SRADDT-West

WATER RESOURCES AND SANITATION

Diagnostic report

CONTENTS

LIST OF TABLES

1. LEGISLATIVE, REGULATORY AND INSTITUTIONAL FRAMEWORK OF WATER AND SANITATION SECTORS

1.1. Legislative and regulatory framework

Law No. 98/5 of 14 April 1998 to lay down regulations governing water resources determines the legal framework for water as well as provisions relating to its protection and management as well as the protection of public health. It pays great attention to the protection, rigorous and rational management of water resources and national coordination of water and sanitation services throughout the national territory. The legislative and regulatory framework for water and sanitation sector is also based on the following texts:

- Law No. 96/12 of 5 August 1996, on the Framework Law on environmental management;
- Law No. 2004/3 of 21 April 2004 to regulate town planning in Cameroon;
- Law No. 2004/17 of 22 July 2004 Decentralisation guidelines
- Law No. 2004/18 of 22 July 2004 to lay down rules applicable to councils.

The implementing legislation focuses on:

- Decree No. 2001/161/PM of 8 May 2001 establishes the powers, organisation and functioning of the National Water Committee;
- Decree No. 2001I162/PM of 8 May 2001 set rules protecting areas around abstraction points and standards for processing and storage of water;
- Decree No. 2001/163/PM of 8 May 2001 to regulate protection perimeters around the collection, treatment and storage points for drinking water;
- Decree No. 2001I164/PM of 8 May 2001 to specify terms and conditions of water extraction surface or groundwater for industrial and commercial uses;
- Decree No. 2001/165/PM of 8 May 2001 to specify rules for the protection of the surface or groundwater against pollution;
- Decree No. 2001I216/PM of 2 August 2001 to establish Special Trust Account to finance sustainable development projects in the field of water and sanitation;

- Decree No. 2005/493 of 31/12/2005 to establish the procedures for delegating public drinking water and liquid sanitation services in urban and suburban areas;
- Decree No. 2005/3089/PM of 29 August 2005 specifying the rules for the assessment, collection and control of the sanitation tax and the water abstraction charge;
- Decree No. 2005/494 of 31/12/2005 to create the Cameroon Water Utilities Corporation.
- Decree No. 2018/144 of 20 February 2018, to reorganise the structure of Cameroon Water Utilities Corporation.

At the international level, Cameroon has approved some 30 multilateral environmental conventions since 1972, several of which are related to water and sanitation issues. At the Regional level, Cameroon is a member of the Niger Basin Authority, Lake Chad Basin Commission and Congo Basin Commission. The most important convention is the one relating to the 'International Drinking Water Supply and Sanitation Decade', where Cameroon has benefited from several water management and supply programmes.

1.2. Institutional context

Many actors are involved in managing the water and sanitation sector in Cameroon.

1.2.1. Implementation, guidance and control bodies

- The Ministry of Energy and Water (MINEE), which supervises the water and sanitation sector, is responsible for designing and implementing the State's drinking water supply and sanitation policy;
- Ministry of Territorial Administration and Decentralisation (MINATD), intervenes in the field of water and sanitation through decentralised communities (councils, urban communities), and develops disaster response strategies through the Directorate of Civil Defence
- The Ministry of Public Health (MINSANTE) is responsible for the implementation of the Government's hygiene and sanitation policy in both urban and rural areas. It provides community health monitoring, promotes environmental health; It is responsible for regulating environmental rehabilitation activities, controlling and monitoring pollutants in the environment, while participating in the development of hygiene and sanitation legislation. It provides community health monitoring and promotes environmental health;
- The Ministry of the Environment, Nature Protection and Sustainable Development (MINEPDED) is responsible for defining the terms and principles for the rational and sustainable management of natural resources and, consequently, for protecting water resources and drawing up sectoral master plans for environmental protection in conjunction with relevant ministries. At the decentralised level, the Ministry includes some bodies such as the Regional Brigades of Environmental Inspection, which monitor compliance with environmental sanitation standards through their inspection units;
- The Ministry of Urban Development and Housing (MINDUH) is responsible for the development of urban infrastructure (water supply networks, sanitation networks, among others);
- The Ministry of Agriculture and Rural Development (MINADER) is involved in planning and monitoring projects aimed at improving the living environment in rural areas (mainly sanitation projects), in conjunction with ministries concerned, through the Sub-department of the improvement of living conditions. It is the project manager for the agricultural hydraulics policy linked with other relevant bodies.
- The Ministry of Livestock, Fisheries and Animal Industries (MINEPIA): its mission is more focused on the protection of marine and river resources, on studies and research for the collection of fisheries and fish resources. It also intervenes in managing water resources through the development of pastoral hydraulics;
- The Ministry of Mines, Industries and Technological Development (MINIMDIT) is responsible mainly for applied standards inventory and directory throughout the country. It is also responsible for quality control and water costs, in line with other ministries involved and dealers;
- The Ministry of State and Land Tenure manages the State public and private estate as well as the entire national property. It prepares, implements and evaluates the country's land registration policy.

1.2.2. Technical support, coordination and consultation bodies

- The National Water Committee, an advisory body responsible for assisting the government in the development of its water policy and related problems, as well as in the search for ways and means of its implementation;

- The National Environment Committee, responsible for analysing the impact of development activities on natural resources and raising public awareness for sound environmental management. These two bodies are presently not operational.

1.2.3. Funding agency

- The Ministry of Finance (MINFI) is in charge of mobilising the financial resources necessary for the implementation of water and sanitation programmes;
- The Ministry of Economy, Planning and Regional Development (MINEPAT) is responsible for controlling and monitoring the implementation of public investment plans and programmes and, consequently, researches, controls and guides investment expenditure on water and sanitation throughout the national territory;
- Special Fund for Equipment and Inter-Communal Intervention (FEICOM) finance equipment or social projects either through financial assistance or non-financial assistance as part of technical assistance or advice to councils;

1.2.4. Supervisory body delegated by public drinking water services

Decree No. 2018/144 of 20 February 2018, to reorganise Cameroon Water Utilities Corporation (CAMWATER), signed the renationalisation of water management in Cameroon and terminated the leasing contract that had linked the State of Cameroon to Cameroon Water Corporation (CDE) since 2007. By this decree, CAMWATER is now Cameroon's government-owned company responsible for managing assets and rights allocated to public drinking water service, as well as the operation of the public service for the production, transport and distribution of drinking water in urban and inter-city areas.

1.2.5. Facilitation and research organisations

- The Ministry of Territorial Administration and Decentralisation (MINATD);
- The Ministry of Foreign Affairs (MINREX);
- The Ministry of Public Health (MINSANTE): It is active in community surveillance, hygiene and environmental health promotion and water-borne disease control;
- The Ministry of Scientific Research and Innovation (MINERESI) through the Centre de Recherches Hydrologiques (CRH) is in charge of assessment and quality of water resources.

1.2.6. Private actors and civil society

The most active are: consulting firms, construction companies, major water users and civil society (NGOs) involved in water and sanitation activities.

1.2.7. International co-operation

Cameroon co-operates with the international community on water and sanitation. It has ratified some 30 multilateral environmental conventions, several of which are related to water and sanitation issues. This co-operation through financing and facilitation agencies, provides the majority of funding for the water sector.

1.3. Strategic Framework

Several framework documents and sectoral plans serve as tools for defining water and sanitation policy in Cameroon. We can quote:

The Growth and Employment Strategy Paper (DSCE): this is the main framework document for guiding Cameroon's development policy. It focuses on accelerating growth, creating formal jobs and reducing poverty. With regard to drinking water supply, the objectives set out in this document are to increase to 75% by 2020 the rate of access to drinking water. The strategy also aims to increase to 60% by 2025 the rate of access to sanitation infrastructure.

The Urban Water Sector Policy Letter: drawn up in 2007, sets out the sector's development paths. These commitments consist in: (i) Developing PPPs that encourages the involvement of new actors through an incentive environment; (ii) Substantially reducing the lack of access to drinking water for urban populations; (iii) Managing water resources in an integrated manner with a sustainable development approach; (v) Improving water sector management through cost recovery in order to ensure the sector's financial equilibrium, mainly by developing stable funding mechanisms; (vi) Defining an appropriate policy for developing the sanitation sector.

The National Strategy for Sewerage: it was developed in 2011 and its main objectives are (i) to increase access to improved sanitation facilities for urban and rural populations and achieve a 57% access rate to improved sanitation by 2020 in rural and urban areas; and (ii) to ensure reliability and efficiency, financial and environmental sustainability and service acceptability, through household and government budgets.

The rural sanitation strategy: it was implemented during the 2013–2015 period, as part of the Rural Drinking Water Supply and Sanitation Project (PAEPA-MRU). This strategy aims at increasing access to sewerage in rural Cameroon, in order to improve the well-being of concerned populations and promote their economic and social development.

2. WATER RESOURCE OF THE REGION

Water resources of the West Region are represented by surface waters consisting of meteoric or rainwater and run-off water (permanent and/or temporary flow streams and lakes); and groundwater.

2.1. Meteoric waters/rainwater

For rainwater monitoring, Cameroon, through the National Meteorological Directorate (DMN) of the Ministry of Transport, has a network of nearly 408 weather stations, with barely 10% functional, and for those functional, they are below their capacity.

The main limitation of the studies is the difficulty of obtaining high-quality climatological data with sufficient temporal depth. As already pointed out by Suchel in 1987, the inability to produce reliable data in Cameroon is mainly due to the 1980s economic crisis, which led to the lock down of a large number of stations set up during the colonial era. Stations that have not been locked down are most at times poorly maintained and do not always meet the standards required by the World Meteorological Organisation (WMO). In addition, there is a lack of motivation among measurement staff, due to the wage cuts that followed the late 1980s economic crisis. This often leads to fanciful or highly deficient records. This is the case of Bafoussam, Dschang, Koundja, Foumbot, Baigom and Semto weather stations managed by the MND in the Region that are still operational.

Annual precipitation in the West Region is around 1,600 mm, representing an average total annual meteoric water resources balance of 22.2 109 m3. Of this volume, one part returns to the atmosphere through evaporation and transpiration and the other part (effective rainfall) contributes to feeding the rivers and replenishing the region's groundwater.

2.2. Groundwater resources

2.2.1. Hydrography

The hydrographic network of the West Region is dense. It is part of the Sanaga watershed (with the Mbam as it largest tributary), an integral part of the vast area of the Atlantic watersheds. The tributaries of this large basin depart from Bamboutos Mountains.

The West Region is only concerned by the Nkam Basins and especially the Noun, which drains most of the Region. These basins are drained by four main rivers (Olivry, 1976), namely:

- the Mapé in the North, a tributary of the Mbam
- the Nkam in the south-west, a coastal river called Wouri that flows into the sea at Douala. It drains the south-western edge of the Bamiléké plateau and the Dschang Region, with its Menoua, Metchié, Mou tributaries etc.;
- the Ndé in the South-east, Noun Tributary;
- the Noun, which drains most of the West Region, after originated in the Oku massif (3,070 m), then dives into the Ndop plain, which is now flooded by the Bamendjin dam. On the right bank, the Noun receives the Mifi-Nord (Babadjou-Mbouda) and the Mifi-Sud formed by the Metchié and the Mifi-Sud proper (Bandjoun), two tributaries of equal importance draining the Bamiléké plateau. On the left bank, the Noun receives small tributaries from the Bamoun area; it flows into the Mbam, one of the major branches of the Sanaga.

2.2.2. Quantitative Balance of Surface Water and Resources Monitoring

The volume of surface water flowing in the Atlantic Basin was estimated from Olivry's study results of the hydrological regime of the region's rivers between 1952 and 1970. This volume is estimated at 3:14 pm km3.

Table 1: Estimated volume of surface water in the West Region

Station name	Reference period	Surface area (km^2)	Inter annual module (m^3/s)	Specific module ($l/s/km^2$)	Drained water cover (mm)	Annual volume elapsed or stored (km3)
Noun to Bafoussam	1952–1970	4700	108.6	23.1	732	5.85
Mapé to Magba	1952–1970	4020	95.7	23.8	800	5.47
Nkam to Melong	1950–1977	2,275	71.1	31.3	987	3.82
Volume of water flowing in the Atlantic Basin						15.14

sources: Olivry 1973, 1976, 1986

In the West Region, monitoring of rivers hydrological regime is not effective. The hydrological stations set up by ORSTOM in the 1950s are no longer operational. Only specific hydrological studies carried out on specific rivers as part of the projects, as well as research work of academics, are available. They do not allow an assessment of the Region's surface water resource.

2.3. Groundwater resources

2.3.1. Characterisation of the aquifers of the Region

From a hydro-geological point of view, the Pan-African granite-gneissic basement covered by a volcanic mantle is characterised by two types of aquifers overlapped or isolated depending on the case. Formations are characterised by altered succession, cracked and healthy base.

Basement or volcanic cover decomposition products, alterations may or may not contain lateritic cap. Their composition is predominantly clayey and therefore their low permeability acts as a charge-storing reservoir. Their thickness depends on a large number of parameters including morphological position, cracking and fracture state of the underlying basement. They evolve to a depth of 30m in Dschang (locality of Fokamezo) on basaltic formations. The potential of alteration aquifers depends on water balance parameters and their geometric configuration. Their resources are mobilised through traditional or developed wells and springs, ensuring the supply of drinking water to a large part of the Region's population.

Under alterations, we gradually move to the basement through an alteration front. It corresponds to an intensely cracked and fractured basement, a phenomenon largely related to surface decompression and regional tectonics. Degraded rocks and cracked areas constitute a deep aquifer whose resource is mobilised through drilling. The main factors of productivity of deep aquifers are the opening of fractures, their orientation, length and the geological nature of different formations affected. In village water campaigns of the West Region, most aquifers generally detected are found in cracked basement, which varies in depth from 28.5 to 81.5 (according to Nano et al. studies, 2009).

It should be noted that the geomorphology (high mountain area) of the Region does not allow good drilling rates to be obtained. Specific ad hoc studies are required to allow drilling to be carried out on preferential flow axes.

Table 2: Characteristics of Selected Drilling in the West Region

Division	Subdivision	Localities	Lithology	Depth (m) drilling	Otherness thickness (m)	Flow rate (m3/h)
Bamboutos	Mbouda	Bakouké	Basalt	51.5	23	0.9
Haut-Nkam	Banka	Poango	Basalt	28.5	7	0.9
	Bandja	Famgham	Granite	38	10	3,5
		Fondjo-menkouet	Granito-gneiss mylonitise	32	20	20
Menoua	Dschang	Bafou/Melekouet	Basalt	81.5	14	2.4
		Nsenla	Granite	45	5	0.8
	Nkongni	Bamelieu	Basalt	51	22	2
		Fokamezo	Basalt	47.2	30	3.3
	Penka Michel	Bamendjou	Granite	30	25	3.6
		Banie-Baloum	Granite	61.5	25	0.7

Source : Nono et al, 2009

2.3.2. Quantitative and estimated assessment/monitoring of groundwater resources

According to the University of Rouen's report of the international symposium on 'Climate and environmental water science for sustainable development in Africa', the West Region has renewable groundwater reserves estimated at 5 km3 'which it shares with the Benue Basin.

Indeed, the main overarching works carried out to characterise Cameroon's main aquifer dates back to the 1960s and 1970s. They were carried out by the Cameroon Bureau of Geological and Mining Research (BRGM). Recent available data on groundwater resources in the West Region are obtained through ad hoc studies by academics and through hydraulic programmes.

2.4. Quality of the Region's Water Resources

The quality of surface and groundwater resources in the Region is not monitored. Apart from the CRC/CAMWATER, which inspects water it withdraws for the supply of drinking water to the population; the only effective analytical campaigns are prompt in time and space, and are carried out as part of research projects or programmes. The results of these campaigns indicate that the region's surface and groundwater resources are increasingly degraded by human activities, including cultural practices and poor liquid and solid sanitation practices.

Physico-chemical and bacteriological analyses carried out in Bafoussam by Mpakam et al. (2006) on water samples from rivers, wells and springs revealed high chemical and bacteriological pollution. Bacteriologically, groundwater analysed has high concentrations of faecal streptococci, total thermotolerant coliforms, indicating pollution of human and animal faecal origin. High concentrations of nitrates and ammonium have also been recorded in these waters. Water from rivers was highly polluted by faecal germs and had high concentrations of suspended solids (SS), bicarbonate and phosphorus. Biochemical Oxygen Demand (BOD 5) and Chemical Oxygen Demand (COD) parameters are also high and reflect the multiple constraints to which surface water resources are subject: poor sanitation practices (liquid and solid) and cultural habits.

In the Foumban urban area, studies conducted by Mfonka (2015) reveal that Nchi River waters are acidic to neutral ($5.3 \leq pH \leq 7.7$) and poorly mineralised [(15 µS/cm <C.E <164.9 µS/cm) and (184 µeq/l ≤ TZ+ ≤ 1565 µeq/l)]. The flow-weighted average concentration of silica is 23.55 mg/l and represents 59.33% of the sum of minerals dissolved solids (TDS) of 39.68 mg/l. The waters of the Nchi drainage basin are calcium-magnesian bicarbonate. The spatial variations of the different chemical species show high concentrations in groundwater compared to run off water. Statistical analyses, temporal variations of dissolved minerals and strong inter-elemental correlations observed reflect their common origin, which is mainly chemical alteration. The presence of faecal coliforms (FC) and nitrates strongly represented in the groundwater of Foumban town show that this water is deteriorated by human activities. Similarly, high concentrations of nitrates in groundwater on the Bamoun Plateau identified by Mouncherou et al. (2011) is an indicator for diagnosing anthropogenic activity on water quality, particularly in agriculture. The chemical parameters of the waters in this zone are mainly controlled by the water-rock interaction depending on the alteration of silicate minerals and human activities.

2.5. USES OF WATER RESOURCES IN THE REGION

Water resources are essential to life; they are used for most human activities. In the West Region, they are used for domestic purposes, agricultural and livestock activities, hydroelectric production and most industrial activities.

2.5.1. Drinking Water Supply to Households

In the West Region, the problem of drinking water supply is acute, and needs are only partially met because of the limited extension of the distribution network (CAMWATER and SCANWATER), the high demographic pressure and low incomes of a large segment of the population. The situation is even more alarming in suburbs and rural areas where people rely on water from boreholes, wells, springs and rainfall, the quality and quantity of which are not always assured. According to the NSO results, ECAM 3 and 4, the population proportion of the West Region with access to drinking water increased from 29.5% in 2007 to 49.4% in 2014.

2.5.2. Water supply networks/urban hydraulics

In urban and suburb area of the West Region, drinking water is supplied by the national water supply network, CAMWATER/CDE.

2.5.2.1. Situation of the production and emission of water supply network

CAMWATER/CDE's water supply network does not extend to all urban and suburb areas in the West Region. There are a total of fourteen (14) CRC treatment and production plants located in ten (10) cities, supplying only thirteen (13) of the 41 Subdivisions in the Region. Urban areas of Koung-Nki and Hauts-Plateaux Divisions are supplied with drinking water from Bafoussam centre. In the Noun Division, only two (2) out of nine (9) Subdivisions (Foumban and Foumbot) together are supplied with drinking water by the CAMWATER network. The following tables present respectively the situation of water treatment plants operated, and the quantities of water transmitted by the CDE network.

Table 3: Inventory of CAMWATER's drinking water treatment and production plants

No.	Division	Towns	Collection area
1	Bamboutos	Mbouda	Balatchi
2	Haut-Nkam	Bafang	Shisingi, koegli
3		Kekem	Melon
4	Menoua	Dschang	Meken, foto
5	Mifi	Bafoussam	Bameka, Bamengoum, metchié
6	Ndé	Bangangte	Banekane
7		Bazou	Bazou
8		Tonga	Tonga
9	Noun	Foumban	Nschie
10		Foumbot	Nkoup

Source: DR – MINEE/West

Table 4: Quantity of water transmitted in m3 into the network per centre 2012–2017

DIVISION	CENTRE	2012	2013	2014	2015	2016	2017
MIFI	BAFOUSSAM	5,356,574	4,747,320	5,799,799	5,947,572	6,130 941	6,628 436
KOUNG NKI	BANDJOUN	387,702	387,685	474,758	447,296	359,673	344,119
HAUTS PLATEAUX	BAHAM	116 709	146 666	138 798	143 937	164 574	94 147
	BAMENDJOU	75 057	70 064	94 710	89 118	107 382	112 378
HAUT NKAM	BAFANG	656 618	614 966	631 277	649 372	715 682	867 260

	KEKEM	53 242	78 937	96 400	/	161 677	153 261
NDE	BANGANGTE	246 996	210 747	338 442	261 487	313 893	523 878
	TONGA	0	0	0	2111	28 766	43 106
	BAZOU	53 425	53 446	52 460	60 779	69 733	60 631
MENOUA	DSCHANG	407 313	426 179	432 176	445 290	679 055	638 152
NOUN	FOUMBAN	664 823	469 296	542 685	531 535	436 495	698 598
	FOUMBOT	207,350	259,820	272,661	348,899	354,386	350,162
BAMBOUTOS	MBOUDA	327,522	347,808	300,410	443,479	499,830	435,190
TOTAL		8,635,089	7,931,359	9,355,111	9,370,875	9,914,705	10,949 318

source : CDE/West Regional Agency

CDE water production in the Region increased from 8,635,089 m3 in 2012 to 10,949,318 m3 in 2017. Bafoussam centre produces the largest quantity of water, 5,356,574 m3 in 2012 and 6,628,436 m3 in 2017. Tonga centre produced only 43,106 m3 in 2017.

Despite an increase over the years, quantities of water produced and distributed by CAMWATER/CDE networks do not meet the water needs of people in urban and suburb areas of the West Region. Indeed, considering the specific consumption of 50l/day/people in urban areas and knowing the number of urban inhabitants are estimated at 884,183 in 2017, domestic water needs are estimated at 16,136,339.75 m3. Thus, only half, or 53.51% of the Region's drinking water needs of urban and suburb areas are covered by the CAMWATER network.

2.5.2.2. Coverage of the C.D.E. network

In 13 councils supplied by CDE networks, there were 51,862 subscribers in 2017, distributed in the following table.

Table 5: Distribution of CDE subscribers per centre between 2015 and 2017

DIVISION	CENTRE	2015	2016	2017
MIFI	**BAFOUSSAM**	22,250	234 31	24,504
KOUNG NKI	**BANDJOUN**	3,203	3,494	3,551
HAUTS-PLATEAUX	**BAHAM**	1,243	1,379	1,377
	BAMENDJOU	757	891	922
HAUT NKAM	**BAFANG**	4 224	4 667	4 735
	KEKEM	535	586	596
NDE	**BANGANGTE**	2 743	3 018	3 085
	TONGA	75	606	616
	BAZOU	635	755	781
MENOUA	**DSCHANG**	2 665	2 788	2 795
NOUN	**FOUMBAN**	3 777	4 249	4 336
	FOUMBOT	2,052	2,521	2,552
BAMBOUTOS	**MBOUDA**	1,898	2003	2,012
TOTAL		46,057	50,388	51,862

source : CDE/West Regional Agency

2.5.2.3. Difficulties in the functioning of CAMWATER/CDE network

The main problems identified hindering the efficient operation of the water distribution system in the West Region are based on the following points:

- From a structural point of view, the dealer's internal organisation has shortcomings/defects with regard to the dimensioning of network's pipes (lack of feasibility studies taking into account population trends). The quality of equipment used for the supply network, the process of network implementation and deployment (poor implementation of projects), compliance with maintenance programmes and the renewal of network equipment;
- Variation of the regime of the Region's rivers are marked according to seasons;
- The deficit/insufficiency in the supply of electricity to some communities, which is essential for the functioning of water treatment plants;
  Failure of councils to comply with good practices when implementing maintenance programmes for access roads is at the root of equipment (pipes) destruction of the water supply network. In addition to temporary water supply disruptions in some areas, it entails significant rehabilitation costs for the entrepreneur;
- The destruction of network equipment during population activities and the failure to report leaks contribute to the waste of resources.

2.5.2.4. Rural water points

In rural areas, village water supply programmes and the work of some elites have made it possible to set up several water supply and drilling systems to facilitate access to drinking water for the population. Despite the construction of these water points in villages, a large part of the population still obtains its water from springs, wells and rivers whose water quality is not known.

a. Location of SCANWATER Stations

The Scandinavia Water project was a Canadian co-operation initiative aimed at providing quality and quantity of water to people in rural areas suffering from water shortage, so as to better combat water-related biological diseases such as bilharzia and Guinea worm. This project also aimed at helping Cameroon's government to build water supplies in all rural areas.

The network set up by Scandinavian Water had been transferred to SNEC, to which the State had entrusted the payment of receipts for energy consumed by the functioning of pumping stations. With an increase in the price per kilowatt of electricity following the privatisation of SONEL in 2004, this network, which had become unprofitable for SNEC, was left out. It was later taken over by some councils or associations to address water supply problems.

In the West Region, there are 70 SCANWATER stations, located in seven (7) Divisions out of eight (8) in the Region. 15 are 60% functional and 55 are in shut-down. This state of affairs is linked to deficiencies in network management, including facility maintenance. The following table presents the status of SCANWATER network in the Region in 2016.

Table 6: Status of SCANWATER stations in the Region

Division And number of stations	Subdivision	Locality	State	Energy	Remarks
BAMBOUTOS (8)	Mbouda	Balatchi-Baméka	Operational	ENEO	Considerable water loss and FB shut-down
	Mbouda	Balatchi-Tialong	Operational	ENEO	Considerable water loss and FB shut-down
	Mbouda	Babété	Shut-down	Generator	Station emptied by thieves, piping 60% damaged
	Mbouda	Bamemkombou	Shut-down		Station emptied, piping 60% damaged, 1 drilling pump broken
	Galim	Mbapout Bagam	Shut-down	ENEO	In failure
	Babadjou	Babadjou	Shut-down	ENEO	In failure – Low-cost rehabilitation
	Batcham	Batcham Chiefdom	In rehabilitation	ENEO	Belgo-Cameroon funding
	Batcham	Bangang-Bambi	In rehabilitation	ENEO	Belgo-Cameroon funding
HAUT-NKAM (9)	Bafang	Bakondji	Shut-down	ENEO	In failure – Low-cost rehabilitation
	Kekem	Fombele-Fonkoaken	Shut-down	Generator	Station emptied by thieves
	Bandja	Babouantou	Shut-down	Generator	In failure – Low-cost rehabilitation
	Bandja	Bandja-Manga	Shut-down	Generator	In failure- Station in good condition - Piping 50% damaged
	Bandja	Fondjomekwet	Shut-down	ENEO	Compressor and control cable stolen – Piping 50% damaged
	Kekem	Bayon	Operational At 30%	Generator	Drilling pump to be changed
	Kekem	Banwa-centre	Shut-down	Generator	In failure – Low-cost rehabilitation
	Bana	Batcha	Shut-down	Generator	Station in good condition - No borehole pump - Piping 50% damaged
	Kekem	Bapoungue	Operational	Water reservoir	Gravity EAF
HAUTS-PLATEAUX (8)	Bangou	Badenkop	Shut-down	Generator	In failure
	Bamendjou	Batchunkang	Shut-down	-	-
	Bamendjou	La'angou-Hiala	Shut-down	-	In failure
	Bamendjou	Batie-Famgoum	Shut-down	ENEO	In failure
	Bamendjou	Batié-Hiala	Shut-down	ENEO	In failure
	Bamendjou	Bapa	Shut-down	-	In failure

Division And number of stations	Subdivision	Locality	State	Energy	Remarks
	Baham	Chenye-Gwengwa	Shut-down	-	In failure
	Baham	Baham -village	Shut-down	-	In failure
NDE (17)	Bangangte	Bahouok	Shut-down	ENEO	In failure
	Bazou	Balengou	Shut-down	ENEO	In failure
	Bangangte	Bamena 1	Shut-down	ENEO	In failure
	Bangangte	Bamena 2	Shut-down	ENEO	In failure
	Bangangte	Badiangseu	Shut-down	ENEO	Station emptied of all its equipment; Cables and electrical poles destroyed by bushfires.
	Tonga	Badounga	Shut-down	ENEO	In failure
	Bangangte	Bangoulap	Operational	ENEO	ALL CLEAR
	Bangangte	Bangoua 1 (Kamna)	Operational	ENEO	ALL CLEAR
	Bangangte	Bangoua 2	Shut-down	ENEO	In failure
	Bangangte	Bangoua 3	Shut-down	Generator	In failure
	Bangangte	Bassamba	Functional	ENEO	ALL CLEAR
	Bangangte	Batchingou	Operational	ENEO	ALL CLEAR
	Bangangte	Batoukop – Topsi	Shut-down	ENEO	In failure
	Bangangte	Fambeu	Shut-down	ENEO	In failure
	Bazou	Katio	Operational	ENEO	ALL CLEAR
	Bazou	Ndionzou	Operational	ENEO	ALL CLEAR
	Bangangte	Sanki	Shut-down	ENEO	In failure
NOUN (9)	Koutaba	Kuondja	Shut-down	Generator	In failure
	Foumban	Koupa-Matapit	Shut-down	Generator	In failure
	Koutaba Koutaba	koutié-Kouchankap	Shut-down	ENEO	In failure
	Massangam	Matchatoum	Shut-down	Generator	In failure
	Bangourin	Bangourain 2	Shut-down	Generator	In failure
	Bangourin	Bangourain 2	Shut-down	Generator	In failure
	Magba	Magba	EU Rehabilitation	ENEO	Operational
	Foumban	Koussam	-	ENEO	-
	Kouptamo	Kouptamo-Mbankouop	Operational	ENEO	ALL CLEAR
MENOUA (13)	Penka Michel	Balessing	Shut-down	Generator	In unrecoverable drilling - Piping 60% damaged - Station at a 70% in good condition.
	Penka Michel	Penka Michel	Operational	ENEO	ALL CLEAR
	Penka Michel	Bamendou 1	Shut-down	Generator	In failure
	Penka Michel	Bamendou 2	Operational	Gravitas	Network to be rehabilitated

Division And number of stations	Subdivision	Locality	State	Energy	Remarks
	Dschang	Foto Lefé	Shut-down	Generator	In failure
	Dschang	Foto-Batsimbing	Functional	ENEO	ALL CLEAR
	Fokoué	Fomopea	Shut-down	Generator	In failure – Low-cost rehabilitation
	Dschang	Foreké Dschang – 5m3/h	Shut-down	Generator	In failure
	Dschang	Foreké Dschang – 10m3/	Shut-down	Generator	In failure
	Nkongni	Baleveng	Shut-down	Generator	In failure
	Nkongni	Djutitsa	Shut-down	Generator	In failure
	Nkongni	Bafou Chiefdom	Shut-down	ENEO	In failure
	Nkongni	Batsing'la Bafou	Operational	ENEO	ALL CLEAR
KOUNG-KHI (06)	Bayangam	Bandrefam	Shut-down	Generator	In failure
	Bayangam	Batoufam	Shut-down	Generator	In failure
	Bayangam	Bayagam	Shut-down	Generator	Collection and destroyed piping
	Poumogne	Bandjoun Chiefdom	Shut-down	Generator	At unrecoverable station – Scanwater piping already recovered by SNEC.
	Poumogne	Mangoum (Magom)	Shut-down	Generator	SNEC coverage area – left out station
	Poumogne	Bandjoun – Yom	Shut-down	Generator	SNEC coverage area – Left out station

Source: MINEE, 2016

b. Status of water supply from AEP systems, boreholes, wells and developed springs

As Scan-Water water supply networks set up in rural areas are very often defective or left out. People therefore rely on mini water supply systems, boreholes, wells and springs, whether developed or not, and even rivers to meet their water needs. In the West Region, rural water projects are implemented by a multitude of actors (ministries such as MINEE, MINADER, MINEPIA within PIB framework; councils; development partners and elites).

Table 7: Water supply infrastructure in rural areas of the Region

Divisions	Types of infrastructure	Numbers	Functionality	Number of wellsprings	Management Committees
Bamboutos	Drilling	73	25 OP/48 NO	/	3 (1F/2NF)
	Well	44	30 OP/14 NO	/	4 (4F/0NF)
	AEP	74	/	132 (70F/62NF)	/
	Developed springs	98	38 OP/60 NO	/	/
Haut-Nkam (without Bandja council)	Drilling	70	23 OP/47 NO	/	21 (15 F/6 NF)
	Well	8	5 OP/3 NO	/	4 (2F/2NF)
	AEP	51	/	307 (179F/128NF)	/
	Developed springs		31 OP/1 NO	/	/
Hauts-Plateaux	Drilling	88	56 F/32 5632	/	31 (23 F/8 NF)

Divisions	Types of infrastructure	Numbers	Functionality	Number of wellsprings	Management Committees
	Well	36	15F/21 NO	/	6 (2 F/4 NF)
	AEP	48	/	150 (108 F/42 NF)	/
	Developed springs	17	7 OP/10 NO	/	/
Koung-Nki	Drilling	66	42 OP/24 NO	/	22 (19 F/3 NF)
	Well	8	6 0P/2 NO	/	1(1F/ONF)
	AEP	62	/	109 (100 F/9 NF)	/
	Developed springs	34	32 OP/2 NO	/	/
Menoua	Drilling	160	80 OP/80 NO	/	67 (43 F/24 NF)
	Well	129	49 OP/80 NO	/	12 (6 F/0 NF)
	AEP	105	295 OP/151 NO	/	/
	Developed springs	193	191 OP/2 NO	/	/
Mifi	Drilling	50	20 OP/30 NO	/	14 (8 F/6 NF)
	Well	8	5 OP/3 NO	/	5 (3 F/2NF)
	AEP	48		42 (20 F/22 NF)	/
	Developed springs	56	3 OP/53 NO	/	/
Ndé (excluding Bazou council)	Drilling	58	40 OP/18 NO	/	21 (10 F/11 NF)
	Well	3	2 OP/1 NO	/	0
	AEP	24		64 (64 OP/48 NO)	/
	Developed springs	10	10 OP	/	/
Noun	Drilling	202	124 OP/78 NO	/	126 (86 F/40 NF)
	Well	189	120 OP/69 NO	/	93 (63 F/30 NF)
	AEP	243	/	482 (305 OP/177 NO)	/
	Developed springs	90	82 OP/8 NO	/	/

sources: Compilation of Pro ADP West Regional Directory data, 2017

The West Region has a total of 767 boreholes (410 functional and 357 non-functional), 381 developed wells (232 functional and 149 non-functional), 660 water supply systems with 1,732 hydrants (1093 functional and 639 non-functional) and 530 developed springs (394 functional and 136 non-functional). The non-functionality of a large number of existing hydraulic structures raises the issue of technical and even financial abilities, as well as the weakness of management and maintenance systems for rural water points, which, once finished, are entrusted to local communities. Indeed, management of water points is most often carried out by management committees which, due to a lack of preparation for the mission and various conflicts, are most often non-functional, with the consequence of subsequent abandonment in an event of structure failure. It should also be noted that many village water projects entrusted to crooked and technically incompetent contractors are never delivered or are poorly executed.

2.5.2.5. Inter-Communal Co-operation in the Management of Water Resources

In order to ensure the supply of water to their populations, some councils in the West Region have decided to pool and manage their resources (human, material, financial). We note in particular:

- Neighbouring councils of Bamendjou, Penka-Michel and Batié have obtained funding of nearly 300 million CFA francs from the European Union for water governance in their respective councils. The project is called 'Promotion of water governance in Bamendjou, Penka-Michel and Batié councils';

- Kong-Ni, Fongo-Tongo, Kye-ossi and Douala 5 councils join forces for water and sanitation management through the Inter-Communal Programme for Sustainable Water Management and Sanitation (PIGeDEA).

2.5.3. Use of water resources for livestock farming

Based on the number of livestock recorded for 2017, water requirements for livestock have been calculated on the basis of survey results carried out by the CIEH (Comité Inter Africain d'Etude Hydraulique), which assess specific water consumption as follows: cattle (39.2 l/day/head), sheep (4.3 l/days/head), goats (4.3 l/days/head), pigs (10 l/days/head), poultry (0.5l/days/head).

Table 8: Estimated water requirements for livestock in the West Region

Production	**Cattle**	**Sheep**	**Pigs**	**Goats**	**Poultry**
	115,483	59,615	115,007	92,588	5,153 568
Specific consumption (l/d/head)	39.2	4.3	10	4.3	0.5
Annual consumption (10-3 km3)	1.65	0.094	0.41	0.15	0.95
Water requirement (10-3 km3)	3.25				

Source: Cacul based on data from DR/EPIA West, 2017

Water resources in the West Region are in high demand for cattle, sheep, pigs, goats and poultry breeding. For farms and pig farms functioning, water resources are extracted from nearby streams and fish ponds or harnessed through boreholes and wells. In the case of cattle, sheep and goats, animals reared on natural rangeland drink from surrounding rivers, marigolds, ponds, springs, lakes and fish ponds. However, in addition to being insufficient in number, some of these rivers dry up in the dry season. Mini dams, wells, dustbins and boreholes are set up to ensure water supply to animals in these cases.

It is important to note that conflicts between farmers and herders over the use of water resources are recurrent in the Region. Conflicts generally concern the occupation of lowland and lowland rivers by farmers, the blocking or occupation of access roads to water points, the installation of dams for cattle watering, which affects the development of crops downstream.

2.5.4. Use of Water Resources for Hydro Power Production

Hydroelectric production is a non-consumptive demand for water resources, it exploits energy potential from water flows (rivers, waterfalls, marine currents, etc.) for the production of electricity, and water used for the operation of hydro turbines can be reused for other purposes. However, hydro power requires the storage of a certain volume of water at a particular site, which may exclude or limit another upstream use.

In the West Region, apart from Bamendjing (582 10-3 km3) and Mapé (126710-3 km3) reservoirs, there are twelve (12) micro hydroelectric power plants set up on rivers in the vicinity of Bafoussam, Mbouda, Dschang and Foumban, but only three (3) of them producing a maximum total power of 34 KW are still in operating state. Studies of the equitable potential of small hydro power in the West Region have also revealed about 30 potential sites for the development of micro-hydroelectric power plants with a total capacity of 10,971 MW.

2.5.5. Agricultural Use

In the West Region, lowlands, which are the axes of preferential convergence of surface waters, hypodermic flows and groundwater, have for long been little or not cultivated, with the exception of some

suburb areas. They are now considered fertile and suitable places for agricultural activities; and are further developed through partial water control measures. Lowlands play a role in maize and beans cultivation, ensuring food security in the event of failure of rainfed crops; tuber crops (sweet potato, taro, cocoyam, potato) on raised ridges; market gardening and flooded rice cultivation, permanent or temporary, with or without water control (Mbo plains); and more recently, dry season market gardening, with different modes of access to water depending on the depth of the water table in the dry season. Some of these lowlands and plains can be observed along the roadside of the Bafoussam -Mbouba – Bamenda, Bafoussam-Foumban axis, in Baleng arteries towards Mbappi and Bamoungoum. Throughout the West Region, the cultivation of market gardens (tomatoes, cabbage, peppers, etc.) along watercourses is very widespread. Farmers take water resources from rivers using motor pumps to water their crops.

It should be noted that cultural habits in the Region, in particular the increased use of fertilisers on market gardening and food crops, constitute a threat to water resources, contributing to the degradation of quality through infiltration and leaching.

2.5.6. Industrial use

The West Region's industrial fabric is not very developed. It is essentially composed of bakeries, cocoa processing and coffee shelling plants, soap/oil factories, plastics processing, feed mills. The functioning of these industries still requires water resources, but in not very significant quantities. By 2015, 49 industries, including 17 in Bafoussam, 19 in Dschang and the other 13 in Foumban, Bangangté, Bafang, Kekem, Bandjoun, Bamendjou, Bazou, Foumbot were connected to the CDE/CAMWATER water supply network.

2.5.7. Use of water resources for fishing and fish farming

Mostly continental crafts, capture fishing is practised in main rivers of the Region's three Divisions which are the Bamendjing reservoir in Bamboutos, Mapé reservoir and Noun reservoir in the Division, the Nkam in the Haut-Nkam. This income-generating activity involves about 3,200 fishermen, 80% of whom are Cameroonians.

Surface water resources are also taken for fish farming, an activity under development in the Region. Indeed, aquaculture is practised in all the subunits of the area, it is essentially represented by freshwater pond fish farming. The intensification of this activity has led in recent years to the development of above-ground infrastructures (concrete bins, plastic sheeting, catchers and cages) in the eight (8) Divisions of the Region. In 2016, there were 1,622 ponds with an average surface area of 335 m2 throughout the Region. For the development of fish infrastructure, water resources are diverted from rivers to be transported to the basins, then after use, they are carried back to the river and can be a source of degradation of its quality.

2.5.8. Use of water resources for craft mining

Craft exploitation of arena sand is very widespread in the Region. Craftsmen collect water from surrounding peaks and from rainfall, or use motor pumps to pump water from rivers to 'wash' sand. This results in an increase in cloudiness and suspended solids in the water of the streams. They also increase the transfer of fine sediments (sand, clay, silt) to watercourses.

2.6. Water resources management in the Region

During the World Summit on Sustainable Development (WSSD) held in Johannesburg in 2002, a global observation emerged, which is the progressive depletion of mobilisable water resources linked to industrial, urban and agricultural development, as well as strong population growth, thus an ever-increasing need for good quality water and the hazards of climate change. The implementation plan of this summit calls for the development of IWRM and water efficiency plans. IWRM is a flexible tool to address water challenges and optimize water's contribution to sustainable development. It seeks to avoid losing lives, wasting money and exhausting the natural environment through inappropriate decisions. Fundamentally, as a process of change, IWRM aims to ensure that water is used to advance a country's economic and social development objectives. This is done in order not to jeopardize the sustainability of vital ecosystems or the ability of future generations to meet their water needs. By agreeing on WSSD recommendations, the Cameroon Government maintains its efforts to pursue reforms of improving water resources management.

The implementation of IWRM at the national level was assessed at 34% at a workshop on the 'Degree of implementation of Integrated Water Resources Management (IWRM) in Cameroon (indicator 6.5.1)' held in September 2017. In the West Region, the lack of a water resource management framework is noted. Despite the supervision of water resources management recognized in MINEE, several other ministries (agriculture, livestock, etc.) are involved in varying degrees. Very few actions of these different Departments are carried out in an agreed manner and very often there is an overlap of skills and achievements on the field. In addition, the prerequisite for the implementation of a territory's integrated water resources management plan requires that some basic data (hydrometrics, physico-chemical quality, etc.) of the hydrographic basins be known and controlled, yet shortcomings in the monitoring and evaluation of water resources have been identified in the West Region.

2.7. Ongoing and planned projects in the field of water supply

In addition to the many projects planned in the West Region by MINEE and other ministries as part of their sovereign missions and through the Public Investment Budget (PIB), water programmes and projects aimed at reducing water supply deficit of the population are developed and financed by the government and development partners.

2.7.1. Nine (9) Cities Project

Currently, in the West Region, precisely in Bafoussam Town, a project led by CAMWATER and executed by a Chinese company (CGC Overseas Construction Group Co. Ltd) is under construction. This project, which is in Phase 1, includes the expansion of Metché water treatment and production plant, as well as the construction of several castles and the extension of the CDE network, not only in Bafoussam Town, but also in neighbouring towns. This project will make it possible in the long term to increase production capacity of Metché, but also to increase CDE network coverage by supplying other cities surrounding Bafoussam such as Bandjoun, Baham, Batié, etc.

2.7.2. Draft Emergency Plan

As part of the three-year emergency plan, the West Region will benefit from 100 human-powered boreholes. So far, the physical execution rate is about 70%.

2.7.3. 1.3.3. PAEPA MRU project and PAEPA/MSU project

PAEPA MRU/West project is a project consisting of a hydraulic and a sanitation component, which will eventually supply 88,800 inhabitants in 27 localities through the laying of 179, 239 km of HDPE pipelines, which will permanently (24H/24) provide water to the 291 Wellsprings equipped with metres and lost wells.

Like the PAEPA MRU/West project, the PAEPA MSU/West project is a project composed of a hydraulic component and a sanitation component

2.7.4. C2D Project

Thanks to the Debt Reduction and Development Contract (C2D) "REGIONAL CAPITALS", Bafoussam Town will benefit from a large number of infrastructure, namely:

- 10 (ten) drinking fountains;
- 80 (Eighty) solar candelabras;
- 8 (Eight) public toilets.

These amenities appear as a significant contribution to fight against promiscuity, insecurity and to some extent youth unemployment.

2.7.5. Medium Term Expenditure Framework (MTEF)

For the improvement of water supply and sanitation services, a Medium Term Expenditure Framework (MTEF) has been set up, taking into account project proposals from across the Region, which can be considered as priorities. This M.T.E.F. covers three (3) years, 2017 to 2019 and is composed of 201 hydraulic projects, 53 sanitation projects.

2.8. Summary of SWOT of the Region's drinking water supply system

2.8.1. SWOT of Urban Hydraulics

STRENGTH	**WEAKNESSES**
- *High potential of water resources (dense hydrographic network, mobilizable groundwater and presence of numerous gravity sources);* - *Existence of the Region water sector's diagnostic study carried out by the DR/MINEE* - *The implementation of the Public-Private Partnership for drinking water supply (partnership system between the various state actors, development partners, Communities);* - *Presence of a decentralisation law that transfers AEPA competencies to CPC.*	- Lack of water resources monitoring (surface and groundwater) in terms of quality and quantity (meteorological, hydrometric and piezometric stations non-existent or non-functional); - Low extension of CAMWATER water distribution network, which does not extend to all urban and suburban areas of the Region (13 districts out of 40); - Pipes under-sizing of the existing supply network; - The obsolescence of water supply network equipment; - Lack of access to drinking water for populations in urban and suburban areas (imbalance between supply and demand); - Low drinking water treatment/water treatment distributed in channels; - Failure to comply with maintenance programs for existing water distribution infrastructure; - The lack of electricity supply in some localities; - Destruction of drinking water supply infrastructure during road maintenance works;

	- Absence of civic spirit and vandalism on infrastructure (destruction of pipes, unreported water leaks, etc.) - Insufficiency/absence of human, financial and material resources of the CPCs to implement competences transferred in terms of AEPA (project owner, project managers and regulators); - Insufficient mutual support between actors involved in AEPA field.
OPPORTUNITY	**THREATS**
- *Government and development partners willingness to make up for the population's water supply deficits, as demonstrated through project financing.*	- Demographic pressure; - Highly variable regime of the Region's rivers and streams (linked to variation in rainfall)/Climate changes that contribute to the decline in the Region's river regime; - The vulnerability of water resources exposed to pollution resulting from human activities (agriculture, livestock, industry, unsanitary conditions).

2.8.2. SWOT of Urban Hydraulics

STRENGTH	**WEAKNESSES**
- *Presence of many gravitational sources;* - *Populations' awareness of water resource vulnerability through the awareness made by some CTDs.*	- Weakness of rural water point management and maintenance systems set up/sustainability of structures/Inefficiency of water point management committees; - The geomorphology of the West Region does not allow for high throughput drilling; - Incompetence at the technical level of some providers of the implementation of rural water supply in the Region/Inadequate technologies for the realisation of some works; - Lack of monitoring of water resources in both quality and quantity (monitoring of drinking water in rural water points and groundwater supply); - Insufficient funding for rural water supply in the Region; - Insufficient mutual support between different actors involved in rural water supply (sectoral, decentralised local authorities, development partners); - Inadequacy between population needs as expressed in CPCs and project specifications; - Weak idea development in implementing water points (insufficient preliminary studies during the execution of hydraulic projects); - Insufficiency/absence of human, financial and material resources of the CPCs to implement competences transferred in terms of AEPA (project owner, project managers and regulators); - Absence of civic spirit and vandalism on infrastructure.
OPPORTUNITY	**THREATS**

- *Government's willingness to contribute significantly to the funding of rural water supply;* - *The ever-increasing interest of external financial partners in improving access to water.*	- Gradual destruction of vegetation cover that promotes groundwater regeneration; - Vulnerability of groundwater resources to pollution resulting from human activities (poultry farming with the discharge of poultry carcasses into surface waters, agriculture, etc.); - Eucalyptus cultivation.

3. SANITATION AND WATER-RELATED ENVIRONMENTAL CHALLENGES

3.1. Liquid sanitation

3.1.1. Household sanitation

The sanitation of households in the West Region is essentially autonomous. The main method of excreta and sewage disposal in households remains the use of deep-bleed latrines. Modern systems consisting of flush toilets with septic tanks are also available. Open defecation is practised in some Divisions. According to INS results, ECAM 3 and 4, the proportion of the population living in housing with improved sanitation facilities increased from 54.4% in 2010 to 42.3% in 2014 in the West Region.

Throughout the West Region, there are 6 private companies specialised in septic tank emptying services, all located in Bafoussam Town. This service is also provided by truck from the Bafoussam urban community, as well as some councils in the region that are not always available. In case of filling trenches, families prefer to dig another trench, use the carbide to lower the level of excreta or in some cases, practice manual emptying with sludge transport to the shallow water. These practices could be explained by the insufficiency and absence of good service roads that could allow the emptying service to reach some quarters, on the one hand, and the unavailability of municipal emptying trucks and emptying costs that are not always accessible to poorest households, on the other hand.

Concerning the discharge areas for sewage sludge in the Region, Bafoussam has a space located on the banks of the Noun River, where bioactivated sludge is discharged. A source of nuisance and degradation of this environment. On the other hand, 5 km from Bangangté city centre, the council has set up a processing plant using a 'planted filter' for sewage sludge, built on an area of 2.5 ha and equipped with a capacity to receive 180 m3 of sludge per week. This station makes it possible to obtain products that are sufficiently hygienic and used for agricultural activities as inputs.

3.1.2. Non-Domestic and Storm Water Sanitation

With regard to non-domestic sewage, apart from sewage treatment plant installed by Société Anonyme des Brasseries du Cameroun (SABC) in Bafoussam, there is a lack of processing plants in almost all industrial units that integrate a water-based transformation process in the West Region. Liquid waste produced is discharged into the natural environment without treatment and is therefore a source of degradation of the Region's water resource quality.

With regard to storm water management, in the West Region's urban areas, storm water drainage works, where they exist, consist of open gutter networks whose orientation is generally modelled on that of roads. Most often poorly sized, these poorly maintained collectors are frequently blocked by solid waste (garbage, plastic bags and bottles, etc.) or sediment resulting from human negligence. In rural areas, rainwater flows along natural gullies that contribute in intensifying soil erosion.

3.2. Solid Sanitation/Solid Waste Management

Article 16 of Law No. 2004/18 of 22 July 2004 to lay down the rules applicable to councils specifies the powers transferred to councils with regard to urban waste management. These are mainly the cleaning of streets, paths and communal public spaces; the monitoring and control of industrial waste management; the fight against insalubrious conditions, pollution and nuisances; and the management of household waste at the local level. Bafoussam community, Bangangté and Bangou councils have entrusted Cameroon Hygiene and Safety Company (HYSACAM) with the collection and treatment of solid waste produced by households; the cleaning and sweeping of streets, squares and markets. Dschang council has opted for the recovery of household waste by composting. Over the period 2015–2018, this council obtained with ERA-Cameroon association, funding from the European Union to implement the MaGe-TV project (Mastery of the Management, Treatment and Recovery of Municipal Solid Waste). The council has retained collection activities under municipal control, delegated pre-collection to neighbourhood associations, and waste treatment and recovery to ERA-Cameroon. The other councils of the Region are struggling to ensure the management of household waste due to a lack of logistical and human resources. More or less developed dump sites have been set up in most councils, but it is not uncommon to observe the deposit of garbage here and there in some municipal urban areas. In rural areas, the use of household waste in agriculture, animal nutrition and eating pattern significantly reduce the quantities available.

3.3. Sanitation Problems in the Region

Sanitation remains a major concern in the West Region. Some of the problems include the following:

- Absence of public toilets;
- Absence of sewage processing plants;
- Inadequate rainwater sanitation facilities;
- Insufficient latrines in public places (schools, health centres, public services, markets, etc.);
- Insufficient equipment in the hygiene services;
- Lack of civic spirit among the people.

3.4. Ongoing and planned projects and programmes in the field of sanitation

In the area of sanitation, many projects have been carried out in the West Region, funded by MINEE and other ministries and agencies (PNDP, FEICOM, etc.). The following table presents achievements in the field of sanitation for the PAEPA MRU/West and PAEPA MSU/West projects.

Table 9: Projects Completed and Ongoing in the Area of Sanitation in the West Region

Project	Councils	PROJECTS/LOCALITIES
PAEPA/MSU	Bafang	Incinerator 1 Bafang (District Hospital D)
		Incinerator 2 Bafang (Dokovi CSI)
		CTG Model 1 Bafang (Festival Square)
		CTG Model 2 Bafang (Face travel agency)
		Access Road to Bafang dump (Baboutcheu Ngaleu)
		Development of the Bafang dump (Baboutcheu Ngaleu)
		Fencing of the Bafang dump (Baboutcheu Ngaleu)
	Banka	Banka Incinerator (CSI Manila)

Project	Councils	PROJECTS/LOCALITIES
		CTG Model BAD Banka (Carréfour Pachi)
		Access Road to Banka dump (behind the Technical High School)
		Development of Banka dump (behind the Technical High School)
		Banka landfill site fence (behind the Technical High School)
	Bana	Incinerator 1 Bana (CMA)
		Incinerator 2 Bana (CSI Bakassa)
		CTG 1 Bana (behind the Agricultural Post)
		CTG 2 Bana (Cheferie Market Square)
		Access Road to Bana dump (Bapou District)
		Development of Bana dumpsite (Bapou District)
		Bana dumpsite fence (Bapou District)
	Bangou	Bangou City Incinerator (CMA)
		CTG 1a Bangou town (Place de l'ancien marché)
		CTG 1b Bangou (Badenkop Market)
		CTG 2 Bangou crossroads (Market place)
		Bangou dump access road (Balembo – Badenkop Road)
		Development of Bangou landfill site (R. Balembo – Badenkop)
		Bangou landfill sites fence (Balembo – Badenkop road)
	Bangangte	Incinerator 1 Bangangté (CMA)
		Incinerator 2 Bangangté (CSI)
		CTG 1a Bangangté (Sand Camp)
		CTG 1b Bangangté (Market B)
		CTG 2 Bangangté (Esplanade de la prefecture)
		CTG BAD Bangangté (Carréfour Kamna)
		Bangangté dump access road (Foumbot Road)
		Development of a Bangangté landfill site (Foumbot Road)
		Bangangté landfill sites fence (Foumbot Road)
	Penka Michel	Incinerator 1 Penka Michel (CMA Bansoa)
		Incinerator 2 Penka Michel (CMA Balessing)
		CTG 1 Penka Michel (Market Square)
		CTG 2 Penka Michel (Carrefour Balessing)
		Penka Michel landfill access road (Municipal Forest)
		Development of Penka Michel landfill site (Municipal Forest)
		Penka Michel landfill sites fence (Municipal Forest)

Project	Councils	PROJECTS/LOCALITIES
	Foumban	Incinerator 1 Foumban (HD)
		Incinerator 2 Foumban (CMA Koukouet)
		CTG 1a Foumban (Market B)
		CTG 1b Foumban (Centre de fiscalité communale)
		CTG 2a Foumban (Cultural Centre)
		CTG 2b Foumban (Camp Gallion)
		CTG BAD Foumban (New Bus Station)
		Foumban dump access road (Malentouen Road)
		Development of Foumban dumpsite (Malentouen Road)
		Foumban dumpsite fence (Malentouen Road)
PAEPA MRU	/	Construction of 83 latrine blocks (Lot 1)
		Construction of 213 latrine blocks (Lot 1)

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