

LES SYNTHÈSES

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Analysis of Financial Sustainability of the Sanitation Sector in Haïti

RABOUILLE Fabien

February 2017



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SYNTHESIS

Analysis of the Financial Sustainability of the Sanitation Sector in Haiti

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ABSTRACT

For decades, Haitian rulers have had to face up to critical issues in providing sustainable water and sanitation services for the population. In 2009, the Water and Sanitation Framework Law has given rise to a new national institutional organization, with the Haiti National Water and Sanitation Directorate (DINEPA). The access to water and sanitation services remains low compared to the Sustainable Development Goals. The Haitian population is particularly vulnerable to natural risks and is suffering from a cholera epidemic in some areas. This report aims at analyzing the latest developments in the sanitation sector in Haiti in both rural and urban areas and evaluating the regulatory, financial and technical aspects of the sanitation chain in Haiti. The mapping out of who is doing what in the sanitation sector presents a picture of the governance framework and the national strategies. At the national scale, the financial aid coming from the donors for the sanitation sector, since the Water and Sanitation Framework Law, is investigated and analyzed. At the local scale, the investment costs and operating costs of the three stages of onsite sanitation (collect, transport, treatment) are used to assess the financial sustainability of the service. Several recommendations to improve the national sanitation situation are provided in this report.

KEY-WORDS: Haiti – DINEPA – Water and Sanitation – Financial Sustainability –International Aid - Fecal Sludge Management –Bayakous - Cholera

TITRE : Étude sur la durabilité financière du secteur de l’assainissement à Haïti

RÉSUMÉ

Depuis des décennies, les dirigeants haïtiens rencontrent des difficultés importantes à fournir des services d’eau et d’assainissement durables à la population. La Loi-Cadre sur l’Eau et l’Assainissement de 2009 a fait émerger une nouvelle organisation institutionnelle nationale, avec notamment la création de la Direction Nationale de l’Eau Potable et de l’Assainissement (DINEPA). L’accès aux services d’eau et d’assainissement à Haïti reste très bas au regard des Objectifs du Développement Durable, dans un contexte de vulnérabilité accrue aux aléas climatiques et d’épidémies de choléra dans certaines régions. Cette synthèse vise donc à réaliser un état des lieux du secteur de l’assainissement dans les zones rurales et urbaines et à évaluer les aspects réglementaires, financiers et techniques de la filière assainissement à Haïti. Une cartographie des acteurs de l’assainissement, du cadre de gouvernance et des stratégies nationales est effectuée dans un premier temps. Puis l’aide internationale des bailleurs de fonds en direction du secteur de l’assainissement à l’échelle nationale, depuis la mise en place de la Loi-Cadre, sera analysée. Enfin, à l’échelle locale, les coûts d’investissement et d’exploitation des trois maillons de l’assainissement non-collectif (collecte, transport, traitement) seront estimés afin d’évaluer la durabilité financière du service. Plusieurs recommandations pour améliorer les services d’assainissement seront formulées.

MOTS-CLÉS : Haïti – DINEPA – Eau Potable et Assainissement – Durabilité financière – Aide Internationale – Gestion des Boues de Vidange – Bayakous - Cholera

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ABBREVIATIONS LIST

ACAT: *Approche Communautaire de l'Assainissement Total*

AECID: Spanish Agency for International Cooperation Development

BID: Inter-American Development Bank

CAEPA: Drinking Water and Sanitation Supply Committee

CDC: Center for Disease Control and Prevention

CEPA: Drinking Water and Sanitation Committee

CTE: Technical Operating Center

DINEPA: Haiti National Water and Sanitation Directorate

JMP: Joint Monitoring Programme

NGO: Nonprofit Organization

MDE: Ministry of the Environment

MENFP: Ministry of National Education and Professional Training

MSPP: Ministry of Public Health and Population

MTPTC: Ministry of Public Works, Transport and Communication

OIEAU: International Office for Water

OREPA: Regional Water Supply and Sanitation Offices

PEPA: Drinking Water and Sanitation Platform

TPF: Technical and Financial Partner

RTN: National Technical Reference Document

SFW: Spanish Cooperation Fund for Water and Sanitation in Latin America and the Caribbean

SSP: Sector Strategic Plan

TEPAC: Water Supply and Sanitation Technician in the Municipality

UNICEF: United Nations International Children's Emergency Fund

URD: Departmental Rural Unit

USD: US Dollar

WASH: Water, Sanitation and Hygiene

WB: World Bank

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INTRODUCTION

Haiti faces enormous challenges in the drinking water and sanitation sector (EPA). According to the Joint Monitoring Program of the World Health Organization and UNICEF (JMP, 2015), access to services remains very low in relation to the Sustainable Development Goals. In 2015, only 10% of households benefited from a water connection to their home and 28% of households used improved unshared toilets. Moreover, according to the World Bank (2015), *"the Haitian population is one of the most exposed to natural disasters - hurricanes, floods and earthquakes"*.

The Republic of Haiti is located in the western part of the island of Hispaniola, which it shares with the Dominican Republic. The area of the country is 27 750 km². According to the Haitian Institute of Statistics and Informatics (IHSI, 2015), its population was 10.9 million in 2015. Haiti is the poorest country in the Americas: its Human Development Index was 0.471 in 2013 and the country was ranked 168th out of 187 countries (UNDP, 2015). Nearly 19% of the Haitian population practices open defecation at the national level and 35% in rural areas. A vicious circle is at work in the EPA sector in Haiti (lack of financial resources, inadequate maintenance of facilities, poor quality of service, refusal or impossibility to pay consumers, lack of trained staff supervising the service). In view of the cholera epidemic that has been raging since 2010, sanitation is a major development challenge.

With a view to strengthening the water and sanitation sector, a major reform was initiated by the Inter-American Development Bank (IDB) in 2007. A first Sector Strategic Plan (PSS) was prepared in 2008 and approved by the Haitian authorities. A major step in the reform was the introduction of the framework law defining the new organization of the EPA sector and the creation of the National Directorate of Drinking Water and Sanitation (DINEPA) on 25th March 2009.

The Institut des Ressources Environnementales et du Développement Durable (IREEDD) and the Groupe de recherche et d'échanges technologiques (GRET) formed a consortium in response to a call for tenders from the World Bank in 2016. The objective of the study is to propose a sustainable financing strategy for water and sanitation services in Haiti, accompanying DINEPA in the formulation of an action plan. The objective of this synthesis is therefore, on one hand, to assess the capacity of DINEPA to finance the sanitation sector and to mobilize international aid for this sector. On the other hand, it is necessary to estimate the level of financial sustainability of sanitation services at the local level in rural and urban areas. The financial sustainability is the balance between the different revenues and costs of the service. As part of this synthesis, "sanitation" is understood as the sanitation of waste water (or "grey water") and excreta. Rainwater, industrial water or solid waste are not taken into account in this synthesis.

The work carried out consists mainly of an analytical bibliographic review in order to propose a snapshot of the sanitation sector in Haiti. First, I analyze the institutional structure of this sector. Secondly, I evaluate the aid coming in from the main donors (here called Technical and Financial Partners, TFP). Finally, the financial sustainability of sanitation services will be estimated. Proposals for actions and accompanying measures to achieve the objectives of cost recovery are formulated.

PART ONE: Mapping of stakeholders and governance framework in the sanitation sector in Haiti

I) Governance of the water and sanitation sector since 2009 Framework-Law

The Republic of Haiti is divided into 10 departments, 42 arrondissements, 145 communes and 571 communal sections (Figure 1).



Figure 1. Map of the Republic of Haiti
(Source : World Bank, 2015)

In rural areas, the implementation of water and sanitation infrastructures is difficult, especially for technical reasons (including the absence of an electrical network) and distance from the transportation routes. In urban areas, whether in the capital Port-au-Prince or elsewhere, there is no collective sanitation network. There is only on-site sanitation in Haiti, "*sanitary facilities (latrines, flush toilets, etc.) and sinks are not connected to a sewer network but to pits (latrine pits, septic tanks) or sumps*". This technology is "*often the only one that is affordable in terms of investment [...], with low water consumption and maintenance constraints are reduced*" (pS-Water, 2011). However, there are also few "*assembled individual sanitation*" pilot operations, close to the mini-sewer system ("*condominium*" sanitation network according to DINEPA). It is set up, for example, by a non-governmental organization (NGO) in the district of Christ Roi in Port-au-Prince since January 2013 (Solidarités International, 2016).

The basis for the definition of the sectoral policy specific to the water and sanitation sector is provided in the Water and Sanitation Framework Law of 25 March 2009 (Le Moniteur, the Official Journal of the Republic of Haiti, 2009). It led the 2010 update of the Haitian Government's 2008 Sector Strategic Plan (PSS), financed by the Inter-American Development Bank (IDB). This Framework Law defines precisely the new responsibilities of the Haiti National Water and Sanitation Directorate (DINEPA), which has its own Sanitation Department created in 2011. The Framework Law has very clearly entrusted the leadership of the water and sanitation sector to the DINEPA: national development, regulation, standardization, pricing, coordination and control. The DINEPA is attached to the Ministry of Public Works, Transport

and Communication (MTPTC). It is based on the National Technical Reference Document (RTN), a sector regulation tool developed with the help of the International Office for Water and UNICEF in 2012 and 2013, defining the standards for infrastructures and water and sanitation services in Haiti. Because of the absence of a Board of Directors, *"all decisions are taken by the Director General of DINEPA, after consultation and taking into account the opinion of the Minister of MTPTC"* (OIEAU, DINEPA, 2016a).

The Framework Law states a transition period during which the four new Regional Water Supply and Sanitation Offices (OREPA) gradually take over, starting in 2011, the allocations and assets of the former structures of the sector: the Autonomous Metropolitan Center for Drinking Water (CAMEP), the National Drinking Water Service (SNEP) and the Community Post of Hygiene and Drinking Water (POCHEP). In principle, this law should allow separation of responsibilities between the planning and regulatory functions (DINEPA), the ownership of the systems (OREPA or municipalities) and the operating functions (public, mixed or totally private entities) (Figure 2).

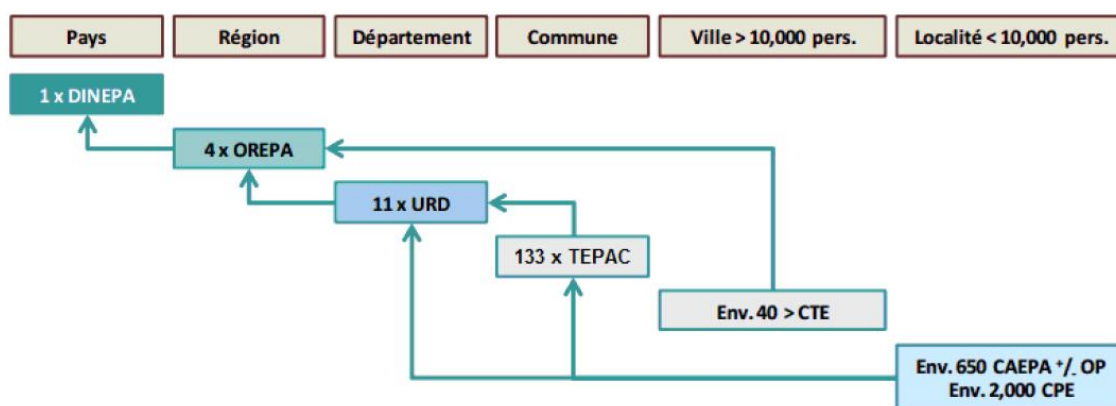


Figure 2. Institutions and decentralized organizations in charge of the management of the water and sanitation sector in Haiti (Source : OIEAU, DINEPA, 2016a)

However, in practice, the DINEPA is not only involved in its regulatory tasks but also in the implementation and management of water and sanitation programs on a day-to-day basis, given that the status of contracting authority of OREPA has not been formally approved since 2008. According to the evaluation of the Framework Law carried out by the International Office for Water, the emergency situation after the January 2010 earthquake and the cholera epidemic caused a delay in the implementation of the actions originally foreseen in the Sector Strategic Plan and the Action Plans (OIEAU, DINEPA, 2016a). DINEPA has still not officially validated these very strategic documents for the development of the water and sanitation sector, notably restricting the process of decentralization towards the OREPA. Consequently, *"there is no investment program of the Technical and Financial Partners directly administered by the OREPAs"*, contrary to the vision of the Framework Law (OIEAU, DINEPA, 2016a). This constitutes a bottleneck in the development of the sector on a national scale. But the recent creation of the first "Sanitation House" on the premises of an OREPA is encouraging. It allows the commissioning of various services or facilities dedicated to the sanitation sector (excavation equipment, slabs, etc.), and shows an evolution of the DINEPA's policy (DINEPA, 2014). In addition, the Framework Law stipulates that *"at the end of the transition period all the systems managed by the OREPAs must have been transferred to the municipalities according to their geographical location"* (OIEAU, DINEPA, 2016a). This decentralization in favor of the municipalities, through a transfer of powers to local and regional authorities, represents the culmination of the Framework Law, with no specific date of application.

To fulfill their mission, the OREPAs rely on the operating structures of the Drinking Water and Sanitation Supply Committees (CAEPA) and the Drinking Water and Sanitation Committees

(CEPA) but also on other structures not mentioned in the Framework Law (TEPAC, URD, CTE). These institutions have been set up by the DINEPA taking into account the reality of the water and sanitation sector at different geographical scales. In rural areas, the service operators are the CAEPA (responsible for the management of the water system), the Water Point Committees (CPE - responsible for water points, pumps, spring catchments, etc.) or private operators in accordance with Article 20 of the Framework Law. The Technical Operating Centers (CTE), whose legal status is still poorly defined, are service operators responsible for the maintenance of facilities and customer service. All these structures should in principle be involved both in the operation of drinking water and sanitation services, but they are unable to meet their sanitation missions due to a lack of technical, financial and human skills. With regard to the URDs, they are the rural representatives of the OREPAs within each department whose vocation is to technically, socially and administratively support the CTE, CPE and CAEPA. They are also lagging behind in the management of the sanitation service. Only the Water Supply and Sanitation Technicians in the Municipalities (TEPAC) play a daily role in the field of sanitation, especially for prevention and communication on the use of latrines and hygiene practices (OIEAU, DINEPA, 2016a).

II) National Sanitation Strategies and Coordination between the Stakeholders

The national strategy in the field of sanitation is reflected in three strategic documents. The first corresponds to the DINEPA rural sanitation intervention strategy (DINEPA, 2014). It was conceived on the basis of the lessons learned from the field (poorly controlled territory, high rates of open defecation, etc.) and is presented as a first step before defining a specific strategy.

The second strategic document corresponds to the Cholera Elimination Plan 2013-2022 written by the DINEPA, the Ministry of Public Health and Population (MSPP), UNICEF, the Center for Disease Control and Prevention (CDC) and The Pan American Health Organization (PAHO) (MSPP, 2012). It is designed to provide a sustainable response to the challenge of the cholera epidemic with targets set for 2014, 2017 and 2022, in line with the 14-month strategy completed in December 2011. The plan mainly mentions microcredit solutions to help households to equip themselves.

Finally, the DINEPA Sanitation Strategy, written with the contribution of the Ministry of the Environment (MOE) and the Ministry of Public Health and Population (MSPP), was designed for the period 2012-2014. It has been then enhanced and extended for the period 2014-2018 (DINEPA, 2012). This strategy proposes a "sanitation triad" that simultaneously integrates *"sanitation services, education and awareness for behavior change, and enforcement of sanitation regulations and laws"*. (DINEPA, 2014). This document represents the main guidance document for sanitation in Haiti, setting out the principles and general guidelines.

The appropriation of the Sanitation Strategy by the ministries concerned, namely Ministry of Public Health and Population, Ministry of the Environment, Ministry of the Interior and Territorial Communities (MICT), Ministry of Agriculture, Natural Resources and Rural Development (MARNDP) and the Ministry of National Education and Professional Training (MENFP) is still in progress (see Annex 1). This chapter also contains a chapter on *"the expected contribution"* from the ministries and departmental directions (DINEPA, 2014). The Inter-Ministerial Committee for Territorial Development (CIAT), through the River Basins and Water Resources Management Unit, *"has a mandate to facilitate coordination between these different Ministries involved in the management of the water and sanitation sector and to ensure that every stakeholder intervenes on its own responsibilities"* (OIEAU, DINEPA, 2016b).

Several places of coordination between the various stakeholders in the water and sanitation sector have been set up at national level. The water and sanitation bimonthly national sectoral table, organized and piloted by DINEPA, aims to exchange information among the main actors and to be a forum for debate. The sectoral sanitation sub-table is the place of coordination and exchanges with partners working in this sector (NGOs, TFPs, companies, etc.). There are also two NGO platforms, the Inter-NGO Liaison Framework (CLIO) and the Drinking Water and Sanitation Platform (PEPA). Thirty-four NGOs are officially recognized as working in the WASH sector by DINEPA. This recognition takes the form of the signing of a framework agreement with the DINEPA. However, more than 50 NGOs are members of the PEPA. The latter gathers monthly the NGOs and institutions intervening in the sector. It is a general platform for the sector which has thematic subgroups dedicated to more specific aspects of the sector, notably on "sanitation marketing" and "water and sanitation in urban areas" (PEPA Haiti, 2016). However, according to the diagnostic of the water and sanitation sector in Haiti carried out in 2015 by the consulting firm Hydroconseil, with the support of UNICEF and piloted by DINEPA, *"although the coordination between the institutions of the sector is generally considered good [...] and included in the official documents, it is not the subject of specific protocols specifically for sanitation and hygiene. In practice, it depends on the goodwill of the agents concerned"* (Hydroconseil, DINEPA, UNICEF, 2015).

The Sanitation Strategy also aims to strengthen *"the diversification of service management models, with the participation of the private sector"* (DINEPA, 2014). At present, the delegation of management of the drinking water service in the city of Saint-Marc is the only example of Public-Private Partnership in Haiti. LYSA won the contract in 2009, which concerns only drinking water and not sanitation at the moment. *"The weak capacities for payment and collection, the difficulties of management and qualification of personnel, the small possible litigation procedures are additional obstacles"* to the engagement of the private partners on this type of assembly (OIEAU, DINEPA, 2016a). The Sanitation Strategy also invites associations and citizens *"to participate in the implementation of this strategy"*, without specifying the terms of such participation (DINEPA, 2014).

It appears that DINEPA is the central stakeholder driving the development of the sanitation sector in Haiti. There are several challenges that this institution faces. It seems essential to *"perpetuate the achievements of the water and sanitation's reform and to pursue it"* via the Framework Law, as this would *"limit the accumulation of functions [of DINEPA] and refocus on its role of regulator"* (OIEAU, DINEPA, 2016b). The 2010 Sector Strategic Plan, officially validated and assimilated by DINEPA agents, would improve the skills development of other Haitian local institutional actors and strengthen the deployment and effectiveness of actions in the sanitation sector.

PART TWO : National sanitation financing

I) Targets and funding strategy for the sanitation sector

Coverage targets, understood as the proportion of the population benefiting from an "improved sanitation" service as defined in the Joint Monitoring Program (JMP, 2015), are presented below. They are defined on the one hand by the DINEPA, MDE and MSPP in the revised Sanitation Strategy of March 2014 (DINEPA, 2014) and by the DINEPA, the Spanish Agency for International Cooperation Development (AECID) and the Spanish Cooperation Fund for Water and Sanitation in Latin America and the Caribbean (SWF) in the 2011-2015 Investment Plan. They are different in urban and rural areas, but are not declined by department. There are large discrepancies between these two documents drafted at different times by different stakeholders (Table 1).

Sanitation	Area	Target year	Targets for "improved sanitation" coverage
2011-2015 DINEPA's Investment Plan	Urban	2015	40 %
	Rural		20 %
Sanitation Strategy	National	2016	70 %
		2022	90 %

Table 1. Summary of current targets for "improved sanitation" coverage
(Source: DINEPA, 2012 & DINEPA, 2011)

A possible explanation for these discrepancies may be the difference in definition of "improved sanitation". It is likely that the 2011-2015 Investment Plan uses the standard set by the Joint Monitoring Program¹, while the Sanitation Strategy considers "any latrine that prevents the contact of excreta with water or insects" (DINEPA, 2014). A latrine without a slab with a "simple hole" is an acceptable method of sanitation in the Sanitation Strategy and enables households to abandon open defecation. "Alternative" sanitary facilities (ECOSAN latrines, buckets and "flying toilets" or "suspended" latrines dropping excreta in the water) are not mentioned in the Sanitation Strategy.

The Sanitation Strategy also includes a target for coverage of public places, namely schools, health centers and markets (80% in 2016 and 95% in 2022) and targets for the rest of the sanitation chain. For example, the Sanitation Strategy is calling for *"implementing the program of support to the informal operators in 10 of the 43 cities targeted by 2016"*, *"to start 10 Excreta Treatment Stations across the country by 2022"* and *"put in place a system of monitoring and continuous evaluation on the basis of validated indicators of sanitation, hygiene and public health"*. This document is thus the only one to integrate all the links of the service, from the

¹ Improved sanitation facilities are likely to ensure hygienic separation of human excreta from human contact. They include the following facilities: flush/pour flush to piped sewer system, septic tank or pit latrine ; Ventilated improved pit (VIP) latrine ; Pit latrine with slab ; Composting toilet. Unimproved sanitation facilities do not ensure hygienic separation of human excreta from human contact (pit latrines without a slab or platform, hanging latrines and bucket latrines). It includes "shared sanitation facilities", shared between two or more households. Only facilities that are not shared or not public are considered improved. The open defecation is when human faeces are disposed of in fields, forest, bushes, open bodies of water, beaches or other open spaces or disposed of with solid waste (JMP, 2015).

collection to the treatment of excreta. At present, there is no consolidated national reporting on access to sanitation services outside the Mortality, Morbidity and Utilization Services (EMMUS) Surveys, which are updated every 4 years and the last of which goes back to 2012. There is neither a detailed inventory of sanitation infrastructure or coverage rates in public places.

DINEPA estimates the need for financing of sanitation work to be between USD 300 million and USD 500 million over the period 2014-2024. DINEPA does not have programs but five-year investment plans. This "*theoretical amount*" takes into account "*the financing of the public infrastructure of treatment and the financing of their exploitation as well as the activities of reinforcement of the sector*" (DINEPA, 2014) (Table 2).

Total cost of the action plan 2014-2024 (millions USD)	October 2014-September 2017	October 2017-September 2024	Total	Distribution
On-site sanitation	42	69,9	111,9	34%
Semi-collective sanitation	4	216	220	66%
Total	46	285,9	331,9	100%

Table 2. Financing requirements in the sanitation sector (Source: DINEPA, 2014)

II) Available budgets of donors for the sanitation sector

DINEPA's operating income is therefore relatively low, generated by the sale of water and amounted to USD 6.5 million for the 2012/2013 financial year and USD 6.8 million for the financial year 2013/2014 (OIEAU, DINEPA, 2016a). The Haitian government is providing financial assistance to DINEPA for operating and investment expenses, i.e. USD 5.7 million and USD 3.7 million, respectively. However, this "*national budget support (of USD 2 million for the financial year 2015-2016) [...] is much lower than the support of other structuring sectors (road development and energy, for example) and represents less than 2% of the budget*" (OIEAU, DINEPA, 2016b). In order to evaluate the amount of international aid allocated to the sanitation sector in Haiti since the 2009 Framework Law, an analysis of the investments (grants and loans) of the main Haitian Government's Technical and Financial Partners (TPFs) was carried out under this synthesis. These investments concern the construction of sanitation infrastructure and facilities, awareness campaigns, capacity building of stakeholders and improvement of the governance framework (Figure 3).

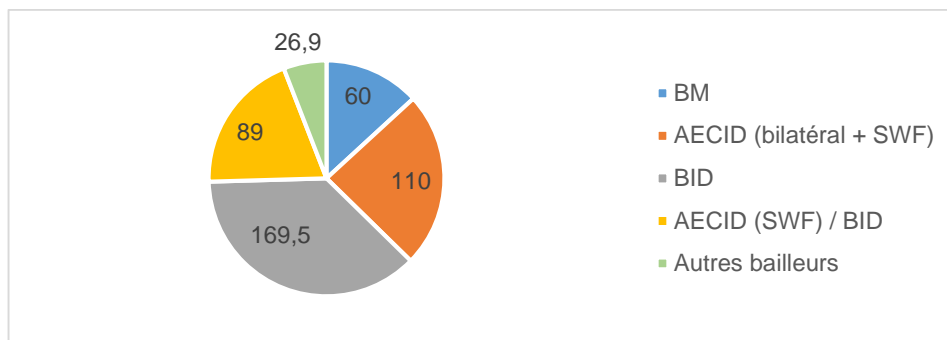


Figure 3. Investments (USD millions) of each donor in the total planned amount of aid (USD 455,4 million USD) in the water/sanitation/building capacities in Haiti since 2009 (Source: websites of Technical and Financial Partners)

Out of a planned investment of USD 455.4 million in the water, sanitation and institutional strengthening sector in Haiti since 2009, almost 81% of the investment for the sector comes from both the Inter-American Development Bank and the AECID through its bilateral program with the Haitian Government and through the FCAS (or SWF), fed by 12 partner countries, for a planned sub-total of USD 368.5 million (see Annex 2). The World Bank (WB) contributes 13% of these planned investments, while the other TFPs in the sector (CDC, UNICEF, Agence Française de Développement) contribute 6%. In total, more than three-quarters of water and sanitation sector funding is implemented directly by DINEPA, which is, in fact, the implementing agency in charge at the national level (Figure 4).

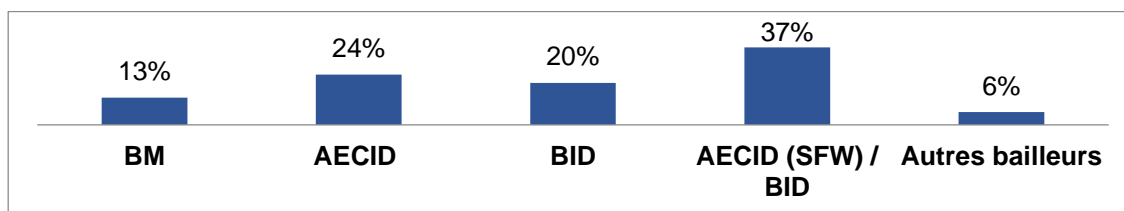


Figure 4. Share of investments (%) of each donor in the total planned amount of aid (USD 455,4 million USD) in the water/sanitation/building capacities in Haiti since 2009 (Source: websites of Technical and Financial Partners)

In order to define the amount of aid allocated to the Sanitation item in the total investment in drinking water, sanitation, institutional strengthening and others (emergency, administration, etc.), several programs had to be withdrawn from the analysis. Their project proposal or project evaluations were not indicating the allocation of expenditure items². The total sub-amount of planned investments in Haiti used for the remainder of the analysis represents USD 308.5 million (67.7% of the allocated funds). All the investment programs studied here have a common characteristic starting after the implementation of the 2009 Framework Law, some being completed and others still in progress (Figure 5).

² The three programs withdrawn from the analysis have the code HA-0014 (BID) ; HA-L1044 / HA-X1021 (AECID (SFW) / BID (2/2)) ; HA-X1014 (AECID (SWF)) (see Annex 2)

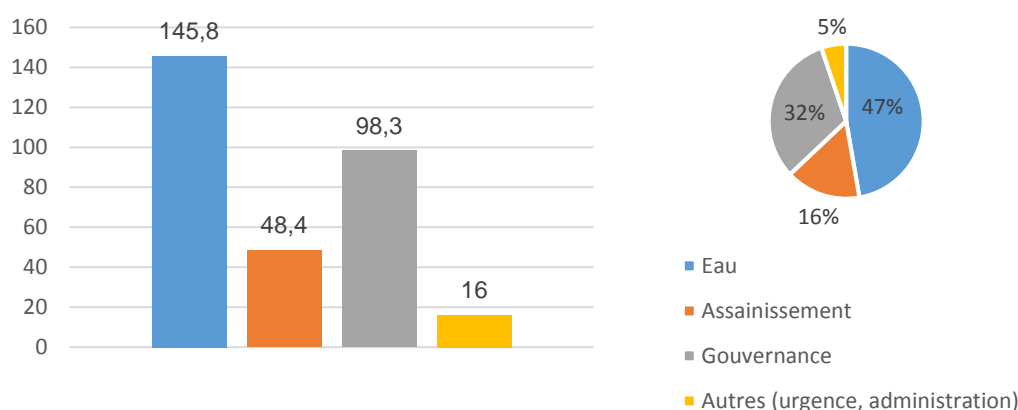


Figure 5. Investments (USD million) and share of investments (%) of each expense item in the subtotal planned amount of aid (USD 308,5 million USD) in Haiti since 2009 (Source: websites of Technical and Financial Partners)

While the overall Institutional Strengthening (32%) of the sector improves the effectiveness of sanitation programs, it is twice as high as Sanitation (16%), USD 48.4 Million. This represents almost three times less than Drinking Water (47%) (see Annex 3). It appears that the sanitation sector in Haiti is not a national priority at the same level of political, financial and technical considerations as drinking water, like many so-called "developing" countries and "developed" countries.

III) Effective aid and low prioritization of the sanitation sector

The sanitation sector does not seem to be, at the moment, a real national priority. Nevertheless, it is generally observed that the water and sanitation programs have a relatively low disbursement rate. The project disbursement rate is used to evaluate the use of financial resources, including the achievement of targets and capacity in the implementation of actions. According to Hydroconseil (2015), *"the rate of disbursement estimated by donors [in the EPA and hygiene sector] is 82%. The table below provides an overview of their disbursements, with an annual average of USD 37.5 million over the period 2011-2014"* (Table 3).

Year	2011	2012	2013	2014
Disbursed amount for the WASH (USD million) not including NGOs aid	37,5	38,7	22,0	50,1

Table 3. Annual disbursed amount for WASH sector by the donors (not including NGOs aid) (Source: Hydroconseil, DINEPA, UNICEF, 2015)

However, it can be seen that many investment programs in the water and sanitation sector have a low rate of disbursement. For example, the bilateral fund between AECID and DINEPA, opened in March 2012 and closed in March 2017, had a disbursement rate of only 27.5% in August 2015 (OIEAU, DINEPA, 2016a). As a result, almost all of the water and sanitation programs of the TFPs analyzed in this study have extensions to their deadlines, ranging from 1 to 3 years, generally due to limited operational capacities of local structures and a lack of human skills in carrying out activities. Indeed, *"the perennial training sectors in the water and sanitation sector in Haiti are rare and not very specialized. [...] Sanitation is virtually absent from the curricula available in Haiti, with the exception of a Master program oriented more on the protection of the environment"* whereas *"the greatest need of personnel is at the sanitation*

level" (Hydroconseil, DINEPA, UNICEF, 2015). To remedy this, the National Institute for Professional Training, a state body under the supervision of the MENFP, and DINEPA have committed in 2014 to create a training course addressing issues related to water and sanitation issues.

The Haitian system depends heavily on international aid to ensure its financial viability, due to the low national financial capacity and the absence of a public service policy definition, which severely limits the accountability of sanitation operators and the willingness-to-pay of the users. The sanitation sector is not yet perceived as a real national emergency for the Haitian Government, the population or the TFPs, despite the strategy of the DINEPA Sanitation Department and the advocacy of many other local stakeholders. A strategy to be considered by the TFPs and the Haitian Government in the years to come, and complementary to the actions currently carried out, could be the mobilization of Haitian migrants regarding the issue of the eradication of open defecation in their country of origin affected by a cholera epidemic. Nearly one million Haitians currently live outside of Haiti and the funds sent to their country of origin accounted for almost 23% of the Gross Domestic Product (GDP) in 2012 (World Bank, 2015). If DINEPA's sanitation policy is promoted and made more visible at the national, regional and international levels, *"migrant workers' funds could have a positive impact on household spending on food, education and care"* as well as the purchase of a latrine or the payment of a regulated desludging service (World Bank, 2015).

PART THREE : Financial sustainability of the sanitation chain at the local scale

In Haiti, there is only on-site sanitation. A sanitation service is a chain composed by the three links: access, disposal and treatment. The first link “access”, also known as “capture” or “containment”, *“gathers all the preoccupations linked to the collection of liquid excreta produced by the inhabitants. The goals of the “access” link are at the same time sanitary, to separate and control the contamination urban risks, in order to preserve a safe environment, and manage pollution risks”* (pS-Eau, 2011). The “disposal” link, also called “emptying and transport” link, gathers *“the technologies which enable the transport of wastewater and excreta outside the user’s dwelling towards the storage place or treatment site”*. Finally, the “treatment” link gathers *“the technologies which enable the storage and treatment of excreta and faecal sludge in order to reduce the pollutant load and eventually considering a repurposing”* (GRET, Oxfam, DINEPA, 2016a).

The Sanitation Strategy of DINEPA, revised in March 2014, integrates these three links through a *“sanitation triad, integrating sanitation services, education and awareness for behavioral change, and application of regulations and laws”*. It has led to a *“Sanitation Package, a set of essential actions that must be present in any sanitation project”* (OIEAU, DINEPA, 2016a). However, financial sustainability of sanitation actions, i.e. the balance between revenues and the costs, is an essential issue in Haiti. Theoretically, a financially sustainable service must have income from operations that can support operational and maintenance costs, as well as investment costs. In practice, both in “developing” and “developed” countries, revenues from water and sanitation services rarely cover their investment, operating and maintenance costs. Revenues to finance a service are based on the universally accepted principle of 3Ts (Taxes, Tariffs, Transfers). A survey of 94 countries, including Haiti, conducted by the United Nations reveals that in 70% of countries, revenues from the sale of water do not cover operating and maintenance costs (GLAAS, 2014). For sanitation alone, the situation is often worse. At present in Haiti, neither the tariff policy nor the definition of a “public service” sanitation policy at the national level has been defined. The visibility of the various costs and their recoveries is therefore limited.

I) Analysis of the “access to sanitation” link

The strategy adopted by DINEPA, MSPP and UNICEF in rural areas is the *Approche Communautaire de l’Assainissement Total* (ACAT), a method close to Community Led-Total Sanitation (CLTS). *“ACAT is looking for familial latrines self-building and behavior changes in order to use toilets properly and ensure maintenance and cleaning”* specifies a report on OXFAM and UNICEF’s projects in Haiti (Delienne D., Lindor W., Brutus N., Noel J-M. R., 2016). However, the PEPA invites the stakeholders to adjust this method because *“ACAT by itself would not be adequate to reach significant results in terms of “improved sanitation” because the goal is firstly to end the “open defecation” mindset”* (PEPA, 2016).

In Haiti, households have to support the cost of the latrines in their house, without consideration of their income. Moreover, the household size considerably varies depending on socioeconomics characteristics, *“from 3,9 people for the “non-poor” households to 6,2 for the “extremely poor” households”* in 2012 (World Bank, 2015). The number of people in the household directly impact the depth of the septic tank and the boring and masonry service

costs. The table below presents an assessment of the average total cost of Ventilated Improved Pit (VIP) latrines in rural areas, of 3 cubic meters (Table 4).

Facility	Type of cost and distribution	Average Total Cost (USD)
Ventilated Improved Pit latrine, with a pit of 3m ³	Pit materials representing ¾ of the costs / digging and masonry services represents ¼	USD 550 with a pit of 3m³ USD 770 with a pit of 4m³
School dry latrines with water points (25 users per cabin)	Materials account for 58% / labor 29% / construction studies and follow-up 13% / maintenance costs of 10 USD per month per block	1450 USD en moyenne pour 4 à 6 toilettes sèches

Table 4. Costs of "improved" family latrines and "shared" latrines in schools set up by the NGO Helvetas since 2003 (Source : Helvetas Swiss Intercooperation Haïti, DDC, 2015)

The sanitary blocks accredited by the Sanitation Strategy are exclusively used for public sanitation spaces (schools, health center, markets) and can benefit a total or partial subsidy, in opposition to private latrines. Even if the "community" sanitary blocks *"are slowing down the acquisition of a latrines by the households"* and so are forbidden by the Sanitation Strategy, they are spread to the informal settlement of Haitian cities (Hydroconseil, DINEPA, UNICEF, 2015). In 2012, "around 50% of the urban population used "shared facility", such as "community" sanitary blocks or neighbors' latrines" (Lazaro, 2013). This percentage was only 18% in rural areas. In Haiti *"there is no (updated) national exhaustive inventory of sanitation facilities in public spaces"* (Hydroconseil, DINEPA, UNICEF, 2015).

II) Analysis of the "disposal" link

There are two types of septic tank emptying in Haiti, as in many developing countries, which are managed by the private sector: mechanical emptying by mechanized dump trucks or manual emptying by members of the family or small private operators. The number of sanitation companies nationwide has grown from *"3 to 14 companies in 3 years, following an extraordinary surge in the aftermath of the January 2010 earthquake"* (DINEPA, 2014). Parallel to this official system, the latrine emptying profession (bayakou) exists, *"the most stigmatized of all the existing activities in the Haitian society"* (Neiburg F., Nicaise N., 2010). According to GRET, Oxfam, DINEPA (2016a), *"the current emptying system is problematic both for informal actors of manual emptying, called bayakous (contact with sewage sludge, poor perception by the population, harassment or ransoming) than for households (price, smell, insalubrity) and the neighborhood (sludge deposit in gullies or open spaces)"*. It is common *"for bayakous to work with mechanical emptying companies"* to identify the technical feasibility of the drainage operation (Smith S. M., 2014).

III) Analysis of the « treatment » link

At the end of 2016, there are five Excreta Treatment Stations in Haiti: two for the metropolitan area of Port-au-Prince (Titanyen and Morne to Cabrit) and three stations in the rest of the country (Cap Haïtien, Les Cayes and St Marc). These are lagoon treatment sites. The first two

treatment plants in Titanyen and Morne-à-Cabri were built following the 2010 earthquake to collect the excreta produced by intern displaced people camps. According to OIEAU, *"the project management of wastewater treatment plants is the responsibility of the DINEPA: design, implementation and management. [...] The management of the wastewater treatment plants depends on the OREPA, but it is subject to the signing of an agreement between the OREPA and the Sanitation Department of the DINEPA"* (OIEAU, DINEPA, 2016a).

Only the Morne à Cabri station is currently operational in Haiti. This station is managed by the OREPA West, which collects a contribution from companies and organizations that come to desludge in the station: 0.6 USD per barrel and between 3 USD (Touré, 2016) and 4 USD (GRET, 2016) per cubic meter discharged by the dump trucks. Dump trucks account for almost 75% of the station's activity. Mechanical emptying companies in Port-au-Prince, as well as those transporting the *"sludge from cholera treatment centers remote from Port-au-Prince and MINUSTAH camps"*, leaves the station *"approaching its capacity in terms of load"* (Hydroconseil, 2015). It is likely that some emptying trucks will be dumping in the natural environment, outside of any control, because *"to desludge in the treatment plant, the facility must actually be closer and more accessible than the habitual illegal dumping site. Moreover, the dumping into the environment has to be punished"* (pS-Eau, 2011). These two conditions are not necessarily met in the case of Port-au-Prince. According to my analysis of the recent diagnosis of treatment stations in Haiti (Touré, 2016), the total invoiced amount related to the volume of excreta treated at the Morne station in Cabri between October 2013 and June 2014 represented a total of USD 122,867. The amount recovered was only USD 53,620, an average rate of bill collection of 43.6%. The monthly value of uncollected invoices over the period is USD 7,694, for a total of USD 69,247 over nine months (see Annex 4).

However, the operating costs of the Morne à Cabri station are currently bearable by the generated revenue. Indeed, all operating costs (personnel costs and operating costs) are estimated at USD 5 200 per month at this station, for a total of USD 46 800 between October 2013 and June 2014 (Touré S., 2016). According to the consultant who conducted the station's diagnosis, it is likely that the staff proposed for the management of the stations is too large and that some duplication in the stations exist. By reallocating positions while maintaining full day and night activity, operating costs for the Morne à Cabri station could fall to \$ 2,733 per month, or \$ 24,597 over the 9-month period considered (Table 5).

Revenues during 9 months (2013-2014)	
Invoiced amount (USD)	122 867
Recovered amount (USD)	53 620
Recovery share of invoices (%)	43
Operating charges during 9 months (2013-2014)	
Current charges (USD)	46 800
Charges after reallocation of posts (USD)	24 597
Change in charges balance (%)	-47
9-month net income	
Before reallocation of charges (USD)	6 820
After reallocation of charges (USD)	29 023

Table 5. Table of changes in the profit and loss account of the Morne-Cabri treatment plant between October 2013 and June 2014 (Source : Touré, 2016).

A better allocation of operating costs would generate a profit of nearly USD 29 000 which would finance part of the investment costs to improve the effluent treatment efficiency of the station or to cover part of the operating costs of another treatment plant in Haiti, after prior refurbishment. The OIEAU highlighted a number of shortcomings in Haiti, notably that "*restarts, repairs such as new station construction are abnormally long. Capitalization of knowledge is insufficient to start work without preliminary studies, DINEPA and operators have not yet acquired enough experience for this type of work / technology. The sizing is sometimes based on pollution values to be treated that are close to those of sewer networks (known by international actors), which is not suited to the excreta currently collected. It leads to malfunctioning on the sanitation chain*" (OIEAU, DINEPA, 2016a).

CONCLUSION

Given the Haitian context, the issues of governance, financing and access to sanitation services are considerable. The Water and Sanitation Framework Law of 2009 has provided a new framework for governance and national visibility for this sector. The creation of DINEPA has facilitated the implementation of an ambitious national sanitation strategy in 2012, but this policy must still be promoted in the context of a cholera epidemic in certain municipalities of Haiti. Pursuing the implementation of the 2009 Framework Law and strengthening the capacities of local stakeholders would eliminate persistent institutional constraints.

Strengthening the national sanitation policy must also involve greater implication of the Haitian Government donors in financing the "sanitation" components of development programs. The dual challenge for DINEPA in the coming years is to sustain international aid in the sanitation sector, to diversify sources of financing but also to gradually emerge from dependence on donors and the Haitian Public Treasury. This must be done by defining a public service policy in the water and sanitation sector. This affirmed policy *"will make it possible to set the modalities of regulation by the DINEPA and the necessary pricing tools of the various services. The price levels will have to be based on the level of services rendered which will remain subject to performance obligations"* (OIEAU, DINEPA, 2016b).

Finally, the DINEPA sanitation strategy is to promote community ownership of the issue of sanitation (the condition for sustainable behavior change) and to understand sanitation from a "chain" perspective, from the collection of excreta to treatment. The use of the market system to develop sanitation, professionalizing informal actors and strengthening local control of households through the "sanitation zoning" could allow for relatively rapid sanitation coverage, on condition that the strong geographical and economic disparities in Haiti is taken into account.

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ANNEXS

Annex 1. Sanitation governance in Haiti depending on the facility or service provided (source : DINEPA, 2014, Petit E., 2017 et OIEAU, DINEPA, 2016a)

(Previous page) Annex 2. Investments of the Technical and Financial Partners in water/sanitation/building capacities sector in Haiti since 2009 (Source: OIEAU, DINEPA, 2016a; AECID, FCAS, DINEPA, 2012 ; Websites of PTF)

Annex 3. Share of each donor (%) in the financing of every item expense (in the subtotal planned amount of aid of USD 308,5 million) in Haiti since 2009 (Source: Websites of PTF)

Annex 4. Financial diagnosis of the Morne-à-Cabri treatment plant between October 2013 and June 2014 (Source : Touré S., 2016).

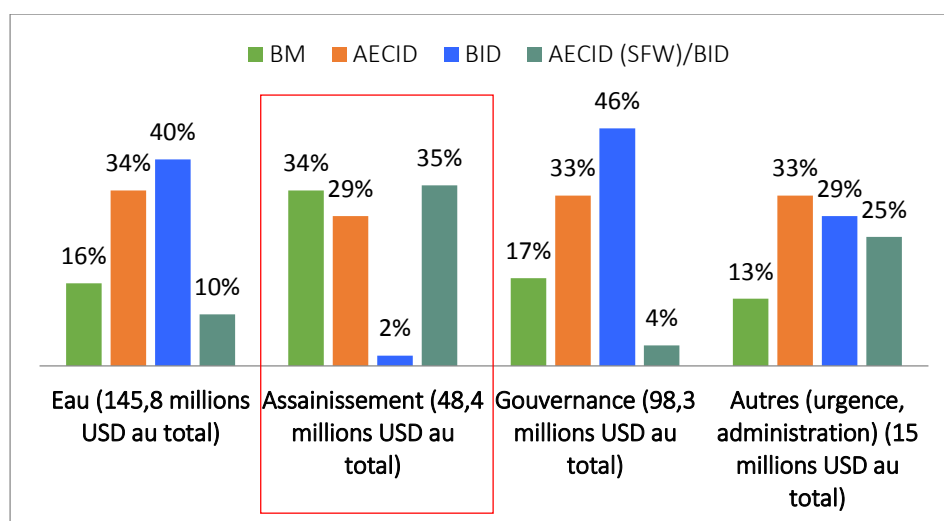
Annex 1. Sanitation governance in Haiti depending on the facility or service provided (source : DINEPA, 2014, Petit E., 2017 et OIEAU, DINEPA, 2016a)

Type of infrastructure or service	Investment	Management and Operation	Regulation	Control of wastewater / activities
Private facilities (sanitary blocks, toilets, sewage systems)	Individual or Public Institution	Individual or Public Institution	DINEPA	Ministry of Public Works, Transport and Communication (MTPTC) (for health regulations) and DINEPA (standards support)
Public sanitary blocks	Ministry of Public Health and Population (MSPP), Ministry of Education and Professional Training (MENFP), Ministry of Homeland Security and Local Government (MICT), Ministry of Trade and Industry (MCI), Secretary of State for Youth and Sport, Private Sector, Town Halls (with DINEPA support, NGOs)	MSPP, MENFP, MICT, MCI, Town Halls (with DINEPA support, NGOs)		Ministry of the Environment (MDE) (discharge standards), MSPP (sanitary regulations) and DINEPA (standards support)
Emptying service	Formal or informal private operators (with NGOs and DINEPA support)	Formal or informal private operators		MDE (quality of sludge discharge and industrial wastewater), MSPP (hospital effluents)
Feacal Sludge Treatment Plant	DINEPA	DINEPA		Ministry of Agriculture (by-product valorisation)
Awareness of sanitation and hygiene	DINEPA and MSPP (with financial support from donors, through NGOs)	DINEPA and MSPP, (in general through NGOs)		MSPP, MENFP, MDE
Pilot projects for "condominium" mini-sewer system	DINEPA and MSPP (with financial support from donors, through NGOs)	Individual		MDE, MTPTC, Town Halls

Institution	Code du programme	Nom du Programme	Type de financement	Période	Agence responsable	Montant Total planifié (Millions \$US)	Montant Eau (Millions \$US)	Montant Assainissement (Millions \$US)	Montant Gouvernance (Millions \$US)	Montant Autres (admin, urgence) (Millions \$US)
Banque Mondiale	P148970	Sustainable Rural and Small Towns Water and Sanitation Project	Grant	2015-2021	DINEPA	50	23	8	17	1
Banque Mondiale	P089839 (IDA) / P114936 (SPF)	Haiti Rural Water and Sanitation Project	IDA Grant / State and Peace-Building Fund (SPF)	2005-2013	DINEPA	10	0,7	8,4	0	0,9
AECID	HTI-003-B	Programme de réforme et d'investissement dans le secteur de l'eau potable et de l'assainissement à Haiti	Grant	2012-2017	DINEPA	100	49	14	32	5
Banque Interaméricaine de Développement (BID)	HA-L1103	Port-au-Prince Water and Sanitation Project III	Grant	2015-ND	DINEPA	30	20,5	0	8	1,5
BID	HA-L1090 / HA-G1032	Institutional Strengthening and Reform of the Water and Sanitation Sector I	HA-L1090 Loan / HA-G1032 Grant	2014 - ND	Ministère de l'Economie et des Finances	29	0	0	29	0
BID	HA-L1075	Port-au-Prince Water and Sanitation Project II	Loan	2013-2018	DINEPA	35,5	28,3	0	6,7	0,5
BID	HA-L1007	Rural Water and Sanitation Programme	Grant	2010-2016	DINEPA	15	10,1	1	1,6	2,3
BID	HA-0014	Potable Water and Sanitation Sector Reform and Investment Programme	Loan	2010-2015	Minsitère des Travaux publics, Transports et Communication	60	48		1	11
AECID (SFW) / BID (1/2)	2190/GR-HA - GRT/WS-11814-HA	Water and Sanitation for Intermediate Cities II	Grant	2009-2016	DINEPA	39	14,2	17	4	3,8
AECID (SFW) / BID (2/2)	HA-L1044 / HA-X1021	Port -au-Prince Water and Sanitation Project I	Grant	2010-2016	DINEPA	50	29,5		17	3,5
AECID (SWF)	HA-X1014	Rural Water and Sanitation Program II	Loan	2010-2016	DINEPA	10	7		1	2
UNICEF/Gouvernements Haiti, Canada, Japon	Source: Blog UNICEF Hai	Campagne d'assainissement total (Las Palmas)	Grant	2014-2019	DINEPA / Ministère de la Santé Publique	14	ND	ND	ND	ND
UNICEF	RWP 2014-2015 WASH	Programme Eau Assainissement & Hygiène	Grant	ND-2015	ND	3,9	ND	ND	ND	ND
AFD	ND	Compétences pour l'emploi des jeunes (métiers de l'eau)	Grant	2014-2019	Institut National de Formation Professionnelle	5	ND	ND	ND	ND
CDC	GH000576	Renforcement Institutionnel pour mieux réguler le Secteur EPA	ND	ND-2015	DINEPA	4	ND	ND	ND	ND

(Previous page) Annex 2. Investissements of the Technical and Financial Partners in water/sanitation/building capacities sector in Haiti since 2009 (Source: OIEAU, DINEPA, 2016a; AECID, FCAS, DINEPA, 2012 ; Websites of PTF)

Annex 3. Share of each donor (%) in the financing of every item expense (in the subtotal planned amount of aid of USD 308,5 million) in Haiti since 2009 (Source: Websites of PTF)



Annex 4. Financial diagnosis of the Morne-à-Cabri treatment plant between October 2013 and June 2014 (Source : Touré S., 2016).

Mois	Nombre de camions	Volume vidange mécanique (m3)	Montant facturé (Gdes)	Montants recouvrés (Gdes)	Pourcentage de recouvrement
oct-13	809	5 208	1 089 527	605 098	56%
nov-13	726	4 472	952 213	417 066	44%
déc-13	566	3 138	748 474	43 649	6%
janv-14	563	3 256	771 088	375 454	49%
févr-14	660	3 706	876 065	729 480	83%
mars-14	713	4 432	965 118	247 441	26%
avr-14	610	4 561	987 569	566 512	57%
mai-14	857	3 850	1 020 214	289 151	28%
juin-14	663	3 023	754 254	289 245	38%

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