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# Sanitation costs analysis in Burkina Faso

*Amah Klutsé, Zakari Bouraima, Cyrille Amegnran*

## Abstract

*The study is conducted in the framework of the WASHCost project in Burkina Faso from data collected in both rural and peri-urban areas. A total of 661households have been surveyed of which 478 households had toilets.*

*The aim of the current paper is to compare the capital expenditure (CapEx) and the operational and maintenance expenditure (OpEx and CapManEx) for sanitation facilities in rural and peri-urban areas in Burkina Faso. It presents the magnitude of the relative cost of different types of sanitation infrastructures such as the VIP toilet, the Ecosan urine diverting toilet, the pour-flush toilet and the traditional pit latrine.*

*In rural areas, the average actualised CapEx hardware varies from US$ 54 to US$ 109. The average OpEx varies between US$ 10 and US$ 21 and this expenditure includes the cost of material families used to clean and maintain the toilet and to remove smells. No CapManEx was recorded for most of the pit latrines in the rural areas. However, average annualised CapManEx varied from US$ 0 to US$ 35. A maximum figure of US$ 134 was recorded.*

*In the peri-urban areas of two small towns (sector 1 in Ouahigouya and sector 2 in Houndé) most existing toilets are pit latrines. Their average updated CapEx hardware is US$ 177 for Ouahigouya sector 1 and US$ 105 for Houndé, sector 2. The average OpEx of the pit latrine is respectively US$ 58 and US$ 29 for sector 1 and sector 2.*

*The paper gives some figures for a small number of pour-flush toilets and flush toilets with septic tanks. It also gives some data for CapManEx.*

*In Sector 30 of Ouagadougou, analysis of hardware costs shows no significant difference between the disaggregated annual CapEx hardware of the ventilated improved pit (VIP) latrines, ECOSAN and traditional pit latrines over an estimated lifespan of 15 years.*

*Likewise, for software, the annual CapExSft is almost the same for modern latrines (VIP, pour flush and Ecosan). Average OpEx for VIP and ECOSAN latrines is respectively US$ 32.3 and US$ 35.3).*

*The pit latrine is not promoted in Burkina Faso, but it is the toilet used by the vast majority of those who have access to one. Section 3 of this paper shows that currently two thirds of the*

*rural population has 'no service' in terms of accessibility and use of toilets, three quarters has no service in terms of reliability of their toilet (which requires maintenance and some money spent on keeping it clean and smell free) while only 5% of the population has access to a toilet that offers some kind of environmental protection by safe disposal of the sludge.*

*Service levels in rural and peri-urban areas are very reliant on household self-supply and expenditure both to acquire them and to keep them functional. All kinds of toilet have operating costs and all have need for rehabilitation. The Government has a big task to meet the Millennium Development target for sanitation – it will require another 6.5 million people to gain access by 2015. A full understanding of the costs and service levels of alternatives is an important building block in the effort to improve sanitation coverage in a country with some of the lowest levels of toilet access and use in the world.*

## Keywords

*Sanitation, cost analysis, capital expenditure, operational and maintenance expenditure, technology, Burkina Faso.*

# 1 INTRODUCTION

Sanitation in Burkina Faso has been boosted through the National Sanitation Strategic Plan and the implementation of the National Program for Water Supply and Sanitation (PN-AEPA). Efforts have been made at institutional, technical, and political levels to improve the sanitation situation of the population both in urban and rural areas.

Sanitation coverage in Burkina Faso is amongst the lowest in the world. In 2007 the access rate to improved sanitation was 18% in urban areas and 15% in rural areas (DGRE, 2008). The traditional pit latrine is common in the urban areas while open defecation is a widespread practice in the rural areas.

In Burkina Faso, the National Utility for Water and Sanitation (ONEA) was in charge of water and sanitation until 2004 when the new law on decentralisation transferred responsibility to the local authorities. Following this decentralisation, regional departments were divided into municipalities and Burkina now has 351 municipalities (49 urban and 302 rural), with elected mayors responsible for the provision of water and sanitation in their territories.

In order to increase water and sanitation coverage in rural areas, the Ministry of Agriculture, Water Resources and Fisheries has charged the General Directorate for Water Resources (DGRE) to implement the national sanitation scheme. A national programme for water supply and sanitation (PN-AEPA, 2006) has been elaborated and adopted by Parliament. The programme strategy concerning sanitation in rural areas is currently being transformed into an operational document in which technologies, community approaches and financing mechanisms are outlined. All sanitation interventions should be carried out within the framework of the national sanitation programme.

The sanitation sector benefits from different sources of funding such as the national budget, multilateral and bilateral funds (as loans, grants or subsidies), contributions from NGOs and associations, decentralized cooperation and from beneficiaries themselves.

The high costs of household sanitation facilities compared to the living standards of the rural population make it difficult for the poor to have access to these facilities. Besides, in urban areas sludge is not managed in an appropriate way because of a lack of treatment plants.
Efforts made by the government in mobilising about US$ 2.2 million per year as an external financial resource and in budgetary support have contributed to raising the national rate of sanitation coverage from 11% in 2005 to 15.6% in 2007. Nevertheless, Burkina Faso cannot meet the Millennium Development Goal target to half the number of people without access to sanitation by 2015, unless 6.5 million people out of a total population of 17.4 million have by then gained access.

This paper presents an analysis of the sanitation service costs in specific rural and peri-urban areas in Burkina Faso. The focus is mainly on a comparison for sanitation facilities between the capital investment expenditure, or CapEx, – differentiated into hardware (e.g.

construction) and software (e.g. toilet promotion) – operational expenditure costs (OpEx) and the cost of major maintenance and repairs (CapManEx).

# 2 METHODOLOGY FOR DATA COLLECTION

## Research questions

For this paper, data collected by the WASHCost Burkina Faso team was analysed to disclose the magnitude of sanitation infrastructures related costs. This paper also relates services received by the population in rural and peri-urban areas to the costs of delivering those services.

## Costs and information collected and analysed

The different components of costs are calculated by considering the following items.

- Capital expenditure (CapEx) divided into:
    - Capital expenditure hardware costs (CapExHrd) for the toilet = Cost of labour + cost of the material + cost of the subsidy (grant from project promoters to cover part of the cost of material), and
    - Capital expenditure software (CapExSft) for the toilet = Costs of obtaining a mason (households have to go to meet the specialised mason many times before he comes to build the toilet, spending money on fuel) + sensitising community members (toilet/hygiene promotion) and training costs.
- Operational and minor maintenance expenditure = Operation and maintenance costs + costs of draining (collection of urine once a week or every two weeks depending on the number of people in the household) + cost of getting a collector (Ecosan) + cost of storage + cost of collection
- Capital Maintenance Expenditure (CapManEx) = Major maintenance expenditure or rehabilitation costs

The sanitation facilities recorded on the sites and for which the cost analysis was done are mostly traditional pit latrines, VIP toilets, pour-flush latrines and Ecosan UD toilets (Figure 1). The focus is not only on the technology but in terms of access to different levels of sanitation services – no service, limited, basic, improved, highly improved (Potter et al., 2010). To assess these, we consider the accessibility to the toilet, its use and reliability (operation and maintenance) and how the facility contributes to environmental protection.


**Figure 1 Types of sanitation infrastructures recorded at research sites.**

## Where institutional level costs were collected

The different types of costs were collected at national, regional or local level. For a governmental sanitation project example the cost of the subsidy and toilet/hygiene promotion can be collected at regional level.

| COSTS | NATIONAL LEVEL | REGIONAL LEVEL | LOCAL LEVEL |
|---|---|---|---|
| CapExHrd | | | |
| CapExSft | | | |
| OpEx | | | |
| CapManEx | | | |

**Table 1 Institutional level of cost data collection**

These different categories of cost have been collected from households, farmers, craftsmen/masons and urine collectors, using appropriate questionnaires. Data also comes from interviews with NGOs, technical institutions, the Project Management Unit, Water Utility Company (ONEA), etc.

## Criteria for selecting where to collect data

The data have been collected by the survey team considering different criteria such as:

- Different types of sanitation facilities existing at household level (VIP, pour-flush toilet, Ecosan UD toilet, and traditional pit latrine).
- Cost of installation of the sanitation infrastructures (in terms of materials, in term of labour)

- Socio-economic status
- Costs of hygiene promotion, publics relations, education, awareness raising and capacity building
- Type and market prices of sanitary hardware (latrine, VIP, pour-flush TCM toilets, Ecosan toilet)

The cost analysis is based on the sample size for each type of cost as shown in Table 2.

| Area | Type of latrine | Sample size for CapExHrd | Sample size for CapExSft | Sample size for OpEx | Sample size for CapManEx |
|---|---|---|---|---|---|
| AOREMA | Traditional pit | 41 | | 41 | 13 |
| BOUERE | Traditional pit | 31 | | 31 | 8 |
| DOSSI | Traditional pit | 37 | | 37 | 18 |
| KOMSILGA | Traditional pit | 50 | | 50 | 3 |
| MARGO | Traditional pit | 31 | | 31 | 4 |
| YAGMA | Traditional pit | 29 | | 29 | 5 |
| Sector 1 Ouahigouya | Traditional pit | 50 | | 50 | 2 |
| | Pour-flush | 2 | | 2 | 2 |
| | Flush toilets | 5 | | 5 | 5 |
| Sector 2 Houndé | Traditional pit | 38 | | 38 | 10 |
| Sector 30 Ouagadougou | VIP | 59 | 26 | 26 | |
| | Pour-flush | 48 | 30 | 30 | |
| | Ecosan | 20 | 3 | 3 | |
| | Traditional Pit | 51 | 31 | 31 | |

**Table 2 Sample size used for cost calculation per area per type of infrastructure**

From the general data base at least 30 households of each type of infrastructure (VIP, TCM, EcoSan toilet) have been surveyed in urban areas. In areas where there were fewer than 30 of these types of infrastructure all of them were considered. In rural areas the team surveyed the entire village. A total of 661 households were surveyed of which 478 households had toilets.

**Area of data collection**

Villages and sectors were chosen for their level of representativeness in the region, the existence of sanitation infrastructure and the availability of a project office to give relevant information on the cost of infrastructure. In total 6 villages and 3 peri-urban sectors covering 44 areas were selected for the survey (Table 3).

| Region | Province | Commune | Area | Level of urbanisation | Pop. | Households survey sanitation |
|---|---|---|---|---|---|---|
| CENTRE | Kadiogo | Bogodogo | Sector 30 | Ville | 15014 | 184 |
| | | Sigh-noghin | Yagma | Village | 1519 | 30 |
| | | Komsilga | Komsilga | Village | 1704 | 51 |
| HAUTS BASSINS | Tuy | Houndé | Sector 2 | Ville | 1568 | 39 |
| | | Houndé | Bouéré | Village | 7299 | 33 |
| | | Boni | Dossi | Village | 3688 | 18 |
| NORD | Yatenga | Ouahigouya | Sector 1 | Ville | 7418 | 51 |
| | | Ouahigouya | Aorema | Village | 4096 | 40 |
| | | Oula | Margo | Village | 2101 | 32 |

**Table 3** **Areas of data collection**
*Source:* Manuel d'instruction de l'enquêteur 2010 (WASHCost)

### Cost analysis

The cost components presented for the rural and peri-urban areas (sector 1 of Ouahigouya and sector 2 of Hounde) are updated to 2009 prices for comparison. These actual costs are not annualised for CapEx and CapManEx because of the different type of work done by the household and the difficulty in estimating and using an adequate theoretical or observed life span of the facilities. Therefore, for comparison purposes, CapEx is annualised using an average span life for 15 years. In fact most of the pit latrines in rural and peri-urban areas were built more than 20 to 30 years ago. For the case of Ouagadougou, the analysis was done by annualising the costs.

### Limitations of data collection

The data collected is more representative of the various climatic and geological areas covered by the study than of the entire country. The current research analysis does not apply to all the country realities. In addition, the results presented in this paper are the fruit of secondary and primary data collection, and the quality of information may sometimes be in doubt. For example, it is difficult for household members to remember or estimate the cost of building or renewing the toilet after months and years have gone by. If the owner of the toilet was not at home and nobody else could give the information, the team needed to return or try to estimate the cost and the appropriate date the toilet was built.

# 3 SANITATION SERVICE LEVELS

To understand costs in their context, it is necessary to understand the service levels that are connected with them. This has been done for services in the study area.

The sanitation service level was analysed by using criteria and indicators proposed in the WASHCost sanitation service ladder (Potter et al., 2010) which outlines five levels of service (highly improved, improved, basic, limited and no service). For each level of service, analysis was based on four criteria: accessibility, use, reliability and environmental protection. Table 4 presents a synthesis of the criteria as applied in Burkina Faso.

- **Accessibility:** type of sanitation facility, separating user from the faeces, whether the facility is shared or not, number of toilets per household and distance from households
- **Use:** number of person per toilet (in Burkina Faso the norm is 10 person/ latrine). Use by all member of the family. Is the toilet used by women, men and children, and is there safe disposal of infant faeces? Toilets should be gender and age sensitive in terms of comfort and privacy.
- **Reliability:** operation and maintenance (routine, regular, weak)
- **Environmental protection:** positive environmental impact, no problematic environmental impact, safe disposal, significant environmental pollution.

| | | |
|---|---|---|
| **Accessibility** | Highly improved | Household with technically improved type of toilet (VIP, Pour-flush, Septic tank, Ecosan) / Each family has sufficient toilets for all members |
| | Improved service | Household with technically improved type of toilet (VIP, Pour-flush, Septic tank, Ecosan) / Each family has toilet in the compound |
| | Basic service | Households with traditional latrine (with cement slab) and there are less than 10 person/latrine |
| | Limited service | Households with traditional latrine and there are more than 10 person/latrine |
| | No service | Households without latrine / Open defecation is practised |
| **Use** | Highly improved | Used by men women, children and infant faeces are disposed of safely |
| | Improved service | Used by men women, children and infant faeces are disposed of safely |
| | Basic service | Used by all member of the family (but not for disposal of infant faeces) |
| | Limited service | Used by all members of the family / not applicable |
| | No service | Households without latrine Open defecation practice |
| **Reliability** | Highly improved | Appropriate routine operation and maintenance |
| | Improved service | Regular operation and maintenance |
| | Basic service | Traditional latrine with maintenance requiring high user effort |
| | Limited service | Without maintenance |
| | No service | Households without latrine / Open defecation practice (Not applicable) |
| **Environmental protection** | Highly improved | Households where faeces and urine has a positive impact on environment (productive reuse, sludge treatment plant) |
| | Improved service | Households where there is safe disposal |
| | Basic service | Households where there is safe disposal |
| | Limited service | Households with traditional latrine and there are more than 10 person/ latrine ; significant environmental pollution |
| | No service | Households without latrine / Open defecation practice / Significant environmental pollution |

**Table 4 Criteria for sanitation service level analysis**
Source: Potter et al., 2010

## Key finding from sanitation service analysis in Burkina Faso

The criteria for service levels shown above translate into services levels in the research areas in Burkina Faso, as summarised in Table 5. The main conclusion is that in the rural areas studied, the vast majority of sanitation services can be considered as 'no service'.

## Accessibility and use

In rural areas 68% of households don't have access to any sanitation facility and they practice open defecation. 32% of the households have a traditional pit latrine (with a platform to separate users from faeces), divided between 27% who share the toilet between 10 or more people (categorised as a limited service) and 5% have fewer than 10 people per toilet (categorised as a basic service).

## Reliability

Reliability is measured through the ease and extent of operation and maintenance. The data shows that 26% of households have toilets and are maintaining them, because there is an associated OpEx that has been collected in this research.

## Environmental protection

Only 5% of households who have pit latrine are contributing to environmental protection

| Area | Service | Accessibility | Use | Reliability | Environmental Protection |
|---|---|---|---|---|---|
| Rural | Highly improved service | 0% | 0% | 0% | 0% |
| | Improved service | 0% | 0% | 0% | 0% |
| | Basic service | | 5% | 26% | 5% |
| | Limited service | 32% | 27% | | |
| | No service | 68% | 68% | 74% | 95% |
| Total | | 100% | 100% | 100% | 100% |

**Table 5 Sanitation service levels received in rural areas**

Concerning the peri-urban areas of Houndé and Ouahigouya, 21% of the households don't have access to sanitation facilities. Overall, in peri-urban areas the services received are between "Limited Services" and "Basic Services" (Table 6) while in Sector 30 of Ouagadougou, the services are higher between "Basic Services" and "Improved Services" (Table 7).

| Area | Service | Accessibility | Use | Reliability | Environmental Protection |
|---|---|---|---|---|---|
| Peri-urban | Highly improved service | 6% | 5% | 5% | 0% |
| | Improved service | | 0% | 1% | 54% |
| | Basic service | 73% | 48% | 71% | |
| | Limited service | | 26% | 23% | 46% |
| | No service | 21% | 21% | | |
| Total | | 100% | 100% | 100% | 100% |

**Table 6 Sanitation service levels received in two peri-urban areas**

| Area | Service | Accessibility | Use | Reliability | Environmental Protection |
|---|---|---|---|---|---|
| Sector 30 | Highly improved service | 51% | 41% | | 1% |
| | Improved service | | 10% | | 85% |
| | Basic service | 47% | 36% | | |
| | Limited service | | 11% | | 14% |
| | No service | 3% | 3% | | |
| Total | | 100% | 100% | | 100% |

**Table 7 Sanitation service levels received in Sector 30 Ouagadougou**

# 4 COST FINDINGS AND DISCUSSION

***Cost analysis per type of toilet and per household for rural areas and two peri-urban areas (Houndé and Ouahigouya)***

## Capital expenditure (CapEx)

The rural areas are mainly characterised by the use of traditional pit latrines, built by the households themselves. The average updated CapEx hardware varies from US$ 54 in Yagma to US$ 109 in Aorema. The minimum CapEx is US$ 11 recorded in Margo and the maximum is US$ 401 recorded in Aorema. This large variation in CapEx depends on the type of superstructure chosen by the households and the depth of the pit. The superstructure can vary from simple fences with clay to fences with concrete material, equipped with a door and a roof.

In the peri-urban area of small towns (Ouahigouya, sector 1) and (Houndé, sector 2) most of the existing toilets are pit latrines. Their average updated CapEx hardware is far higher than for pit latrines in rural areas: US$ 177 for Ouahigouya sector 1 and US$ 105 for Houndé, sector 2.

In Ouahigouya, two pour-flush toilets and 5 flush toilets with septic tanks have been recorded in sector 1 with respectively US$ 227 USD and US$ 336 USD average CapEx.

The data presented from rural and peri-urban areas is shown graphically in Figures 2 and 3.

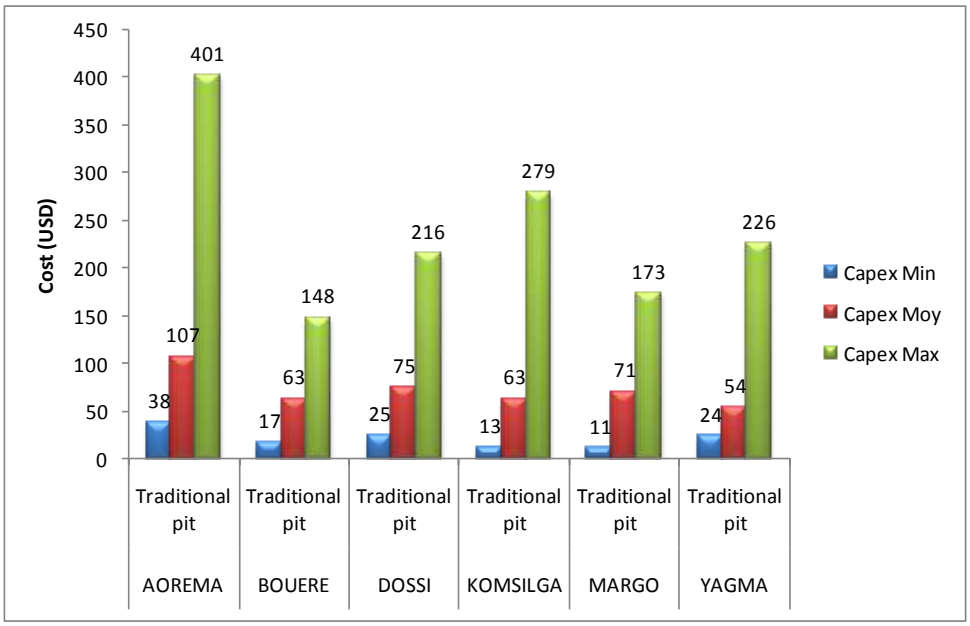



**Figure 2 CapEx hardware for traditional pit latrine in rural areas**

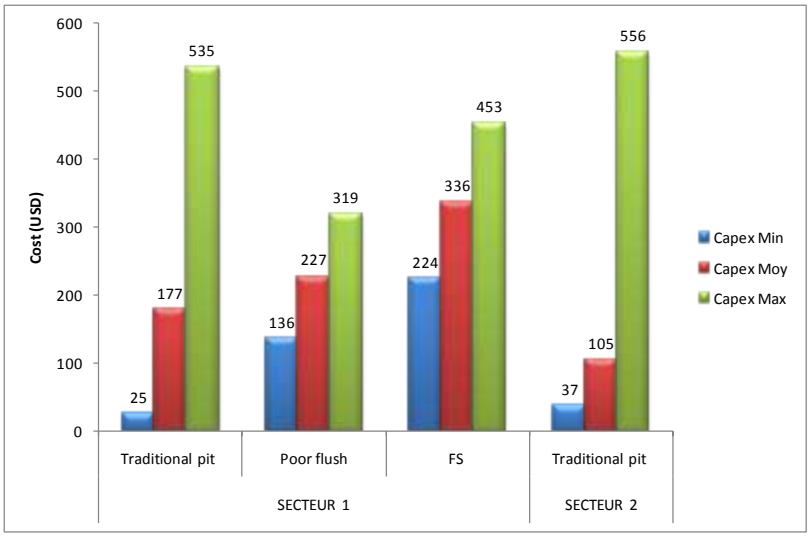



**Figure 3 CapEx hardware for sanitation facilities in peri-urban areas**

## Cost is a factor in whether people acquire toilets

Because of the low living standards, people sometimes do not make it a priority to build a latrine in their home. They continue to practise open defecation as an alternative solution. Among those who have the means to build a latrine in their homes, maintenance remains a big concern as households generally do not have enough means to cover their basic needs. The size of households is generally bigger in the rural areas than in the peri-urban or urban areas. Here, solidarity may be an alternative solution to the lack of

sanitation facilities. Households often group together in a compound and live as one family, sharing the toilets that have been built by one or two households. This was specifically encountered in Aouréma where more than sixty households may be living in a single compound. A latrine can be achieved through joint efforts by households in the same compound even if no household can afford it alone.

The existence of a few pour-flush and flush toilets in the peri-urban areas is indicative of the progressive urbanisation process. However, they cannot outweigh the number of the traditional latrines because of the increased capital costs.

As in the rural areas, households lacking sanitation facilities for their own will go elsewhere in the neighbourhood. The backbone of such practice is solidarity that exists between fellow citizens in sharing toilets, especially since open defecation is not as easy in small towns as in villages. There are public toilets in a limited number of places and, of course, inhabitants do resort to them too.

## Operational expenditure (OpEx)

For the rural sites, the average OpEx varies between US$ 10 and US$ 21 (Table 8). This expenditure mainly concerns the cost of materials that families use to clean and maintain the toilet and to avoid bad smells.
For the peri-urban areas (Table 9), the average OpEx of the pit latrine is respectively US$ 58 and US$ 29 for sector 1 and sector 2. For the pour-flush toilets and septic tanks average OpEx value is respectively US$ 32 and US$ 14.

| rural area | Type of latrine | Number in survey | OpEx (USD at 2009 prices) | | |
|---|---|---|---|---|---|
| | | | Min | Average | Max |
| AOREMA | Traditional pit latrine | 41 | 0 | 21 | 78 |
| BOUERE | Traditional pit latrine | 31 | 0 | 10 | 42 |
| DOSSI | Traditional pit latrine | 37 | 0 | 13 | 41 |
| KOMSILGA | Traditional pit latrine | 50 | 0 | 10 | 53 |
| MARGO | Traditional pit latrine | 31 | 0 | 14 | 104 |
| YAGMA | Traditional pit latrine | 29 | 0 | 10 | 64 |
| Total | Traditional pit latrine | 219 | 0 | 13 | 104 |

**Table 8 OpEx for traditional pit latrines in rural areas**

| peri-urban area | Type of latrine | Number of survey | OpEx (USD at 2009 prices) | | |
|---|---|---|---|---|---|
| | | | Min | Average | Max |
| SECTOR 1 | Traditional pit latrine | 50 | 0 | 58 | 169 |
| | Pour-flush toilet | 2 | 8 | 32 | 55 |
| | Flush toilet with septic tank | 5 | 0 | 14 | 49 |
| SECTOR 2 | Traditional pit latrine | 38 | 4 | 29 | 174 |
| Total | Traditional pit latrine | 88 | 0 | 13 | 169 |

**Table 9 OpEx for sanitation facilities in peri-urban areas**

In Margo, there is a toilet located at the health centre dedicated to the family of the medical doctor. They mention maintaining it regularly. This explains the high OpEx of US$ 104 observed there, which is eight times the average spent on looking after toilets and keeping them clean. High operational expenditures in some households should not hide the existence of other households in which users may lack the means to take care of their latrines after construction. However, they can still regularly clean or sweep the surroundings of the latrines and therefore still ensure a minimal level of care of these facilities.

## Capital maintenance expenditure (CapManEx)

CapManEx differs from OpEx in that it covers major repairs and renewals. This is the expenditure without which a latrine may suddenly be put out of service, perhaps permanently. These renewals generally concern replacement of the fences and the replacement roofs, doors and the slab. From the health protection point of view, any replacement of slabs is more relevant than the renewal of the superstructure. However, it has not been possible to break-down CapManEx to this extent. For most pit latrines in rural areas no CapManEx was ever recorded, which is the case if the household carries out its own repairs using materials to hand. Although in Dossi none of the 18 pit latrines in the sample had had money spent on repairs, in other places, the average CapManEx was around the US$ 10 mark and in Aorema reached US$ 35. The maximum US$ 134 - was also recorded in Aorema, where one owner renewed the fence and reshaped the floor of the toilet.

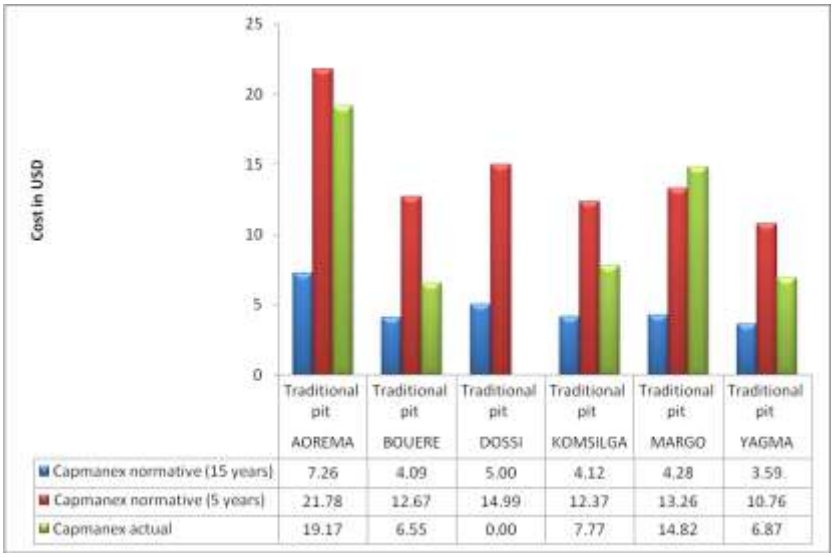
In the peri-urban areas, only two pit latrines had been rehabilitated in sector 1 and 10 latrines in sector 2. The average updated CapManEx was US$ 68 for sector 1 (Ouahigouya) and US$ 40 for sector 2 (Houndé). There has been no rehabilitation of the flush toilet with septic tank in sector 5. In peri-urban areas some households say they have no opportunity to empty (desludge) the latrine. In rural areas this is usually done by the householders themselves.

CapManEx is calculated using the real span life observed since the maintenance or the renewal was done (observed CapManEx).

But the ideal CapManEx can also be calculated by annualising CapEx over the lifetime of the asset – in this case a toilet. This is known as CapManEx normative. It is the (annualised) estimate of what it would cost to keep the asset in good repair and to replace it at the end of its life. On the basis of a theoretical lifespan of 15 years, this shows that the annual cost for renewal of traditional latrines in rural areas (Figure 4) varies between US$ 3.59 and US$ 7.26. In peri-urban areas (Figure 5) it varies between US$ 6.99 and US$ 18.69.

It is possible to do a similar calculation using an assumed lifespan of five years instead of 15, and this is shown in the same figures. The normative CapManEx costs assuming a five year life span are three times higher than when assuming a 15 year lifespan.

In Sector 30 of Ouagadougou where we only have normative CapManEx, they are at much higher levels (Figure 6) but show only small differences between the different types of technology. Here the costs (15 year normative CapManEx) range from US$ 23.9 for a pour-flush toilet to US$ 30.8 for a VIP latrine. The analysis is done separately for this sector of Ouagadougou, because the sampling approach for collecting the data and the variety of type of toilet is very specific to this area.




| | Traditional pit AOREMA | Traditional pit BOUERE | Traditional pit DOSSI | Traditional pit KOMSILGA | Traditional pit MARGO | Traditional pit YAGMA |
|---|---|---|---|---|---|---|
| Capmanex normative (15 years) | 7.26 | 4.09 | 5.00 | 4.12 | 4.28 | 3.59 |
| Capmanex normative (5 years) | 21.78 | 12.67 | 14.99 | 12.37 | 13.26 | 10.76 |
| Capmanex actual | 19.17 | 6.55 | 0.00 | 7.77 | 14.82 | 6.87 |

**Figure 4** **Annualised costs for pit latrines in rural areas showing normative CapManEx for a 15-year and a 5-year lifespan and the actual observed CapManEx.**

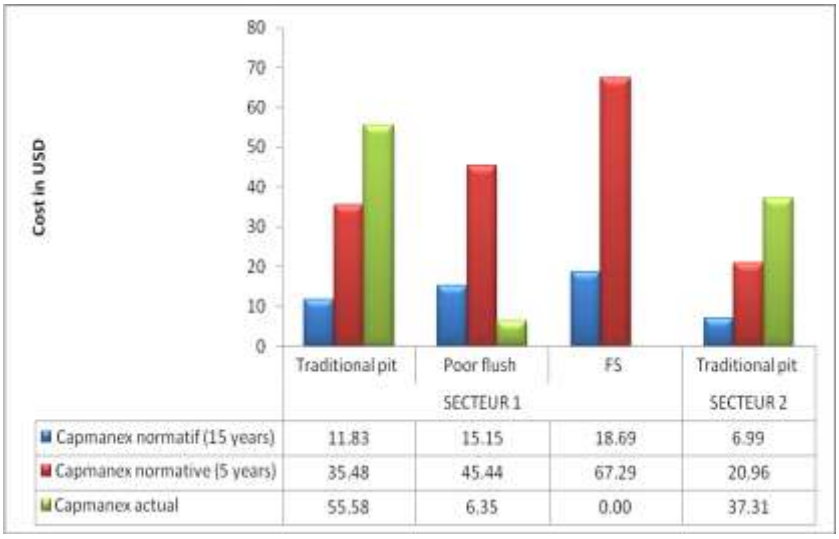



**Figure 5** **Annualised costs for pit latrines in two peri-urban areas showing normative CapManEx for a 15-year and a 5-year lifespan and actual observed CapManEx.**

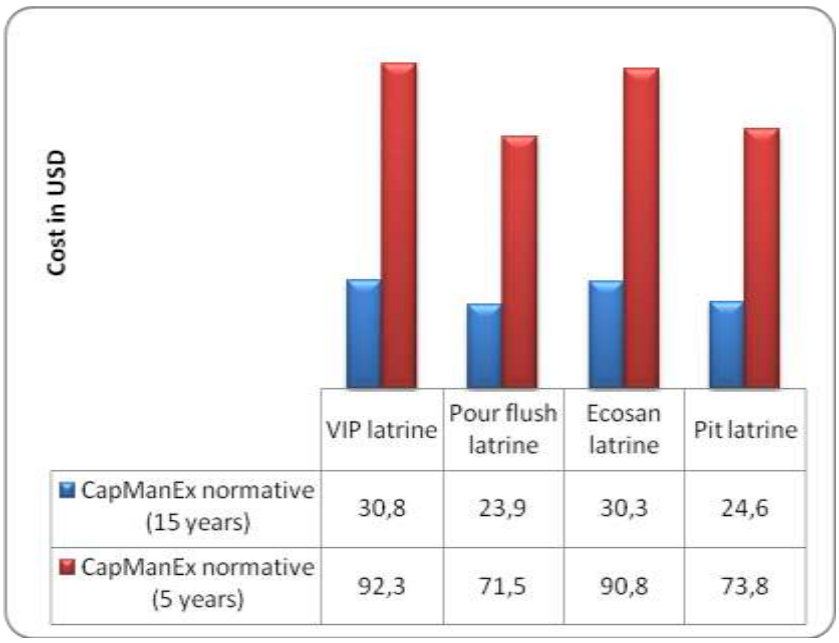
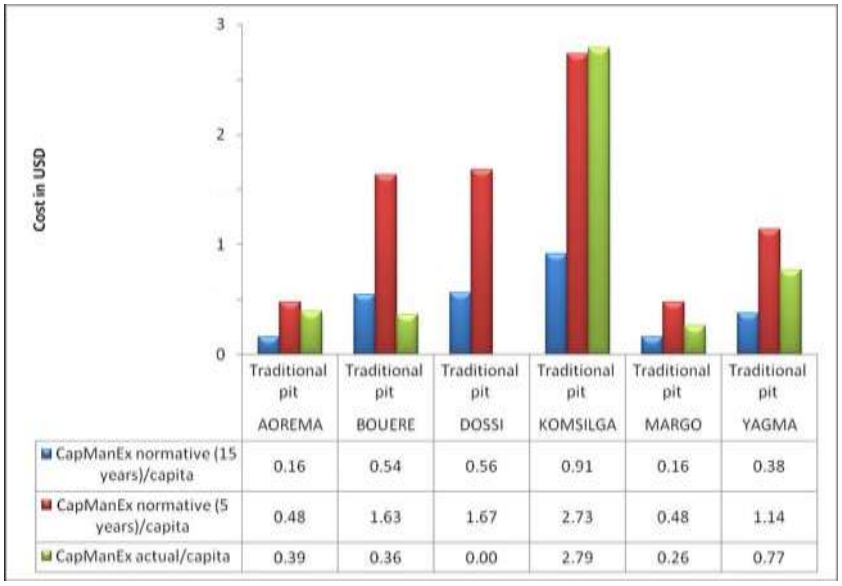



**Figure 6** **Annualised normative CapManEx for four types of toilet in Sector 30 Ouagadougou for a 15-year and a 5-year lifespan**

## CapManEx per capita

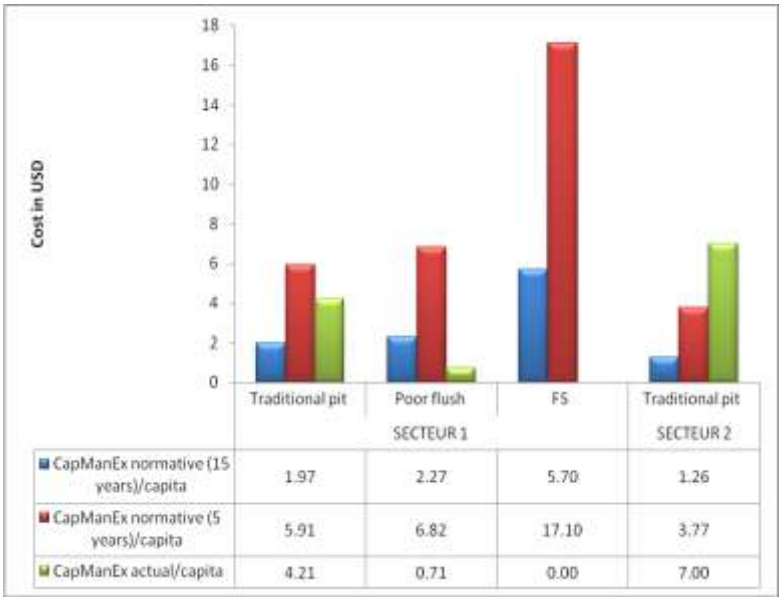
In rural areas, (Figure 7) the per capita CapManEx normative for a lifespan of 5 years is between US$ 0.48 and US$ 2.73. For a 15 year life span that translates to a range between US$ 0.16 and US$ 0.91. In the two peri-urban areas (Figure 8) the per capita costs (normative 15 years) are much higher from US$ 1.97 for a traditional pit latrine to US$ 5.70 for a flush toilet. Again the costs over a five year lifespan are three times higher. In Sector

30 of Ouagadougou (Figure 9) there is again very little difference between the per capita costs for different technologies. The five year figures vary from US$ 3.40 for pour flush and Ecosan latrines to US$ 3.80 for a VIP latrine.




| | Traditional pit AOREMA | Traditional pit BOUERE | Traditional pit DOSSI | Traditional pit KOMSILGA | Traditional pit MARGO | Traditional pit YAGMA |
|---|---|---|---|---|---|---|
| CapManEx normative (15 years)/capita | 0.16 | 0.54 | 0.56 | 0.91 | 0.16 | 0.38 |
| CapManEx normative (5 years)/capita | 0.48 | 1.63 | 1.67 | 2.73 | 0.48 | 1.14 |
| CapManEx actual/capita | 0.39 | 0.36 | 0.00 | 2.79 | 0.26 | 0.77 |

**Figure 7 CapManEx per capita actual and normative (15 years and 5 years) in rural areas**




| | Traditional pit | Poor flush | FS | Traditional pit |
|---|---|---|---|---|
| | | SECTEUR 1 | | SECTEUR 2 |
| CapManEx normative (15 years)/capita | 1.97 | 2.27 | 5.70 | 1.26 |
| CapManEx normative (5 years)/capita | 5.91 | 6.82 | 17.10 | 3.77 |
| CapManEx actual/capita | 4.21 | 0.71 | 0.00 | 7.00 |

**Figure 8 CapManEx per capita actual and normative (15 yrs and 5 yrs) in two peri-urban areas**

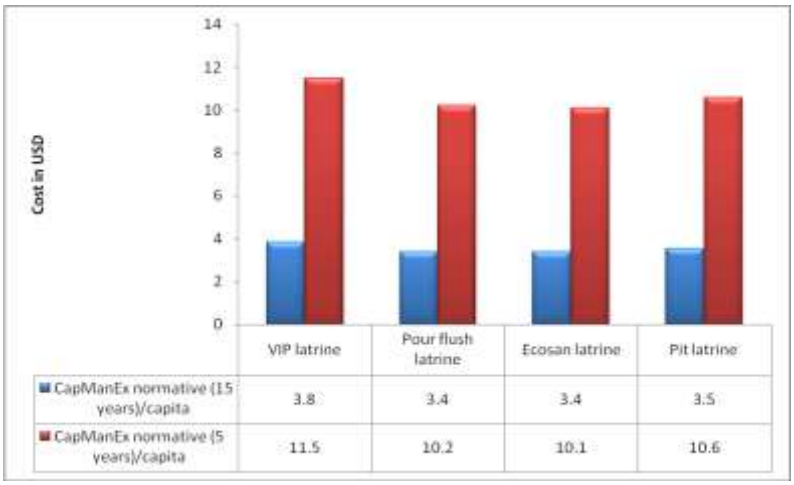



**Figure 9 CapManEx per capita normative (15 years and 5 years) in section 30 of Ouagadougou**

## Operation and maintenance costs (OpEx)

Data was also collected on day to day operation and maintenance costs (OpEx) which is mainly the cost of keeping the facilities clean and odour free. The following figures show this for pit latrines in rural areas (Figure 7); for pit latrines, pour-flush latrines and flush toilets in per-urban areas (Figure 8); and for VIP latrines, pour-flush latrines, Econsan latrines and pit latrines in Sector 30 of Ouagadougou (Figure 9). Figure 7 shows that the annual OpEx for pit latrines in rural areas varies between US$ 12 and US$ 27. In the two peri-urban areas (Figure 8) the OpEx is lowest for the flush toilets (US$ 27.53) and highest for the traditional pit latrine ($US 64.69) reflecting the higher costs in keeping these odour free. In Sector 30 of Ouagadougou, the costs are again highest for the pit latrine (US$ 43) and lowest for the pour-flush latrine (US$ 22.80).

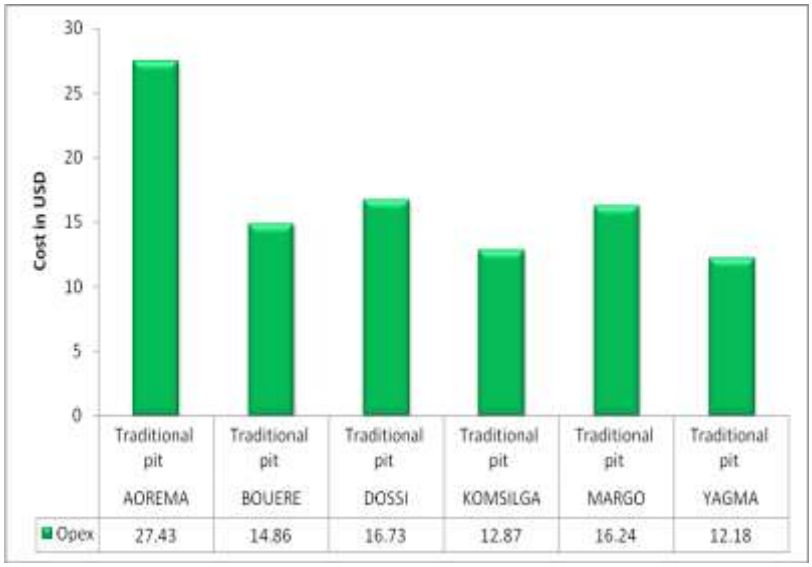



**Figure 10 Annual OpEx for pit latrines in rural areas**

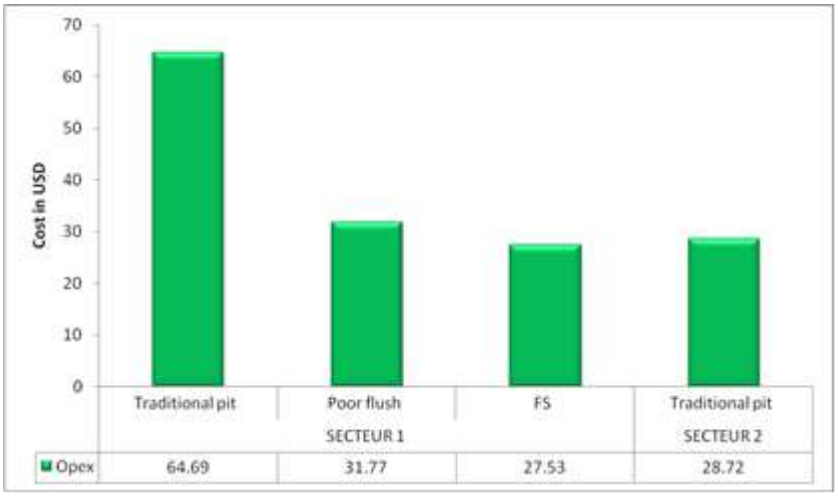



**Figure 11 Annual OpEx per type of technology in two peri-urban areas**

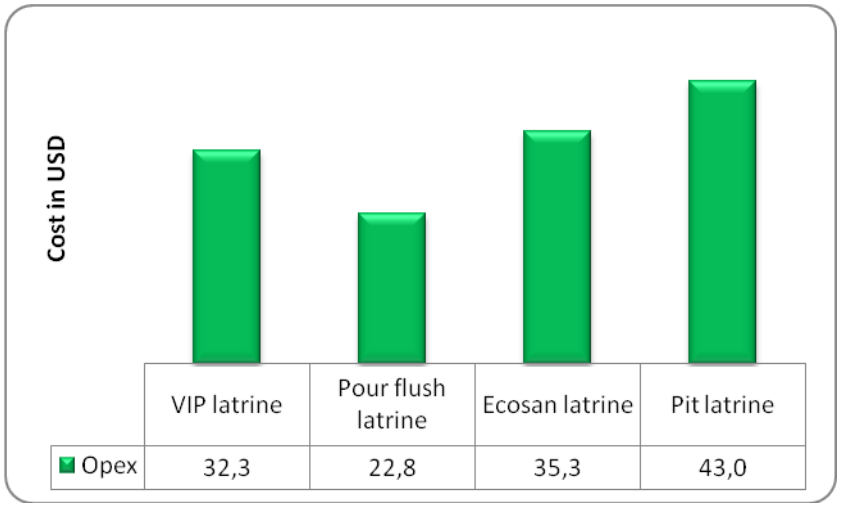



**Figure 12 Annual OpEx per type of technology in Sector 30 of Ouagadougou**

***OpEx per capita***

The OpEx costs per capita in rural areas (Figure 13) range from a low of US$ 0.56 to a high of US$ 3.12, showing significant variation between locations. For the two peri-urban areas, there are also large variation for OpEx per capita (Figure 14). The flush toilet system (FS) that had the lowest overall annual OpEx per type of technology shows by far the highest OpEx per capita. It is significantly higher that the per capita cost for pit latrines in Sector 1, the technology that had by far the highest OpEx by type of technology in the same area. However, in Sector 30 of Ouagadougou it is pit latrines that show the highest per capita OpEx.

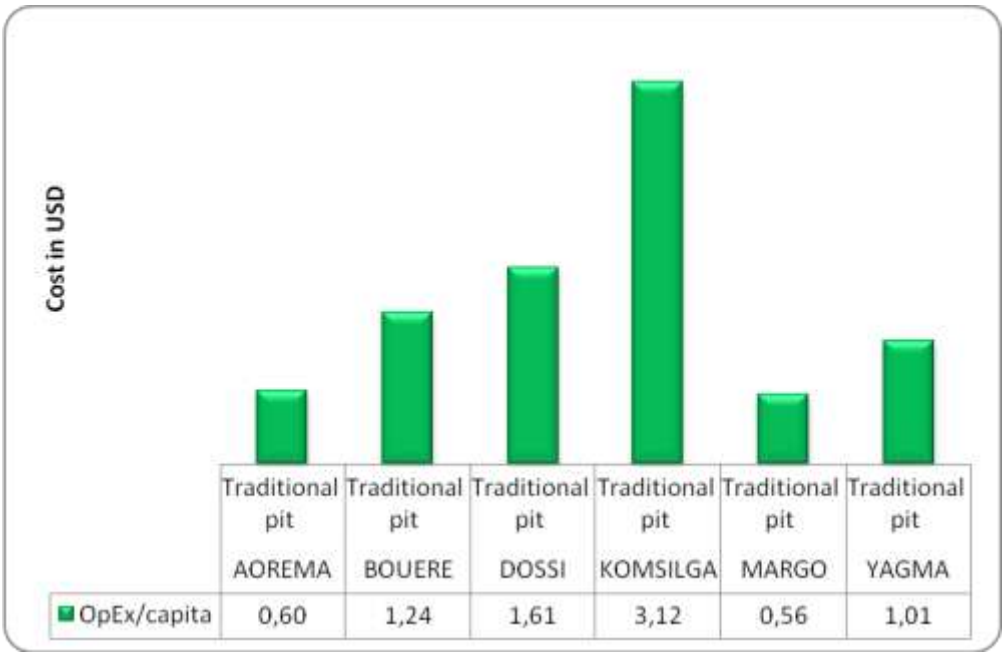



**Figure 13 Annual OpEx per capita in rural areas**

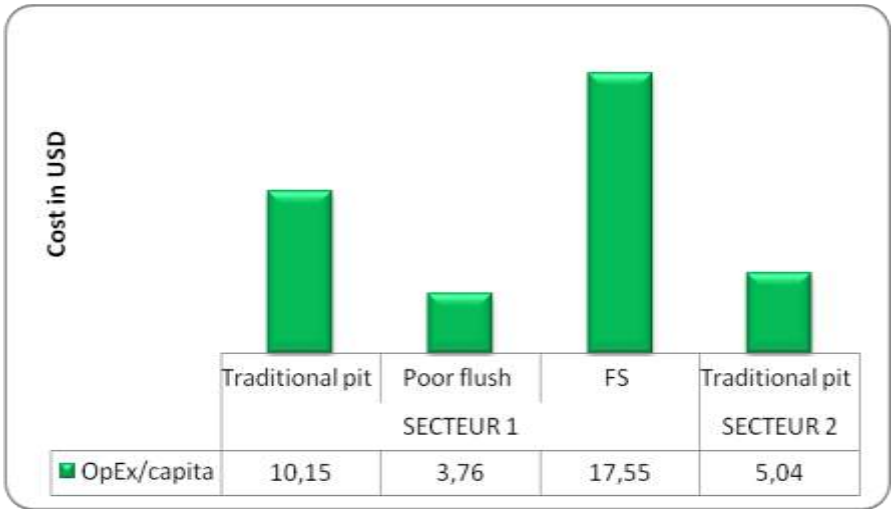



**Figure 14 Annual OpEx per capita in two peri-urban areas**

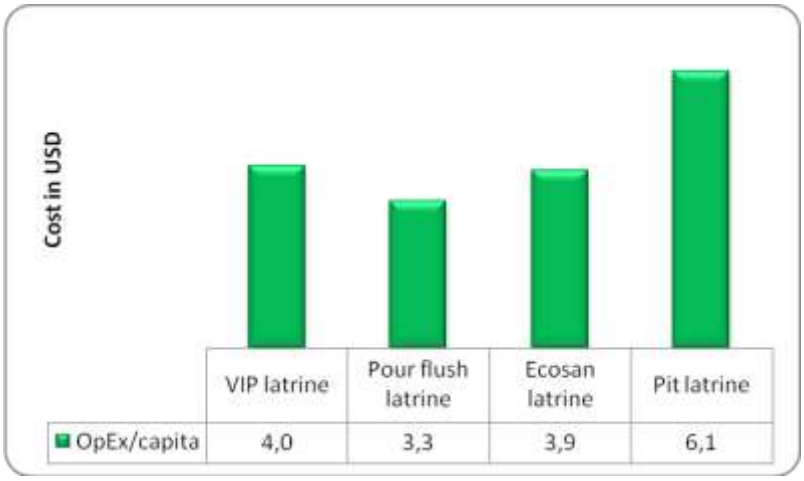



**Figure 15 Annual OpEx per capita in Sector 30 Ouagadougou**

### *Cost analysis for Sector 30 of Ouagadougou*

Some extra cost analysis has been done for Sector 30 in Ouagadougou, adding together annualised CapEx hardware, CapEx software and OpEx, per type of toilet. Figure 16 (annualised assuming a 15 year lifespan) and Figure 17 (annualised for a five year lifespan) tell the same story. In this sector at least, the costs of VIP latrines, Ecosan latrines and pit latrines are similar, with pour-flush latrines coming in at a lower overall cost. However, the overall costs are high even assuming a 15 year life span, with the pour flush latrines costing US$ 46.70 dollars per toilet per year, and the pit latrines costing US$ 67.60. If the lifespans were just five years, these two costs would rise to US$ 94.30 for pour-flush latrines, and US$ 124.60 for the VIP latrine, which over this timescale would be more expensive than the pit latrine mainly because of higher CapEx software costs.

CapEx software – a lot of which is to do with promoting toilets and hygiene – is clearly focused here on toilets other than the pit latrine. For example the CapEx software costs associated with VIP latrines are more than 15 times greater than those associated with pit latrines.

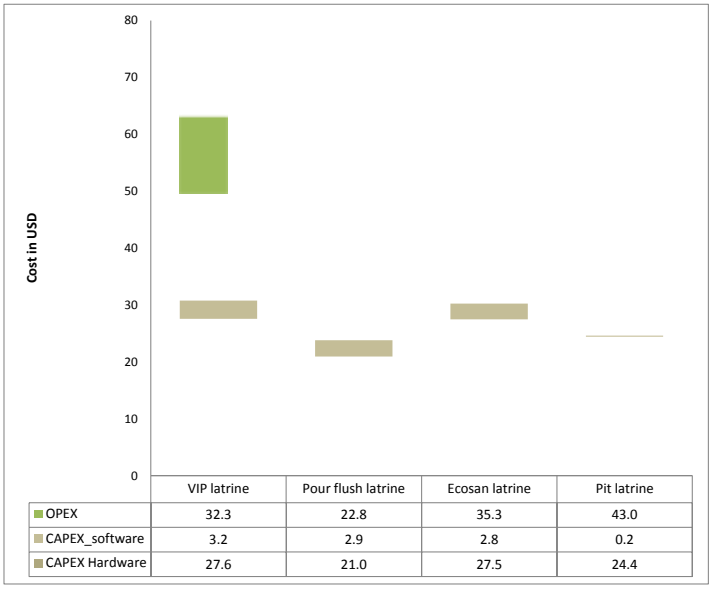
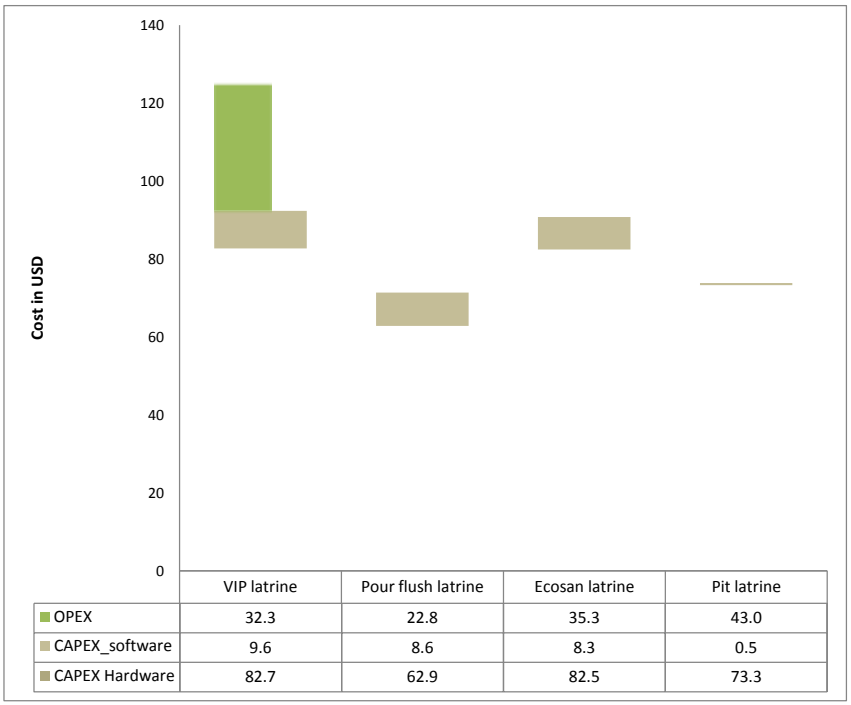
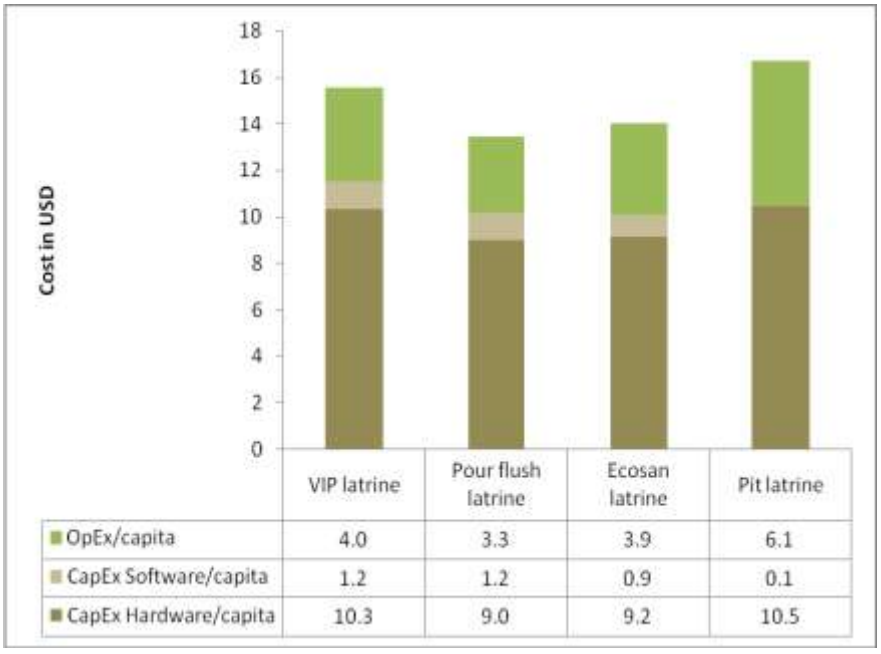



**Figure 16 Annualised (15 years) cost per type of toilet for Sector 30**




| | VIP latrine | Pour flush latrine | Ecosan latrine | Pit latrine |
|---|---|---|---|---|
| OPEX | 32.3 | 22.8 | 35.3 | 43.0 |
| CAPEX_software | 9.6 | 8.6 | 8.3 | 0.5 |
| CAPEX Hardware | 82.7 | 62.9 | 82.5 | 73.3 |

**Figure 17 Annualised (5 years) costs per type of toilet for Sector 30**




| | VIP latrine | Pour flush latrine | Ecosan latrine | Pit latrine |
|---|---|---|---|---|
| OpEx/capita | 4.0 | 3.3 | 3.9 | 6.1 |
| CapEx Software/capita | 1.2 | 1.2 | 0.9 | 0.1 |
| CapEx Hardware/capita | 10.3 | 9.0 | 9.2 | 10.5 |

**Figure 18 Annualised (5 years) costs per capita per year per type of toilet for Sector 30**

# 5 CONCLUSIONS

Unit cost analysis approach is useful for planning sanitation programmes and it is also useful for understanding why people make the choices they make. The traditional pit latrine is not considered to be improved sanitation either by international standards or by the policies of Burkina Faso. Yet the data shows that traditional pit latrines are by the far the most used, not only in rural areas but in peri-urban areas too. At first sight the data analysed for this paper suggests that there are not large differences in the costs of different types of toilets – although there are differences in costs between rural areas and peri-urban area. Households are responsible for paying the capital expenditure to build to toilet. The average CapEx hardware in rural areas is between US$ 54 and US$ 107 while in peri-urban areas it costs between US$ 105 and US$ 177.

In rural areas all the costs related to access to sanitation facilities have to be fully met by the households while in urban and peri-urban areas there are some programmes giving subsidies to meet part of the costs related to the construction of the toilet.

Households are in charge of the maintenance and the rehabilitation of the toilets when necessary. The data recorded shows that the CapManEx can vary, considering the cost of changing the slab, the door or the roof of the toilet. Regarding the renewal of the pit, in some villages the life span has progressed from 20 to 30 years. In rural areas it appears that many households do much of the work themselves, perhaps disguising some of the costs maintaining and repairing pit latrines.

For an estimated lifespan of 15 years (which is the norm that has been set in Burkina Faso for latrines), the disaggregated annual CapEx hardware (CapExHrd) shows no significant difference between VIP latrines, ECOSAN UD toilets and traditional pit latrines, varying between US$ 21 and US$ 27.6. Basically, the cost of digging the pit and the choice of different types of superstructure and the material most influence variation in CapManEx normative. If the lifespan is taken as 5 years, then CapManEx normative varies between US$ 62.9 and US$ 82.7.

Costs related to the promotion of sanitation and the creation of demand are mainly focused on big and small towns, supported by government programmes. In rural areas, the costs of promotion are usually for hygiene promotion programmes linked to a project for water supply.

To improve the use of hygienic and appropriate toilets, the government has initiated a national strategic plan to promote the use of appropriate technologies by households through project funding. The most promoted technologies are the VIP, pour-flush, EcoSan urine-diverting toilets, and flush toilets with septic tanks.

The costs of awareness raising and creating demand from communities come under the heading of CapEx software (CapExSft). This is practically the same for VIP, pour-flush and Ecosan toilets, at between US$ 2.8 and US$ 3.2. The traditional pit latrine, the most

commonly used toilet in communities, does not feature in promotion campaigns or in the national policy. The low level of CapExSft in relation to traditional latrines results from the fact that no NGO or official body promotes these toilets so households building this type of toilets do receive information, education, or advice. The only CapExSft costs for them are the costs incurred in securing the services of local masons or diggers.

The high value of OpEx (US$ 43) for traditional pit latrines is due to the fact that they require much more maintenance (cleaning, treatment of smells, disinfection, etc.). For the pour-flush toilet, the low value of OPEX would be explained by the fact that there is no need to buy products to reduce the smell, because the water keeps odour low.

Households owning VIP and Pour-flush latrines usually take care of emptying them. The emptying frequency of traditional pit-latrines varies a lot depending on the level of use, the pit volume and the water table conditions. The cost for manual pit emptying depends on the volume of sludge and the conditions. Emptying may occur annually or every two or three years.

Relating the service levels discussed at the start of this paper to the costs discussed in later parts shows the extent to which service levels depend on household investment. In rural areas 68% of households practice open defecation and the associated cost is zero. To have access to the basic level of service (which only 5% achieve) the rural household invests from $US 0.48 to $US 2.73 per capita per year. To maintain this service level households invest (CapManEx) from US$ 0.26 to US$ 2.79 per capita per year. To have reliable basic service level, the cost varies from US$ 0.56 to US$ 3.12 per capita per year.

In peri-urban area, 73% of households have access to a basic or limited service level, at a cost that ranges from US$ 3.77 to US$ 5.91 per capita per year. In terms of reliability, the households invest from US$ 5.04 to US$ 10.15 per capita per year to have basic service and from US$ 3.76 to US$ 17.55 to have improved or highly improved service level. Clearly, a household of ten people has significant costs.

The mismatch between the toilets that people currently use and those that are currently promoted may be a necessary part of improving service delivery by moving away from the traditional pit toilets which make even a basic acceptable level of service difficult. But to succeed in close the gap in sanitation means paying attention to the costs of each part of the service and persuading those who currently have no toilet – and therefore no monetary costs – that their best choice may be to seek an acceptable level of service associated for example with a well-built and well maintained VIP latrine. Some households it is clear are paying larger sums of money to reduce odours in their toilets, because the traditional pit latrine is difficult to keep clean and smell free.

Comparing the normative “ideal” CapManEx with the actual expenditure on Capital Maintenance, it can be concluded that the actual lack of capital maintenance and the low expenditure on operational maintenance illustrated in this paper will lead to earlier deterioration of the infrastructure, which at least has the potential to involve more cost-intensive capital expenditure in new infrastructure

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# CONTACT DETAILS


**CREPA/WASHCost**
Burkina Faso, 03 BP 7112
Ouagadougou 03, Burkina Faso.
washcost-burkina@reseaucrepa.org