

# Report on UNICEF's Water Interventions Mapping (2005-2009)



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## **Executive Summary**

This report documents the results of UNICEF's interventions mapping carried out by SWALIM for the period 2005 to 2009 as part of UNICEF's EC funded programme "Integrated Water Resource Management and Rural Water and Sanitation Programme in Somalia". The major objective of the mapping exercise is to evaluate progress made in the water sector - in terms of coverage of water services and increase in number of beneficiaries served through UNICEF's water interventions. The final programme report was submitted by UNICEF to EC.

In undertaking this task, SWALIM and UNICEF staff worked in close co-ordination and consultation. A designated project officer from UNICEF USSC was the focal point to provide information, documents and, data as requested / required by SWALIM to undertake this project. The scope of assessment covered the entire country, based on the zonal operational areas as defined by UNICEF, North West Zone (NWZ), North East Zone (NEZ) and South Central Zone (SCZ). The data provided by UNICEF Zonal Offices and missing data was collected by SWALIM<sup>1</sup> through field survey whenever security permitted.

The activities carried out under this activity are listed in Letter of Agreement presented in Annex-1. Below is summary of the major ones:

1. Water interventions data collection, analyses and mapping;
2. Mapping rural water interventions;
3. Mapping Urban water interventions,
4. Assessment of water intervention in terms of:
  - a. Water source, storage and distribution technology, e.g. shallow well, borehole, water yard, distribution facility, etc.
  - b. Water lifting mechanism technology, e.g. hand pump, solar driven pump, diesel generator driven pump, etc.
  - c. Coverage by zone, e.g. NEZ, NWZ and CSZ or by region and,
  - d. Annual coverage progress, e.g. 2005, 2006, etc.
5. Production of annual, zonal and regional maps for rural interventions and water supply maps for major towns intervened on.

As a result of the analyses, the study concluded that the project endeavoured to rehabilitate or construct different types of water supply systems. Based on the data availed by UNICEF and that collected by SWALIM the following have been concluded:

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<sup>1</sup> Information on strategic water sources was collected by SWALIM in collaboration with UNICEF during the period 2008 – 2009 totalled 2,254 water sources visited in 14 out of the 18 regions of Somalia.

- i. A total of 378 interventions were implemented country wide during the period from 2005 to 2009.
- ii. A total of 108 interventions were recorded for the period pre-2005. These interventions backdate as early as 1992 to 2004.
- iii. An increased number of interventions were recorded in the year 2006 and 2009, with decreased interventions undertaken from 2005 to 2007.
- iv. For the CSZ where 10 regions were covered, interventions implemented were substantially reduced and a total of 153 interventions were recorded in this zone.
- v. Most of the interventions were implemented in the less populated NWZ covering 5 regions and NEZ covering 2 regions, recording a total of 162 and 63 interventions respectively.
- vi. Interventions were carried out on different source types; namely berkads, borehole water yard, dam, motorized shallow well (water yards), school WASH facilities, shallow well, solar water system, spring and, town water supply systems.
- vii. A significant number of shallow wells and borehole water yard were intervened on recording 83.5% of the total interventions undertaken in comparison to 16.5% interventions on other sources. Interventions were fewer on berkads, dams and springs due to their seasonality and hence unreliable sources of water during dry periods. Solar systems were the least intervened on.
- viii. Construction and development of water systems, was key in the interventions implemented by UNICEF in order to increase supply and storage of water through construction of water tanks and enhancing water lifting mechanisms by installing hand pumps. 241 water systems were constructed with 54 being new water sources constructed, of these 29 shallow wells, 9 dams and 19 borehole water yards.
- ix. Training and building capacity of users to manage, operate and maintain facilities has been offered and water management committees established, following the implementation of the integrated water resources management and rural water and sanitation capacity of programme for Somalia by UNICEF.
- x. 107 borehole water yards were rehabilitated and fitted with separate lifting and distribution facilities for human and livestock, 141 shallow wells were rehabilitated through installation of hand pumps, water tanks and additionally, cleaning and protection activities were carried out on areas surrounding the shallow wells.
- xi. Interventions on water supply systems in urban towns of Somalia entailed the upgrade and development of the already existing distribution pipeline network. Eight (8) urban water supply systems were constructed including improvement of sources, excavation and layout of new pipelines, extension of pipelines, construction of water tanks and kiosks and establishment of public private partnerships (PPP) for managing water utilities allowing good service delivery and cost recovery.

- xii. The total number of beneficiaries of the programme was found to be 1,724,250, with 526,250 in NWZ, 342,250 in NEZ and 855,750 in CSZ. 41% are rural population, 36% are IDPs and 23% are urban population.

As the main leader in the water sector, UNICEF is highly encouraged to keep updated records on interventions from its projects and share the data with SWALIM for proper storage and mapping.

## Glossary of Terms and Somali Terms

<b>Term</b>	<b>Meaning / Explanation</b>
<i>Artesian well</i>	a well deriving its water from a confined aquifer in which water level stands above the ground surface; sometimes also referred to as spring
<i>Berkad</i>	Is a manmade cistern to store run-off water and typically sunk into the ground and made of stonework plastered watertight. There are three types of berkads: (1) concrete lined underground rainwater tanks, usually covered by natural roofing material to limit evaporation and gravity filled by channel guided water run-off. They are small to large size (30-600 m <sup>3</sup> ) and mostly lined with a thick wall (450-700 mm) made with stones held in concrete mortar. They can be private or communal. They are filled in dry seasons by water trucks and more and more often commercial, (2) the same structure, found in some villages and collect rainfall from a roof with a system of gutters and pipes. House berkad or roof tops, are smaller in size and mostly constructed for domestic consumption and, (3) simple storage berkad, below or above ground, only meant to be filled by water trucks in dry seasons mostly found in urban areas for commercial or private domestic use
<i>Berkado</i>	plural of berkad in Somali language
<i>Borehole or bore well</i>	a mechanically drilled well with limited bore diameter and of significant depth, casement, filtration screens and usually mechanically pumped
<i>Borehole yard</i>	a water supply system equipped with public taps, piping system, standpipes for trucks and donkey carts
<i>Ceel</i>	Hand dug / Shallow well
<i>Dam</i>	A dam acts as a barrier to impound water. In Somalia the most typical dams are balli or warr type, open ponds with a bund wall to impound surface run-off. Sub-surface and sand dams are less common and impound shallow aquifer runoff in wadi sections.
<i>Hand dug well<sup>2</sup></i>	Any source that taps groundwater that has been developed by non-mechanical means with diameter of 1 to 3 m dug manually to tap shallow ground water at depths of 6 to 20m. They are usually unprotected and covered by wooden sticks and troughs are used for watering the livestock

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<sup>2</sup> In Somalia there are many names and varieties of wells. These can include anything from traditional wells dug in clusters in wadis on migration routes to a caisson-lined shaft fitted with infiltration gallery and hand pump. The descriptor name may therefore be in Somali (e.g. beeyo, buq, laas, ceel etc) or English (e.g. collector well, hand dug well, traditional well, farm well etc).

<b>Term</b>	<b>Meaning / Explanation</b>
<i>Improved hand dug well</i>	Hand dug wells lined and in some cases equipped with filtration screens and well covered
<i>Improved water source</i>	Household connection, Public Standpipe, Borehole, Protected dug well, Protected Spring, Rainwater collection (JMP, 2004)
<i>Mini water system</i>	Pipe system from wells, springs, and boreholes with short transmission system pipeline with public distribution points such as kiosks, public standpipes and animal troughs
<i>Mugciid</i>	Underground reservoir storage well with an average depth of 15 meters
<i>Rehabilitation</i>	Restoration in original functional state at least and when applicable up-grading to improved supply facility
<i>Spring</i>	Any source of water naturally flowing from the ground to or across its surface. The descriptor may be in Somali (isha, laas) or English (artesian spring/well, spring well etc).
<i>Unimproved water source</i>	Unprotected well, unprotected spring, river or ponds, vendor-provided water, Source tanker truck water, bottled water (JMP, 2004)
<i>Togga</i>	Seasonal River
<i>Urban water system</i>	Pipe system from wells, springs, boreholes serving collective kiosks and house connections, also referred as reticulated water system
<i>Wadi(s)</i>	Seasonal stream
<i>Warr</i>	Unlined dug-out (dam), usually 2-3 m deep

### **Somali Climate Seasons**

<i>Gu</i>	Main rainy season normally from March/April to June
<i>Hagaa</i>	Hot and windy season normally starts in July to August
<i>Deyr</i>	Short rainy season starts October to November
<i>Jilaal</i>	Very dry and cool season starts from December to
February/March	



## **List of Abbreviations**

CARTIS	Catholic Agency for International Aid and Development
CSZ	Central South Zone
EC	European Commission of the European Union
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GTZ	German Technical Cooperation
GUMCO	Golden Utilities Management Company
IDP	Internally Displaced Person
JMP	Joint Monitoring Programme of UNICEF and WHO
MICS	Multiple Indicator Cluster Survey
MWMR	Ministry of Water and Mineral Resources
NEZ	North East Zone
NGO	Non Governmental Organization
NWZ	North West Zone
PPP	Public Private Partnership
PSAWEN	Puntland State Agency for Water, Energy and Natural Resources
PVC	Polyvinyl Chloride
SWIMS	Somalia Water Sources Information Management System
SWALIM	Somalia Water and Land Information Management Project of FAO
UN	United Nations
UNICEF	United Nations Children Fund
WASH	Water, Sanitation and Hygiene
WDA	Water Development Agency
WHO	World Health Organization

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## **1. Introduction**

Water, in most parts of Somalia, has always been scarce, and the problems have been aggravated by the destruction and looting of water supply installations during the civil war and the continuing conflicts, and general lack of maintenance. They are compounded with erratic rain patterns, which produce both droughts and floods. For example the Jilaal, the long dry season, is historically a period of hardship especially in the central zones of Somalia. In such a season water becomes scarce, demanding long treks by livestock and humans in search of sufficient water and pasture. Also in most areas the nomadic way of life is adapted to the low annual rainfall amounts of high spatial and temporal variability, which induce persistent droughts worsened by the arid geology. In contrast the geomorphology and river hydrology provide opportunities for settled agriculture, but also induce periodic flooding, and stress in the riverine communities.

During the last century, attempts by EC/EU, UNICEF and other donors to mitigate water stress and develop a more secure water future saw improvements in rural technology and service delivery, along with trends in urbanization. The benefits accrued in improving water supplies, in terms of public health, economic production and livelihood development are slowly being recognized.

However, in Somalia, ensuring acceptable levels of water service coverage through the sustainable provision of adequate quantities of sufficient quality water, at an acceptable cost to society and the environment, represents a major challenge. It is a challenge that must be addressed at the household, community and national level, and within the shifting perceptions of the right way to go. Data on access to safe water are not available for much of the country but only a small proportion. According to UNICEF's MICS data less than 25% of the total population have access to safe water throughout the year although there are a lot of seasonal and regional variations.

The key problems related to the water supply in Somalia include inadequate management of water resource use pattern, inadequate access to safe strategic sustainable water sources such as boreholes and protected wells, inequitable control of and access to water supplies at the community level means poor management, operation and maintenance of water supply systems.

### **1.1 Major Water Sources in Somalia**

In order to implement various intervention activities for rehabilitating or developing the water infrastructures of Somalia, it is quite necessary to have a stock of the existing major water sources of the country. The major water sources of Somalia are listed below:

### *South and Central Zone*

The major water sources in south and central zone consist of:

- i. The Juba and Shabelle rivers
- ii. Water pans or dams (waro or balliyo in Somali language)
- iii. Springs
- iv. Shallow hand – dug wells
- v. Deep water boreholes

### *Northern East and North West Zones (Puntland and Somaliland)*

The Major surface water sources in Puntland and Somaliland consist of:

- i. Water pans or dams (waro or balliyo in Somali language)
- ii. Springs
- iii. Underground cistern (berkado or mugciid)
- iv. Shallow hand dug wells
- v. Deep water boreholes
- vi. Subsurface dams
- vii. Infiltration galleries

The main sources of water are therefore summarised into: river water, surface run off, rainwater harvesting from roofs, hand dug wells and springs. In addition, bore wells are the principal source of municipal water supply in most towns and in rural and pastoral areas during the dry seasons.

## **1.2 General Overview of Rural and Urban Water Supply Sectors in Somalia**

### **1.2.1 Rural Water Sector**

Water availability for the rural population in Somalia depends on certain extent on which part of the country one is considering. For example, in the southern parts of the country people use surface water resources from the two perennial rivers, the Juba and the Shabelle and water pans (catchments) that are normally filled up during the rainy seasons, whereas the majority of the rural population in northern Somalia depend entirely on ground water for their living, and to some extent on rain water collection in *bekado* and *balleys* during the rainy seasons. The major water consumers are the pastoralists.

The rural water sector is characterised by regular shortages, which at times get very severe during drought periods. The shortages in the water supply are as a result of limited strategic sources as well as frequent break down of water systems and their lifting mechanisms. The rate of berkado failure for example is over 50% within five years of construction, according to SWALIM and CARTIS studies. This high failure rate is attributed to poor engineering designs, construction and maintenance routines, and weak government structures to support the community-based water supply projects. The rural communities rely more on external donors for their water supply. However, such donors

are seen as providers rather than facilitators, a perception which ought to be changed if water supply projects are to be sustained.

Water quality is of great concern in rural areas of Somalia. There are many water sources with unsuitable water for human consumption, but locals use them either out of ignorance or because they do not have an alternative. Well-head protection is not very common with the shallow wells and many of the other sources such as dams, ponds and berkads are left open to all kinds of contamination from the surrounding. In addition to establishing new water points, considerable amount of resources should be channelled towards interventions aimed at protecting the existing water points to improve on water quality.

The management of water sources in many parts of rural Somalia is through local committees in the case of communal sources, or individuals in the case of private sources. For sources administered by government agencies, communities select the operators and the agency trains them and sets the water price. However, proper monitoring and accounting system is always lacking in the water supply systems, which makes them un-sustainable and unsustainable.

Generally, the lack of surface water resources to support domestic, livestock and commercial activities in many rural areas of Somalia implies that people have to tap more on underground sources. Currently, there is little information available on hydrogeology to help identify underground reservoirs capable of yielding enough water to support the population without over exploiting underground water.

### **1.2.2 Urban Water Sector**

Majority of the urban centres in Somalia have a form of centralised water supply system either established by the previous government's Water Development Agency (WDA) or recently through donors. Many of the systems established by the previous government were however damaged during the times of civil war, and are either partially operational or completely broken down. UNICEF and other donors have been rehabilitating these systems in some of the towns to improve on water supply.

An assessment done by SWALIM and UNICEF in 2006 for selected urban centres established that the existing water supply systems do not satisfy the water requirements for the entire urban population. In Bossaso for example, which is one of the pilot urban centres selected, only one third of the population served by house connections while in Boroma and Cerigavo less than a quarter of the population were served by house connections during the time of the assessment in 2006.

Water supply in urban centres does not always meet required WHO water quality standards. There are many un-improved water sources used in urban water supply. Apart from the borehole water served by the utilities which is reported to be safe, most of other

unprotected sources like berkads, water ponds and public shallow wells contain bacteriological contamination. In the case of a protected water source, contamination may occur during handling, delivery and storage.

The water supply service remains poor despite huge investments by UNICEF and other donors. This could mainly be attributed to a number of reasons: limited coverage of the supply networks, high return of IDPS and Diaspora to the towns which increase the pressure on the installed system, and low efficiency of the supply pipes due to excess leakage as a result of poor operation and maintenance.

The high dependency on ground water resources for the urban supply necessitates the need for a proper water resources management plan, which in many towns is either weak or non-existent. An example is in the town of Borama, where the ground water table has dropped substantially in the past few years leading to significant drop down in the water levels, placing the town population at high risk due to un-guaranteed sustainability to meet their future demands. There are no countrywide studies and information on groundwater reservoirs and recharge patterns, and some boreholes are drilled without conducting hydrogeological surveys and environmental impact assessments.

### **1.3 Status of Water Sources**

Since the collapse of the Somali government in the 1990s, majority of the water sources and its infrastructures are left unattended. Hence, the system suffered looting, vandalism, breakdowns, neglect and lack of responsible authority and caretaker. This resulted in the collapse of the system.

The results of SWALIM water sources inventory survey carried out in 2008 and 2009 revealed that there are 2,260 strategic water sources in the regions surveyed. The situation related to water supplies is worse than the modest imagination. There is large number of unprotected shallow wells in most towns and rural settlements and the majority of households obtain their water from shallow wells most of which are unprotected. Also in some areas, despite the extremely high salinity levels still water is being used for drinking purposes by human and livestock. Bore wells are the principal sources for municipal supplies in almost all towns and also for dry season supplies in most rural, including pastoral, areas. A very high proportion, of the bore wells have passed their designed live span, 30-40 years, and are out of order and require major rehabilitation works. There is frequent breakdown of public water systems and supply points. There is also lack of any sense of ownership and responsibility for such facilities, and the absence of functional local government structures in many areas results in lack of care and maintenance.

Bore wells are expensive to construct, operate and maintain, and water is a significant expenditure item for poor households. In all towns, and some rural settlements, people



who do not own their own wells have to pay for water. This severely limits the amount of water poor household's use.

There are great discrepancies in the water supply in the rural and urban centres in Somalia. The findings of an assessment carried out by SWALIM in 2006 in partnership with UNICEF, indicated that in major urban centres in Somalia, there are established water supply systems fitted with pipeline network used for water distribution. Contrary, the majority of the rural population depend on water from open sources which are highly vulnerable to contamination and drying out.

#### **1.4 Background to UNICEF Water Interventions**

The EC funded “Integrated Water Resource Management and Rural Water and Sanitation Programme in Somalia” is four-year programme implemented by UNICEF in line with EC WASH programme in Somalia and aims to improve the availability and increase the coverage of water in areas identified as high priority and those having acute shortages of water supply. These include areas of settlements of vulnerable groups such as returnees, IDPs and pastoral population in drought stricken regions of Somalia. In addition, the project aims to ensure sustainable water management systems based on capacities of local communities, and where feasible through public-private partnership.

#### **1.5 Purpose and Outcome**

The overall objective of mapping UNICEF's interventions in Somalia is outlined in a letter of agreement signed between FAO Somalia and UNICEF Somalia (Annex 1). The purpose is to map and evaluate progress made in the sector - in terms of coverage of water interventions and increase in number of beneficiaries served through UNICEF's water interventions. The mapping was carried out for one major component of the overall EC programme: constructing or rehabilitating water supply infrastructure and building community capacity to maintain and repair them. The major activities carried out by FAO SWALIM are:

- Collection and compilation of key data and information on water supply systems implemented by UNICEF and partners in rural and urban areas across Somalia from 2005 to 2009 including: development of a map showing UNICEF interventions, dynamic atlas, flash player power point presentation and, report on the findings of the mapping exercise.
- Production of soft and hard copy maps at the National and Zonal / Regional levels illustrating the locations of water systems and key data compiled / collected under this activity.
- Production of maps showing increase in coverage over years to reflect increase in overall coverage in terms of rural water supply and urban systems.

- Production of town water supply maps for 7 towns (Merka, Baad Weyne, Bossaso, Gebily, Berbara, Boroma and Baidoa) that their systems were either rehabilitated or newly constructed, showing water source, storage tanks, kiosks, pipelines, etc.
- Production of a narrative report giving the key findings of the mapping exercise.

## **2. Methodology**

In undertaking this task, SWALIM staff worked in close co-ordination and consultation with a designated project officer from UNICEF USSC who was the focal point to provide information, documents and, data as requested / required by SWALIM to undertake this project. The assessment was mainly undertaken through a desk study of data provided by UNICEF Zonal Offices. Missing data was collected by SWALIM through field survey whenever security permitted.

### **2.1 Data Collection and Compilation**

The importance of quality reliable data on WASH interventions of Somalia can hardly be underestimated, if proper monitoring and evaluation of the same is to be achieved in future, in this regard; the collection and compilation of data for mapping of water interventions undertaken by UNICEF involved a detailed assessment of water sources and supply systems in the rural and urban areas across Somalia.

The scope of assessment covered the entire country, based on the zonal operational areas as defined by UNICEF, North West Zone (NWZ), North East Zone (NEZ) and South Central Zone (SCZ). Some of the intervention data on annual basis from 2005 to 2009 were obtained from both UNICEF and SWALIM databases or through field surveys using the Somalia Water Sources Information Management System (SWIMS) Software. SWIMS stores and manages a wide range of data for different types of water sources used in Somalia: boreholes, shallow wells, springs, dams, and berkads, in addition to capturing the interventions undertaken on the different sources types, the agency involved and the year activity was undertaken.

All data from SWIMS was inputted from datasheets obtained from the field, detailing different attributes depending on the source type. This include; location, intervention, function and use, water characteristics, supply and distribution and the source management.

The interventions undertaken in the period from 2005 to 2009 were captured, with additional interventions carried out before this time being reflected. Data on rehabilitation works, development of new water sources and water supply systems, especially pipeline distribution, improvement, construction, training components and capacity building activities, were summarised and validated. Validation of the data was performed by UNICEF field team.

Detailed fact sheets were developed by zone. Therein, information on the spatial location of the sources intervened on was indicated, functionality status and general condition of the sources was stated, the date of intervention by year, interventions undertaken and the intervening agencies partnered with UNICEF during implementation

of this programme. This data was later used for analyses and mapping activity as discussed below.

## **2.2 Data Analyses and Mapping**

Spatial location of the sources intervened on, was used for the mapping activity, this were obtained from the field using a GPS and each source was given a spatial reference in terms of latitude and longitude as positioned on the earth surface. Where this information was missing, use is made of the UN Reference Humanitarian Grid or settlements names instead. Using GIS based software; these sources were plotted and displayed on a map

Maps produced were categorised according to:

- i. Year of intervention. This depicts the number of interventions carried out in a specific year. Zonal maps; symbolically displays the type of source intervened in the different zones, it gives a clear indication of the number of different sources types intervened on and their spatial distribution within the zone
- ii. Regional administrative units; illustrates the distribution of the sources intervened within a region.

Analysis followed closely after the mapping activity to assess progress made in the water sector in terms of coverage of water, sanitation and health services and increase in number of beneficiaries served through UNICEF's WASH interventions.

### 3. Mapping of Rural Water Interventions

#### 3.1 Existing Water Systems

SWALIM in collaboration with UNICEF carried out a country wide survey of the strategic point water sources (boreholes, springs, dams and shallow wells), that last long into the dry season. These sources are utilised by the local communities when the seasonal sources dry out such as the berkads and some shallow wells; only used during the rainy season.

Great challenges were presented, but despite these challenges significant achievements were made. With over 30,000 Kilometres travelled in the country 2,254 sources were visited, inspected and assessed; 1,038 in Somaliland, 571 in Puntland and 635 in the regions surveyed in southern and central Somalia. Some regions (Hiran, Middle Shabelle, Lower Shabelle and Lower Juba) were not surveyed due to lack of accessibility. The coverage of the Water sources assessed is as shown in Table 1 and Figure 1.

**Table 1: Strategic Point Water Sources Surveyed by SWALIM**

Location	Number of Source Types					
<b>Northern Somalia (Somaliland and Puntland)</b>						
Region Names	Dam	Borehole	Dug well	Other	Spring	Grand Total
Awdal	14	25	104		37	<b>180</b>
Woqooyi Galbeed	87	43	212	4	34	<b>380</b>
Togdheer	19	40	86	31	20	<b>196</b>
Sanaag	2	32	107	1	30	<b>172</b>
Sool	2	18	86		3	<b>109</b>
Bari		53	127		108	<b>288</b>
Nugaal		48	115		55	<b>218</b>
Mudug		41	25			<b>66</b>
<b>Sub Total</b>	<b>124</b>	<b>300</b>	<b>862</b>	<b>36</b>	<b>287</b>	<b>1,609</b>
<b>South and Central Somalia Regions</b>						
Mudug		7	66			<b>73</b>
Galgadud		44	113			<b>157</b>
Bakool	9	16	57		3	<b>85</b>
Bay	17	43	32		2	<b>94</b>
Gedo	55	9	100		11	<b>175</b>
Middle Juba	22	6	32		1	<b>61</b>
<b>Sub Total</b>	<b>103</b>	<b>125</b>	<b>400</b>		<b>17</b>	<b>645</b>
<b>Grand Total</b>	<b>227</b>	<b>425</b>	<b>1262</b>	<b>36</b>	<b>304</b>	<b>2,254</b>

### **3.2 Annual Progress of UNICEF Interventions**

UNICEF in its effort to increase and sustain access to and utilization of improved WASH services for communities has over the period of the project undertaken several interventions. This remarkable achievement is recognizable in the progressive increase in the number of interventions undertaken; a total of 378 interventions were implemented during the period from 2005 to 2009 as shown in Figure 2, which is a drastic rise as compared to the period before the year 2005. As analysed, Pre-year 2005 interventions were back dated interventions as early as 1992 to 2004 and a total of 108 interventions were implemented. Distinctively, an increased number of interventions are recorded in the year 2006 and 2009 (Annex 3), with a decreased number of interventions undertaken from 2005 to 2007, Figure 3.

Given the security constraints and status of existing sources, great changes has to be made in the orientation of where water interventions were undertaken, while objectives and intended results remained the same for most parts, for the CSZ where 10 regions were covered; interventions implemented were substantially reduced and a total of 153 interventions were recorded; most of the interventions were eventually implemented in the less populated NWZ covering 5 regions and NEZ covering 2 regions, recording a total of 162 and 63 respectively, as recognized in Figure 3. A summary is given in Table 2 and 3 which show the clear picture of zonal interventions.

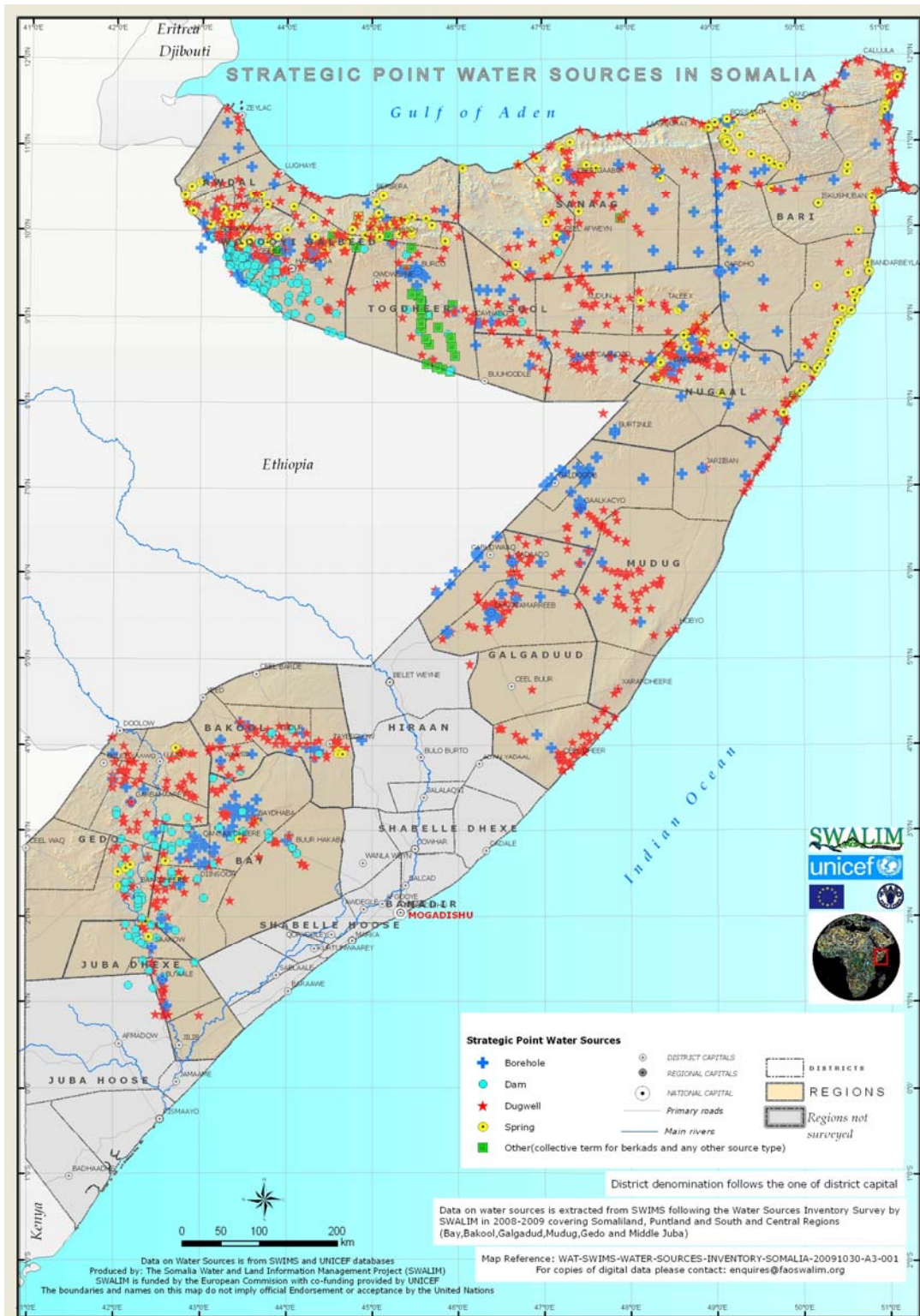
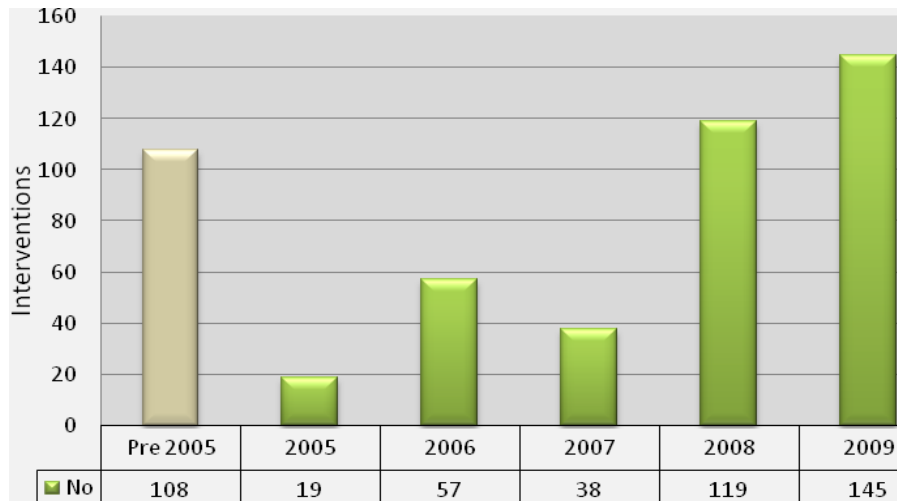
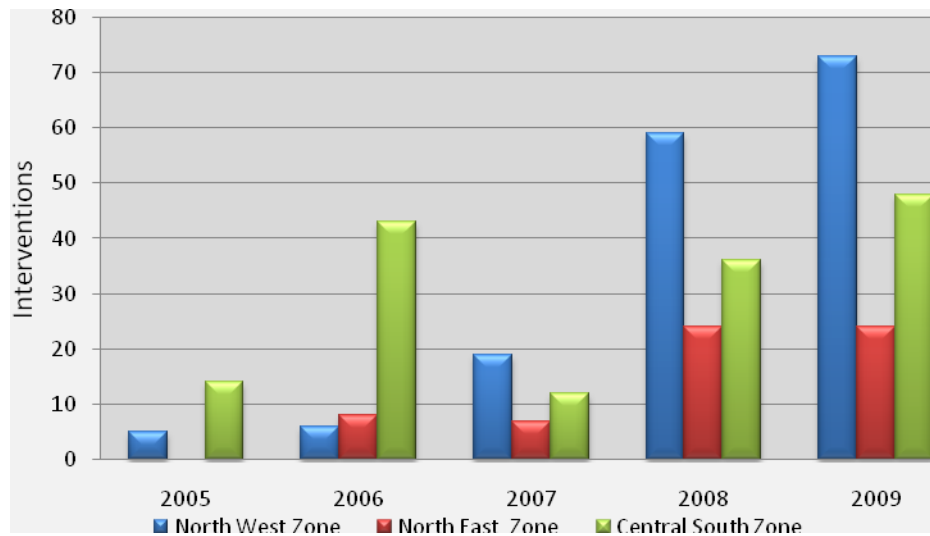


Figure 1: Coverage of strategic water sources surveyed by SWALIM



**Figure 2: Annual progress in UNICEF interventions**



**Figure 4: Coverage of UNICEF annual zonal/regional interventions**



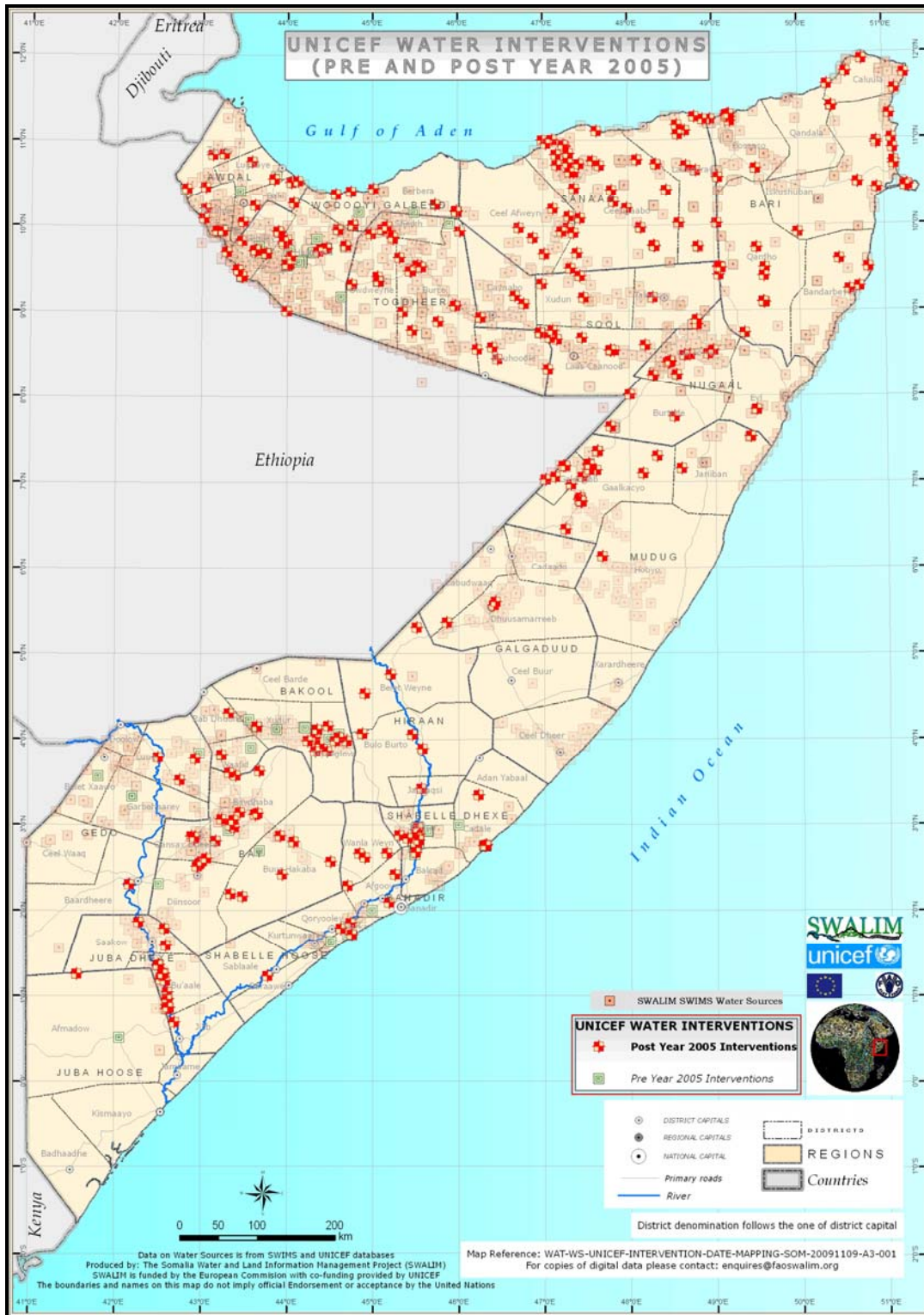


Figure 3: UNICEF rural water interventions pre and post the year 2005

### **3.3 Summary of Interventions**

Interventions undertaken are summarised according to the zone of operational units – NWZ, NEZ and CSZ as defined by UNICEF (Figure 4). The number of different source types; namely berkads, borehole water yard, dam, motorized shallow well (water yards), school WASH facilities, shallow well, solar water system, spring, town water supply system, urban water supply, within a regional administrative unit where interventions were carried out is indicated, as shown in Table 2. Figure 5, 6 and 7 present the zonal interventions for NWZ, NEZ and CSZ respectively, while the maps showing the regional interventions are given in Annex 4.

A significant high number of shallow wells and borehole water yard were intervened on, recording 83.5% of the total interventions undertaken. Evidently this shows a higher utilization of this two water source types by a greater population in Somalia. In comparison to 16.5% of other sources intervened on, fewer berkads, dams and springs were intervened on due to their seasonality and may pose as unreliable sources of water during dry periods.

Despite their low costs in operation and maintenance and allows communities-mostly in the rural areas where they are utilized to carry out this repair requirements without support, interventions on solar water systems were minimal. Interventions on urban water supply are limited to the major towns, where pipe network systems are used to supply water.

### **3.4 Construction of New Water Sources**

Based on the data collected as part of interventions undertaken by UNICEF over the period of 2005-2009, 54 new water sources have newly been constructed. Of these 29 shallow wells, 9 dams and 19 borehole water yards have been developed. Subsequently, training and building capacity of users to manage, operate and maintain facilities has been offered, following the implementation of the integrated water resources management and rural water and sanitation capacity of programme for Somalia by UNICEF.

### **3.5 Rehabilitation Works**

Implementation of rehabilitation works was ideally to improve the functionality of the existing water sources. 107 borehole water yards were rehabilitated and fitted with separate lifting and distribution facilities for human and livestock, 141 shallow wells were rehabilitated through installation of hand pumps, water tanks and additionally, cleaning and protection activities were carried out on areas surrounding the shallow wells.

Desilting and cleaning activities were implemented on 4 springs and 5 berkads, while the rehabilitation of 5 School WASH facilities was implemented in the central and south zone to promote improved hygiene and sanitation practices. However, this was faced by a drawback of lack of community consensus.

**Table 2: Zonal / Regional interventions implemented by UNICEF (2005-2009)**

Year	2005	2006	2007	2008	2009	Total per region	Pre 2005 Interventions
<b>North West Zone</b>							
Awdal		1	2	10	6	19	14
Woqooyi Galbeed	5	2	4	15	16	42	25
Togdheer			6	13	10	29	8
Sanaag		1	5	14	31	51	
Sool		2	2	7	10	21	
<b>Sub-Total</b>	<b>5</b>	<b>6</b>	<b>19</b>	<b>59</b>	<b>73</b>	<b>162</b>	<b>47</b>
<b>North East Zone</b>							
Bari		3	6	18	18	45	
Nugal		5	1	6	6	18	
<b>Sub-Total</b>		<b>8</b>	<b>7</b>	<b>24</b>	<b>24</b>	<b>63</b>	
<b>Central South Zone</b>							
Mudug		10	4	7	7	28	
Galgudud						3	
Bakool	8	6	2	3	7	26	13
Bay	3	8	3	4	10	28	3
Gedo		3			2	5	3
Hiraan	2			4	3	9	
Middle Shabelle			1	8	10	19	35
Lower Shabelle			2	4	5	11	5
Middle Juba	1	15		4	3	23	
Lower Juba		1				1	2
<b>Sub-Total</b>	<b>14</b>	<b>43</b>	<b>12</b>	<b>36</b>	<b>48</b>	<b>153</b>	<b>61</b>
<b>Total</b>	<b>19</b>	<b>57</b>	<b>38</b>	<b>119</b>	<b>145</b>	<b>378</b>	<b>108</b>

**Table 3: Summary of UNICEF's regional interventions by source type**

Source type	Berkad	Borehole water yard	Dam	Motorized shallow well (water yards)	School WASH facilities	Shallow well	Solar water system	Spring	Town water supply system	Urban water supply	Grand Total
<b>North West Zone</b>											
Awdal		6	1	4		6	1			1	19
Woqooyi Galbeed		7		9		22	2			1	42
Togdheer	1	7		6		14	1				29
Sanaag		9		7		33	1			1	51
Sool	3	6		1		10	1				21
<b>North East Zone</b>											
Bari		14		5		20		4	1	2	45
Nugal		8				9			1	1	18
<b>South Central Zone</b>											
Mudug		23				3			1	2	28
Galgudud		1			2						3
Bay		10	6	1	2	7	1			1	28
Bakool		22				13	1				26
Middle Shabelle		5		2		12					19
Lower Shabelle	1			2		8			1	1	11
Hiraan		5			1	3					9
Gedo		1				4					5
Lower Juba		1									1
Middle Juba		11	2			9	1				23
<b>Total</b>	<b>5</b>	<b>126</b>	<b>9</b>	<b>37</b>	<b>5</b>	<b>170</b>	<b>9</b>	<b>4</b>	<b>4</b>	<b>8</b>	<b>378</b>

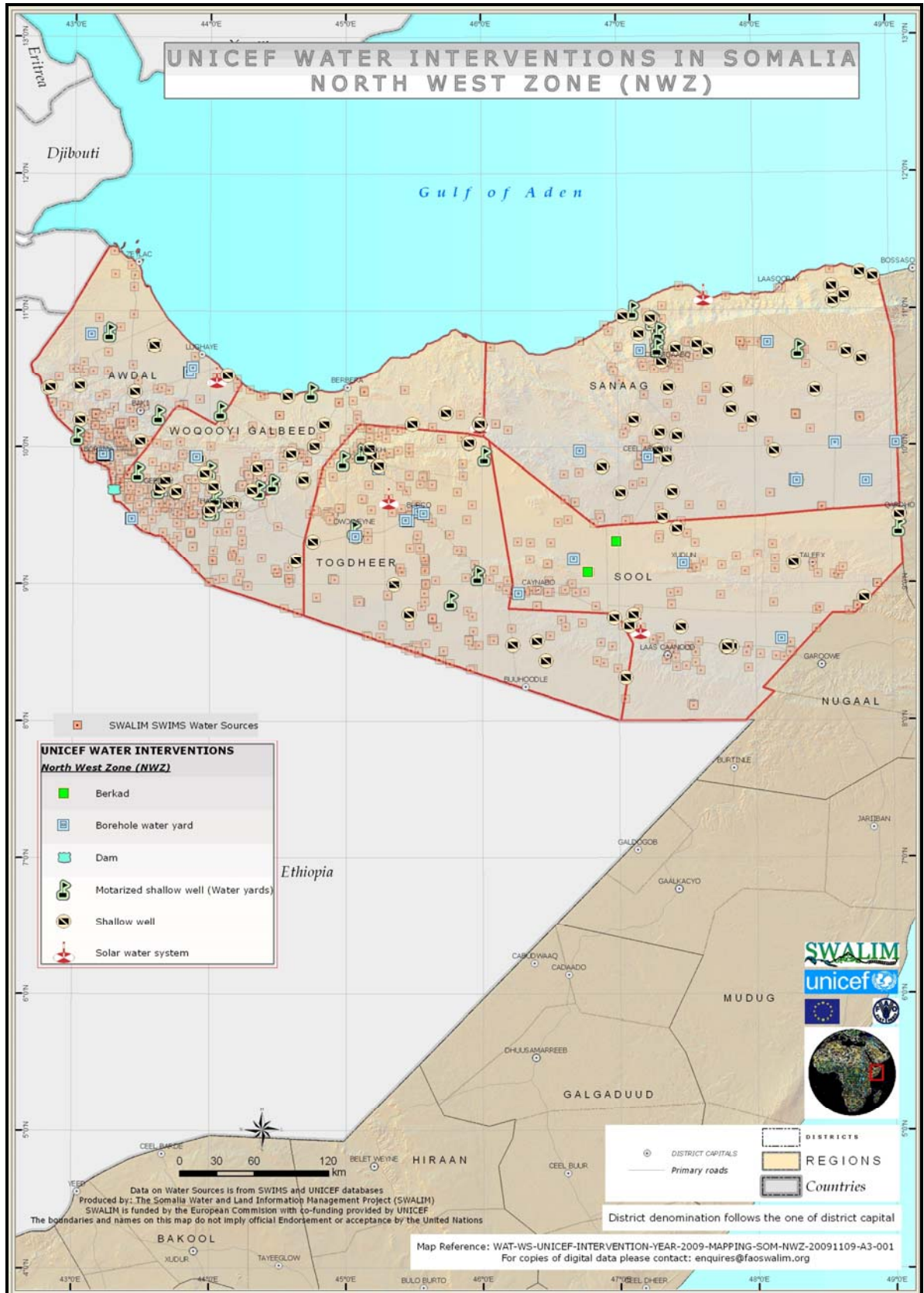


Figure 5: Interventions in NWZ



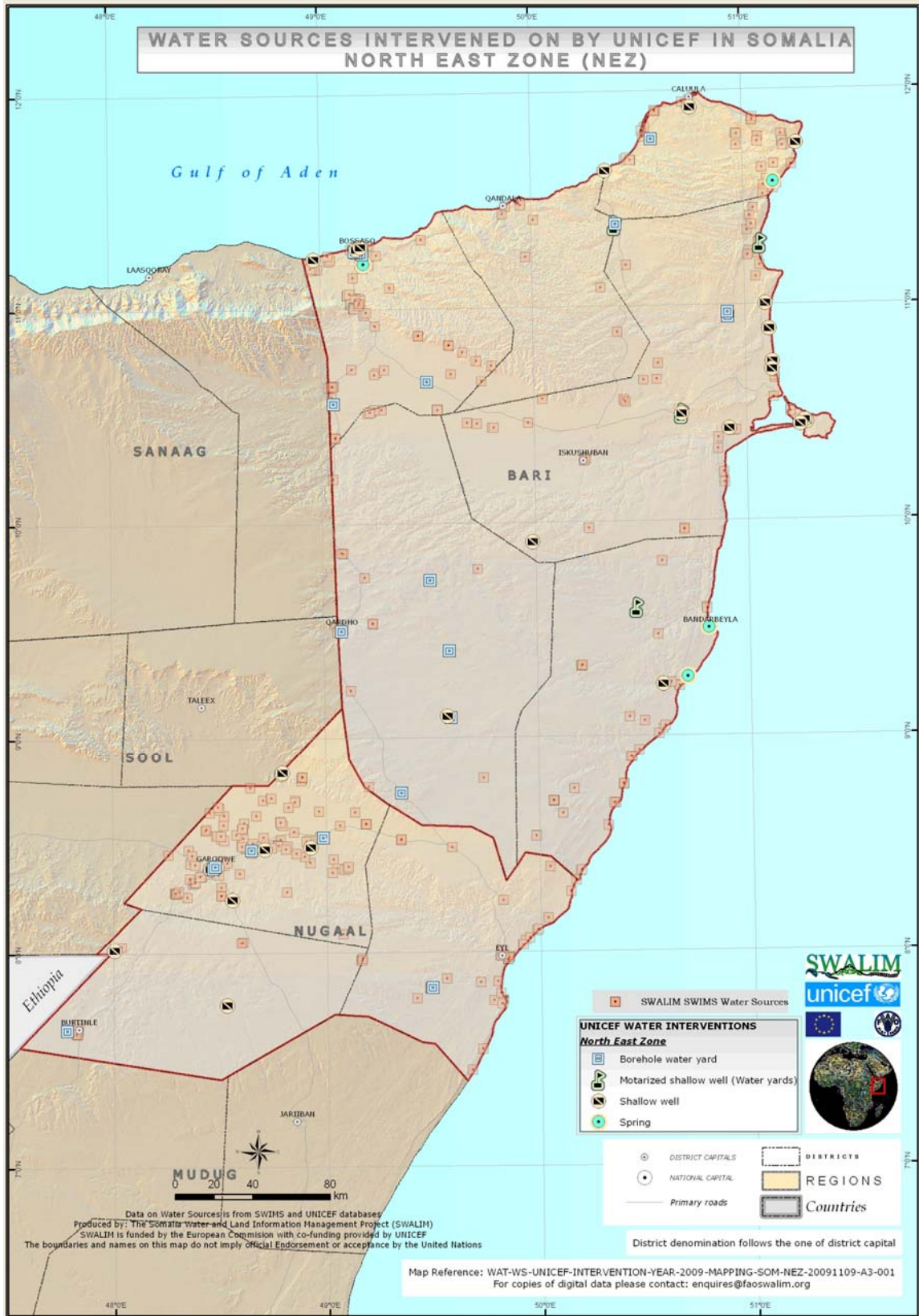


Figure 6: Interventions in NEZ



Figure 7: Interventions in CSZ

### 3.6 Water Systems

Construction and development of water systems, was key in the interventions implemented by UNICEF in order to increase supply and storage of water through construction of water tanks and enhancing water lifting mechanisms by installing hand pumps. Specifically there are 241 shallows wells and 37 motorized shallow well implemented from the data provided by UNICEF.

### 3.7 Other Rural Interventions

Training and capacity building was offered to ensure empowering of communities and authorities to manage water resources in a sustainable manner. Water management committees were established and members trained on operation and maintenance skills.

### 3.8 Beneficiaries

The total number of rural beneficiaries of the programme was found to be 707,500 and the total number of IDPs was found to be 621,250, 78% are found in CSZ, Table (4) and Figure (12). The rural and IDP beneficiaries represent 77% of the total beneficiaries, 41% and 36% respectively. Out of the rural populations 41% of the beneficiaries are found in NWZ, 15% in NEZ and 44% in CSZ.

**Table 4: Beneficiaries estimates of UNICEF's WASH interventions (2005-2009)**

Zone	Urban Water Systems		Rural Water Systems	IDPs	Zone Total
	Location	Beneficiaries			
NWZ	Borama	80,000			
	Gebiley	45,000			
	Berbera	42,000			
Sub-total		167,000	292,250	67,000	526,250
NEZ	Bossaso	145,000			
	Ba'adweyne	22,500			
Sub-total		167,500	105,750	69,000	342,250
CSZ	Merka	21,000			
	Baidoa	40,000			
Sub-total		61,000	309,500	485,250	855,750
<b>Sector Total</b>		<b>395,500</b>	<b>707,500</b>	<b>621,250</b>	<b>1,724,250</b>



## **4. Mapping of Urban Water Interventions**

### **4.1 Earlier UNICEF Interventions Mapping**

In addressing the urban water interventions, UNICEF in Collaboration with SWALIM undertook an urban water supply assessment in 2006 as mentioned earlier. Since information on the piped networks were not available in the three major towns investigated, it had to be inferred using a GPS to locate existing pipe layout, water kiosks, storage tanks and shallow wells. This activity was carried out with the help of the utility managers and in some cases with community participation.

Following the assessment, detailed water supply systems maps of the 3 pilot towns of (Bossaso, Borama and Erigavo) were compiled and mapped to assess coverage and a report produced jointly.

### **4.2 Current Urban Interventions Mapping**

UNICEF has been helping to improve water supply services in urban areas in Somalia since early in the 1990's. UNICEF administered many water supply rehabilitation and improvement services in cities such as Bossaso, Borama, Baidoa, Erigavo, Gebiley, Berbera, Baadweyne, and Merka. A map showing the urban water system implemented by UNICEF during the project period is presented in Figure 8. These Rehabilitation works restored and expanded urban water supplies and strengthened water services, which are currently managed jointly by the local authorities and community's investment.

It is to be noted that there are no information on pipelines and other water infrastructure are available for the towns of Baad Weyne, Gebiley, and Berbera. The interventions implemented are only symbolically represented on the satellite image map at the location of the town.

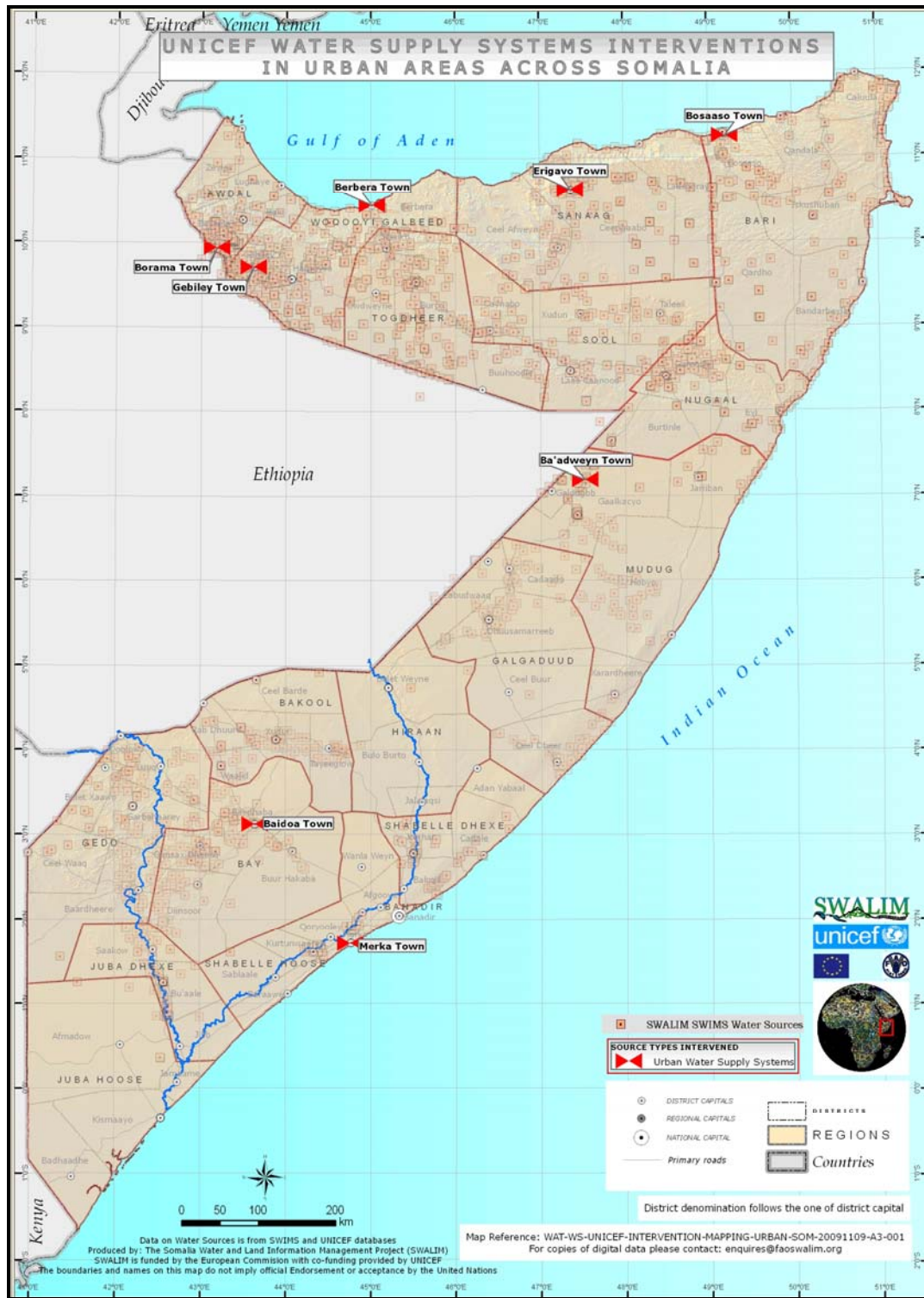


Figure 8: Locations of UNICEF urban water interventions

### **4.3 Public Private Partnership**

As part of the project UNICEF established Public Private Partnerships (PPP) in some of the urban water supply systems rehabilitated. PPP involved the community, water authority and the private sector in ensuring sustainable service delivery to bring reliable and safe supply of water to urban communities in areas of UNICEF interventions. It is a remarkable initiative in which all partners and stakeholders took part in managing, monitoring, and improving the system and establishing water committees and water boards to oversee the daily operations of the system.

PPP approach resulted in strengthening existing utilities, e.g. GUMCO in Bossaso, SHABA in Boroma, FARJANO in Jowhar, etc.

### **4.4 Engineering Designs**

Information on the pipeline network designs of the towns of Merka, Baadweyne, Bossaso and Baidoa were provided by Howard Humphrey Company, which was contracted by UNICEF to assess the water supply systems of this towns. Data on boreholes, water tanks, UNICEF present and future pipeline extensions and constructions, newly established waterlines, buildings within and the sizes of pipe layouts were provided. Spatial adjustments was performed on the AutoCAD data received form Howard Humphrey Company to facilitate mapping using GIS based software and overlaid on high resolution Quick bird images, to display a clear picture of the properties and pipeline network on the ground and maps produced.

### **4.5 Summary of Urban Interventions**

Interventions on water supply systems in the urban towns of Somalia entailed the upgrade and development of the already existing distribution pipeline network. Below is summary of interventions undertaken for each town is given.

#### **4.5.1 Bossaso Water Supply System**

Development of the pipeline was implemented, a new water pipeline by UNICEF was put in place and probable future pipeline extensions and constructions by UNICEF were laid out, as indicated on the map in Figure 9.

#### **4.5.2 Baidoa Water Supply System**

A series of interventions were undertaken, these included drilling and equipping of 5 boreholes, installation of a 24-km long pipeline network, rehabilitation of the Chinese tank and building of a steel 500 m<sup>3</sup> capacity water tank with a 10m tower. The layout of Baidoa interventions are provided in Figure 10.

#### **4.5.3 Merka Water Supply System**

Development of the pipeline was implemented with 8 new kiosks constructed to enhance the supply and distribution of water. Interventions on Merka town are given in Figure 11.

#### **4.5.4 Ba'adweyne Water Supply System**

The water supply system was scaled up, by the development of a new pipeline. One water tank was constructed and 4 hatches (sluice gates) established. Probable future pipeline extensions and constructions by UNICEF were laid out as shown in Annex 3.

#### **4.5.5 Erigavo Water Supply System**

Rehabilitation works were implemented on GTZ Well No. 3. This well has 180 m<sup>3</sup>/hr of yield. A new 147 m<sup>3</sup> capacity water tank was constructed and new six- and four-inch PVC piping installed of 3 Km long. Five new kiosks, a generator and watchman rooms were also constructed. The borehole was equipped with a Grundfos submersible Sp k-45 pump and a Perkins PEP03 generator and a 40KVA electric motor. However, major drawbacks faced the pipeline for lack of junction boxes or saddle boxes or protected main halls. The system is not yet operational

#### **4.5.6 Berbera Water Supply System**

According to the latest information received from UNICEF, major physical works were implemented on the water supply systems and included:

- 1) Excavations, dismantling and removal of 10,730 meters of the old Turkish and British 6 inch and 8 inch cast iron and asbestos pipes and replacing them with new 6 inch and 8 inch UPVC pipes; with the appropriate fittings (bends, elbows, unions, adapters, gate valves, air valves etc)
- 2) Installation/backfilling and testing of 3,500 meters of new 4 inch UPVC pipes between the old British tank and the Jaamalaaye new IDP settlement.
- 3) Cleaning and repair of the existing 13 spring collection tanks, repairing cracks on walls and installation of protective covering made of corrugated iron sheeting, timber posts and beams with mesh to the spring collection wells.
- 4) Desilting and replacing of inlets/outlets with new pipes, from the existing collection chambers at the Dubar springs.
- 5) Construction of 3 new chambers, rehabilitation of 12 existing chambers at the spring site and construction of 1one underground tank for regulating flow of water from the springs.
- 6) Construction of 3 new kiosks with an 870m long supply trench fitted with 4" UPVC pipes and 3 new water yards installed with 300 meters of 2" UPVC supply pipes to the three kiosks.

Due to lack of data, there is no map produced for this water supply system (see Annex 3).



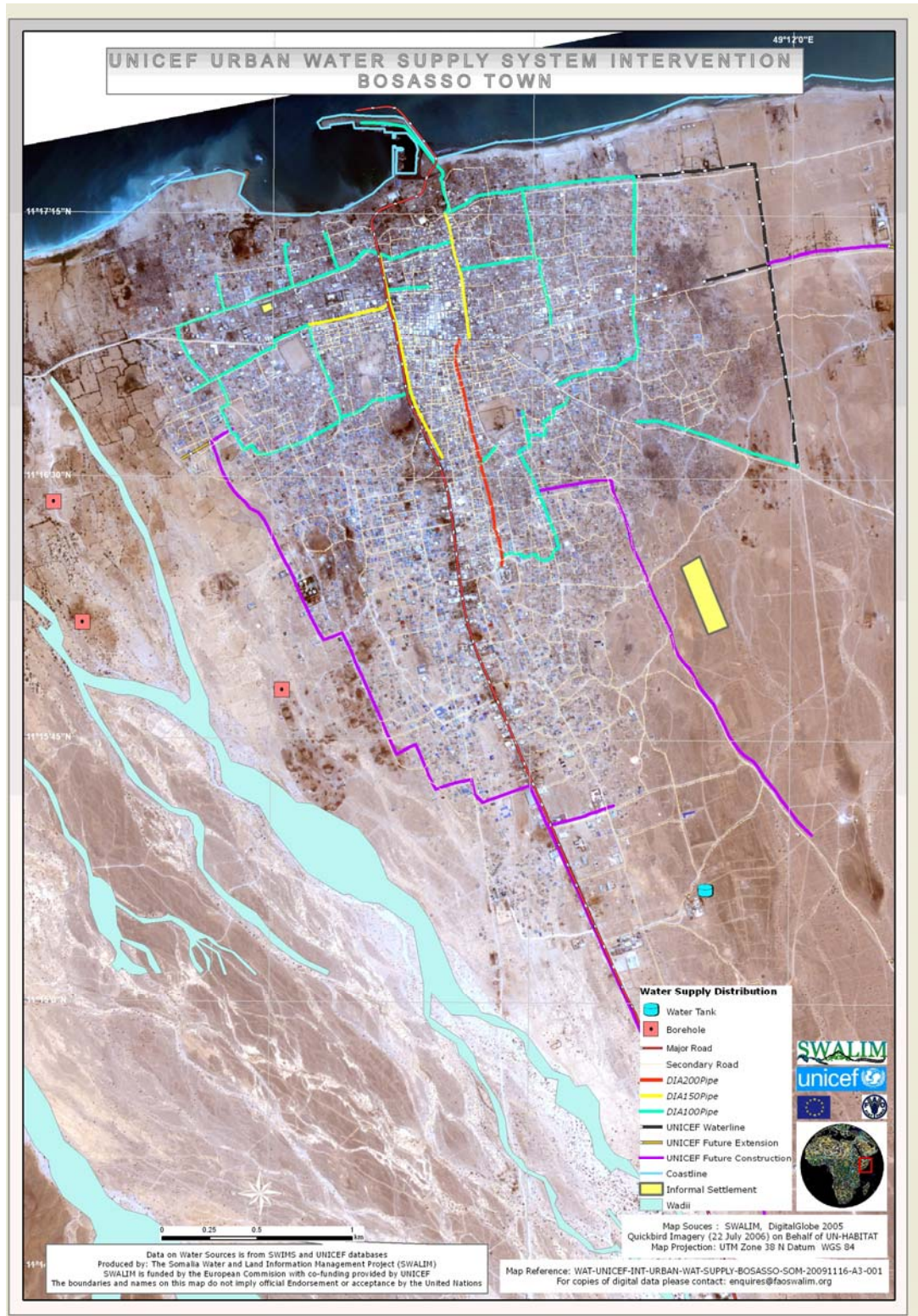


Figure 9: Bossaso urban water supply interventions map

#### **4.5.7 Gebiley Water Supply System**

Intervention works on the existing water supply system was carried out in phases from the period 2005 to 2008 as summarized below:

- 1) Rehabilitation of the existing borehole head in addition to; installation of 1 Generator (Perkins 30KVA) and 1 one Submersible pump, SP17-18 with 16 pieces of riser pipes electrical cable and testing of the borehole yield.
- 2) Development of the pipeline with 12 Kilometres of a new 6 inch and 8 inch UPVC ring mains.
- 3) Construction of 5 new water kiosks complete with pipe connections, ground tank and a 225 m<sup>3</sup> elevated steel tank.
- 4) Connection of one booster pump to the new transmission pipe to lift water to the new elevated tank was implemented.
- 5) First orientation workshop on PPP to Gebiley water users, community leaders, former water agency management and members of the municipal authorities.
- 6) Implementation of a collaboration of the Gebiley water supply system equipment inventory with the municipality and the existing Gebiley water agency.
- 7) Rehabilitation and equipping of the old water agency offices compound to serve as the main offices for the newly established utility company.
- 8) Installation of 1300 linear meters of new 4" UPVC transmission pipe complete with fittings (none return valves, gate valves etc), from the new well to the existing transmission line along the main road from Jameeco1 borehole.
- 9) Installation of 400 linear meters of new 4" UPVC pipes with rings to a section of the existing transmission pipe to replace old transmission mains from Jameeco1 borehole to the town.

Due to lack of data, there is no map produced for this water supply system (see Annex 3).

#### **4.5.8 Improvement to Borama Water Supply System**

Modification interventions were implemented on the pipeline design of the town and supported by the rehabilitation of 4 boreholes by UNICEF. Each was equipped with submersible pumps together with a central power station located at the booster station. However only three of the boreholes are in operation as the fourth one was kept inoperative to avoid well depletion as part of sound water resources management policy implementation.

#### **4.5.9 Other Urban Interventions**

Water management committees were established and training and capacity building offered. An example includes; workshops and programmes planned and implemented to enhance community awareness towards Borama water supply and Public Private Partnership. Similar trainings were offered in other major towns as mentioned earlier, e.g. Gebiley water supply system in the year 2006 where training on computerized billing system was offered to the financial and administrative staff of the existing

water agency by an external consultant hired by UNICEF. Other technological innovations were also enhanced, with the introduction of computerized billing systems.

#### **4.6 Beneficiaries**

The total number of urban beneficiaries of the programme was found to be 395,500, Table (4) and Figure (12). This represents 23% of the total number of beneficiaries, 42% of which are in NWZ, 42% in NEZ and 16% in CSZ. It was not possible to estimate the total number of IDPs served in urban areas.



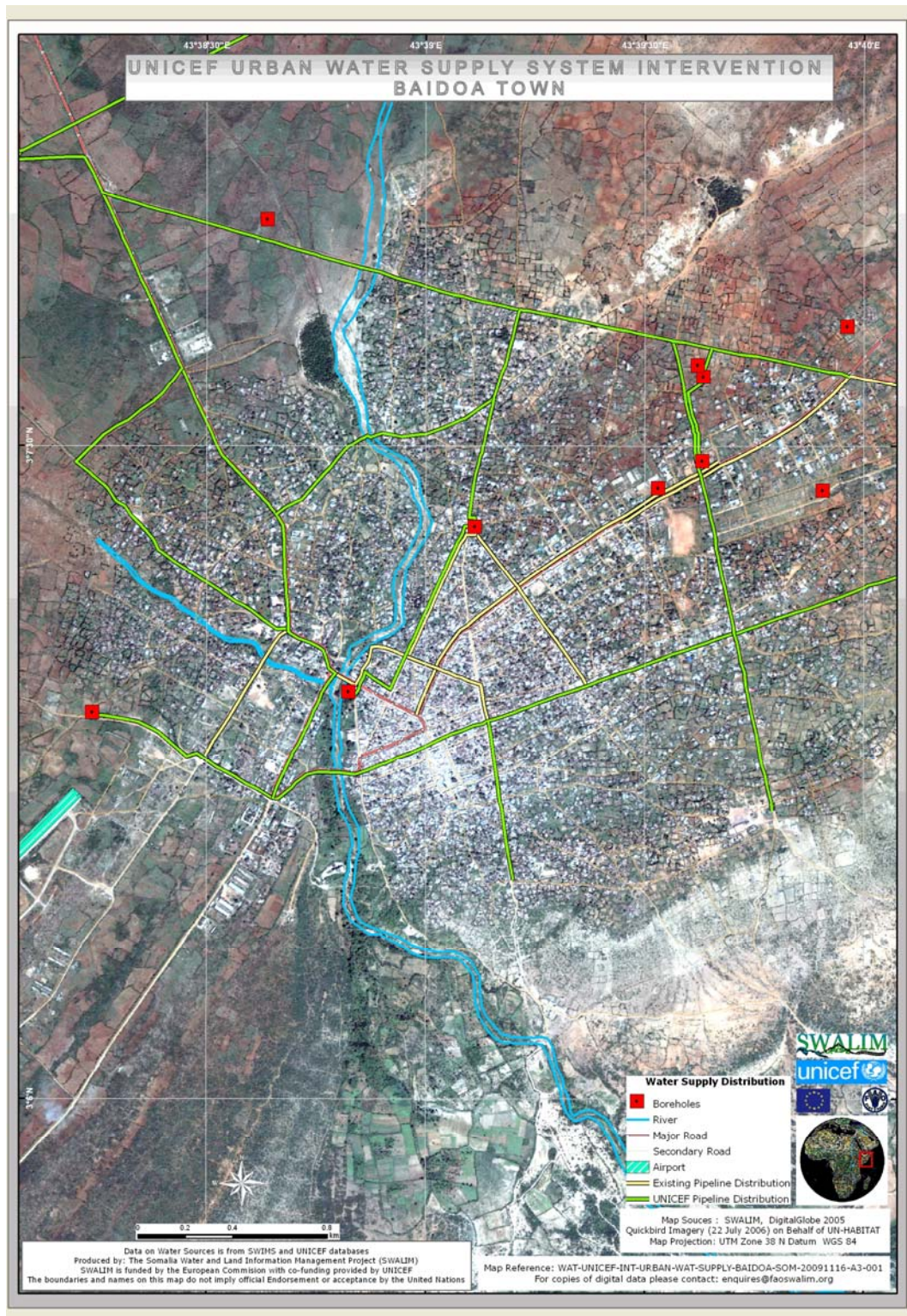


Figure 10: Baidoa urban water supply interventions map



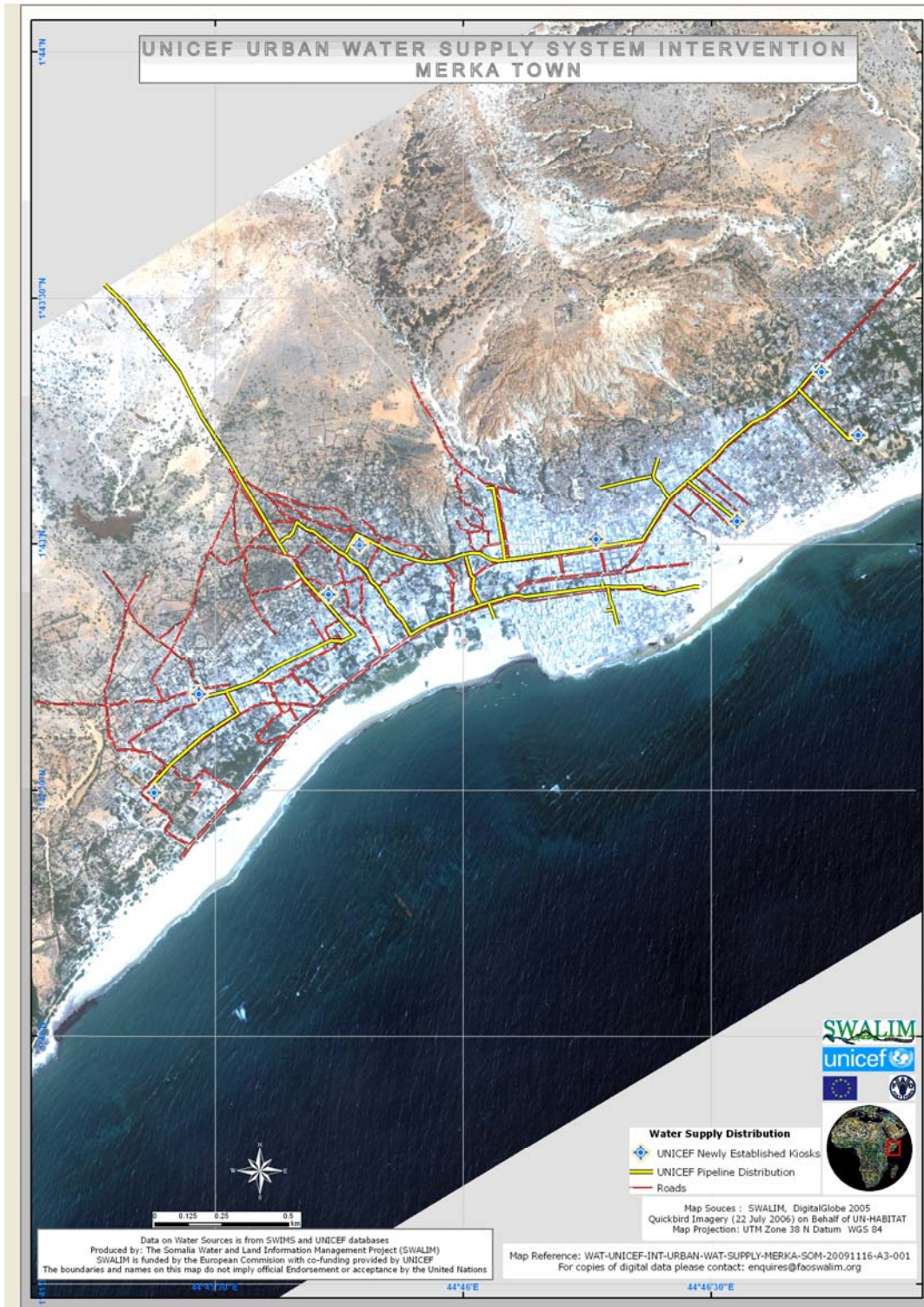


Figure 11: Merka town urban water supply interventions map

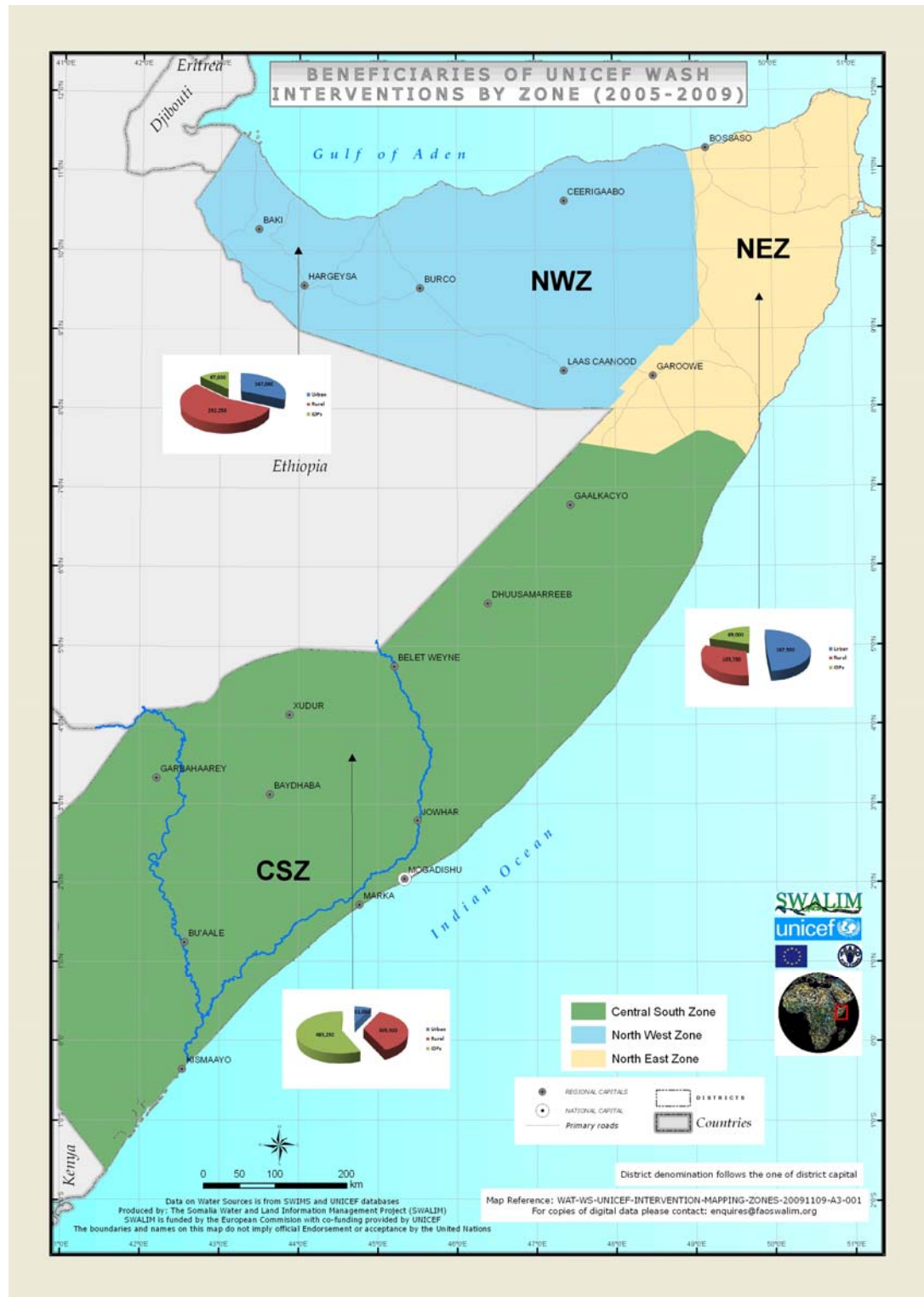


Figure 12: Map of beneficiaries estimates for UNICEF’s WASH interventions

## 5. Mapping Findings and Conclusions

It is evident from the mapping exercise undertaken for the period 2005-2009 that major achievements in the rural water sector have been realized by UNICEF under the project “*Integrated Water Resource Management and Rural Water and Sanitation Programme in Somalia, Contract No. 518-UNO-RW3-04*”. This has resulted into construction and rehabilitation of major water sources that have been abandoned by communities due to lack of capacity to manage and maintain their rural water infrastructure.

It is worth mentioning here that most of the interventions during the 5 years of the project took place in the northern part of the county. This is mainly due to the prevailing good security and existence of regional authorities that carry out routine maintenance with the help of other donors.

Another milestone towards sustainable water resource management is the establishment of rural water management committees and public private partnership in the major towns where UNICEF rehabilitated the water systems.

In the south central regions, specifically in Mudug and Galgadud regions there have been few interventions implemented. This may be mainly attributed to the lack of security in the area and the types of water sources in use by the community, e.g. berkads and water pans, while UNICEF’s objective under this project was to develop sustainable and improved water sources. Therefore UNICEF’s investment has been directed towards maintenance/construction of sustainable sources.

It is widely recognized that effective water governance requires thorough, scientifically accurate information about the water domain to be compiled, mapped and made widely available. The collection, analysis, mapping and open sharing of data are therefore vitally important if a balanced Somali water future is to be a reality; and for effective management and decision making, especially in response to demand.

In Somalia today the baseline data on resources and water supplies is far from complete. Mobile populations, large area coverage and conflict make demand analysis a difficult undertaking. An agreed priority is therefore that this data process is biased in favour of providing good quality baseline data on fixed supplies. This is a foundation from which a temporally dynamic, demand led systems approach may in time be engineered.

Underpinning the development of the water domain, in favour of improving supplies for the benefit of the Somali community, is a need to assess the resource base from which supplies are derived. Currently, there is no data on hydrogeology and status of the groundwater resources. Data is therefore critical if sustainable use of the natural resource is to be assured, and if the hydro-meteorological uncertainty of drought and flooding are to be understood, and combated. Together with UNICEF and partners SWALIM managed to collect and analyse data and information on strategic water

## *Conclusions*

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sources for two thirds of the country. These data are expected to address many of the integrated water resources management and rural water supply issues raised by UNICEF project in the future.

The total number of beneficiaries of the programme was found to be 1,724,250, with 526,250 in NWZ, 342,250 in NEZ and 855,750 in CSZ. 41% are rural population, 36% are IDPs and 23% are urban population.

As the main leader in the water sector, UNICEF is highly encouraged to keep updated records on interventions from its projects and share the data with SWALIM for proper storage and mapping.

**Annexes**

**Annex-1: Letter of Agreement**



UNITED NATIONS  NATIONS UNIES

**BASIC AGREEMENT DOCUMENT FOR FUNDS  
DIRECTED TO UN AGENCIES**

**A. PROJECT SUMMARY**

<b>Project Title:</b>	Mapping of UNICEF Water Interventions in Somalia from 2005 to 2009.
<b>Project Start/End Dates:</b>	Project funds will be spent and accounted for over a 4 month period from July 1 <sup>st</sup> 2009 to October 31 <sup>st</sup> 2009.
<b>Location:</b>	Somalia
<b>Contribution Amount:</b>	US \$26,700.00
<b>Donor:</b>	United Nations Children's Fund (UNICEF)
<b>Executing Agency:</b>	Food and Agriculture Organization, through its Somalia Water and Land Information Management (SWALIM) Project and in collaboration with UNICEF, national counterparts and implementing NGOs
<b>Nature of Activities:</b>	Collection and compilation of key data and information on water supply systems implemented by UNICEF in rural and urban areas across Somalia <sup>1</sup> from 2005 to 2009 including: development of a map showing UNICEF interventions, dynamic atlas, flash power point presentation and, report on the findings of this mapping exercise.
<b>Purpose:</b>	To map and evaluate progress made in the sector - in terms of coverage of WASH services and increase in number of beneficiaries served through UNICEF's WASH interventions.
<b>Strategy and Activities:</b>	The following activities will be undertaken by SWALIM under this agreement: <ol style="list-style-type: none"><li>1) Collection and compilation of key data guided by the attached format which has been developed by SWALIM for SWIMS, on UNICEF's ongoing / completed urban and rural water supply interventions across Somalia from 2005 to 2009. UNICEF and SWALIM will review the format and modify if need be. The number of water systems that are expected to be covered by this exercise ranges between 750-800. UNICEF zonal offices will provide a list of all water systems that have been or being implemented during 2005-2009 with tentative locations. They will also provide all the data and information that are available. On the other hand, SWALIM will attempt to collect the missing information through field survey and as security permits.</li></ol>

<sup>1</sup> UNICEF has over the past 5 years been implementing water interventions across all zones of Somalia (NEZ, NWZ and SCZ), and this mapping exercise should therefore cover all these zones.

- 2) Development of a dynamic atlas in a DVD with all pertinent data/key documents related to UNICEF's water interventions;
- 3) Development of flash power point presentation illustrating annual progress of UNICEF's interventions over the 5 years period;
- 4) Production of soft and hard copy maps<sup>2</sup> at the National and Zonal/Regional level illustrating the locations and key data collected under activity 1) above.
- 5) Production of a narrative report giving the key findings of the mapping exercise.
- 6) Presentation to UNICEF and Key donors/partners – of the outcomes and products from the mapping exercise

In undertaking this task, SWALIM staff will work in close coordination and consultation with a designated project officer from UNICEF USSC who will be the focal point to provide information, documents and, data as requested / required by SWALIM to undertake this project.

This assessment will be undertaken through a desk study of data provided by UNICEF Zonal Offices. Missing data will be collected by SWALIM through field survey and as security permits.

At the onset of the project UNICEF and SWALIM staff will meet to define a comprehensive work plan and data / information requirements on the UNICEF water project to undertake this project.

Special attention to be made to ensuring visibility of the key donors to this project (EC) on all outcome documents;

**Expected outcome:**

Assessment report, dynamic atlas, presentation and, map of UNICEF WASH interventions over the past 5-years to inform assist in monitoring of UNICEF's contribution to progress in and future decision-making.

**ANTICIPATED EXPENDITURE**

UNICEF will contribute **\$26,700.00 USD** (Only twenty seven thousand and seven hundred US dollars) to SWALIM to facilitate the implementation of this project. These funds will be used to cover the costs incurred over the period July 1<sup>st</sup> 2009 to October 31<sup>st</sup> 2009 related to implementation of the activities outlined above, as per the attached budget in Annex 1.

**B. REPORTING**

FAO will prepare and furnish to UNICEF the following reports/outcomes:

- a) A narrative report giving the key findings of this mapping exercise;
- b) A dynamic atlas with all pertinent data/key documents related to UNICEF's water interventions;
- c) A power point presentation illustrating annual progress of UNICEF interventions over the 5 years
- d) National and Zonal/Regional level maps illustrating the locations and key data – as outlined in activity (1) above – of the UNICEF interventions

These reports/outcome documents will be presented to UNICEF within the close of the project period, and at latest by 30 November 2009.

<sup>2</sup> Sizes will range from large wall maps, medium size wall Maps and A4 size maps.



SWALIM will also, within this same date (30 November 2009) make a presentation to UNICEF and Key donors / partners – of the outcomes and products from the project.

**Financial Reporting**

At the termination of the project, a final statement of account on the use of the entire contribution will be forwarded to UNICEF. This will be sent to UNICEF by latest 30 November 2009. Any unexpended or uncommitted part of the contribution will be returned to UNICEF, unless otherwise agreed in writing by the two parties (FAO and UNICEF).

**C. PAYMENT INSTRUCTIONS**


Upon signature of this document, the funds shall be paid by cheque to the following account:

**Account Name:** FAO-Somalia TCE Operations  
**Account Number:** 6462360033  
**Bank Name:** Commercial Bank of Africa, Wabera Branch  
**Currency:** US Dollars

**D. CERTIFICATION AND AGREEMENT BY FAO**

FAO certifies that the statement herein under the heading, "Nature of Activities" is an accurate description of the Project and that agreement and acceptance of this Basic Agreement Document is indicated by the duly authorized signature below.

Signed on behalf of FAO:



Name: Graham Farmer  
Position: **FAO Officer-in-Charge for Somalia**

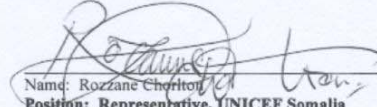
Date:



**E. CERTIFICATION AND AGREEMENT BY UNICEF**

UNICEF certifies that agreement and acceptance of this Basic Agreement Document is indicated by the duly authorized signature below.

Signed on behalf of UNICEF:



Name: Rozzane Chorrot  
Position: **Representative, UNICEF Somalia**

Date:

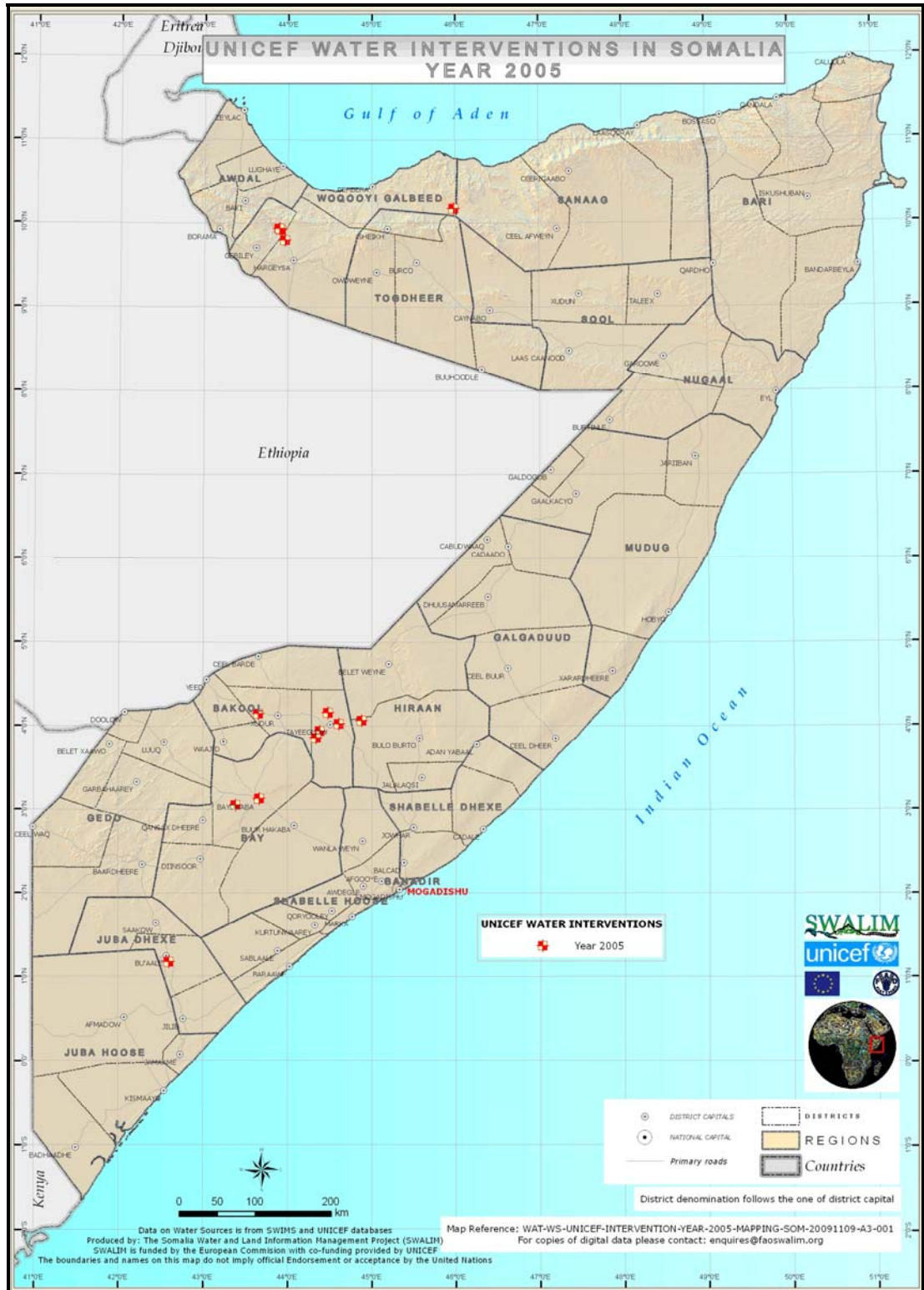
Annex 1 - Budget, UNICEF/FAO Agreement - Mapping of UNICEF Water Interventions in Somalia from 2008 to 2009.

SWALIM GCP/SOM/048/EC					
Cost of UNICEF Somalia Water Interventions Mapping					
1 Field Data Collection Costs	Description	Unit	USD Total	Grand Total	
<b>Zone</b>					
<b>North West</b>					
Total DSA	Data collection for selected sites	21 man days (team of 3 people, for seven days)	7 days	1,785	
Others	Car hire and guide		7 days	1,360	3,145
<b>North East</b>					
Total DSA	Data collection for selected sites	21 man days (team of 3 people, for seven days)	7 days	1,785	
Others	Car hire and guide		7 days	1,360	3,145
<b>South / Central</b>					
Total DSA	Data collection for selected sites	21 man days (team of 3 people, for seven days)	7 days	1,785	
Others	Car hire and guide		7 days	1,360	3,145
<b>SWALIM cost</b>					
	SWALIM Team travel to 3 zones	DSA for 2	12 days	2,392	
	UNHAS Flights - 2 SWALIM staff	Flights	Flights	4,918	
	Car hire and security escort	Car Hire	Per day	3,900	
	GIS Officer		One month	1,755	
	Hydrologist		One month	1,800	
<b>Total Field Data Collection</b>					<b>14,785</b>
					<b>24,200</b>
<b>2 Desk Work</b>					
	One National Consultant		One month	2,000	
	<b>Total Desk Work</b>				<b>2,000</b>
<b>3 Production of Deliverables</b>					
	maps, DVDs, other material				500
	<b>Total deliverables</b>				<b>500</b>
<b>GRAND TOTAL</b>					<b>28,700</b>

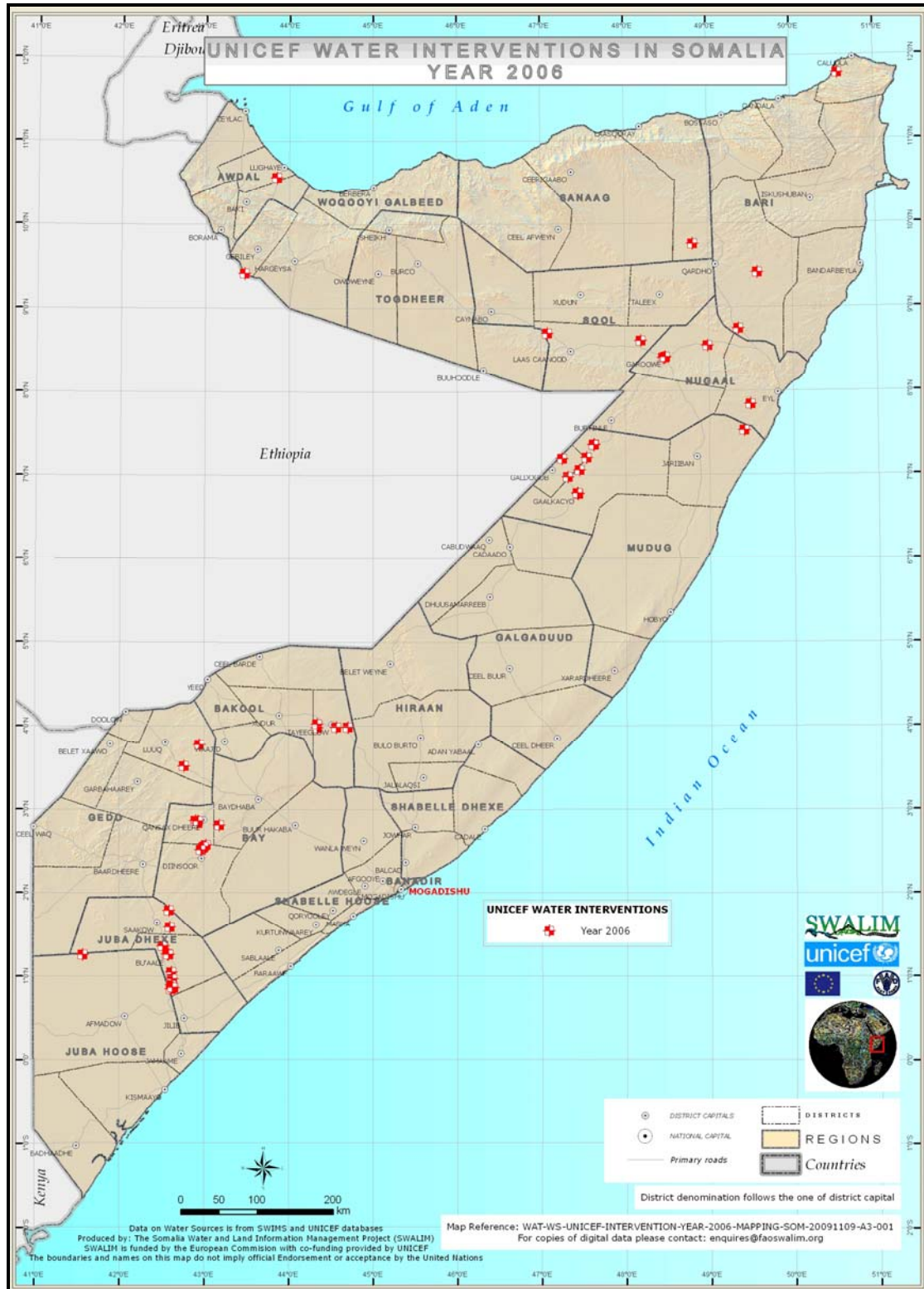
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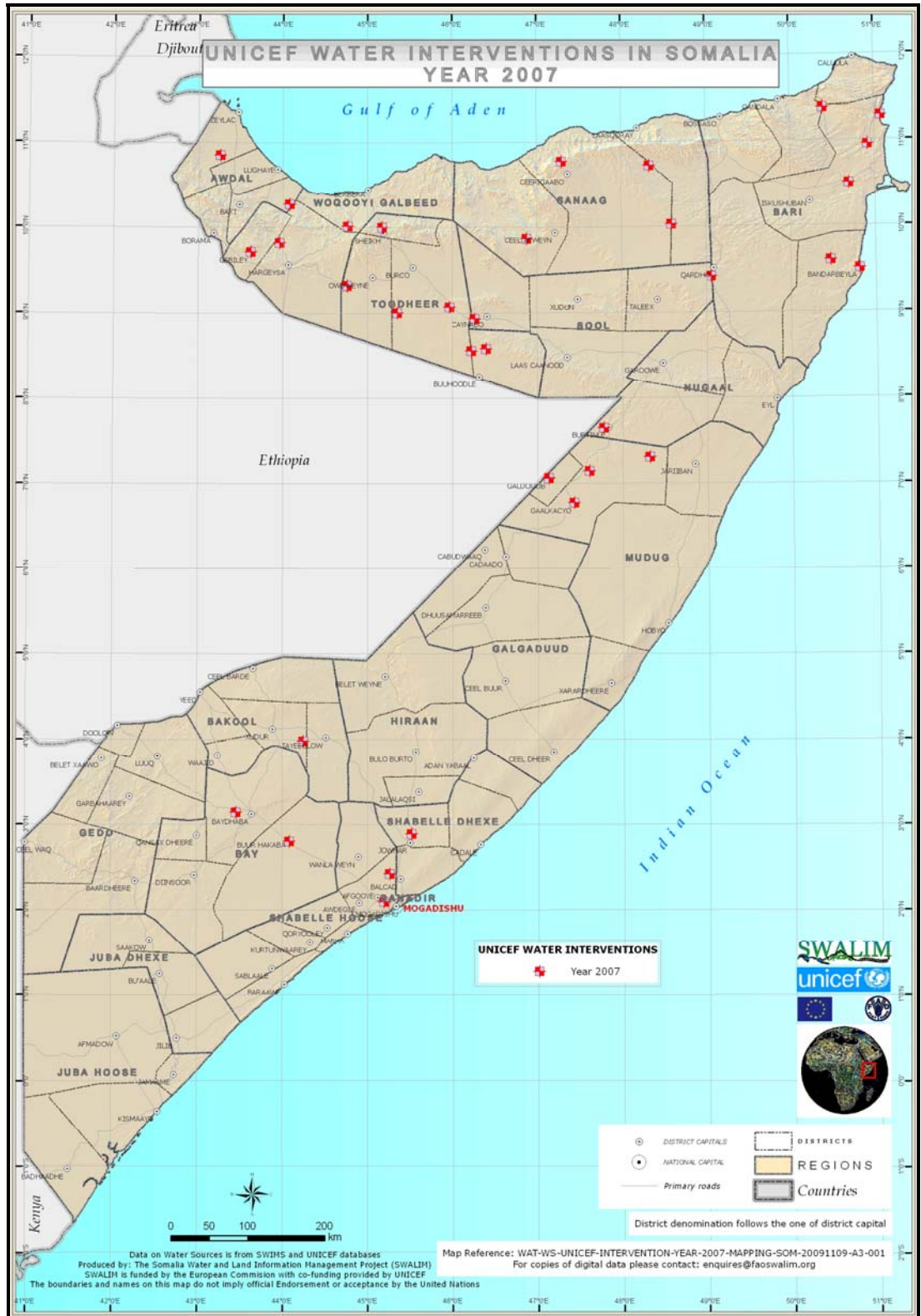
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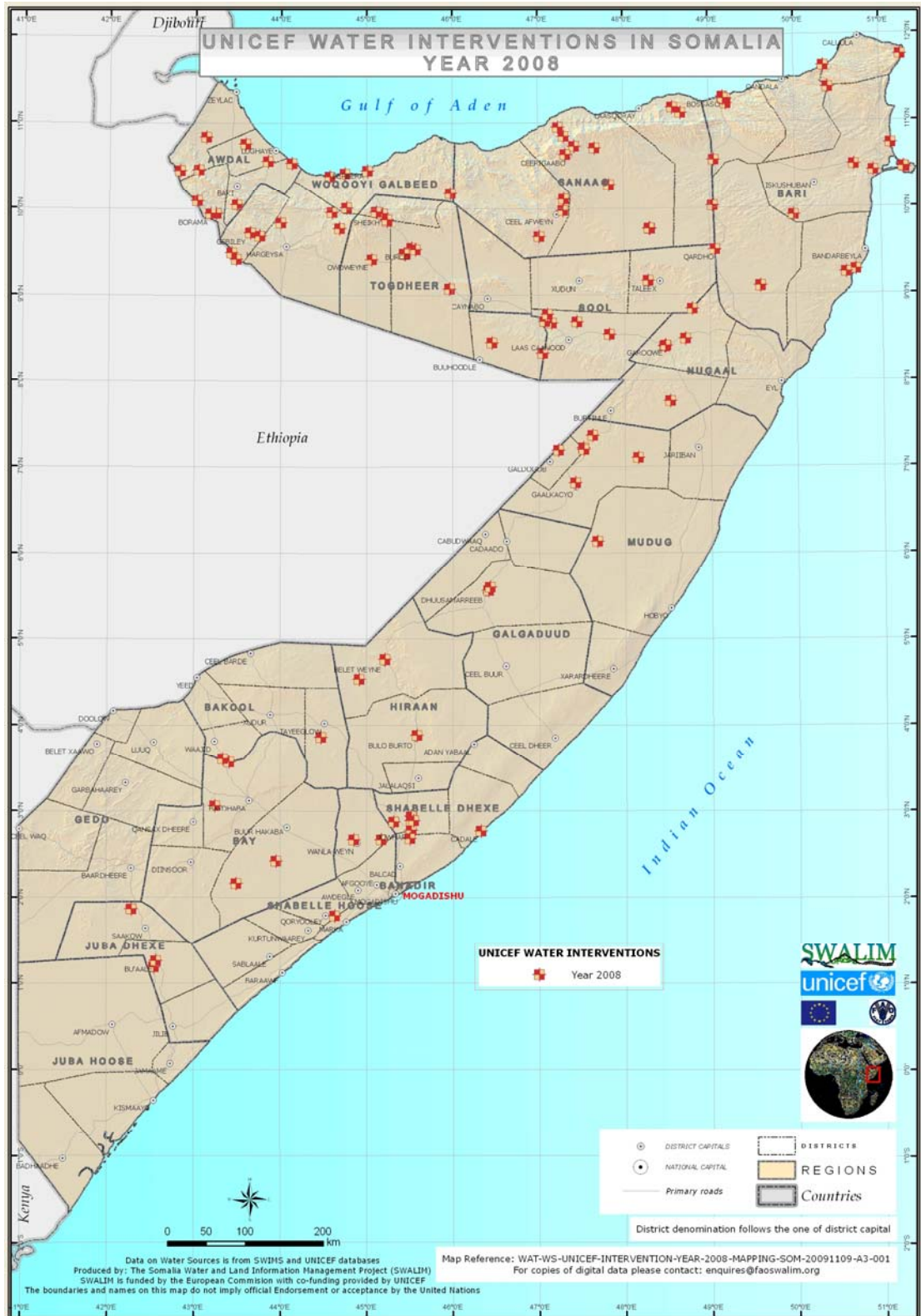
**Annex-2: Maps showing UNICEF interventions by year**



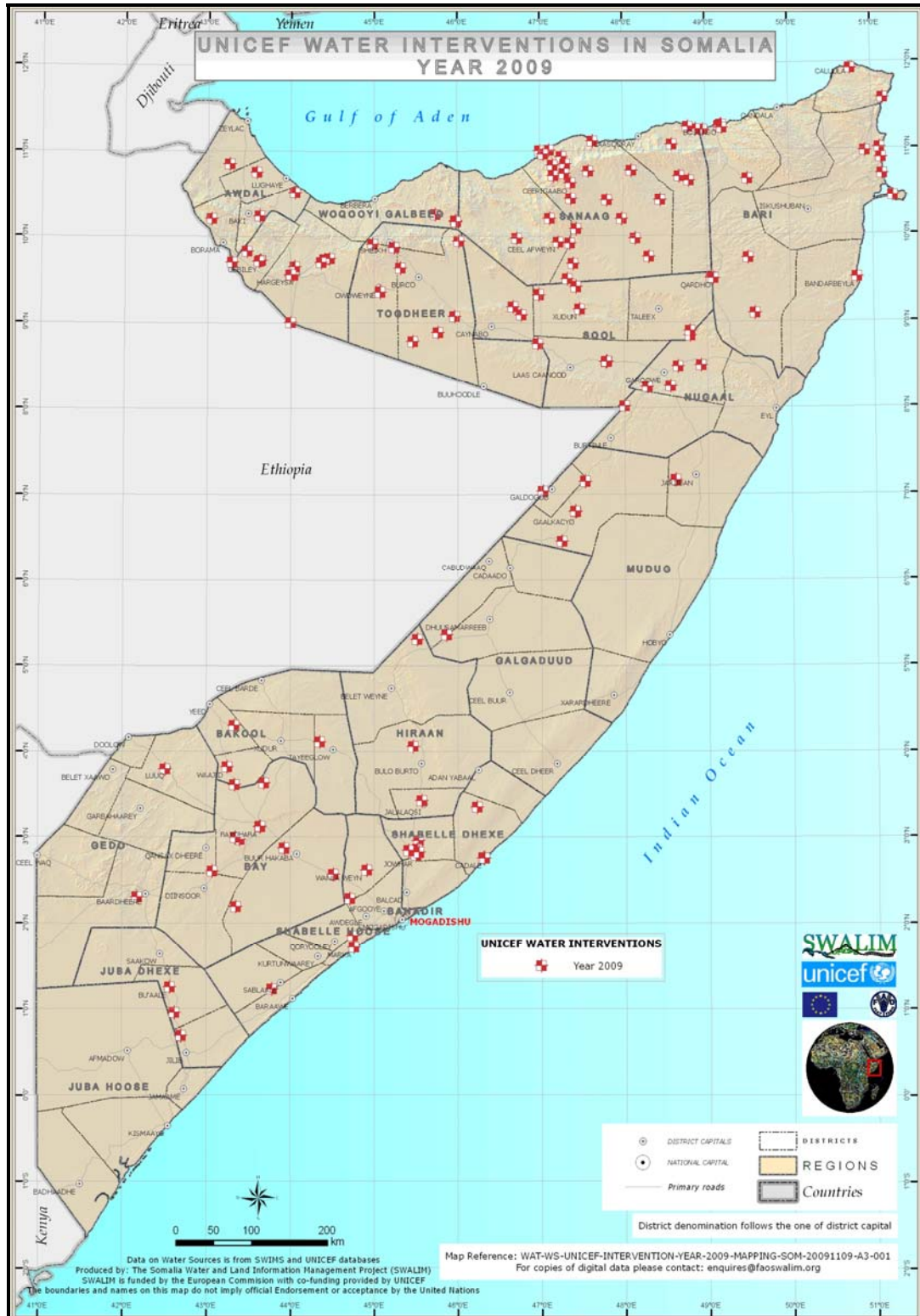






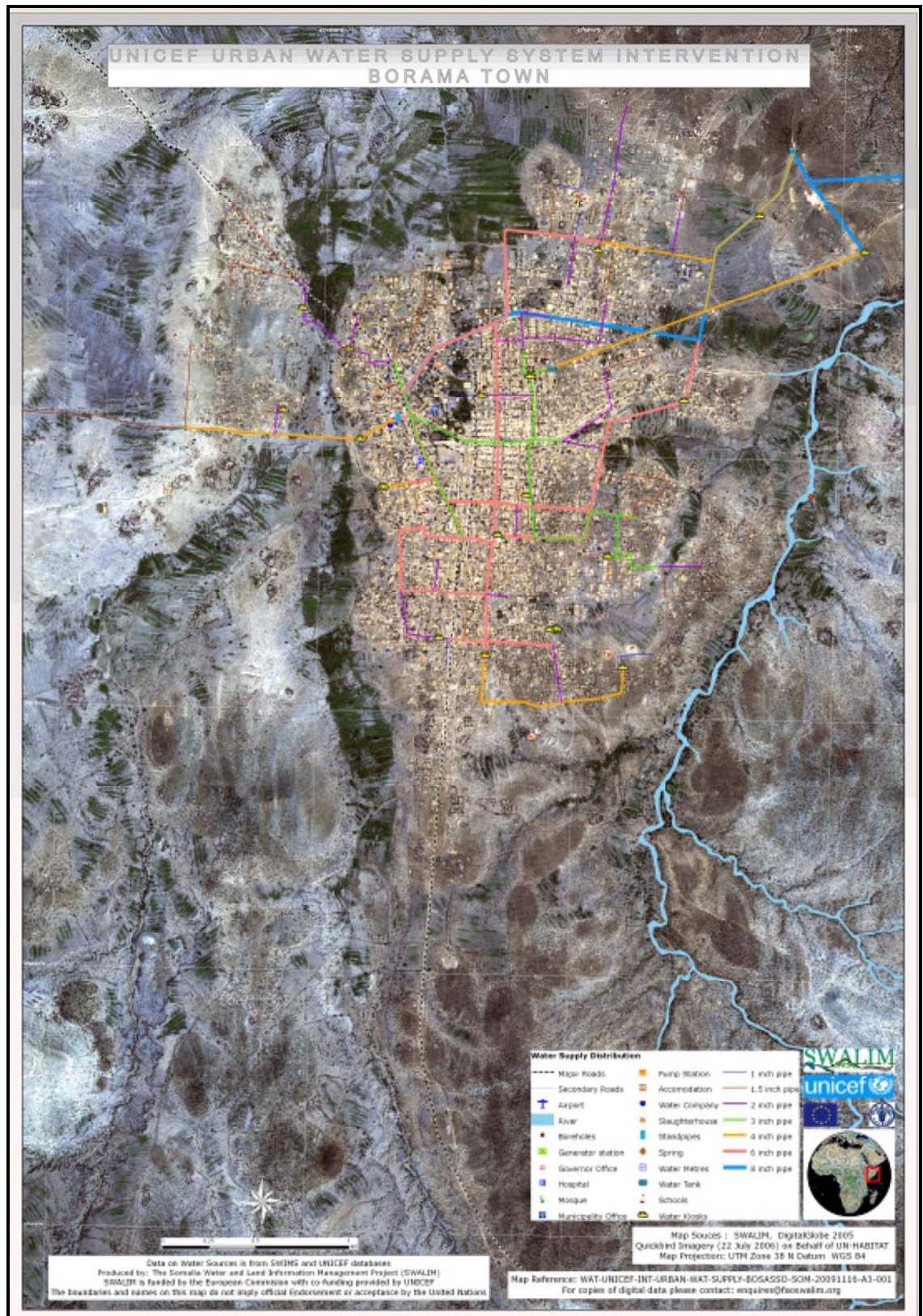




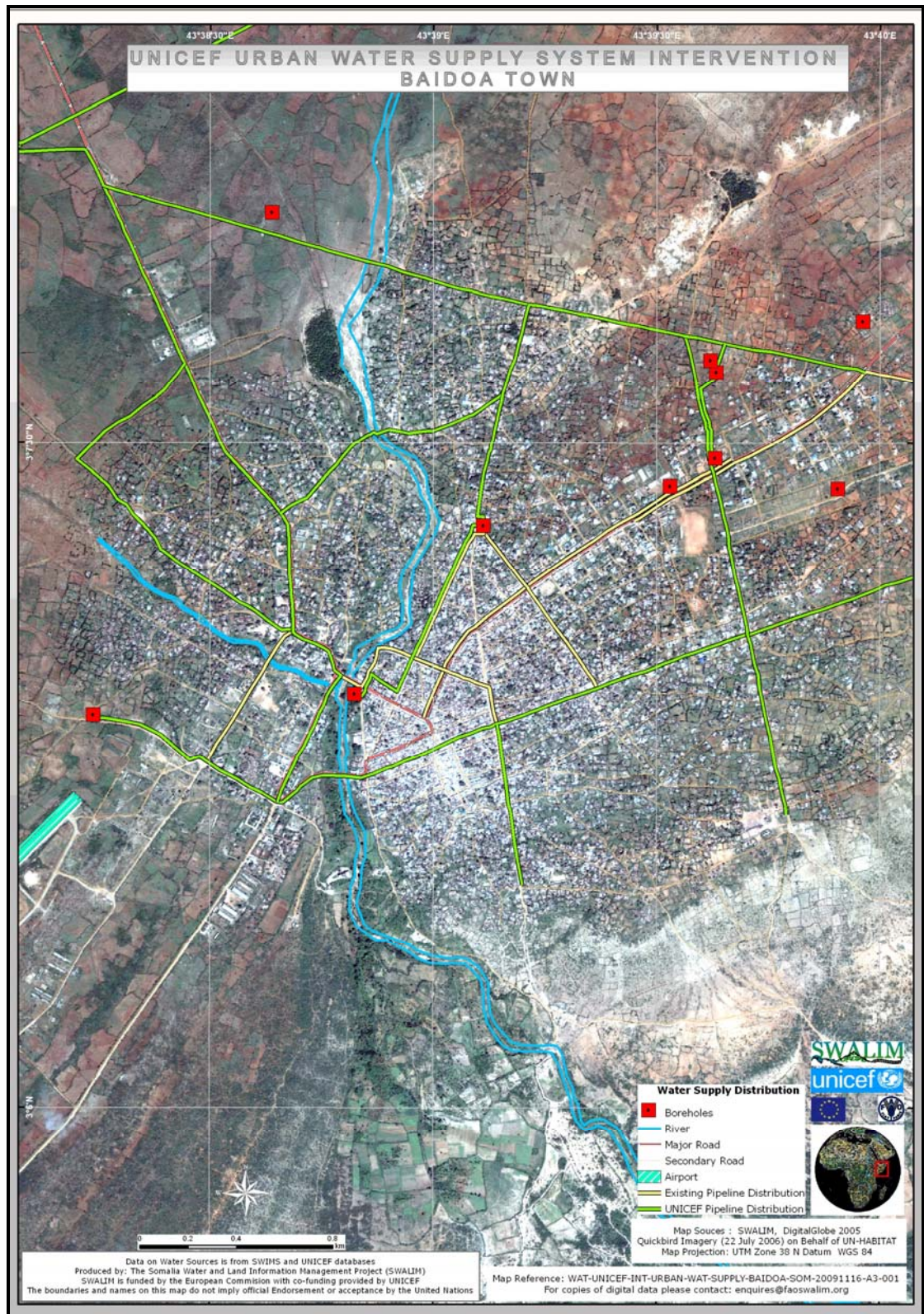




**Annex-3: Urban Water Supply Intervention Maps**



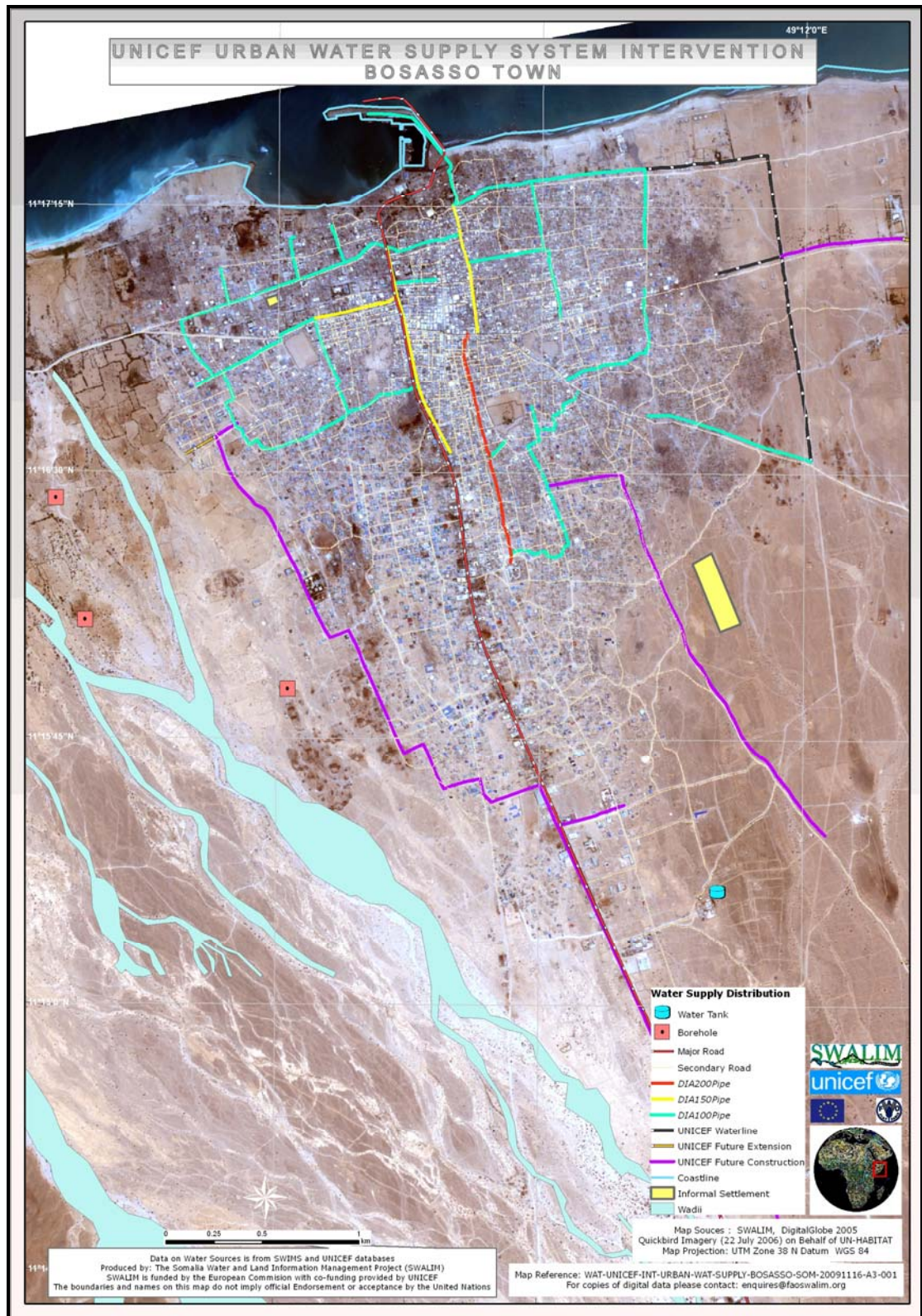


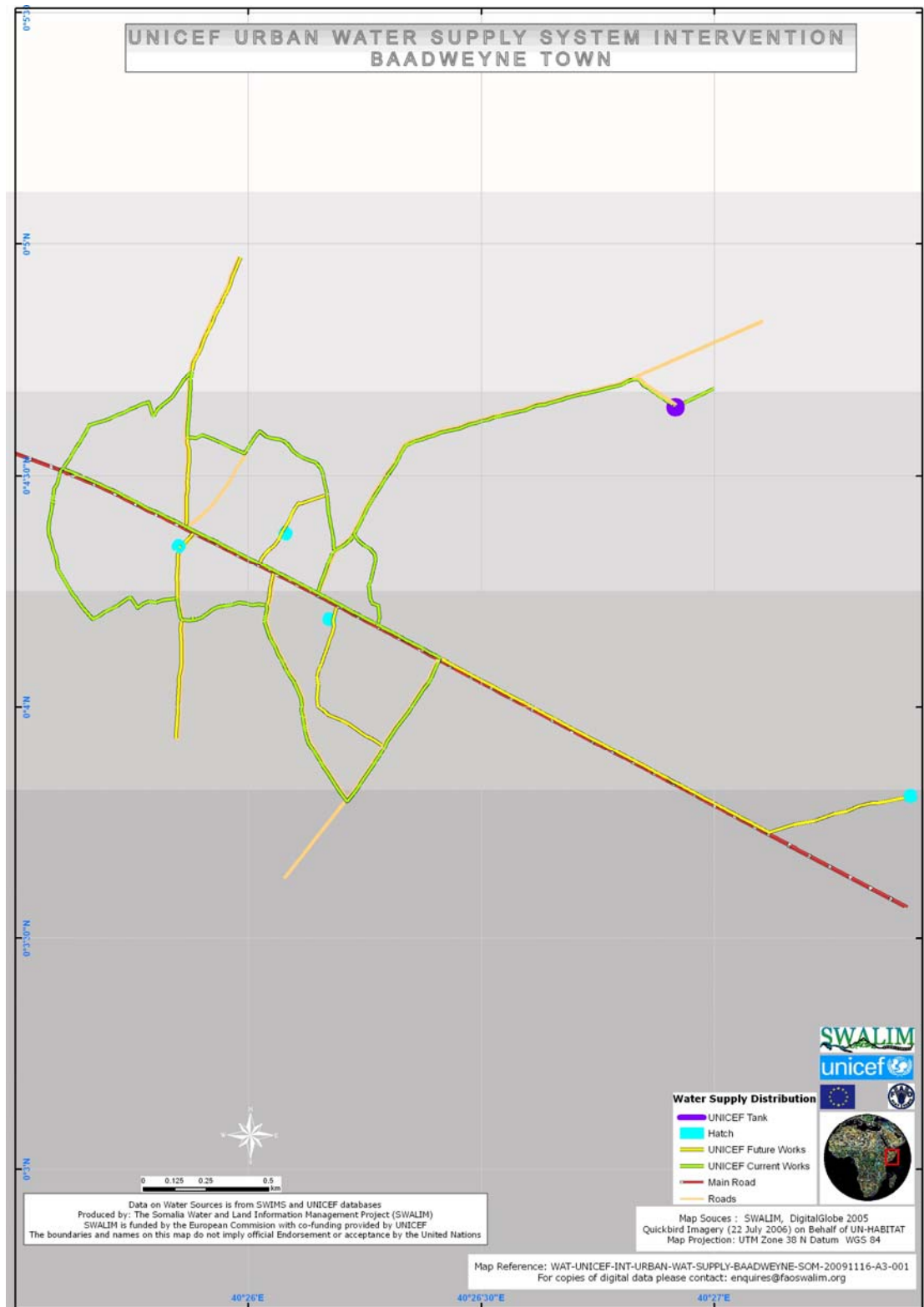




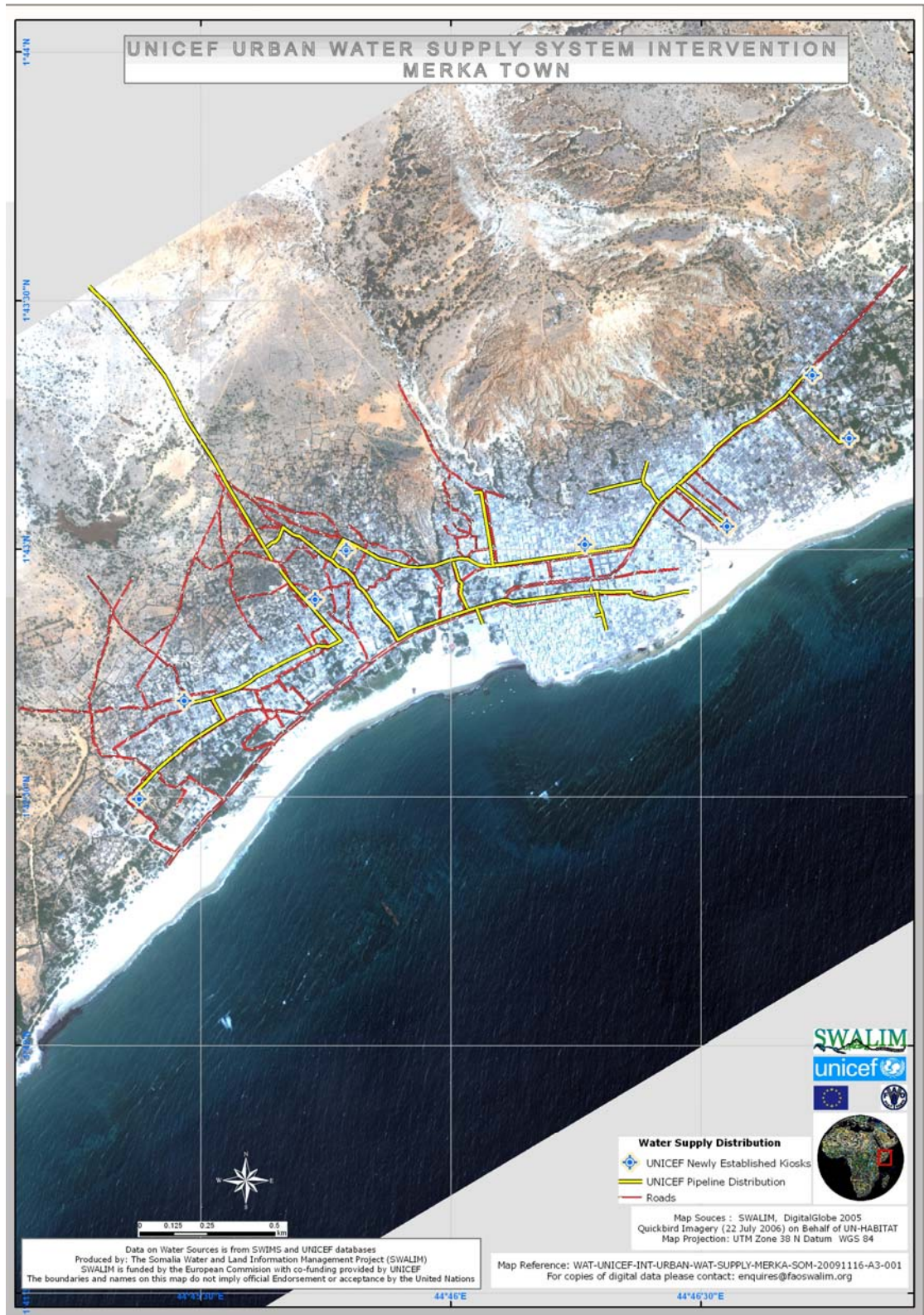
















**Annex-4: Water Supply Interventions by Region**



