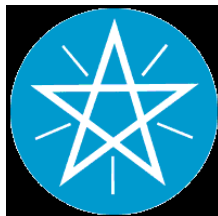


**FEDERAL  
REPUBLIC OF**



**DEMOCRATIC  
ETHIOPIA**

**MINISTRY OF WATER AND ENERGY**

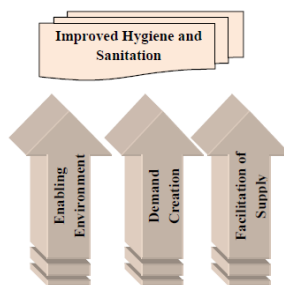


**MoWE  
URP ETHIOPIA**

**PART IV**

**URBAN SANITATION UNIVERSAL ACCESS PLAN**

**(USANUAP)**



**December 2011  
Addis Ababa**

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## List of Abbreviations and Acronyms

AWSSA	Addis Ababa Water Supply and Sewerage Authority
CSA	Central Statistical Agency
DFID	Department for International development
ESP	Environmental support Project
GTP	Growth and Transformation plan
Ha	hectares
HSDP IV	Health Sector Development Program IV
JTR	Joint Technical Review
M&E	Monitoring and Evaluation
MIS	Management Information System
MoH	Ministry of Health
MoWR	Ministry of Water Resources
MOWE	Ministry of Water and Energy
MSF	Multi Stakeholder Forum
NHSSAP	National Hygiene and Sanitation Strategic Action Plan
PASDEP	Plan for Accelerated Sustainable Development for Eradicating Poverty
PE	population equivalent
PT	Public Toilets
SNNPNRS	Southern Nations and Nationalities Peoples National Regional State
TWB	Town Water Board
TSG	Town Support Group
TVETCs	Technical Vocational Education Training Colleges
UAP	Universal Access Plan
UHEW	Urban Health Extension Workers
USD	United states Dollar
WaSH	Water Supply, Sanitation and Hygiene
WIF	WaSH Implementation Framework

## Executive Summary

The sanitation situation in the country is getting priority since 2000 following the launching of the health extension program. Many people living in rural and urban areas still look for access to safe and reliable sanitation facilities. In spite of the fact that the majority of households lack sufficient understanding of hygienic practices regarding food, water and personal hygiene exemplary results are being observed in some rural kebeles that have declared open defecation free status. It is now expected that the recently launched urban health extension program will also enable to change situations in urban areas and enable the country to cope up with the health problems related to unsafe and inadequate water supply and unhygienic waste management, including that of human excreta at a national level.

The plan and corresponding investment requirement shown in this document are indicative and require further studies in the form of sanitation master plan or water supply and sanitation feasibility studies.

It is foreseen that sanitation studies in most towns (other than those large towns where urban waste water master plans will be made) will be carried out as integrated components of water supply feasibility studies, the costs of which are to be included in the urban water supply budgets.

The scope of this component is limited to:

- Sewerage expansion in the case of Addis Ababa only.
- on-site sanitation and septage collection and disposal, as an alternative to sewerage in all the 970 towns in the country;
- Solid waste disposal
- Hygiene education and awareness promotion to support the impact of improved water supply services on public health.

A complete National Urban Sanitation and Hygiene strategic action plan that includes urban drainage and other aspects is expected to be prepared by the Ministry of Urban development and construction.

The country requires a total of 203,250,078 USD for achieving 100% access to latrines, solid waste disposal and desludging facilities by the year 2015.

Physically the activities shown below with corresponding estimated expenses will be undertaken during the planning period:

I. No.	Particulars	Amount in USD
1	Sanitary Landfill site preparation	16,300,226
2	Sludge drying Bed preparation	3,745,809
3	Construction of Communal Toilets	32,995,374
4	Construction of Public Toilets	32,995,374
5	Procurement of 1 m3 donkey pulled carts	2,225,197
6	2.5m3 capacity Truck for SW Disposal	2,134,915
7	5m3 capacity Truck for SW Disposal	4,041,780
8	2.5m3 Capacity Solid Waste Bins	682,576

I. No.	Particulars	Amount in USD
9	5m3 Solid Waste Bins	1,216,559
10	3m3 Capacity tractor mounted Vacuum Truck	3,815,293
11	5m3 Capacity Vacuum Truck	4,132,904
12	Sewerage Expansion	37,623,864
13	San Mark	14,436,342
14	Creation of Enabling environment and Capacity Building	15,634,621
15	Urban Health Extension Activities	31,269,243
	Total	203,250,078

In physical terms the construction of 2851 communal and public latrines & about 177,000 household latrines *and upgrading of more than 200,000 latrines (to be verified after the WaSH inventory)* that would fill the gap and help the country achieve 100% target, procurement of 544 vacuum trucks, 1,869 solid waste disposal carts, 283solid waste disposal trucks, 567 solid waste bins, preparation of sludge drying beds and sanitary landfill sites in all towns will be undertaken during the planning period. San Mark activities will be undertaken along with creation of enabling environment and capacity under the urban health extension program. The awareness creation will be undertaken by 6806 urban health extension workers, the health sector community, the WaSH movement, the media and school clubs. Monthly payments ranging from about 2USD to 2.9 USD based on town sizes are required to be paid by households to cover operation and depreciation expenses. In the case of the urban poor and the marginalized targeted subsidy could be applied to reasonably lower the indicated rates. Income generating options like composting of the waste could help in filling the gap for covering operation and depreciation expenses.

## 1. Introduction

The sanitation situation in the country is getting priority since 2000 following the launching of the health extension. Many people living in rural and urban areas still look for access to safe and reliable sanitation facilities. In spite of the fact that the majority of households lack sufficient understanding of hygienic practices regarding food, water and personal hygiene exemplary results are being observed in some rural kebeles that have declared open defecation free status. It is now expected that the recently launched urban health extension program will also enable to change situations in urban areas and enable the country to cope up with the health problems related to unsafe and inadequate water supply and unhygienic waste management, including that of human excreta.

The plan and corresponding investment requirement shown in this document are indicative and require further studies in the form of sanitation master plan or water supply and sanitation feasibility studies.

It is foreseen that sanitation studies in most towns (other than those large towns where urban waste water master plans will be made) will be carried out as integrated components of water supply feasibility studies, the costs of which are to be included in the urban water supply budget.

## 2. Scope

This Part IV document (i.e. Urban Sanitation UAP is to be read and used in conjunction with part I: UAP rural water supply, part II: National hygiene and sanitation strategic action plan, Part III: Urban water supply UAP. A complete National Urban Sanitation and Hygiene strategic action plan is expected to be prepared by the Ministry of Urban development and construction. The sections of this indicative plan includes amongst other relevant aspects:

- Sewerage expansion in the case of Addis Ababa only.
- on-site sanitation and septage collection and disposal, as an alternative to sewerage in all towns;
- Solid waste disposal
- hygiene education and awareness promotion to support the impact of improved water supply services on public health

## 3. Background

### 3.1. Sanitation Service Levels

Access to sanitation does experience a steady increase in Ethiopia. Table 3.1 gives census and survey results of CSA.

**Table 3-1: Households with Access to Sanitation, CSA<sup>1</sup>**

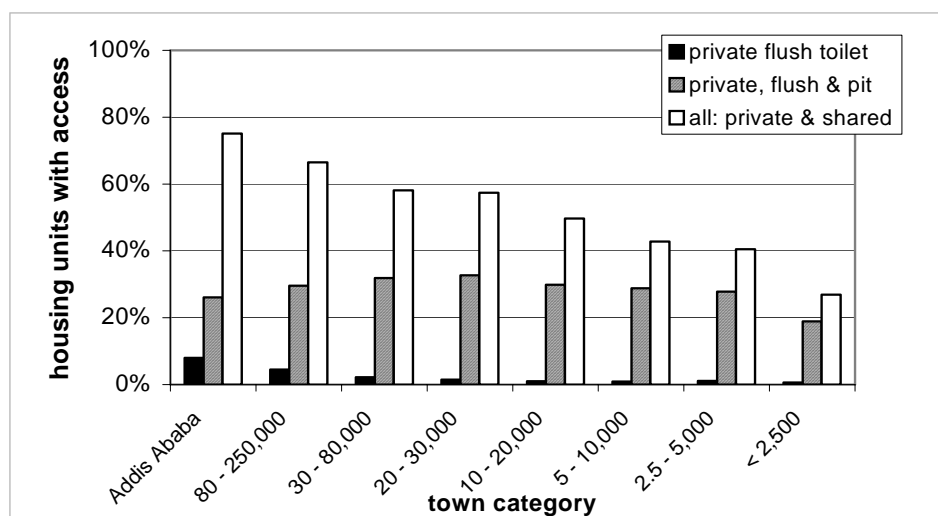
Year	Urban	Rural	Overall	Remarks
1994	57%	6%	13%	
1996	58.0%	5.0%	13.0%	
1998	67.7%	7.5%	16.0%	
2000	71.6%	8.9%	18.0%	
2011	75%	57%	60%	HSDP IV

The CSA survey statistics do provide data per region, zone and a selected number of towns. The 1994 Census also provides woreda and town-wise data. And there are variations.

As stated in the 2003 Water supply and sanitation Master plan volume II document, the city-states of Addis Ababa, Dire Dawa and Harar score relatively higher latrine access, with 2/3 to 3/4 of the town populations using a sanitary toilet. Review of more detailed data revealed that the use of flush toilets was only reserved to 12%, 7% and 8% of the dwellers of the three respective towns. In Addis Ababa this meant 45,000 households only in 2003, of which 1/3 use them as a shared facility. Changes in towns are relatively low as compared to rural areas where dramatic change has been registered i.e. a jump from about 10% in 2000 to more than 50% in 2011

Figure 3.1 illustrates access to various types of facilities by town-size. The general picture is that people living in larger towns are better off.

**Figure 3-1: Access to Sanitation, Urban Population (CSA 1994)**



While more than 60% of the households in the largest towns have access to any type of latrine (either privately owned or shared), in the smaller towns this is 40% and less. The use of private latrines (either a pit latrine or a flush-type) is similar in all towns: around 30%. It is remarkable that in the largest towns this is less than in the medium-sized towns. The cause may be the larger

<sup>1</sup> CSA 1994 Census , CSA 1996, 1998 , 2000 ESP Surveys and HSDP.IV



low-cost residential areas in the first group, where sharing of toilet facilities may be more common due to lack of space.

The possession of private flush latrines is more common in the largest towns: from 8% in Addis Ababa and 4.5% in towns larger than 80,000 inhabitants, to 2% and less in the smaller towns. In fact, in 1994 half of the country's flush toilets were in Addis.

### **3.2. Trends in Household Sanitation**

The CSA censuses, surveys as well as household surveys undertaken for water supply and sanitation projects (11 towns, 12 towns, 25 towns, and Environmental Support project 10 towns) show the same trend: increasingly more households use latrines. There has been an autonomous growth of 3% annually, bringing the urban coverage (excluding Addis Ababa) from 51% in 1984 to 75% in 1998. Rural coverage shows an even stronger autonomous increase as mentioned above.

### **3.3. Quality of Latrines**

As per survey done by the Environmental support project in 2003 the quality of latrines is generally poor. Over 50% are structurally unsafe and 50% hygienically inappropriate. It seems that households require assistance in these areas. There apparently is an interest to invest in household sanitation, but the quality of the facilities has much to desire for. The San Mark activity being launched recently is expected to improve quality in both rural and urban areas

### **3.4. Public Sanitation Services**

Addis Ababa is the only town with a small sewerage system with less than 3% of the population connected. Of these 25,000 pe (population equivalent) are from non-domestic institutions. Sludge collection services are limited to a few large towns only. Of the 30 largest towns surveyed in 2003 by Environmental Support Project (MoWE) only 11 had the service. In five of these the private sector provided the service in addition to the municipality.

### **3.5 Sewerage**

Though sewerage was planned to be implemented in 36 towns at a cost of Birr 1,399,300,000 in 2003 in the water supply and sanitation plan document, the progress is little. In reality, it might be only Diredawa other than Addis Ababa that can start implementing small decentralized sewerage before 2015. Other towns like Mekele, Bahir Dar, Hawassa , Adama and Harar shall make an extraordinary effort to introduce decentralized sewerage before 2015 due to low per capita water consumption and high investment requirement. The city rehabilitation program going on in most

of the large towns by constructing condominium buildings is of course creating conducive environment for decentralized sewerage as observed in Addis Ababa<sup>2</sup>.

Towns that expect to introduce sewerage should prepare Urban Wastewater Master Plans at the outset. These plans shall anticipate on sewerage development on the medium term, need to consider the introduction of small-scale neighbourhood sewerage in housing development areas, and shall include the provision of adequate septage collection and disposal services.

The use of relatively cheaper subsurface flow constructed wetlands could be introduced in bigger towns with adequate space to polish wastewater effluent from septic tanks and primary wastewater treatment units as suggested by the horn of Africa environmental network sponsored study in Addis Ababa.

Further Research and development in wastewater treatment by higher learning institutes is required to test the appropriateness of various cost effective technologies

It would therefore be appropriate to undertake the wastewater master plan studies of at least the largest 10 towns before a realistic sewerage plan is prepared.

To this end, it is only the sewerage expansion plan of Addis Ababa as indicated in the GTP that is included in this document.

## 4. Urban Sanitation Implementation Strategy

### 4.1. Implementation Strategy

These interventions target communities and institutions universally by giving attention to schools and health institutions. The urban sanitation plan will be implemented by Urban Health Extension agents and WaSH volunteers that are to be selected from among the community members, school children, teachers, health institution staffs trained for hygiene and sanitation promotion.

Attention in regard to improving sanitation facilities will be given to low income communities (including disabled and people with special needs), schools and health institutions through construction of communal toilets. Public latrines (for sustainability these latrines could include bio-gas, public showers and cloth washing facilities when feasible) will be constructed at market places, bus stops and business centres. Health institutions and schools will be technically supported to construct and rehabilitate institutional/school latrines. The plan will be implemented by employing the three pillars of sanitation i.e. creation of enabling environment, capacity building and construction of facilities. The major actors to be involved in urban sanitation include the urban development, health, water and education sectors. Construction of urban sanitation facilities like sludge drying beds, sanitary landfill sites are to be undertaken by the municipalities. Desludging and solid waste disposal facilities will also be made available by the municipalities,

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<sup>2</sup> Condominium villages in Mickey Leyland, Gelan and Kaliti villages of Addis Ababa are connected to Waste stabilization ponds constructed by the Administration recently. Effluents from the ponds are currently being injected into rivers. Introduction of constructed wetland s for polishing the effluent could be foreseen in the years to come.

water and sewerage services (in the case of desludging) and private sector (wherever feasible). It would be advisable to keep some of the solid waste disposal and desludging facilities at zonal level so that serving a number of small towns from a central place could be possible. A youth group or small scale micro enterprises could gradually be established and capacitated to undertake the disposal and desludging activities. Household latrines are expected to be executed by the communities themselves through the creation of awareness by the urban health extension workers. Model mothers trained by the health extension workers could speed up the process as is being demonstrated in Addis Ababa. Institutions are also expected to construct and rehabilitate their own schemes in the process of achieving the UAP targets by 2015.

Moreover urban sanitation requires the enforcement of standards by implementing the “polluters pay principle” in the case of specially industries. The new slum upgrading program of constructing condominium building in towns is expected to provide room for affordable decentralized sewerage as demonstrated in some condominium villages in the capital city.

The enhancement of acceptable quality latrine/toilet facilities construction could be achieved through San Mark activities to be run by youth group or small scale entrepreneurs for which more than 14million USD seed money is proposed in this plan.

## 4.2. Implementation Organization Structure

Urban Sanitation needs to be integrated with urban water supply and other infrastructure developments by the water and urban development sectors. The WaSH implementation Organizational structure presented in the WIF and Urban Water supply UAP could be utilized by including the urban development sector and municipalities till a more formal structure is put in place by the Ministry of Urban Development and Construction.

## 5. Proposed urban sanitation Physical plan (2011-2015)

### 5.1. Household Latrine and Hand washing Facilities Access plan

The base line data for 2011 is estimated based on progresses made during the past decade and trend indicated in section 4 above. In general without going into town category details urban latrine access by 2011 is around 75% as indicated in Table 3-1. When urban latrine access is expressed in terms of town categories , towns with less than 1000 population have close to 50% latrine access while Addis Ababa with >1,000,000 population has a latrine access that is close to 90% by 2011 as indicated in table below.

**Table 5-1: Physical Plan for Achieving 100% Access in Access to Latrines by Town Category (2011-2015)**

Category	Category	Flush Toilets			Latrines		
		2011	2015	2020	2011	2015	2020
<1000	<1000	4.24%	5.00%	6.00%	43.76%	95.00%	94.00%
1000-5000	1000-5000	4.74%	5.50%	6.00%	53.26%	94.50%	94.00%
5000-15000	5000-15000	5.24%	6.00%	6.50%	57.76%	94.00%	93.50%
15000-20000	15000-20000	6.14%	7.00%	7.50%	61.86%	93.00%	92.50%

Category	Category	Flush Toilets			Latrines		
		2011	2015	2020	2011	2015	2020
20000-30000	20000-30000	7.05%	8.00%	8.50%	68.95%	92.00%	91.50%
30000-50000	30000-50000	8.76%	10.00%	10.50%	71.24%	90.00%	89.50%
50000-100000	50000-100000	10.48%	12.00%	12.50%	70.52%	88.00%	87.50%
100000-500000	100000-500000	13.00%	15.00%	18.00%	70.00%	85.00%	82.00%
500000-1000000	500000-1000000	14.00%	18.00%	20.00%	72.00%	82.00%	80.00%
>1000000	>1000000	17.14%	20.00%	25.00%	70.86%	80.00%	75.00%

An estimated 176,732 new house hold latrines are expected to be constructed during the planning period (2011-2015) as shown in Annex 1 that gives details of new household latrines to be constructed by town category. Number of latrines to be upgraded for attaining acceptable standard could be more than 200,000 the exact figure of which could better be estimated following the finalization of the WaSH inventory.

## 5.2. Institutional Toilet and Hand Washing Facilities

Institutional toilets and hand washing facilities will be universally constructed and or rehabilitated during the planning period by the institutions themselves through awareness creation to be enhanced by urban extension workers. Health centres and schools will be given higher attention with a view of mobilizing students and health experts as the core sanitation army.

## 5.3. Communal/Public Toilet and Hand Washing Facilities

Communal toilets with hand washing facilities to be managed by communities and Public toilets with hand washing facilities that will be managed by the municipality, youth group or small enterprises are helpful in sanitizing towns. In the case of communal toilets and hand washing facilities needy communities will be encouraged to contribute up to 50% of the construction cost in kind, labour and cash. Accordingly, it is proposed to construct a total of 2851 communal and public toilets for the various town categories in the countries as depicted in table below. Shower facilities and biogas production that are being demonstrated in some towns like Asosa could be included as part of the services for ensuring sustainability wherever feasible.

**Table 5-2 : Requirements of Public Toilets by Town Category**

Category	Population Range	2020 Population	Proposed No. of Communal Toilets(PT)	Proposed No. of Public Toilets(PT)	Assumption	Rate in USD of 1 public Toilet with 8 seats	Amount in USD of all Public toilets in the category (2011)	Total No of Toilets Within the category
1	<1000	1080		1	1PT/1,000People	22,728	22,728	25
2	1000 to 5000	4277	1	1	2PT/5,000People	22,728	22,728	840
3	5000 to 15,000	11950	1	1	2PT/10,000People	22,728	22,728	764
4	15,000 to 20,000	24999	2	2	2PT/10000People	22,728	45,456	156
5	20,000 to 30,000	34640	2	2	2PT/15,000People	22,728	45,456	164
6	30,000 to 50,000	53162	4	4	2PT/15,000People	22,728	90,912	224

Category	Population Range	2020 Population	Proposed No. of Communal Toilets(PT)	Proposed No. of Public Toilets(PT)	Assumption	Rate in USD of 1 public Toilet with 8 seats	Amount in USD of all Public toilets in the category (2011)	Total No of Toilets Within the category
7	50,000 to 100,000	95938	5	5	2PT/20,000People	22,728	113,640	210
8	100,000 to 200,000	189557	9	9	2PT/20,000People	22,728	204,552	162
9	200,000 to 500,000	337513	17	17	2PT/20,000People	22,728	386,376	136
10	500,000 to 1,000,000					22,728	-	
11	>1,000,000	4256478	85	85	2PT/50000People	22,728	1,931,880	170
Total								2851

#### 5.4. Desludging facilities Requirement

In a situation where the little progress in sewerage is limited to Addis Ababa, enhancing desludging services would be a key strategy for improving sanitation in all towns including Addis Ababa. Composting could be considered as a means for recycling and reusing the sludge. Table below gives requirements for desludging facilities by region in 2011, 2015 and 2020.

**Table 5-3: Requirements of Desludging Facilities (2011-2020)**

I.No	Region	Desludging Facilities					
		3m3 Capacity tractor mounted Vacuum Truck			5m3 Capacity Vacuum Truck		
		2011	2015	2020	2011	2015	2020
1	Afar	4	5	7			
2	Gambella	1	1	1	1	1	1
3	Harari				1	2	2
4	Addis Ababa				31	42	53
5	Dire Dawa				2	3	4
6	Benishangul	3	4	6			
7	Somali	11	15	21	1	2	2
8	Amhara	24	30	38	8	11	14
9	Oromia	56	75	102	11	15	19
10	SNNPR	28	38	53	5	7	8
11	Tigray	11	15	21	4	6	8
	Total	138	184	249	64	88	111

Sludge Drying Bed area for typical towns within the indicated population category in hectares is indicated in table below.

**Table 5-4: Requirements of Land in Ha for Sludge Drying Bed by Town Category**

Category	Population Range	Sludge Drying Bed Area of a typical town within the indicated Category(Ha)		
		2011	2015	2020
1	<1000	0.003	0.004	0.005
2	1000 to 5000	0.01	0.01	0.02
3	5000 to 15,000	0.03	0.04	0.05
4	15,000 to 20,000	0.07	0.08	0.10
5	20,000 to 30,000	0.09	0.11	0.15
6	30,000 to 50,000	0.14	0.17	0.22
7	50,000 to 100,000	0.23	0.33	0.40
8	100,000 to 200,000	0.47	0.66	0.83
9	200,000 to 500,000	0.84	1.18	1.48
10	500,000 to 1,000,000			
11	>1,000,000	11.62	15.61	19.81

Model and corresponding assumptions for arriving at the above results are given in Annex 1.

### 5.5. Siting of Sludge drying Beds

Sludge drying beds should better be sited close to roads and within 5 to 10 kms distance from towns depending on the size of the town. They should be kept away from well fields and airports.

#### 5.5.1. Cost of Desludging

Desludging of latrines and septic tanks can't be sustainable unless a system for collecting affordable desludging fee on monthly basis along with water bills are introduced. It is usually observed that many households are not accustomed to getting their toilets/septic tanks emptied once per year. As a result, it is very common to see leaking toilets and septic tanks all around the country. It will therefore be strategic to provide adequate desludging facilities and plan to desludge latrines/septic tanks of all households universally. This requires that every family shall pay the monthly fee that will cover depreciation and operation cost as indicated in table below.

**Table 5-5: Cost of Desludging**

I.No.	Facilities	Sludge Disposal Cost per trip by town Category (USD)										
		<10 00	1000 to 5000	5000 to 15,00 0	15,00 0 to 20,00 0	20,00 0 to 30,00 0	30,00 0 to 50,00 0	50,00 0 to 100,0 00	100,0 0 to 200,00 0	200,00 0 to 500,00 0	500,00 0 to 1,000,0 00	>1,000, 000
1	Depreciation Cost /Trip	2.21	2.21	2.21	2.21	2.21	2.21	5.05	5.05	5.05	5.05	5.05
2	Operation Cost/Trip	6.44	6.44	6.44	6.44	6.44	6.44	9.97	9.97	9.97	9.97	9.97

I.No.	Facilities	Sludge Disposal Cost per trip by town Category (USD)										
		<10 00	1000 to	5000 to	15,00 0 to	20,00 0 to	30,00 0 to	50,00 0 to	100,00 0 to	200,00 0 to	500,00 0 to	>1,000, 000
	Total Sludge Disposal Cost per trip by town category	8.65	8.65	8.65	8.65	8.65	8.65	15.03	15.03	15.03	15.03	15.03
	Monthly Desludging Fee per family	0.72	0.72	0.72	0.72	0.72	0.72	1.25	1.25	1.25	1.25	1.25

As depicted in the table the cost of desludging varies from 0.72 USD (in towns with population <or=50,000) to USD 1.25 (in towns with population > or = 50,000). Details of the costing are shown in Annex 2.

## 5.6. Solid waste Disposal facilities

Solid waste is becoming a nuisance in all towns with the scale of the problem increasing as the population size increases. This plan attempts to minimize the problem by determining required facilities for transporting the solid waste and proposing sanitary land fill area requirement for the various town categories in the country. The health extension workers and sanitation experts of municipalities are expected to create awareness on the benefit of solid waste sorting in order to apply the Reduce, Recycle and Reuse (RRR) Principle. Incineration of solid waste and energy generation could be considered in bigger towns in the future.

Furthermore enforcing of environmental protection legislations and guidelines would be pivotal for sanitizing urban areas.

The three pillar intervention (i.e. creation of enabling environment, Creation of Capacity and Facilitation of supply) should be interwoven with enforced legislations so that those who deserve reward could be congratulated and those who deserve sanction could be sanctioned.

Quick demonstration of how such community led action could lead towards achieving the GTP for better health and dignity of communities could soon turn out to be a universal sanitation movement.

Requirements of solid waste disposal facilities are shown in table below.

**Table 5-6: Requirement of Solid Waste Disposal Facilities by Region**

I. No.	Region	Solid waste Disposal Facilities									Solid Waste Bins 2.5 m3 capacity @2 Nos /Truck (2015 requirement)	Solid Waste Bins 5 m3 capacity @2 Nos /Truck 2015 requirement
		1m3 capacity Donkey pulled Cart			2.5m3 capacity Truck			5m3 capacity Truck				
		2011	2015	2020	2011	2015	2020	2011	2015	2020		
1	Afar	52	78	119	3	4	6				8	0
2	Gambella	16	23	36				1	1	1	0	2
3	Harari							1	2	2	0	4
4	Addis Ababa							51	79	122	0	158
5	Dire Dawa							4	6	10	0	13
6	Benishangul	30	45	69	1	2	3				4	0
7	Somali	109	164	251	6	9	14	1	2	2	18	4
8	Amhara	261	391	600	17	26	41	10	14	19	53	28
9	Oromia	475	713	1,094	39	60	91	13	19	25	119	37
10	SNNPR	225	337	518	19	30	45	6	10	14	59	20
11	Tigrai	78	118	181	9	14	21	4	6	8	28	12
	Total	1,245	1,869	2,869	94	145	222	92	139	202	289	278



Sanitary Landfill area requirements for a typical town within different population ranges varying from <1000 to >1,000,000 is indicated in table below.

**Table 5-7: Requirements of Land in Ha for Land fill Site by Town Category**

Category	Population Range	Land Fill Site area of a typical town within the indicated Category (Ha)		
		2011	2015	2020
1	<1000	0.003	0.012	0.025
2	1000 to 5000	0.01	0.05	0.10
3	5000 to 15,000	0.04	0.13	0.28
4	15,000 to 20,000	0.08	0.28	0.59
5	20,000 to 30,000	0.11	0.39	0.82
6	30,000 to 50,000	0.17	0.59	1.25
7	50,000 to 100,000	0.30	1.07	2.26
8	100,000 to 200,000	0.60	2.12	4.46
9	200,000 to 500,000	1.07	3.78	7.94
10	500,000 to 1,000,000			
11	>1,000,000	13.46	47.64	100.18

Model and corresponding assumptions for arriving at the above results are given in Annex 1.

## 5.7. Siting of Sanitary land fill sites

Sludge drying beds should better be sited close to roads and within 5 to 10 kms distance from towns depending on the size of the town. They should be kept away from well fields and airports.

### 5.7.1. Cost of Solid Waste Disposal

Solid waste disposal also requires a strategy that embraces all households universally. To this end a positive step in the house to house collection of solid waste is started in Addis Ababa and other towns where households pay fees together with water bills. In line with this good practice, monthly fees to be covered by households in the various town categories are given table below.

**Table 5-8: Cost of Solid waste Disposal**

I.No	Facilities	Cost of Solid Waste Disposal by town Category (USD)										
		<1000	1000 to 5000	5000 to 15,000	15,000 to 20,000	20,000 to 30,000	30,000 to 50,000	50,000 to 100,000	100,000 to 200,000	200,000 to 500,000	500,000 to 1,000,000	>1,000,000
1	Depreciation Cost /Trip	1.13	0.68	0.54	1.75	1.75	1.75	3.47	3.47	3.47	3.47	3.47
2	Operation											

I.No	Facilities	Cost of Solid Waste Disposal by town Category (USD)										
		<1000	1000 to 5000	5000 to 15,000	15,000 to 20,000	20,000 to 30,000	30,000 to 50,000	50,000 to 100,000	100,000 to 200,000	200,000 to 500,000	500,000 to 1,000,000	>1,000,000
	Cost/Trip	6.63	3.98	2.65	5.74	5.74	5.74	8.71	8.71	8.71	8.71	8.71
	Total SW Disposal Cost per trip by town category	7.76	4.65	3.19	7.49	7.49	7.49	12.18	12.18	12.18	12.18	12.18
	Monthly Solid waste Disposal fee per family	4.19	2.51	1.72	1.62	1.62	1.62	1.32	1.32	1.32	1.32	1.32

As seen from the table Monthly fees in towns with populations less than 15000 need to be subsidized to USD 1.62 and levelled to the fees of the other town categories between 15,000 and 50,000 population to make the fees affordable. Households in towns with Population >50,000 are expected to pay USD 1.32 per month. One could observe that households pay less in towns with populations > 50,000 due to economy of scale. Details of the costing are shown in Annex 2.

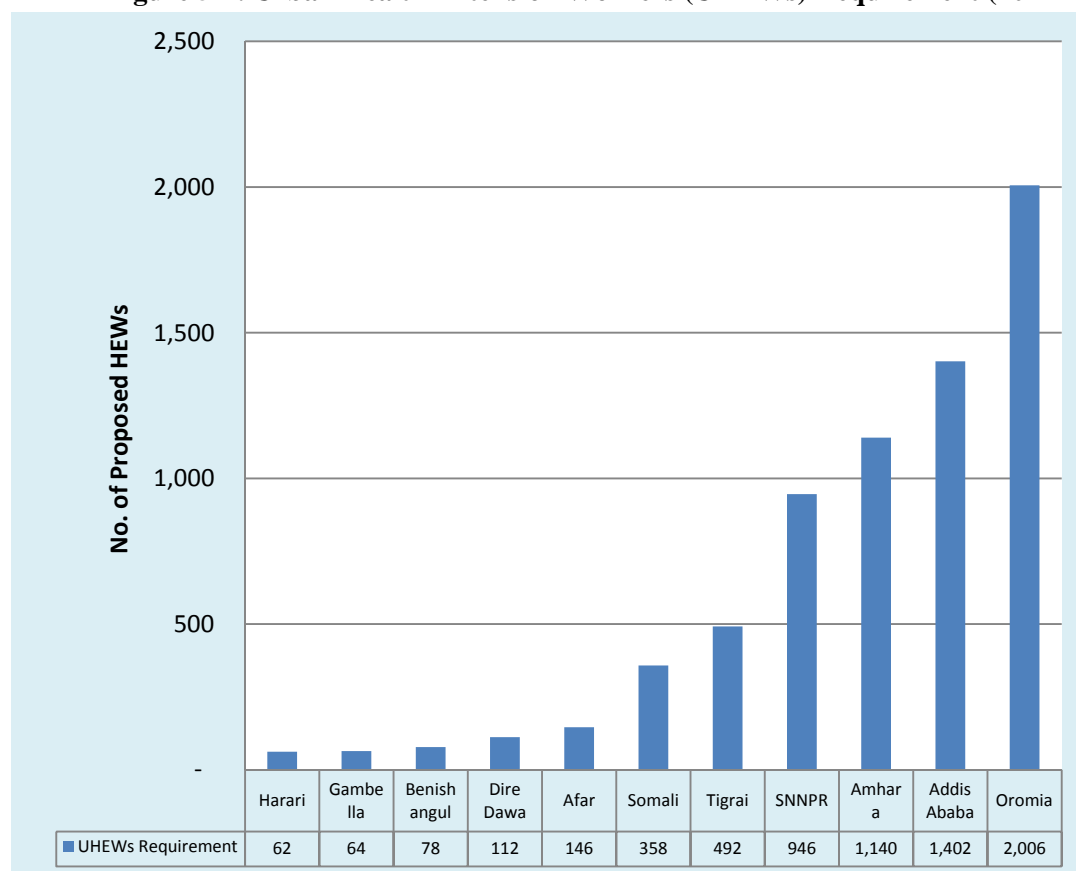
## 5.8. Human Resource Requirement

The assigning of urban health extension workers at urban kebele level have started recently. It is proposed that a minimum of 6,806 urban health extension workers are required as shown in figure below. Details are given in Annex 3. It is also assumed that health workers in hospitals & health centres will strongly support the software activities being undertaken by the health extension workers. Municipalities will coordinate and regulate sanitation activities by ensuring sludge drying bed and sanitary landfill sites are secured together with desludging and solid waste disposal facilities.

The whole intervention could be made community led by organizing sanitation volunteers and youth group from among urban dwellers that can spearhead sanitation movement in towns.

Study, design and construction works could be executed by the consultants and contractors proposed in the urban water supply UAP document. The consultants and contractors are expected to expand their area of expertise to WaSH and Water resources Development sectors so that they can be involved in multiple projects throughout the planning period and beyond

**Figure 5-1: Urban Health Extension Workers (UHEWs) Requirement (2011-2015)**



## 6. Proposed Indicative Financial plan (2011-2015)

A total of USD 203,250,078 is required to undertake sanitation activities in the 970 towns during the planning period as shown in table below.

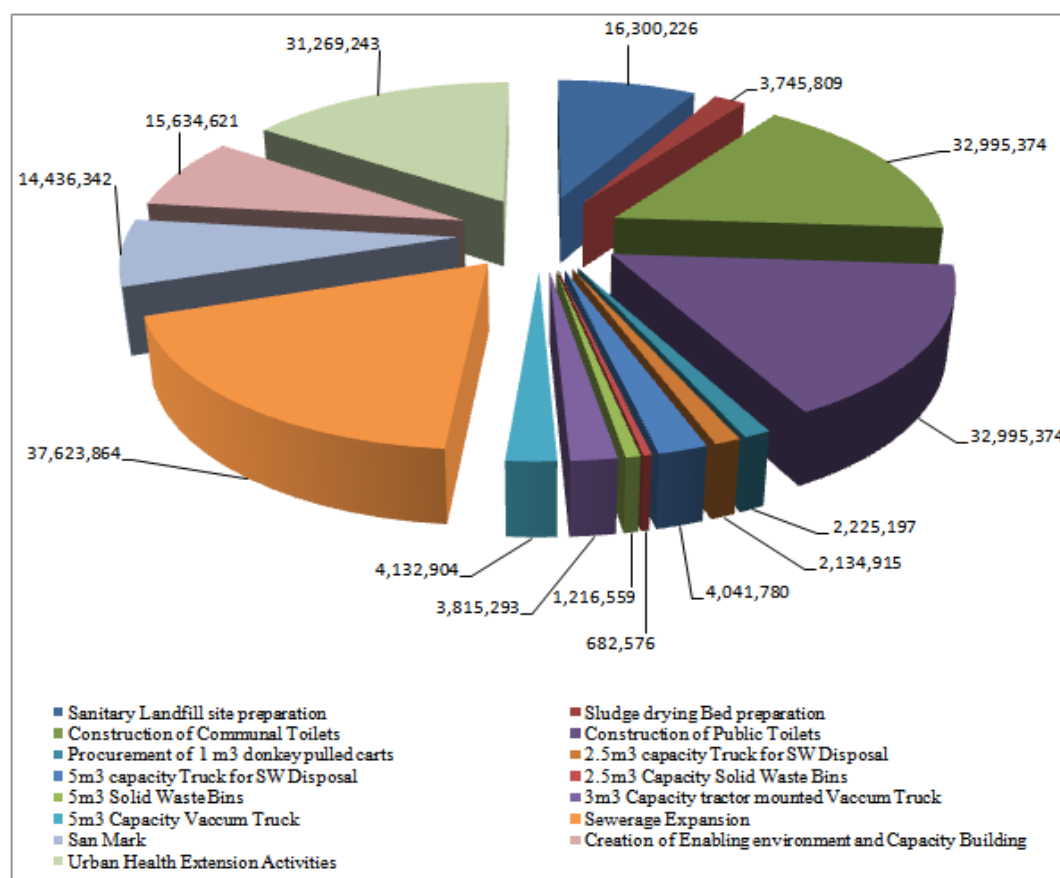
**Table 6-1: Summary of Financial Urban Sanitation Universal Access Plan (2011-2015)**

I.No	Regions	Regional Factor	Total					Grand Total
			2011	2012	2013	2014	2015	
1	Afar	1.15	236,822	950,307	1,310,862	1,315,093	959,540	4,772,624
2	Gambella	1.1	81,335	318,698	438,896	440,578	322,371	1,601,879
3	Harari	1	52,996	213,041	294,398	295,879	216,273	1,072,588
4	Addis Ababa	1	12,776,687	20,488,016	16,815,116	10,814,456	8,146,327	69,040,601
5	Diredawa	1	105,667	424,886	587,297	590,408	431,672	2,139,930

I.No	Regions	Regional Factor	Total					Grand Total
			2011	2012	2013	2014	2015	
6	Benishangul	1.1	124,374	499,156	688,645	690,973	504,236	2,507,385
7	somali	1.15	532,993	2,139,634	2,952,635	2,963,379	2,163,078	10,751,719
8	Amhara	1	1,357,006	5,449,509	7,522,910	7,553,044	5,515,258	27,397,726
9	Oromya	1	2,461,410	9,884,234	13,644,421	13,698,556	10,002,351	49,690,971
10	SNNPR	1	1,168,352	4,691,780	6,476,708	6,502,473	4,747,998	23,587,311
11	Tigrai	1	528,911	2,124,744	2,934,163	2,946,929	2,152,598	10,687,345
	Total		19,428,565	47,186,015	53,668,062	47,813,784	35,163,716	<b>203,250,078</b>

The breakdown of financial requirements for major sanitation activities that are included within the scope of this indicative plan is shown below.

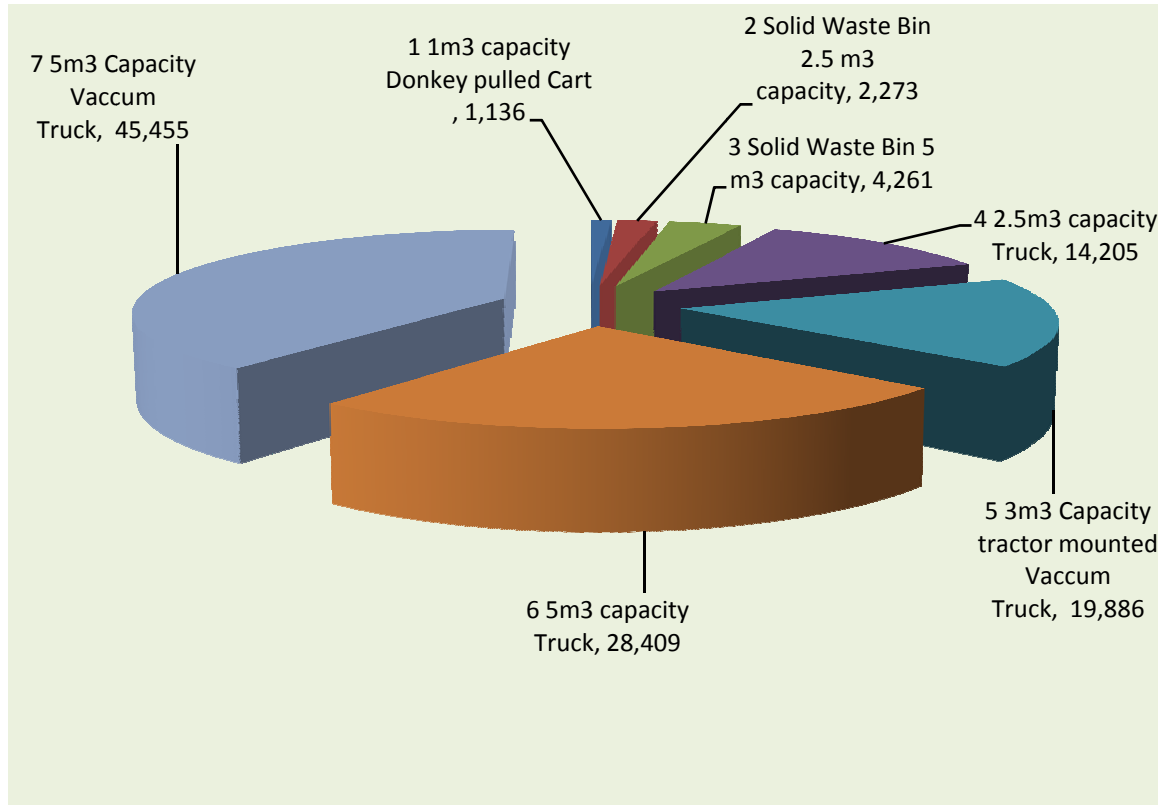
**Figure 6-1: Breakdown of Urban Sanitation Financial Requirements**



Details of the financial Requirement are given in Annex 4.

Estimated Rates used in determining the cost of facilities to be procured and or assembled locally are shown in figure below.

**Figure 6-2: Estimated Rates in USD of Items to be procured and or locally assembled**



## 7. Conclusion and the way forward

The water and health sectors need to closely work with urban development sector that is responsible for urban planning and infrastructure development in the years to come. This indicative document could serve as an input for Ministry of Urban development and construction for finalizing the complex urban sanitation strategic action plan expected to be published and disseminated soon. Additional aspects could be urban drainage, decentralized sewerage in some of the big towns etc. The nature of any plan being dynamic necessitates updating as soon as the WaSH inventory data are processed and dispatched.

## 8. References

1. AAWSSA, Discussion note 2, potential of constructed wetlands in polishing wastewater effluent from Septic tanks and primary treatment units in Addis Ababa, 2011
2. Birhanu Genet, Constructed Wetland System for Domestic Wastewater Treatment: A Case Study in Addis Ababa, Ethiopia (Sponsored by Horn of Africa Regional Environmental Centre / Network) ,2007
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4. Ministry of Finance and Economic Development: Growth and Transformation Plan, Draft, September 2010
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7. Ministry of Water and Energy. "Universal Access Plan", 2006.
8. Ministry of Water and Energy, Town Supply Planning Guideline prepared with the assistance of the World Bank, October 2009
9. USAID: Ethiopia Water and Sanitation Profile, ca. 2007, accessed on September 18, 2010
10. World Resources Institute: Water Resources and Freshwater Ecosystems COUNTRY PROFILE - Ethiopia, accessed on September 10, 2010
11. World Bank: Project Appraisal Document: Urban Water Supply and Sanitation Project, 2004 and 2007

*Annexes*

**Annex 1: Household Latrines to be constructed During the Planning Period**

Town Category	people with No Latrines			Population		Additional people 2012-2015)	No. of Household Latrines To be constructed(@ an average of 5 persons per household)
	2011	2015	2020	2011	2015		2011-2015
<1000	52.00%	0.00%	0.00%	756	890	134.00	106
1000 to 5000	42.00%	0.00%	0.00%	2,994	3,522	528.00	357
5000 to 15,000	37.00%	0.00%	0.00%	8,364	9,841	1,477.00	914
15,000 to 20,000	32.00%	0.00%	0.00%	17,497	20,587	3,090.00	1,738
20,000 to 30,000	24.00%	0.00%	0.00%	24,244	28,526	4,282.00	2,020
30,000 to 50,000	20.00%	0.00%	0.00%	37,208	43,780	6,572.00	2,802
50,000 to 100,000	19.00%	0.00%	0.00%	67,147	79,006	11,859.00	4,924
100,000 to 200,000	17.00%	0.00%	0.00%	132,670	156,102	23,432.00	9,197
200,000 to 500,000	14.00%	0.00%	0.00%	236,224	277,946	41,722.00	14,958
500,000 to 1,000,000						-	
>1,000,000	12.00%	0.00%	0.00%	2,979,086	3,505,256	526,170.00	176,732



**Annex2: Model for Estimating Sanitation Facilities Requirements**

Daily per capita loadings of various on site sewerage sludge

Variable	Septage	pit latrine sludge
BOD(mg/l)	5,000	53,000
Discharge(l/c/d)	1	0.15
Sludge accumulation rate(i/c/d)	0.15	0.15

Latrine/toilet coverage projection(Bulen)

	2009	2010	2011	2015	2020
No latrine			0.00%	0.00%	0.00%
Dry pit latrine			97.50%	91.50%	86.50%
Flush toilet			2.50%	8.50%	13.50%
<b>Wastewater Production</b>					
<b>Wastewater production factors</b>					
Domestic	70%	70%	80%	80%	80%
Non-domestic	80%	80%	80%	80%	80%

	2009	2010	2011	2015	2020
<b>Septage volume to be generated (m<sup>3</sup>/year)</b>					
Domestic			7	28	53
Non domestic 110% of domestic septage			8	30	59
Total			14	58	112

Solid Waste Generation and Collection Potential					
Horizon (year)	Unit		2011	2015	2020
<b>Population</b>			756	890	1,080
waste generation rates *)	gr/c.d		250	300	350
total generated	kg/day		189	267	378
potentially collectable			55%	60%	65%
<b>collection volumes</b>	<b>kg/day</b>		<b>104</b>	<b>160</b>	<b>246</b>
	m <sup>3</sup> /day		0.2	0.3	0.5
temporary disposal (in street)	m <sup>3</sup> /day		0.2	0.3	0.5
<b>final disposal</b>	initially	m <sup>3</sup> /day	0.2	0.2	0.4
		m <sup>3</sup> /yr	59	91	139
	<b>after some years*</b>	<b>m<sup>3</sup>/yr</b>	<b>46</b>	<b>70</b>	<b>108</b>
		waste densities at house in Kg/m <sup>3</sup>			500
		waste densities in temporary disposal site Kg/m <sup>3</sup>			620
		waste densities at landfill, initially Kg/m <sup>3</sup>			775
		waste densities at landfill, after a few years Kg/m <sup>3</sup>			1000
*) this includes some 20% street sweepings					
<b>At Landfill</b>			2011	2015	2020
<b>Cumulative quantities</b>	<b>m<sup>3</sup></b>		<b>114</b>	<b>403</b>	<b>848</b>
Land fill area(4m height including 20% working space)	m <sup>2</sup>		34.15	120.92	254.26
Land fill area	<b>Ha</b>		<b>0.00</b>	<b>0.01</b>	<b>0.03</b>

			2011	2015	2020
Solid Waste Generation Potential in m <sup>3</sup> /Year			<b>58.75</b>	<b>90.54</b>	<b>138.86</b>
Number of 1m <sup>3</sup> capacity Sold Waste Disposal donkey pulled carts 1 trip/week			<b>1.13</b>	<b>1.74</b>	<b>2.67</b>

**Sludge Production**

Description	Unit			2015	2020	2025
<b>Population</b>	No			756	890	1,080
Sludge Volume from pit latrines	M <sup>3</sup> /y			32	36	41
Sludge Volume from flush toilets	M <sup>3</sup> /y			1	3	6
Non domestic sludge	M <sup>3</sup> /y			1	4	7
<b>Total sludge to be generated</b>	<b>M<sup>3</sup>/y</b>			<b>34</b>	<b>43</b>	<b>54</b>
<b>3m3 Capacity tractor mounted Vacuum Truck @3 trips/day</b>	<b>No of Vacuum trucks considering 300 working days/year</b>			<b>0.01</b>	<b>0.02</b>	<b>0.02</b>
Total effective Drying bed surface area required using 0.2m thick	M <sup>2</sup>			170.12	213.13	271.64
Total effective required area using six cycles per year	M <sup>2</sup>			28.35	35.52	45.27
Sludge drying bed area	<b>Ha</b>			<b>0.003</b>	<b>0.004</b>	<b>0.005</b>

N:B

1. Non-shaded Figures are dummy figures showing how results could be determined using the simplified model
2. Shaded Figures are inputs to the model for determining facilities requirements

## Annex 3: Costing Details of Solid Waste Disposal and Sludge Emptying Facilities

### a) Estimated Number of Trips for Disposal and Desludging by Various facilities

I.No.	Facilities	Amount (USD)	Estimated life Time(years)	Depreciation per annum(USD)	Trips per week		Trips per day									
					<1000	1000 to 5000	5000 to 15,000	15,000 to 20,000	20,000 to 30,000	30,000 to 50,000	50,000 to 100,000	100,000 to 200,000	200,000 to 500,000	500,000 to 1,000,000	>1,000,000	
1	1m3 capacity Donkey pulled Cart (2011)	1,136	5	227.27	3	5	1									
2	2.5m3 capacity Truck	14,205	10	1,420.45				3	3	3						
3	5m3 capacity Truck	28,409	10	2,840.91							3	3	3	3	3	
4	Solid Waste Bin 2.5 m3 capacity	2,273	15	151.52												
5	Solid Waste Bin 5 m3 capacity	4,261	15	284.09												
6	3m3 Capacity tractor mounted Vacuum Truck	19,886	10	1,988.64	3	3	3	3	3	3						
7	5m3 Capacity Vacuum Truck	45,455	10	4,545.45							3	3	3	3	3	3

**b) Depreciation Cost per trip by Town Categories of Facilities**

I.No.	Facilities	Amount (USD)	Estimated life Time (years)	Depreciation per annum(USD)	Depreciation Cost per trip by town category(USD) (20110)										
					<1000	1000 to 5000	5000 to 15,000	15,000 to 20,000	20,000 to 30,000	30,000 to 50,000	50,000 to 100,000	100,000 to 200,000	200,000 to 500,000	500,000 to 1,000,000	>1,000,000
1	1m3 capacity Donkey pulled Cart	1,136	7	162.34	1.13	0.68	0.54								
2	2.5m3 capacity Truck	14,205	10	1,420.45				1.58	1.58	1.58					
3	5m3 capacity Truck	28,409	10	2,840.91							3.16	3.16	3.16	3.16	3.16
4	Solid Waste Bin 2.5 m3 capacity	2,273	15	151.52				0.17	0.17	0.17					
5	Solid Waste Bin 5 m3 capacity	4,261	15	284.09							0.32	0.32	0.32	0.32	0.32
6	3m3 Capacity tractor mounted Vacuum Truck	19,886	10	1,988.64	2.21	2.21	2.21	2.21	2.21	2.21					
7	5m3 Capacity Vacuum Truck	45,455	10	4,545.45							5.05	5.05	5.05	5.05	5.05
	Total depreciation cost per trip of disposing solid waste in USD				1.13	0.68	0.54	1.75	1.75	1.75	3.47	3.47	3.47	3.47	3.47
	Total depreciation cost per trip desludging				2.21	2.21	2.21	2.21	2.21	2.21	5.05	5.05	5.05	5.05	5.05

## c) Operation Cost of Facilities by Town Categories

I.No.	Facilities	Amount (USD)	Estimated life Time (years)	Depreciation per annum(USD)	Operation Cost per trip by town category(USD) (2011)										
					<1000	1000 to 5000	5000 to 15,000	15,000 to 20,000	20,000 to 30,000	30,000 to 50,000	50,000 to 100,000	100,000 to 200,000	200,000 to 500,000	500,000 to 1,000,000	>1,000,000
1	1m3 capacity Donkey pulled Cart	1,136	7	162.34	6.63	3.98	2.65								
2	2.5m3 capacity Truck	14,205	10	1,420.45				5.74	5.74	5.74					
3	5m3 capacity Truck	28,409	10	2,840.91							8.71	8.71	8.71	8.71	8.71
4	Solid Waste Bin 2.5 m3 capacity	2,273	15	151.52											
5	Solid Waste Bin 5 m3 capacity	4,261	15	284.09											
6	3m3 Capacity tractor mounted Vacuum Truck	19,886	10	1,988.64	6.44	6.44	6.44	6.44	6.44	6.44					
7	5m3 Capacity Vacuum Truck	45,455	10	4,545.45							9.97	9.97	9.97	9.97	9.97
	Total Operation cost per trip of disposing solid waste in USD				6.63	3.98	2.65	5.74	5.74	5.74	8.71	8.71	8.71	8.71	8.71
	Total Operation cost per trip of desludging				6.44	6.44	6.44	6.44	6.44	6.44	9.97	9.97	9.97	9.97	9.97

**Annex 4: Proposed Health Extension Workers Requirement by Region and Town Category**

Category	Population Range	Afar	Gambella	Harari	Addis Ababa	Dire Dawa	Benishangul	Somali	Amhara	Oromia	SNNPR	Tigray	Total
1	<1000	14	4	-	-	-	2	6	6	6	12	-	50
2	1000 to 5000	48	8	-	-	-	26	80	182	320	150	26	840
3	5000 to 15,000	48	20	-	-	-	32	128	316	588	276	120	1,528
4	15,000 to 20,000	24	-	-	-	-	-	16	72	136	40	24	312
5	20,000 to 30,000	12	-	-	-	-	-	12	168	168	84	48	492
6	30,000 to 50,000	-	-	-	-	-	18	54	-	234	144	54	504
7	50,000 to 100,000	-	32	-	-	-	-	-	160	256	128	96	672
8	100,000 to 200,000	-	-	62	-	-	-	62	124	186	-	124	558
9	200,000 to 500,000	-	-	-	-	112	-	-	112	112	112	-	448
10	500,000 to 1,000,000	-	-	-	-	-	-	-	-	-	-	-	-
11	>1,000,000	-	-	-	1,402	-	-	-	-	-	-	-	1,402
Total		146	64	62	1,402	112	78	358	1,140	2,006	946	492	6,806

**Note: Two health extension workers are assumed to be required for every 5000 people living in a town. For towns with less than 5000 Population 2 health extension workers are proposed**

## Annex 5: Details of Indicative Financial Requirements

### a) Landfill site and Sludge Drying Bed preparation Requirements

Annual Escalation			0%	1%	1%	1%	1%	0%	1%	1%	1%	1%
Allocation Percentage			5%	20%	27.5%	27.5%	20%	5%	20%	27.5%	27.5%	20%
I.No	Regions	Regional Factor	Financial Requirement for landfill site 2011-2015 with 1% escalation per annum					Financial Requirement for Sludge Drying Bed 2011-2015 with 1% escalation per annum				
			2011	2012	2013	2014	2015	2011	2012	2013	2014	2015
1	Afar	1.15	16,758	67,703	94,023	94,963	69,755	3,731	15,074	20,934	21,143	15,530
2	Gambella	1.1	7,721	31,191	43,316	43,750	32,136	3,721	8,920	11,607	11,704	9,132
3	Harari	1	7,604	30,721	42,664	43,091	31,652	1,766	7,135	9,909	10,008	7,351
4	Addis Ababa	1	170,754	689,847	958,024	967,605	710,750	42,206	170,511	236,798	239,166	175,678
5	Diredawa	1	13,540	54,701	75,966	76,725	56,358	3,145	12,704	17,643	17,819	13,089
6	Benishangul	1.1	9,066	36,626	50,865	51,373	37,736	2,018	8,155	11,325	11,438	8,402
7	Somali	1.15	45,691	184,593	256,354	258,917	190,187	10,257	41,438	57,547	58,123	42,694
8	Amhara	1	130,089	525,558	729,868	737,167	541,483	29,199	117,963	163,821	165,460	121,538
9	Oromya	1	229,425	926,876	1,287,199	1,300,071	954,961	51,364	207,511	288,181	291,063	213,799
10	SNNPR	1	106,945	432,056	600,018	606,018	445,148	23,908	96,589	134,137	135,479	99,515
11	Tigray	1	58,332	235,662	327,276	330,549	242,803	13,109	52,960	73,548	74,284	54,565
	Total		795,924	3,215,534	4,465,572	4,510,228	3,312,968	184,424	738,960	1,025,449	1,035,684	761,293



## Urban Sanitation UAP

### b) Public Toilets Construction requirements

Annual Escalation			0%	1%	1%	1%	1%
Allocation Percentage			5%	20%	27.5%	27.5%	20%
I.No	Regions	Regional Factor	Financial Requirement for Public Toilets				
			2011	2012	2013	2014	2015
1	Afar	1.15	124,152	496,607	682,834	682,834	496,607
2	Gambella	1.1	37,501	150,005	206,257	206,257	150,005
3	Harari	1	20,455	81,821	112,504	112,504	81,821
4	Addis Ababa	1	193,188	772,752	1,062,534	1,062,534	772,752
5	Diredawa	1	38,638	154,550	212,507	212,507	154,550
6	Benishangul	1.1	63,752	255,008	350,636	350,636	255,008
7	somali	1.15	262,679	1,050,715	1,444,734	1,444,734	1,050,715
8	Amhara	1	630,702	2,522,808	3,468,861	3,468,861	2,522,808
9	Oromya	1	1,151,173	4,604,693	6,331,453	6,331,453	4,604,693
10	SNNPR	1	545,472	2,181,888	3,000,096	3,000,096	2,181,888
11	Tigrai	1	231,826	927,302	1,275,041	1,275,041	927,302
	Total		3,299,537	13,198,150	18,147,456	18,147,456	13,198,150

## Urban Sanitation UAP

### c) Solid waste disposal carts and Trucks

Annual Escalation		0%	1%	1%	1%	1%	0%	1%	1%	1%	1%	0%	1%	1%	1%	1%	
Allocation Percentage		5%	20%	27.5%	27.5%	20%	5%	20%	27.5%	27.5%	20%	5%	20%	27.5%	27.5%	20%	
I.No	Regions	Regional Factor	1m3 capacity Donkey pulled Cart for SW Disposal					2.5m3 capacity Truck for SW Disposal					5m3 capacity Truck for SW Disposal				
			2011	2012	2013	2014	2015	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015
1	Afar	1.15	5,574	22,519	31,273	31,586	23,201	3,334	13,470	18,706	18,893	13,878	-	-	-	-	-
2	Gambella	1.1	1,605	6,484	9,005	9,095	6,681	-	-	-	-	-	1,360.15	5,495.02	7,631.21	7,707.52	5,661.53
3	Harari	1	-	-	-	-	-	-	-	-	-	-	2,514.34	10,157.92	14,106.81	14,247.88	10,465.71
4	Addis Ababa	1	-	-	-	-	-	-	-	-	-	-	112,558.81	454,737.58	631,516.81	637,831.98	468,516.58
5	Diredawa	1	-	-	-	-	-	-	-	-	-	-	8,925.25	36,057.99	50,075.54	50,576.29	37,150.58
6	Benishangul	1.1	2,897	11,704	16,254	16,416	12,059	1,546	6,248	8,676	8,763	6,437	-	-	-	-	-
7	Somali	1.15	10,920	44,119	61,270	61,882	45,455	7,424	29,993	41,653	42,069	30,902	2,891.49	11,681.61	16,222.83	16,385.06	12,035.57
8	Amhara	1	22,401	90,499	125,680	126,937	93,241	18,774	75,846	105,332	106,385	78,145	20,136.44	81,351.20	112,976.48	114,106.25	83,816.23
9	Oromya	1	40,696	164,413	228,329	230,612	169,395	42,338	171,047	237,542	239,917	176,230	26,360.28	106,495.55	147,895.69	149,374.65	109,722.47
10	SNNPR	1	19,549	78,977	109,679	110,775	81,370	20,964	84,695	117,621	118,797	87,262	13,871.26	56,039.89	77,825.40	78,603.65	57,737.96
11	Tigray	1	6,706	27,092	37,624	38,001	27,913	9,865	39,854	55,347	55,900	41,061	8,738.18	35,302.26	49,026.02	49,516.28	36,371.95
	Total		110,348	445,806	619,113	625,305	459,315	104,246	421,153	584,876	590,725	433,914	197,356	797,319	1,107,277	1,118,350	821,479

## Urban Sanitation UAP

### d) Truck Mountable Solid Waste Collection Bins

Annual Escalation			0%	1%	1%	1%	1%	0%	1%	1%	1%	1%
Allocation Percentage			5%	20%	27.50%	27.50%	20%	5%	20%	27.50%	27.50%	20%
I.No	Regions	Regional Factor	2.5m <sup>3</sup> Capacity Solid Waste Bins					5m <sup>3</sup> Solid Waste Bins				
			2011	2012	2013	2014	2015	2011	2012	2013	2014	2015
1	Afar	1.15	1,045	4,224	5,866	5,924	4,352	-	-	-	-	-
2	Gambella	1.1	-	-	-	-	-	469	1,894	2,630	2,656	1,951
3	Harari	1	-	-	-	-	-	852	3,443	4,782	4,830	3,548
4	Addis Ababa	1	-	-	-	-	-	33,665	136,006	188,878	190,767	140,127
5	Diredawa	1	-	-	-	-	-	2,770	11,190	15,541	15,696	11,529
6	Benishangul	1.1	500	2,020	2,805	2,833	2,081	-	-	-	-	-
7	Somali	1.15	2,352	9,503	13,198	13,330	9,791	980	3,960	5,499	5,554	4,080
8	Amhara	1	6,023	24,332	33,791	34,129	25,069	5,966	24,102	33,472	33,807	24,833
9	Oromya	1	13,523	54,632	75,870	76,629	56,287	7,884	31,849	44,231	44,673	32,815
10	SNNPR	1	6,705	27,086	37,616	37,992	27,907	4,261	17,216	23,909	24,148	17,738
11	Tigray	1	3,182	12,855	17,852	18,030	13,244	2,557	10,330	14,345	14,489	10,643
	Total		33,330	134,651	186,997	188,867	138,731	59,403	239,990	333,286	336,619	247,262

## Urban Sanitation UAP

### e) Vacuum Trucks

Annual Escalation			0%	1%	1%	1%	1%	0%	1%	1%	1%	1%
Allocation Percentage			5%	20%	27.50%	27.50%	20%	5%	20%	27.50%	27.50%	20%
I.No	Regions	Regional Factor	3m3 Capacity tractor mounted Vacuum Truck					5m3 Capacity Vacuum Truck				
			2011	2012	2013	2014	2015	2011	2012	2013	2014	2015
1	Afar	1.15	6,068	24,513	34,043	34,383	25,256	-	-	-	-	-
2	Gambella	1.1	1,263	5,101	7,084	7,154	5,255	2,176.25	8,792.04	12,209.94	12,332.04	9,058.44
3	Harari	1	-	-	-	-	-	4,022.94	16,252.67	22,570.89	22,796.60	16,745.14
4	Addis Ababa	1	-	-	-	-	-	94,599.42	382,181.67	530,754.80	536,062.35	393,762.16
5	Diredawa	1	-	-	-	-	-	7,163.01	28,938.54	40,188.40	40,590.28	29,815.41
6	Benishangul	1.1	4,598	18,576	25,798	26,056	19,139	-	-	-	-	-
7	Somali	1.15	17,503	70,714	98,204	99,186	72,856	4,626.38	18,690.57	25,956.53	26,216.09	19,256.91
8	Amhara	1	29,725	120,089	166,773	168,441	123,728	25,100.91	101,407.68	140,829.92	142,238.21	104,480.43
9	Oromya	1	74,306	300,196	416,897	421,066	309,292	35,059.07	141,638.63	196,700.65	198,667.65	145,930.42
10	SNNPR	1	37,813	152,765	212,153	214,274	157,394	15,076.63	60,909.58	84,588.18	85,434.06	62,755.20
11	Tigray	1	15,021	60,686	84,278	85,121	62,525	13,981.09	56,483.62	78,441.62	79,226.04	58,195.13
	Total		186,297	752,640	1,045,229	1,055,681	775,446	201,806	815,295	1,132,241	1,143,563	839,999

## Urban Sanitation UAP

### f) Sewerage Expansion in Addis Ababa

Annual Cost Escalation in %			0%	1%	1%	1%	1%
Allocation Percentage during the planning period			5%	20%	27.50%	27.50%	20%
I.No	Regions	Regional Factor	Sewerage Expansion				
			2011	2012	2013	2014	2015
1	Afar	1.15	9,067,614	12,694,886	8,688,636	4,040,909	3,131,818
2	Gambella	1.1					
3	Harari	1					
4	Addis Ababa	1					
5	Diredawa	1					
6	Benishangul	1.1					
7	Somali	1.15					
8	Amhara	1					
9	Oromya	1					
10	SNNPR	1					
11	Tigray	1					
	Total		9,067,614	12,694,886	8,688,636	4,040,909	3,131,818

g) Seed Finance for SAN MARK

1) Estimated Seed Finance Requirement by Town Category(2011)

Category	Population Range	San Mark Seed Money (USD)/town (2011)
1	<1000	5682
2	1000 to 5000	8523
3	5000 to 15,000	11364
4	15,000 to 20,000	14205
5	20,000 to 30,000	17045
6	30,000 to 50,000	19886
7	50,000 to 100,000	35511
8	100,000 to 200,000	71023
9	200,000 to 500,000	142045
10	500,000 to 1,000,000	284091
11	>1,000,000	2272727

## Urban Sanitation UAP

### 2) Break Down of The San Mark Requirements by Region During The Planning Period (2011-2015)

Annual Escalation		0%	1%	1%	1%	1%
Allocation Percentage		5%	20%	27.50%	27.50%	20%
I.No	Regions	San Mark				
		2011	2012	2013	2014	2015
1	Afar	22,018	88,952	123,531	124,767	91,647
2	Gambella	6,889	27,833	38,653	39,040	28,676
3	Harari	3,551	14,347	19,924	20,123	14,781
4	Addis Ababa	113,636	459,091	637,562	643,938	473,002
5	Diredawa	7,102	28,693	39,848	40,246	29,563
6	Benishangul	11,364	45,910	63,758	64,396	47,301
7	somali	44,888	181,346	251,844	254,362	186,840
8	Amhara	125,926	508,740	706,513	713,578	524,156
9	Oromya	221,453	894,672	1,242,476	1,254,900	921,781
10	SNNPR	104,548	422,372	586,569	592,435	435,170
11	Tigrai	43,538	175,892	244,270	246,712	181,221
	Total	704,913	2,847,847	3,954,947	3,994,497	2,934,139

### h) Creation of Enabling environment and Capacity Building

I.No	Regions	Creation of Enabling environment and Capacity Building @ 10%				
		2011	2012	2013	2014	2015
1	Afar	18,217	73,101	100,836	101,161	73,811
2	Gambella	6,257	24,515	33,761	33,891	24,798
3	Harari	4,077	16,388	22,646	22,760	16,636
4	Addis Ababa	982,822	1,576,001	1,293,470	831,881	626,641
5	Diredawa	8,128	32,684	45,177	45,416	33,206
6	Benishangul	9,567	38,397	52,973	53,152	38,787
7	somali	40,999	164,587	227,126	227,952	166,391
8	Amhara	104,385	419,193	578,685	581,003	424,251
9	Oromya	189,339	760,326	1,049,571	1,053,735	769,412
10	SNNPR	89,873	360,906	498,208	500,190	365,231
11	Tigrai	40,685	163,442	225,705	226,687	165,584
	Total	1,494,350	3,629,539	4,128,158	3,677,828	2,704,746



## Urban Sanitation UAP

### i) Urban Health Extension Activities

Regions	Urban Health Extension Activities @20% of Overall Financial Requirement				
	2011	2012	2013	2014	2015
Afar	36,434	146,201	201,671	202,322	147,622
Gambella	12,513	49,031	67,522	67,781	49,596
Harari	8,153	32,776	45,292	45,520	33,273
Addis Ababa	1,965,644	3,152,002	2,586,941	1,663,762	1,253,281
Diredawa	16,256	65,367	90,353	90,832	66,411
Benishangul	19,134	76,793	105,945	106,304	77,575
somali	81,999	329,174	454,251	455,905	332,781
Amhara	208,770	838,386	1,157,371	1,162,007	848,501
Oromya	378,678	1,520,651	2,099,142	2,107,470	1,538,823
SNNPR	179,747	721,812	996,417	1,000,381	730,461
Tigray	81,371	326,884	451,410	453,374	331,169
Total	2,988,701	7,259,077	8,256,315	7,355,657	5,409,493