Ghana

Positioning Survey for the Dutch water sector

Aidenvironment

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Glossary

Abbreviation	Explanation
AfDB	African Development Bank
CWSA	Community Water and Sanitation Agency
ECOWAS	Economic Community of West African States
EKN	Embassy of the Kingdom of the Netherlands
EU	European Union
EUJS	EU Joint Strategy
GIDA	Ghana Irrigation Development Authority
GNWP	Ghana-Netherlands WASH Program
GOG or GoG	Government of Ghana
GWCL	Ghana Water Company Ltd.
GWW	Ghana WASH Window
ICOUR	Irrigation Company of the Upper East Region
IFI or IFIs	International Financial Institute(s)
IRDD	Irrigation, Reclamation and Drainage Department
IWRM	Integrated Water Resource Management
JMP	Joint Monitoring Program
LIMC	Lower Middle Income Country
MASP	Multiple Annual Strategic Plan
MDG or MDGs	Millennium Development Goal(s)
MEST	Ministry of Environment, Science and Technology
MoF	Ministry of Food and Agriculture
MWH	Ministry of Works and Housing
NGO or NGOs	Non Governmental Organization(s)
NWP	Netherlands Water Partnership
ODA	Official Development Aid
PMC or PMCs	Product Market Combination(s)
PPP or PPPs	Public Private Partnership(s)
PSO or PSOs	Public Service Organization(s)
RVO	Rijksdienst voor Ondernemend Nederland
SWF or FDW	Sustainable Water Facility of Fonds Duurzaam Water
WASH	Water, Sanitation and Hygiene
WB	World Bank
WEICO	Weija Irrigation Company
WRC	Water Resources Commission

Executive Summary

Introduction:
The aim of the water positioning survey is to identify opportunities, product market combinations (PMCs), strategies, and approaches for the Dutch water sector in Ghana. Chapter 1 gives an overview of the current water situation and the water sector, chapter 2 provides insight in the current activities, opportunities, and potential PMCs that are present for the Dutch water sector, and chapter 3 elaborates on the (positioning) strategies to enter and operate on the market.

Demand:
The impacts of climate change in Ghana are expected to significantly aggravate water stress. Sustainable and secured water provision will in addition to water availability, depend on the effectiveness of water governance. There is a need to increase institutional capacity in order to ensure effective management of local water resources and create the connection between information flow, knowledge acquisition and decision making. For WASH service delivery, although institutional improvements have been made, quality and sustainability of services need to be improved. Large investments are needed for waste water treatment, as urban areas are rapidly growing. There is a high inequality in coverage between urban, peri-urban, low-income urban and rural areas and, with the economy developing, solid waste problems have increased.

Current interest and activities of Dutch organizations:
There are many Dutch organizations active in Ghana, which is also related directly to the regional hub function of the Dutch embassy, the fact that Ghana is a fast-track country and funding opportunities (like the Ghana WASH Window Program (GNWP)). Dutch activities at the moment include WASH (and to a more limited extend on waste treatment), irrigation and port development. There are also projects in the field early warning systems and flood prevention (dredging). Dutch organizations are interested in the areas of water for food production, water management and in WASH service delivery.

Potential product market combinations:
Product market combinations are seen in climate resilient planning to ensure sustainable access to water resources and food security, as well as flood management and improving institutional capacity on (local) water governance. These relate to the large need for building capacity on water governance and water management. Innovative waste management solutions have a large potential.

Suggestions on positioning strategies for future activities:
Dutch organizations could work jointly through a business platform or hub, through the Dutch embassy, in order to gain access to programs, partners and funds related to EU joint programming, World Bank or governmental budgets. Organizations can make use of the GNWP- Ghana WASH Window through RVO and the Dutch embassy.[1] However, the GNWP has become a popular instrument and it is therefore not clear if this offers opportunities for "new-comers". This report provides insights into the current strategies of several Dutch organizations already active in Ghana. Local capacity and strong partners are seen as key for starting up activities in Ghana.

This positioning survey is not a fully fledged marketing survey or report. This survey elaborates on the (current/base line) activities of the Dutch water sector and flags potential opportunities and product market combinations. The survey makes suggestions on possible positioning strategies for

[1] For criteria and info see: http://www.rvo.nl/subsidies-regelingen/ghana-wash-window-gww-fdw

Dutch sector players. To make a well balanced decision on entering or operating on these markets we recommend organizations to perform an in-depth due diligence themselves.

1. Country profile

This chapter provides an overview of all relevant basic information on the country in general and the water sector specifically. The chapter has three parts: 1) facts and figures on the country, 2) the (physical) water situation, and 3) the water sector, describing the institutional setting and framework. Part 3 ends mentioning the Dutch Government strategy on cooperation.

1.1 Facts

Government type:	Constitutional Democracy
Political situation:	Ghana is a relative stable country with a quite faire political climate, especially compared to the situation under the authoritarian leadership of some presidents until the 1990's. Ghana is member of the Economic Community of West African States (ECOWAS) that seeks to promote economic integration across the region. Ghana is planning to introduce a common currency in a group of six countries that are part of the ECOWAS by 2015 (together with Gambia, Guinea, Nigeria, Sierra Leone and Liberia) (Via Water, 2014). Recently, Ghana has become a lower middle income country (LIMC) (MASP, 2014)
Stability:	Ethnic conflicts occur periodically, which are mostly related to land use or traditional leadership issues. In the political arena some sort of discrimination is still visible, through loyalties, which makes the distinction between political and ethnic conflicts not always clear. In Ghana, state and religion are separated. The northern part of the country is mainly Muslim and poor, the southern areas are richer and predominantly Christian. In the government, a religious balance is respected and religious issues are avoided in

	political discussions. This division leads to migration to large cities such as Accra (Via Water, 2014)
Language:	The national language is English. Other languages are Asante (15%), Ewe (13%) Fante (10%), and many other local languages.
Population:	25,758,108 (2014 est.)
Population growth:	2.19% (2014)
Economic growth (GDP growth in %):	7.9% (2013), which ranks 13th on the world list
Expected growth (GDP growth in % till 2016):	2015: 7.3%, 2016: 7.5%
GDP (PPP):	USD 90.41 billion (2013 est.), country comparison to the world: 78
GDP (PPP) per capita:	USD 3,500 (2013 est.), country comparison to the world: 173
Unemployment rate (in%):	10% (2000)
Inflation rate (in %):	17% (2014), 2015: 18%, 2020: 17%
Foreign direct investments (in % of GDP):	6.7% (2013)
ODA in % of GNI:	4.6% (2010-2014)
Imports:	USD 18.49 billion (2013 est.)
Import partners:	China (25.6%), Nigeria (11%), Netherlands (6.2%), Singapore (4.5%), UK (4.1%), India (4%) (2012 est.)
BTI index on banking system:	8. Ghana has a high degree of market competition, which is mainly hindered by limited access to affordable loans. The country knows many subsidies that distort the market, however, reducing subsidies is very difficult political task. The inflation rate is high in Ghana, which is not dealt with in a successful way until present. The instable administrative system of the economy leads to a large informal sector, especially among the urban poor and rural dwellers that do not produce cash crops, such as cocoa. Economic protection is relatively low compared to other African countries. This mainly concerns agriculture and manufacturing. A trend is visible on lowering the tariff barriers for foreign trade. The legal framework of the banking sector is well designed in Ghana. The private banking sector is expanding due to the market driven approach, which ultimately has also lead to higher competition and the availability of banking services in rural areas. The credit growth of the banks is high, which is a good incentive for local business to invest. The World Bank and the Ghanaian government have together increased the risk-management capacities of the banks. The central bank has a good autonomic position in the system, but is not always effective in influencing

	the banking sector in general. This is mainly caused by the weak connection between the directives of the central bank and the responsiveness of private banks.
Doing business index:	70 out of 189
WEF Global competitive index:	111 out of 148

1.2 The water situation

1.2.1 Physical description of the water situation

Ghana has a warm, humid climate. Mean annual rainfall of the country is estimated at 1 187 mm. Most of Ghana belongs to the humid tropics. In the southeast (near Accra) conditions are somewhat dryer. The northern part of the country has a sub-humid climate, with occasional droughts and floods. Southern Ghana, including Accra, has a bimodal rainfall pattern, with most rainfall in May-June and a secondary peak in October. July-September and November-February are dry months. The northern part of the country in the sub-humid zone of Ghana, including Tamale, has one rainy season, with a peak in September. The unreliability of rainfall is a cause of concern (Source: Aquastat). All of Ghana's rivers drain southwards to the Gulf of Guinea. The Volta River, with a catchment area within Ghana of nearly 70% of the country, is by far the largest river draining the entire north, centre and east of the country. The remaining rivers, all in the south and southwest, drain about 30% of the country. (Source: http://wrc-gh.org/en/water-resources-mgt/river-systems)
The occurrence of groundwater in Ghana is associated with 3 main geological formations. These are the basement complex, comprising crystalline igneous and metamorphic rocks; the consolidated sedimentary formations underlying the Volta basin (including the limestone horizon); and the mesozoic and cenozoic sedimentary rocks. The basement complex and the Volta in formation cover 54 percent and 45 percent of the country respectively. Groundwater occurrence depends on jointing, shearing, fracturing and weathering of the basement complex. The depths of aquifers are normally between 10 m and 60 m, and yields rarely exceed 6 m3/hr. In the extreme south eastern and western part of the country, the aquifer depths vary from 6 m to 120 m. There are also limestone aquifers, some of which are 120 m to 300 m in depth. The quality of groundwater resources in Ghana is generally good except for some cases of localized pollution and areas with high levels of iron, fluoride and other minerals. Salinity in certain groundwater occurrences is also found especially in some coastal aquifers.[2]

1.2.2 Climate and climate change

Sub-Saharan Africa is the region expected to be hit hardest by climate change due to its location in the tropics and high dependence on ecosystem resources (IPCC 2007). Ghana has experienced about 20% decrease in rainfall since the 1960s accompanied by a rise in the frequency of extreme events, notably droughts and floods. Rainfall has become more unreliable (EPA, 2000; Yaro, 2010). The high reliance on rainfall agriculture therefore exposes farmers to the impacts of climate change. Recurrent drought and occasional floods in the north of the country severely affects agri-cultural activities. (source: VIA Water report Ghana)
Fluctuations in runoff and stream flows will increase. Specific parts in the Volta basin will experience significant reductions in runoff, while the south-western area will experience increases. These fluctuations will increase the risk of floods and/or droughts in both rural and urban areas. Because most of these changes are caused by upstream areas outside the territory of Ghana, there is a need for

[2] http://wrc-gh.org/en/water-resources-mgt/ground-water-mgt

dialogue with Ghana's neighbors on the management of shared water resources. Climate change and its associated sea-level rise are expected to significantly affect vulnerable coastal communities.[3]

1.2.3 Pressures on water sources

- Total renewable water resources : 53,2 cu km
- Fresh water withdrawal: 0,98 cu km / year

The major consumptive uses in Ghana are water supply, irrigation and livestock watering. Domestic and industrial urban water supplies are based almost entirely on surface water, either impounded behind small dams or diverted by weirs in rivers.[4] Population growth and rapid urbanization, due to rural-urban migration, are among the major constraints to the provision of water and sanitation in Ghana. The increased pressure on urban water systems and the rise of urban slums and failure to comply with housing regulations in the country are key concerns (Machdar, 2010). Slums and unauthorized structures, particularly those built on waterways, contribute to flooding during heavy rains. Also, the unplanned nature of the structures in urban slums makes it difficult to connect such localities to municipal water supply systems. Activities in Burkina Faso, like construction of many small dams in the Volta river, have an impact on the availability of water on the Ghanaian side.[5] Surface water quality considerations are becoming increasingly important due to mining activities, urban and industrial pollution problems and agricultural development.[6] Finally, Ground water depletion is becoming an issue, due to a large number of boreholes. It is however, an issue of how to deal with lowering ground water levels.

1.2.4 Irrigation

Irrigated land: 309 sq km irrigated land (CIA 2003) in relation total area cultivated land 72.810 sq ha and total surface in 227.533 sq km (CIA 2014).

Rainfed agriculture is predominant and average farm size is small (< 1.2 ha), thus smallholder farms dominate the sector, accounting for about 80 percent of total agricultural production. The use of irrigation technology is not widespread, but considered of great importance for seasonal and incidental occurrence of droughts. The total irrigation potential has been estimated at 1.9 million ha. Most public irrigation schemes have deteriorated and need some form of rehabilitation, they are operating at low levels of overall efficiency. Drainage and irrigation go hand in hand, but as a result of persistent poor maintenance, subsurface drains are virtually absent from irrigation schemes in Ghana. A few irrigation projects in the country are operated by private companies. In the case of the Tono and Vea Schemes, they were initially fully funded by the government. In an attempt to stop continuous public funding of the schemes, the Irrigation Company of the Upper East Region (ICOUR) was established as a commercial entity, like Weija Irrigation Company (WEICO), which also operates as a commercial entity. The Government intended to make WEICO operate on its own but this faces financial problems.[7]

[3] Assessing the impact of sea-level rise on a vulnerable coastal community in Accra, Ghana, Kwasi Appeaning Addo, Michael Adeyemi, 2013

[4] http://wrc-gh.org/en/water-resources-mgt/ground-water-mgt

[5] VIA Water report Ghana

[6] http://wrc-gh.org/en/water-resources-mgt/river-systems

[7] Aquastat

1.2.5 Flooding of river systems

Sub-Sahara Africa is considered to be most vulnerable to climate variability including flooding. Flooding due to erratic rainfall mainly affects Northern Ghana. The frequency and severity of floods in Northern Ghana over the last decade has increased considerably. This is often related to spillage of the Bagri Dam in Southern Burkina Faso. The combined effect of heavy rainfall and spillage of the Bagri dam, has led to loss of lives, displacement of vulnerable persons and the destruction of key infrastructure, food stocks and livestock throughout the region. In August 2007, the floods coincided with the most critical time of the year, the lean (minor) farming season when Ghanaian families faced food insecurity. Floods are a common feature in Ghana hence certain community coping mechanisms are in place.

1.2.6 Coastal zones and maritime areas

The coastal zone covers only 6.5% of the total land area. It has a coastline of 528km long with an Exclusive Economic Zone of over 218,000km2 and continental shelf of 23,700km2. It is home to a quarter of the nation's population and more than three quarters of its industries. Four out of the six metropolitan centers of Ghana are located in the zone, as well as 21 districts in the four regions (out of the ten regions) of Ghana. The coastal and marine area is endowed with numerous natural resources, e.g. fisheries, wetlands, mangroves, lagoons, estuaries, sandy and rocky beaches, sea turtles, manatees, whales, dolphins and birds. Ghana's coastal fisheries is the fourth most productive of 36 countries in the Atlantic. The two sea ports in Tema and Takoradi are very significant in international trade and commerce. The beaches, cliffs, lagoons, wildlife, cultural and historical sites and coastal landscape also provide an immense potential for tourism development and recreation. The increasing pressure, conflict over land, water and resource utilization constraints exacerbate social and sanitation problems and climate change impact leading to depletion of resources and coastal erosion. Since the 1960s, Keta and Keta-Kedzi have lost more than a quarter of the total land mass due to sea erosion. Annual rate of coastal erosion in the Keta area is estimated at 3 meters (EPA, 2007), and in recent times, Ada Foah and surrounding areas are experiencing coastal erosion.[8]

1.3 The water sector

1.3.1 Public sector

The ministries dealing with water and irrigation include the Ministry of Food and Agriculture, the Ministry of Works and Housing, and the Ministry of Environment, Science and Technology. In the Ministry of Food and Agriculture (MoFA), the Ghana Irrigation Development Authority (GIDA) is the main institution in charge of irrigation. It started in the early 1960s as a Land Planning Unit of MoFA, was upgraded in 1964 to become the Irrigation, Reclamation and Drainage Department (IRDD) and became the Irrigation Department in 1974. Finally, in 1977, GIDA was established by the SMC (Supreme Military Council) Decree No. 85. It is entrusted with irrigation development, provides all agricultural inputs and extension services, delivers water to the farmers and secures the repayment of credits. It is also expected to exercise management control over its irrigation dams, the associated catchment areas and over the drainage of irrigated areas and general water quality, especially within its project areas. Due to its vast terms of reference together with scarce available resources, GIDA offers poor services and its irrigation projects are often unsuccessful because of the lack of technical support.

Institutions involved in water management within the Ministry of Works and Housing (MWH) are:

- The Water Resources Commission (WRC), which is the leading institution involved in water resources management in the country. This new institution came into being in 1996 following the execution of the Water Resources Management (WARM) studies supported

[8] Ghana MDG Report 2010

by CIDA, DANIDA, DFID, CfD, GTZ, UNDP and the World Bank. Prior to this date, the management of the country's water resources was fragmented among various institutions with no clear policy on who is in control.

- The Ghana Water Company Limited (GWCL), which exercises management functions over water sources that it abstracts for treatment and subsequent distribution to consumers. In some cases, it builds dams on which water supply schemes for big cities are based. It has the mandate to manage such water sources, including the relevant catchment areas for the benefit of the Ghanaian public.
- The Community Water and Sanitation Agency (CWSA), which is responsible for water supply to rural communities, including small towns. It also deals with household sanitation and hygiene promotion and has offices in all regions of Ghana.

Within the Ministry of Environment, Science and Technology (MEST), the following institutions are involved in water management:

- The Environmental Protection Agency (EPA) by virtue of its mandate and functions is one of the institutions that are involved in some aspects of water resources management. It maintains and enforces standards for wastewater discharge into water bodies. It also ensures, through the concept of Environmental Impact Assessments (EIA), that negative impacts of development projects are reduced through the monitoring of the companies' mitigation plans.
- The Water Research Institute (WRI) was formed in 1996 from the merger of the Institute of Aquatic Biology and the Water Resources Research Institute, all part of the Council for Scientific and Industrial Research (CSIR). It has a mandate to conduct research into water and related resources. In pursuance of this mandate, it generates and provides scientific information, strategies and services towards the rational development, utilization and management of Ghana's water resources in support of the socio-economic advancement of the country, especially in the agriculture, health, industry, energy, transportation, education and tourism sectors. It engages, amongst other things, in research on groundwater resources (availability, quality, quantity), on hydro meteorological and hydrological data for planning and research, on irrigation technology, rainwater harvesting, sawah eco-technology for rice production, water management in valley bottoms for rice production and production of bio-insecticides for the control of malaria and bilharzia vectors.[9]

1.3.2 Legislation

Decentralization is considered imperative in the effective delivery of water and sanitation in Ghana. However, the legal framework for the management of community water and sanitation has resulted in the existence of separate categories of institutions at district and sub-district or community levels with similar or overlapping roles. This situation presents a threat to water and sanitation provision as it has in some instances resulted in power struggles and rivalries. Removing this constraint requires the integration of such institutions at the district and sub-district levels and could ensure adequate legitimacy, reduce fragmentation of roles, and allow for greater organizational autonomy as well as accountability (Mpadu-Boakye & Laryea, 2009).

The WASH sector in Ghana has been constrained by interlinked political, administrative, economic, social and legislative factors (Osumanu, 2008). The high cost of water treatment, high maintenance cost of water treatment plants and equipment, water losses during distribution, increasing population and non-payment of water bills by consumers account for the public water sector's inability to supply adequate water. This has led to the involvement of the private sector to improve

[9] Aquastat

water supply services, but this move in itself is not a panacea to the problem of in-adequate household water supply. Privatization of the sector has been controversial, because many consumers do not understand or accept why companies should make profits out of a basic necessity. The real issue is better management and efficient delivery of clean drinking water (Osumanu, 2008; Suleiman & Cars, 2010). The political will for reform is essential, but the responsibilities of government agencies for supplying water have not been defined clearly. Partnerships between the government, government agencies and citizens meant to create awareness of water issues - ranging from fighting corruption, conservation and reaching consensus on appropriate water rates, to creating laws to protect re-sources and mechanisms to resolve water disputes - have equally failed to achieve good results (Osumanu, 2010).

1.3.3 Public sector current spending and investment plans

Below an overview is given of public sector current spending and investment plans, related to water.

Ministry department	2015 (euro)
Ministry of Food and Agriculture	106,689,490
Ministry of Fisheries and Aquaculture Development	18,786,160
Ministry of Land and Natural Resources	71,563,400
Ministry of Water Resources, Works and Housing	119,974,979

Summary of MDA Expenditure Allocation, Source: http://www.mofep.gov.gh/sites/default/files/budget/Budget-Appendix-Tables-2015.pdf

1.3.4 Private sector

The private sector in Ghana is dominated by enterprises in the informal sector, with approximately 90% of the companies being MSMEs and employing less than 20 persons. The private sector is the main employer, and the primary generator of exports. The government has been active in improving the country's business environment and the country has been ranked, at least twice, amongst the top 10 reformers globally by the World Bank's Doing Business team. A number of issues continue to adversely affect Ghana's private sector development. These include infrastructural weaknesses; cumbersome public administration and land tenure system; under- developed financial systems, with some banks still undercapitalized, wide interest rate spreads and high non-performing loans driven mainly by GOG arrears, weak human capital, and low access to technology, including in the agribusiness sector. Government is developing a Public-Private Partnerships (PPP) regulatory framework towards further instilling confidence in the business environment, and manage fiscal commitments, and is also seeking to improve access of MSME to the capital market (source: Republic of Ghana Country Strategy Paper 2012 – 2016, African Development Bank and African Development Fund).

Ghana's economic opportunities attract considerable attention from Dutch companies. Over the past years export to Ghana from the Netherlands has grown substantially, from EUR 330 million in 2010 and EUR 660 million in 2011, to EUR 1.1 billion in 2012. Dutch direct investments in Ghana grew rapidly since the signing of the bilateral tax treaty in 2009. This increase was partly due to investments from third countries looking for security and predictability in taxation. Investments have been stable over the past year. The increase in trade with The Netherlands is expected to be followed by an increase in investments over next period as companies get familiar with West African markets and their opportunities. The embassy will actively support these Dutch investors. So will the recently established Ghana Netherlands Business & Culture Council. (Source: MASP Ghana)

An overview of local and international private sector organizations in Ghana can be found on: http://www.ghanaweb.com/GhanaHomePage/directory/cat2.html

1.3.5 NGOs and knowledge institutes

An overview of local and international NGOs in Ghana can be found on:
http://www.ghanaweb.com/GhanaHomePage/directory/cat32.html
CONIWAS is a coalition of NGOs in the WASH sector.

1.3.6 Pressing needs

Climate resilient measures to ensure sustainable access to water resources for food security
The impacts of climate change in Ghana are expected to significantly aggravate water stress, reducing food security and the energy generation capacity. Recommended hard options for the water subsector include increased water transfer from the Volta basin to meet the needs of a growing urban population; construction of efficient infrastructure; and blocking of dry-stream channels to harvest rainwater to recharge the groundwater system. A number of soft options were also deemed to be of high priority: afforestation, improved land use practices, protection of river courses, and de-sedimentation of reservoirs.

Improvement of WASH service delivery, and in specific sanitation and waste (water) management
Specific issues related to access to WASH are: low quality and sustainability of services, low capacity of service providers, insufficient and unskilled practitioners, large investments needed for sewerage treatment (only found in Accra) and there is a high inequality in coverage between urban, peri-urban, low-income urban and rural areas.[10] Access to sanitation remains a major health issue. Due to open defecation (18% nationwide, JMP 2013) and poor sanitation, a modern city as Accra does experience the outbreak of water borne diseases such as cholera. Wastewater treatment is largely absent. Only 4% of the urban population is connected to sewers and the limited sewerage/ sludge treatment plants are often not functioning. With the economy developing, solid waste problems have increased. Though private sector involvement is visible in this sub-sector, capacities of services and facilities are limited compared to the needs. [11]

Improving institutional capacity on local water governance
Sustainable provision of water will in addition to water availability, depend on the effectiveness of water governance. The National Community Water and Sanitation Program (NCWSP) ensured that the ownership and management of water pumps and small town water systems constructed by the Ghana Water Company were handed over to communities. Institutions charged with the mandate of managing Ghana's water resources are under-resourced and lack the capacity to effectively carry out their mandate. Weak institutional capacity of the Water Resources Commission constrains its ability to ensure effective management of local water resources.[12] Next to this due to the monopoly of Ghana Water Company Ltd, many developments many developments are blocked due to centralised decision making.

Improvement of data for better water management
Water governance is contingent on effective information flow and acquisition of knowledge. There is a disconnection between information flow, knowledge acquisition and decision making. The critical analysis of knowledge flow is crucial in addressing this gap as a means to ensure effective water management in the country particularly at a time when water resources are not only being diminished by the effects of climate change but under much pressure due to increasing population and livelihood diversification into water intensive economic strategies.

[10] http://www.slideshare.net/TrackFin/13-track-fin-ghana

[11] resultaat fiche Accra Water

[12] VIA Water

A further important ongoing concern requiring appropriate hydrological data is the current and future development of urban drainage in a number of Ghana's major cities, for which flood and storm runoff data is needed for proper planning and design.[13]

Siltation of dams
Siltation is a cause for concern in most dams and reservoirs. However, very few studies have been carried out to establish what percentages of the various dams have been silted up. In the case of Lake Volta it is not known how much of the dead storage has been lost to siltation. The siltation volume in Weija Reservoir is not known either, but initial studies carried out prior to its construction concluded that after 50 years of operation less than 1 percent of the volume of the dam would be lost to siltation.[14] The sharing of data on the siltation of dams is however seen as an issue.

Coastal zone adaptation measures
Investment in coastal zone adaptation is likely to be uneconomic because the costs are likely to far exceed any benefits. A better strategy would be to protect key investments and natural resources— ports, harbours, beaches, and coastal mangroves— and to zone significant new infrastructure away from vulnerable areas to the greatest extent possible. Emphasis must be placed on soft options such as enhancing capacity in early warning systems and the use of GIS and satellite imagery for coastal zone management.[15]

1.3.7 Dutch cooperation and priorities

The Multi Annual Strategic Plan 2014 – 2017 was formulated on the basis of Ghana's ambition to become Aid free by 2020. The embassy will increase cooperation with the EU partners and the period 2013 – 2016 will be used to prepare a joint program EU Joint Strategy (EUJS). The next Multi Annual Strategic Plan will be part of an EU joint program. The MASP 2014 – 2017 covers a wide array of activities: from a business promotion objective with a development perspective, to a development perspective with an emphasis on private sector involvement. The embassy will invest in the creation and maintenance of relevant networks to link partners in Ghana and The Netherlands and will increase the number of platforms to match companies, NGO's, research and government institutions.

Opportunities in water, sanitation and waste management
Opportunities in the WASH sector have been identified by the Accra Embassy.[16] Urban water and sanitation are ideally suited to introduce and reinforce private sector involvement. Most citizens are ready to pay for high quality services and the local and international business community is eager to enter into these new markets. Water shortages are a serious threat for economic growth as companies rely on continuous water supply. Access to sanitation remains a major health issue. In 2011 the governments of The Netherlands and Ghana embarked on the development of the Ghana-Netherlands WASH Program (GNWP), which consist amongst others of the Ghana WASH Window (GWW): an instrument to stimulate public-private partnerships (PPP). This provides opportunities for the Dutch WASH Sector to further establish itself in Ghana. Dutch private companies and institutions have the expertise and experience to come up with innovative solutions, such as "waste to nutrients & energy" initiatives. The activities of the GNWP focus on main urban settlements and includes restoration of degraded watersheds and polluted wetlands, preventing deforestation and promoting afforestation in watersheds, linking water management topics with climate change by

[13] http://wrc-gh.org/en/water-resources-mgt/river-systems

[14] Aquastat

[15] World Bank, Economics of Adaptation to Climate Change

[16] See website: http://www.rvo.nl/actueel/nieuws/kansen-de-sector-water-en-sanitatie-ghana

reducing emissions and river basin management and investments in irrigation to raise agricultural productivity.

Opportunities in modernization of agriculture and food security
Ghana's rapid economic development and growing middle class provide opportunities for the Dutch private agricultural sector. There are opportunities across the entire agricultural sector ranging from agricultural inputs, agro logistics and post-harvest management to food processing. Horticulture is a good example of a sector in which the Netherlands can be involved in the entire value chain. There are mutual interests with regard to the availability of agricultural products and agro resources. The Netherlands, for example, has strong stakes in cocoa and palm oil. In the light of increasing consumption in Asia, Africa could serve as an additional source of palm oil.

Regional function of Dutch Embassy in Accra
The Dutch embassy in Accra has as regional function. It covers the coastal countries in West Africa from Sierra Leone, via Liberia, Ivory Coast and Ghana to Togo. The embassy functions as a regional hub for migration, trade and consular affairs. Accra is a regional hub for many Dutch companies and is well positioned to increase its regional functions specifically in the area of trade promotion.

2. Chances and opportunities

In this chapter presents the results of the web survey among Dutch water sector players, completed by the main observations derived from previous (existing) market studies and interviews with water professionals and strategic actors within the Dutch water sector (please refer to Appendix 1 providing an overview of the method of research). The first section describes the current situation. The second section describes the most important trends, linking the current situation with future opportunities, which is the topic of the third section. This chapter ends by identifying promising product market combinations (PMCs).

2.1 Current situation

2.1.1 Progress on MDGs

MDG 7c:

- On track: no
- Drinking Water: 87%
- Sanitation: 14.4%

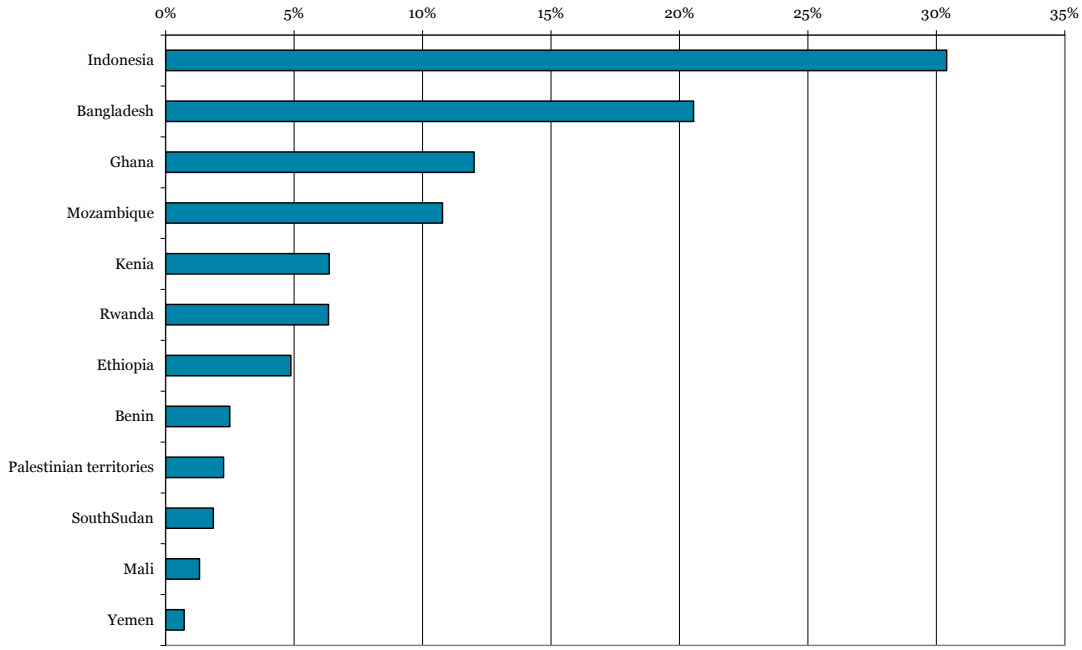
Ghana has surpassed the MDG target for access to drinking water with coverage increased from 53% in 1990 to 86% in 2011. However, these statistics hide major issues such as reliability of water services, poor maintenance of facilities/ systems and poor water quality. Progress in the area of sanitation is much less impressive with coverage increasing from 7% in 1990 to 14.4% in 2012.

2.1.2 Dutch sector involvement

The share of total Dutch exports in the water sector to the 12 OS-countries is estimated at 25% of the total Dutch exports in this sector, equaling about € 60 million[17]. Figure 1 shows the breakdown of these exports over the various OS-countries. The share of Ghana is 11% of this total.

[17] This estimation is based on the sample results of the web survey. Starting from this value relative export shares of the various regions and countries have been determined for the sample. Since the sample may not represent the whole water sector in an optimal way, the research cannot draw any hard or general conclusions. The actual value of export will be higher, but this value can only be obtained with sample results once the whole population is known. Getting to know the population is complex and cannot be realized in the context of this study. Another complicating factor lies in the fact that large projects (especially those in water construction) may influence export figures drastically and lead to large fluctuations over time. For the sample of the web survey no such 'disturbing' projects have been found. The method used in this survey is in line with the method used for WEX 2014, which are also based on sample results.

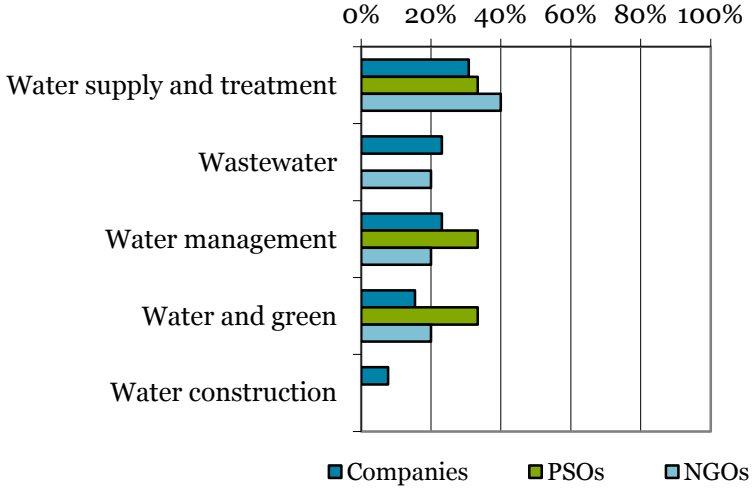
Figure 1 Breakdown of Dutch exports in the water sector to the 12 OS-countries, in % of turnover (N = 60)



Source: Web survey Panteia, 2014/2015

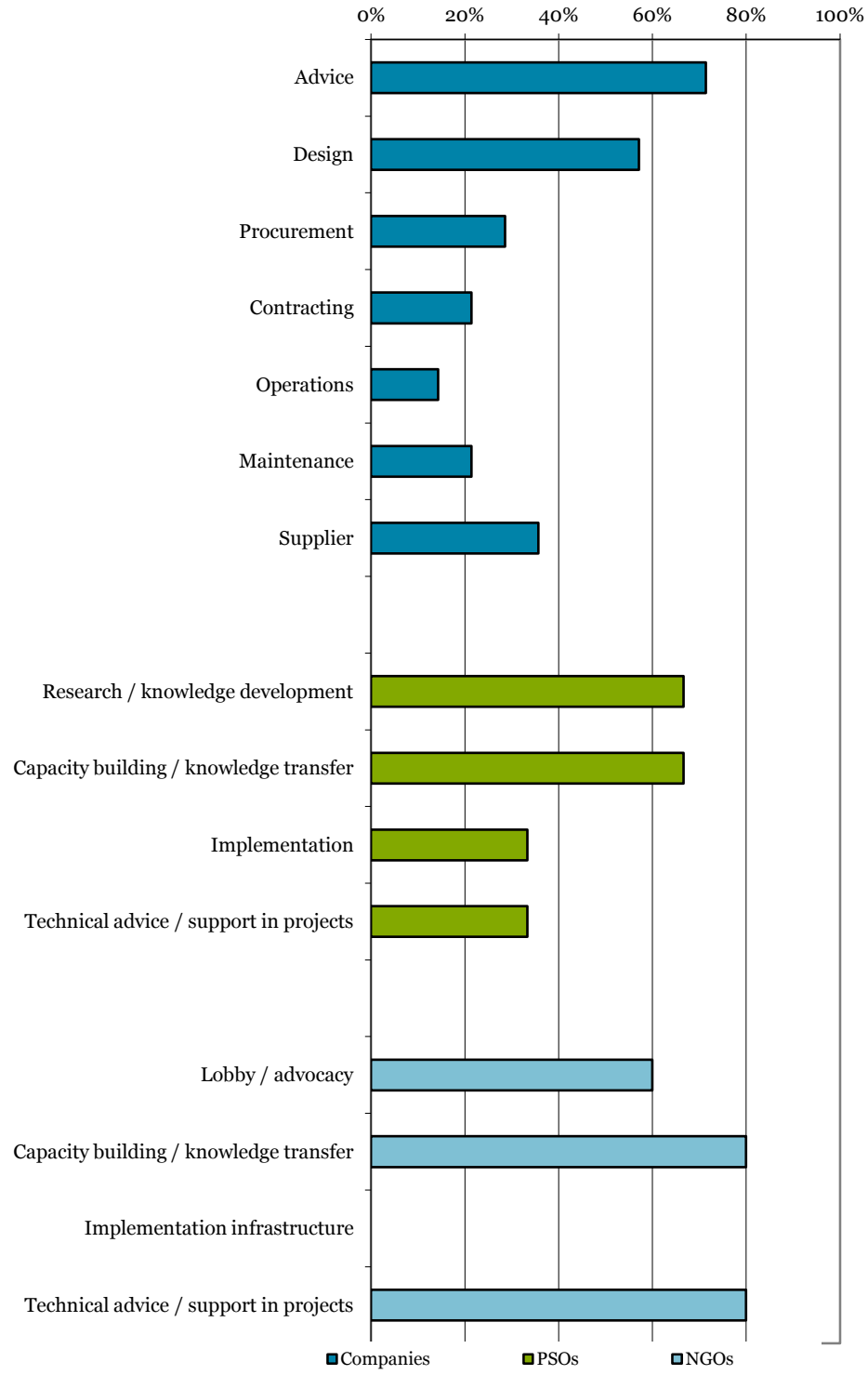
Current activities and activity areas in various subsectors in Ghana, resulting from the web-survey, are given in figure 2 and 3.

Figure 2 Current activities of Dutch companies (N=13), PSOs (N=3) and NGOs (N=5) in the various subsectors of Ghana, in % of total observations



Source: Web survey Panteia, 2014/2015

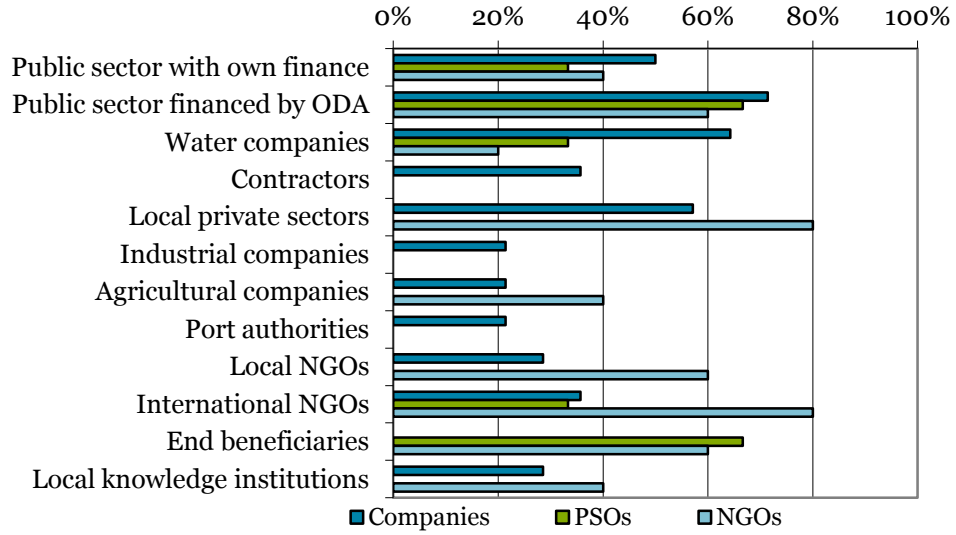
Figure 3 Current activity areas of Dutch companies (N=14), PSOs (N=3) and NGOs (N=5) in Ghana, in % of respondents (more answers possible)



Source: Web survey Panteia, 2014/2015

Client groups of Dutch parties in Ghana

Figure 4 Current client groups of Dutch companies (N=14), PSOs (n=3) and NGOs (N=5) in Ghana, in % of respondents (multiple answers possible) (N=22)



Source: Web survey Panteia, 2014/2015

2.1.3 Dutch support programs

Below estimates for Netherlands Bilateral Cooperation with Ghana in period 2013-2016 are given (in EUR millions) as included in the MASP of the Dutch Embassy.

Programs	Commitment 2013 - 2016	Planned disbursements 2013	2014	2015	2016
	In EUR million				
Water, Sanitation and Hygiene program	53,00	3,00	10,00	20,00	20,00
Food and agriculture program	21,50	6,40	6,80	5,30	3,00
Sexual and Reproductive Health and Rights (SRHR)	20,70	6,30	5,70	5,70	3,00
Private sector support	5,40	0,40	2,00	1,50	1,50
Total	**100,60**	**16,10**	**24,50**	**32,50**	**27,50**

Below the project spending through the EKN of 2013 as given in the "resultaat fiche" are given.

Name project	Name organisation	Type	2013
GNWP TA Masterplanning	Witteveen & Bos	Research institute / company	495,000
Ghana WASH Window FDW	RVO	Government	1,234,156
TA to engage municipal assemblies	Maple Consult	Research institute / company	30,640
Ex ante evaluation	Ecorys	Research institute / company	452,477
Quick impact activities	Ministry of Local Government	Government	796,991

ACC West-Africa Port Development	Netherlands Africa Business Council	NGO	233,455

Source: EKN resultaat fiche, Accra Water and Accra Food Security

Below an overview is given of the current programs funded through DDE and the specific funding programs.

Program	Nr of projects	Total budget	Period of execution	Most relevant sectors
PSI	4	€ 2.614.625	01-01-2010 / 31-08-2016	Agri & Food/ Energy
FDOV	2	€ 3.120.000	15-05-2013 / 30-04-2019	Agri & Food
FDW	2	€ 9.193.268	01-04-2013 / 31-12-2017	Water
PSD Apps	3	€ 780.768	01-08-2013 / 31-07-2016	Water/Education/Agri&Food
ORIO	8	€ 41.555.124	22-02-2012 / 01-03-2021	Water/Social Services
DHK	1	€ 120.330	01-11-2013 / 01-11-2014	Chemie/ Agro & Food
PUM	70	€ 350.000	01-01-2014 / 31-12-2014	Agro
NWO		€ 300.000		
CBI	8	€ 993.693	01-01-2008 / 01-11-2017	Agro & Food/Marketing Intel.
FNV	20	€ 669.720	01-01-2013 / 31-12-2016	Cross sectoral
BoPInc	1	€ 4.666.666	01-01-2011 / 31-03-2017	Food
CNV	1	€ 138.673	01-01-2013 / 31-12-2014	Textile, agro
Total	**123**	**€64.502.867**		

Source: DDE projects

2.2 Trends

2.2.1 Pressing needs

A pressing need can be seen as a local need or demand related to water in the specific country. Below the most pressing needs resulting from desk-research and consultations with experts are summarized, which are described in more detail in paragraph 1.3.6. This list not exhaustive and there is no priority given in the sequence of these pressing needs.

- Climate resilient measures to ensure sustainable access to water resources for food security
- Improvement of WASH service delivery, and in specific sanitation and waste (water) management
- Improving institutional capacity on local water governance
- Improvement of data for better water management
- Siltation of dams
- Coastal zone adaptation measures, including port development and water related activities in off-shore oil and gas investments, for instance, oil spill contingency plans.

2.2.2 Government plans and agenda

Ghana is a transition country, but the Government of Ghana will continue to invest public funds in drinking water, sanitation, health services and agriculture, although it will retreat from investments in large investments which are commercially viable. Sanitation and water are still seen as high priority. Although steps are taken to transform Ghana's food and agricultural sector, challenges remain which both offer opportunities as risks for Dutch organizations. Below the governmental agenda on investments, water, sanitation and agriculture is given:

- The Ghanaian government has put a 'de facto' moratorium on public borrowing. The public debt is kept below the 50% GDP target to avoid crowding out private investment. The Ghanaian government will concentrate its funds on public tasks and has decided to focus on activities that cannot be funded through the private sector. The government explicitly mentions its retreat from investments in large infrastructure in energy or maritime logistics, as they are commercially viable. The government will invest public funds in for example drinking water, sanitation, health services and agriculture (mainly cocoa and palm oil).
- The Ghana Shared Growth and Development Agenda (GSGDA) and all previous medium term development plans considered sanitation and water as priority developmental issues that feature as key focus for poverty reduction and improvement in the living conditions of all Ghanaians.
- Ghana has acknowledged the need for transformation and is currently implementing its Food and Agriculture Sector Development Policy and its Medium Term Agricultural Sector Investment Plan. Although Ghana has made some headway, important challenges remain. Transformation of the Ghanaian agricultural sector into a modern agricultural sector with a professional and decisive private sector offers opportunities for Dutch business.

2.2.3 Agenda of donors and funders

The transition of Ghana to low-middle income country is also reflected in the agenda of main donors in the country. Focus is on economic growth through for example increasing private sector participation and blending of grants and loans. Below the focus of the agenda's of the Dutch embassy, EU, World Bank and African Development Bank are given.

- Ghana is a transition country and the Dutch embassy actively promotes further involvement of the Dutch water sector, through collaboration in PPP partnerships and direct partnerships with private sector companies in water, sanitation, waste management and the agricultural sector. There is a changing role of the public sector and increasing role of the private sector.

Ghana has expressed interest in the Netherlands investing in its water and sanitation sectors, including support to IWRM and irrigation. (Source: resultaat fiche Accra Water, 2013)

- The Dutch embassy will continue to work on the Netherlands' trade and investment position and focuses on the combination of trade and development cooperation in the "top sectors": Water and Sanitation, Health, Agriculture, Energy, Logistics and Creative Design. The promotion of investments by Dutch companies through PPP facilities, market surveys and general business support will further increase FDI from The Netherlands thus providing access to technology, knowledge and markets.
- EU partners also propose to experiment with project funding through using a mix (blending) of grant money and loans. In particular when it comes to funding productive infrastructure or private sector development, it can be beneficial to use grant money to facilitate and leverage loan agreements from other sources, including from investment or development banks (e.g. EIB, AFD, KFW). This Multi-annual Indicative Program and the choice of sectors to be supported through EU's development assistance will also to a large extent be influenced by EU's renewed development policy as laid down in its so-called "Agenda for Change". In the run-up to the preparation of the MIP 2017-2020, EU partners will try to increasingly harmonize their aid delivery mechanisms and consider options for joint funding or delegated cooperation. (Source: TRANSITION TOWARDS EU JOINT PROGRAMMING, Multi-Annual Indicative Programme 2013-2016, GHANA, Draft, version February 2014)
- The objective of the Ghana Country Partnership Strategy FY13-FY16 of the World Bank is to assist government to sustain economic growth, accelerate poverty reduction and enhance shared prosperity in a sustainable manner. The CPS seeks to support Ghana to consolidate its transition to lower middle income status, address sources of inequality, and help pave the way to access to International Bank for Reconstruction and Development (IBRD). The CPS program is based on three pillars; improving economic institutions, improving competitiveness and job creation, and protecting the poor and vulnerable. Ghana is an important stakeholder in the regional projects.
- Towards helping Ghana exploit its strengths and mitigate the impact of its challenges, the African Development Bank Group strategy has emphasized selectivity, Bank track record in the country, demonstrated positive impact on green growth, economic diversification and job creation. The Bank's strategy will, therefore, be based on two strategic pillars namely: (i) improving productivity in Ghanaian enterprises and in particular in the micro, small and medium-sized agribusinesses, and (ii) supporting economic and structural reforms aimed at improving the business environment. As Ghana's economy and the Bank Group's strategy foresee the development of sectors that are sensitive to climate change and vulnerable to unsustainable exploitation, Bank Group support for Ghana's green growth objectives will also be more specific. Towards this end, the Bank will support the country's efforts towards accessing resources from the Strategic Climate Fund, and other available instruments aimed at initiating transformational change towards low-carbon and climate-resilient development.

2.2.4 Macro developments in agriculture, industry, etc

With the start of oil extraction from the Jubilee field in December 2010 and the Government's decision, around the same time, to rebase its National Accounts and consequently increase its measure of GDP with about 60%, Ghana entered into a new phase of development. From that moment on Ghana has been considered by the international community as oil producing (lower) middle income country. This undoubtedly was to have repercussions on its relationship with its DPs. The rapidly growing influence and financial commitments from "non-OECD development partners", in particular the BRICS, also contributed to the fact that in a number of donor capitals - many of which were struggling with a deep financial crisis - questions were raised about the appropriate volumes and modalities of the provision of Official Development Assistance (ODA) -hitherto

overwhelmingly delivered in the form of grants or very concessional loans- to Ghana on the medium to longer term.
On the macroeconomic assumptions for the coming years, the IMF projects that activity in the non-oil sector will be weakening due to energy disruptions and high domestic interest rates. Increased oil production should keep overall economic growth close to 8%. Inflationary pressure will increase. The IMF projects a weaker outlook for cocoa and gold exports and a subsequent current account deficit at around or slightly above 12% of GDP. The path of medium-term fiscal consolidation is slow as the Government of Ghana plans a 6% of GDP fiscal deficit in 2015. Another issue is that the Government of Ghana is not in the position to borrow any more.

2.3 Opportunities relevant to Dutch Water Sector

2.3.1 Past and current opportunities

In the table below, examples of projects with Dutch involvement are presented including financial characteristics, resulting from the web survey. In appendix IV a more extensive list of projects per type of organization is given.

Projects mentioned by companies and institutions	Dutch finance or mix?	Financial sources
Assistance MJSP	Full Dutch finance	EKN
Brong Ahafo Water and Sanitation Project	No Dutch finance	AFD
GNWP	Mix of Dutch and foreign finance	GNWP
Special Treat Project	Full Dutch finance	RVO
Triple S	No Dutch finance	BMGF
TA programma	Full Dutch finance	EKN
Water Resources Commission	No Dutch finance	DANIDA
SMARTERWASH	Full Dutch finance	FDW
Hilton foundation	No Dutch finance	Hilton Foundation
Projects mentioned by NGOs	**Dutch finance or mix?**	**Financial sources**
Dutch WASH Alliance	Full Dutch finance	DGIS – MFS2
Smarter WASH	Mix of Dutch and foreign finance	PPP/DGISP-WB-CWSA
SMARTerWASH	Mix of Dutch and foreign finance	FDW, World Bank, Ghana private
Niche NUFFIC	Full Dutch finance	NUFFIC
WCAR	Mix of Dutch and foreign finance	UNICEF-WB
Ghana IRC WASH program	Mix of Dutch and foreign finance	DGIS, Hilton Foundation

Source: Web survey Panteia, 2014/2015

2.3.2 Future opportunities

Main opportunities in governmental and larger donor organizations / IFIs are as follows:

Government of Ghana:
Volta River Authority:

- Volta Delta project

Ministry of Water Resources, Housing and Works:

- • ACCRA-TEMA METROPOLITAN AREAR WATER SUPPLY PROJECT (Euros 56.5 Million)
- The project involves installation of equipment for the production of 9 million gallons per day, the construction of four reservoirs at Adukrom, Dodowa, Atimpoku and Akorley as well as 92km transmission pipelines.
- • TESHIE-NUNGUA DESALINATION WATER PROJECT
- The Teshie-Nungua Desalination Water Project is a 13million gallons per day treatment plant to serve 500,000 people in the project area. It is being implemented through a Build, Operate, Own and Transfer (BOOT) mechanism. The project involves the desalination of sea water and aims at improving water delivery to the following areas; Teshie, Nungua, the Teshie Military barracks, Batsoona, Sakumono and parts of La-Dadekotopon. The project is 25% complete.
- • KWAHU RIDGE WATER SUPPLY PROJECT
- Work has begun on this project to rehabilitate the existing facility and expand the capacity of the water supply system from 1 million gallons per day to 3.5 million gallons per day to serve an estimated population of 330,000.
- • KUMASI WATER SUPPLY PROJECT-ADDITIONAL WORKS (24 Million Euros)
- This project involved the expansion of the Barekese Dam from producing 24 million gallons per day of water to 30 million gallons per day.
- • AKIM ODA-AKWATIA-WINNEBA WATER SUPPLY PROJECT (USD$ 165 million)
- The project involves the rehabilitation and expansion of water supply systems serving these three towns and their surrounding communities. New water treatment plants will be constructed to produce 2.2 million and 2 million gallons of water a day respectively. The existing Winneba water treatment plant will also be rehabilitated to restore it to its original capacity of 3 million gallons a day. The project is expected to be completed in June 2016.
- Pwalugu Multipurpose Dam

World Bank:

- • Sustainable Land and Water Management. Project period: June 2014 – February 2018. Total budget: 13,25 million USD. The objective of the Sustainable Land and Water Management (SLWM) Additional Financing Project for Ghana is to expand the area under sustainable land and water management practices in selected watersheds. The additional financing will ensure the adoption of the sustainable land and water management practices aimed at reducing land degradation and enhancing maintenance of biodiversity in the Kulpawn-Sissili and Red Volta watersheds.
- • Risk Management Country Plan. Project period: August 2014 – February 2016. Total budget: 0,8 million USD.
- • OBA Urban Sanitation Facility for the Greater Accra Metropolitan Area (GAMA). Project period: May 2014 – unknown. 8,76 million USD
- • Result Based Financing for Sanitation and Hygiene. Project period: December 2013 – August 2017. Total budget: 3 million USD
- • GH-GAMA Sanitation and Water Project. Project period: June 2013 – November 2018. Total budget: 150 million USD. The development objective of the Greater Accra Metropolitan Area (GAMA) Sanitation and Water Project for Ghana is to increase access to improved sanitation and improved water supply in the GAMA, with emphasis on low income communities and to strengthen management of environmental sanitation in the GAMA.

- • Natural Resources and Environmental Governance Technical Assistance. Project period: June 2013 – December 2016. 5 million USD
- • Additional Financing for Ghana Urban Water Project. Project period: March 2012 – December 2015. Total budget: 50 USD. The objectives of the Additional Financing (AF) for the Urban Water Project are to: (i) significantly increase access to the piped water system in Ghana's urban centers, with an emphasis on improving access, affordability and service reliability to the urban poor; and (ii) restoring long term financial stability, viability and sustainability of the Ghana Water Company Limited (GWCL).
- • Sustainable Rural Water & Sanitation Service. Project period: June 2010 – June 2016. Total budget: 77,34 million USD. The objective of the Sustainable Rural Water and Sanitation Project is to expand access to, and ensure sustainable water supply and sanitation services in rural and small town communities in six regions of Ghana.
- • Ghana Commercial Agriculture. Project period: March 2012 – September 2017. Total budget: 100 million USD. The objective of the Commercial Agriculture Project for Ghana is: increased access to land, private sector finance, input and output markets by smallholder farms from private public partnerships in commercial agriculture in Accra Plains and Savannah Accelerated Development Authority (SADA) zone. The program has four components of which one is focusing on irrigation: Securing Public-Private Partnerships (PPPs) and small-holder linkages in the Accra Plains. This component will conclude one or two transactions for PPPs in an irrigation investment in the Accra Plains.
- Greater Accra Metropolitan Area Project.

EU projects:

- • An integrated approach to guinea worm eradication through water supply, sanitation and hygiene in northern region. Sector: Basic drinking water supply and basic sanitation. EU Contribution: € 15,000,000.00 (100% of total).
- • Development of National and River Basin Integrated Water Resources Management (IWRM) Plans. Sector: Water resources policy and administrative management. EU Contribution: € 1,330,500.00 (100% of total).
- • Small towns and water and sanitation project in Central and Western Regions. Sector: Unspecified. EU Contribution: € 23,000,000.00 (100% of total).

Others (UNDP, African Development Bank):

- • United Nations Development Program (UNDP) supports a number of initiatives set forth in the Ghana Plan of Action for Disaster Risk Reduction and Climate Change Adaptation 2010–2015.
- African Development bank: Urban Sanitation Improvement Project.

Below an overview is given of the total expenditure allocation per Ministry for the period 2015 – 2017 in Euros.

Ministry department	2015	2016	2017
Ministry of Food and Agriculture	411,821,430	461,045,951	481,579,785
Ministry of Fisheries and Aquaculture Development	72,514,577	84,514,150	94,561,951
Ministry of Land and Natural Resources	276,234,724	301,592,909	325,611,598
Ministry of Water Resources, Works and Housing	463,103,420	578,788,922	640,611,318

Source: Summary of MDA Expenditure Allocation, http://www.mofep.gov.gh/sites/default/files/budget/Budget-Appendix-Tables-2015.pdf

Below an overview is given of the division of budget allocation of the Dutch Embassy between "Water and Sanitation" and "Food and Agriculture" over the years 2013 – 2016.

Theme	Objectives	Budget 2013 – 2016
Food and Agriculture	Sustainable growth in agriculture (Cocoa, palm oil and seed production): • Improved access to markets; • Increased agricultural productivity; • Sustainable food production.	22 million euro
Water and Sanitation	Improved sanitary conditions in five municipalities: • Access to safe drinking water and sanitation for five municipal assemblies. • Secured water supply for several major towns.	58 million

Source: MASP

The total volume of EU development assistance for the period 2013-2016, in terms of planned disbursements, is estimated at around EUR 1,400 million. Below the planned minimum disbursements per sector for the EU and each EU Member State for the period 2013-2016 are given.

Sector	Netherlands	UK	Denmark	Germany	France	Spain**	Italy	Total (EUR)
Water and Sanitation	53				20-27.00	5.0		83-90.0
Agriculture	21.5			9.40	40-60.0	13.0	2.15	106.05-126.05
Health	20.7	115.20	42.10					164.80
Private Sector Development	5.4	47.00	35.10	24.50	1.2-2.0		10.55	163.15-163.95
Energy				41.67	120-160.0	0.12		157.14-197.14
Environment and Natural Resources							0.56	7.56
Transport					38-55.00			86.90-103.90
Total per development partner	**100.6**	**406.60**	**197.00**	**154.27**	**307.8-416.3**	**25.49**	**13.26**	**Minimum 1,400**

**EU: The amounts in italics indicate focal and non-focal sectors of the 10th EDF that are to be phased out/replaced by other sectors under the 11th EDF.*

***For Spain, it has not been possible to indicate the annual planned disbursements. Over the period from 2013-2016, Spain's total commitments are expected to amount to EUR 25 million.*

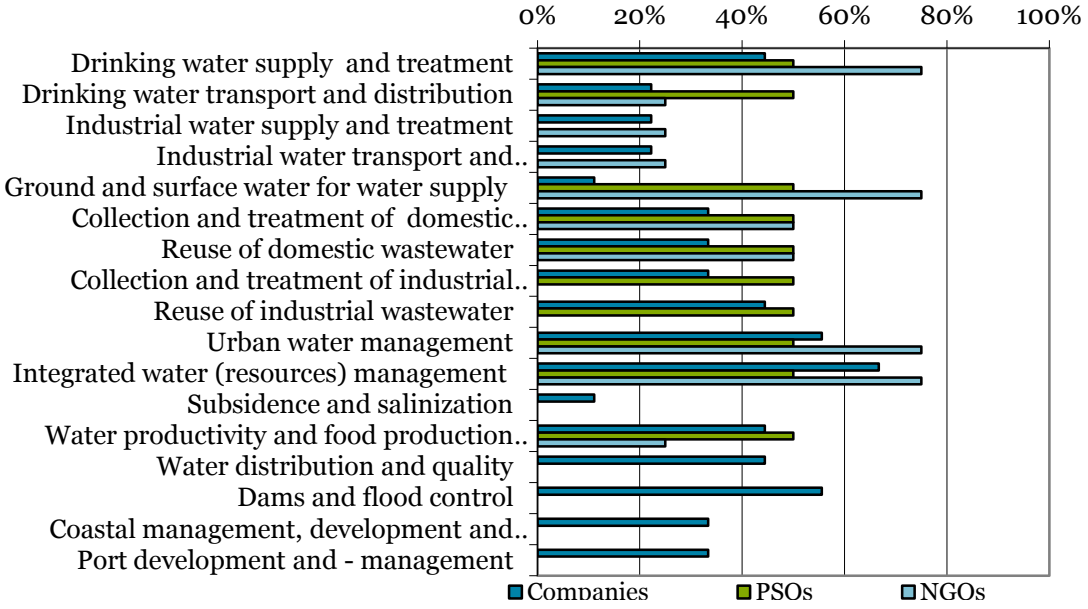
Source: TRANSITION TOWARDS EU JOINT PROGRAMMING, Multi-Annual Indicative Programme 2013-2016, GHANA, Draft, version February 2014

Opportunities, resulting from the web survey:
- Irrigation projects in horticulture sector;
- Port development in Tema and Takoradi;

- Climate change mitigation project in Northern Region of Ghana, with extensive improvement of water supply, drainage control, and health & hygiene components (funded by CIDA);
- Water treatment systems and sewerage systems;
- Inland dredging.

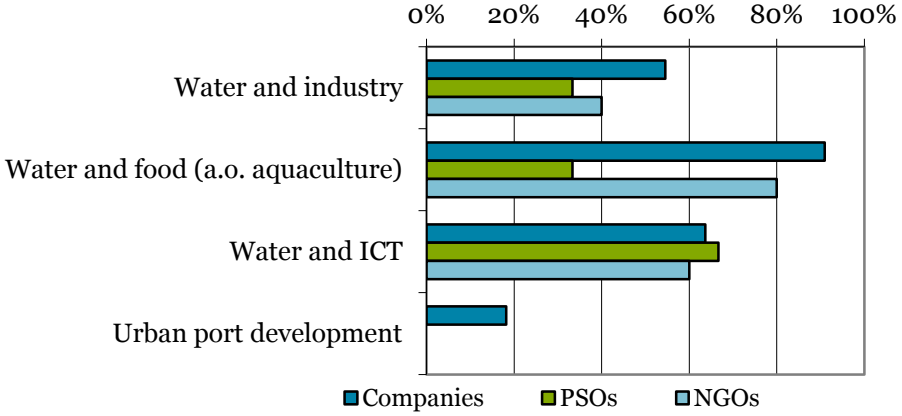
In general, resulting from the web survey as given in figure 5, Dutch organizations are mostly interested in integrated water resources management in Ghana, closely followed by drinking water supply and treatment, urban water management and water productivity and food production. There is a difference between NGOs and companies (including Water Boards and knowledge institutes): NGOs are mainly interested in drinking water supply and treatment followed by ground and surface water for water supply. This can also result from the reducing budgets for WASH, but the remaining large need especially in northern Ghana. In the cross-overs (figure 6) we see that the main interest lies in Water & Food for all Dutch sector organizations.

Figure 5 Promising areas in Ghana according to companies (N=9), PSOs (N=2) and NGOs (N=4) active in Ghana, in % of respondents (multiple answers possible)



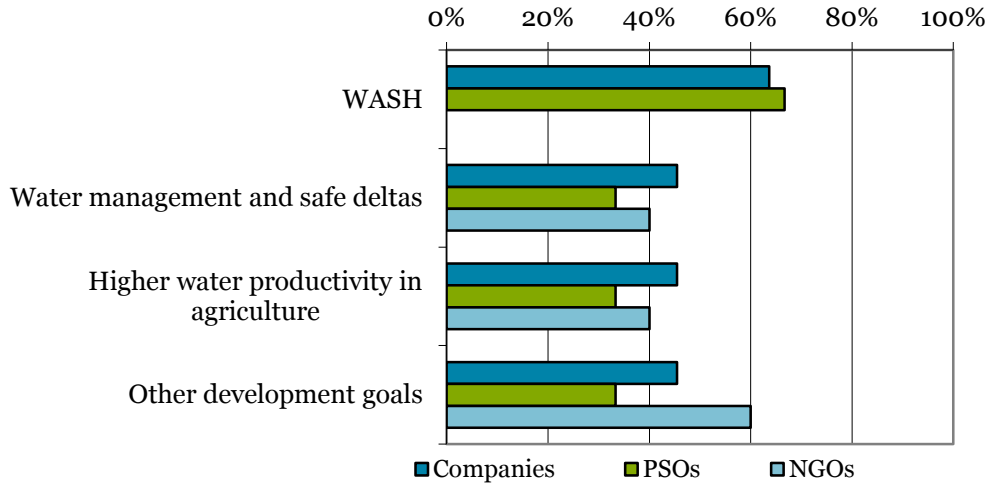
Source: Web survey Panteia, 2014/2015

Figure 6 Promising cross-overs in Ghana according to companies (N=11), PSOs (N=3) and NGOs (N=5) <u>active</u> in this country, in % respondents (multiple answers possible)



Source: Web survey Panteia, 2014/2015

Figure 7 Development opportunities in Ghana according to companies (N=11), PSOs (N=3) and NGOs (N=5) <u>active</u> in this country, in % respondents (N=19)



Source: Web survey Panteia, 2014/2015

2.4 Potential Product-Market Combinations

Below a list of potential Product Market Combinations for the Dutch water sector in Ghana are given. These are directly linked to the pressing needs as defined in paragraph 1.3.6. and the opportunities resulting from chapter 2.

Demand
Climate resilient planning to ensure sustainable access to water resources and food security. Transformation of the Ghanaian agricultural sector into a modern agricultural sector with a professional and decisive private sector offers opportunities for Dutch business. Opportunities to link the water sector interventions with food security exist, as demonstrated by the recent start of a river basin development plan for agriculture funded by the Sustainable Water Fund.
Product
• Sub-sectors / themes: Integrated Water Resources Management, Irrigation, Water&Food • Services / Products: Consultancy/ engineering services for large infrastructure projects or complex planning exercises focusing on IWRM linked to agriculture. Mapping and modeling to provide input for decision making. Technical Advice and technologies on climate-smart irrigation methods. Technical Advise on modernization of the agricultural sector integrating water resources management into agricultural practices.
Market
Government staff, (I)NGOs, private sector players (including farmers)

Demand
Improvement of WASH service delivery, and in specific sanitation and (waste) water management (including faecal sludge and solid waste) Specific issues related to access to WASH are: low quality and sustainability of services, low capacity of service providers, insufficient and unskilled practitioners, large investments needed for sewerage treatment (only found in Accra) and there is a high inequality in coverage between urban, peri-urban, low-income urban and rural areas.

Product

- Sub-sectors / themes: WASH, waste water treatment, rural water supply, urban water management, faecal sludge management, solid waste (treatment and recycling).
- Services / Products: Capacity building of government and NGOs on sustainable WASH service delivery, Technical Advise on urban water management and sewerage systems

Market

Government staff, NGOs, private sector (waste companies)

Demand

Improving institutional capacity on local water governance

Institutions charged with the mandate of managing Ghana's water resources are under-resourced and lack the capacity to effectively carry out their mandate. Weak institutional capacity of the Water Resources Commission constrains its ability to ensure effective management of local water resources. (source: VIA Water) Next to this due to the monopoly of Ghana Water Company Ltd, many developments are blocked due to centralised decision making.

Product

- Sub-sectors / themes: IWRM, water governance
- Services / Products: Capacity building on IWRM and water governance, Technical Advise on IWRM plans

Market

Government staff, NGOs

Demand

Improvement of water management / governance at national and regional level

Water governance and water management is contingent on effective information flow and acquisition of knowledge. In the regional context, Ghana is downstream in the Volta Basin, shared by six countries. Ghana seeks to strengthen its role in the Volta Basin Authority. Support to this Authority will be an option to enhance regional cooperation on water-related issues. Recommended hard options for the water subsector include increased water transfer from the Volta basin to meet the needs of a growing urban population; construction of efficient infrastructure; and blocking of dry-stream channels to harvest rainwater to recharge the groundwater system. A number of soft options were also deemed to be of high priority: afforestation, improved land use practices, protection of river courses, and de-sedimentation of reservoirs. There is a disconnection between information flow, knowledge acquisition and decision making. Requiring appropriate hydrological data is another concern for the current and future development of urban drainage in a number of Ghana's major cities, for which flood and storm runoff data is needed for proper planning and design.

Product

- Sub-sectors / themes: water management, IWRM
- Services / Products: Technical Advise on national and regional (cross-boundary) water management and governance, developing a database of national geo data for planning and monitoring, including hydrological modeling, data collection technologies, innovative financial strategies

Market

Governmental staff, water authorities, meteorological service companies, equipment providers, knowledge institutes

Demand

Flood management and dredging of main rivers and dams

Flooding due to erratic rainfall mainly affects Northern Ghana. The frequency and severity of floods has increased considerably. This is often related to spillage of the Bagri Dam in Southern Burkina

Faso. The combined effect of heavy rainfall and spillage of the Bagri dam, has led to loss of lives, displacement of vulnerable persons and the destruction of key infrastructure, food stocks and livestock throughout the region. Next to this, siltation is a cause for concern in most dams, reservoirs and rivers.

Product

- Sub-sectors / themes: Flood management, river management
- Services / Products: Technical Advise on flood management measures, hydrological modeling, early warning systems, dredging and sand mining

Market

Government staff, private sector companies

Demand

Coastal zone protection measures

The increasing pressure, conflict over land, water and resource utilization constraints exacerbate social and sanitation problems and climate change impact leading to depletion of resources and coastal erosion. Since the 1960s, Keta and Keta-Kedzi have lost more than a quarter of the total land mass due to sea erosion. Annual rate of coastal erosion in the Keta area is estimated at 3 metres (EPA, 2007), and in recent times, Ada Foah and surrounding areas are experiencing coastal erosion (Ghana MDG Report 2010). Investment in coastal zone adaptation is likely to be uneconomic because the costs are likely to far exceed any benefits. A better strategy would be to protect key investments and natural resources— ports, harbours, beaches, and coastal mangroves— and to zone significant new infrastructure away from vulnerable areas to the greatest extent possible. Emphasis must be placed on soft options such as enhancing capacity in early warning systems and the use of GIS and satellite imagery for coastal zone management.

Product

- Sub-sectors / themes: coastal zone development
- Services / Products: Technical Advise on coastal zone protection and restoration of degraded watersheds and polluted wetlands (including Ramsar sites), Technical Advise on preventing deforestation and promoting afforestation in watersheds; also in relation to off-shore oil and gas development.

Market

Government, (I)NGOs

Demand

Port development

Product

- Sub-sectors / themes: coastal zone / port development
- Services / Products: Technical Advise on Port Management at Tema

Market

To be defined, via information and network of NABC and EKN

3. Market strategies

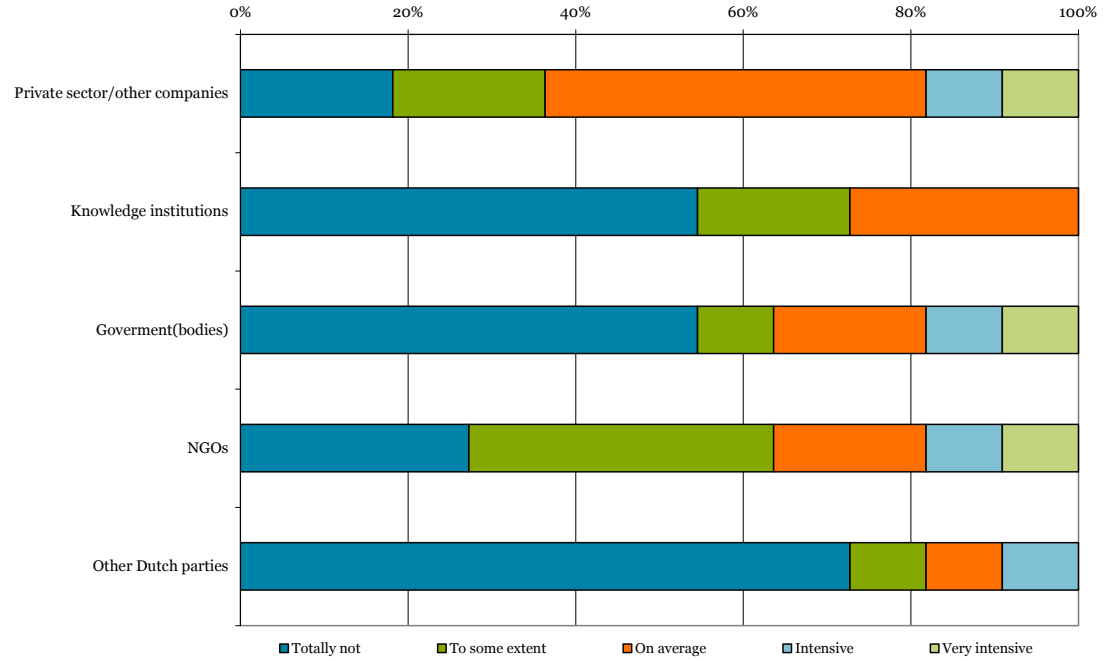
To convert market opportunities into business requires a plan: a market strategy. Strategic interviews and results from the web survey, completed with desk research on existing market studies provided valuable insight in different market (entry) strategies. The chapter starts by describing how Dutch organizations cooperate with parties, projects and programs. The second section describes how activities within the water sector are being financed. How Dutch organizations operate on the market is part of section three. Section 4 describes lessons learnt, while section 5 describes the major bottlenecks and drivers. The chapter ends by suggesting specific positioning strategies per potential product market combination (PMCs).

3.1 Entering or re-entering the country

Current intensity of cooperation of Dutch companies with various parties in projects and programs in Ghana

Figure 8 provides an indication of the status and intensity of the cooperation of Dutch parties with various other parties in Ghana, such as private sector/other companies, knowledge institutions and government(bodies). Cooperation with government(bodies), NGOs and private sector/other companies appears to be the most intense: 18% of the companies state that cooperation with these parties is (very) intense.

Figure 8 Intensity of cooperation of Dutch organizations with various parties in projects and programs in Ghana, in % of respondents (N=11)

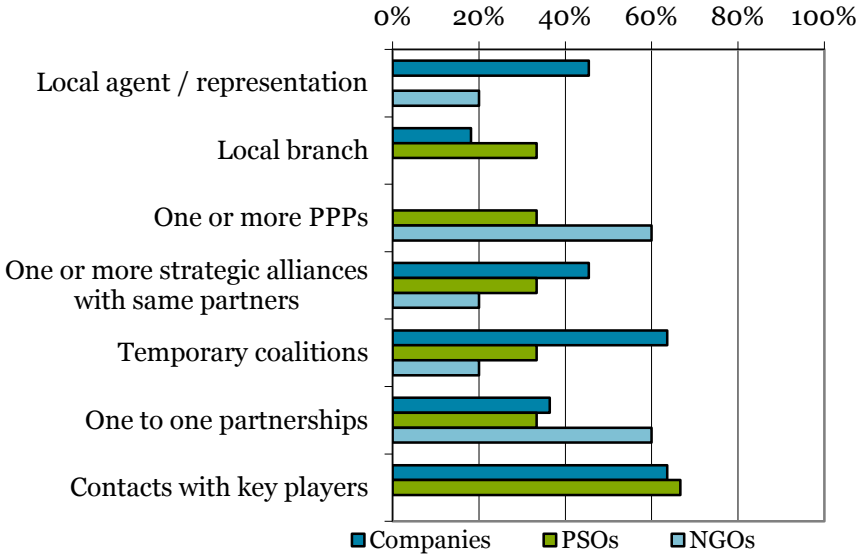


Source: Web survey Panteia, 2014/2015

3.2 Cooperation and business development alternatives

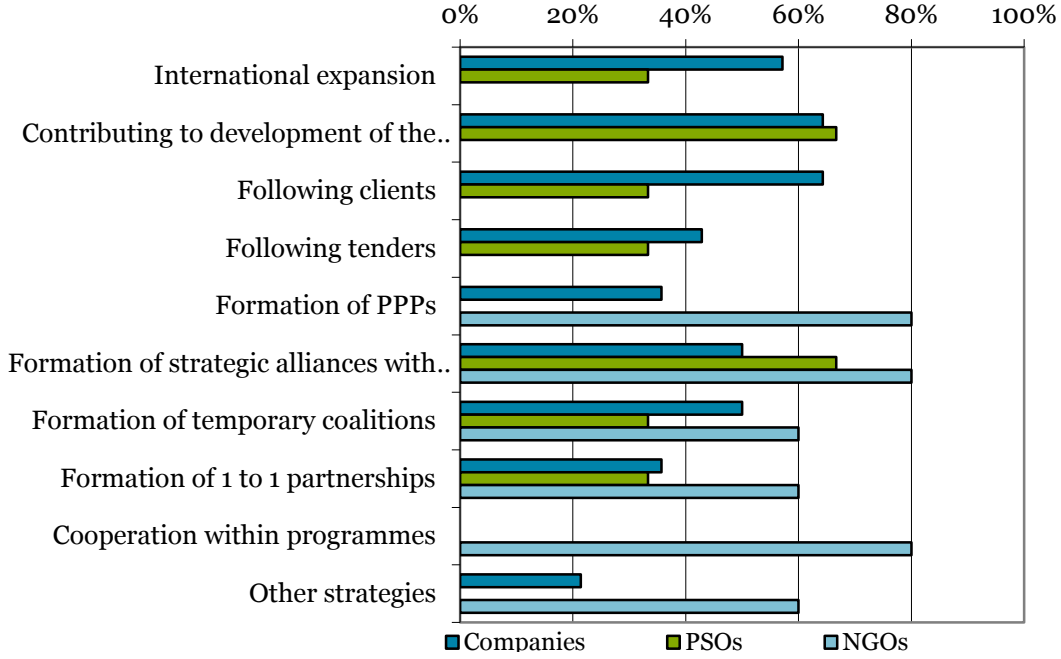
In figure 9 and 10 current strategies and representation of Dutch organizations in Ghana are given, resulting from the web-survey.

Figure 9 ***Current representation characteristics of Dutch companies (N=11), PSOs (N=3), and NGOs (N=5) in Ghana, in % of respondents (multiple answers possible)***



Source: Web survey Panteia, 2014/2015

Figure 10 ***Current strategies Dutch companies (N=14), PSOs (N=3), and NGOs (N=5) in Ghana, in % of respondents (multiple answers possible)***



Source: Web survey Panteia, 2014/2015

3.3 Successes and lessons learned

A lot of investment in local capacity of partners is needed in order to be prepared and identify strong partners for consortium building. During the strategic interviews #24 mentioned that they have a specific partnership policy with criteria to select both local and international partners. Another crucial success factor is the investment in relations with local and national governments in order to be a known player, create awareness and ensure budget for activities. Although a strong PPP partnership under the Ghana Netherlands WASH Platform (GWNP) has been set-up in collaboration with two Dutch private sector companies, the financial contribution from the involved water company as well as the government is not yet secured.

Interviewee #31 (a private sector company) mentions that their activities first started with a pilot in which they worked together with a local representative in order to gain better understanding of the local market and players. The project was started with funding from Partners for Water, which ensured that initial activities could take place. The trajectory to come from a pilot to a larger program was long and could be continued due to a private investor who supported the project. They learned that they should have done a more in-depth market assessment in the pilot phase in order to identify qualified local partners instead of setting-up their own company.

Interviewee #9 has developed a positioning strategy which is focusing on large complicated projects that require high end technology in order to minimize competition. They focus on broadening the range of services in order to realize growth in a stagnating market. They work through local and regional representatives who are responsible for business development and acquisition.

- The Dutch embassy sees that most activities of Dutch companies in Ghana are relatively small, specialized in narrow niches and individualistic, while often a multi-sectoral, integrated and cooperative approach is required. The competition is often better organized in offering a more comprehensive package, addressing several sectors and arranging for finance. Also they sees that competitors often have long-term representation in Ghana or the region (not “deliver and run”): ensuring continuity and maintaining networks is important. Successful business models and investments should extend beyond the water sector.
- An evaluation was done on the business cases financed under the GNWP (Lessons learned from Business cases GNWP, Ecorys). It was seen that investments financed through a loan component need to be clearly identified and better defined, with clear revenue streams associated to them. This is a key justification for engaging in a “Master Planning/preparatory phase”, which will enable defining in more detail the nature of the hardware investment projects that can be financed through the proposed commercial loan. In the unlikely event that such lending does not come through, potential alternatives may need to be examined: lending from development banks (such as the World Bank, the African Development Bank or the European Investment Bank) may need to be arranged. However, there is a risk of delay of the program. Funding may need to be allocated from existing budgets, as the Government of Ghana has announced repeatedly its intention (but no formal commitments) to increase funding to WASH. Dutch grant funding may need to be made conditional upon the Government of Ghana providing matching financing on a year on-year basis. That could reduce overall visibility for the program however. The size and scope of the investments might need to be reduced to fit what is available under the grant.
- Another evaluation was done of the Dutch water program in Ghana (Quick Scan Water program Ghana, Tuinhof). It was recommended that the guiding principle in program design is to focus on restoration of linkages in the water cycle and to integrate water resources management, water supply provision and wastewater management. Environmental sanitation encompasses liquid waste (wastewater etc), solid waste (landfills, e-waste etc).

The linkage with water is the potential threat of (solid waste) dumpsites on the (ground)water quality and this issue should be included in the program design.

3.4 Drivers and bottlenecks

Bottlenecks

- High interest rates.
- PPP, being a "new" approach to program design in Ghana, raises institutional challenges as a broad number of interlocutors need to be involved whereas there is no "support agency" for MAs (like CWSA for rural areas).
- The "urban sector" has recently become more crowded with several development partners planning investments in this area, including the World Bank (through its GAMA project) and US Eximbank, which has recently signed a funding agreement with AMA municipality for a mix of environmental improvements (including drainage cleaning).
- Other donors are currently developing programs in those areas (particularly in AMA) that may introduce a risk of overlap with the GNWP, including the World Bank's GAMA project and the EximBank-funded project directed at AMA for urban drainage clean-up and a range of environmental services.
- Opportunities for commercial (non-ODA) funding in the water sector are rare, mainly because of the dire financial situation of the Ghana government which is a main actor and driver in water sector investments.
- One of the bottlenecks for economic development in Ghana is infrastructure and particular congestion in the port of Tema, which handles most of the trade. Reducing the waiting time will contribute to a better economic climate in Ghana.
- Besides the economic success stories West Africa witnesses terrorism, organized crime, trafficking in persons, drugs and arms, piracy in the Gulf of Guinea and rising fundamentalism. The Western Sahel, in particular, is an increasingly unstable zone, with the threat of spillover into North Africa, as illustrated by the situation in Mali. Ghana is not immune to the effects of regional insecurity. Drug trafficking and illegal migration are on the increase, also in Ghana. However, Ghana serves as a good example how to deal with in security and religious coexistence.
- Ghana is overcrowded with private sector players, donors and NGOs.
- Despite the evident enthusiasm of the private sector for Ghana the business environment is seen as challenging. An unstable tax and local content policy in the region, risks and uncertainties with landownership, cumbersome administrative procedures and the quality of workforce are mentioned as impediments for doing business in Ghana.

Drivers

- The Dutch Embassy is very active in trade promotion and organizes many trade missions, incoming and outgoing, in cooperation with relevant institutions (RVO, NABC, NWP etc…) in the Netherlands. All Dutch trade promotion instruments apply to Ghana and are (pro-) actively used by EKN. In addition, a Dutch-Ghana Chamber of Commerce is active (GNBCC). Ghana has expressed interest in the Netherlands investing in its water and sanitation sectors, including support to IWRM and irrigation.
- The Dutch embassy will continue to work on the Netherlands' trade and investment position and focuses on the combination of trade and development cooperation in the "top sectors": Water and Sanitation, Health, Agriculture, Energy, Logistics and Creative Design. The promotion of investments by Dutch companies through PPP facilities, market surveys and general business support will further increase FDI from The Netherlands thus providing access to technology, knowledge and markets.

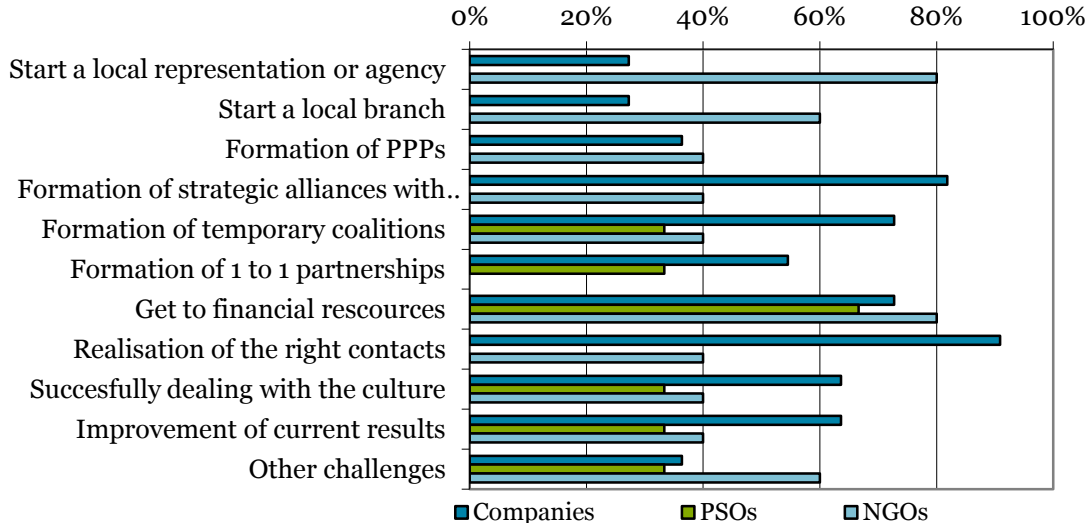
- The Dutch Embassy will establish a top sector fund, which purpose is to investigate promising business opportunities and to address any bottlenecks experienced by the private sector in the enabling environment with regard to trade and investment between the Netherlands and Ghana. The embassy coordinates and facilitates Netherlands private sector inputs in the health sector particularly on ORIO and NUFFIC (NICHE) programs to complement the Ghana government efforts.
- On trade promotion, the Dutch embassy is looking at working more actively with the various trade associations like the Association of Ghana Industries (AGI), Ghana Investment and Promotion Center (GIPC), Ghana Architects Association and the Ghana Employers Association (together in the DECP program with VNO NCW) to mention a few, by organizing trade programs in the Netherlands and Ghana, workshops and events in collaboration with partners like CBI, NABC and GNBBC (Ghana Netherlands Business & Culture Council). . Together with Ghanaian (donor) groups like the Private Sector Development Working Group, the Agriculture Working Group or the Energy Working Group, the embassy will be focused on the investment climate and the further development of the private sector with the Government of Ghana.
- Since the tax treaty between Ghana and The Netherlands came into effect in 2008, investments in Ghana from The Netherlands have substantially increased, from EUR 36 million in 2007 to EUR 2.1 billion in 2011. The Netherlands is one of ten countries to have a bilateral tax treaty with Ghana. The Netherlands, within the framework of the OECD Tax Inspectors without Borders program is cooperating with the "Large Tax Payers" office of the Ghana Revenue authority to improve service levels and predictability for companies and investors in Ghana.
- Dutch construction and consultancy companies are well known in the sector: they enjoy an excellent reputation. Ghana continues to offer interesting opportunities for Dutch companies in this sector. At the same time the Ghanaian water and sanitation sector stands to profit from the added value of the knowledge and experience of the Netherlands water sector.
- The National Policy on Public Private Partnerships (June 2011) has clear objectives which include leveraging public assets and funds with private sector resources from local and international markets to accelerate the needed investments in infrastructure and services. The policy is to promote and facilitate investment in the private sector, by creating and enabling PPPs where value for money for government can be clearly demonstrated. The policy seeks to increase the availability of public infrastructure and services whilst improving service quality and efficiency of projects. The PPP policy sets up efficient and transparent institutional arrangements for the identification, structuring and competitive tendering of PPP projects, whilst providing a framework for developing efficient risk-sharing mechanisms. It also encourages and promotes indigenous Ghanaian sector participation in the delivery of public infrastructure and services.
- In the run-up to the preparation of the MIP 2017-2020, EU partners will try to increasingly harmonize their aid delivery mechanisms and consider options for joint funding or delegated cooperation. EU partners intend to use the whole spectrum of aid delivery instruments at their disposal (project approach, program based approach, sector budget support, general budget support, pooled funding, direct support to civil society etc.) for the implementation of the Joint MIP 2013-2016. This provides opportunities for the Dutch water sector in having access to these funds, as the Embassy is aligning its MASP to the MIP.
- The transformation of the economy will demand capital, new technologies and access to local, regional and international markets. The Government alone will not be able to transform the economy.
- The new 'Transition Countries Fund' can be of great importance to be used as a flexible intervention, besides the other financial instruments and PSD instruments and programs. The Embassy sees clear opportunities in the infrastructure sector where the 'Dutch Good

Growth revolving Fund' can make a difference for Ghana, together with the Dutch private sector.

- The African Development Bank has returned to Abidjan in the coming years. The office of the Netherlands representative at the AfDB will be supported from the Accra Embassy. In addition a Dutch trade office has recently opened in Abidjan, linked to the Accra Embassy. This will provide opportunities to improve the Netherlands network and knowledge for regional business opportunities.
- Ghana contributes to regional stability in taking the lead in combating piracy in the Gulf of Guinea. Ghana was also one of the first countries to contribute to the international peace keeping efforts in Mali. The "Kofi Annan International Peacekeeping Training Center" (KAIPTC) illustrates Ghana's ambition to lead the region to peace and political stability. Ghana is more effective than its neighbors in maintaining its political stability. The peaceful resolution of the conflict over the outcome of the presidential elections shows that the Ghanaian polity values stability of short term political gains. Ghana's police forces manage to keep safety at levels that continue to attract foreigners from the region and beyond. Accra is rapidly becoming a regional hub for many large corporations. This provides scope for the provision of regional trade support services centred at the embassy.
- International companies see Ghana as a hub for business in West Africa. Major Dutch companies have set up their regional headquarters and made substantial investments in Ghana. More than hundred Dutch companies are active on the Ghanaian market. General interest in Ghana is growing fast, ranging from large multinationals to small and medium enterprises.

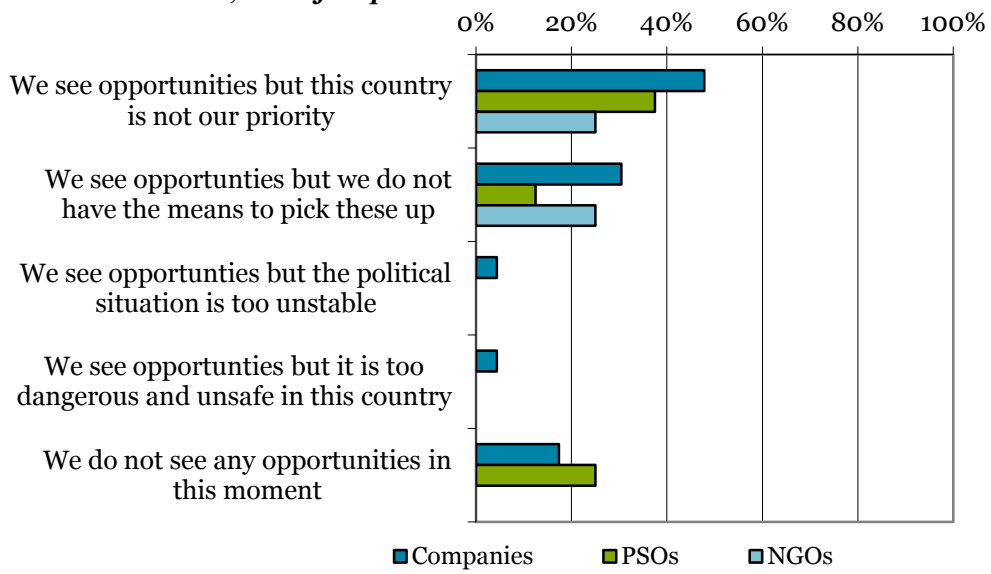
In figure 11 the main challenges for current Dutch organizations active in Rwanda are given. This is resulting from the web-survey. In figure 12 the main drivers and bottlenecks are given.

Figure 11 Challenges for scaling up activities in Ghana for companies (N=11), PSOs (N=3) and NGOs (N=5), in % of respondents



Source: Web survey Panteia, 2014/2015

Figure 12 Reasons why companies (N=23), PSOs (N=8) and NGOs (N=8) are not active in Ghana, in % of respondents



Source: Web survey Panteia, 2014/2015

3.5 Strategies for each PMCs

Below a selection has been made of the PMCs as given in chapter 2.4. This selection has been made based on consultation with the Dutch core advisor and embassy, as well as identified trends and opportunities.

Theme: Integrated Water Resources Management, Irrigation, Water&Food
Product
Climate resilient planning to ensure sustainable access to water resources and food security.
Consultancy/ engineering services for large infrastructure projects or complex planning focusing on IWRM linked to climate-smart agriculture. Mapping and modeling of these plans including climate scenario's to provide input for decision making. Early warning systems.
Finance
World Bank: Sustainable Land and Water Management program, Natural Resources and Environmental Governance Technical Assistance program, Ghana Commercial Agriculture program. EU: Development of National and River Basin Integrated Water Resources Management Plans. UNDP: supports a number of initiatives set forth in the Ghana Plan of Action for Disaster Risk Reduction and Climate Change Adaptation. Government of Ghana: Ministry of Water Resources, Works and Housing. African Development Bank: Strategic Climate Fund. Dutch funding opportunities: EKN, FDW, FDOV, G4AW. EU: Government of Ghana: diverse projects through the Ministry of Water Resources, Housing and Works
Partners
Ministry of Water Resources, Works and Housing/ Water Resources Commission, Ministry of Agriculture, (I)NGOs, local agricultural companies, local consultancies and knowledge institutes
Entry strategy
Dutch players could work jointly through a business platform or hub, through the Dutch embassy, in order to gain access to programs, partners and funds related to EU joint programming, World Bank or governmental budgets. The hub offers possibilities for networking and matchmaking with Dutch and local companies or organizations and offers opportunities to position the Dutch water sector stronger, as there is competition in this field.

Theme: Flood management, river management
Product
Flood management and dredging of main rivers and dams
Technical Advise on flood management measures, hydrological modeling, early warning systems, dredging and sand mining of main rivers and reservoirs
Finance
Government of Ghana: Volta Delta project, Ministry of Water Resources, Housing and Works. World Bank: White Volta Flood Hazard Assessment and Forecasting.
Partners
Water Resources Commission, National Disaster Management Organization (NADMO), Hydrological Service Department (HSD), Ghana Meteorological Agency (GMet), Volta River Authority (VRA), Water Research Institute of the Centre for Scientific and Industrial Research, Ghana Irrigation Development Authority (GIDA), Environmental Protection Agency (EPA), and the Savannah Accelerated Development Authority (SADA). Local dredging companies. Dutch dredging companies (to know: Boskalis).
Entry strategy
Either through contacts of the Dutch Embassy or currently active Dutch companies or through the above mentioned organizations. It is important to assess main players in this field and potential for

collaboration.
Theme: IWRM, water governance
Product
Improving institutional capacity on local water governance
Capacity building on IWRM and water governance, Technical Advise on development of IWRM and water governance plans, Technical Advise on financial strategy or approach in water governance plans
Finance
World Bank: Natural Resources and Environmental Governance Technical Assistance. EU: Development of National and River Basin Integrated Water Resources Management Plans. Government of Ghana: Ministry of Water Resources, Housing and Works. Dutch funding: NUFFIC
Partners
All ministries involved in water, as well as the Ghana Water Company Ltd. and the Volta River Authority. Dutch Water Boards or Unie van Waterschappen.
Entry strategy
Through contacts or relations between the Dutch Water Boards and the organizations mentioned under Partners. The Dutch embassy can play a role in this.

Theme: WASH, waste water treatment, rural water supply, urban water management
Product
Improvement of WASH service delivery, and in specific sanitation and (waste) water management (including faecal sludge management solid waste management)
Capacity building of government and NGOs on sustainable WASH service delivery, Technical Advise on urban water management and sewerage systems, Technical Advise on financial set-up local water operators
Finance
World Bank: OBA Urban Sanitation Facility for the Greater Accra Metropolitan Area (GAMA), Result Based Financing for Sanitation and Hygiene, GH-GAMA Sanitation and Water Project, Additional Financing for Ghana Urban Water Project, Sustainable Rural Water & Sanitation Service. EU: An integrated approach to guinea worm eradication through water supply, sanitation and hygiene in northern region and Small towns and water and sanitation project in Central and Western Regions. African Development bank: Urban Sanitation Improvement Project. Government of Ghana: multiple projects on WASH. Dutch funding: EKN, GNWP, FDW
Partners
CONIWAS, IRC Ghana, WaterAid Ghana, Ghana Water Company Ltd., VEI, IRC Ghana, Simavi
Entry strategy
Gain access to the organizations active under the GNWP through the Dutch embassy and assess possibilities for activities. However, the GNWP has become a popular instrument and it is therefore not clear if this offers opportunities for “new-comers”.

Appendix I: Methodology

The Water OS positioning survey is part of the Water OS program: a facility of the Ministry of Foreign Affairs. The Water OS program aims at providing support to the Dutch Embassies in 12 partner countries in the formulation and implementation of their water programs. Central element of the program is the involvement of the Dutch water sector, i.e. companies, NGOs, knowledge institutes and governmental organizations.

In order to generate more evidence for effective continuation of the Water OS Program and to 'trigger' Dutch water sector players, RVO contracted Aidenvironment, in collaboration with Panteia, Chris Engelsman and Jan Oomen, to conduct a "Positioning Survey". This survey identifies opportunities, strategies and approaches for the Dutch water sector, and more specifically seeks high potential Product/Market Combinations (PMCs) in the 12 Water OS countries included in the Survey. The final deliverables of the survey are twelve positioning survey reports (one for each country) and one overarching management summary. Primary target group for the Positioning Survey Reports are the Technical Experts (TDs) at the Netherlands Embassies in the 12 OS countries, with all Dutch water sector players as secondary target group.

The methodology comprises desk research, a web survey and additional strategic interviews:

- The desk research studied the most essential reports and documents per country (market scans, market reports, strategic papers of Embassies and International Financial Institutions). The Key Advisors within the Water OS program played an important role in rendering accessible and prioritizing the data available.
- In the period November 2014 – January 2015, Panteia carried out a web survey. Two different questionnaires have been applied, one for companies, knowledge institutions and water boards, and another questionnaire for NGOs. Despite the length of the survey and thanks to a considerable effort of the project team and NWP, the response rates were not disappointing and for a web survey in general above average: NGOs: 16 out of 48 implying a response rate of 33,3%, and companies (including knowledge institutions and water boards): 87 out of 531 implying a response rate of 16,4%.
- Based on the outcomes of the desk study and web survey, Aidenvironment selected 27 companies, 3 (semi) commercial financiers, 7 NGOs, and 8 knowledge institutes (including Water Boards ('waterschappen') and water service providers) to be interviewed on strategic topics focusing on market opportunities and applicable market entry strategies (and business models). Through these strategic interviews, the research team gained more detailed information on projects of front runners. These projects gave more information on lessons learned, success factors, and opportunities for up scaling.

Regarding the web survey, two important remarks can be made:

Value and limitation of the survey results
The web survey results have provided very useful data for this study. The value of the results especially lies in the provision of relative figures on various aspects enabling comparisons between countries, opportunities, bottlenecks, groups or respondents, etc. and to monitor the developments in these figures over time. The limitation of the study lies in the inability to provide reliable absolute figures on for instance turnover values.

OS-study versus WEX
For the web survey a similar methodology has been applied as is done for the WEX (Water Export Index) – study, which is carried out twice a year. A sample of companies and institutions is asked to provide data on national and export turnover in the water sector and the division of this turnover over regions and over subsectors. The samples do not have the same composition. Also over time the

samples may differ in the WEX, but never provide a bottleneck though to assess the WEX and to make reliable comparisons over time. Like in the WEX, the estimation of the export turnover is based on the sample results of a survey. Starting from this value relative export shares of the various regions and countries have been determined for the sample. Since the sample may not represent the whole water sector in an optimal way, we cannot draw any hard or general conclusions about the export turnover figure and division of this figure over subsectors, regions and countries. The real value will be higher, but this value can only be obtained with sample results once the whole population is known. Getting to know the population is difficult and cannot be realized in the context of this study nor in the WEX-study. Another complicating factor for generalizing study results lies in the fact that large projects (especially those in water construction) may influence total and regional export figures drastically and lead to large fluctuations over time. For the sample of the web survey no such 'disturbing' projects have been found. The sample results of the OS-study regarding relative export shares of regions are in line with the results of the WEX 2014.

The average budget per country positioning report is EUR 7,000. Therefore, the positioning survey cannot be seen as a fully fledged market research. An in-depth assessment of the markets (the OS Water countries) was not part of this research, instead the research relied on secondary information (reports available) and expert opinions (Key Advisors Water OS program, TD staff on Embassies, YEP network, and a network of 'water professionals').

An important disadvantage of the web survey – in contrast with a telephone survey for which a stratified sample has been selected - is that the characteristics of the total population are unknown. By lack of a stratified sample, the outcome of the web survey does not offer the opportunity to level up the sample results to the total population and to calculate absolute figures for turnover and export volumes for each subsector and region. Despite this limitation of the web survey, it does provide very useful information for the positioning studies.

Additionally to the country specific positioning reports, a management summary was drafted. The management summary elaborates on the overall findings and provides overall conclusions.

Appendix II: Finance

The Dutch Government is able to support activities performed by the water sector in developing countries (in this case the 12 Water OS countries) in different ways. On a strategic level, financial support can be labeled as:

Bilateral support (country to country)
Multilateral support (to different countries often funneled through International Financial Institutes or UN related organizations)
Specific instruments (e.g. managed by RVO or commercial organizations like Atradius and FMO)

The financial support from Dutch Government related to the 12 Water OS countries aims to combine trade and aid perspectives. The policy focuses on three key points: 1) improved management of water catchments and safe deltas, 2) efficient use of water, especially in the agriculture sector, and 3) improved access to clean drinking water and sanitation.

This appendix provides an overview of the support provided on different strategic levels: bilateral, multilateral and specific instruments. The content is structured following the most important organizations involved in funneling these funds starting with the Ministry of Foreign Affairs, The Dutch Embassies, RVO, Dutch (Semi) Commercial Players, and the most relevant International Finance Institutes. At the end, the appendix provides a non exhausted list of foundations financing water related projects and activities.

Centralized programs managed by IGG/Water DGIS/Ministry of Foreign Affairs
DGIS (within the Ministry of Foreign Affairs) focuses on the Dutch international cooperation with partnering countries. The cooperation involving the water sector is mandate of the section water within the department of DME (future: IGG (Inclusive Green Growth)). This section manages the water related portfolio of programs providing regional and multilateral support. The funding is often labeled and does not provide direct opportunities for the Dutch water sector.

Decentralized programs managed by Embassies:
The Multi Annual Strategic Plans (MASP) is the nucleus of Dutch bilateral support to a country. Projects, programs or businesses being part of the Embassies' program to implement the MASP fit into the country specific strategy and are aligned with the overall water policy of Dutch government. The funding of Dutch Embassies provides opportunities for the Dutch water sector.

Specific Instruments: RVO
RVO has developed different type of instruments depending on the phase the project/program/business is in, starting at the development of an idea, testing the concept in a pilot, scaling up the pilot to significant size to start building a business or self financing project on. We follow this structure when presenting the different instruments.

To finance the development of an idea, innovation or R&D:

VIA water:
This is a relatively small fund (EUR 10 million over 4 years) to finance out of the box ideas and small-scale innovations using grants. Aqua for all manages the fund, which started operating in 2015. Maximum size of the grant is EUR 200,000 per project.

To finance a pilot:

Partners for Water:
This is a funding program (grants) financed by different Ministries runs from 2010 till 2014. After 2015 the program will continue following the same strategy. In 2015 the facility is not open for new application. The program financed 80 projects of which 50 included a pilot. The average subsidy size was EUR 200,000 financing 20-80% of the budget. The new program will start with a total budget of EUR 10.5 million.

DHK:
This instrument provides grants and aims to finance demonstration pilots, feasibility studies and acquiring of knowledge. The program has a specific EUR 3 million window for DGGF countries of which EUR 1 million is allocated to the least developed countries. This facility is specifically applicable for projects in fragile states.

DRR:
DRR finances the Dutch Risk Reduction Team, a database of Dutch Water Experts that are available for solving water related issues with respect to disasters. DRR is not a facility financing disaster response or aid, though DRR provides knowledge that can be used to e.g. avoid disasters. RVO in close cooperation with NWP manages the facility.

To finance the scale up of activities or pilots:

ORIO / DRIVE:
ORIO was cancelled in 2014. ORIO used to be a grant facility financing investments related to the development, implementation and operation of infrastructure in developing countries. Governments of these countries submit the applications and the private sector is involved in the development and execution of projects.

DRIVE is the successor of the ORIO program and provides concessional loans to governments of developing countries to develop, construct and operate infrastructure. DRIVE will be launched in April 2015 and has an available budget of EUR 100.000.000 annually expecting to finance 10-15 projects. The facility aims to actively involve the Dutch Water sector and contribute to development of the receiving country.

G4AW:
G4AW stands for Geodata for Agriculture and Water and finances projects, programs and businesses aiming to improve food security in developing countries by using satellite data. Netherlands Space Office (NSO) is executing this program, commissioned by the Dutch Ministry of Foreign Affairs. In 2014-2015 the facility has EUR 30.5 million available to provide grants (EUR 0.5-5.0 million) financing up to 70% budgets. Proposals and partnerships should be based on a business plan geared towards satellite data at the start of the information chain.

FDW/FDOV and GWW:
RVO developed three facilities to finance Public Private Partnerships (PPP) in the water (and agriculture) sector. These facilities aim to: 1) increase access to drinking water and sanitation, 2) enhance efficient and sustainable water use (especially in the agriculture sector), 3) improve management of catchment areas and safe deltas, and 4) (specifically for FDOV) improve food security and private sector development. GWW (Ghana Wash Window) is a specific window financing water related PPPs in Ghana.

The three facilities are in place since 2012, in 2014 FDW and FDOV launched and closed its second call, the GWW second call for proposals closes in February 2015. The facilities are planning the third call to be executed in 2016. Because the facilities just started operating, (impact) results have not been reported yet.

The facilities provide grants and have different modalities. The facilities received many applications and resulted into the finance of new initiatives. The application process is being perceived by a significant group of applicants as complex, and requires a clear business case, or theory of change aiming to enhance the enabling environment as part of the proposal, plus a significant contribution by the private sector. The facilities are especially applicable for large applications fitting into investment agenda's or strategic objectives of the private sector players involved.

DGGF:
The Dutch Good Growth Fund started operations in mid 2014 and aims to combine aid and trade goals. DGGF is a revolving fund, providing finance (not grants) to initiatives with a 'healthy risk profile'. DGGF focuses on 66 countries (called the DGGF countries), including the Water OS countries. DGGF is build on three pillars: 1) a fund financing activities of Dutch SMEs in DGGF countries (managed by RVO), 2) a fund financing local SMEs and banks in DGGF countries (managed by PWC and Tripple Jump), and 3) a fund financing export credit insurance and export finance activities (managed by Atradius).

In Pillar 1, RVO works closely together with Dutch banks. The fund is equipped to provide guarantees to banks up till 60% of the credit risk, loans to banks and investment funds (equity). The maximum is EUR 10 million per project or business. A TA facility will be in place to provide assistance on improvement of the business plan or investment proposal.

Pillar 2 is under construction; this pillar will provide fund to fund investments up to EUR 175,000.

Pillar 3 provides export credit insurances covering non-market risks up till a maximum claim amount of EUR 15 million. Besides insurances, this fund provides export finance instruments. Products focus on Dutch SMEs needs, covering small and large transactions.

Besides these above mentioned programs and facilities, the following instruments can be useful and applicable for financing water related activities.

PSI:
PSI was grant program available for non-Dutch and Dutch companies wishing to make an innovative investment, in cooperation with a local partner in one of the PSI countries. This program stopped operating mid 2014.

MMF:
MMF is a match making program, aiming to establish a long term business relationship between a Dutch entrepreneur and an entrepreneur from a developing country.

OS Partner Countries:
This program finances the projects, managed by the local Dutch Embassies. These projects fit into the Multi Annual Strategic Plans of the specific Embassies.

TDs / economic diplomacy:

This program finances the so called thematic experts working at the Dutch Embassies in a limited number of OS Partner Countries.

TMEA:
Managed by DDE / DGIS, this large program focuses on the East African region financing initiatives contributing to the enhancement of trade relations within the region. The facility is applicable for financing initiatives linked to port development.

Water Mondiaal:
Water Mondiaal is a program launched by the Dutch government to cooperate actively with countries in low-lying delta areas, protecting them against floods and ensuring sufficient, clean water. Partners for Water is managing this program, the program aims creating long lasting cooperation agreements between the public and private sector , and civil society and knowledge institutes. Water Mondiaal focuses on five deltas: Egypt, Bangladesh, Indonesia, Mozambique and Vietnam.

(Semi) Commercial Organizations managing funds on behalf of Dutch Government
The following facilities or organizations are in some way closely linked to RVO or the Ministry of Foreign Affairs.

Atradius:
Atradius offers a comprehensive range of credit management solutions that protect businesses of all sizes against the commercial and political risks inherent in domestic and global trade. Atradius provides credit insurance, debt collection services, bonding, reinsurance and a range of special products.

Atradius Dutch State Business performs different facilities on behalf of and for account of the Dutch State. There is no direct link with the RVO organization, though Atradius products can be combined with RVO instruments (e.g. ORIO/DRIVE).

Atradius does not specifically focus on the water sector. However dredging, waste management, port development and the maritime sector are important sectors from a business perspective. Atradius is not actively involved in all Water OS countries; the table below provides an overview of the outstanding volumes of credit insurance products per January 2014.

Table 1: Atradius business in Water OS countries
Credit Insurance outstanding risks

Country	Risk Volume (EUR million)
Mali	1
Yemen	1.2
South Sudan	0

Palestine	0
Ethiopie	0
Mozambique	105
Benin	0
Rwanda	0.1
Ghana	182
Kenya	118
Indonesia	1,373
Bangladesh	0

Source: Atradius January 2015

Atradius manages the third pillar of DGGF. In the first six months Atradius received 7-8 requests, one of these came from the maritime sector. The DGGF facility provides support on smaller transactions; therefore this product is applicable for Dutch small and medium enterprises.

FMO:
FMO manages three funds relevant for the Dutch water sector.

FOM-OS
The first pillar of the DGGF program will replace this fund. The fund offered loans to private sector players investing in non (commercially) bankable projects or businesses in developing countries.

Innovative Finance Fund for Development
This fund aims to catalyze private sector investments.

IDF
IDF stands for Infrastructure Development Fund. The IDF is aimed at creating reliable infrastructure in many sectors, ranging from potable water and mobile telecommunication services to roads and power. By providing risk capital through the IDF, FMO takes on definite risk while acting as a gateway for other financers.

IDF offers finance through equity, mezzanine and debt products that can be used even in early stage of projects. The fund has the following fund limits:
Individual transaction amounts maximized at EUR 25 million
Financing about 25% of total project investment
Shareholding maximum 25%
Maximum tenor of 20 years
Convertible contributions are selectively available for financing during the development phase of projects (up to 49% of total development cost)

About 8% of the portfolio is allocated to water related projects (mainly water related to energy: dams). IDF hardly finances projects in other sub sectors of the water sector, this is due to: 1) the limited willingness to pay (drinking water), 2) the strong involvement of a weak public sector, 3) the limited role of the private sector, 4) the lack of involvement by Dutch water sector as a strategic operator or investor.

Within the FMO organization the department NL Business manages the IDF fund and provides (financial) transaction advisory support to Dutch businesses aiming to become active in developing markets. NL business brings in the financial perspective when Dutch businesses want to develop a consortium. Regarding consortium development within the Dutch water sector, port development, dredging and waste (water) treatment are potential sectors. Thinking along the lines of so called

corridor concepts (infrastructure connection points like transfer utilities) seems to be a promising market entry point.

EP - Nuffic:
EP-Nuffic is the main expertise and service centre for internationalization in Dutch education, from primary and secondary education to higher professional and academic higher education and research. EP – Nuffic runs several programs, the NICHE program is relevant for the water sector.

The Netherlands Initiative for Capacity development in Higher Education (NICHE) is a Netherlands-funded development cooperation program. By sustainably strengthening higher education and technical and vocation education and training (TVET) capacity in partner countries, it contributes to economic development and poverty reduction. The program focuses on four policy priorities: 1) Water, 2) Food security, 3) Sexual and Reproductive Health and Rights (SRHR) and 4) Security and the rule of Law.

Dutch Commercial Banks:
Looking at the global networks of the larger Dutch international operating banks (ABN AMRO, Rabo bank and ING), the Rabobank has the most visible overall presence in the 12 Water OS. In the strategic interviews, this bank was the only commercial bank mentioned a couple of times as being active in the international water sector.

The water sector is not a specific priority sector for Rabobank. From an international perspective Rabobank focuses on the agriculture sector. However Rabobank is involved in financing the Dutch water sector in The Netherlands. From this perspective, Rabobank 'follows its clients abroad' (especially the dredging and water engineering sector plus larger consultancies are being mentioned). Rabobank has branches in Kenya and Indonesia, participations in Rwanda and Mozambique and operates in partnership with e.g. Standard Charter Bank in Mali, Ghana, and Bangladesh.

Export finance, guarantees and currency risk management are the most common services/products offered to international operating clients.

International Financial Institutes (IFIs):
The so-called multilateral aid program of governments is being managed by IFIs like the Worldbank, ADB, AfDB and EU (EU grant program and EIB). The following IFIs play an important role financing water sector related projects, programs and businesses.

World Bank (WB):
In 2014 WB announced reorganization. The new structure has five relevant departments focusing on water: GP14 Water, GP1 Agriculture, GP3 Energy and Extractives, GP 4 Environment & Natural Resources, GP12 Transport and ICT, and GP13 Urban & Rural Social Development.GP14 Water department integrates WASH, irrigation, and Water Resource Management. One global staff pool is in place to partner with outside organizations. More weight is put on knowledge into operations. WB offers loans to developing countries, projects have to fit the multiyear WB strategy, and the fund receiving countries lead the tender procedure. About 20% of the annual budget is allocated to water projects of which 53% WASH, 13% irrigation, 24% water and energy, and 10% flood protection and delta technology.

The Asian Development Bank:

Programs of ADB are complementary to other donors and have the starting point to promote inclusive water policies (including the poor). Focus on mainstreaming water efficiency in supply and use and enhanced cooperation with the private sector. From 2010-2020 the budget is USD 20-25 billion.

The African Development Bank (AfDB):
Looking at the AfDB strategy 2013-2022 paper, the 10 year focus will be on inclusive growth and green growth. The bank identifies five operational priorities: 1) infrastructure development, 2) private sector development, 3) governance and accountability, 4) regional economic integration, and 5) skills and technology. In implementing its ten-year Strategy, the Bank will pay particular attention to fragile states, agriculture and food security, and gender. Supporting the water sector is specifically part of the agenda on infrastructure and agriculture and food security.

In view of its important contribution to the achievement of all the MDG goals and therefore its unique contribution to poverty reduction on the continent, the water sector has received major attention as a strategic priority of the Bank. Since 2000, following the adoption of its Integrated Water Resources Management (IWRM) Policy, the Bank has increased its focus on the water sector, especially on drinking water, sanitation and hygiene, and the promotion of integrated management of water resources.

The African Water Facility is an interesting facility that can be used to finance WASH related activities.

The EU:
These funds are the main source of EU development aid for the African, Caribbean and Pacific (ACP) countries and the overseas territories (3% of the annual EU budget in 2008-13). The funds are connected to the Cotonou Treaty. The European Investment Bank invests significant amounts in the water sector. The grant programs do not have a specific focus on water related projects, the EU Water Facility, one of the grant programs focusing specifically on water will be cancelled.

Foundations:
Especially for development related activities within the water sector, foundations provide interesting opportunities to finances projects and programs. Below an unexhausted list of foundations provides a first entry point to seek for funds. As each foundation has its own finance policy, we refer to the individual websites for more information.

Blood:Water.
Blue Planet Network Foundation
Charity Water
ExxonMobil Foundation
Global Water Challenge
Millennium Water Alliance
Project Concern International
ActionAid International USA
Alcoa Foundation
Boeing Company Charitable Trust
BP Foundation
Global Green USA
Habitat For Humanity International, Inc.
Lemelson Foundation
McKnight Foundation

Prem Rawat Foundation
Water 1st International
Water Environment Research Foundation
Wateraid America, Inc.
World Vision, Inc.

Appendix III: Elaborated outcomes of web survey

The Comext database of Eurostat includes trade statistics for a limited number of water sector related products. Table 1 demonstrated the development of the exports of these products for EU-28 in total and for some EU-countries during the 2010-2013 period. The Dutch share in total EU-28 exports is 7% on average, lower than the respective shares of Germany and France.

Table 2: Exports from EU28-countries to Ghana (in mln. €) in total and for water sector related products and export shares of some EU-countries, 2010-2013

	2010	2011	2012	2013	Total 2010-2013
Total EU-28 exports to Ghana	2.150	2.926	3.613	3.416	12.105
Water sector related products	*42*	*56*	*64*	*33*	*196*
Shares in EU-28 exports of water sector related products					
- Netherlands	*19%*	*2%*	*6%*	*2%*	*7%*
- Germany	*19%*	*29%*	*8%*	*8%*	*16%*
- France	*18%*	*8%*	*21%*	*4%*	*14%*
- Denmark	*1%*	*2%*	*1%*	*1%*	*1%*

Water sector related products:

TUBES, PIPES AND HOSES, AND FITTINGS THEREFOR, OF PLASTICS

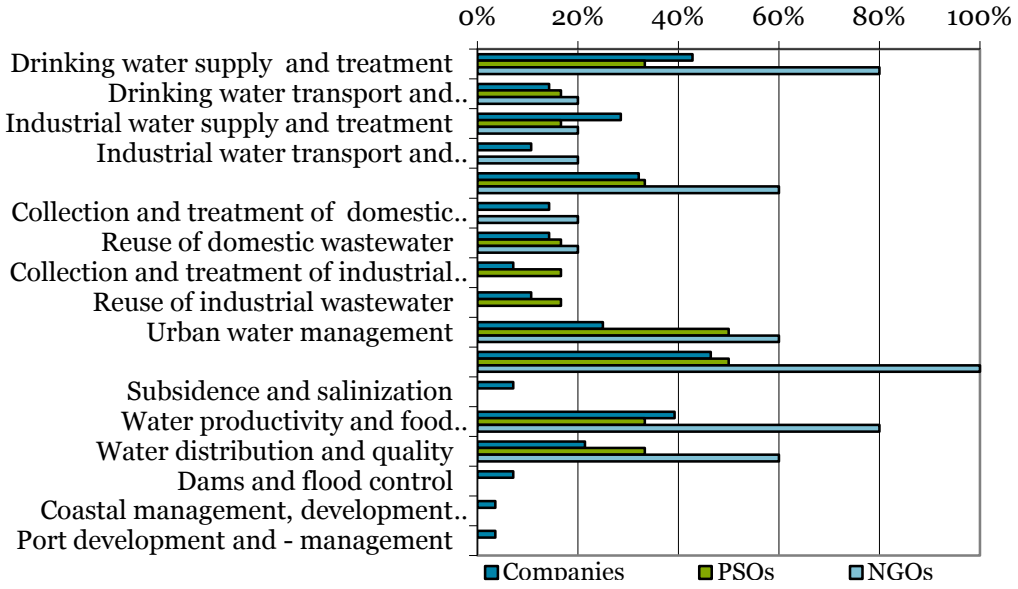
TUBES, PIPES AND HOLLOW PROFILES, AND TUBE OR PIPE FITTINGS, OF IRON OR STEEL

STEAM TURBINES AND OTHER VAPOUR TURBINES AND PARTS THEREOF, N.E.S.

PUMPS FOR LIQUIDS, WHETHER OR NOT FITTED WITH A MEASURING DEVICE; LIQUID ELEVATORS; PARTS FOR SUCH PUMPS AND LIQUID ELEVATORS

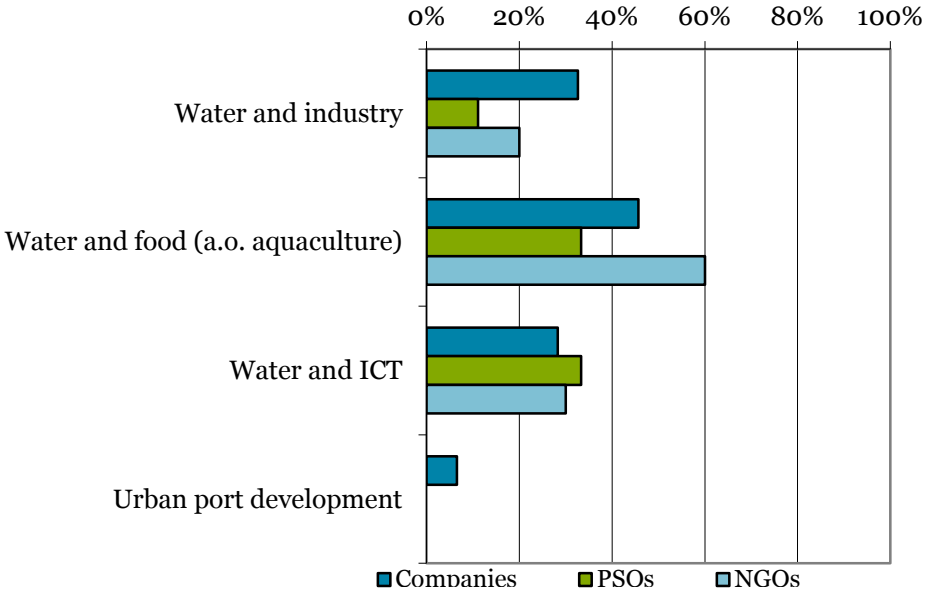
Source: Comext Eurostat

Figure A.1 Promising areas in Ghana according to companies (N=28), PSOs (N=6) and NGOs (N=5) <u>interested</u> in Ghana, in % of respondents (multiple answers possible)



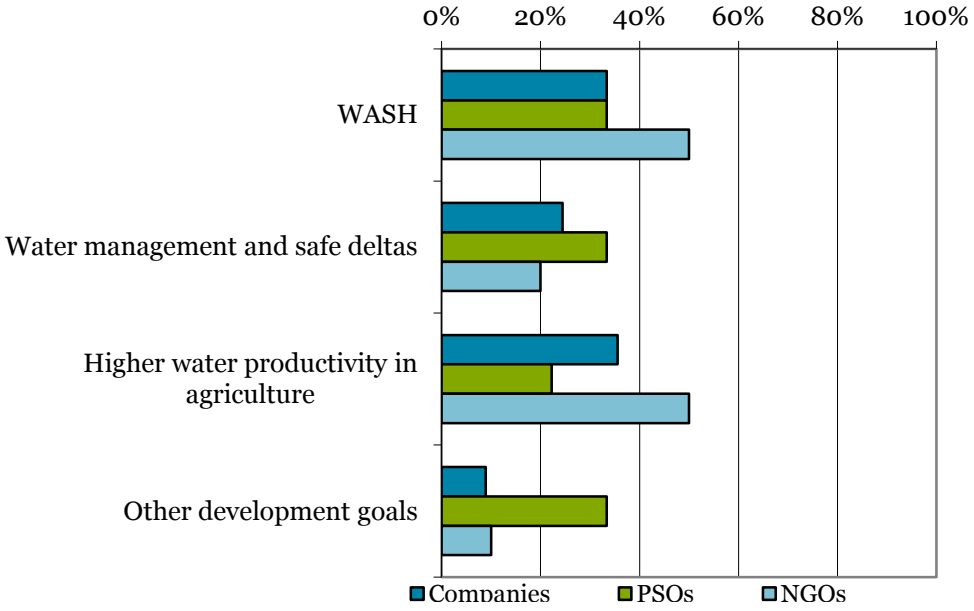
Source: Web survey Panteia, 2014/2015

Figure A.2 Promising cross-overs in Ghana according to companies (N=46), PSOs (N=9) and NGOs (N=10) <u>interested</u> in Ghana, in % of respondents (more answers possible)



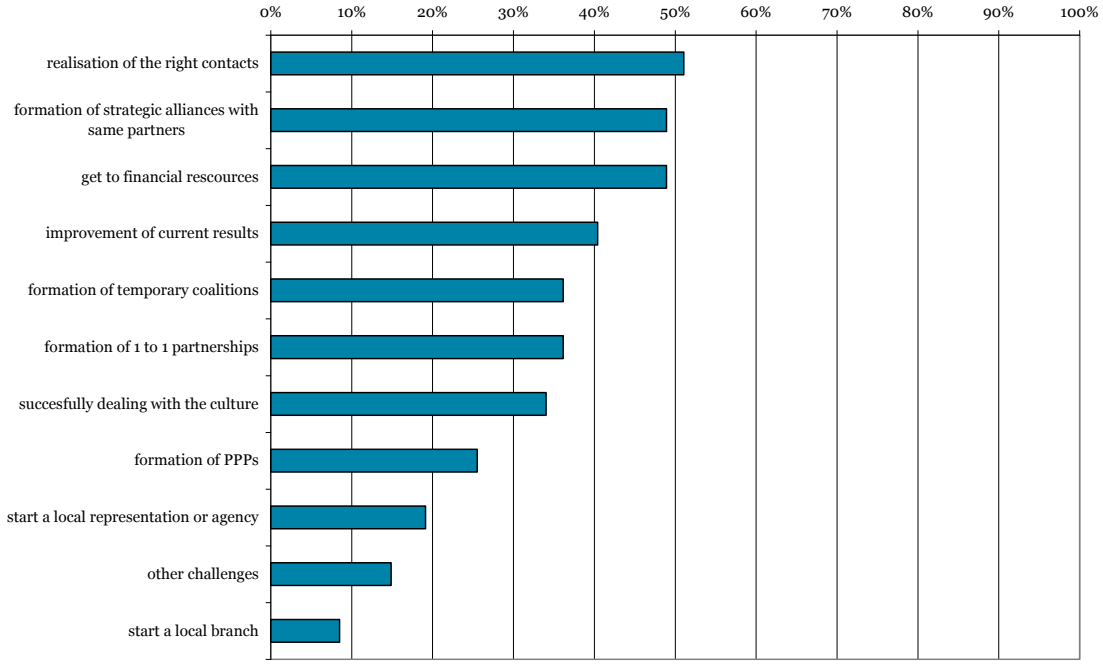
Source: Web survey Panteia, 2014/2015

Figure A.3 Development opportunities in Ghana according to companies (N=45), PSOs (N=9), and NGOs (N=10) <u>interested</u> in Ghana, in % of respondents (more answers possible)



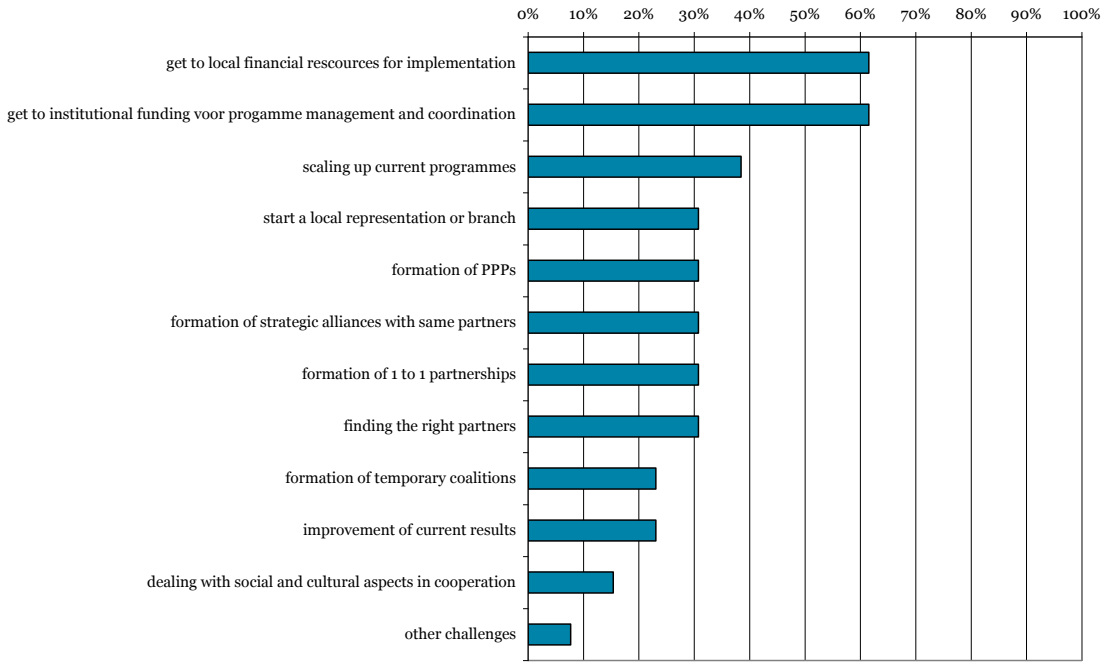
Source: Web survey Panteia, 2014/2015

Figure A.4 Challenges for scaling up activities in Ghana according to Dutch companies, Water Boards and knowledge institutions, in % of respondents (N=47)



Source: Web survey Panteia, 2014/2015

Figure A.5 Challenges for scaling up activities in Ghana according to NGOs, in % of respondents (N=13)



Source: Web survey Panteia, 2014/2015

Appendix IV: Projects per type of organization

NGO	Project description
Simavi, Berenschot, Witteveen&Bos	The consortium consisting of three Dutch partners, Witteveen+Bos (lead), Berenschot and Simavi will provide Technical Assistance to the Ghana-Netherlands WASH Program (GNWP). The program is a joint initiative by the government of Ghana and the Dutch embassy in Ghana.
SafiSana Foundation, Partners for Water	The project that is designed for future roll out in other regio, aims to proof the viability of the concept in several areas. The pilot will focus on a) the public sanitation concept, b) waste collection and processing and c) post-treatment and marketing of energy and fertilizer. For each 'area' we look at the industry analysis, technical viability, commercial viability and management and ownership.

Private sector	Project description
RoyalHaskoningDHV, WorldWaternet, Aqua for All	The Ghanaian social venture Safi Sana started in 2009 to offer public toilet services in communal service blocks and a small-scale production unit for waste treatment in the region Accra. Safi Sana is an initiative of Aqua for All in a consortium of commercial and public partners, including Royal HaskoningDHV, African Development Bank, World Waternet, local Municipalities and the Body of Surveyors of the Dikes Regge & Dinkel.
HKV Consultants, RoyalHaskoningDHV	HKV Consultants, in cooperation with Royal HaskoningDHV has been appointed by the United Nations Development Program (UNDP) for the provision of services to develop disaster risk and early warning systems in Ghana. The project is funded by the Norwegian Government. Ghana's National Disaster Management Organisation (NADMO) is the Implementing Partner.
RoyalHaskoningDHV	Kumasi - the second largest city in Ghana - has been suffering from frequent water shortages. In 2005, RoyalHaskoningDHV carried out a feasibility study for the expansion of Kumasi's water supply system. The project received financial support from the Dutch ORET Fund and implementation started in 2007. The project was commissioned in early 2010 and the operational support phase will be completed in 2011.
Arcadis, RoyalHaskoningDHV, VanOord, Partners for Water	The continuing urbanization of coastal areas, in combination with periodic flooding, is causing increasingly serious problems around the world. Arcadis, RoyalHaskoningDHV and Van Oord jointly developed DUAL to address this problem. DUAL uses the silt produced during dredging work in ports to create building land in coastal areas. This allows urban areas to expand at a much lower cost. This project entailed a market analysis of the opportunities to introduce DUAL in various countries.
VitensEvides	The project involved a 5-year management contract for the provision of drinking water services to 8 million consumers through 81 systems in urban centers in Ghana. For this purpose, Aqua Vitens Rand Water Limited (AVRL), was established to which more than 3000 employees of GWCL were seconded. Apart from managing the day-to-day operations, the project aimed at improving service provision and financial sustainability of the company to attract further investment. This project was made possible with contributions from Rand Water Services Ltd. and the Embassy of the Kingdom of the Netherlands to Ghana.

Knowledge institutes	Project description
IRC	SMARTerWASH aims to ensure monitoring information is effectively used to keep water and sanitation services working. There are three smart components that will be operationalized: (a) The District Monitoring and Evaluation System (DiMES) to analyze and collect data against sector guidelines; (b) Akvo FLOW to collect data using mobile phones and visualize it online; (c) SkyFox SMS to help communities report problems, order spare parts, and access financing.
IRC	The aim of this 3 year project is to ensure that over the next three years, 1.3 million people in 13 rural districts in Ghana will have access to lasting water services. The grant from the Hilton Foundation will enable IRC to scale-up results of the innovations from the Triple-S work to more districts, and further strengthen the enabling structures to improve the quality of water services.
IRC	The Water, Sanitation and Hygiene Technologies (WASHTech) program is a three-year action research that will provide the sector with a systematic and participatory way of assessing and adopting technology innovation that effectively takes the poorest of the world a step closer to expanding their life choices and opportunities for development. The program is in collaboration with WaterAid, Centre Régional pour l'Eau Potable et l'Assainissement à faible coût (CREPA) and Training, Research and Networking for Development (TREND), Ghana.

Appendix V: Sources

Embassy of the Kingdom of the Netherlands, Multi-Annual Strategic Plan 2014-2017

Resultaat Fiches Ambassades en Themadirecties, 2012

VIA Water report Ghana, 2014

http://www.rvo.nl/actueel/nieuws/kansen-de-sector-water-en-sanitatie-ghana

Other sources used are mentioned in the text.

Appendix VI: Respondents

NWP/Core Advisors:
Gert de Bruijne

Dutch Embassy:
Fred Smiet

Local water professionals (peer reviewer):
Elsie Appau

Web survey:
Not disclosed

Strategic interviews:

Name organization	Contact person
Alkyon + ARCADIS	Ferry Vis
Aqua for All	Sjef Ernes
Aqua Industrial Water Treatment	Marik Beerten
AquaAero Water systems	Martijn Nitzsche
Atradius	Oscar Boot
Bam International	Maikel Jagroep
Bam International	Henk van Veen
Basic Water Needs	Martijn Smid
Berson UV	Paul Buijs
Boskalis	Bastiaan Lammers
Bucon Industries	Peter Bulsing
Colubris Environment	Marco Moekardanoe
Deltares	Ron Thiemann
ECORYS Nederland	Viek Verdult
ECORYS Nederland	Ilse van de Velde
Euroconsult Mott Macdonald	Pieter van Stuijvenberg
Euroconsult Mott Macdonald	Hero Heering
FMO	Roel Messie
Genap	Dick van Regteren
Groasis	Pieter Hoff
Grontmij Nederland	Ernst Malipaard
Hatenboer-Water	Peter Willem Hatenboer
ID Consultancy	Dick Konijn
IHC Merwede	Sergio Ooijens
IRC	Stef Smits
ITC	Victor Jetten
ITC	Dinand Alkema
Landustrie Sneek	Arie van Steen
MetaMeta	Simon Chevalking

Nijhuis Water Technology	Christiaan Beuzel
Norit	Jan van den Dikkenberg
Rabobank International	Alexander Hoogendoorn
Redox Water Technology	Maurice Nijrolder
Royal Eijkelkamp	Fons Eijkelkamp
Royal Eijkelkamp	Frank Tillmann
Royal Haskoning DHV Nederland	Harrie Laboyrie
Safisana Holding	Aart van den Beukel
Simavi	Ewout van Galen
SNV	Leendert Bos
TNO	Albert Jansen
UNESCO-IHE	Pieter van der Zaag
Vitens-Evides International	Marco Schouten
WASTE	Jacqueline Barendse
Waterschap Aa en Maas	Paule Dobbelaar
Wavin Overseas	Giles Crofts
Wetlands International	Chris Baker
Witteveen + Bos	Polite Laboyrie
WUR	Ivo Demmers
ZOA	Harm Bouta