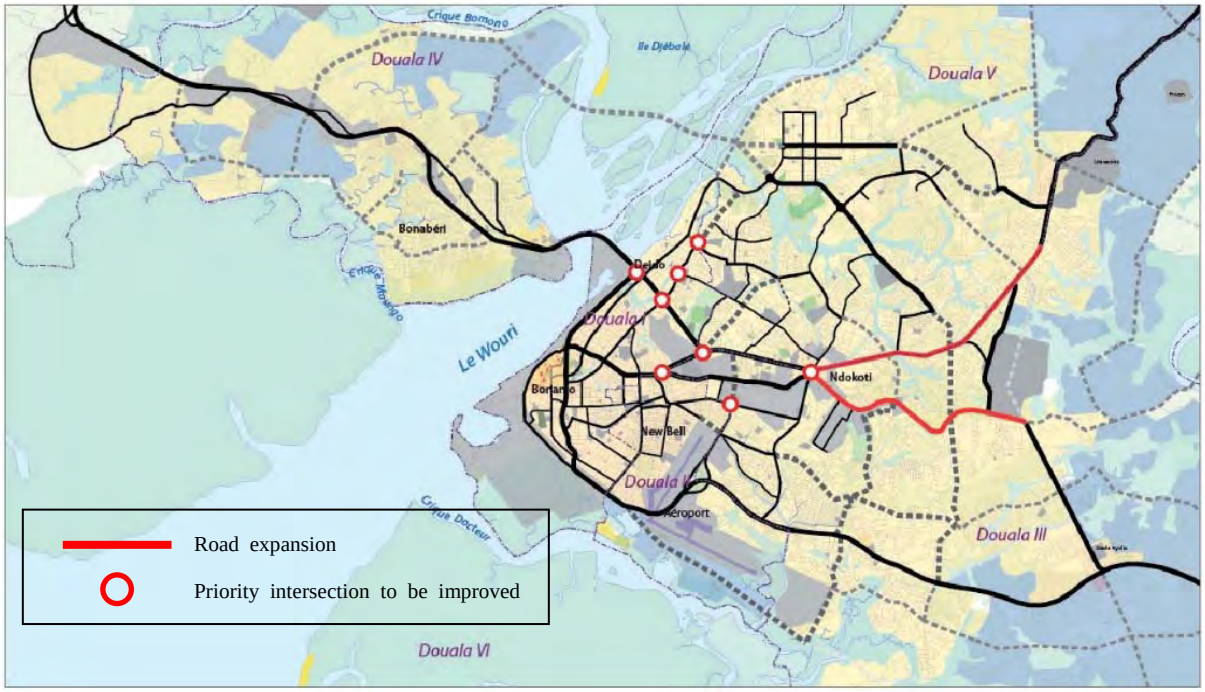
Source: Douala City Development Master Plan

Figure 4.2 2015 Bus Network (left: expanded routes, right: routes with bus lanes)



Source: Douala City Development Master Plan

Figure 4.3 2015 Main Road Development in Densely Populated Residential Areas



Source: Douala City Development Master Plan

Figure 4.4 2015 Road Expansion Routes and Priority Intersections to be Improved

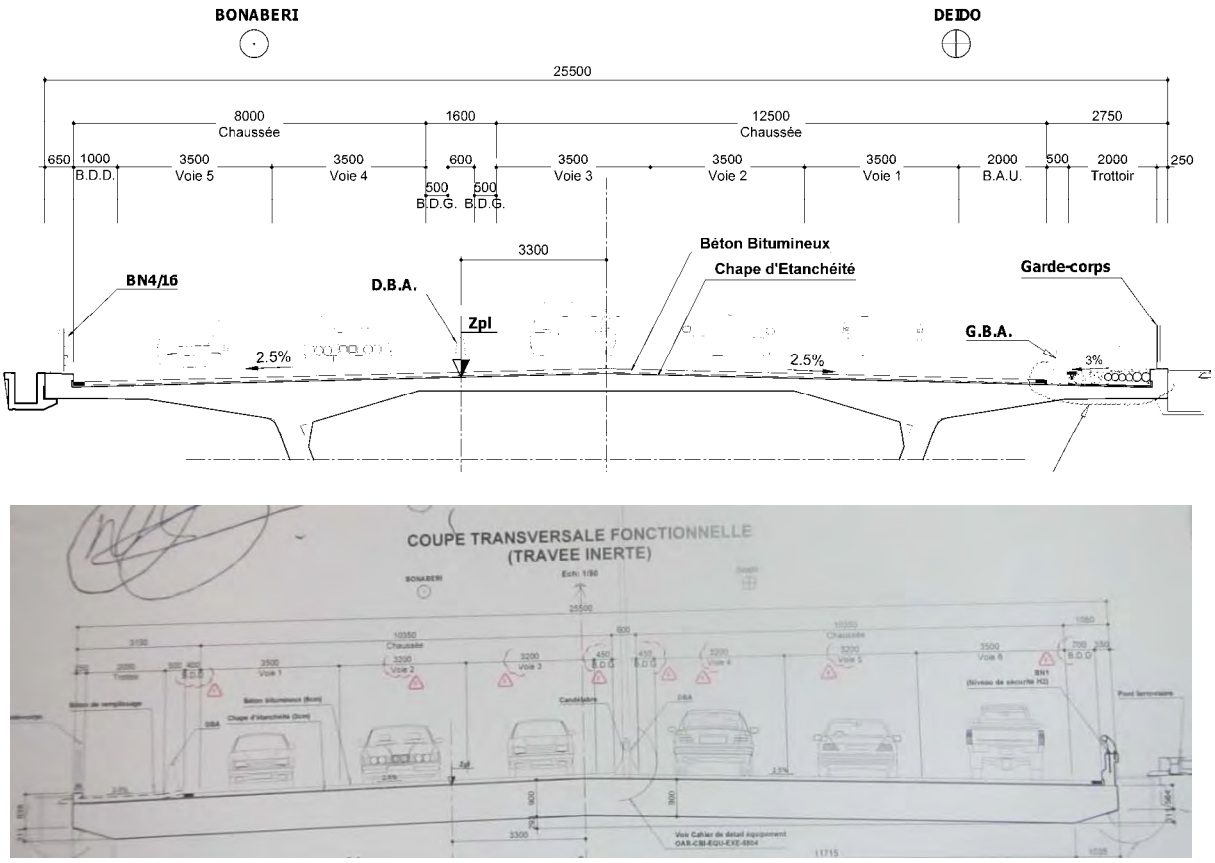
4.2 Development Plan related to Road Sector

4.2.1 2nd Bridge

(1) Project overview

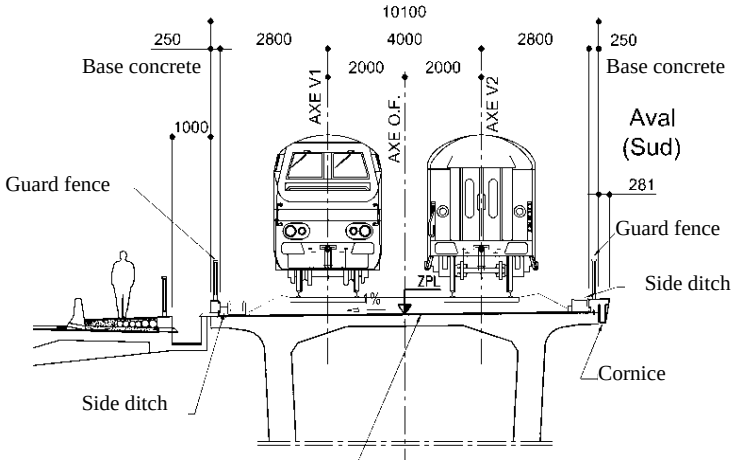
This Project is a construction project of a highway bridge and a railway bridge over the downstream area of the 1st Bridge 1 (existing bridge). The road bridge is 25.50 meters wide (It will have five lanes and then extended to six lanes. * See photos.) and the railway bridge is 10.10 meters wide. The river is approx. 750 meters wide where the bridge is planned to be built and the bridge type is PC 6-span continuous box-girder bridge with a span of 91 to 133 meters. The span of 133 meters for a PC box-girder bridge seems slightly longer than the span commonly used in Japan. However, it is common in France and single-chamber box-girder structure is selected for its economic efficiency and construction feasibility. (In Japan, triple-chamber box-girder structure is common because of limitation of the slab span.) There are five bridge piers in the river and the foundation structure is pile foundation (pile length: approx. 45 meters, pile diameter: 2.50 meters, number of piles per pier: 4 to 6).

The design and construction tender is a design-build type launched by the Ministry of Public Works and a consortium including a group company (Soger Satom) in charge of the construction section of VINCI that received the order. Among the companies involved in the consortium, ISC, VINCI and the architect Thomas Lavigne, are in charge of designing the two bridges.



Source: 2nd Bridge construction consortium

Figure 4.5 2nd Bridge Plan Diagram (highway)

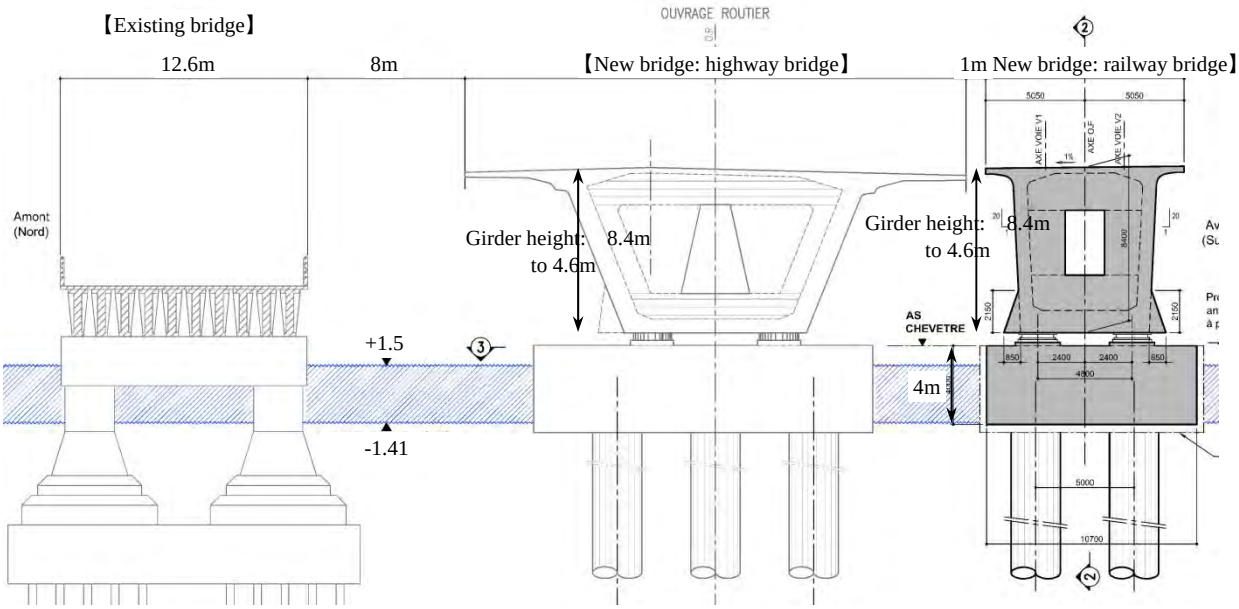


Source: 2nd Bridge construction consortium

Figure 4.6 2nd Bridge Plan Diagram (railway)

(2) Purpose and effects of the Project

The 1st Bridge (exiting bridge) was put into use in 1954 and faces the challenges of aging and capacity shortage compared to the traffic volume. The project is expected to double the vehicle traffic capacity and use the railway effectively. It is also expected to enable smooth transportation to the capital Yaounde, breadbasket in the western region of the country and Nigeria. It will have significant economic impacts and cement, rebars, metal scaffolds and other construction materials are produced locally and used.



Source: 2nd Bridge construction consortium

Figure 4.7 Distance between 2nd Bridge and Existing Bridge

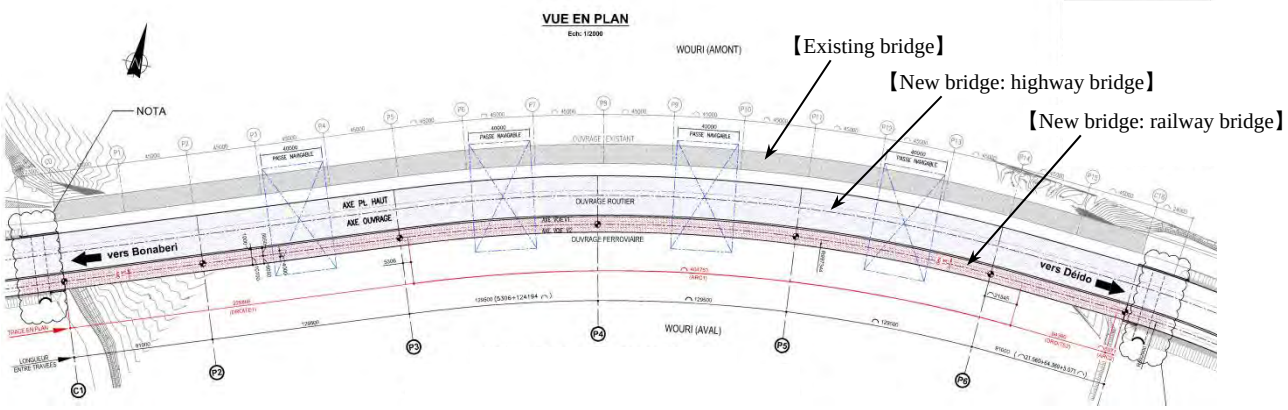


Figure 4.8 Plan View

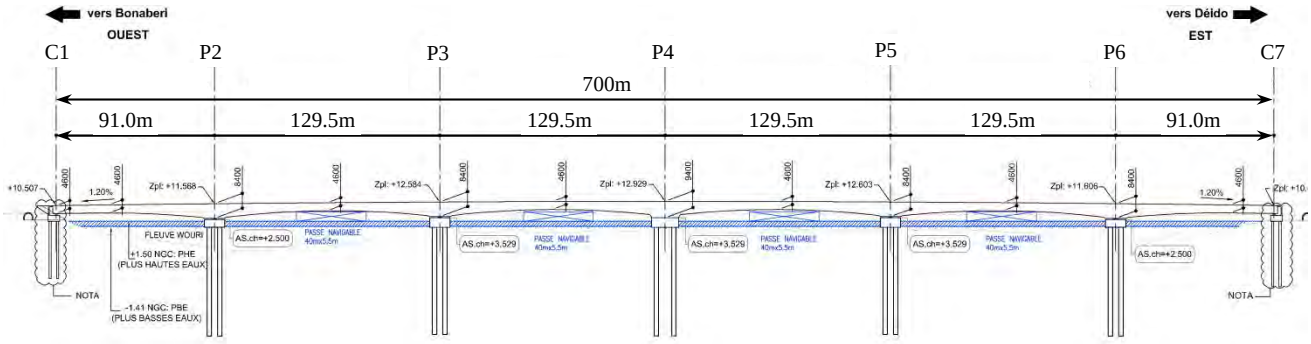


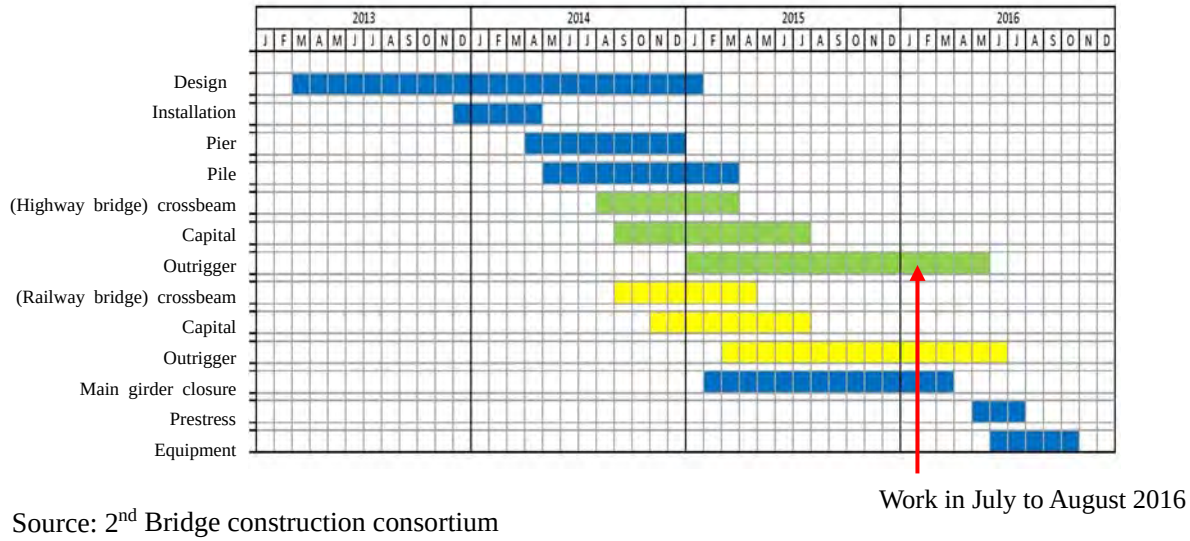
Figure 4.9 Side View

Source: 2nd Bridge construction consortium

(3) Construction schedule

The following table shows the schedule for the 2nd Bridge construction (as of October 2016) when the order was placed. As of July to August 2016, the outrigger construction and main girder closure work was underway. It was over half a year behind schedule and the bridge construction was planned for July 2017 in the site schedule table. Construction of the access road is scheduled for completion in March 2018 and overall completion is scheduled for November 2018.

Table 4.5 2nd Bridge Construction Plan (at order placement)



Source: 2nd Bridge construction consortium

(4) Construction cost

The construction cost that includes expenses in each construction process is shown below, according to the reference materials we obtained from the MINTP.

Table 4.6 2nd Bridge Construction Cost by Item

Superstructure	46,880,000,000	FCFA	8,279,008,000	Yen
Substructure	5,750,000,000	FCFA	1,015,450,000	Yen
Foundation structure	17,220,000,000	FCFA	3,041,052,000	Yen
Temporary pier	12,500,000,000	FCFA	2,207,500,000	Yen
Total	82,350,000,000	FCFA	14,543,010,000	Yen

XAF1 = JPY0.1766

Source: Interview with the 2nd Bridge construction consortium

4.2.2 3rd Bridge

(1) Survey overview (contents of F/S)

The feasibility study (F/S) for 3rd Bridge was outsourced to a Tunisian consulting company SCET by the MINTP and conducted from August to December 2015. It was an F/S for a high-standard highway that skirts Douala City and the study results of the routes are shown below.

(2) Studied routes and recommendations

Three routes, Nord-Est-1, Nord-Est-2 and Sud-ouest, were reviewed in the 3rd Bridge F/S. The third route was eliminated because of its inferior financial efficiency as a 20km-long bridge was required to cross the Wouri River. As for the remaining two routes, they were partially revised, a total of four routes, Nord-Est-1-1, Nord-Est-1-2, Nord-Est-2-1 and Nord-Est-2-2, were proposed and their financial efficiency, structure and landscape were reviewed.

According to the review results, Nord-Est-2-2 with the highest evaluation score was the preferred choice. It is a PC box-girder Bridge (like 2nd Bridge) and the construction cost of each route was estimated within the unit price of 2 500 000 (FCFA/m2).

Table 4.7 Survey Item and Results

	Nord Est1-1	**Nord Est1-2**	**Nord Est2-1**	**Nord Est2-2**
Cost (financial efficiency)	30	28.81	28.41	29.40
Caractéristiques géométriques (structure)	8	8	5	10
Insertion dans le site (landspace)	8	8	10	10
Impact sur l'environnement et socio économique (environmental impacts and socioeconomic impacts)	32	32	40	40
Hydrologie et Hydraulique (hydrology)	5	5	8	8
TOTAL	**83**	**81.81**	**93.41**	**97.40**

Source: 3rd Bridge F/S report (REALISATION DES ETUDES DE CONTOURNEMENT DE LA VILLE DE DOUALA, AVEC LA CONSTRUCTIOND'UN 3éme PONT SUR LE FLEUVE WOURI)

Table 4.8 Estimated Construction of the 3rd Bridge

Proposed Route	Bridge Area (m2)	Construction Cost (FCFA)	Construction Cost (JPY)
Nord-Est-1-1	10,526	26,315,000,000	4,647,229,000
Nord-Est-1-2	10,526	26,315,000,000	4,647,229,000
Nord-Est-2-1	12,465	31,162,500,000	5,503,297,500
Nord-Est-2-2	9,695	24,237,500,000	4,280,342,500

XAF1 = JPY0.1766

Source: 3rd Bridge F/S report

Table 4.9 Proposed Routes and Construction Cost by Construction Item

	Nord Est1-1	**Nord Est1-2**	**Nord Est2-1**	**Nord Est2-2**
Preparatory work	7,500,000,000	7,800,000,000	7,900,000,000	7,600,000,000
Removal of obstacles (trees, grass and houses)	2,391,500,000	2,434,900,000	2,308,000,000	2,329,000,000
Leveling and civil engineering work	35,510,000,000	37,440,000,000	38,392,000,000	39,649,000,000
Bridge deck work	49,810,000,000	52,238,750,000	50,440,250,000	51,158,500,000
Drainage work	4,550,000,000	4,780,000,000	4,600,000,000	4,680,000,000
Bridge construction	32,196,000,000	32,449,000,000	37,098,500,000	30,261,500,000
Bridge railing and signboard installation	6,825,000,000	7,170,000,000	6,900,000,000	7,020,000,000
Lighting work	3,000,000,000	3,000,000,000	3,000,000,000	3,000,000,000
Land acquisition	2,400,000,000	3,000,000,000	1,800,000,000	1,500,000,000
Construction supervision cost	4,000,000,000	4,000,000,000	4,000,000,000	4,000,000,000
Indirect cost and contingency	37,045,500,000	38,578,350,000	39,109,250,000	37,800,000,000
Total project cost ※JPY in parenthesis.	**185,228,000,000 (32,711,264,800)**	**192,891,000,000 (34,064,550,600)**	**195,578,000,000 (34,539,074,800)**	**188,998,000,000 (33,377,046,800)**

XAF1 = JPY0.1766

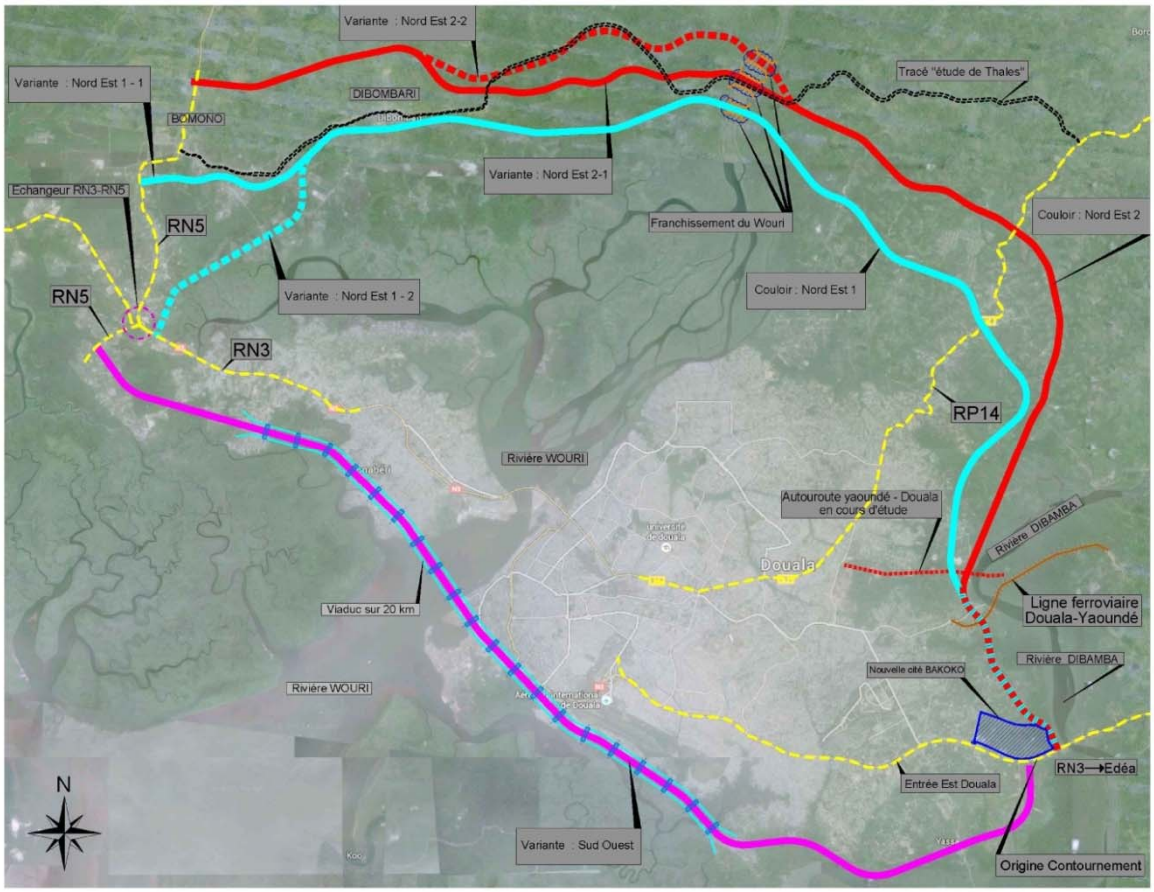


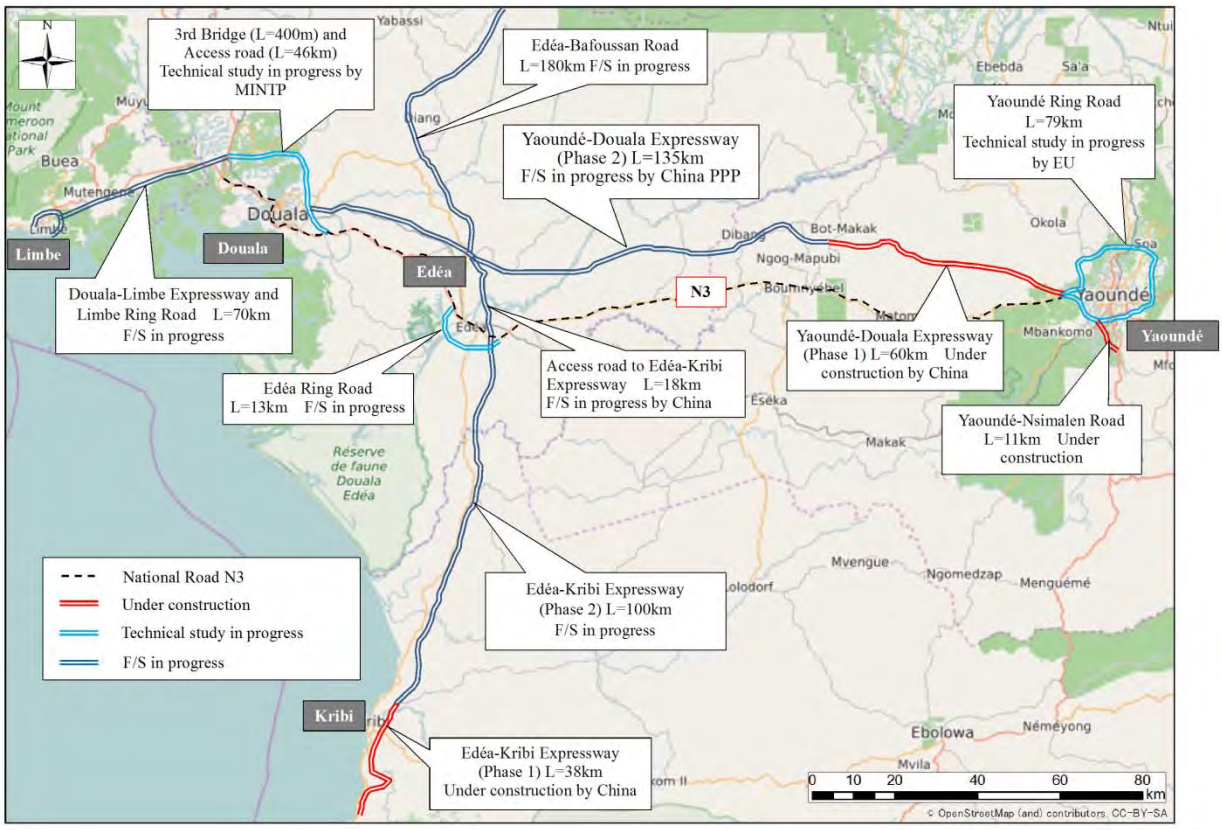
Figure 4.10 Planned 3rd Bridge Route (top table: construction cost estimation, bottom: reviewed route)
Source: 3rd Bridge F/S report

(3) Future project development

We obtained a response that the F/S was completed and the route was decided but no further development was decided. Although the survey team conducted an exploratory investigation of the decided route, both banks were undeveloped roads and the planning, design and construction will require a considerable time.

4.2.3 High-standard intercity highway

Information on a wide-area road network development map owned by the Ministry of Public Works (MINTP) is reflected in Figure 4.11. It contains a plan for an expressway network that connects the largest city of Cameroon, Douala, the capital of Yaounde, the new Limbe port and the new Kribi port. Phase 1 construction work of both the Yaounde-Douala and Edea-Kribi expressways was launched with assistance from China, while a technical survey and F/S are being conducted for other expressways. In Douala, the survey target area, there is also a development plan for a road that runs around the outer edge of Douala, including the 3rd Bridge and is to be connected with the expressways.

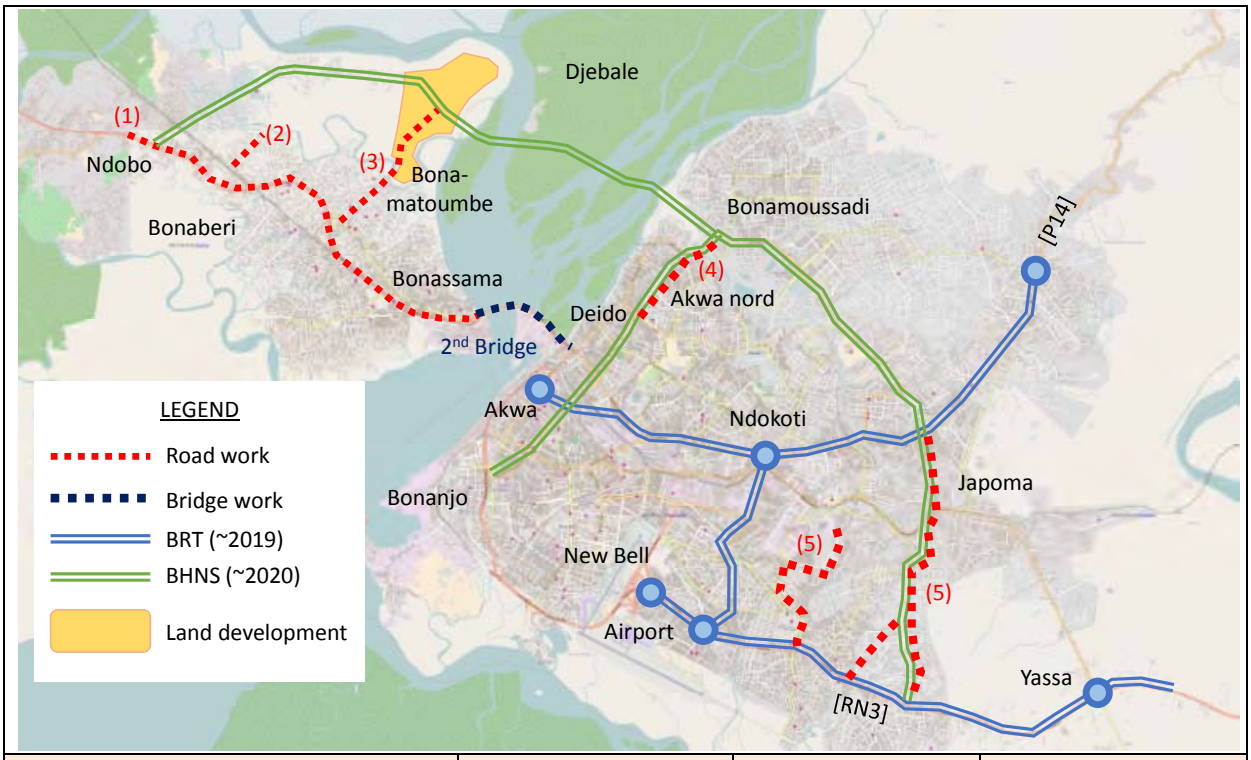


Source: MINTP

Figure 4.11 Wide-Area Road Development Map

4.2.4 Inner-city road

The following figure shows positional relation and progress of road development projects which have been implemented in Douala city.



Project		Outline	Organization	Progress
■ ■ ■	(1) RN3 Road widening	2x2 (partially 2x1) lane	MINTP / Soger Satom / VINCI / AFD	Under construction
■ ■ ■	(2) Rue.4561	L=750m	CUD	Planning
■ ■ ■	(3) Bonamatoumbe road (Rue.4445)	Rue ecole publique ~ Bonamatoumbe / L=4,000m, 2x2lane	CUD	Topo survey, geological survey and EIA completed
■ ■ ■	(4) Road construction	Bonewonda / 2+2+2 lane (BHNS)	CUD / Génie Militaire	Under construction
■ ■ ■	(5) Road widening	2+2+2lane (BHNS)	CUD	APS complete
■ ■ ■	The 2nd Bridge construction	Road bridge 3x2 lane / Railway bridge 2 track	MINTP / Soger Satom / VINCI / AFD	Expected to complete in 2018
═══	BRT	Exclusive bus lane / With largescale terminal	MINHDU/Parco polo	Planning BRT introduction / Road widening construction on RN3 continued to East
═══	BHNS	Exclusive bus lane	CUD	Planning
▭	Projet d`Amenagement Concerte de Bonamatoumbe	Real estate development plan (300ha)	CUD / SAD	Planning completed / Some parcel started offer for sale

Source: JICA survey team

Figure 4.12 Ongoing project related to the Djebale bridge

4.3 Development Plan related to Public Transportation

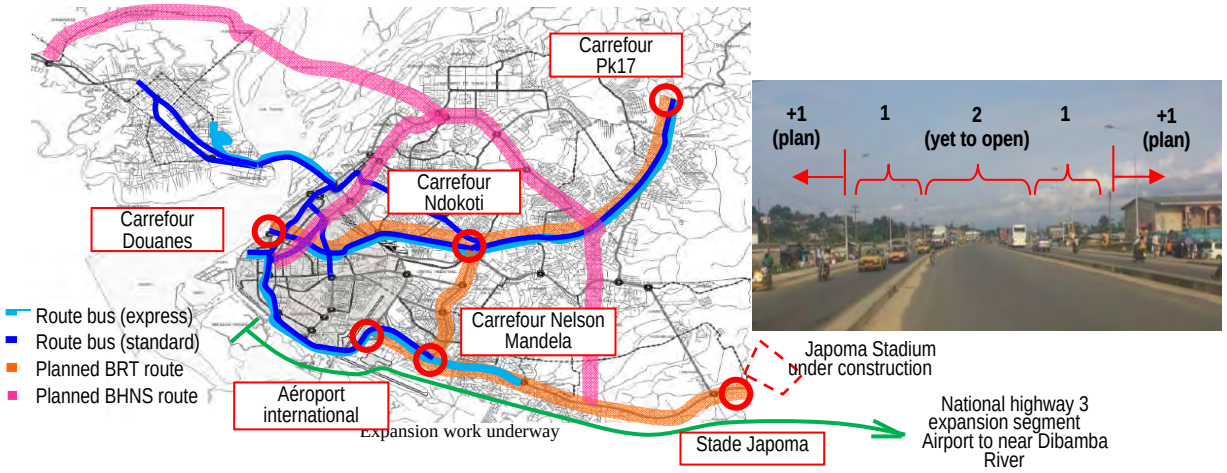
4.3.1 BRT and BHNS

The bus route service in Douala has been operated since around 2000 by the SOCATUR. However, the use ratio is less than 1% (according to the 2012 Master Plan) and it touched on the need for further bus services to ease urban traffic congestion.

Since selecting Cameroon as the host nation for the 2019 African Cup of Nations, the BRT Project by the MINDUH and CUD has been implemented on a full scale. It was entrusted to a bus consortium led by a Brazilian bus company, Malcopolo and F/S was launched in 2016 after the preliminary survey in 2014. Three routes -- Carrefour Douanes-Carrefour Pk17 (17km), Carrefour Ndokoti-Carrefour Nelson Mandela (4km) and Aéroport international- Stade Japoma (14km)) are planned in Douala. The final report was submitted in September 2016 and the construction is scheduled to start in 2017 and be completed in 2019.

As described earlier, AFD is conducting expansion work (1+2+1 lanes) of national highway 3 from the airport to the stadium. However, there are plans to use the two lanes in the center restricted by the separation block as high-speed vehicle lanes for the time being and further expansion is planned to introduce BRT. There are also plans to add another lane to both outer sides of the road for a total of six lanes to introduce BRT. Details of the lane composition are not obtained.

The CUD is studying the possibility of introducing BHNS in tandem with the BRT project with 2020 as the target year.



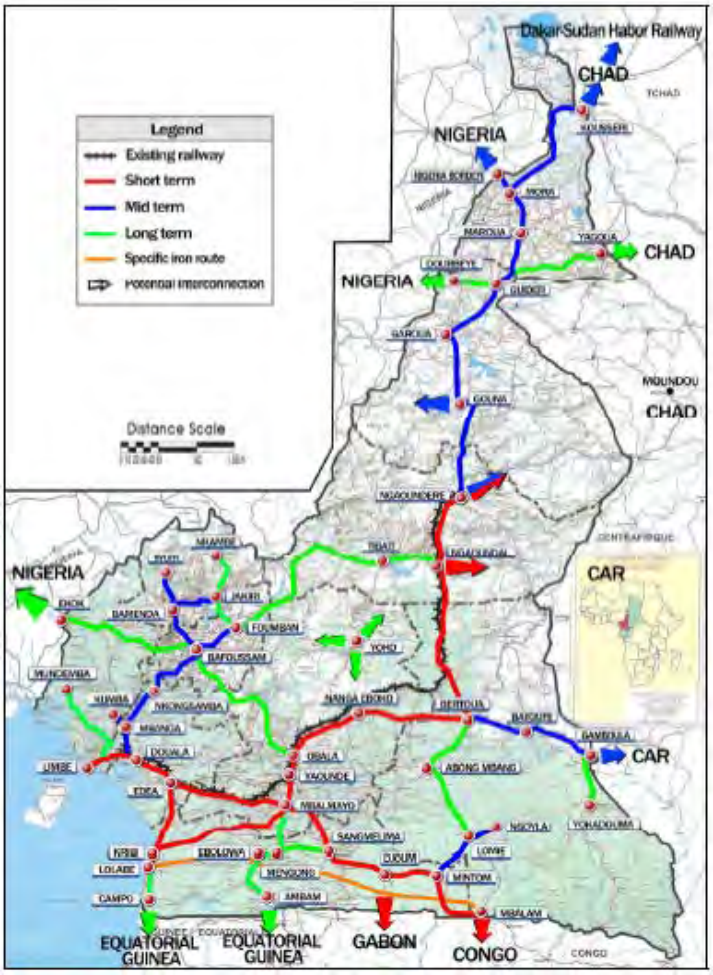
Source: Produced by JICA survey team base on interview with CUD

Figure 4.13 Planned BRT and BHNS Routes and Road Expansion Work of National Highway 3

4.3.2 Railway

The railway development plan was entrusted to a consortium led by Korean KOTI by the MINEPAT and a short- to medium- and long-term master plan aiming to expand trade with neighboring countries was made public in 2012.

In the short-term, railway development with the export of iron ores and other mineral resources from the southern region in mind and the use of deep-sea ports (Kribi and Limbe ports) under development that is to be described later is planned.



Source: The National Railway Master Plan in Cameroon (MINEPAT)

Figure 4.14 Railway Development Plan

Table 4.10 Routes of the Short-Term Development Plan

No.	Section	Major Intermediate Points	Function
1	Edea~Lolabe(Kribi Deep Sea Port)	Koukoue, Mbebe, Fifinda, Londji	Branch Line
2	Mbalam~Mbalmayo~Lolabe(Kribi Deep Sea Port)	Djoum, Sangmelima, Mbalmayo, Kribi	Branch Line
3	Douala~Limbe	Tiko	Industrial /Branch Line
4	Ngaoundere~Douala	Ngaoundal, Bertoua, Obala, Yaounde, Mbalmayo	Main Line

Source: The National Railway Master Plan in Cameroon (MINEPAT)

4.4 Port and Harbor Development Plan

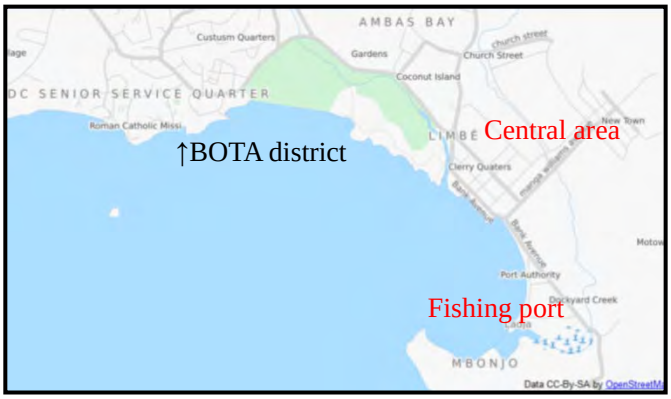
The ports in Douala City that is the survey target are virtually the only international ports in Cameroon. The Port of Douala faces problems such as inaccessibility for large vessels due to insufficient water depth, aging of the port facility and extended time in the port due to insufficient capacity and development projects of the Port of Limbe west of Douala City and the Port of Kribi south of the city are carried out by Korea and China to improve the situation.

4.4.1 Port of Limbe

(1) Current port

The Port of Limbe is situated approx. 60 kilometers west of Douala City and the current port is located in Bota district. It is a small port two or three meters deep, which means large vessels cannot dock. As crude oil is extracted offshore, small boats and crude oil tankers are used transportation. Goods are also transported from Douala City and neighboring Nigeria. The port in Bota district handles only crude oil and goods and the port in the center of Limbe town that is prospering as a resort functions as a fishing port.

Figure 4.15 Location of Limbe Port



Source: JICA survey team

Figure 4.16 Map of Limbe

Source: JICA survey team

Photo 4.1 Boat that carries crude oil

Source: JICA survey team

Photo 4.2 Current Limbe Port in Bota District

(2) Condition of the port where development is planned

The new port development project was launched by a Korean company 25km west from Bota district in Limbe. Although the survey team requested that Mt. Molonga Epraim (Port Controller Bota) of the Port of Limbe provide information on the new port, he responded that the development situation, progress or project map could not be provided, although he could offer information on future forecast (cargo or traffic volumes), etc.

The survey team visited the new port with him where goods are available and it was transported to Douala and Yaounde. He also explained that a Korean company is building a cement plant and it will launch the port development once completed.

Source: JICA survey team

Figure 4.17 Location of the New Port of Limbe

Explanation by Mr. Molonga	Crude oil refinery	Signboard of Korean company
		
Cement plant	**Construction site on the new port of Limbe (in front of the cement plant)**	
		

Source: JICA survey team

Photo 4.3 Condition of the New Port of Limbe

4.4.2 Port of Kribi

(1) Current port

The Port of Kribi is situated approx. 100km southeast of Douala City and the current port is located in the center of Kribi town. It is busy transporting goods from Douala City and the west African neighboring country of Mali. As the water is shallow, it is a small port.

The management office is next to the port and the new port project team set up an office there. The survey team received explanations from the project team about an overview and the construction situation of the project that is to be described later. They responded that they could not provide a project map.

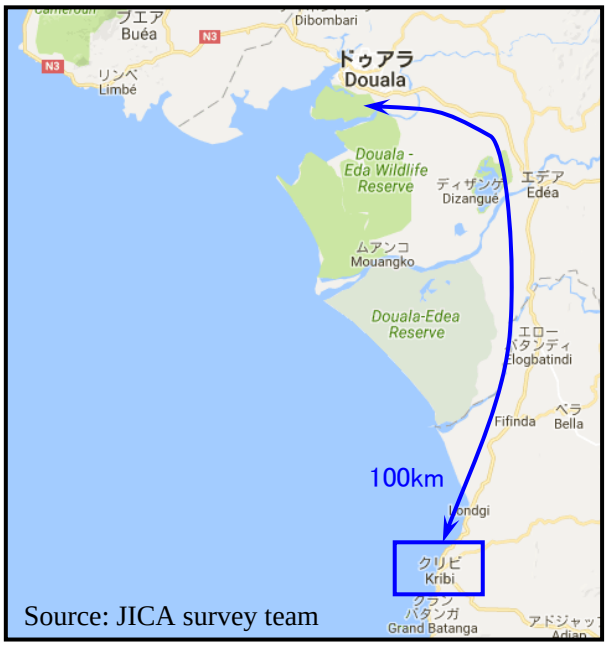


Figure 4.18 Location of Port of Kribi

Current Port of Kribi	Kribi port management office	Port in the back of the management office
		

Source: JICA survey team

Photo 4.4 Port of Kribi

(2) Development situation

The new port is situated approx. 16 km south of the current port and the development is an assistance project from China. It is a large-scale project including urban development of Kribi and high-standard highway construction (an orbital high-standard highway that connects the new Kribi port and city center) centering on the port development. The survey was launched in 2008 at the first five years were spent on measurement and a ground survey, etc., to decide on the location of the new port. Development work started in 2012 to be completed in 2035. Phase 1 (50ha) is completed and a ground survey for Phase 2 (60ha) is being conducted.

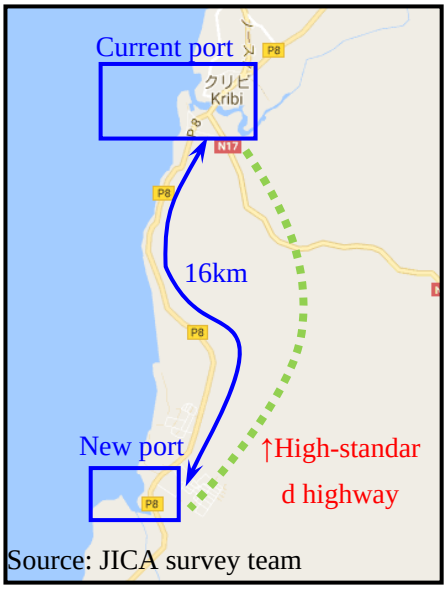
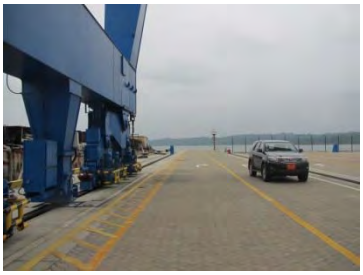


Figure 4.19 Location of New Port of Kribi

Although no details for Phase 3 and thereafter have yet been planned, further port expansion is being considered. There are plans for the completed port in Phase 1 to go into operation in 2016 and business partner companies have almost been confirmed. The high-standard highway is planned to be completed from the new port to the current Port (40km) by 2018, with plans for a four-lane (2x2) road, to be expanded to a 6-lane (2x3) road later if needed.

Explanation by Mr. Munongo Aboko Peter and Mr Nganmo Garga	Gate of the new Limbe port	To be extended to the back of the photo in Phase 2
		
Overall new port (Phase 1)		
		
Signboard of the Chinese company that is conducting the road work	High-standard highway under construction	Movie of the Kribi development produced by China
		
A scene from the movie: New port	A scene from the movie: Kribi town	
		

A scene from the movie: High-standard highway	A scene from the movie: Kribi Airport
	

Source: JICA survey team

Photo 4.5 New Port of Kribi

4.5 Djebale Island Development Plan

4.5.1 Djebale Island: An Overview

Djebale Island is situated approximately in the center of Douala City and its perimeter is covered with mangrove. The island covers an area of 7.2km2 and its perimeter is approx. 11.7km long. The inland area is hard with sandy soil deposited over a long time and the trees grow thickly. There are two villages in the center of the western side and around 300 residents (approx. 100 households) in total. The satellite photo below is precise enough to identify the number of residences and difference in leaf colors when enlarged. The locations of the villages are shown there. Living conditions on the island were confirmed in the survey. There is no automobile or paved road on the island. Electricity is provided via solar panels and well water is used. The primary school has been abandoned and children live in a primary school dormitory away from the island. Some islanders requested a road to link the island with the city. When the survey team asked the CUD about the island development, they responded that there was no specific data or plan and that they were gathering and sorting various opinions. The intention is to formulate a master plan soon and the basic development concept is a nature park utilizing the abundant nature of the island. The CUD explained that it was important to construct a road to the island; not only to utilize its tourism resources but also to supply electricity and water and improve the living environment of the residents.

Source: JICA survey team

Figure 4.20 Jebale Island

4.5.2 Tourism Development Plan including Djebale Island

(1) Review in seminar sessions

The CUD and a voluntary organization, les ateliers, (financial assistance provided by the AFD) have conducted survey and workshop to enhance the Douala Master Plan since 2013. The first workshop session was held from June 22 to July 6, 2013, to discuss and select city issues and gather a variety of views. Most of the selected issues including traffic congestion, waste problem and road drainage facility are included in the master plan announced in 2012. The second workshop session was held from November 4 to 18, 2016, and more in-depth discussions were conducted by limiting the area to Djebale Island and Deïdo intersection, Plateau Joss (part of current Bonanjo), and Ndokotti. Members of the second session changed from the first session. les ateliers publicly invited participants and three groups with architects, financial analysts and other experts were formed. The workshop is held to have citizens and concerned parties discuss issues and how to use the contents of the discussions is up to the CUD. It plans to formulate a Djebale Island development plan based on the discussions.

Table 4.11 Seminar Summary

Seminar Session	Participating Country	Member	Agenda
Session 1 June 2013)	France, Cameroon, UK, Italy, Senegal, Chad, Togo, Haiti, Benin, Mali, Lebanon, Equatorial Guinea, China, South Africa, Burkina Faso and Morocco	【Workshop】 21 persons (7 x 3 groups) 【Management】6 persons 【Others (including C/P)】 20 persons	・ Improvement of living and employment climate ・ Urban development ・ Division of commercial and residential districts ・ Improvement of natural environment * Selection of issues on the above
Session 2 (November 2016)	France, Cameroon, Togo, Benin, Senegal, Mali and Japan (survey team)	【Workshop】 15 persons (5 x 3 groups) 【Management】14 persons 【Others (including C/P)】 30 persons	・ Development plan of areas subject to review

Source: JICA Survey Team

(2) Tourism Resources

Djebale Island enjoys mangrove and other abundant natural resources as tourism resources and the CUD and the seminar have selected tourism development utilizing the natural resources as one of the themes of island development.

The gun battery and church from the 1840 as well as an annual festival called ndongo in early December are also tourism resources of the Island. The village chief of the island gives a prayer enshrining the Wouri River and boat races, wresting and other events are held in the ndongo festival.

The survey team went around the island on a boat. The planted mangrove with white flowers and divers collecting sand for building materials are very interesting to believe that they can be tourism resources.

Gun battery in the 1840, Germany	Church in the 1840s, Germany
	
Ndongo festival (Djebale island village chief gives a prayer to the river.)	Wresting event in Ndongo festival (Called Ewenji)
	
Practice for boat race in ndongo festival	Boat race in ndongo festival
	
Planting mangrove	Sand collection in Wouri River
	
Boat slip in Djebale Island	Sand collection in Wouri River
	

Source: JICA Survey Team

Photo 4.6 Tourism Resources of Djebale Island