

# URBAN SANITATION EXPERIENCES OF SENEGAL AND BURKINA FASO

## Broadening Urban Sanitation Activities



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# FOREWORD

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The search for sustainable solutions to address the complex issue of equitable access to water and sanitation services has led to a number of international commitments over the past decade to raise the sanitation profile in the agenda of national development policies. By including water and sanitation in the Millennium Development Goals (MDG), these commitments seek to reduce by half the portion of the population without access to safe water and basic sanitation. And yet, though efforts have been deployed to assess the situation, identify appropriate solutions and, to a limited extent, to mobilize increased funding of activities, access to adequate sanitation in the urban areas of sub-Saharan Africa (SSA), and particularly in West Africa, still lags far behind access to safe water. For many years, public funds and external financial assistance to the sanitation sector have mostly been devoted to expanding and rehabilitating sewerage networks, even though it was established that trying to scale up sewerage was not a feasible or economically sustainable answer to sanitation issues in West African cities. Recognizing the challenge, the World Bank decided to review in depth large-scale operations that adopted a comprehensive approach of urban sanitation, so as to make references and tools available to the sanitation actors in Africa, which would, in turn, enable accelerated progress benefiting the urban population at large.

In West Africa, two operations, the Ouagadougou Strategic Sanitation Plan (*Plan stratégique d'assainissement des eaux usées de la ville de Ouagadougou*, PSAO) and the Dakar Periurban On-site Sanitation Program (*Programme d'Assainissement Autonome des Quartiers Péri Urbains de Dakar*, PAQPUD) executed in Burkina Faso and Senegal, respectively, are often mentioned in view of their outcomes and implementation achievements. Whereas their backgrounds, timespans and implementation features differ, both operations shared a similar view of urban sanitation activities, were demand-driven and challenged the widely accepted principle that the improvement of household sanitation facilities should remain in the realm of private and not public goods, or at best be encouraged exclusively through software efforts.

This study aims to offer evidence that urban sanitation in large West African cities faces specific issues linked to urban setting, housing development and urban environment, and to the development of water services. These issues are acutely perceived by urban households and largely shape their demand for sanitation, whereas the available supply offers unsatisfactory or unaffordable solutions. The two operations in review showed that public sanitation (or water and sanitation) utilities, when supported by a strong political will and with the assistance of a variety of actors, may, to a large extent, fill the gap between supply and demand, provided that they adopt adequate and efficient implementation arrangements in a participatory approach. As importantly, both operations showed that cost-effectiveness and equity considerations justify substantial subsidies for household facilities, which can be sustained by internal resources and external assistance.

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# EXECUTIVE SUMMARY AND KEY FINDINGS

## SUMMARY FEATURES AND OUTCOME

	<b>PSAO (Burkina Faso)</b>	<b>PAQPUD (Senegal)</b>
Implementation Period	1993-2009	2002-2007
Leadership	ONEA (National Water and Sanitation Utility)	ONAS (National Sanitation Utility)
Sanitation Solutions	On-site (excreta disposal, greywater disposal) and sewerage	On-site (excreta disposal, greywater disposal and mixed) and condominial systems
Number of beneficiaries:	1,182,000	583,000
• On-site greywater disposal	67%	50%
• On-site excreta disposal	32%	27%
• On-site mixed	-	13%
• Condominial systems	-	10%
• Sewerage	1%	-
Beneficiaries as % of urban population	70% (entire city)	37% (peri-urban areas)
Number of constructed sanitation facilities:		
• On-site greywater disposal	79,800	37,200
• On-site excreta disposal	37,700	20,000
• On-site mixed	-	10,300
• Condominial systems	-	10
Percentage of city septage collected	N/A	70%
Total Cost (US\$ Million)	35.80	44.45
Investment cost (US\$ per capita):		
• On-site greywater disposal	12	30
• On-site excreta disposal	13	48
• On-site mixed	-	103
• Condominial systems	-	108
• Sewerage	299	209
Financing Sources (%)		
• Beneficiaries	31%	11%
• Government/Utility	14%	2%
• External Assistance	55%	87%
Actual level of subsidization of beneficiaries (%):		
• Comprehensive on-site solution	27%	55%
• Condominial systems	-	84%
• Sewerage	63%	88%
Demand Generation	Consulting firms (3)	Community-based organizations (38)
Number of proposed technical options	6	20
Replication	Five other cities and towns	Follow-up operation and small towns
Operational Sustainability	Likely (undocumented)	Yes (documented)
Financial Sustainability	Yes	Contingent on availability of external financing

## KEY FINDINGS

***Both operations reached a substantial portion of the urban population, whose demand revealed the extent of wastewater disposal issues and cannot be ignored by public interventions.***

- By 2009, the PSAO reached 70 percent of the total Ouagadougou population. It took much longer than expected to achieve the Plan's initial objectives whereas the PAQPUD reached 37 percent of the population of Dakar's periurban areas in four years and exceeded its initial objectives.
- The demand-driven approach that was followed by both operations revealed that households attached a high priority to the improvement of greywater disposal (requested by 67 percent of program beneficiaries in Ouagadougou and 50 percent in Dakar).
- Household demand for improvements of their sanitary and environmental conditions was largely shaped by the features of past housing development, the increasing population density and the consumption of space. Whereas the awareness of health hazards associated with unsafe excreta disposal was unquestionable, households living in informally developed areas also suffered from the shortfalls of wastewater disposal, which prevented the adoption of hygienic practices and generated additional health hazards.
- Both operations recognized that the long-established practice of limiting public interventions to collective sanitation serving essentially the commercially/publicly developed segment of the housing market was no longer tenable, all the more as water service connections were becoming available to all strata of population. Seventy (70) percent of Ouagadougou households and 85 percent of Dakar households are connected to the water networks, which substantially compound the wastewater disposal issues.
- Implementation rules and activities of both operations were accordingly designed to meet this diverse demand of households.

***Sanitation utilities are well placed to lead and implement sanitation programs and bring credibility and accountability.***

- Moot conflicts over sectoral responsibilities between ministerial departments or between the different layers of government have often prevented the emergence of a sectoral leadership and of a comprehensive vision of urban sanitation. Political willingness enlightened by strong advocacy efforts of the World Bank Group to disseminate the strategic sanitation approach settled the debate in Burkina Faso and Senegal by establishing public utilities, ONEA and ONAS, respectively, as sector leaders.
- Sanitation utilities have a comparative advantage to manage and coordinate complex programs, to ensure the technical quality that the households are looking for, and to establish partnerships with all stakeholders. However, their leadership must also be supported by the Government's effective commitment to ensure the financial equilibrium of their sanitation activities.

***Implementation arrangements were flexible and responsive to field realities. Responsibilities and workloads were aligned with the capacities of the various actors, whose accountability was strengthened by performance incentives that were built into the contracts.***

- The initial arrangements and rules of the programs required not only fine-tuning, but also substantial adjustments to address weaknesses that were revealed in the pilot phases. The two operations followed different options in allocating responsibilities, particularly as regards the households' roles and the use of delegated contract management. They shared, however, a common concern to firmly establish the technical leadership of the sanitation utility and to put it in full control of the field actors' performances.
- The NGOs specialized in water and sanitation that were initially selected as support structures were not comfortable in the procedures-driven context of the programs and were unable to effectively carry out support activities; they were also less responsive to performance incentives than consulting firms or neighborhood, community-based organizations (CBOs), which eventually replaced them. Dakar CBOs, which were close to the beneficiaries, also demonstrated that they could efficiently reach the poorest households and manage flexible pro-poor mechanisms.
- Delegated contract management enabled quick capacity building in Dakar, but the slower pace that was followed in Ouagadougou did not hamper the scaling-up of the on-site sanitation activities when external financial resources became available.

***The efforts to stimulate and elicit demand for sanitation were diverse and intensive. The process was highly participatory and provided valuable feedback***

- Program promotion mixed mass communication and face-to-face communication activities. Mass communication reinforced the credibility of the program among opinion leaders and in providing equal access to information to all potential beneficiaries.
- Social marketing was a key factor in stimulating demand for on-site sanitation, but required familiarity with the specific social conditions of the neighborhoods and a large presence of women in the management teams and the teams of the support providers (60 percent of community workers).
- Focus group meetings provided valuable feedback on the needs and motivations of households for improving sanitation, which allowed a fine tuning of the range of technical solutions.

***The range of technical options had to be broadened to be demand-responsive and match beneficiaries' motivations and needs and to comply with the urban environmental constraints.***

- The PSAO was a precursor to broadening the range of on-site facilities by proposing to rehabilitate traditional latrines and to build showers and soakaway pits, in addition to the preferred solutions of sector technical specialists (VIP and PFL). The PAQPUD went a step further by offering mixed solutions and customized options, and also by offering the condominial alternative to households living in neighborhoods that were not suitable for on-site sanitation or conventional sewerage.
- The broad catalog of options in Dakar matched the motivations of the households, as revealed by the focus groups, which were linked to (i) social status associated with the pride of owning "modern" facilities (existing facilities created odors, infestation of insects and mosquitoes or encumbered the compound by multiplying inadequate pits); (ii) convenience (likely the reason of the low demand for the VIP latrine); (iii) sanitation practices (overwhelming demand for PFLs) ; (iv) privacy (hence the demand for shower and latrine cabins); (v) willingness to reduce maintenance costs; and (vi) the need to reduce neighborhood conflicts generated by wastewater disposal.

***Both operations recognized the critical importance of urban and environmental factors.***

- The increasing population density and associated consumption of urban space by housing reinforced the household demand for adequate sanitation facilities. Conversely, the low population density of the secondary urban centers of Burkina Faso, in which the strategic planning approach was replicated, explains to a large extent their relatively low demand for sanitation.
- The emphasis put in Dakar on the prior verification of the feasibility of sanitation options, at the neighborhood level, made possible the effective delivery of sanitation services in all areas, as condominial systems could be proposed to the population of areas not suitable for on-site sanitation.

***The quality of the technical design of on-site facilities and the quality control provided by the support structures reinforced the credibility and acceptability of the programs.***

- Urban households and masons were indeed familiar with latrines and soakaway pits before the inception of the programs, but most of the facilities were of substandard quality and could not deliver adequate services. The PSAO and the PAQPUD established construction standards and quality control procedures that were actually complied with, and households were ready to pay for improved quality, which translated into improved services and reduced maintenance costs. The quality of technical training and coaching that was provided to masons and SMEs was also a key factor of the satisfactory technical performances. The provision of septage disposal facilities is a necessary, but usually overlooked, complement of on-site sanitation facilities.
- The usually defective conditions in which the septage haulers operate and discharge latrine effluents result from the absence of adequately located and managed septage disposal facilities. The PAQPUD aimed at providing environmentally-sustainable solutions in that respect, in order to put on-site sanitation on a par with sewerage. The facilities that were constructed benefited an even larger population than the direct beneficiaries of the program. This was achieved in very economical conditions and the effective use of facilities by septage haulers augurs well of the sustainability of the services.

***Cost effectiveness and equity considerations fully justify public interventions to support on-site sanitation and further justify a high level of subsidies.***

- Investing in on-site sanitation, even by providing comprehensive solutions –combining excreta and greywater disposal facilities at household level, completed by septage disposal facilities–, or in condominial systems is by far more cost-effective than investing in sewerage.
- The actual level of subsidies accruing to households constructing on-site facilities in Ouagadougou and Dakar was substantially lower than the one received by well-off sewerage customers. The widespread policy of not providing public funds to support on-site sanitation, while accepting heavy subsidies for the costlier sewerage alternative denies equity and cost-effectiveness and ignores the positive externalities of wastewater disposal.
- The high level of subsidization of Dakar beneficiaries is justified by the pro-poor focus of the PAQPUD. Poverty targeting was effectively achieved through geographical targeting and flexible rules managed by CBOs.



***The existence of sanitation surcharges levied on water consumption that are clearly linked to program activities is a key factor of the financial sustainability of public interventions***

- The financial sustainability of the PSAO results from the careful design, implementation and management of the sanitation surcharges. Since 1993, the proceeds of the surcharges have fully covered: (i) ONEA's operating costs in sanitation; (ii) ONEA's expenditures for software activities in favor of on-site sanitation; and (iii) the cost of in-kind subsidies that enabled building about 10,000 facilities per year. The implementation record of the program, as well as the financial equilibrium of ONEA's sanitation activities helped to convince donors to support the expansion of the PSAO.
- In contrast, ONAS has not been able to maintain its financial equilibrium, –largely because of its unfunded mandate in urban drainage–, and to allocate the sanitation surcharge paid by un-sewered customers to the financing of on-site sanitation. It is, therefore, necessary to correct the current distortions of the cost recovery policies of the sanitation sector in Senegal, to attract more external financing for the replication of the PAQPUD.

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# ACRONYMS

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AFD	French Development Agency ( <i>Agence Française de Développement</i> )
AfDB	African Development Bank
AGETIP	Public Interest Works Executing Agency ( <i>Agence d'Exécution des Travaux d'Intérêt Public</i> )
CBO	Community-Based Organization
COGES	Facility Management Committee ( <i>Comité de Gestion</i> )
CREPA	Regional Center for Low-cost Water Supply and Sanitation ( <i>Centre Régional pour l'Eau Potable et l'Assainissement à faible coût</i> )
CW	Community Worker
DAS	Directorate of Sanitation/Senegal ( <i>Direction de l'Assainissement</i> )
DASS	Directorate of Sanitation/Burkina Faso ( <i>Direction de l'Assainissement</i> )
EAC	Equivalent Annual Cost
EPCD	Municipal Development Agency ( <i>Etablissement public communal pour le développement</i> )
GIS	Geographical Information System
GPOBA	Global Partnership on Output-Based Aid
GREA-AO	Abidjan Regional Office of the UNDP-World Bank Water and Sanitation Program ( <i>Groupe Régional Eau et Assainissement – Afrique de l'Ouest</i> )
IDWSSD	International Drinking Water Supply and Sanitation Decade
IEC	Information, Education and Communication
JMP	WHO/UNICEF Joint Monitoring Program
KfW	German Aid Agency ( <i>Kreditanstalt für Wiederaufbau</i> )
MDG	Millennium Development Goal
NGO	Non-Governmental Organization
ONAS	National Sanitation Agency of Senegal ( <i>Office National de l'Assainissement du Sénégal</i> )
ONEA	National Water and Sanitation Agency ( <i>Office National de l'Eau et de l'Assainissement</i> )
PACVU	Urban Environment Project ( <i>Projet d'Amélioration des Conditions de Vie Urbaine</i> )
PAQPUD	Dakar Periurban On-site Sanitation Program ( <i>Programme d'Assainissement Autonome des Quartiers Péri Urbains de Dakar</i> )
PEPAM	Water and Sanitation Millennium Program ( <i>Programme d'Eau Potable et d'Assainissement du Millénaire</i> )
PFL	Pour-Flush Latrine

PHAST	Participatory Hygiene and Sanitation Transformation
PLT	Long Term Water Sector Project ( <i>Projet Sectoriel Eau à Long Terme</i> )
PN-AEPA	National Water Supply and Sanitation Program ( <i>Programme National d'Approvisionnement en Eau Potable et d'Assainissement</i> )
PS	Promotion Structure
PSAB	Bobo-Dioulasso Strategic Sanitation Plan ( <i>Plan stratégique d'assainissement des eaux usées de la ville de Bobo-Dioulasso</i> )
PSAO	Ouagadougou Strategic Sanitation Plan ( <i>Plan stratégique d'assainissement des eaux usées de la ville de Ouagadougou</i> )
SME	Small and Medium-Scale Enterprise
SAA	ONAS Department of On-site Sanitation (Service d'Assainissement Autonome)
SONES	<i>Société Nationale des Eaux du Sénégal</i>
SSP	Strategic Sanitation Plan
UNDP	United Nations Development Program
VIP	Ventilated Improved Pit Latrine
WFSP	Washing Facility with Soakaway Pit ( <i>Bac à Laver Puisard</i> )
WSP	Water and Sanitation Program (formerly UNDP-World Bank Water and Sanitation Program)

# INTRODUCTION

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## Scope of the Study

The overall objective of this study is to assess the design and implementation of two sanitation operations, the PSAO and the PAQPUD, in Senegal and Burkina Faso, respectively, by evaluating their methodologies, financial and technical parameters as well as understanding the policy and legal framework in order to replicate their key features where applicable. For both countries, the following questions are addressed by the document:

- What have been the performances of the two operations in terms of outcome, institutional and capacity building and sustainability?
- What was specific in the context and legal framework, compared to surrounding countries? How did they impact the two projects?
- Were there any reforms in the sanitation sector, implemented during or prior the projects and what were their impacts?
- How did the operational mechanisms impact the implementation of the two projects?
- To what extent were the sanitation technologies a determining factor in the success of the projects?
- What factors have influenced the level and type of sanitation investment in Senegal and Burkina Faso and what has motivated households to invest in sanitation?
- How has the political economy of national/sub-national government relations affected sanitation investments and what has motivated governments, utilities and donors to invest in sanitation?
- How is equity addressed in sanitation sector investment in each country?
- Comparing how sanitation investment fares vis-à-vis water supply investments, are there lessons to be learned from how successful water reform in Senegal/Burkina influenced increased investment for sanitation?

## Report Structure

Section I reviews the trends of the urban sanitation market in West Africa and the rationale for public interventions in sanitation.

Section II summarizes the main design features of the two operations.

Section III assesses the operations' performances, in terms of outcome, efficiency and equity as well as their sustainability and replicability.

The case studies are presented separately and follow a common format:

- Context and approach followed by the operation
- Detailed features of the operation
- Performance assessment and replications
- Key factors of success and limitations

## **I. TRENDS OF THE URBAN SANITATION MARKET**

This section looks first into the patterns of the urban sanitation market in West Africa – and its linkage with urban development and household water supplies. Then, the section reviews the rationale and the political economy underpinning public interventions in favor of urban sanitation that prevailed prior to the startup of the two operations in Senegal and Burkina Faso, and continues to prevail in other countries. Finally, it looks into the decision-making process that led to going forward with the two operations.

### **A. THE URBAN SANITATION MARKET**

#### **Key Features of Demand for Sanitation**

As elsewhere in West Africa, the development of urban sanitation in Dakar and Ouagadougou has reflected weaknesses in urban planning since it did not build on an orderly programming of infrastructure accompanying housing development, but essentially resulted from the aggregation of disconnected initiatives. The latter were dictated by the housing patterns and in particular by the segmentation of the housing market between formal developers and individual constructions. Commercial developers and public housing agencies constructed multi-story buildings or residential housing fully equipped with running water and internal facilities (kitchen, washing and toilets). The majority of housing was, however, developed by the individual households themselves, at their own pace, depending of their financial resources and with construction and equipment standards that are much lower than in the case of commercial or public development. The sanitary equipment of individual housing usually consisted of traditional pit latrines and of rudimentary shower and washing facilities using water buckets supplied by standpipes or other sources (e.g. traditional wells in Ouagadougou).

The disposal of liquid wastes (greywater or excreta) followed similar segmentation patterns. Formal housing could benefit from connections to sewers (Dakar) or open drains (Ouagadougou) or from septic tanks in the residential areas with a low population density. Individual housing relied on septage haulers for emptying latrines, on soakaway pits, or frequently discharged greywater in the vicinity of the plots.

The inherent limitations of these arrangements have been exacerbated by the growing urbanization, which resulted in higher occupancy of the plots and higher population density, and in turn made obsolete the practice of multiplying the number of latrines or soakaway pits inside the plots to avoid emptying costs. In addition the growing water connection rate resulting from the successful implementation of social connections increased the household water consumption and the volume of wastewater.

#### **The Supply Side**

The supply of sanitation infrastructure and facilities has been unable to respond to the demand, in terms of quantity and quality. The development of public sanitation infrastructure lagged behind urban development in the areas covered by developers. It was hampered by the lack of financial resources, as the costs of public investments were not recovered from their beneficiaries (see below, Public Interventions in Sanitation).



The sanitation needs of individual housing were mostly filled by masons and artisans. The latter often built facilities without adequate technical standards and due consideration of the soil conditions (infiltration, level of water table), which resulted in poor delivery performance, high maintenance costs and negative impact on the housing environment.

### Starting Points and Indicators

To illustrate the above, Table 1 presents some contextual indicators of urban development and urban sanitation that prevailed at the startup of the two operations.

Table 1: Starting Points

Indicators	Ouagadougou (1993)	Dakar (2001)
Population	700,000	2,200,000
Share of formal developers in the housing market (%)	<10%	40%
No. of water service connections	24,000	171,400
Households with water service connection (%)	35%	75%
No. of sewer connections	0	60,000
Households with sewer connection (%)	0%	28%
Households with improved sanitation facilities (%)	32%	82%
Prevalence of open defecation (%)	7%	<3%

The above indicator of access to improved sanitation follows the standard definition used by the WHO/UNICEF Joint Monitoring Program (JMP), which refers to excreta disposal. The indicator level may not coincide with the households' perception of the fulfillment of their sanitation needs. Although 82 percent of Dakar households had access to improved sanitation, 64 percent of Dakar households were not satisfied with their sanitation facilities.

### B. PUBLIC INTERVENTIONS IN SANITATION

In clear contrast with the relative harmony prevailing in the urban water supply sector, the political economy of urban sanitation was driven by conflicting factors linked to the multiplicity of public stakeholders, the unequal advocacy potential of private stakeholders, and the lack of a sectoral strategic approach to the issues.

Municipalities, as well as several ministerial departments respectively in charge of water, health and hygiene, urban development and housing or environment, claimed responsibilities in sanitation. The ensuing debate, –which remained largely academic as the parties were unable to offer or mobilize adequate human and financial resources–, nevertheless prevented the emergence of a sectoral leadership and a comprehensive vision of urban sanitation solutions. Municipalities, which could have played an important role, considered liquid wastes as a low priority compared to flood control or solid wastes, all the more as they could not raise appropriate fiscal resources. Among private stakeholders, developers have been very effective in defending their economic interests, as they have been consistently exempted from contributing to the expansion of public sanitation infrastructures (and, more generally to all public networks, including water distribution and drainage), in contrast with the widely accepted practice outside West Africa.

As a result, the public sector did not invest at all in developing sanitation infrastructure in most of West African countries (including Burkina Faso). The few countries that did make these investments (including Senegal) limited their interventions to sewerage, considering that public interventions were essentially justified by the large-scale externalities linked to collective sanitation. This approach left aside on-site sanitation, reflecting the engineering bias of the sector's technical staff in favor of large schemes.

### **C. RENEWED VISIONS**

*In Burkina Faso and Senegal, the shift to a comprehensive vision of urban sanitation resulted from Government's recognition of the limited impact of the previous public interventions and from the advocacy efforts pursued by the World Bank Group.*

Burkina Faso was one of the few countries that, after the end of the International Drinking Water Supply and Sanitation Decade (IDWSSD), decided to fill the development gap between urban water supply and urban sanitation and to that effect, followed the strategic sanitation approach, actively advocated by the UNDP-World Bank Water and Sanitation Program (now WSP). The approach aimed to devise sanitation solutions that were demand-responsive, flexible and involved the active participation of all stakeholders. The Government clarified the institutional framework by appointing ONEA as the sole agency in charge of developing urban sanitation and established a sanitation surcharge based on actual services rendered, which would have to be used exclusively by ONEA for sanitation activities. In turn, ONEA formulated a comprehensive set of sector policies and a medium-term comprehensive investment program covering on-site sanitation, sewerage and school sanitation.

In Senegal, the Government, after implementing a successful reform of the urban water supply sector, recognized that conventional sewerage was neither technically nor economically feasible in the major part of Greater Dakar. In a January 2001 Sector Policy Letter, the Government expressed its commitment to "promote and develop alternative and appropriate on-site or condominial sanitation systems in periurban neighborhoods [...] and to develop partnerships with small-scale private enterprise to respond to the demand for sanitation services in urban and periurban areas". Concurrently, IDA agreed to redress imbalances in resource allocation between urban water and sanitation by bringing more resources to the sanitation sector, and particularly to finance the development of alternative solutions to sewerage under a specific program focusing on the poor in the periurban areas of Dakar.

## **II. OVERVIEW OF THE OPERATIONS**

This section summarizes the main features of the two operations, compares how they have been developed and identifies the underlying rationale of their formulation.

The PSAO was primarily a strategic and long-term instrument for the sustainable development of sanitation throughout the entire city of Ouagadougou. The establishment of sound arrangements, policies and partnerships initially took precedence over quantitative targets. The attention turned to physical achievements once the development framework had been firmly anchored and the actors had acquired satisfactory capacities, which took more than five years. Although the initial PSAO document explicitly stated the need to improve household wastewater disposal

conditions, no specific targets were set in that respect. Households expressed a very strong demand for greywater disposal facilities during the pilot phase of the PSAO, which led to include such facilities in the list of the technical solutions supported by the program.

In contrast, the PAQPUD was primarily a results-oriented program with a short time span, ambitious quantitative objectives, and an explicit focus on the poor. However, the PAQPUD was designed by a team which was fully familiar with the implementation of the PSAO and incorporated many of its lessons, particularly the need to meet the demand for greywater disposal.

The coverage and objectives of the two operations, together with their budgets are summarized in Table 2 below

Table 2: Scope and Objectives

<b>Targets</b>	<b>PSAO (Burkina Faso)</b>	<b>PAQPUD (Senegal)</b>
Targeted Area	Entire city of Ouagadougou	Low-income periurban areas of Dakar
Targeted population at program inception	700,000	1,500,000
Timespan (original)	1993-2005	2002-2006
Strategic Objective (s)	To provide a sustainable framework for the development of urban sanitation services	To provide an efficient and performing sanitation alternative in urban areas that were ignored by sewerage systems
Provision of Access to Sanitation Services	<ul style="list-style-type: none"> <li>• About 329,000 additional people with access to improved basic sanitation by 2000</li> <li>• About 919,000 additional people with access to improved basic sanitation by 2005</li> </ul>	About 400,000 additional people with access to sanitation services (basic sanitation and wastewater disposal) by 2006
Construction of On-site Sanitation Facilities	Construction of about 22,000 and 59,000 on-site facilities by 2000 and 2005, respectively	Construction of about 60,000 on-site facilities by 2006
Construction of Condominial Facilities	None	Construction of 11 condominial networks serving about 90,000 people by 2006
Construction of Sewerage Facilities	Construction of sewers and treatment plant to collect about 3,100 m <sup>3</sup> /day and serving about 10,000 people	None
School Sanitation	74,000 students having access to sanitation in 166 schools by 2000	61,000 students having access to sanitation in 70 schools by 2006
Initial Budget (US\$ m)	18.1 (1993-2000)	29.3 (2002-2006)

## A. INSTITUTIONAL ANCHORING

*In both cases, a national public utility was the leader, but households played entirely different roles; they were implementers in Ouagadougou and participatory beneficiaries in Dakar.*

ONEA had no prior experience in sanitation and had to build capacities in all aspects; the utility decided to play a role as promoter of on-site sanitation and to let households contract the execution of their facilities. ONAS had been actively involved in sewerage

(and drainage) but had no experience of on-site sanitation and could have followed the ONEA model. However, the successful Senegalese experience with the management of a host of contracts in the context of community-based urban operations led ONAS to adopt an entirely different approach, which was also consistent with the relatively short time span of the PAQPUD, compared to the long-term PSAO. On-site facilities were executed by small and medium enterprises contracted by AGETIP, the executing agency for public works, on behalf of ONAS, which delegated to the latter the procurement and management of all contracts.

## B. IMPLEMENTATION ARRANGEMENTS

The complexity of the implementation arrangements, as shown in Table 3, reflects the combined needs of the demand-driven and participatory approach required for on-site sanitation, and of the more conventional approach required for sewerage or septage disposal investments.

*In both cases, the arrangements required substantial adaptations to field realities, and particularly to the capacities of the actors, as they were revealed in the pilot phases. The initial option of using non-governmental organizations (NGOs) as the primary interlocutors of households was dismissed and replaced by the recourse to consulting firms (the promotion structures of the PSAO) or to the combination (in Dakar) of community-based organizations (CBOs) and technical consultants.*

Table 3: Implementation Arrangements

<b>Roles and Responsibilities</b>	<b>PSAO (Burkina Faso)</b>	<b>PAQPUD (Senegal)</b>
Oversight	ONEA	ONAS (initially Steering Committee)
Program Management	ONEA	AGETIP
Financial Management	ONEA	AGETIP
Contracting	<ul style="list-style-type: none"> <li>• Support activities: ONEA and promotion structures</li> <li>• Supplies for construction of facilities: ONEA and prefabricators</li> <li>• Works: households and masons</li> </ul>	<ul style="list-style-type: none"> <li>• Support activities: AGETIP and CBOs</li> <li>• Technical design and supervision: AGETIP and consulting engineers</li> <li>• Works : AGETIP and SMEs</li> </ul>
Demand generation	Promotion Structures	CBOs (initially NGOs)
Hygiene Education	Promotion Structures	CBOs
Training	<ul style="list-style-type: none"> <li>• Design of training modules: ONEA (initially with CREPA)</li> <li>• Execution: promotion structures</li> </ul>	<ul style="list-style-type: none"> <li>• Design of training modules: ONAS</li> <li>• Execution: AGETIP and ONAS</li> </ul>
Technical Design	<ul style="list-style-type: none"> <li>• Development of technical options: ONEA</li> <li>• Household facility: Promotion structure validates supplies order</li> </ul>	<ul style="list-style-type: none"> <li>• Development of technical options: ONAS</li> <li>• Household facility: Consulting engineer validates option, design and siting</li> <li>• Condominial systems: designed by consulting engineer</li> </ul>
Construction	<ul style="list-style-type: none"> <li>• On-site facilities: masons (with supplies from prefabricators)</li> <li>• Sewerage: international contractors</li> </ul>	<ul style="list-style-type: none"> <li>• On-site facilities: SMEs (with local masons as subcontractors)</li> <li>• Condominial systems: local contractors</li> <li>• Septage disposal facilities: international contractors</li> </ul>

<b>Roles and Responsibilities</b>	<b>PSAO (Burkina Faso)</b>	<b>PAQPUD (Senegal)</b>
Works Supervision	Promotion structures with oversight from ONEA	Consulting engineers
Monitoring and Evaluation	ONEA	ONAS and AGETIP

### **C. DEMAND GENERATION**

*In both cases, the efforts to stimulate and elicit demand for sanitation were diverse and intensive. The process was highly participatory and provided valuable feedback.*

Demand stimulation activities adopted three approaches: mass communication, dialogue with households and advocacy. The slow pace of mobilization observed in the pilot phases showed that mass communication campaigns carried out by professionals were a prerequisite, given the city-wide audience of the operations, so as to provide equal access to all potential beneficiaries. Community development workers (CW) conducted household visits and neighborhood focus groups, combined with group visits to existing facilities. Advocacy was particularly emphasized in the PAQPUD to sensitize locally elected officials to the urban environment benefits of on-site sanitation and condominial systems, and to create partnerships and develop the communities' ownership.

Households were not confined to a role of passive receptors of top-down messages. The focus groups provided valuable feedback on the needs and motivations of households for improving sanitation, which allowed a fine tuning of the range of technical solutions. The most frequently mentioned factors were the following:

- A widespread dissatisfaction with existing facilities that created odors, infestation or encumbered the plots by multiplying inadequate pits and were unable to ensure privacy;
- Factors linked to convenience and sanitation practices, which led, e.g., the Dakar households to prefer pour-flush latrines (PFL) rather than ventilated improved pit (VIP) latrines;
- Economic factors linked to the possibilities of savings on maintenance costs and the level of financial contributions; and
- Urban environmental factors and particularly the need to reduce neighborhood conflicts generated by wastewater disposal.

The detailed monitoring data collected by the PAQPUD give an indication of the level of efforts deployed in generating demand and of the actual yield from that effort: about 73 percent of the households living in targeted areas were contacted by the CWs (and 21 percent participated to focus groups), 51 percent formally requested facilities and 37 percent actually benefited from the program.

### **D. TECHNICAL OPTIONS**

*The range of technical solutions was progressively broadened to match the household needs and to comply with the constraints of the urban environment.*

The initial menu of proposed technical options in Ouagadougou was limited to PFL and VIP latrines and (after the pilot phase) to soakaway pits. It was later expanded to

accommodate the overwhelming demand for greywater disposal facilities and households' willingness to rehabilitate traditional latrines at a moderate cost. The catalog of the PAQPUD was much broader and included customized solutions, comprehensive solutions addressing both excreta and wastewater disposal, and offered the possibility of connecting to condominial systems in areas that were not suitable for on-site disposal (impermeable soils or high water table). In both cases, the construction of on-site facilities was completed by public investments in septage disposal facilities, which were particularly effective in Dakar (see below, Operational Sustainability). Table 4 below lists the available technical solutions.

Table 4: Proposed Technical Solutions

Sanitation Mode	PSAO (Burkina Faso)	PAQPUD (Senegal)
Greywater Disposal	<ul style="list-style-type: none"> <li>• Soakaway pit</li> <li>• Shower and soakaway pit</li> <li>• Washing facility with soakaway pit (WFSP)</li> </ul>	<ul style="list-style-type: none"> <li>• Soakaway pit</li> <li>• Shower cabin</li> <li>• Shower and soakaway pit</li> <li>• WFSP</li> <li>• WFSP with de-greaser</li> </ul>
Excreta Disposal	<ul style="list-style-type: none"> <li>• VIP latrine</li> <li>• Pour-flush latrine (PFL)</li> <li>• Latrine rehabilitation</li> <li>• Septic tank</li> </ul>	<ul style="list-style-type: none"> <li>• VIP latrine</li> <li>• PFL</li> <li>• PFL cabin</li> <li>• Pits for PFL</li> <li>• Watertight pit latrine</li> <li>• Latrine rehabilitation</li> <li>• Septic tank</li> </ul>
Mixed Solutions	Not available	<ul style="list-style-type: none"> <li>• PFL and shower/soakaway pit</li> <li>• VIP and shower/soakaway pit</li> <li>• Pits for PFL and shower/soakaway pit</li> </ul>
Condominial Systems	Not available	Interceptor tank inside plot plus connection to small-bore sewer

To ensure the technical quality and performance level that was expected by the households, contractors and masons received extensive training and coaching and had to comply with verifiable technical standards. These necessary requirements increased the costs of on-site facilities, but were largely compensated by the program subsidies.

#### E. FINANCING AND SUBSIDY DESIGN

*The design of the financing and subsidy arrangements differs markedly in the two operations and reflects their distinctive targeting and goals.*

Financial sustainability was a primary concern in the preparation of the PSAO, which sought to ensure the financial equilibrium of ONEA's sanitation activities. ONEA's expenditures in promoting on-site sanitation were expected to be fully compensated by the revenues from the sanitation surcharges levied on the water consumption. External funds, in the form of grants, were to be mobilized exclusively for financing the sewerage component of the Strategic Plan.

Conversely, the PAQPUD was designed as a component of an IDA-funded project, which also aimed at closing the gap between water supply and sanitation in terms of

external financial support. IDA funds would finance all project expenditures, including the portion of expenditures for on-site sanitation that was not financed by the beneficiaries.

Table 5 summarizes the subsidy arrangements that applied to the construction of household facilities. As mentioned above, the PSAO had been designed as an instrument to develop sanitation for the entire population of Ouagadougou, without specifically targeting the urban poor (the program eventually reached 70 percent of the city population). Subsidies were designed in line with the findings of the willingness to pay study that was part of the Strategic Plan preparation. The study pointed to the need for limited subsidies of about 25 percent of the hardware costs. These subsidies were available to all households and were provided in kind through the free supply of inputs (latrine doors and roofs, slabs, syphons and bricks), while household directly paid the labor costs of the masons who constructed the facilities.

The PAQPUD was explicitly designed to reach the poor and, to that effect, relied on geographical targeting, focusing on periurban low-income neighborhoods. This pro-poor focus of the PAQPUD dictated a different approach to subsidies. As works contracts were managed by AGETIP and not by the households, beneficiaries were to reimburse AGETIP a portion of the contract costs, which was initially set at 50 percent and was reduced to 25 percent after the pilot phase. In addition, specific and more favorable rules applied to the poorest households, as identified by the CBOs, which had close ties with the communities.

Table 5: Subsidy Arrangements

Rules	PSAO (Burkina Faso)	PAQPUD (Senegal)
Household eligibility criteria	None	Residence in selected periurban neighborhoods
Household contribution	100% of labor costs, equivalent to: <ul style="list-style-type: none"> <li>- 82 % of cost of greywater disposal facilities</li> <li>- 70 % of cost of latrines</li> <li>- 100% of cost of septic tanks</li> </ul>	25% of facility cost (all options)
Possibility of credit	No	Limited
Average hardware subsidy (%)	28%	78%
Specific rules for poorest households	None	<ul style="list-style-type: none"> <li>• Possibility of in-kind payment</li> <li>• Possibility of payment by installments</li> </ul>
Change of rules during implementation	Household contributions were decreased to 70 % (greywater) and 50% (latrines) after 2006.	Household contributions were higher (50%) during the pilot phase.

### III. PERFORMANCE ASSESSMENT

This section reviews first the outcome and outputs of the two operations, their performances in building capacities, and the structure of their costs and actual financing sources. Then the section looks into the efficiency –measured by the cost-effectiveness– of the sanitation expenditures and the equity aspects.

## A. OUTCOME

*Both operations reached a substantial portion of the urban population, whose demand evidenced the extent of wastewater disposal issues.*

### Access

Table 6 below lists the main outcome and input indicators and shows the preeminence of the demand for greywater disposal facilities (67 percent in Ouagadougou, and 50 percent in Dakar, not counting the combined excreta/greywater facilities).

By 2009, the PSAO reached 70 percent of the total Ouagadougou population. It took much longer than expected to achieve the Plan's initial objectives and required the PSAO to modify its financing strategy (see below page 13). In Senegal, the PAQPUD reached 37 percent of the population of Dakar's periurban areas in four years and also exceeded its initial objectives.

Table 6: Summary Outcome and Output Indicators

Outcome/Output Indicator	PSAO (Burkina Faso)		PAQPUD (Senegal)	
	Actual	As % of 2005 Target	Actual	As % of 2006 Target
Number of beneficiaries:				
On-site sanitation facilities				
• Greywater disposal	798,000		290,000	
• Excreta disposal	377,000		156,000	
• Mixed	-		80,000	
Subtotal	1,174,700		526,000	
Condominial systems	-		57,000	
Sewerage	7,700		-	
Total	1,182,400	129%	583,000	146%
Number of facilities:				
• Greywater disposal	79,820		37,250	
• Excreta disposal	37,650		19,960	
• Mixed	-		10,290	
Total	117,470	193%	67,500	113%
Number of condominial systems	-		10	91%
Number of beneficiary schools	625	377%	77	110%
Number of households having received hygiene education	not available		73,400	367%
Percentage of city septage collected	not available		70%	not available

*Household privileged sanitation solutions that allowed them to fully benefit from water service connections and to improve their environment.*

Figure 1 below shows the overwhelming success of the shower/soakaway pit option in Ouagadougou (65 percent of constructions), –which, interestingly, was not the cheapest option–, followed by the latrine rehabilitation (24 percent). The other options together represent only 11 percent.



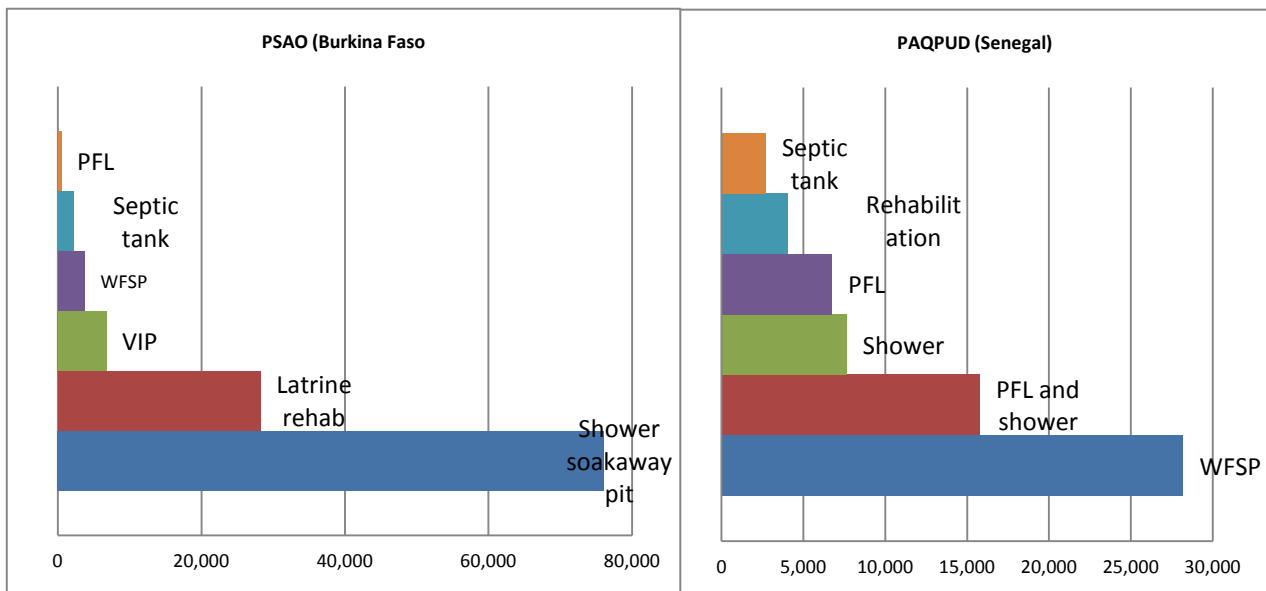


Figure 1: Most Popular On-site Facilities  
(Number)

The demand in Dakar was more diverse, reflecting the broader range of available options, and also the influence of the high population density and land occupancy of the periurban areas. The most popular option, the WFSF (42 percent), was also the least expensive. It was followed by one of the most expensive options, which combined a PFL with a shower/soakaway pit (23 percent), then by the PFL and the shower/soakaway pit separately, with 10 percent each.

### Benefits

By addressing the comprehensive sanitation needs of the population, the two operations generated two series of benefits. First the households benefited from improved sanitary conditions and from improved sanitary equipment which enabled them to fully use their water service connections (the household connection rate reached 70 percent in Ouagadougou and more than 85 percent in Dakar by 2009). Second, the urban environment at large benefited from a safer disposal of liquid wastes. In the case of Dakar, these benefits were reinforced by the implementation of disposal facilities that allowed collecting and treating 70 percent of the septage generated in the entire city.

### Capacity Building

*The operations allowed capacity building for all actors at a pace that was closely related to the implementation approaches.*

The learning curve of the PSAO spanned more than five years, during which the ONEA sanitation team progressively built capacities in program management and coordination. It became apparent in 1999 that the initial decision to rely on one NGO to act as the promotion structure –providing all technical support, training and community mobilization services– was not optimal. However, it took one year to replace it by several consulting firms with integrated responsibilities (social, technical and training) and another year to build their capacities. This is clearly reflected by the pace of construction activities, as shown in Figure 2. From 2001 onwards, ONEA had acquired

enough experience to be able to duplicate the PSAO in Bobo-Dioulasso, the second largest city, and after 2006 to manage scaled-up programs with the assistance of AfDB.

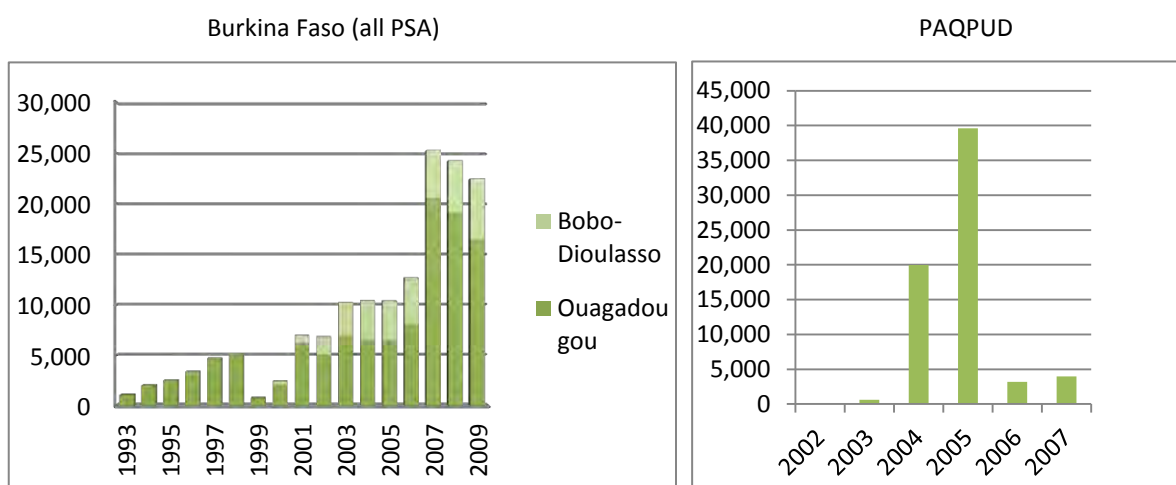


Figure 2: Pace of Construction of On-site Facilities

In Dakar, the delegation of implementation responsibilities to an experienced entity allowed PAQPUD to build capacities in eighteen months. Jumping from 1,000 to 20,000 then to 40,000 constructed facilities per year was made possible by the fact that AGETIP could simultaneously manage 38 CBOs and a number of SMEs and consulting firms. In addition, the sharing of leadership between ONAS and AGETIP did not create frictions and a consensus was quickly reached to modify the arrangements in order to address the initial weaknesses of the program rules.

## B. COSTS AND FINANCING

### Costs

Table 7 presents the cost structure of the two operations, which are quite similar when the sewerage expenditures are excluded. Support activities, which focused on on-site and condominal facilities, account for one quarter of expenditures.

Table 7: Costs of Program Activities  
(US\$ million)

Activities	PSAO (Burkina Faso)	%	PAQPUD (Senegal)	%
Sewerage	13.21	36.9%	-	-
Condominal systems	-	-	9.99	22.5%
Household facilities	14.64	40.9%	19.29	43.4%
School Sanitation	2.54	7.1%	0.92	2.1%
Septage disposal	-	-	3.85	8.7%
Support activities	5.40	15.1%†	10.39	23.47%
<b>Total</b>	<b>35.80</b>	<b>100.0%</b>	<b>44.45</b>	<b>100.0%</b>

†Support activities amount to 23.9% of PSAO expenditures for on-site sanitation

However, the average investment costs per capita (hardware and software), as shown in Table 8, differ substantially. The higher average cost of sewerage (the most expensive

sanitation mode) is 50 percent higher in Ouagadougou (US\$299) than the one observed in other operations in Dakar (US\$209), which reflects the fact that Dakar had already developed networks. Condominial systems are 50 percent cheaper (US\$108) than sewerage systems in Senegal and the average cost of on-site sanitation is by far the lowest. However, a fair comparison should refer to a comprehensive on-site sanitation solution, which combines excreta and greywater disposal and provides the same level of service as the other sanitation modes. The cost of this solution in Dakar (US\$117) is slightly higher than the condominial solution, but much lower in Ouagadougou (US\$65).

Table 8: Average Investment Costs  
(US\$ per capita)

Sanitation Alternative	PSAO (Burkina Faso)	PAQPUD (Senegal)
Sewerage	299	209
Condominial system	-	108
On-site sanitation:		
All solutions	24	48
Comprehensive solution†	65	117
Partial Solutions		
• WFSP	8	32
• Shower/soakaway	21	55
• VIP latrine	43	46
• Pour-flush latrine	29	68
• Latrine rehabilitation	10	24

†Ouagadougou: VIP latrine + shower/soakaway; Dakar: PFL + shower/soakaway

Assuming that the construction standards were the same in the two operations, the higher unit costs of on-site facilities in Dakar are mainly attributable to (i) a lower number of users per facility than in Ouagadougou; (ii) higher labor costs for Dakar SMEs than for Ouagadougou masons; and (iii) a more difficult work environment in the densely populated plots of Dakar.

## Financing

The contributions of the various financing sources of the two operations are summarized in Table 9 below.

Table 9: Financing Sources

Financing Sources	PSAO (Burkina Faso) (1993-2009)		PAQPUD (Senegal) (2001-2007)	
	US\$ M	%	US\$ M	%
Households	10.97	30.6%	4.74	10.7%
External Assistance	19.73	55.1%	38.69	87.0%
ONEA/ONAS	5.10	14.2%	-	-
Government	-	-	1.02	2.3%
Total	35.80	100.0%	44.45	100.0%

The sewerage component of the PSAO, which had no equivalent in Dakar, introduces a bias, as it was essentially financed by external assistance. A more meaningful assessment should be made by comparing the financing mix of the Ouagadougou on-site activities with the whole of the PAQPUD, as shown in Figure 3 below.

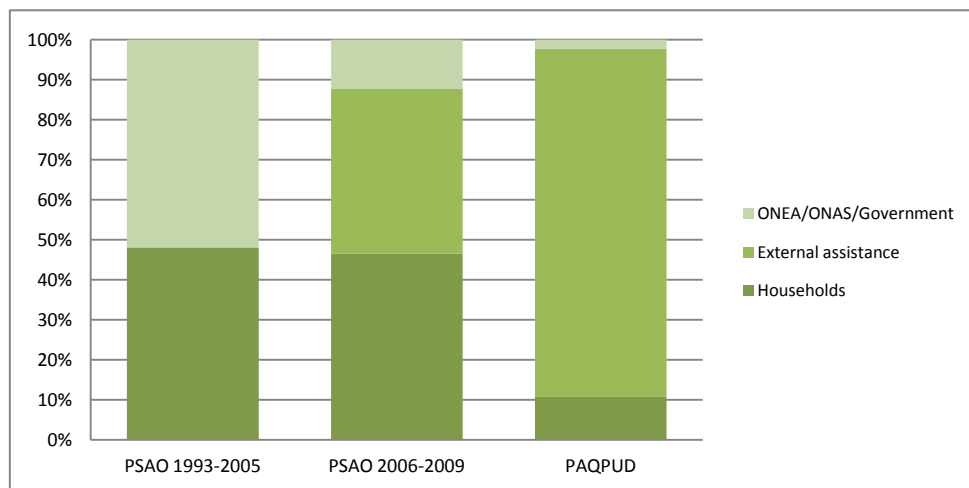


Figure 3: Financing Mix of Non-Sewerage Activities

The financing of the PSAO went through two separate phases. Until 2005, it was entirely funded by the household contributions to the costs of facilities, and by the proceeds of the sanitation surcharge collected by ONEA, which means that it was eventually entirely funded by its beneficiaries. However, the sewerage surcharges could not support financing more than 6,500 facilities per year in Ouagadougou (and about 3,500 in Bobo-Dioulasso), which was insufficient to meet the growing demand. The satisfactory record of PSAO implementation allowed ONEA, from 2006 onwards, to mobilize external assistance from the African Development Bank (AfDB) to finance on-site sanitation, which led to a 150 percent increase in the number of facilities financed each year.

Conversely, the short time span of the PAQPUD led to a reliance primarily on external assistance, which was readily available under the Bank-financed Long Term Water Sector Project (PLT). ONAS was not in a position to self-finance activities from the sewerage surcharge levied in Dakar in a short period, especially because the proceeds of the surcharge were already going to cover the operating costs of the sewerage network (see below, page17, Financial Sustainability).

### C. EFFICIENCY AND EQUITY

Efficiency refers here to the global economic efficiency of the investments, in order to assess whether the strategic choices of the two operations were cost-effective in addressing the sanitation needs. Equity is assessed by (i) comparing the actual level of subsidization accruing to the beneficiaries of the various sanitation options; and (ii) reviewing the pro-poor merits of the rules of the two operations.

#### Cost-Effectiveness

The cost-effectiveness analysis compares the equivalent annual costs (EAC, annualized capital costs and operational costs) of sanitation solutions that provide identical benefits, i.e. the collection and removal of greywater and excreta from the housing and their final disposal in adequate environmental conditions. Table 10 below compares the EAC per capita of conventional sewerage (including house connection, sewers and

treatment plant) with the EAC of condominial systems and of the on-site solution that delivers the same service level, i.e. the combination of a VIP or PFL latrine with a shower and soakaway pit, completed by septage treatment facilities<sup>1</sup>.

Table 10: Equivalent Annual Cost of Sanitation Alternatives  
(US\$ per capita)

Sanitation Alternative	Investment cost		Annualized Capital Cost*		Annual O&M costs		Equivalent annual cost	
	PSAO	PAQ PUD	PSAO	PAQ PUD	PSAO	PAQ PUD	PSAO	PAQ PUD
<b>Sewerage</b>	<b>299</b>	<b>209</b>	<b>30.7</b>	<b>21.9</b>	<b>10.0</b>	<b>6.7</b>	<b>40.7</b>	<b>28.6</b>
<b>Condominial system</b>	-	<b>108</b>	-	<b>11.0</b>	-	<b>3.8</b>	-	<b>14.8</b>
<b>Comprehensive on-site sanitation†</b>	<b>69</b>	<b>121</b>	<b>8.5</b>	<b>14.1</b>	<b>3.90</b>	<b>4.7</b>	<b>12.4</b>	<b>18.8</b>
<b>Partial on-site solutions</b>								
WFSP	8	32	0.8	3.0	0.0	0.0	0.8	3.0
Shower/soakaway	21	55	2.0	5.2	0.0	0.0	2.0	5.2
Pour-flush or VIP latrine‡	43	68	4.1	6.4	2.0	3.6	6.1	10.0

\* Annual repayment of capital cost over the lifespan of the sanitation equipment with an 8 percent interest rate

† Ouagadougou: VIP latrine + shower/soakaway; Dakar: PF latrine + shower/soakaway

‡ Ouagadougou: VIP latrine; Dakar: PF latrine

The above findings support the conclusions of the review of the average investment costs, i.e. that: (i) it is more cost-effective to provide household-level sanitary facilities than to try to expand sewerage everywhere; (ii) condominial systems are economically justified wherever on-site sanitation is not suitable; and (iii) the partial on-site solutions, which match the demand of the majority of households, are the most cost-effective.

## Equity

*Actual Subsidization of Sanitation Services.* The actual level of subsidization of services is computed by comparing their EAC, as defined above, with the total annual contributions of the households, namely: (i) the annualized cost of their direct contribution to investments (connections to networks or on-site facilities); (ii) the annual sewerage surcharges; and (iii) the annual emptying costs of on-site facilities. Results are shown in Figure 4, together with the subsidization levels of partial on-site sanitation solutions.

*The findings reinforce the case for subsidizing household facilities, as the equity of the current cost recovery policies is highly questionable.* The cost recovery policies favor sewerage customers, who are the most subsidized (88 percent in Dakar and 63 percent in Ouagadougou), as well as the customers of condominial systems (84 percent). The actual subsidization levels of the comprehensive on-site sanitation solutions are much lower (27 percent in Ouagadougou and 55 percent in Dakar) and are also lower than the direct investment subsidy. Subsidization may also become negative, as it the case for the WFSP in Ouagadougou; the subsidization levels of the other partial solutions are quite similar in the two operations.

<sup>1</sup> The PSAO did not include septage treatment facilities. Notional costs (based on the Senegal experience) are introduced here for the sake of comparison.

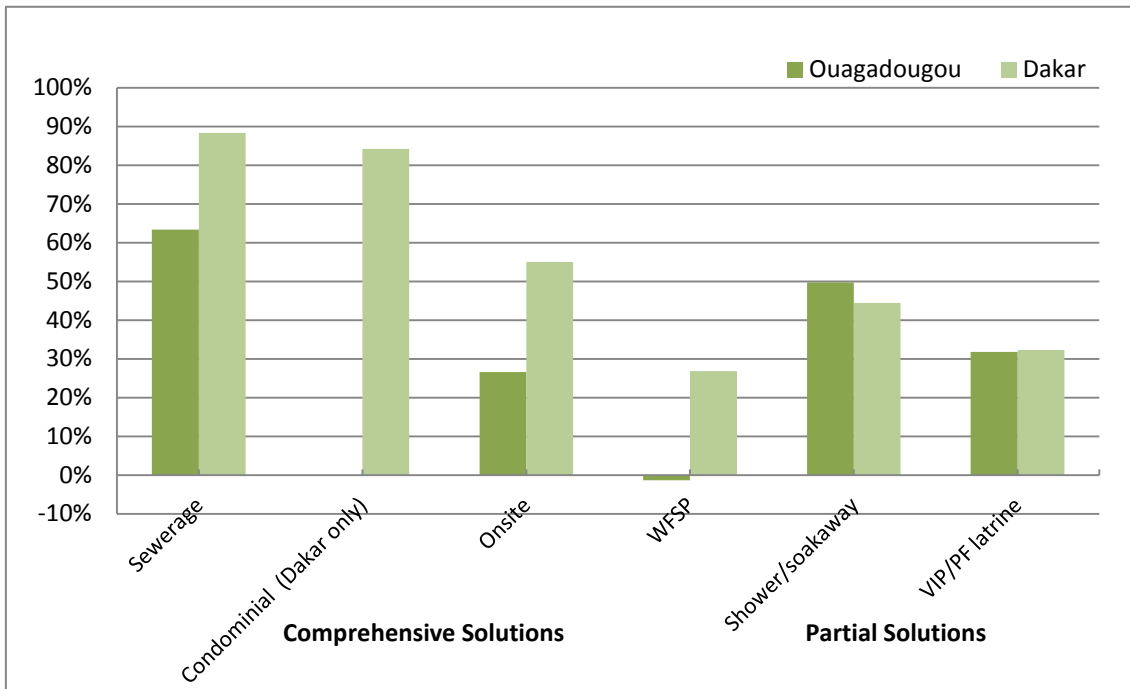


Figure 4: Actual Subsidization of Sanitation Alternatives

*Pro-poor Merits of Program Rules.* Although the PSAO did not focus on the poor, the subsidization of household facilities has direct pro-poor merits, as the catalog of on-site options met the demand of the population at large and explicitly excluded the subsidization of options more suited to residential areas (septic tanks). It is, however, likely that the subsidy rules would have to be revisited if ONEA decided to target the poorer strata of the urban population.

The pilot phase of the PAQPUD demonstrated that the subsidies have to be set to a relatively high level to trigger the demand of poor households. The impact studies conducted at the end of the program concluded that the geographical targeting of periurban neighborhoods was an acceptable proxy of income targeting. The program beneficiaries were significantly poorer than the average Dakar population. In addition, the CBOs were able to identify the poorest households (generally without adequate latrines and without any greywater facility disposal) and allow them to make in-kind contributions to benefit from the comprehensive on-site sanitation package.

#### D. SUSTAINABILITY

##### Operational Sustainability

Detailed information on the operational performances of all types of sanitation facilities is readily available in Dakar, whereas ONEA did not collect data on the functioning of household sanitation facilities.

Dakar surveys found that 81 percent of household latrines were clean and that 85 percent of households observed substantial improvements of their environment after the construction of greywater disposal facilities. The operation of school sanitation

facilities was more problematic in both cities and required additional efforts to involve principals and parents in monitoring maintenance.

Sewerage facilities, including wastewater treatment plants –which are usually out of service after some years of operation elsewhere in sub-Saharan Africa– are satisfactorily operated and maintained in both cases. ONAS was also particularly successful in establishing a partnership with septage haulers, which use extensively the septage disposal facilities constructed under the PAQPUD. Seventy (70) percent of the daily septage production of the entire city are collected, a dramatic improvement when compared to the 14 percent collected before the program, and an outstanding, if not unique, performance in West Africa.

However, the commissioning and operation of the Dakar condominal systems initially faced issues linked to a lack of coordination with other ONAS departments and to a shortage of operational revenues, as ONAS gave priority to its sewerage activities. These issues were settled under the follow-up GPOBA-financed project.

### **Financial Sustainability**

The financial sustainability of the Ouagadougou experience is unquestioned and the PSAO model was replicated after 2000 in Bobo-Dioulasso, the second largest city in Burkina Faso and later in four other urban centers. Financial sustainability results from the successful implementation and management of the sanitation surcharges, which were created with the objective of: (i) compensating the costs incurred by ONEA in the promotion of on-site sanitation; and (ii) covering the operating costs of sewerage services and the balance of the sewerage investments that were not financed by external grants and subsidies. Since 1993, the sanitation surcharges have fully covered (i) ONEA's operating costs; (ii) ONEA's expenditures for software activities in favor of on-site sanitation; and (iii) the cost of in-kind subsidies allowing the construction of about 10,000 facilities per year. Donors, who were initially reluctant to finance on-site sanitation, have been convinced to participate in the scaling up of the activities after 2006. Current commitments from AfDB, Denmark, France and Germany are sufficient to meet the external financing needs of urban sanitation in Burkina Faso up to 2015.

In contrast, the financial sustainability of the PAQPUD relied exclusively on the availability of external financial assistance. The lack of internal resources for financing on-site sanitation results from the fact that the sanitation surcharge is levied in Senegal on the water consumption of all water customers living in cities with a sewerage network (including the metropolitan area of Dakar), regardless of whether or not they are connected to sewers. The proceeds of the surcharge are the only operational revenue source of ONAS and are entirely absorbed by the operating expenditures of sewerage and drainage. Many sectoral actors, including donors, have pushed for establishing differential rates in line with the sanitation mode, but the rate structure has not been modified.

The PAQPUD was followed by a smaller GPOBA-funded operation, which eventually replicated similar rules. It was also mainstreamed in the Millennium Water and Sanitation Program (PEPAM) that constitutes the instrument through which the Government of Senegal intends, by 2015, to achieve the Millennium Development Goals (MDGs) in water supply and sanitation. Although several sector donors initially

showed limited enthusiasm to assist in funding household facilities, they agreed that the development of appropriate on-site sanitation is unquestionable. Still, the financial viability of ONAS at large is more uncertain than the one of ONEA, and the distortions of its cost recovery policy hamper the large-scale replication of the Dakar experience.



# ANNEX A: Burkina Faso Case Study

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## The Ouagadougou Strategic Sanitation Plan (PSAO)



## A.1. INTRODUCTION

The alarming lack of sanitation in Africa at the end of the UN-sponsored International Drinking Water Supply and Sanitation Decade (IDWSSD) triggered the decision of the Government of Burkina Faso (GOB) to seek the technical and financial support of the UNDP-World Bank Water and Sanitation Program (now WSP) to lay the fundamental groundwork for the development of urban sanitation. This support enabled ONEA and the Ministry of Water to prepare the first Strategic Sanitation Plan of the capital city of Ouagadougou (*Plan stratégique d'assainissement des eaux usées de la ville de Ouagadougou*, PSAO) in 1992 and to mobilize financial resources for its implementation.

In an urban setting marked by widespread poverty and the absence of urban planning, the participatory design of the Strategic Sanitation Plan enabled the creation of a detailed picture of the current state of sanitation services and facilities, to define the strategic pillars of the development of services, to set up implementation arrangements and to mobilize all stakeholders (central government, municipalities, private sector, beneficiaries, donors, NGOs and ONEA).

This case study reviews the context, features and performance of the PSAO and outlines the key factors contributing to the Plan's success and limitations. The case study also reviews how the PSAO approach was replicated in other urban centers, particularly Bobo-Dioulasso.

The preparation of this case study was based on a review of project documentation and on a consultative process with the project stakeholders conducted through individual interviews and two workshops. A first workshop was held in April 2010 to identify and discuss the key factors of success or blockage, and a first draft of the case study was discussed in a second workshop in December 2010.

## A.2. CONTEXT

### A.2.1. PRIOR SITUATION

In 1992, 70 percent of the population of Ouagadougou (about 700,000 people) had access to safe water (35 percent through household connections, 20 percent through standpipes and 15 percent through handpumps<sup>2</sup>). The access rate to improved sanitation (excreta disposal) was only 32 percent (including only 5 percent with septic tanks and flush toilets). 61 percent of the population used unimproved latrines and 7 percent practiced open defecation. In the absence of sewerage system, the most affluent neighborhoods and the business/administrative downtown districts, as well as the few

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<sup>2</sup> 22 percent of the population was supplied by water vendors, which, according to the JMP definition, is not a safe water source.

major industrial plants, discharged wastewater in their surroundings or in open drains. Greywater from kitchen, showers and washing facilities was poured on streets or in substandard pits that often overflowed. Septage collected by a few private and public haulers from septic tanks and latrines was also disposed of in the open.

### **A.2.2. INSTITUTIONAL CONTEXT AND PRIOR PROJECTS**

The National Water and Sanitation Agency, ONEA, had been created in 1985. It was formally in charge of urban water and sanitation services, as well as of drainage, but was only active in water supply. Its sanitation and drainage competencies conflicted with the mandates given to other public bodies, e.g. the Directorate of Hygiene Education and Sanitation (*Direction de l'Education pour la Santé et l'Assainissement*, DESA) of the Ministry of Health, the Ministry of Environment and the municipalities. All these agencies lacked adequate staff and resources to deliver their responsibilities. A sanitation fee levied on water consumption created in 1985 was to be billed and collected by ONEA. However, the proceeds were used to finance various activities not directly linked to sanitation services. Other public bodies thus claimed that the sanitation fee was actually a tax that should be transferred to the general budget.

Very few sanitation projects had been previously implemented in Ouagadougou. Less than 10 km of sewers had been constructed to connect some industrial and administrative sites equipped with wastewater treatment plants to the city water reservoirs. However, only one plant was still operational in 1992 and the discharge of raw wastewater was the norm.

### **A.2.3. THE STRATEGIC SANITATION APPROACH**

The Government and the sector actors had acknowledged in 1990 the unsatisfactory outcome of the UN's International Drinking Water Supply and Sanitation Decade (IDWSSD) as regards sanitation, and pointed to the absence of a sectoral strategy. It was agreed then that the necessary development of urban sanitation should not be planned exclusively from a technical perspective, as it had been the case in many West African countries, which prepared costly master plans that privileged the sewerage option and were never implemented.

The Government decided to adopt the strategic sanitation approach, which was actively disseminated at that time in the sub-region by the Abidjan Regional Office of the WSP (*Groupe Régional Eau et Assainissement*, GREA-AO). The approach aimed to devise sanitation solutions that were demand-responsive, flexible and involved the active participation of all stakeholders, including NGOs and the private sector. The formulation and the effective implementation of sustainable development arrangements, rather than the construction of a certain number of works over a specified time, was considered as the most important criterion of success.

The approach required the existence of a responsible agency to define the overall objectives, establish criteria for the development of the various sanitation alternatives (sewerage and on-site sanitation) and to manage the system of incentives. The Government clarified the institutional framework by appointing ONEA as the sole agency in charge of developing urban sanitation and established a sanitation surcharge based on actual services rendered, which would have to be used exclusively by ONEA

for sanitation activities. It was further agreed that Ouagadougou would be the first city benefiting from a Strategic Sanitation Plan.

### A.3. THE OUAGADOUGOU STRATEGIC SANITATION PLAN

#### A.3.1. OVERVIEW

##### **Objectives**

The objectives of the PSAO were: (i) to provide a sustainable framework for the development of urban sanitation services; (ii) to significantly increase the access rate of the Ouagadougou population to improved sanitation by the year 2000; (iii) to provide students of all city schools with access to improved sanitation; and (iv) to ensure the safe disposal of wastewater generated by industries and large water users, as well as of greywater and septage collected from on-site facilities.

##### **Contents**

The PSAO document formulated a comprehensive set of sector policies, including (i) selection criteria of the various types of sanitation services; (ii) recommended technical options; (iii) institutional framework; and (iv) cost recovery and financing policies.

The PSAO assessed the long-term (2005) perspectives of the sanitation services and included a medium-term (1993-2000) investment program consisting of three components:

1. An on-site household sanitation component, which aimed at promoting the rehabilitation or replacement of 9,000 traditional latrines, the construction of about 9,750 new improved latrines and about 2,200 septic tanks and the improvement of grey water disposal facilities through the provision of information, education and communication (IEC) services. This was to be combined with the provision of in-kind subsidies, the dissemination of adequate technologies and the training of the artisans to build the facilities. Although the initial PSAO document explicitly stated the need to address household needs to improve wastewater disposal conditions, no specific targets were set in that respect;
2. A school sanitation component, which aimed at providing latrine blocks to all primary and secondary schools of Ouagadougou that were not equipped and at developing an hygiene education program;
3. A collective sanitation (sewerage) component, which aimed at constructing a sewerage network and a wastewater treatment plant to serve the downtown business and residential districts and to collect, after pre-treatment, wastewater from major industrial sites.

Table A.1 below summarizes the medium-term quantitative targets (number of facilities and additional population getting access to improved (basic) sanitation) of the program together with longer-term targets for the year 2005. Details on the types of facilities to be constructed are given in Table A.9 of Appendix A.1.

Table A.1: PSAO Targets 2000-2005

Year	Baseline (1992)	2000	2005
<b>On-site Sanitation</b>			
Number of improved excreta disposal facilities	14,925	37,850	75,905
Additional number of facilities	0	22,925	60,980
Population with access to improved (basic) sanitation†	224,000	553,200	1,143,200
Additional population with access to improved (basic) sanitation†		329,200	919,200
<b>School Sanitation</b>			
Latrine blocks	21	187	n/a
Number of students with access to improved sanitation	9,400	83,400	n/a
<b>Sewerage</b>			
Served population	0	6,000	10,000
Wastewater collected (m <sup>3</sup> /day)	0	2,560	3,100

† Population estimated using an average number of 15 people per facility

Source: PSAO (1993)

## Phasing

The implementation of the PSAO began in 1993 with a 12-month pilot project that targeted one downtown traditional neighborhood and one periurban neighborhood. The pilot project, which focused on the on-site sanitation component, aimed at (i) testing implementation arrangements and the acceptability of technical solutions; (ii) fine-tuning the demand-generation tools; and (iii) training social workers and artisans. The PSAO document was finalized afterwards and was officially adopted by the Government in January 1995. Implementation was then extended to all city neighborhoods and to the school sanitation component, with financing from ONEA (through the sanitation surcharges) and beneficiaries.

The sewerage component started in 1996 with the financial support of IDA –through the Urban Environment Project (*Projet d'Amélioration des Conditions de Vie Urbaine*, PACVU)–, and of the French Aid Agency (*Agence française de développement*, AFD), which also supported, together with the German Aid Agency (*Kreditanstalt für Wiederaufbau*, KfW) the replication of the PSAO to Bobo-Dioulasso, the second largest city.

The PSAO was extended after 2000, with the support of the same donors, until 2005, and, from 2006 to 2009, with the support of the African Development Bank (AfDB), which contributed to the continuation of the on-site sanitation component.

### A.3.2. DESIGN

#### Responsibility

ONEA had set up, at the end of 1990, a team to prepare the PSAO documents and to manage its implementation. The team consisted of two sanitation engineers, one urban

specialist, one sociologist and one technician, and was assisted by a coordinator appointed and financed by GREA-AO. The team was trained in Ouagadougou by the Regional Center for Low-cost Sanitation and Water Supply (*Centre Régional pour l'Eau Potable et l'Assainissement à Faible Coût*, CREPA) and visited the Kumasi Sanitation Project in Ghana.

### **Preparatory Studies**

The ONEA team carried out, with the assistance of consultants financed by GREA-AO, a series of preparatory studies, including:

- An urban study to assess urban development and its linkage with the development of sanitation services, completed by a household survey of greywater and excreta disposal;
- An environmental diagnostic study to prepare a mapping of the suitability of physical conditions (geology and water table) of the various city neighborhoods for sanitation, and to assess the impact of the discharge of excreta and wastewater on the urban environment, water resources and health conditions. The soil characteristics were generally suitable for on-site sanitation, but the high water table level in the downtown areas led to recommend sewerage solutions for the business and administrative districts;
- A study of the willingness-to-pay (WTP) for on-site sanitation facilities, which was based on contingent valuation surveys. The study found that 80 percent of households were ready to pay or borrow the equivalent of CFAF 100,000 to improve sanitation, i. e. about 75 percent of the total cost of a latrine. The WTP revealed a preference for pour-flush latrines;
- A feasibility study of the collection and disposal of industrial wastewater and of the wastewater produced by the downtown business and administrative districts;
- An economic and financial study to assess how sanitation surcharges could contribute to finance ONEA's sanitation activities.

The findings of the preparatory studies were discussed in several workshops with the stakeholders (civil society, NGOs, ministerial departments and municipalities).

### **A.3.3. IMPLEMENTATION**

#### **Roles and Responsibilities**

In the execution of the investment program ONEA played a conventional role of executing agency for the sewerage component and a much more innovative role in the on-site sanitation component, which is described below.

The implementation responsibilities of the on-site sanitation component were allocated as follows:

- Oversight, coordination, and monitoring remained with ONEA through its Department of Sanitation (*Direction de l'Assainissement DASS*);
- ONEA contracted promotion and demand-generation activities to a promotion structure (PS) –initially a NGO and, later, consulting firms–, and training activities to the CREPA;

- Works were executed by masons contracted by households;
- Part of construction materials and supplies<sup>3</sup> were procured by ONEA from prefabricators and provided to households as an in-kind subsidy;
- The quality of works and supplies was supervised by consulting firms contracted by ONEA.

### **Partnerships and Contractual Arrangements**

The contractual arrangements aimed at establishing a partnership framework between households, the promotion structure, artisans (masons and prefabricators) and ONEA, and at creating incentives.

The team of community workers (CWs) –of whom 60 percent were women– of the promotion structure plays the role of social intermediary inside the communities, between households and masons and prefabricators, and between the latter and ONEA. The promotion structure selects masons and prefabricators in the neighborhoods for initial training and put them in contact with the households without intervening in the negotiation of the works contracts. The promotion structure signs a performance agreement with ONEA, the fulfillment of which is a condition for the renewal of its services contract.

Masons and prefabricators provide labor and supplies for constructing the facilities that were designed in accordance with the households' requests and with ONEA's technical guidelines. They operate under different contractual arrangements. Masons are directly contracted by households, who select them from a list of agreed and trained neighborhood masons. Their interventions are programmed and supervised by the promotion structure in close coordination with ONEA. Prefabricators are contracted by ONEA and their unit prices are regulated by ONEA and periodically adjusted to the prices of inputs.

### **Flow of Funds**

Public funds, which were generated by the proceeds of the sanitation surcharge or by donors' contributions, were managed by ONEA and entirely separated from funds brought by beneficiaries. The promotion structure and the prefabricators were paid by ONEA. The masons used the materials supplied by the prefabricators, whereas their labor costs were exclusively paid by beneficiaries, who did not receive any cash subsidy.

### **Adjustments**

The PSAO arrangements were modified during implementation to take into account, *inter alia*, the lessons of the pilot phase and the need to reinforce performance incentives and demand incentives.

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<sup>3</sup> Doors and corrugated iron roofs for latrine cabins, slabs for VIPs and washing facilities, ventilation pipes for VIPs, sinks and syphons for pour-flush latrines, and bricks for pit walls.

*Lessons from the pilot phase.* The pilot phase allowed construction of 1,090 on-site facilities in 15 months. Implementation validated (i) the demand generation approach with a mix of mass communication and individual household information; (ii) the acceptability of technical options; (iii) the feasibility of financing ONEA's promotion activities by the sanitation surcharge.

The pilot phase evidenced a stronger than expected demand of households for greywater disposal (soakaway facilities), which amounted to 60 percent of the total number of facilities and a preference for latrine rehabilitation (24 percent) over VIP latrines (14 percent) and pour-flush latrines (PFL, 2 percent). The field results contradicted the WTP study, which had predicted a much higher demand for excreta disposal and in particular for PFLs<sup>4</sup>.

The pilot phase also evidenced that training needs had been underestimated. The promotion structure could not provide *ex nihilo* enough community workers with adequate competencies and their training took much longer than expected. It was decided to integrate training activities in the responsibilities of the promotion structure, rather than relying exclusively on the CREPA.

*Integration of Implementation Responsibilities.* After four years of scaled-up implementation, it became clear that the NGO was overwhelmed by the growing demand and that ONEA could not by itself ensure works supervision. ONEA decided in 1998 to recruit consulting firms on a competitive basis to act as promotion structures with integrated responsibilities in community development, training and technical supervision and to introduce performance incentives, to which consulting firms would be more responsive than NGOs.

#### **A.3.4. TECHNICAL ASPECTS**

The PSAO was designed at the onset to address comprehensive sanitation needs, i.e. excreta and wastewater (greywater) disposal.

##### **Sanitation Alternatives**

The PSAO retained on-site sanitation as the basic alternative since: (i) sewerage was almost nonexistent in Ouagadougou; and (ii) the preparatory studies had concluded that the entire city area was suitable for on-site sanitation, provided that facilities would be of acceptable quality and adequately sized.

The scope of the sewerage alternative was limited to areas developed with multi-story buildings with high water consumption and to a few industrial sites, which had to be equipped with on-site pre-treatment (brewery, tannery and slaughterhouse). A treatment plant would receive all the collected wastewater and the septage collected by

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<sup>4</sup> This is not entirely surprising, as (i) Ouagadougou households were not familiar with the types of latrines proposed in the survey questionnaire; and (ii) the contingent valuation survey referred to monthly payments of a hypothetical credit financing the facility to assess the willingness to pay, rather than to the total cash contribution, which was actually paid at the implementation stage.



haulers from on-site facilities. The treatment would be complete, including lagoons, secondary and tertiary treatment (maturation ponds).

The condominal alternative, which was not widely disseminated at that time<sup>5</sup>, was not contemplated by the PSAO. The low water connection rate and the rather flat layout of the city did not favor such an option, which would have required a number of costly pumping stations.

### Technical Options for On-site Facilities

The types of sanitation facilities that were proposed to Ouagadougou households were the following:

- Greywater disposal solutions consisted, after the pilot phase, of: (i) soakaway pits; and (ii) shower facilities with soakaway pit (*douche puisard*). Washing facilities associated with soakaway pits (*bac à laver puisard*, WFSP) were also introduced in 2000;
- Excreta disposal solutions initially consisted of: (i) pour-flush latrines with one or two pits (PFL); (ii) ventilated improved latrines with one or two pits (VIP); (iii) rehabilitation of existing latrines; and (iv) septic tanks that were proposed without any possibility of subsidy.

The capital costs of the facilities might substantially vary with the size of the households. The average unit costs gathered by ONEA were as follows:

Table A.2: PSAO Average Cost of On-Site Sanitation Facilities

Type of Facility	Sanitation Mode	Unit Cost (CFAF)
WFSP	Greywater Disposal	24,600
Shower soakaway pit	Greywater Disposal	51,300
Pour-Flush latrine	Excreta Disposal	99,000
VIP latrine	Excreta Disposal	160,000
Latrine rehabilitation	Excreta Disposal	40,000
Septic tank	Excreta Disposal	185,000

Source: ONEA (1999-2003)

The school latrines consisted of blocks of VIP latrines with two pits (usually seven latrines per block).

### A.3.5. SOCIAL ASPECTS

#### Demand Generation

*Communication Strategy.* The communication strategy relied on: (i) media planning surveys to develop mass communication campaigns (radio and TV spots, press and social events); and (ii) participatory techniques to develop social communication. The

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<sup>5</sup> The ONEA team had visited the small-bore sewer network constructed in Kumasi, Ghana, but was not convinced by the operational performances and the design, which led to constructing connections and interceptor tanks outside the household's plots.

community workers (CWs) were trained in GRAAP<sup>6</sup> and focus group management. CWs organized information meetings with visual aids (cards, photos and models), guided visits to areas already equipped with sanitation facilities and home visits. The number of visits seemed to be a determining factor in whether or not households participated in the program. On average, each CW contributed to the construction of 100 sanitation facilities per year.

*Processing of requests.* Table A.3 below summarizes the processing of the households' demand for on-site sanitation facilities.

Table A.3: PSAO - Processing Steps of Household Requests

Step	Purpose	Activities
1	Information	Community workers (CW) organize focus groups and visit households to deliver information on environmental health, sanitation solutions and PSAO rules
2	Demand Gathering	Households fill requests forms stating the type of facility selected. CWs put household in contact with area masons.
3	Agreements	Mason and household negotiate a works contract. A quantitative estimate of inputs required for the construction is prepared and transmitted to ONEA through the CW. Input order forms are prepared by ONEA and transmitted to households by the CW.
4	Construction	Works are executed by the mason. The area prefabricator supplies inputs against order forms signed by mason and household. The PS technician verifies the quality of inputs and inspects works in progress. The prefabricator periodically transmits collected order forms to ONEA for payment.
5	Completion	Once completed, the PS technician verifies that the facility complies with standards. The CW fills a final monitoring form to be signed by the household.

Source: ONEA – Manual of Procedures for On-site Sanitation

### Integration of Artisans

Ouagadougou masons had prior experience in the construction of traditional latrines, but needed extensive training in adequate design and standards. In each neighborhood, the promotion structure carried out a preliminary enumeration of artisans (masons and prefabricators) and selected candidates for training. At the end of the training sessions, artisans received a kit of molds of slabs, ventilating pipes and bricks for the construction of pits.

During the pilot phase, many trained masons disappeared at the implementation stage, as they found other more remunerative opportunities. To strengthen their involvement in the program, ONEA and the promotion structure provided coaching and technical support to artisans after the initial training. They were encouraged to regroup in associations and to exchange experiences in periodic workshops. This continuous support substantially increased their motivation over time and they eventually gained pride in considering themselves as ONEA agents.

<sup>6</sup> Support and Research Group for Community Self-Promotion (*Groupe de Recherche et d'Appui pour l'Auto-promotion Populaire*)

### A.3.6 FINANCING ARRANGEMENTS

#### Cost Recovery Policies

ONEA and the Government agreed that sanitation activities should not have a negative impact on ONEA's overall financial equilibrium. The cost recovery policies were thus based on the following principles:

- The costs associated with the development of on-site sanitation would be fully recovered from beneficiaries, through their contributions to the cost of facilities and through a sanitation surcharge paid on water consumption, which would cover the costs incurred by ONEA (staff costs and the costs of support activities);
- The beneficiaries of sewerage services would pay a different sanitation surcharge, which would cover the operating expenditures of the services and a minor share of the sewerage investments that would be self-financed by ONEA. The remainder of the sewerage investments would be financed by external grants.

The sanitation surcharge was set at CFAF 20 per m<sup>3</sup> for ONEA's water customers with on-site sanitation facilities, CFAF 10 per m<sup>3</sup> for water sold at standpipes, CFAF 60 per m<sup>3</sup> for domestic customers with a sewer connections and CFAF 90 per m<sup>3</sup> for administrative and commercial customers with a sewer connection.

The initial financing plan of the PSAO is provided below<sup>7</sup>. Grants would finance 34 percent of total expenditures and households would finance 38 percent through their payments for on-site facilities and would eventually repay ONEA's share (28 percent) through the sanitation surcharges.

Table A.4: PSAO Financing Plan 1994-2000  
(CFAF million)

Program Activities	Total Expenditures	ONEA	Household Payments	Grants
<b>Sewerage</b>	<b>4,332</b>	<b>916</b>	<b>0</b>	<b>3,416</b>
<b>On-site Sanitation</b>				
Household facilities (excreta disposal)	4,850	1,050	3,800	0
Support activities	420	420	0	0
<b>Sub-total</b>	<b>5,270</b>	<b>1,470</b>	<b>3,800</b>	<b>0</b>
<b>School Sanitation</b>	<b>436</b>	<b>436</b>	<b>0</b>	<b>0</b>
<b>Total</b>	<b>10,038</b>	<b>2,822</b>	<b>3,800</b>	<b>3,416</b>
<b>%</b>	<b>100.0%</b>	<b>28.1%</b>	<b>37.9%</b>	<b>34.0%</b>

<sup>7</sup> The costs of the PSAO were estimated in 1992 and have been adjusted here to account for the impact of the CFAF devaluation that took place at the end of 1993.

## Subsidy Arrangements

*Initial Subsidy Levels.* The subsidy arrangements were initially designed in view of the findings of the WTP study, which found that households were ready to finance 75 percent of the cost of improved sanitation. The subsidy level was adjusted to the mode of sanitation. It amounted to about 18 percent for excreta disposal solutions (VIP, PFL or rehabilitation) and to 30 percent for greywater disposal (soakaway pits).

*Further Changes of Rules.* From 2006 onwards, foreign donors agreed to help ONEA to finance on-site sanitation. The external support created an opportunity to boost demand by increasing the level of subsidization, which was raised to about 50 percent of the cost of the facilities.

*Eligibility.* The PSAO aimed at promoting sanitation throughout the city, without a particular focus on the poor. The emphasis put on on-site sanitation would indeed favor the improvement of the living conditions of the less affluent neighborhoods, but the PSAO rules did not consider targeting the poorest areas. All households were eligible for in-kind subsidies, with the exception of (i) people living in the residential downtown districts targeted by the development of the sewerage network; and (ii) households that selected septic tanks as their preferred sanitation solution.

### A.4. PERFORMANCE ASSESSMENT

#### A.4.1. OUTCOME AND RESULTS

##### Outcome

Overall, the PSAO achieved its objectives of promoting on-site sanitation facilities, mainstreaming school sanitation and creating an operational sewerage network. The actual household demand for sanitation services was, however, quite different from what was anticipated and the pace of implementation slower than expected. This outcome is not surprising in the context of a strategic sanitation plan, which should privilege the establishment of a sustainable and demand-driven development framework over the completion of quantitative targets.

Table A.9 of Appendix A.1 provides the detailed outcome and output indicators for the target years of the program, and for the year 2009. Results are summarized below.

Table A.5: PSAO - Summary Outcome and Indicators

Outcome/Output Indicator	2000		2005		2009	As % of 2005 Target
	Target	Actual	Target	Actual	Actual	
<b>On-site Sanitation</b>						
<i>Number of beneficiaries</i>						
Greywater disposal		136,700		374,600	798,000	n/a
Excreta disposal	329,200	81,100	919,200	158,500	377,000	41%
<i>Total</i>	<i>329,200</i>	<i>217,800</i>	<i>919,200</i>	<i>533,100</i>	<i>1,175,000</i>	<i>128%</i>
<i>No. of facilities</i>						
Greywater disposal		13,700		37,500	79,800	n/a
Excreta disposal	20,925	8,100	59,000	15,800	37,700	64%
<i>Total</i>	<i>20,900</i>	<i>21,800</i>	<i>59,000</i>	<i>53,300</i>	<i>117,500</i>	<i>199%</i>
<b>School Sanitation</b>						

Outcome/Output Indicator	2000		2005		2009	As % of 2005 Target
	Target	Actual	Target	Actual	Actual	
Latrine blocks	166	170	n/a	295	625	n/a
Number of students	74,000	77,000	n/a	134,000	284,000	n/a
<b>Sewerage</b>						
Served population	6,000	-	10,000	6,800	7,700	77%
Wastewater collected (m <sup>3</sup> /day)	2,560	-	3,100	1,650	2,200	71%

Source: ONEA

The above data show that the PSAO eventually met, but with delays, the initial targets in terms of total number of constructed facilities and total beneficiaries. However, in responding to the households' demand, the implementation of the PSAO showed that the Ouagadougou population privileged greywater disposal facilities (68 percent of constructed facilities) over excreta disposal (32 percent). The actual number of beneficiaries of improved basic sanitation (excreta disposal) is 59 percent lower than expected (377,000 vs. 919,000); the gap between expected and actual values is accentuated by the fact that the average number of people sharing a latrine was estimated at 15 in the PSAO document, whereas the actual average was only 10. Conversely, the majority of PSAO beneficiaries are beneficiaries of greywater disposal facilities, for which the original PSAO document did not set any target; their number (800,000) exceeds the population of the city at the start-up of the program. To understand the reasons behind the above preferences, it is helpful to examine in detail the demand for the various technical solutions.

Figure A.5 shows the relative share of the main types of on-site facilities constructed (117,500). The final distribution is in line with the results of the pilot phase.

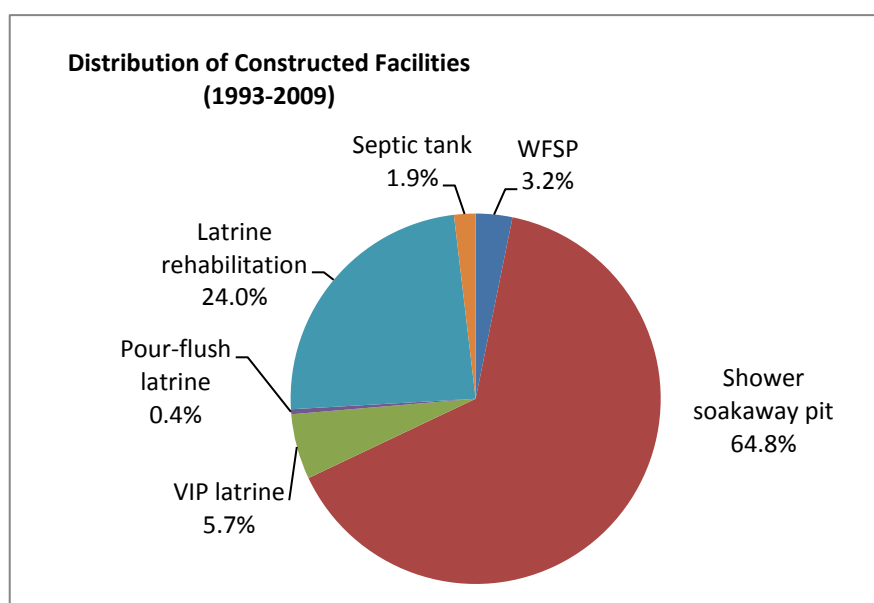


Figure A.5: Demand for On-site Facility Solutions

The shower soakaway pit was the most popular option (about two thirds of the total), followed by the latrine rehabilitation (one quarter of the total). The latter was also by far the preferred latrine option, well ahead of the VIP (less than 6 percent), the septic

tank and the PFL (0.4 percent). The preference for greywater disposal facilities cannot be explained by cost considerations, as the shower soakaway pit required a household cash contribution of CFAF 25,000, i.e. twice as much as the amount of the contribution for latrine rehabilitation. There is no doubt that the demand for greywater disposal facilities was also driven by the parallel development of water connections. The water connection rate in Ouagadougou increased from 38 percent in 1992 to 70 percent in 2009 and the volume of wastewater increased dramatically.

The pace of construction activities varied over time, as shown in Figure A.6, which gives the average annual number of facilities constructed during the 1993-2000, 2001-2005 and 2006-2009 periods.

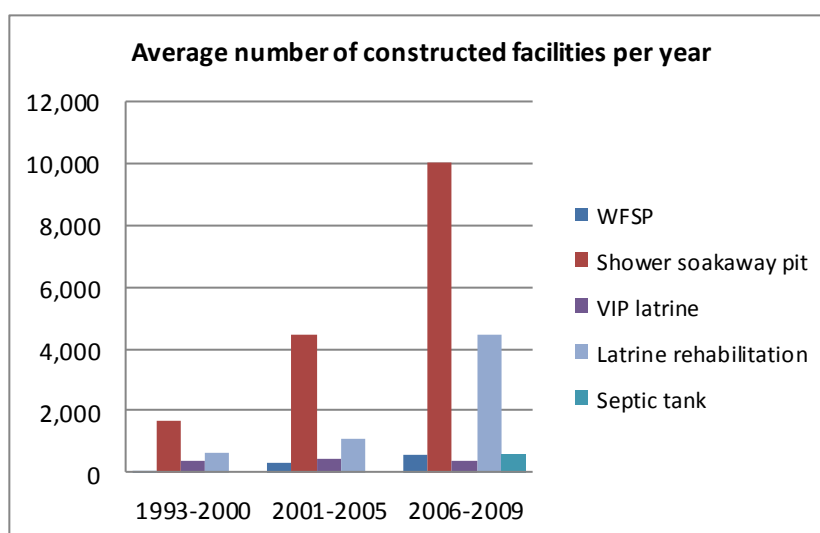


Figure A.6: Pace of Construction Activities  
(Annual Averages)

The results point to a substantial acceleration of the pace of construction, in particular for 2006-2009. About 64,000 facilities were constructed during that period, i.e. more than the total in the 13 preceding years (53,000). This peak corresponds to the implementation of an AfDB-financed program that increased the funds available for in-kind subsidies and for support activities, and also allowed increased subsidization from 25 percent to 50 percent. The share of greywater disposal facilities increased over time, as well as the demand for latrine rehabilitation, which surpassed all other excreta disposal solutions.

*School Sanitation.* The program of school latrines was implemented as planned over 1993-2000 and was expanded afterwards, to cover all Ouagadougou schools, public and private.

*Sewerage.* The implementation of the sewerage component started in 2002, once external funding became available from AFD and IDA, and resulted in the construction of:

- 77 km of sewers, including 9 km of interceptors, 31 km of secondary sewers and 37 km of tertiary sewers;
- 341 sewerage connections;

- One wastewater treatment plant with 10 hectares of lagoons, including three anaerobic lagoons, three facultative lagoons and three maturation ponds ;
- One laboratory, one storage facility and operation facilities equipped with remote control.

### **Institution and Capacity Building**

The PSAO established ONEA as the recognized leader of urban sanitation in the country. The agency progressively built capacities in programming, coordination, technical design and operation of sewerage facilities. In 1994, ONEA's team in charge of preparing the PSAO officially became ONEA's Sanitation Unit in charge of implementing the PSAO, which in turn was elevated in 1998 to the level of a Sanitation Department (*Direction de l'assainissement*, DASS). Institution building was facilitated by the existence of the sanitation surcharges that could sustainably finance the expansion of ONEA's sanitation activities and the operational costs of DASS. By 1998, ONEA had developed enough technical expertise, which initially depended on assistance from GREA-AO and CREPA, to independently manage the on-site sanitation component and from 2002, the sewerage component of the PSAO. By the same time, DASS had acquired enough programming and coordination capacities to also manage the Strategic Sanitation Plan (SSP) of Bobo-Dioulasso and, by 2006, to increase by 250 percent its absorption capacity with the implementation of the AfDB-financed program.

The training activities funded by the PSAO targeted (i) about 200 masons and 20 prefabricators who were trained in sanitation technologies; and (ii) about 120 community workers of the promotion structures who were trained in social communication. As mentioned above, initial training was followed during implementation by intensive coaching, particularly for the artisans.

### **Operational Performances**

*Sustainability of On-site Sanitation.* ONEA did not gather data on the use and maintenance of household facilities. Initial assessments of the school latrines showed that their maintenance and caretaking arrangements were inadequate. The installations were the victims of their own success, in that they suffered from unauthorized use, during the night, by other people living in the vicinity. These weaknesses were corrected with the generalization of household latrines and by strengthening the involvement of parents and teachers in the management and oversight of facilities.

The financial sustainability of on-site sanitation activities is closely monitored by ONEA, as the collection rate of sanitation surcharges is one of the key indicators of the Performance Contract signed by the agency and the Government. Figure A.7 presents ONEA's annual revenues from the sanitation surcharges together with its annual expenditures related to on-site sanitation.

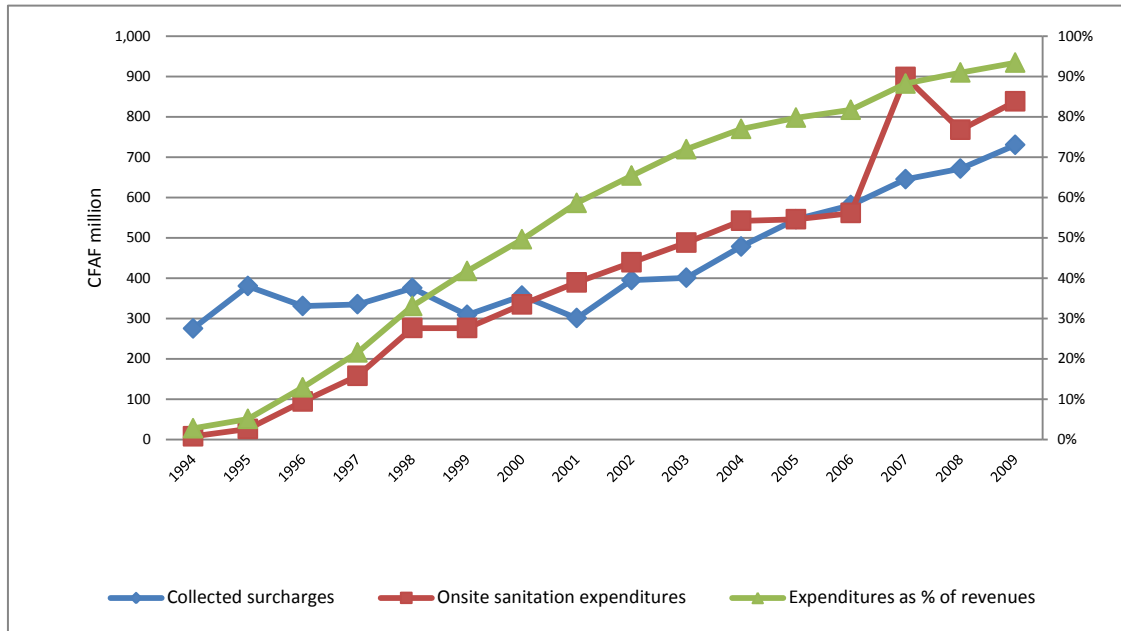


Figure A.7: ONEA Revenues and Expenditures for On-site Sanitation

*Sewerage Operations.* The sewerage facilities are satisfactorily operated and the wastewater treatment plant functions in accordance with standards. The plant’s effluents are re-used, after tertiary treatment, in the irrigation of 600 small agricultural plots covering 11 hectares. Still, the volume of wastewater collected by the sewerage system represents only 4 percent of the total wastewater generated in Ouagadougou, whereas the greywater disposal facilities built under the PSAO may collect 33 percent of the total wastewater.

#### A.4.2. COSTS AND FINANCING

##### Costs

Between 1993 and 2009, the overall cost of the PSAO amounted to CFAF18.2 billion (US\$35.8 million)<sup>8</sup>. Table A.11 of Appendix A.2 lists the detailed expenditures, which are summarized in Figure A.8. 57 percent (CFAF 10.4 billion) were spent in the last four years. About 24 percent of the costs of the on-site sanitation components were spent on support activities (promotion structure, training and program management by ONEA).

<sup>8</sup> CFAF costs have been converted in US\$ at the average exchange rate of each review period (US\$1 = CFAF 575 for 1993-2000, CFAF 560 for 2001-2005 and CFAF 475 for 2006-2009).



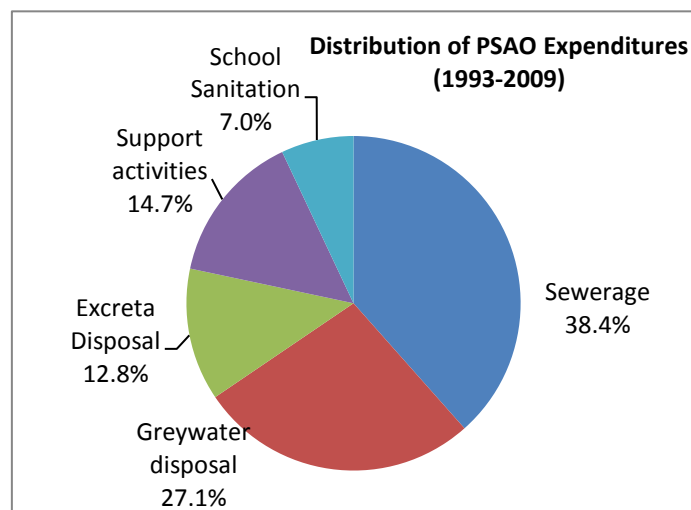


Figure A.8: Costs of PSAO Activities

Figure A.9 gives the relative share of the various types of household sanitation facilities in the total expenditures. Greywater disposal facilities account for two thirds of expenditures.

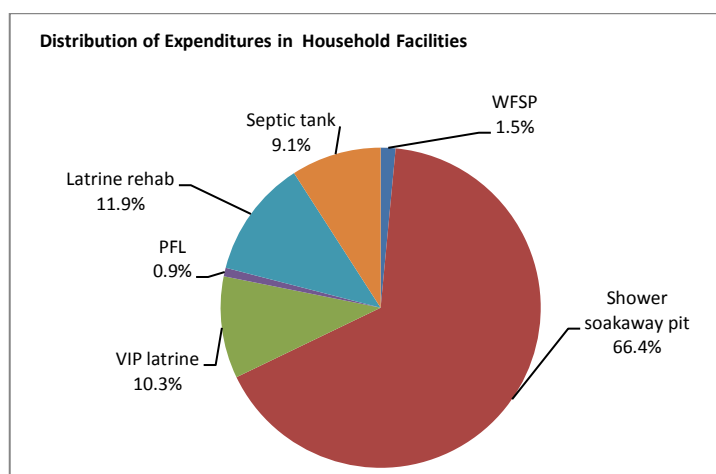


Figure A.9: Costs of Household Facilities

## Financing

The contributions of the various financing sources are detailed in Table A.12 of Appendix A.2 and summarized below. The financing mix differs from the initial forecasts, as more grant financing was mobilized to cover the costs of sewerage investments, and after 2006, to fund the in-kind subsidies, which in turn reduced ONEA's share.

Table A.6: Summary PSAO Financing

Period	Financing Sources	ONEA	Households	Grants	Total
1993-2005	US\$ Million	2.91	2.54	8.38	13.83
	%	21.0%	18.4%	60.6%	100.0%
2006-2009	US\$ Million	2.19	8.43	11.35	21.97

Period	Financing Sources	ONEA	Households	Grants	Total
	%	10.0%	38.4%	51.7%	100.0%
Overall	US\$ Million	5.10	10.97	19.73	35.80
	%	14.2%	30.6%	55.1%	100.0%

Source: ONEA

Households directly paid 53 percent of the costs of the on-site sanitation component, ONEA financed 22 percent and grants financed 25 percent.

Until 2005, the sanitation surcharges generated enough revenues to compensate ONEA's share of program investments and the operating costs of DASS. However, it became clear at that time that the funding of the on-site sanitation component of the PSAO needed to be boosted to increase access to sanitation. This required both stimulating demand by increasing the subsidization level and increasing the global amount of subsidies to reach a larger audience. The donors agreed to fill the gap and began to finance on-site sanitation.

#### A.4.3. EFFICIENCY AND EQUITY

The efficiency of the PSAO is reviewed in light of its overarching objective to provide adequate sanitation solutions to the entire urban population by privileging the on-site alternative over the sewerage alternative. The evaluation should thus compare the cost-effectiveness of the two alternatives. The analysis is completed by: (i) comparing the actual level of subsidization accruing to on-site beneficiaries with the one accruing to seweraged households; and (ii) assessing whether the PSAO rules enabled delivering its benefits to the poor.

#### Cost-Effectiveness

The cost-effectiveness analysis compares the equivalent annual costs (EAC, annualized capital costs and operational costs) of sanitation solutions that provide identical benefits, i.e. the collection and removal of greywater and excreta from the housing and their final disposal in adequate environmental conditions. Table A.7 below compares the EAC per capita<sup>9</sup> of conventional sewerage (including house connection, sewers and treatment plant) with the EAC of condominial systems and of the on-site solution that delivers the same service level, i.e. the combination of a VIP latrine with a shower and soakaway pit, completed by septage treatment facilities<sup>10</sup>.

<sup>9</sup> The detailed calculations are given in Table A.13: PSAO - Cost-Effectiveness of Sanitation Alternatives Table A.13 of Appendix A.3.

<sup>10</sup> The PSAO did not include septage treatment facilities. Notional costs (based on the Senegalese experience) are introduced here for the sake of comparison.

Table A.7: PSAO Equivalent Annual Cost of Sanitation Alternatives(US\$ per capita)

Sanitation Alternative	Investment cost	Annualized Capital Cost*	Annual O&M costs	Equivalent Annual Cost
<b>Sewerage</b>	<b>299</b>	<b>30.75</b>	<b>9.99</b>	<b>40.74</b>
<b>On-site sanitation</b>				
VIP latrine+ shower/soakaway	65	8.16		
Septage Disposal Facilities	4	0.40		
<b>Total</b>	<b>69</b>	<b>8.56</b>	<b>3.93</b>	<b>12.49</b>
<b>Partial Solutions</b>				
WFSP	8	0.78	0	0.78
Shower/soakaway	21	2.04	0	2.04
VIP latrine	43	4.13	1.97	6.10
Latrine rehabilitation	10	1.17	1.97	3.14

\* Annual repayment of capital cost over the lifespan of the sanitation equipment with an 8 percent interest rate

The above results amply justify the PSAO choices. Conventional sewerage is 2.2 times costlier than the comprehensive on-site sanitation solution. The partial on-site solutions are indeed much less expensive.

## Equity

*Actual Subsidization of Sanitation Services.* The actual level of subsidization of services is computed by comparing the EAC of the household's sanitation service, as defined in the above paragraph, with the total annual contributions (capital and operating expenditures) of the household. Table A.14 of Appendix A.3 provides the detailed calculations; the results are summarized below in Table A.8.

Table A.8: PSAO Actual Levels of Subsidization

Alternative	Equivalent Annual Cost (US\$ per capita)	Total Contribution (US\$ per capita)	Subsidy Level (%)
Sewerage customers	40.74	14.94	63.3%
Beneficiaries of comprehensive on-site sanitation package	12.49	9.17	26.6%
Beneficiaries of partial solutions:			
• WFSP	0.78	0.79	-1.4%
• Shower/soakaway	2.04	1.03	49.7%
• VIP latrine	6.10	4.16	31.8%
• Latrine rehabilitation	3.14	2.74	12.6%

Domestic customers of the sewerage network receive a 63 percent subsidy, which is much higher than the one accruing to beneficiaries of a full on-site sanitation package (less than 27 percent). Households who selected the least expensive on-site sanitation solutions may end up paying more than the full annual cost of their facilities (WFSP).

*Pro-poor Merits of Program Rules.* The PSAO aimed at developing access to sanitation, without specifically targeting the poor. As mentioned above, the in-kind subsidies were available to all households expressing demand for on-site sanitation and no particular efforts were deployed to reach the poor. A 1999 household survey found that, among the beneficiaries of on-site sanitation facilities, the percentage of civil

servants and employees of the formal private sector was higher than in the average urban population, whereas employees of the informal sector, laborers and unemployed persons were less likely to construct facilities. This is not surprising as the poorer households might have faced difficulties in having to pay the masons within the short period of construction. The possibility of credit arrangements that was mentioned in the WTP studies never materialized.

#### **A.4.4. REPLICABILITY**

ONEA built on the achievements of the PSAO to replicate the strategic sanitation approach, first in Bobo-Dioulasso, the second largest city of Burkina Faso, in 1999, and in 2006, in four secondary urban centers (Fada N’Gourma, Koudougou, Ouahigouya and Banfora). In addition, the Government mainstreamed on-site sanitation in the National Water and Sanitation Program (*Programme National d’Alimentation en Eau Potable et d’Assainissement*, PN-AEPA), which was developed to address the country’s anticipated needs in 2015. The implementation experience of these strategic sanitation plans (SSPs) is reviewed below, in particular to assess their consistency with the PSAO rules.

#### **Implementation Experience of the Other SSPs**

*Bobo-Dioulasso.* Bobo-Dioulasso, with a population of about 350,000 people faced sanitation problems similar to those of Ouagadougou. In 1999, ONEA developed the Bobo-Dioulasso Strategic Sanitation Plan (PSAB) with the support of the IDA-financed PACVU. The PSAB built on the PSAO experience and adopted its implementation framework and rules. Preparation studies were identical to the ones carried out in Ouagadougou and ONEA set up a specialized sanitation unit in Bobo-Dioulasso. The associated investment program contemplated: (i) the construction of sewerage facilities serving industrial sites and the downtown residential area; (ii) the promotion of on-site sanitation facilities; and (iii) the construction of school latrines and of public toilets.

The sewerage facilities were built under financing of KfW. The second component was financed by households and ONEA and the third component by ONEA.

The implementation experience of the PSAB was quite similar to the PSAO. As in Ouagadougou, the pace of construction increased over time from less than 700 facilities in 2001 to almost 6,000 in 2009. Table A.10 of Appendix A.1 compares the forecasts of the PSAB document with the actual number of constructed facilities. Results are summarized in Figure A.10 below, which shows the distribution of forecast/constructed facilities over 2000-2005, 2006-2009 and 2000-2009.

Whereas the previsions assumed that the demand of Bobo-Dioulasso households would be evenly split between greywater disposal (WFSP and shower/soakaway pit) and excreta disposal (PFL, VIP, rehabilitation and septic tanks), implementation revealed an overwhelming demand for greywater disposal. This trend even increased in the last review period. The popularity of showers with soakaway pits (even higher than in Ouagadougou with 81 percent of constructed facilities) may be attributed, as in Ouagadougou, to the development of household water connections.

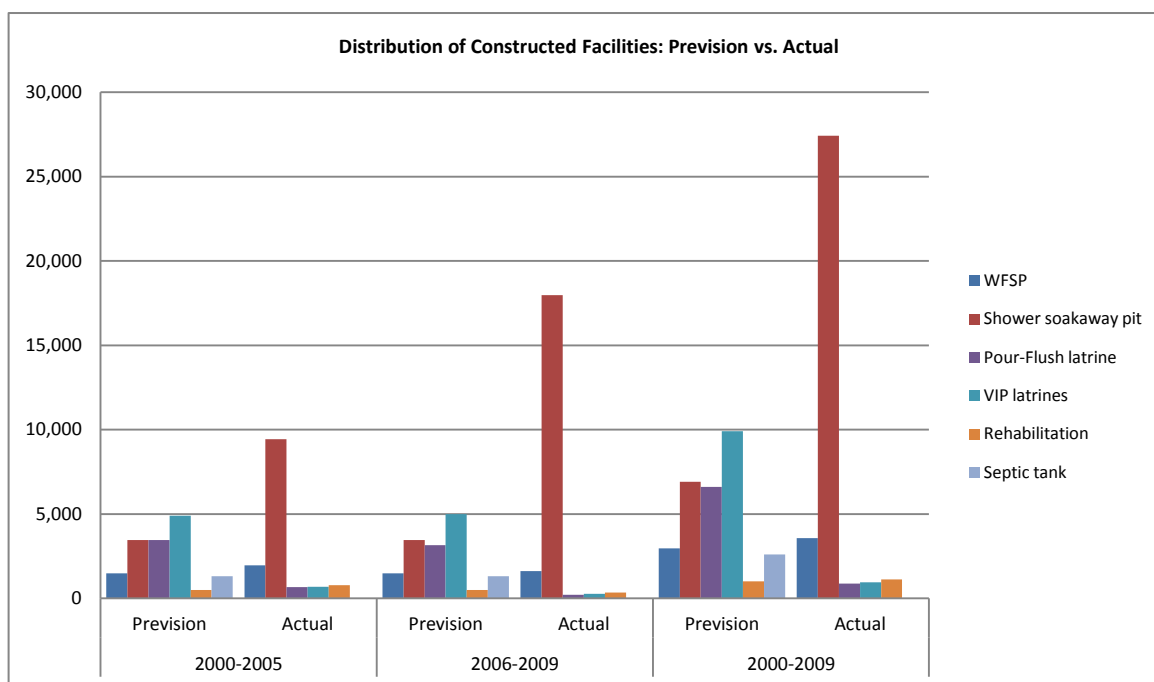


Figure A.10: Distribution of On-site Sanitation Facilities in Bobo-Dioulasso

*SSPs in Secondary Urban Centers.* In replicating the SSP in four secondary centers, ONEA agreed to involve the municipalities in implementation, by delegating the coordination to donor-supported municipal development agencies (*Etablissements publics communaux pour le développement*, EPCD). The pilot phase of the SSPs, which ended in 2008, revealed substantial weaknesses in implementation, which were attributable to:

- A limited availability of the EPCDs, which were already overwhelmed by other priorities;
- The implementation capacity of the promotion structure, which was unable to set up efficient management arrangements in four centers scattered across the country;
- The lack of familiarity of the promotion structure with local conditions as they simply transferred their community workers from Ouagadougou to the new centers;
- A low willingness to pay by the households, which was identified in the preparatory studies, but was not taken into account in the subsidy rules.

ONEA addressed these weaknesses by (i) establishing its own implementation units in the centers; (ii) recruiting additional promotion structures and requesting them to hire and train local staff; and (iii) adjusting the subsidy rules.

### Mainstreaming Sanitation in the PN-AEPA

The PN-AEPA constituted the instrument through which the Government of Burkina Faso intended, by 2015, to achieve the Millennium Development Goals (MDGs) in water supply and sanitation. The PN-AEPA provides a global programmatic framework to coordinate interventions in the water and sanitation sector.

The PN-AEPA built on the experience of the PSAO and reflects the increasing priority given to sanitation. The associated medium-term investment program is split equally between water supply and sanitation, including on-site sanitation. Although several sector donors initially showed limited enthusiasm to assist in funding household facilities, they quickly agreed that the development of appropriate on-site sanitation was unequivocal. The African Development Bank, the European Union, DANIDA, KfW and AFD are currently providing financial assistance to the construction of household facilities in urban and rural areas.

## A.5. KEY FACTORS OF SUCCESS AND LIMITATIONS

### A.5.1. STRATEGIC APPROACH

*Overall, the successful outcome of the PSAO demonstrated the relevance of the concept of strategic sanitation planning based on four pillars: (i) a comprehensive vision of urban sanitation as the improvement of sanitary and environmental conditions; (ii) responsiveness to demand, with effective consideration of the housing environment; (iii) the establishment of a comprehensive implementation framework; and (iv) the effective implementation of sound cost recovery policies.*

*In addition, the formulation of the strategic sanitation plans allowed the mobilization of donors and the progressive development of consensus on the merits of on-site sanitation.*

### A.5.2. POLITICAL ECONOMY, LEADERSHIP AND OWNERSHIP

*The strong involvement and political willingness of the Government enabled the resolution of conflicts over sectoral responsibilities between the ministerial departments or between the different layers of government. The selection of a sanitation sector leader was challenged at the outset by several ministries, particularly the Ministry of Health. As importantly, municipalities claimed entitlement to a major share of the sanitation surcharge. The Government's arbitration in favor of ONEA gave the green light to preparation of the PSAO, which, in turn, improved the legitimacy of the sanitation surcharge by linking the surcharge revenues with services that were effectively rendered.*

*The initial disputes actually denoted an absence of vision of wastewater and excreta disposal, which had long been considered a private issue by local governments. Municipalities felt that drainage and solid wastes deserved a much higher priority. By revealing a strong household demand, the PSAO developed awareness of the health and environmental impact of on-site sanitation.*

*Once established, ONEA's leadership was no longer challenged and its ownership was supported by the Government's commitment to ensure the financial equilibrium of its sanitation activities. The Government played an effective role in (i) the timely approval of the revisions to the sanitation surcharge and (ii) ensuring that external funds were passed as grants to ONEA.*

*Donors such as UNDP, IDA and WSP played a decisive advocacy role and provided substantial advisory services by providing expertise and facilitating the exchange of experiences during preparation and implementation.*

### **A.5.3. FACTORS LINKED TO IMPLEMENTATION ARRANGEMENTS**

*The clear separation of responsibilities between ONEA, the promotion structures, and the households reduced ONEA's workload and allowed it to focus on coordination, program management and monitoring. ONEA's burden in procurement and financial management was alleviated by the fact that (i) households directly contracted the masons; and (ii) the promotion structures had integrated responsibilities covering demand-generation activities, technical supervision and training. Conversely, the experience of the SSPs in secondary centers showed that ONEA was in a unique position to manage the programs and that coordination responsibilities could not be left to municipalities.*

*Learning and capacity building was much slower than anticipated and extended well beyond the pilot phase, but once the processes were mastered, the absorption capacity picked up at an accelerated pace. It took more than five years to fine-tune the implementation processes and the coaching and monitoring of the field actors. Afterwards, the pace of implementation tripled in 2001-2005 and tripled again in 2006-2009, when the financing constraints were released.*

*The performance incentives that were built in the contracts of the promotion structures after 1999 strengthened their accountability. Consulting firms proved to be much more results-oriented than NGOs. The establishment of a periodic assessment system allowed ONEA to monitor the performances of the promotion structures, which, in turn, had to set up efficient monitoring arrangements of the field workers by supervisors and area coordinators.*

### **A.5.4. TECHNICAL FACTORS**

*The quality of the technical design of on-site facilities and the quality insurance provided by the promotion structures reinforced the credibility and acceptability of the program. Ouagadougou households (and masons) were familiar with latrines and soakaway pits before the PSAO, but most of the facilities were of substandard quality and could not deliver adequate services. The PSAO established construction standards and quality control procedures that were actually complied with, and households were ready to pay for improved quality, which warranted improved services and reduced maintenance costs.*

*The range of technical solutions was broad enough to match the specific motivations and needs of beneficiaries. Whereas technical discussions during preparation focused on the respective merits of VIPs and PFLs, the pilot project revealed household preferences for soakaway pits and latrine rehabilitation, which was quickly acknowledged by ONEA technicians.*

*The quality of technical training and coaching that was provided to masons and prefabricators was also a key factor of the satisfactory performance of the artisans.*

*The provision of septage disposal facilities was, however, initially overlooked in the PSAO. The sewerage component only included the construction of one septage injection point at the wastewater treatment plant, which could not meet the disposal needs. ONEA has now programmed the construction of autonomous septage treatment plants that could offer better service to septage haulers.*

#### **A.5.5. SOCIAL FACTORS**

*The strategic choices of the PSAO matched the beneficiaries' motivations to improve sanitation, which combined their individual needs and concerns about their neighborhood environment. Focus group meetings revealed that the motivations of the households were primarily linked to (i) convenience (existing facilities created odors, infestation or encumbered the compound by multiplying inadequate pits) and privacy; (ii) dignity and social status associated with the pride of owning "modern" facilities; and (iii) the need to reduce neighborhood conflicts generated by wastewater disposal.*

*Program promotion effectively mixed mass communication and face-to-face communication activities. Social marketing was a key factor in stimulating demand for on-site sanitation, but required familiarity with the specific social conditions of the neighborhoods, as demonstrated by the poor achievements of the pilot phase in the secondary urban centers.*

*The prevalence of women in the promotion structure teams (60 percent of community workers) helped the women beneficiaries to play a prominent role in expressing demand.*

*There were no pro-poor mechanisms embodied in the PSAO, as the subsidy eligibility rules did not specifically favor the participation of poor households.*

#### **A.5.6. URBAN AND ENVIRONMENTAL FACTORS**

*By adopting a comprehensive view of urban sanitation and acknowledging the need to address wastewater disposal issues, the PSAO recognized the critical importance of urban and environmental factors. The increasing consumption of urban space by housing and the increasing population density had reinforced household demand for adequate sanitation facilities. As importantly, the substantial growth of the water connection rate in Ouagadougou and Bobo-Dioulasso boosted the demand for greywater disposal, which had rapidly become unmanageable in the absence of improved facilities.*

*Conversely, the low population density of the secondary urban centers explains to a large extent their relatively low demand for sanitation.*

#### **A.5.7. ECONOMIC AND FINANCIAL FACTORS**

*Clear cost recovery policies and the strong commitment to maintain the financial equilibrium of ONEA have warranted the financial sustainability of the PSAO and, generally, of ONEA's interventions in sanitation. The principle of a sanitation surcharge was widely accepted by urban water customers, whose number increased markedly during the execution of the PSAO. The proceeds of the surcharge can*



actually cover ONEA's sewerage operating costs, ONEA's expenditures for managing and promoting on-site sanitation throughout the country, and a substantial portion of the in-kind subsidies to households. In addition, the Government fully complied with its commitment to provide grant financing for sewerage investments.

*Although it was initially expected that the development of on-site sanitation could be entirely financed by household contributions and the sanitation surcharge, it became clear that additional funding from external grants was required to meet the demand. The quality of sector governance and ONEA's performances in managing external funding helped to convince donors to finance on-site sanitation.*

*Subsidies played an important role in the generation of demand, but it is not fully clear whether the modification of the subsidization level after 2006 was the main reason behind the acceleration of the construction activities. The sharp increase of the available financing might have been an even more important factor.*

*The actual level of subsidies accruing to households constructing on-site facilities is substantially lower than the one received by well-off sewerage customers. This distortion does not seem to have deterred the current beneficiaries of the PSAO. However, the subsidization level could be revisited if ONEA and the Government were willing to expand the PSAO's benefits to poorer strata of the urban population.*

*The PSAO is a long-term instrument of the development of sanitation and, as such, created a genuine market for the private sector. This strengthened the sense of ownership of informal (masons, prefabricators) and formal (local consulting firms) actors, who recognized that business opportunities in this sanitation market are not entirely contingent on the availability of external funding, as it is the case with conventional projects. The swift processing of payments by ONEA also reinforced the partnerships and allowed contractors to sustain and develop their activities.*

## Appendix A.1: Outcome and Results

Table A.9: PSAO Outcome and Output Indicators

Year	2000		2005		2009
	Target	Actual	Target	Actual	Actual
<b>On-site Sanitation</b>					
<b>Number of facilities</b>					
<i>Greywater disposal</i>					
WFSP		142		1,520	3,752
Shower soakaway pits		13,531		35,943	76,069
<i>Sub-total</i>		<i>13,673</i>		<i>37,463</i>	<i>79,821</i>
<i>Excreta disposal</i>					
VIP latrines	3,250	3,023	12,750	5,178	6,710
Pour-flush latrines	6,500	95	17,000	205	508
Latrine rehabilitation	9,000	4,998	24,000	10,469	28,229
Septic tanks	2,175	0	5,225	0	2,204
<i>Sub-total</i>	<i>20,925</i>	<i>8,116</i>	<i>58,975</i>	<i>15,852</i>	<i>37,651</i>
<b>Total</b>	<b>20,925</b>	<b>21,789</b>	<b>58,975</b>	<b>53,315</b>	<b>117,472</b>
<b>Additional population with access to</b>					
Greywater disposal		136,700		374,600	798,200
Excreta disposal	329,200	81,100	919,200	158,500	376,500
<b>Total</b>	<b>329,200</b>	<b>217,800</b>	<b>919,200</b>	<b>533,100</b>	<b>1,174,700</b>
<b>School Sanitation</b>					
Latrine blocks	166	170	n/a	295	625
Number of students getting access to improved sanitation	74,000	77,000		134,000	284,000
<b>Sewerage</b>					
Served population	6,000		10,000	6,800	7,700
m <sup>3</sup> /day	2,560		3,100	1,650	2,200

Source: ONEA

Table A.10: Number of Constructed Household Facilities in Bobo-Dioulasso

Type of Facility/Period	2000-2005		2006-2009		2000-2009	
	Forecast	Actual	Forecast	Actual	Forecast	Actual
WFSP	1,480	1,955	1,480	1,612	2,960	3,567
Shower soakaway pit	3,450	9,440	3,450	17,980	6,900	27,420
<b>Sub-total</b>	<b>4,930</b>	<b>11,395</b>	<b>4,930</b>	<b>19,592</b>	<b>9,860</b>	<b>30,987</b>
Pour-Flush latrine	3,450	667	3,150	203	6,600	870
VIP latrines	4,900	684	5,000	267	9,900	951
Rehabilitation	500	784	500	334	1,000	1,118
Septic tank	1,300	0	1,300	0	2,600	0
<b>Sub-total</b>	<b>10,150</b>	<b>2,135</b>	<b>9,950</b>	<b>804</b>	<b>20,100</b>	<b>2,939</b>
<b>Total</b>	<b>15,080</b>	<b>13,530</b>	<b>14,880</b>	<b>20,396</b>	<b>29,960</b>	<b>33,926</b>

Source: ONEA

## Appendix A.2: Costs and Financing

Table A.11: Costs of PSAO Activities  
(CFAF million)

Activities/Period	1993-2000	2001-2005	2006-2009	Total
<b>Sewerage</b>	0	4,784	2,219	7,003
<b>On-site Sanitation</b>				
<i>Greywater disposal</i>	699	1,184	3,647	5,530
<i>Excreta Disposal</i>	640	435	1,693	2,769
Household facilities	1,340	1,619	5,340	8,299
Support activities	447	540	1,683	2,669
<b>Sub-total</b>	1,786	2,159	7,023	10,968
<b>School Sanitation</b>	249	179	850	1,278
<b>Total</b>	2,035	7,121	10,092	19,248

Source: ONEA

Table A.12: PSAO - Financing Sources  
(CFAF million)

Activities/ Period	1993-2000			2001-2005			2006-2009			Overall						
Program Activities	Total Costs	ONEA	Households	Grants	Total Costs	ONEA	Households	Grants	Total Costs	ONEA	Households	Grants	Total Costs	ONEA	Households	Grants
<b>Sewerage</b>					<b>4,784</b>	<b>90</b>		<b>4,694</b>	<b>2,219</b>	<b>30</b>	<b>177</b>	<b>2,012</b>	<b>7,003</b>	<b>120</b>	<b>177</b>	<b>6,706</b>
<b>Onsite Sanitation</b>																
<i>Greywater disposal</i>	445	134	312		837	251	586		3,647		2,553	1,094	4,929	385	3,450	1,094
<i>Excreta Disposal</i>	338	48	290		305	55	251		1,693		1,273	419	2,336	102	1,814	419
Household facilities	783	181	601		1,142	306	837		5,340		3,826	1,514	7,265	487	5,264	1,514
Support activities	261	261			381	381			2,028	1,012		1,015	2,669	1,654	0	1,015
<b>Sub-total</b>	<b>1,043</b>	<b>442</b>	<b>601</b>		<b>1,523</b>	<b>686</b>	<b>837</b>		<b>7,368</b>	<b>1,012</b>	<b>3,826</b>	<b>2,529</b>	<b>9,934</b>	<b>2,141</b>	<b>5,264</b>	<b>2,529</b>
<b>School Sanitation</b>	<b>249</b>	<b>249</b>			<b>179</b>	<b>179</b>			<b>850</b>			<b>850</b>	<b>1,278</b>	<b>428</b>		<b>850</b>
<b>Total</b>	<b>1,292</b>	<b>691</b>	<b>601</b>		<b>6,486</b>	<b>955</b>	<b>837</b>	<b>4,694</b>	<b>10,436</b>	<b>1,042</b>	<b>4,003</b>	<b>5,391</b>	<b>18,215</b>	<b>2,688</b>	<b>5,441</b>	<b>10,085</b>
<b>%</b>	<b>100.0%</b>	<b>53.5%</b>	<b>46.5%</b>	<b>0.0%</b>	<b>100.0%</b>	<b>14.7%</b>	<b>12.9%</b>	<b>72.4%</b>	<b>100.0%</b>	<b>10.0%</b>	<b>38.4%</b>	<b>51.7%</b>	<b>100.0%</b>	<b>14.8%</b>	<b>29.9%</b>	<b>55.4%</b>

### Appendix A.3: Efficiency and Equity

Table A.13: PSAO - Cost-Effectiveness of Sanitation Alternatives

Alternative	Unit	Quantity	Investment Cost (US\$ m) (2)	Design Population (3)	Direct cost (US\$ per capita) (4)	Total cost (US\$ per capita) (5)	Lifespan (years) (6)	Annualized Capital Cost @ 8%* (7)	Annual O&M costs (US\$/capita) (8)	Equivalent Annual Cost (US\$/capita) (9)=(7)+(8)
<b>Sewerage</b>										
Sewerage investments										
Total wastewater	m3/day	2,465								
Industrial wastewater	m3/day	1,618	8.65	50,000						
Domestic wastewater	m3/day	847	4.53	15,000	302	302	20	30.75		
<b>Total</b>			13.18			<b>302</b>	<b>20</b>	<b>30.75</b>	<b>9.99</b>	<b>40.74</b>
<b>On-site sanitation</b>										
VIP +										
shower/soakaway	Household	1	0.001	10	53	70	15	8.15	3.93	
Septage Disposal†			3.37	1,050,000	3	4	20	0.40		
IEC, supervision	32% of investment costs									
<b>Total</b>					<b>74</b>	<b>74</b>		<b>8.56</b>	<b>3.93</b>	<b>12.49</b>
<b>Partial Solutions</b>										
WFSP	Household	1	67	10	7	9	15	0.78	0	0.78
Shower/soakaway	Household	1	175	10	17	23	15	2.04	0	2.04
VIP latrine	Household	1	354	10	35	47	15	4.13	1.97	6.10
Latrine Rehabilitation	Household	1	79	10	8	10	10	1.17	1.97	3.14

\* Annual repayment of capital cost over the lifespan of the sanitation equipment with an 8 percent interest rate

†Data drawn from the PAQPUD

Table A.14: PSAO - Actual Level of Subsidization of Sanitation Alternatives

Alternative	Household contribution to investment (US\$/capita) (1)	Annualized Contribution Cost (US\$/capita)* (2)	Sanitation Surcharge (CFAF/m <sup>3</sup> ) (3)	Annual Water Consumption (m <sup>3</sup> /capita) (4)	Annual Sanitation Surcharge (CFAF) (5)=(3)x(4)	Annual Sanitation Surcharge (US\$/capita) (6)	Household emptying costs (US\$/capita) (7)	Total household contribution (US\$/capita) (8)=(2)+(6)+(7)	Household contribution (%) (9)=(8)/EAC	Subsidy Level (%) (10)=100%-(9)
<b>Sewerage</b>	<b>100.24</b>	10.21	60	40.2	2,409	<b>4.73</b>	<b>0.00</b>	<b>14.94</b>	<b>36.7%</b>	<b>63.3%</b>
<b>On-site sanitation</b>										
VIP + shower/ soakaway	40.55	4.74	20	12.8	256	<b>0.50</b>	<b>3.93</b>	<b>9.17</b>	<b>75.9%</b>	<b>24.1%</b>
Septage Disposal	0.00	0.00								
<b>Total</b>	<b>40.55</b>	<b>4.74</b>	20	12.8	256	<b>0.50</b>	<b>3.93</b>	<b>9.17</b>	<b>73.4%</b>	<b>26.6%</b>
<b>Partial Solutions</b>										
WFSP	2.48	0.29	20	12.8	256	0.50	0.00	0.79	101.4%	-1.4%
Shower/ soakaway	4.50	0.53	20	12.8	256	0.50	0.00	1.03	50.3%	49.7%
VIP latrine	14.51	1.69	20	12.8	256	0.50	1.97	4.16	68.2%	31.8%
Latrine Rehabilitation	2.36	0.28	20	12.8	256	0.50	1.97	2.74	87.4%	12.6%

\* Annual repayment of capital contribution over the lifespan of the sanitation equipment with an 8 percent interest rate

#### Appendix A.4: List of Participants into the Review Workshop

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# ANNEX B: Senegal Case Study

## The Dakar Peri Urban On-site Sanitation Program (PAQPUD)





## B.1. INTRODUCTION

This case study reviews the Dakar Peri-Urban On-site Sanitation Program (*Programme d'Assainissement Autonome des Quartiers Péri Urbains de Dakar*, PAQPUD) to evidence the key factors that contributed to the Program's success and limitations. In this respect, the institutional, financial, technical, social and implementation aspects are examined to identify the project features that facilitated or hampered its success. A comparative analysis with subsequent sanitation operations in Senegal, particularly the current GPOBA-financed project, is carried out to validate the findings.

The preparation of this case study was based on a review of project documentation and a consultative process targeting the project stakeholders through individual interviews and two workshops. A first workshop was held in April 2010 to identify and discuss the key factors of success or obstacles, and a first draft of the case study was discussed in a second workshop in November 2010.

## B.2. CONTEXT

### B.2.1. PRIOR SITUATION

The WHO/UNICEF Joint Monitoring Program (JMP) estimated in 2000 that 66 percent of the urban population of Senegal had direct access to improved sanitation, while 18 percent had access to shared sanitation facilities. The situation was better in the capital city of Dakar, with a direct access rate of 82 percent and a shared access rate of about 10 percent. The capital city benefited from a significant, but aging, sewerage network that was concentrated in the administrative and commercial sections of Dakar and could not keep pace with the sprawling urban development. Nearly one third (31 percent) of Dakar households were connected to sewers. The high cost of connecting to the sewerage system (around US\$400, i.e. more than half the GNP/capita) combined with the cost of internal plumbing, represented a major hurdle facing households interested in hooking up to the system. Sixty-one (61) percent of Dakar households relied on on-site excreta disposal facilities (53 percent used their own or shared latrines, 8 percent used flush toilets and septic tanks).

Although there was indeed room for improving access to basic sanitation (excreta disposal), the city was facing another challenge in terms of final disposal of excreta and wastewater, compounded by the fact that 75 percent of Dakar households benefited from private service water connections. Discharge of untreated wastewater, with or without fecal content, was the norm, thus leading to widespread pollution of the environment. The Camberene waste water treatment plant, which was the only facility in operation, treated less than 10 percent of the wastewater generated in Dakar. Of the fecal material collected by septage haulers from on-site sanitation facilities, 86 percent was disposed into open drains, empty plots or on streets at nighttime, or during rainy episodes. Sullage water from households not connected to sewers was poured on streets and open spaces, which created conflicts and tensions among households and health hazards with mosquito infestation. According to the 1996 willingness-to-pay study (carried out in preparation of the PAQPUD), 64 percent of the population was not satisfied with their sanitation facilities.

The urban development process in Dakar periurban neighborhoods took place at the initiative of individual households who could not afford the housing programs of commercial land developers, which were the only ones equipped with collective sanitation. On-site sanitation was thus the only option of periurban households, but facilities, if any, were built below standards and without consideration of the environment. The social water connection programs of the 1990s provided periurban households with direct access to water, but their water consumption (and the associated health impact) was strongly limited by the absence of adequate water disposal of internal washing and shower facilities.

## **B.2.2. INSTITUTIONAL CONTEXT AND PRIOR PROJECTS**

Until 1996, a public agency, the National Water Operating Company of Senegal (*Société Nationale d'Exploitation des Eaux du Sénégal*, SONEES), was responsible for urban water in 56 cities and towns and for sanitation in the six cities where a sewerage network had been built. Senegal embarked then in a comprehensive urban water and sanitation reform program to develop access to services. In the urban water sub-sector, a state asset-holding company (*Société Nationale des Eaux du Sénégal*, SONES) was created, and operations were contracted out to a private operating company (*Sénégalaise des Eaux*, SDE), under a 10-year enhanced lease agreement (*affermage*) procured through international competitive bidding (ICB). The urban sanitation sector remained under public management, with the creation of a separate autonomous public agency, the National Sanitation Agency of Senegal (*Office National de l'Assainissement du Sénégal*, ONAS). The development of sanitation services was expected to rely on support from public finances, whereas urban water services were expected to become financially autonomous and fully recover their costs.

During the first four years of reform, significant improvements were made in the quality of water service delivery and the efficiency of operations, and in progressing towards the financial equilibrium of the sub-sector. The connection rate increased markedly with the construction of 81,000 social (free) water connections throughout the country, which were cross-subsidized by water revenues. The reform had been supported by a multi-donor (including IDA) project, the Water Sector Project, with a cost of US\$223 million. Only 10 percent of the project funds were devoted to sanitation investments, which focused on sewerage, including the construction of about 12,700 social sewer connections in Dakar and Rufisque.

From 1996 to 2000, ONAS activities remained limited to conventional sewerage and drainage. ONAS prepared 19 sanitation master plans that did not mention the possibility of supporting on-site sanitation solutions. On-site sanitation was not considered an acceptable alternative to sewerage, due to existing regulations and the engineering-driven attitude of professional staff in charge of sanitation.

Overall, by 2001, urban sanitation was still lagging way behind urban water supply as more than 300,000 urban households benefited from a water service connection, and only 60,000 households from a sewer connection.

### **B.2.3. SECTORAL STRATEGY**

The Government recognized that conventional sewerage was neither technically nor economically feasible in the major part of Greater Dakar. In a January 2001 Water and Sanitation Sector Policy Letter, the Government expressed, *inter alia*, its commitment to “promote and develop alternative and appropriate on-site or condominial sanitation systems in periurban neighborhoods [...] and to develop partnerships with small-scale private enterprise to respond to the demand for sanitation services in urban and periurban areas”.

The challenge was to develop demand-based sanitation services, expand the technology menu for on-site sanitation, introduce hygiene education, increase the participation of small-scale contractors and artisans in service delivery, develop management capacity at the community level and channel matching funds for demand-driven sanitation services. Another challenge was to monitor sanitation coverage in periurban areas of Greater Dakar and set up incentive mechanisms and support systems to increase coverage and facilitate access to services.

The Long Term Water Sector Project (*Projet Sectoriel Eau à Long Terme*, PLT), which was initiated at the end of 2001 with financing from IDA and other donors, intended to redress imbalances by allocating more resources to the sanitation sector. US\$98 million (42 percent of total investments) were devoted to sanitation, of which US\$59 million funded the expansion of the sewerage systems and US\$42 million was allocated to the development of alternative solutions under a specific program, the PAQPUD.

## **B.3. THE PROGRAM**

### **B.3.1. OVERVIEW**

#### **Objective**

The objective of the PAQPUD was to achieve sustainable improvements in the delivery of sanitation services in unserved and low-income areas of Dakar. This objective was to be pursued by implementing a community-based program for developing on-site and condominial (condominial) sanitation services. 400,000 people were expected to benefit from the PAQPUD. Comparatively, the sewerage component of the PLT was expected to benefit 140,000 people.

#### **Description**

The PAQPUD consisted of two components:

- The investment program for constructing sanitation facilities and infrastructure, including: (i) 60,000 on-site sanitation facilities for excreta or wastewater disposal; (ii) 11 semi-collective (condominial) systems (household settling tanks and small-bore sewers) in areas not suited for on-site disposal; (iii) septage disposal and treatment facilities that would collect the effluent of household latrines and septic tanks; and (iv) 70 blocks of school latrines and public toilets.
- The capacity building and demand generation program for: (i) improved sanitation by developing marketing, information and communication activities;

(ii) expanding the spectrum of sanitation facilities and reducing costs to make them affordable to low-income households; (iii) developing hygiene education; (iv) increasing entrepreneurial, managerial and technical capacity for artisans and small scale private sector to construct and maintain sanitation facilities; (v) developing capacity of local NGOs and community-based organizations for planning, financing and managing demand-based and participatory sanitation programs; and (vi) increasing ONAS' capacity to plan, implement, supervise and monitor demand based on-site and decentralized sanitation programs.

## **Scope and Phasing**

The project was divided into two phases. An 18-month pilot phase (January 2002 – July 2003) targeted three periurban municipalities (*communes d'arrondissement*) with at least 20,000 inhabitants each. Three NGOs were recruited to carry out the demand-generation program and the supervision of works. After an in-depth review and substantial changes in the program rules (see page 56 below, Implementation Assessment of the Pilot Phase), the scaling-up phase started in March 2004 and ended in December 2007. The scaling-up phase expanded program activities to 31 municipalities of Greater Dakar and two neighboring rural districts, with a total population of about 1,500,000 people.

### **B.3.2. IMPLEMENTATION**

#### **Roles and Responsibilities**

The implementation arrangements reflected ONAS' willingness to delegate responsibilities for the execution of the investment program and the demand generation program, as well as the decision to rely on small and medium-scale enterprises (SME) and, later (after the end of the pilot phase) on service providers that were close to communities.

*Oversight and Coordination.* ONAS was the executing agency of the PAQPUD. As ONAS' implementation capacities were fully engaged in the sewerage component of the PLT, and as the agency had no prior experience in managing the large number of small contracts required by the program, ONAS adopted the principle of delegated implementation, while retaining overall responsibility for oversight<sup>11</sup>, coordination, monitoring and evaluation. During the preparation of the PAQPUD, ONAS set up its On-site Sanitation Department (*Service Assainissement Autonome*, SAA) that developed the Manual of Procedures of the Program and served afterwards as the Program Coordination Unit. The SAA was staffed by one ONAS engineer and several specialized sanitation consultants, who were also in charge of developing technical options and training modules.

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<sup>11</sup> A Steering Committee regrouping representatives of ministries respectively in charge of Water and Sanitation, Urban Development and Environment and of municipalities was initially set up, but did not remain active after the pilot phase.

*Delegated Contract Management.* ONAS contracted AGETIP to procure and manage all contracts related to the execution and supervision of works (with the exception of septage treatment facilities that remained under the direct responsibility of ONAS), demand management activities and training. AGETIP was an NGO created in 1989 to facilitate the execution of labor-intensive urban works, and which had been previously employed as a delegated contract management agency in various IDA-financed urban, education and health projects. AGETIP had extensive experience with community-based projects and in efficiently managing contracts with SMEs.

*Works Execution.* All on-site and offsite facilities (excluding septage treatment facilities) were executed by 19 SMEs under contracts with AGETIP, which selected them through competitive bidding under simplified procedures (community participation in procurement) in accordance with Bank's Directives. Each SME was assigned to a specific area. SMEs employed overall about 1,000 artisans and other workers belonging to local communities (laborers, trench-diggers, drivers, cart transporters, watchmen). SMEs with satisfactory performances were eligible for contract extensions.

Due to the complexity of the works and the lack of prior experience in Senegal, septage treatment facilities were executed by contractors recruited by ONAS after international competitive bidding.

*Works Design and Supervision.* NGOs carried out design studies, siting and works supervision during the pilot phase. These responsibilities shifted to five consulting engineers contracted by AGETIP after the extensive assessment that was conducted in 2003 (see below, Implementation Assessment of the Pilot Phase).

*Demand-Generation Activities.* Community mobilization –including the collection of beneficiary contributions, support and follow-up, and hygiene education and communication activities– was initially entrusted to three NGOs that had previously managed small-scale sanitation projects in Dakar. After the review of the pilot phase, these responsibilities were entrusted to 48 community-based organizations (CBOs) that were closer to the beneficiaries<sup>12</sup>.

*Role of Beneficiaries.* Beneficiary households expressed their demand, selected the type of facility they would need and brought their contribution to the costs. Beneficiaries were not part to the construction contracts. They were also represented, together with local, religious, and traditional authorities and civil society in local project committees (CLPs). CLPs were established to oversee investment and management of condominial sanitation systems and public facilities.

*Role of Municipalities.* Municipalities were involved in decisions regarding the condominial systems and public facilities, in particular site selection, monitoring of

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<sup>12</sup> Dakar CBOs are neighborhood organizations that promote and execute community projects with external support. They do not focus on a specific range of activities. The national NGOs initially contracted by ONAS were, on the contrary, countrywide organizations specialized in water and sanitation.

works execution and selection of the management type in the operational phase. They also participated in information, education and communication activities.

### Contractual Incentives

All contracts with service providers included clauses for assessing performances. AGETIP was contracted for an initial period of two years with an extension contingent to satisfactory performance. NGOs and CBOs were also contracted for two years, with a six-month trial period and specific targets for their various activities (a list of monitoring indicators is provided in Table B.1 below). Similarly, SMEs' contracts could be extended subject to satisfactory performance in terms of number of facilities constructed and the quality of works.

Table B.1: PAQPUD - Performance Indicators for Service Providers

Activities	Total activities per month	Total activities per worker per month
NGOs-CBOs:		
• Household visits	1,000	100
• PHAST† sessions	200	20
• Community mobilization sessions	2	-
• Household requests received	400	40
• Follow-up visits	500	50
Consulting Engineers:		
• Number of verified requests	-	57

† Participatory Hygiene and Sanitation Transformation Method

### Flow of Funds

AGETIP was responsible for the financial management of all contracts of service providers and SMEs. AGETIP initially received an advance of 30 percent of the contracts' value and obtained monthly replenishments of funds from the Designated Account of the PLT, through ONAS, on the basis of works and services that had been executed or rendered. Service providers were directly paid by AGETIP. SMEs were also paid by AGETIP, both from project funds and from cash contributions of the beneficiary households. The latter were collected by NGOs and CBOs and were deposited in a specific account opened by AGETIP for further payment to SMEs<sup>13</sup>.

### Implementation Assessment of the Pilot Phase

*Outcome of the Pilot Phase.* 600 household facilities were constructed during the 18 months of the pilot phase, i.e. only 24 percent of the target. A self-assessment workshop conducted by ONAS' SAA and AGETIP concluded that these disappointing results were attributable to: (i) the slow execution of communication and training activities; (ii) the excessive cost of cash contributions, as perceived by households; (iii) insufficient consideration of households' physical environment (soil conditions, water table, layout of the plot); and (iv) weak capacities in works supervision.

<sup>13</sup> During the scaling-up phase, the payment of cash contributions was spread out over time and AGETIP pre-financed the households' share of the costs of facilities.

These findings led to major corrective actions that were adopted by the PAQPUD and are presented in Table B.2 below.

Table B.2: PAQPUD - Identified Weaknesses and Corrective Actions

Identified Weaknesses	Corrective Actions
<p><b>Delivery of Implementation Responsibilities:</b> NGOs were unable to carry out together technical and social activities, and to establish an effective relationship with communities.</p>	<ul style="list-style-type: none"> <li>• Separation of social and technical responsibilities and recruitment of consulting engineers to carry out the latter;</li> <li>• Involvement of community-based organizations with close links to beneficiary households;</li> <li>• Strengthening of ONAS and AGETIP teams to reinforce monitoring capacities.</li> </ul>
<p><b>Household Financial Contributions:</b> Weak response of households to mobilization efforts</p>	<ul style="list-style-type: none"> <li>• Decrease household contribution from 50% to 20-25% of facility costs;</li> <li>• Payment of contribution by installments instead of upfront payment and introduction of in-kind contributions;</li> <li>• Exploration of sponsoring and micro credit solutions for poorest households.</li> </ul>
<p><b>Communication and Training :</b> Insufficient information of beneficiaries and local authorities and slow strengthening of technical and social engineering capacities.</p>	<ul style="list-style-type: none"> <li>• Launching of mass communication activities by specialized firms;</li> <li>• Reinforcement of training activities.</li> </ul>
<p><b>Selection of Technical Solutions :</b> Frequent mismatches between solutions selected by household and actual technical feasibility in several program areas</p>	<ul style="list-style-type: none"> <li>• Broadening of technical solutions and updating the Catalog of available options;</li> <li>• Introduction of condominial solutions in areas with high water table, impermeable soils or high population density.</li> </ul>

### B.3.3. TECHNICAL ASPECTS

The PAQPUD made the strategic decision at the onset to address comprehensive sanitation needs, i.e. excreta and wastewater (greywater) disposal, in line with the program's goal to provide a feasible alternative to sewerage. The range of technical options was hence much broader than those usually offered in basic sanitation programs.

#### Technical Options

*On-site Sanitation.* A complete list of the types of sanitation facilities available to beneficiary households, together with their unit costs, is given in Table B.10 of Appendix B.2 and summarized below:

- Greywater disposal solutions consisted of: (i) washing facilities associated with soakaway pits (*bac à laver puisard*, WFSP), with an average cost of about CFAF 106,000) and with de-greaser; (ii) shower facilities with soakaway pit (*douche puisard*, DP, CFAF 182,500); and (iii) improvement of existing facilities with the construction of shower cabins or soakaway pits;
- Excreta disposal solutions consisted of: (i) pour-flush latrines with one or two pits (*toilette à chasse manuelle*, PFL, CFAF 137,000 to 224,000); (ii) ventilated improved latrines with one or two pits, VIP, CFAF 142,500); (iii) latrines with watertight pit (*fosse étanche*, FE, CFAF 229,000); (iv) septic tanks; and (v) rehabilitation of existing latrines with the construction of secondary facilities (cabins and pits for all types of latrines);
- Mixed solutions, which associate latrine and shower facilities (CFAF 212,000 to 389,000).

*Condominial Systems.* Technical surveys showed that 12 municipalities were suitable for condominial systems. The systems consisted of (i) a settling tank and a connection box in the household's compound; (ii) small-bore sewers that could be laid anywhere, in particular in the narrow streets of traditional neighborhoods. The sewers were connected, in most cases, to a pretreatment plant or to conventional sewer pipes, if available in the vicinity. A few systems required a pumping station.

*Septage Disposal.* To provide, for the first time in Dakar, an environmentally-safe disposal of the effluents of latrines and septic tanks, the program included the construction of autonomous septage treatment plants and of septage injection points in the sewerage network. ONAS contracted a specialized consulting firm (SANDEC) to develop a communication and training program for the septage haulers, to ensure that the facilities would be effectively used.

*Public and School Facilities.* Apart from household facilities, the program included the construction of school sanitation facilities (blocks of latrines and connections to the water distribution network) and of public toilets in markets and public transport stations.

### **Technical Feasibility and Design Studies**

ONAS carried out surveys in Greater Dakar to map the soil conditions and their suitability for on-site sanitation, together with surveys of the level of the water table, which was close to ground level in seaside communities. About 60 percent of the entire city (and a much greater proportion in the periurban areas targeted by the program) was deemed suitable for on-site sanitation facilities. Results were entered in a Geographical Information System (GIS) that became available in 2004 to the service providers. The feasibility of selected solutions was also reviewed with regard to the available space in the plot, which was often shared by several families.

### **B.3.4. SOCIAL ASPECTS**

#### **Demand Generation**

*Communication Strategy.* The communication strategy in the pilot phase relied on direct information of the households by the NGOs' community workers (CWs). These actions were not effectively carried out as their monitoring showed that CW's workload was well below expectations and that only 14 percent of contacted people reacted positively by submitting requests. The appropriation of the program by the CWs was questionable, due to the prior involvement of the NGOs in heavily subsidized operations and to a defective training on the program rules.

The changes introduced after July 2003 brought a fresh generation of CWs recruited locally by CBOs, who were adequately trained in the Participatory Hygiene and Sanitation Transformation learning methodology (PHAST) and focus group management. Communication activities were expanded to include advocacy focusing on community leaders and elected representatives, and by launching mass communication campaigns through radio and TV.

*Processing of requests.* Table B.3 below summarizes the processing of the households' demand for on-site sanitation facilities.



Table B.3: PAQPUD - Processing Steps of Household Requests

Step	Purpose	Activities
1	Information	CWs visit households and organize guided visits to the various types of facilities already constructed in the area.
2	Request	Households express demand by filling a request form stating the type of facility selected.
3	Validation and design	CWs and technicians visit households to check the feasibility of the requests. Alternatives solutions may be proposed. If the request is feasible, the CW, the technician and the household agree on the location of the facility, which is designed and priced. The amount of the household contribution is assessed.
4	Agreement	The household pays an initial contribution <sup>14</sup> to the CBO, which transfers funds to AGETIP, together with the request of the beneficiary. AGETIP issues a work order to the area SME and consulting engineer.
5	Construction	Works are executed by the area SME and supervised by the consulting engineer. The CBO inspects works and verifies that in-kind contributions (if any) are actually provided by the household.
6	Completion	Once completed, works are inspected by the consulting engineer and the CBO for possible corrections of defects. The location of the works is registered by ONAS in the GIS. Follow-up verifications of the satisfactory performance of the facility take place during the warranty period.

*Social Activities.* AGETIP and the SAA closely monitored the level of social activities during the scaling-up phase. The monitoring results are summarized in Table B.8 of Appendix B.1. Efforts during community mobilization stages were intensive, with almost 1.15 million household visits and 65,000 focus group meetings. The follow-up stage (design, works inspection and assessments of the operational performance) included more than 900,000 visits of household facilities and 3,000 visits and meetings for the condominium systems and public facilities. The social activities generated about 145,000 requests from 99,000 compounds.

### Gender Aspects

The program design accounted for the prevalent role of women in sanitation activities and changes in social behavior. The key role of women was reflected in:

- staffing of the SAA and AGETIP teams by a majority of feminine engineers and social specialists;
- staffing of the CBOs;
- at least 50 percent representation of women on local project committees and facility management committees (*comités de gestion*, COGES);

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<sup>14</sup> During the pilot phase, the full amount of the contribution had to be paid up front. In the scaling-up phase, the amount of the initial payment that triggered the execution of the works was determined by the CBO, in consideration of the household characteristics (e.g. a lump sum of CFAF 10,000 or one third of the total contribution). The balance was to be paid in several installments. The in-kind contribution (construction of the superstructure of the latrine or shower) was to be provided within three months.

- the strong involvement of women in community mobilization and as facilitators in advocacy activities.

### **B.3.5. SUBSIDY ARRANGEMENTS**

#### **Subsidy Level**

*On-site Facilities.* The few on-site sanitation projects that had been implemented in Dakar before the PAQPUD (mostly initiated by NGOs) were subsidized at 90-95 percent.

A willingness-to-pay study carried out during PAQPUD preparation<sup>15</sup> concluded that households were prepared to contribute 50 percent to the cost of on-site facilities. The initial program rules reflected this finding, by setting a uniform 50 percent contribution for all types of facilities, which had to be paid up front.

However, the poor results of the pilot phase led to reconsideration of the subsidy level, which, after 2003 was set to 20 percent of the costs of greywater facilities and to 25 percent of the costs of mixed and excreta disposal facilities. Table B.10 of Appendix B.2 provides a detailed list of contributions. The schedule of payment was modified to introduce installments and the possibility of in-kind contributions consisting in the construction of the superstructure (cabin) by the household.

*Condominial Systems.* Households connected to the condominial systems had to pay: (i) a connection fee of CFAF 22,000, similar to the fee for a social sewer connection; and (ii) a 20 percent contribution to the cost of the settling tank (interceptor) that is built within the compound.

Although the investment subsidy levels adopted by the PAQPUD are high, the program beneficiaries are eventually paying a higher share of the sanitation services than the households connected to the sewerage network (see page 67 for a more detailed discussion).

#### **Eligibility Rules**

*Geographic Targeting and Urban Development Criteria.* The eligibility criteria were based on geographical targeting, using the urban characteristics of the neighborhoods as a proxy for the income of the residents. All households of selected neighborhoods could benefit from the program subsidies. Urban development in the targeted neighborhoods primarily consisted of traditional compounds, with one-story constructions inhabited by single or multiple low-income families, and did not include apartment buildings or areas built by commercial land developers. The targeted areas also included several “urban villages” populated by fishermen of the northern coast of Dakar. The layout of the neighborhoods, with narrow and/or irregular streets was not generally suitable for the laying of conventional sewers. Most of the PAQPUD

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<sup>15</sup> Report on the Social and Financial Participation of Populations in the Sanitation of Dakar Periurban Neighborhoods.

municipalities had been previously targeted by SONES/SDE social water connections programs, and the water connection rate was there close to the average of the city.

*Dealing with Poorest Households.* Specific subsidy rules applied, however, to the poorest households, at the discretion of CBOs. CBOs were better placed to identify the latter because of their intimate knowledge of the communities, whereas robust data on individual incomes were not readily available. The poorest households were eligible to the in-kind contribution and could also benefit, to a limited extent, from additional subsidies from sponsors and municipalities.

## B.4. PERFORMANCE ASSESSMENT

### B.4.1. OUTCOME AND RESULTS

#### Outcome

The program was successful in achieving or exceeding its quantitative targets, as shown in Table B.4 below.

Table B.4: Program Indicators of PAQPUD - Targets and Achievements

Outcome/Output Indicator	Target (2006)	Actual Completion (2007)	As % of Target
Beneficiaries:			
• On-site sanitation facilities		526,000	
• Condominial systems		57,000	
Total	400,000	583,000	146%
Number of facilities:			
• Greywater disposal		37,250	
• Excreta disposal		19,960	
• Mixed		10,290	
Total	60,000	67,500	113%
Number of condominial systems	11	10	91%
Number of beneficiary schools	70	77	110%
Number of households having received hygiene education	20,000	73,400	367%
Percentage of city septage collected	N/A	70%	-

Sources: Long Term Water Sector Project – ICR and ONAS Technical Note No. 7

*On-site Sanitation.* The outcome indicators show that the PAQPUD approach fully responded to the households' demand by addressing both greywater and excreta disposal needs. The households' needs in the Dakar periurban areas are sensibly different from the ones that may be addressed in the usual basic sanitation programs; the demand for greywater disposal facilities is overwhelming, as shown in Figure B.11.

Therefore, the number of beneficiaries is a better indicator of impact in terms of improvement of sanitary and environmental conditions in the Dakar context than the core IDA indicator of number of people having access to improved sanitation, which ignores greywater disposal. In addition the PAQPUD addressed environmental and health issues generated by the downstream disposal of septage from latrines and septic tanks.

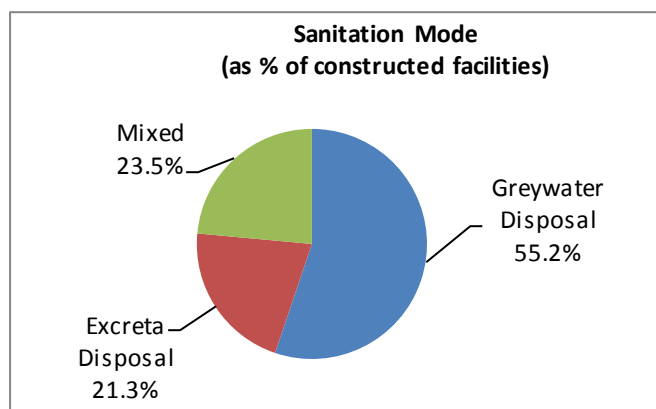


Figure B.11: Demand for On-site Sanitation Modes

Figure B.12 below shows the relative share of the main types of on-site facilities constructed (67,500). The washing facility with soakaway pit (WFSP) is the most popular (and the least expensive) option, followed by the pour-flush latrine (associated or not with a shower), by far the preferred latrine, and the shower facilities. Interestingly, the VIP latrine attracted almost zero demand (27 latrines built, i.e. 0.004 percent of constructions).

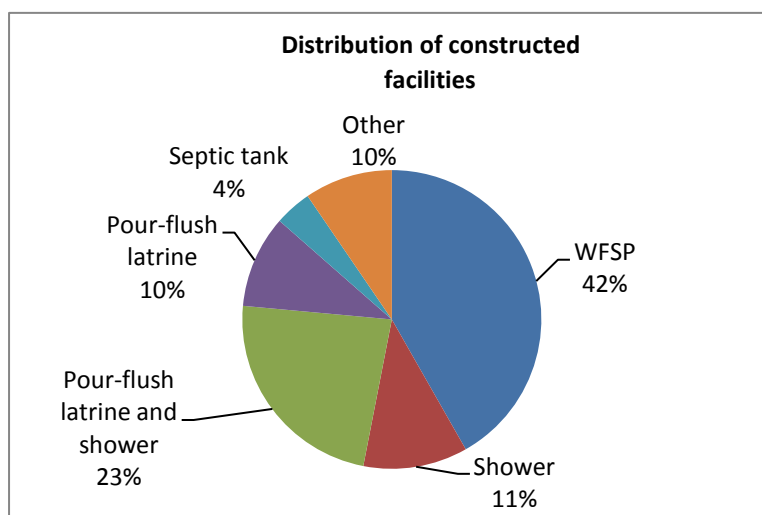


Figure B.12: Demand for On-site Facility Solutions

*Condominial Systems.* Of the 11 planned systems<sup>16</sup>, 10 were built and about 6,500 households were connected. However, only 4 of these systems were operational at the end of the PAQPUD. The commissioning of other systems was contingent on the completion of downstream works (mostly pumping stations) that ONAS was unable to execute within the program timeframe.

<sup>16</sup> The PAQPUD documents often refer to the “number of equivalent-systems”, which is not a physical indicator, but a planning indicator; an equivalent-system is a unit of account for the number of households that may be connected (70 households). The number of systems mentioned here is the number of autonomous small-bore sewer networks built.

*Septage Disposal.* All planned septage disposal facilities (three treatment plants and three septage injection points) were built and are used by septage haulers. The volume of collected effluents reached 1,350 m<sup>3</sup> per day, and amounts to about 70 percent of the daily septage production of the entire city. This is a dramatic improvement when compared to the 14 percent collected before the PAQPUD, and an outstanding, if not unique, performance in West Africa.

### Capacity Building and Capitalization

*Training.* The training activities funded by the program targeted all actors involved in the implementation and operation of sanitation facilities. About 3,800 people were trained (see Table B.9 of Appendix B.1), of which 46 percent in social communication (PHAST), 48 percent in sanitation technologies and 6 percent in operation and management. The dramatic increase of the implementation pace after the pilot phase (see Figure 3) evidences the strengthening of the capacities of CBOs, SMEs and technical supervisors

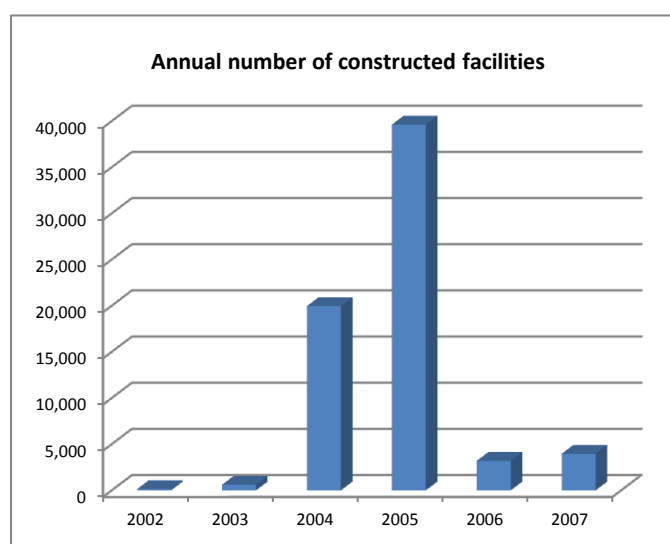


Figure B.13: Pace of Construction of Household Facilities

*Capitalization.* The program documentation (program rules and manual of procedures) were continuously updated during implementation, as well as the various technical and training guides. ONAS and AGETIP further issued multi-media tools (CD-ROM and DVDs).

### Sustainability and Operational Phase

*Sustainability of Household and School Facilities.* The service providers and ONAS assisted the beneficiaries in the operational phase and monitored the delivery performances of the household and public facilities. Household surveys<sup>17</sup> found that 81 percent of household latrines were clean. As importantly, surveys found that 85 percent

<sup>17</sup> ONAS Technical Note No. 5: Ownership and Sustainability Mechanisms in the PAQPUD Implementation

of households observed substantial improvements of their environment (particularly a substantial decrease of mosquito infestation), which were attributable to the discontinuation of greywater discharge in streets and surroundings. The latter achievements were confirmed by the elected officials of the targeted neighborhoods, and evidences substantial changes in the hygiene practices of beneficiary households. Results were less convincing for the school sanitation facilities, as a 2007 assessment found that only 50 percent of the blocks of latrines were correctly maintained.

*Operation of Condominial Systems.* As mentioned above, only 4 of the 11 condominial systems were operational at the completion of the PAQPUD. This was attributable essentially to ONAS' weak performance in managing contracts for the construction of pumping stations that were financed in parallel with the PAQPUD. In one case, a wastewater treatment plant could not be built due to a conflict with the riparian population, who complained (with reason) that they had not been offered the possibility of getting a connection to the condominial system (Thiaroye). To improve coordination, ONAS established a specific unit to oversee the condominial systems and four additional systems are now operational. The remaining works are completed under the follow-up IDA-financed PEPAM.

*Operation and Use of Septage Disposal Facilities.* The septage disposal facilities are effectively used by septage haulers. The latter pay service fees that cover the operating costs of the facilities. This satisfactory outcome is attributable to the PAQPUD's sensitization and training efforts and also to the fact that the locations of the facilities generate substantial transport and time savings for the hauling companies.

## **B.4.2. COSTS AND FINANCING**

### **Program Costs**

The overall cost of the PAQPUD amounted to CFAF 23.3 billion (US\$44.4 million)<sup>18</sup>. Table B.11 of Appendix B.3 lists the detailed expenditures, which are summarized in Figure B.4. About one fourth (23.4 percent) was spent on support activities by service providers and for training and program management (ONAS and AGETIP).

Greywater disposal accounted for one third of the total cost of household facilities (US\$19.29 million), whereas excreta disposal accounted for 20 percent, and mixed facilities (mainly pour-flush latrines associated with showers) for 47 percent.

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<sup>18</sup> Costs data are drawn from the World Bank Disbursements System (WB Client Connection: Transactions List; November 2009) and from the Project Coordination Unit reports. The dollar exchange rate (US\$1 = CFAF 525) is the average exchange rate during program implementation, as valued in the payment of withdrawal applications.

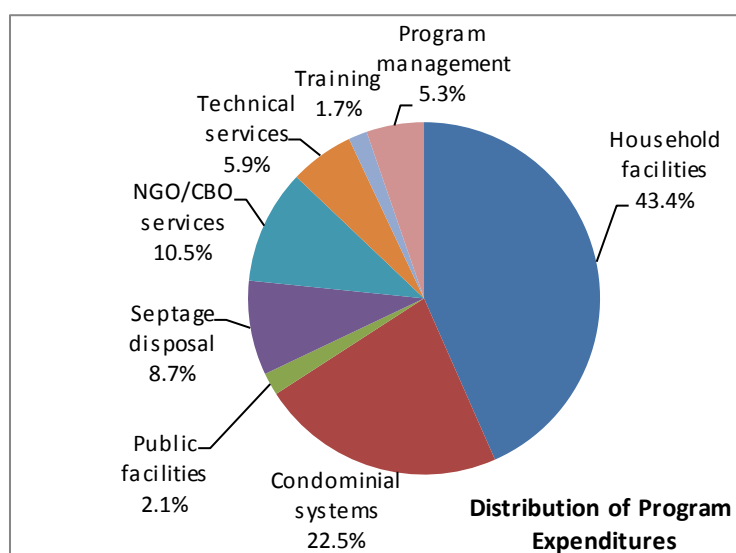


Figure B.14: Costs of Program Activities

### Program Financing

The contributions of the various financing sources are detailed in Table B.12 of Appendix B.3 and summarized below:

Table B.5: PAQPUD - Financing Summary

Financing Sources	IDA	Beneficiaries	Government	Total
US\$ million	38.69	4.74	1.02	44.45
%	87.0%	10.7%	2.3%	100.0%

The IDA Credit funded 100 percent of support activities and of the cost of public facilities and 90 percent of the septage disposal facilities. The Credit also funded 78 percent of the cost of household sanitation facilities and 95 percent of the cost of condominial systems.

Beneficiaries contributed 22 percent to the cost of on-site sanitation facilities and 5 percent to the condominial systems. In-kind contributions amounted to 41 percent of household contributions. Financial assistance from municipalities (CFAF 70 million) played a marginal role). The collection rate of contributions reached on average 62 percent at the completion of works, and subsequent mobilization efforts by the CBOs eventually brought it to 95 percent.

The Government contribution funded 10 percent of the cost of septage disposal facilities and the associated 18 percent value-added tax (VAT), as well as the VAT on ONAS expenditures.

#### B.4.3. EFFICIENCY AND EQUITY

The efficiency of the program is reviewed in light of its overarching objective of addressing the comprehensive sanitation and environmental needs of periurban

neighborhoods and its explicit goal of finding an economic and reliable alternative to conventional sewerage. The preferred evaluation tool should thus be the cost-effectiveness of the program investments. The analysis is completed by: (i) comparing the actual level of subsidization accruing to PAQPUD beneficiaries with the one accruing to seweraged households; and (ii) assessing whether the program rules enabled delivering its benefits to the poor.

### Cost-Effectiveness

The cost-effectiveness analysis compares the equivalent annual costs (EAC, annualized capital costs and operational costs) of sanitation solutions that provide identical benefits, i.e. the collection and removal of greywater and excreta from the housing and their final disposal in adequate environmental conditions.

Table B.6 below compares the EAC per capita<sup>19</sup> of conventional sewerage (including house connection, sewers and treatment plant) with the EAC of condominial systems and the EAC of the on-site solution that delivers the same service level, i.e. the comprehensive package associating a pour-flush latrine with a shower and soakaway pit, completed by septage treatment facilities.

Regardless of technical feasibility considerations, the PAQPUD approach is consistently more efficient than sewerage. Conventional sewerage is twice as costly as condominial systems and more than 50 percent more costly than the comprehensive on-site sanitation solution. The partial on-site solutions are indeed much less expensive.

Table B.6: PAQPUD – Equivalent Annual Cost of Sanitation Alternatives  
(US\$ million)

Sanitation Alternative	Investment cost	Annualized Capital Cost*	Annual O&M costs	Equivalent Annual Cost
<b>Sewerage</b>				
Household connections and tertiary sewers	89	10.39		
Primary and secondary sewers	50	4.48		
Wastewater Treatment	69	7.08		
<b>Total</b>	<b>209</b>	<b>21.94</b>	<b>6.67</b>	<b>28.61</b>
<b>Condominial systems</b>				
Systems	96	9.81		
Additional Works	12	1.19		
<b>Total</b>	<b>108</b>	<b>11.01</b>	<b>3.81</b>	<b>14.82</b>

<sup>19</sup> The detailed calculations are given in Table B.14 of Appendix B.4.



Sanitation Alternative	Investment cost	Annualized Capital Cost*	Annual O&M costs	Equivalent Annual Cost
On-site sanitation				
Pour-flush latrine + shower/soakaway	117	13.73		
Septage Disposal Facilities	4	0.39		
Total	121	14.12	4.76	18.88
Partial Solutions				
WFSP	32	3.03	0	3.03
Shower/soakaway	55	5.21	0	5.21
Pour-flush latrine	68	6.41	3.57	9.98

\* Annual repayment of capital cost over the lifespan of the sanitation equipment with an 8 percent interest rate  
Sources: ONAS and PLT Works Contracts (sewerage); PAQPUD (other alternatives)

## Equity

*Cost Recovery Policies for Sanitation.* As mentioned above, conventional sewerage projects in Senegal are heavily subsidized. Sewers, pumping stations and treatment plants are entirely funded by public funds, without further cost recovery from service charges. Households may pay only CFAF 22,000 for a social service connection to sewers. However, all households with a water service connection –regardless of their sanitation mode– pay a sanitation surcharge of about CFAF 58 per m<sup>3</sup> on their water consumption, which is collected by SDE and transferred to ONAS to finance its operation and maintenance (O&M) costs. In addition, households without a sewer connection periodically pay septage haulers for emptying latrine pits or septic tanks, and households connected to the condominial systems pay an annual fee of CFAF 1,000.

*Actual Subsidization of Sanitation Services.* The actual level of subsidization of services is computed by comparing the EAC of the household's sanitation service, as defined in the above paragraph, with the total annual contributions (capital and operating expenditures) of the household.

Table B.14 of Appendix B.4 provides the detailed calculations of actual subsidization of sanitation alternatives; the results are summarized below.

PAQPUD beneficiaries connected to condominial systems receive an 84 percent subsidy, which is close to the one accruing to the customers of sewerage networks with a social connection (88 percent). Subsidies accruing to beneficiaries of the comprehensive on-site sanitation package are substantially lower (55 percent). Other beneficiaries are even less subsidized.

Table B.7: PAQPUD- Actual Levels of Subsidization

Alternative	Equivalent Annual Cost (US\$ per capita)	Total contribution (US\$ per capita)	Subsidy Level (%)
Sewerage customers;	28.61	3.33	88.4%
Condominial system customers	14.82	2.35	84.1%
Beneficiaries of comprehensive on-site sanitation package	18.88	8.49	55.0%
Beneficiaries of partial solutions:			
• WFSP	3.03	2.21	26.8%
• Shower/soakaway	5.21	2.89	44.4%
• Pour-flush latrine	9.98	6.76	32.3%

Sources: ONAS and PAQPUD

*Pro-poor Merits of Program Rules.* Impact studies conducted at the end of the PLT concluded that the geographical targeting of periurban neighborhoods was an acceptable proxy of income targeting. The program beneficiaries were significantly poorer than the average Dakar population, even though a minority of medium-income resident households may have also benefited from the subsidies.

As mentioned above, the CBOs were able to identify the poorest households (which were generally without adequate latrines and without any greywater facility disposal) and allow them to make in-kind contributions to benefit from the comprehensive on-site sanitation package. The 2005 ONAS progress report notes that, after January 2005, thanks to the promotion of in-kind contributions, the number of constructed comprehensive on-site sanitation packages became almost equal to the number of WFSPs.

#### B.4.4. REPLICABILITY

The overall results of the PAQPUD were substantial, but the program could not by itself meet the urban sanitation needs of Dakar, nor those of the other urban centers of Senegal. At completion, the program registered more than 70,000 household requests that could not be satisfied for lack of funding.

The sector actors initiated two series of actions to build on the PAQPUD's outcome: (i) follow-up operations in the PAQPUD areas, including the one financed by the Global Partnership on Output-Based Aid (GPOBA); and (ii) mainstreaming on-site sanitation in the Water and Sanitation Millennium Program (*Programme d'Eau Potable et d'Assainissement du Millénaire*, PEPAM), which was developed to address the country's anticipated needs in 2015. These initiatives are reviewed below, in particular to assess their consistency with the PAQPUD rules

## **Follow-up Operations (GPOBA)**

Two small-scale operations were carried out with the support of an international NGO (Plan International) and UNDP, which reached 138 and 583 households, respectively.

In 2007, the GPOBA provided a grant of US\$5.76 million to help constructing about 15,100 on-site household facilities in five of the municipalities already targeted by the PAQPUD. ONAS was the executing agency and the operation was expected to be completed in 18 months.

The GPOBA-financed project introduced several changes to the implementation arrangements and rules used by the PAQPUD:

- The strict application of the Output-Based Aid (OBA) approach led to (i) reinstating the principle of an upfront payment of the household contribution and to exclude in-kind contributions<sup>20</sup>; and (ii) modifying the flow of funds and introducing periodic verifications by an independent technical auditor prior to final payments;
- For the sake of simplicity, the technical catalog was reduced to five on-site options (WFSP, shower/soakaway, single PFL, PFL with shower/soakaway, and septic tank) and excluded any possibility of rehabilitation.
- In addition, and considering that IEC activities had been previously carried out in the targeted areas during the PAQPUD, GPOBA reduced the remuneration of the service providers (CBOs and consulting engineers), from 17 percent to less than 12 percent of the total costs.

In February 2010, i.e. 18 months after the actual startup of activities, only 1,100 household facilities (7 percent of the target) had been constructed; a joint assessment found that the poor performances were mostly attributable to the above-mentioned changes of rules. The operation was restructured by (i) reinstating the PAQPUD catalog of technical options; (ii) offering the possibility of connections to condominal systems; (iii) reinstating the possibility of in-kind contributions; and (iv) increasing funding for IEC activities. The closing date was postponed to December 31, 2011.

4,000 household facilities and 400 connections to the condominal sewers were built in the first 10 months following the restructuring, which evidences *ex post* the appropriateness of the original PAQPUD rules.

## **Mainstreaming Sanitation in the PEPAM**

The Water and Sanitation Millennium Program (PEPAM) constitutes the instrument through which the Government of Senegal intends, by 2015, to achieve the Millennium Development Goals (MDGs) in water supply and sanitation. The PEPAM provides a

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<sup>20</sup> The subsidy levels and the unit costs of the on-site facilities remained similar to the PAQPUD; GPOBA however introduced a ceiling of US\$484 for the global amount of any household subsidy.

global programmatic framework to coordinate interventions in the water and sanitation sector.

The PEPAM –prepared with funding from the PLT and in parallel with the implementation of the PAQPUD– reflects the increasing priority given to sanitation. The associated medium-term investment program is split equally between water supply and sanitation, including on-site sanitation. Although several sector donors initially showed limited enthusiasm to assist in funding household facilities, they quickly agreed that the development of appropriate on-site sanitation was unequivocal. The African Development Bank, the European Union, Japan and the French Development Agency are currently providing financial assistance to the construction of household facilities in urban and rural areas.

## B.5. KEY FACTORS OF SUCCESS AND LIMITATIONS

### B.5.1. STRATEGIC APPROACH

Overall, the successful outcome of the PAQPUD demonstrated the relevance of its underlying strategic approach based on three pillars: (i) a comprehensive vision of urban sanitation as the improvement of sanitary and environmental conditions; (ii) responsiveness to demand, with effective consideration of the housing environment; and (iii) efficient and equitable allocation of public funds to sanitation investments, regardless of whether the facilities were public or private property.

#### A. POLITICAL ECONOMY, LEADERSHIP AND OWNERSHIP

*A recent study<sup>21</sup> reviewed the political economy underlying the PAQPUD and identified key factors in promoting sanitation in the development agenda and generating demand.* The study outlined that, contrary to what may be observed in a number of countries, there was no conflict between the different levels of government or between the ministerial departments over the responsibilities in managing sanitation and that the Bank played a prominent role in promoting sanitation by expanding public investments to include new alternatives. The study also found that the development of partnerships with the civil society and CBOs, the emphasis put on public debate and communication were critical in generating demand in low-income neighborhoods and in getting support from municipalities.

*ONAS and AGETIP shared the leadership of the program in accordance with their respective skills and without creating frictions.* The SAA team of ONAS, which mixed technical and social development specialists, took the lead on the program design and rules, and developed and updated the training guides on all program aspects. AGETIP took the lead on field implementation. Their partnership built on frequent coordination meetings with the various actors and field visits by the SAA.

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<sup>21</sup> S. Garbarino and J. Holland: Understanding and Managing the Political Economy for more Pro-Poor Sanitation Investment and Service Provision Operational: Experiences from Case Studies in Brazil, India, Indonesia and Senegal

In other operations that adopted delegated contract management, the delegating agencies (particularly ministerial departments) often expressed frustration of not being enough involved in the physical implementation of delegated activities<sup>22</sup>. This was not the case in the PAQPUD, as ONAS already had a full plate with the implementation of the sewerage/drainage component of the PLT and had no desire to interfere.

*The Bank played a decisive advocacy role at the Government level and facilitated the decision-making process in adjusting the program rules to the implementation circumstances.* The inclusion of the PAQPUD in the PLT followed intensive Bank efforts to disseminate the Burkina Faso experience (PSAO) and the experience of LAC countries (Brazil and Bolivia) in condominial sewerage. The Bank was also instrumental in persuading ONAS and the Government to quickly draw lessons from the implementation of the pilot phase and making the necessary adjustments to the program.

*All field actors and stakeholders demonstrated a high level of ownership, but ambiguities remain about the commitment at the highest level of Government, which may in turn influence ONAS' strategy.* The initial commitment of the Government to the PAQPUD is unquestioned and the equal priority given to water supply and sanitation in the PEPAM evidences the progress made by sanitation in the Senegalese development agenda. However, recent positions taken by the highest level of Government in favor of a full concession of sanitation services in Dakar may indicate a renewed bias in favor of the sewerage option. In a context where social and technical considerations are subordinated to political will, there is a risk that this bias may undermine the convictions of both the Ministry in charge of sanitation and of ONAS management.

#### **B.5.2. FACTORS LINKED TO IMPLEMENTATION ARRANGEMENTS**

*The PAQPUD demonstrated that the absorption capacity of on-site sanitation investments could be swiftly developed from scratch to reach a significant portion of the urban population.*

*Implementation arrangements rightly segmented responsibilities in line with the capacities and accountability of the actors.* The use of delegated contract management warranted the efficient organization and control of field activities. AGETIP fully mastered the programming and coordination of multiple tasks in a demand-driven approach, and was in a much better position than ONAS to carry out, in a timely fashion, financial management and monitoring of multiple contracts with service providers and SMEs.

*The performance incentives that were built into field actors' contracts after the pilot phase strengthened their accountability.* The pilot phase had evidenced the limitations of the NGOs, which could not carry out multiple implementation responsibilities in a timely manner. NGOs were not comfortable in the procedures-driven context of the

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<sup>22</sup> This was for instance the case for the Directorate of Sanitation of Niger in the implementation of the Niamey Pilot Urban Sanitation Program.

program, as they were used to working in less demanding environments as executing agencies of operations that they had entirely designed<sup>23</sup>. CBOs proved to be much more results-oriented than the NGOs and more open to the messages conveyed by the beneficiaries.

*The monitoring and evaluation arrangements facilitated the program coordination and reinforced the adherence to program rules and objectives.*

### **B.5.3. TECHNICAL FACTORS**

*The quality of the technical design of on-site facilities and of the technical training provided to SMEs and supervisors reinforced the credibility and acceptability of the program.*

*Broadening the range of on-site sanitation solutions enabled the program to tailor the technical options to the specific motivations and needs of beneficiaries.* The catalog of options went well beyond what is usually proposed in other on-site sanitation programs and effectively responded to individual demand. It expanded opportunities for combined solutions (greywater and excreta disposal) as well as improvements of existing facilities to improve privacy (construction of shower or latrine cabins) and efficiency (reconstruction of pits and septic tanks to standards) or to reduce the operational costs (additional pits allowing to save on emptying costs).

*The provision of septage disposal facilities was a necessary, but usually overlooked, complement of on-site sanitation facilities, which benefited an even larger audience than the PAQPUD clients.* This was achieved in very economical conditions and the effective use of facilities by septage haulers augurs well for the sustainability of the services.

*International know-how on condominal systems was effectively transferred to Senegal, but the interface with conventional sewerage could have been more efficiently managed by ONAS.*

### **B.5.4. SOCIAL FACTORS**

*The strategic choices of the PAQPUD matched the beneficiaries' motivations to improve sanitation, which combined their individual needs and concerns about their neighborhood environment.* Focus group meetings revealed that the motivations of the households were primarily linked to (i) convenience (existing facilities created odors, infestation or encumbered the compound by multiplying inadequate pits) and sanitation practices (overwhelming demand for PFLs) ; (ii) social status associated with the pride of owning "modern" facilities; and (iii) the need to reduce neighborhood conflicts generated by wastewater disposal. These findings were fully taken into account in the catalog of technical options.

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<sup>23</sup> Another attempt to engage large NGOs in comprehensive implementation responsibilities of an urban sanitation project (Niger) failed as the NGOs bid excessive amounts for their services.

*Program promotion rightly mixed mass communication and face-to-face communication activities. The pilot phase suffered from the absence of large-scale communication, which, once carried out in the expansion phase, reinforced the credibility of the program among opinion leaders.*

*The large-scale presence of women in the teams of ONAS, AGETIP and the CBOs helped women beneficiaries to play a prominent role in expressing requests and pushing for community involvement.*

#### **B.5.5. URBAN AND ENVIRONMENTAL FACTORS**

*By revisiting the concept of urban sanitation, the PAQPUD recognized the specificities of periurban neighborhoods and the need to address the consequences of the generalization of water service connections. The PAQPUD strategy allowed households access to adequate sanitation solutions and at the same time to fully benefit from their water connections in conditions close to what was readily available in apartment buildings or residential areas.*

*The emphasis put on the prior verification of the feasibility of sanitation options, at the neighborhood level, enabled the effective delivery of sanitation services.*

#### **B.5.6. ECONOMIC AND FINANCIAL FACTORS**

*The appropriateness of subsidizing household sanitation facilities should be judged in view of the fact that the actual level of subsidies in the PAQPUD was substantially lower than the one received by well-off sewerage customers. The widespread policy of not providing public funds for support of on-site sanitation, while heavily subsidizing the costlier sewerage alternative denies equity and cost-effectiveness and ignores the positive externalities of wastewater disposal.*

*It may, therefore, be necessary to correct the current distortions of the cost recovery policies of the sanitation sector in Senegal, to more efficiently link service charges with actual service levels. Commercial land developers should contribute to the costs of developing the sewerage networks, while the sanitation surcharge on the price of water paid by un-sewered water customers should be redirected to the financing of on-site sanitation programs.*

## Appendix B.1: Support Activities

Table B.8: PAQPUD - Social Activities

Activities	Number	Audience (No. of people)
Household visits	1,155,848	1,155,848
PHAST and focus group meetings	65,433	327,165
Guided visits of facilities	19,123	38,246
CLP meetings	2,426	21,834
Advocacy and social mobilization meetings	1,195	23,900
Follow-up visits to households (supervision, hygiene education and operational phase)	807,210	1,614,420
Follow-up visits of schools	2,452	12,260
Follow-up visits of public facilities	291	1,455
COGES meetings for condominal systems	206	2,060
<b>Total</b>	<b>2,054,184</b>	<b>3,197,188</b>

Source: PAQPUD Progress Reports

Table B.9: PAQPUD - Training Activities

Type of training	Profile of trainees	Number of trainees
SARAR/PHAST	NGOs/CBOs (CWs, coordinators and supervisors), PAQPUD staff, consulting firms (field technicians), hygiene services workers, municipality technical agents	666
School sanitation guide : Training of trainers	Teachers, school principals and school district inspectors	958
Management committees	Members of COGES (schools and condominal systems)	130
On-site sanitation technologies	Masons, engineers and field technicians of consulting firms, CWs, ONAS technicians and AGETIP project managers	1,800
Operation and management of condominal systems	ONAS technicians, municipality technicians and COGES members (Ngor, Ouakam, Yoff, Cité Ousmane Fall, Bargny, Hann Bel Air, Rufisque, Thiaroye, Mbao),	123
Operation and management of septage disposal facilities	ONAS and AGETIP staff, septage haulers, consulting engineers	100
<b>Total</b>		<b>3,777</b>

Source: PAQPUD Progress Reports



## Appendix B.2: On-site Facilities

Table B.10: On-Site Facilities - Number, Cost and Household Contribution

Type of Facility	Sanitation Mode	Number	Percentage	Unit Cost (CFAF)	Contribution (CFAF)
WFSP	Greywater Disposal	27,403	40.6%	106,105	21,221
WFSP with de-greaser	Greywater Disposal	785	1.2%	137,620	27,524
Shower with soakaway pit	Greywater Disposal	4,290	6.4%	182,453	45,613
Shower cabin	Greywater Disposal	1,835	2.7%	89,482	22,371
Soakaway pit for shower	Greywater Disposal	1,505	2.2%	99,598	24,900
Soakaway pit	Greywater Disposal	1,432	2.1%	91,331	18,266
<b>Sub-total</b>		<b>37,250</b>	<b>55.2%</b>	<b>113,912</b>	<b>24,255</b>
PFL (2 pits) and shower	Mixed	15,418	22.8%	389,811	97,453
PFL (1 pit) and shower	Mixed	370	0.5%	302,447	75,612
2 pits for PFL and soakaway pit	Mixed	92	0.1%	211,917	52,979
VIP 2 pits and shower	Mixed	13	0.0%	389,811	97,453
<b>Sub-total</b>		<b>15,893</b>	<b>23.5%</b>	<b>386,747</b>	<b>96,687</b>
PFL 2 pits	Excreta Disposal	3,505	5.2%	224,653	56,163
PFL 1 pit	Excreta Disposal	825	1.2%	137,289	34,322
PFL Cabin	Excreta Disposal	1,696	2.5%	106,438	26,610
2 pits for PFL	Excreta Disposal	614	0.9%	120,586	30,147
1 pit for PFL	Excreta Disposal	119	0.2%	58,035	14,509
Septic tank	Excreta Disposal	2,699	4.0%	308,262	77,066
Watertight pit	Excreta Disposal	818	1.2%	229,283	57,321
VIP 1 pit	Excreta Disposal	7	0.0%	142,525	35,631
VIP 2 pits	Excreta Disposal	7	0.0%	194,616	48,654
Other (including rehabilitation)	Excreta Disposal	4,067	6.0%	100,000	25,000
<b>Sub-total</b>		<b>14,357</b>	<b>21.3%</b>	<b>180,452</b>	<b>45,113</b>
<b>Total</b>		<b>67,500</b>	<b>100.0%</b>	<b>192,305</b>	<b>45,746</b>

† Weighted average

WFSP: Washing Facility with Soakaway Pit PFL: Pour-Flush Latrine VIP: Ventilated Improved Pit Latrine

Source: PAQPUD

## Appendix B.3: Program Costs and Financing

Table B.11: PAQPUD Expenditures

Program Activities	Total Expenditures		As % of Total Expenditures
	(CFAF m)	(US\$ m)	
<b>Works</b>			
Household on-site facilities	10,123	19.29	43.4%
• Greywater disposal	3,416	6.51	14.6%
• Excreta disposal	2,020	3.85	8.7%
• Mixed	4,794	9.13	20.5%
Condominial systems	5,245	9.99	22.5%
Public toilets	83	0.16	0.4%
School sanitation facilities	400	0.76	1.7%
Septage disposal facilities	2,022	3.85	8.7%
<b>Sub-total Works</b>	<b>17,874</b>	<b>34.05</b>	<b>76.6%</b>
<b>Support Activities</b>			
NGO/CBO services	2,445	4.66	10.5%
Technical design and supervision	1,376	2.62	5.9%
Training	400	0.76	1.7%
AGETIP services	880	1.68	3.8%
ONAS coordination and support	355	0.68	1.5%
<b>Sub-total Support</b>	<b>5,456</b>	<b>10.39</b>	<b>23.4%</b>
<b>Total expenditures</b>	<b>23,329</b>	<b>44.45</b>	<b>100.0%</b>

Sources: WB Disbursement System and Program Coordination Unit Reports

Table B.12: Financing of PAQPUD Activities  
(CFAF million)

Program Activities	Total Expenditures	IDA	Beneficiaries	Government
<b>Works</b>				
Household on-site facilities	10,123	7,896	2,227	
Condominial systems	5,245	4,983	262	
Public toilets	83	83		
School sanitation facilities	400	400		
Septage disposal facilities	2,022	1,542		480
<b>Sub-total Works</b>	<b>17,874</b>	<b>14,904</b>	<b>2,489</b>	<b>480</b>
<b>Support Activities</b>				
NGO/CBO services	2,445	2,445		
Technical design and supervision	1,376	1,376		
Training	400	400		
AGETIP services	880	880		
ONAS coordination and support	355	300		55
<b>Sub-total Support</b>	<b>5,456</b>	<b>5,401</b>		<b>55</b>
<b>Total expenditures</b>	<b>23,329</b>	<b>20,306</b>	<b>2,489</b>	<b>534</b>

Sources: WB Disbursement System and Program Coordination Unit Reports

## Appendix B.4: Efficiency and Equity

Table B.13: PAQPUD - Cost-Effectiveness of Sanitation Alternatives

Alternative	Unit	Quantity	Investment cost (US\$ m) (1)	Design Population (2)	Investment Cost (US\$ / capita) (5)	Lifespan (years) (6)	Annualized Capital Cost @ 8%* (7)	Annual O&M costs (US\$ /capita) (8)	Equivalent Annual Cost (US\$/ capita) (9)=(7)+(8)	Source of Data
<b>Sewerage</b>										
Household connections and tertiary sewers	Number	13,800	10.95	138,000	89	15	10.39			PLT
Primary and secondary sewers					50	30	4.48			Contracts ONAS
Wastewater Treatment IEC, supervision	12% of investment costs	7,600	10.86	175,000	69	20	7.08			PLT Contracts ONAS
<b>Total</b>					<b>209</b>		<b>21.94</b>	<b>6.67</b>	<b>28.61</b>	
<b>Condominial systems</b>										
Systems			9.99	128,000	96	20	9.81			PAQPUD
Additional Works			1.50	128,000	12	20	1.19			PEPAM
IEC, supervision	23% of investment costs									PAQPUD
<b>Total</b>					<b>108</b>		<b>11.01</b>	<b>3.81</b>	<b>14.82</b>	
<b>On-site sanitation</b>										
PFL + shower/soakaway	Household	1	743	8	117	15	13.73			PAQPUD
Septage Disposal			3.26	1,050,000	4	20	0.39			PAQPUD
IEC, supervision	23% of investment costs									PAQPUD
<b>Total</b>					<b>121</b>		<b>14.12</b>	<b>4.76</b>	<b>18.88</b>	
<b>Partial Solutions</b>										
WFSP	Household	1	202	8	32	15	3.42	0	3.03	PAQPUD
Shower/soakaway	Household	1	348	8	55	15	5.60	0	5.21	PAQPUD
Pour-flush latrine	Household	1	428	8	68	15	6.80	3.57	9.98	PAQPUD

\* Annual repayment of capital cost over the lifespan of the sanitation equipment with an 8 percent interest rate

Table B.14: PAQPUD - Actual Subsidization of Sanitation Alternatives

Alternative	Household contribution to investment (US\$ per capita) (1)	Annualized contribution (US\$ per capita) (2)	Sanitation surcharge (CFAF/m <sup>3</sup> ) (3)	Annual water consumption (m <sup>3</sup> per capita) (4)	Annual Sanitation Surcharge (CFAF) (5)=(3)x(4)	Annual surcharge (US\$ per capita) (6)	Household emptying costs (7)	Total household contribution (US\$/capita) (8)=(2)+(6)+(7)	Household contribution (%) (9)=(8)/EAC	Subsidy Level (%) (10)=100%-(9)
<b>Sewerage</b>										
Household connections and tertiary sewers	4.19	0.49								
Primary and secondary sewers	0.00	0.00								
Wastewater Treatment	0.00	0.00								
<b>Total</b>	<b>4.19</b>	<b>0.49</b>	<b>58.4</b>	<b>25.6</b>	<b>1,492</b>	<b>2.84</b>	<b>0.00</b>	<b>3.33</b>	<b>11.6%</b>	<b>88.4%</b>
<b>Semi-collective systems</b>										
Systems	5.24	0.53								
Additional Works	0.00	0.00								
<b>Total</b>	<b>5.24</b>	<b>0.53</b>	<b>58.4</b>	<b>14.6</b>	<b>853</b>	<b>1.62</b>	<b>0.19</b>	<b>2.35</b>	<b>15.9%</b>	<b>84.1%</b>
<b>On-site sanitation</b>										
PFL + shower/soakaway	18.01	2.10								
Septage Disposal	0.00	0.00								
<b>Total</b>	<b>18.01</b>	<b>2.10</b>	<b>58.4</b>	<b>14.6</b>	<b>853</b>	<b>1.62</b>	<b>4.76</b>	<b>8.49</b>	<b>45.0%</b>	<b>55.0%</b>
<b>Partial Solutions</b>										
WFSP	5.05	0.59	58.4	14.6	853	1.62	0.00	2.21	73.2%	26.8%
Shower/soakaway	10.86	1.27	58.4	14.6	853	1.62	0.00	2.89	55.6%	44.4%
Pour-flush latrine	13.37	1.56	58.4	14.6	853	1.62	3.57	6.76	67.7%	32.3%

\* Annual repayment of capital contribution over the lifespan of the sanitation equipment with an 8 percent interest rate

## Appendix B.5: List of Participants in the Review Workshop

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# ANNEX C: List of Supporting Documents

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## Burkina Faso

Décret N° 1995-001/PRES/EAU portant adoption du Plan Stratégique d'Assainissement des eaux usées et excréta de la ville de Ouagadougou (PSAO)

Décret N° 2001-46/PRES/PMME portant adoption du document relatif au Plan Stratégique d'Assainissement de la ville de Bobo-Dioulasso

ONEA/Ministère de l'Eau: Plan stratégique d'assainissement des eaux usées de la ville de Ouagadougou, December 1993

ONEA/DASS : Plan stratégique d'assainissement des eaux usées de la ville de Bobo-Dioulasso, August 1999

ONEA : Renforcement de l'Assainissement Urbain dans les villes de Ouagadougou et Bobo-Dioulasso, November 2008

A.O. Ouédraogo, T.F. Zida and A. Manou-Savina: Documentation sur l'expérience de la taxe d'assainissement au Burkina Faso. Rapport provisoire. Août 2003. 23 pages.

J.A. Ouédraogo : Politique de l'assainissement conduite par l'ONEA: approche technique, culturelle, financière et gouvernance, 2010.

M. Vézina: The Ouagadougou Strategic Sanitation Plan: An Holistic Approach to a City's Problems – WSP Field Note No. 10, August 2002

World Bank: Urban Environment Project - Project Appraisal Document (Report No. 13802),

World Bank : Urban Environment Project – Implementation Completion Report (Report No. 34 835), December 29, 2005

F. Zabsonré : Assainissement autonome opérationnel dans le périmètre ONEA : Une expérience réaliste, faisable et durable, 2009

## Senegal

S. Garbarino and J. Holland: The Political Economy of Sanitation: How can we increase investment and improve service to the poor – Operational experiences from case studies in Brazil, India, Indonesia and Senegal – Water and Sanitation Program Technical Paper, February 2011

Global Partnership on Output Based Aid (GPOBA) - Mise en place d'un schéma d'OBA pour les services d'assainissement des eaux usées et de traitement des boues - rapport final, June 2007

PAQPUD – Manuel de Procédures

ONAS : Catalogue des options technologiques dans les quartiers périurbains de la région de Dakar.

ONAS : Cahier technique des ouvrages d'assainissement autonome, 2003.

ONAS : Document d'orientation du PAQPUD pour 2005-2007, March 2004

ONAS : Note technique n°5 sur les technologies appropriées d'assainissement autonome, May 2004

ONAS : Etude d'impact des activités sociales et des réalisations sur le comportement d'hygiène des bénéficiaires du PAQPUD

ONAS : Note de réflexion N°2 sur la demande : Analyse de la faible demande dans la phase pilote du PAQPUD, November 2003

PEPAM : Elaboration d'un document de stratégie pour la réalisation en 2015 des OMD – Sous-programme urbain, Ministry of Agriculture and Water, 2005

PEPAM: Revue annuelle conjointe – Rapport de synthèse, April 2010

P. D. Seck: Rapport sur la participation financière et sociale des populations dans l'assainissement des quartiers périurbains de Dakar, 2002

F.M. Sow and F. M. Dieng - Etude sur la problématique de la demande en ouvrage d'assainissement, 2003

S. Tremolet, E. Perez and P. Kolsky: Financing Household Sanitation for the Poor: A Global Six Country Comparative - Water and Sanitation Program Technical Note No. 10, January 2010

World Bank: Long Term Water Sector Project - Project Appraisal Document, February 7, 2001

World Bank: Long Term Water Sector Project - Implementation Completion and Results Report, December 18, 2009.