



# NATIONAL INVESTMENT PROFILE



## WATER FOR AGRICULTURE AND ENERGY

- FINAL DRAFT -

**NIGERIA**

## EXECUTIVE SUMMARY

The agriculture sector in Nigeria is of great importance in both economic and social terms. It accounts for around 33 percent of the total GDP of the country (WB 2014) and employs around 23 percent of the total economically active population (FAO 2014). However, agriculture has failed to keep pace with Nigeria's rapid population growth, turning the country into a net food importer.

Most of the agricultural output (up to 90 percent) comes from households with less than 2 ha under cropping, normally rainfed. This situation partly explains the low productivity levels in the country, with considerable gaps between current and potential yields.

FAO-Aquastat (2005) estimated that the area equipped for irrigation in the country was 293 000 ha, accounting for less than one percent of the cultivated land and around 15 percent of the irrigation potential.

Considering that Nigeria is well endowed with water resources where agriculture withdrawals represent around 2 percent of the total actual renewable resources, irrigation can play an important role in closing the yield gap in the country.

Regarding energy resources, there is also a great potential to develop hydropower in Nigeria, which can justify the investment in infrastructure to tap the water resources potential for both agriculture and energy production.

The Nigeria Vision (NV20:2020) aims to transform agriculture to a sustainable profitable sector by increasing yields and productivity. To this end, Nigeria launched in 2001 the CAADP process in the country and prepared several policy documents, like the National The National Food Security Programme (NFSP), the 5-Point Agenda and more recently the National Agriculture Investment Plan (NAIP) 2011-2014. All these plans aim to increase the area under irrigation, although with different specific targets and time frames.

To translate those goals into reality, Nigeria is currently implementing and planning to implement a number of irrigation, and also hydropower, projects for a total of about US\$720 million. Of those US\$11.5 million would be allocated to the development of small scale irrigation systems, US\$182 million to the rehabilitation and modernization of irrigation schemes, US\$250 million to large scale irrigation development, US\$24 million to the development of small/medium scale hydropower, US\$68 million to the rehabilitation of hydropower plants and US\$111 million to the development of large scale hydropower. There is a total of US\$73.84 million dedicated to the category *Others*, which in the case of Nigeria mainly refer to drinking water supply or flood control projects. If this last category is not considered the total envelope would add up to about US\$645 million.

These figures show that investment in large scale irrigation is predominant in the envelope. The financial analysis of projects also illustrated that investment is mostly executed by public sources and that the country has a short term standpoint, since investment projects in the medium and long term are not planned.

It would be important for the country to ensure that the institutional and political environment is adequate for the success of these investments. In addition to this it is recommended that mechanisms are put in place to encourage the participation of the private sector in developing water resources and to support project formulation in the longer term.

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	2
TABLE OF CONTENTS.....	3
1. CONTEXT .....	4
1.1 AGRICULTURE AND FOOD SECURITY.....	4
Agriculture .....	4
Irrigation and Water Control .....	6
Food security.....	7
Food self sufficiency.....	7
1.2 WATER RESOURCES AND HYDROPOWER .....	8
1.3 CLIMATE CHANGE .....	10
2 NATIONAL STRATEGIES FOR WATER, AGRICULTURE AND ENERGY .....	11
3 INVESTMENT ENVELOPE .....	16
4 PROJECT PORTFOLIO AND THE NATIONAL INVESTMEN PLAN (NAIP) .....	22
5 CONCLUSIONS.....	24
ANNEX 1. PROJECT PORTFOLIO .....	26
Table 1.1. ON-GOING PROJECTS .....	26
Table 1.2. PIPELINE PROJECTS .....	33
ANNEX 2. MAP OF NIGERIA.....	41
REFERENCES .....	42

## 1. CONTEXT

### 1.1 AGRICULTURE AND FOOD SECURITY

#### Agriculture

Nigeria, with almost 169 million inhabitants in 2012 (WB 2014) is Africa's most populous country. The population is growing rapidly, and in recent years the economy has also been growing at a rapid pace. Agriculture, accounting for around 33 percent of the total GDP of the country in 2012 (WB 2014) and employing around 23 percent of the total economically active population (FAO 2014), is of great importance for the country in both economic and social terms.

However, the economic relevance of the sector has been in decline ever since the early 1970s when oil revenues started to rise. Agriculture has failed to keep pace with Nigeria's rapid population growth, so that the country now relies on imports to sustain itself. In order to reduce the dependency on oil revenues, the government has acknowledged the need to diversify the country's economy by promoting the development of the agricultural sector (Olajide et al., 2012).

Nigeria has a wide range of agro-ecological zones that can support the production of most types of crops (FAO-Aquastat, 2005, and Federal Republic of Nigeria, 2010a):

- The *dry northern savannah* is suitable for sorghum, millet, maize, groundnuts and cotton; sorghum and millet are the most important crops;
- In the *Middle Belt* and south the main food crops are cassava, yam, plantain, maize and sorghum;
- In the *south*, the main cash crops are oil palm, cocoa and rubber;
- *Low-lying and seasonally flooded areas* are increasingly producing rice.

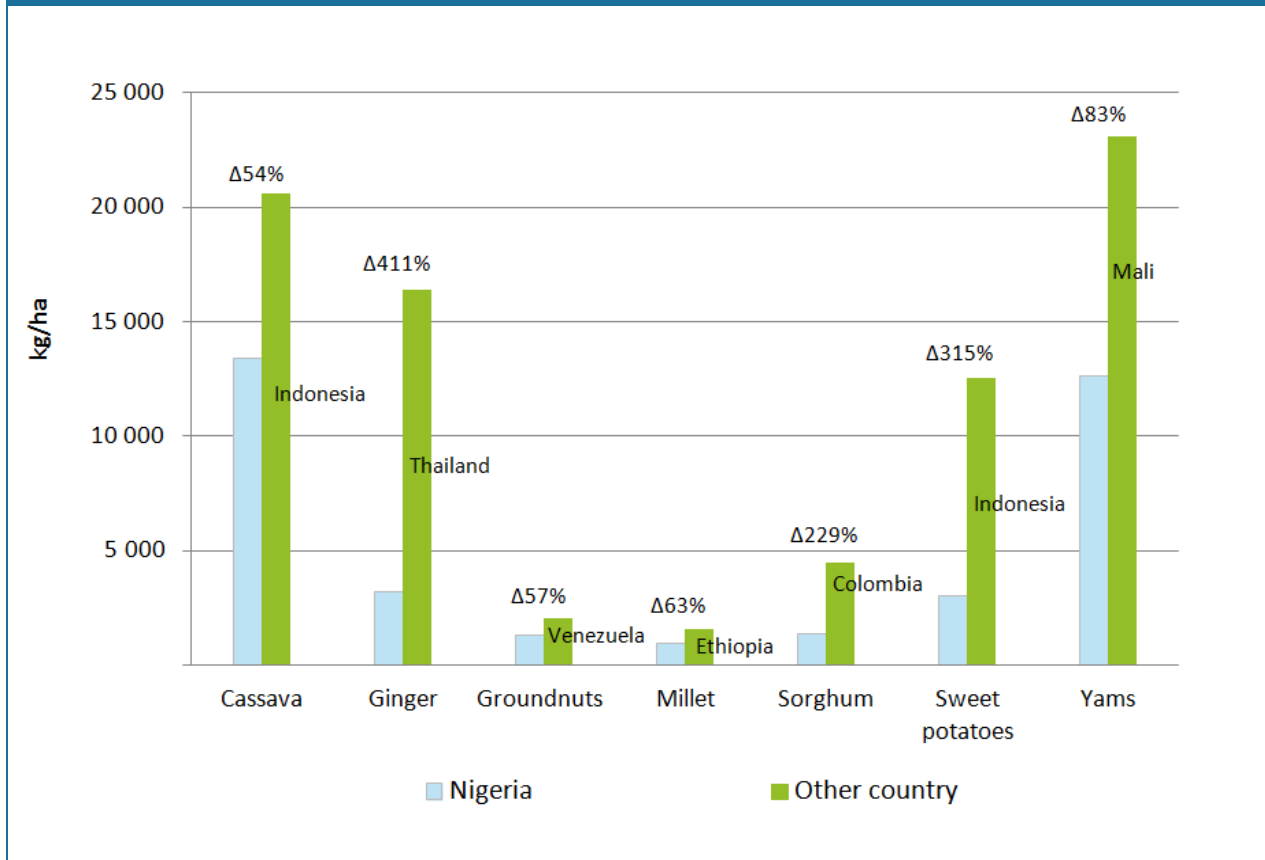
The country occupies a total land area of 92.4 million hectares (ha) which consists of 91.1 million ha of land and 1.3 million ha of water bodies. Of the available estimated arable land (61 million ha), about 40 million ha were actually cultivated in 2011 (FAO 2014).

Most of the agricultural output (up to 90 percent) comes from households with less than 2 ha under cropping. Typical farm sizes range from 0.5 ha in southern Nigeria to 4 ha in the north (Federal Republic of Nigeria, 2010a). About two-thirds of the cropped area is in the north, with the rest about equally distributed between the Middle Belt and the south (FAO-Aquastat 2005).

In spite of Nigeria's great potential for agriculture development (it is blessed with abundant water and land resources), productivity levels in the country has been low. For example, yields for the most important crops in the country, such as cassava, yam, cocoyam, ginger, sorghum,

millet, rice, maize, beans, groundnut and sweet potato, are far below their potentials (Federal Republic of Nigeria, 2010a). Figure 1 compares average yields for the period 2010-2012 in Nigeria with other developing countries for some of the crops mentioned. One can see that yield gaps can go over 400 percent, as it is the case for ginger, for which Nigeria is one of the top producers in the world. Thailand can have an output of around 16 000 kg/ha of this crop, whereas Nigeria only produces about 3 000 kg/ha.

Figure 1. Yield gaps between Nigeria and other producing countries (2010-2012)



Own elaboration using FAO 2014 data

Farming systems in the country are still predominantly subsistence-based and rainfed, which makes them dependent on weather fluctuations. In addition to this, many agricultural policies have also been ineffective. Due to these challenges, the Federal Government of Nigeria has identified the modernization of the agricultural sector as a major priority (Ehui and Tsigas, 2009). The role of irrigation in closing the yield gap is also acknowledged by the Nigerian government.

## Irrigation and Water Control

About 90 percent of Nigeria's food production comes from small rainfed farms. As it was mentioned before, the sector is dominated by subsistence farmers that produce well below potential. FAO-Aquastat (2005) estimated that the area equipped for irrigation was 293 000 ha (less than one percent of cultivated land) and the area actually irrigated was 218 800 ha. Of the latter, 173 000 ha were under private small scale irrigation and 29 000 ha under public irrigation schemes<sup>1</sup>. Private irrigation can be further classified into (a) farmer-owned and operated irrigation schemes (informal irrigation) that receive assistance from government in the form of subsidies and training; and (b) residual flood plains or *Fadama*<sup>2</sup>, where no government aid is supplied and is based on traditional irrigation practices.

The most important irrigated crops are rice, beans/cowpea, groundnuts, maize, millet, and vegetables. Together they account for 90 to 95 percent of the total water managed area.

Irrigation potential estimates in Nigeria vary from 1.5 to 3.14 million ha. The latest FAO-Aquastat figure gives a total of about 2.1 million ha, of which around 1.6 million from surface water and 0.5 million ha from groundwater. However, as far as groundwater is concerned, it should be mentioned that while the extractable water resources are sufficient for up to 0.5 million ha in the north of Nigeria, areas suitable for irrigation with groundwater have not been assessed yet. The National Agriculture Investment Plan 2010-2014, however, uses the 3.14 million ha figure. This would mean that only 9 to 14 percent of the irrigation potential in the country would be used.

This vast potential has remained untapped since there has been little private investment beyond the *fadama*-level production and public investment was probably discouraged due to its poor performance in the past years. In addition to this, there have been some institutional obstacles to the development of irrigation in the country. For instance, water and agriculture policies have usually been developed independently. Although the Federal Ministry of Water Resources (FMWR) has the overall responsibility for formulating policies and programmes for irrigation development in Nigeria, the Federal Ministry of Agriculture and Rural Development (FMARD), the State Irrigation Departments (SIDs) and the River Basin Development Authorities (RBDAs) also carry out their own programmes, notably the *Fadama* project and state irrigation schemes. This has led to a fragmented and often conflicting approach to irrigation development with the various agencies involved competing rather than cooperating with and complementing each other.

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<sup>1</sup> *The National Agricultural Investment Plan (NAIP) 2011-2014* (Federal Republic of Nigeria, 2010) gives a very different figure: it claims the area irrigated is just 40 000 ha, 1 percent of the estimated 3.14 million ha potential. The NAIP is probably only referring to public irrigation systems.

<sup>2</sup> The term *Fadama* is a Hausa name for irrigable land—usually low-lying plains underlain by shallow aquifers found along major river systems;

## Food security

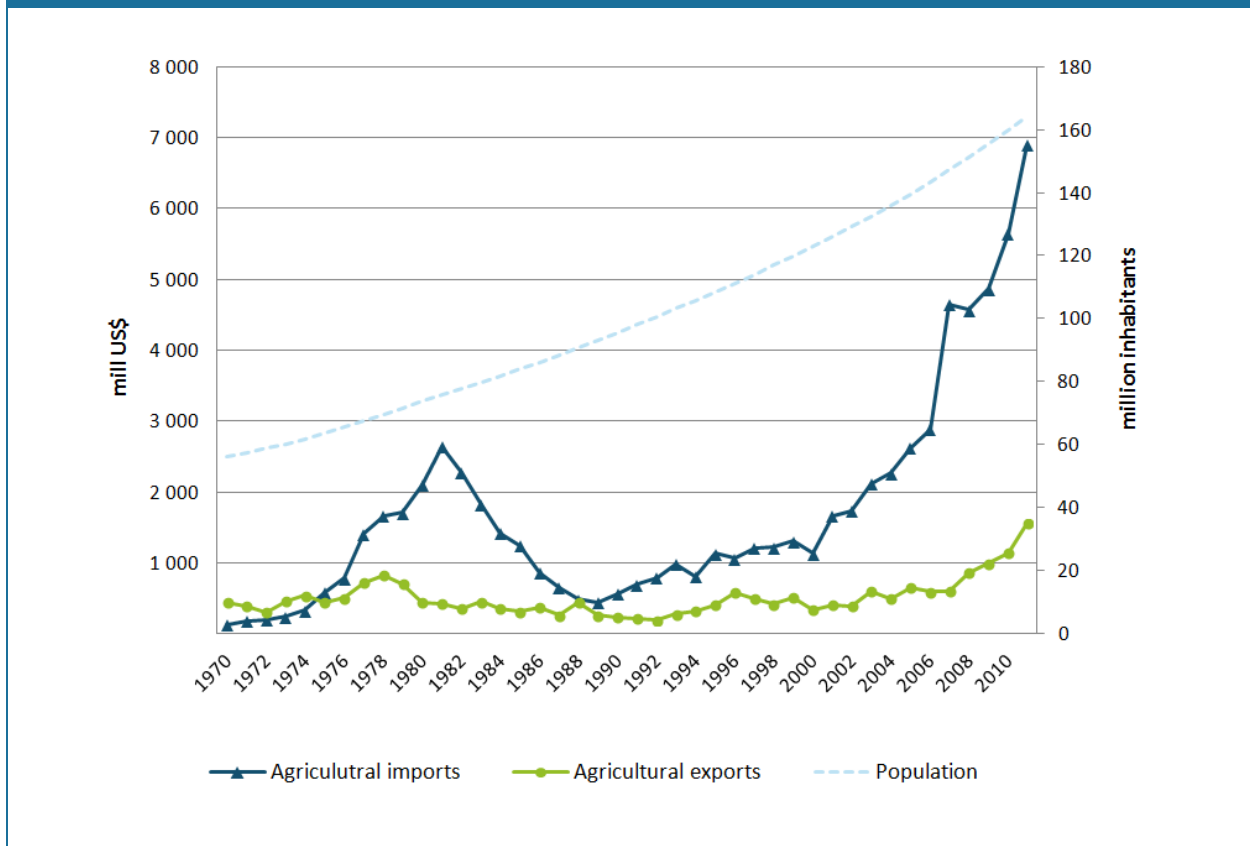
According to FAO (2013), Nigeria has made great progress in reducing the levels of undernourishment. In the past 20 years, the share of undernourished in the total population fell from 21 percent in the period 1990-92 to around 7 percent in 2011-13. However, there is still more room for improvement. It is estimated that roughly 40 percent of children under five are stunted and 25 percent are underweight. Micronutrient deficiencies in vitamin A, iron and iodine are also widespread (Federal Republic of Nigeria, 2010a).

Demand for food is expected to increase as a result of the country's growing urbanization and the quest for industrialization. Urban population has been steadily on the rise, already accounting for 50 percent of the total population in 2011. It is expected that by 2050, it will increase to a 60 percent.

## Food self sufficiency

The largely subsistence agricultural sector in the country has failed to keep up with rapid population growth, making Nigeria a net food importer. Figure 2 shows how Nigeria's import bill for agricultural products has been on the rise ever since the late 1980s. It grew from US\$485 million in 1988 to almost US\$7 000 million in 2011. The sharpest increase was between 2006 and 2011, when the bill more than doubled. The main imported products (in value) for the period 2009-2011 were wheat, rice, palm oil and sugar.

As for exports, there has also been an increase from the late 1980s until nowadays, however, at a much slower pace than imports. The export earnings for agriculture went up from US\$400 million in 1988 to around US\$1 500 million in 2011. Main exported products (in value) for the period 2009-2011 were cocoa beans, butter, sesame seeds, rubber, cigarettes and cotton lint.

Figure 2. Trade in agricultural<sup>3</sup> products in value 1970-2011

Own elaboration using FAO 2014 data

## 1.2 WATER RESOURCES AND HYDROPOWER

The country is well drained with a close network of rivers and streams. Some of these, particularly the smaller ones in the north, are seasonal. There are four principal surface water basins in Nigeria (Figure 3); the Niger Basin, the Lake Chad Basin, the West Coast basin and the West Central Coast basin. The country has also extensive groundwater resources, located in eight recognized hydro-geological areas together with local groundwater in shallow alluvial (Fadama) aquifers adjacent to major rivers. Nigeria's total annual renewable water resources are estimated at 286.2 km<sup>3</sup>. Annual internally produced resources amount to 221 km<sup>3</sup>, made up of 214 km<sup>3</sup> surface water and 87 km<sup>3</sup> groundwater, while 80 km<sup>3</sup> of the latter is assumed to be overlap between surface water and groundwater. External water resources are estimated at 65.2 km<sup>3</sup>/year, being surface water coming from Niger, Cameroon and Benin. Exploitable surface water resources are estimated to be 80 percent of the natural flow, which is about 96

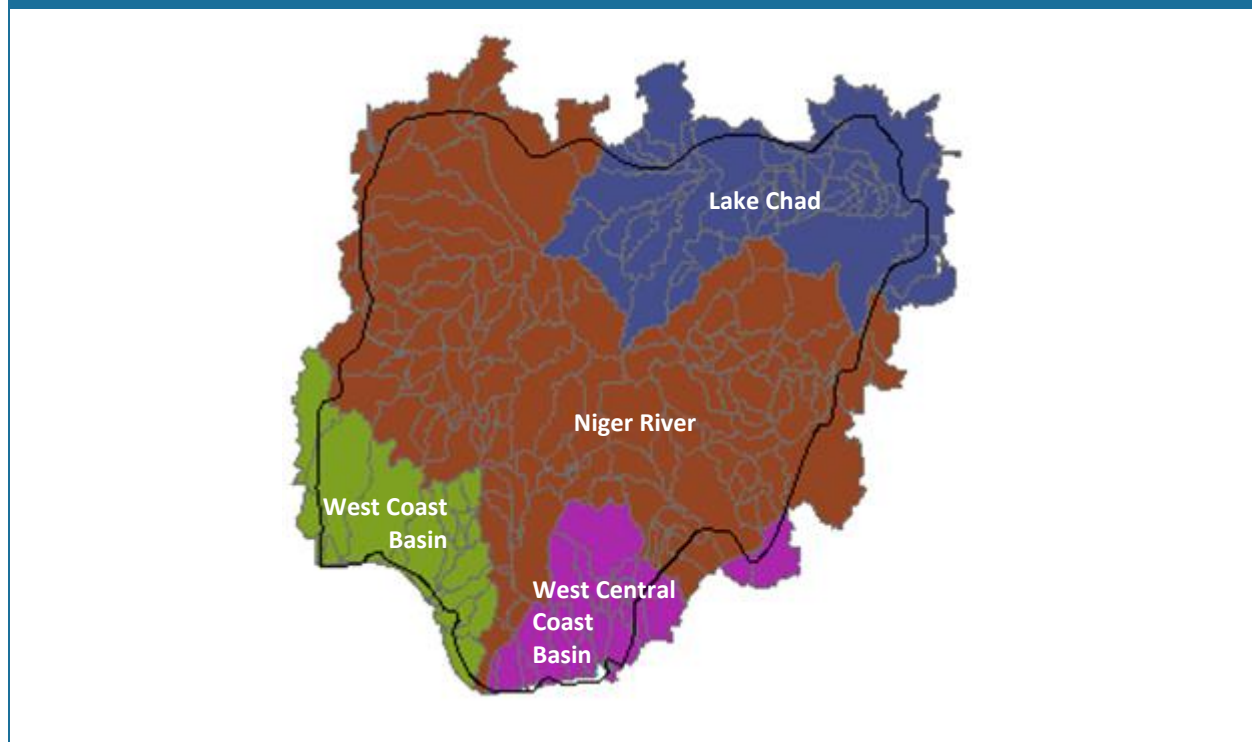
<sup>3</sup> Refers to crop and livestock products



km<sup>3</sup>/year. Annual extractable groundwater resources are about 59.51 km<sup>3</sup>, distributed as follows: 10.27 km<sup>3</sup> in northern Nigeria; 25.48 km<sup>3</sup> in the Middle Belt; 23.76 km<sup>3</sup> in the south. Dam capacity is estimated to be 45.6 km<sup>3</sup>.

Total annual water withdrawal was estimated at 8 km<sup>3</sup> for the year 2000. Agriculture was the biggest water user with 5.5 km<sup>3</sup>, or 69 percent of the total water withdrawal, followed by municipalities with about 1.7 km<sup>3</sup> (21 percent) and industry with 0.8 km<sup>3</sup> (10 percent).

**Figure 3. The four major river basins in Nigeria**



*Oshodi, K.O., n.d*

Regarding energy resources, hydropower is one of the largest energy resource for electricity generation in the country, accounting for about 24 percent of the total electricity produced in 2010 (UNdata 2014).

The National Energy Policy of Nigeria estimates that the technically exploitable hydropower potential of the country is about 10 734 MW, with 10 000 MW corresponding to large scale hydropower<sup>4</sup> and 734 MW to small scale hydropower. By 2001, only 20 percent of this potential had been exploited.

A latter communication in 2013 by the Director General of the Energy Commission of Nigeria, gave a slightly higher figure for hydropower potential, estimated at around 15 000 MW, with

<sup>4</sup> Large scale hydropower is defined when a facility has a capacity over 100 MW.

3 450 MW corresponding to small scale generation. Nigeria has currently (2010) a hydropower installed capacity of 2381 MW (UNdata 2014), accounting for 16 percent of that potential.

Considering this potential and that the average access to electricity in the country is only about 50 percent (WB, 2014)<sup>5</sup>, Nigeria has both the need and the capacity to significantly improve its energy security.

### 1.3 CLIMATE CHANGE

Nigeria is located primarily within the lowland humid tropics and is generally characterized by a high temperature regime almost through the year. In the far south, mean maximum temperature is 32°C while in the north it is 41°C. However, the mean minimum temperature is 21°C in the south and under 13°C in the north which has a much higher annual range. The mean temperature for the country is 27°C, in the absence of altitudinal modifications. Over the last few decades, there has been a general increase in temperature throughout Nigeria.

The effects of climate change have been detectable in Nigeria since the 1960s and differ across the country. While excessive flooding, especially during the past decade, has impacted negatively on farming in coastal communities, desertification is affecting the Sahel. Traditionally, desertification in the Sahel has been blamed on overgrazing practices of the local population. But it has been discovered that climate change also plays a role in this process. Rainfall in the Sahel has been declining steadily since the 1960s. The result has been the loss of farmlands and conflicts between farmers and herdsman over ever decreasing land.

In Nigeria's First National Communication to the UNFCCC (Ministry of Environment of the Federal Republic of Nigeria, 2003), the expected climate changes are analyzed for the period 1961-2100. The main findings are summarized below:

- The most significant changes are with respect to temperature and temperature related parameters. Depending on the emission scenarios, changes in minimum and maximum temperatures could be around 7°C or more in certain parts of the country.
- There has been an observed trend towards aridity in Sub Saharan West Africa. Findings in Nigeria suggest that this trend could be arrested or reversed as the century progresses. However, it is likely that additional water needs created by higher temperatures may not be met by increases in rainfall.
- With distance from the sea, rainfall and humidity will decrease and temperature will increase.

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<sup>5</sup> In urban areas access to electricity is estimated at 87 per cent and the rural areas at about 40 per cent.

The expected climatic changes have implications for various sectors of the economy. Agriculture, being predominantly rainfed, is very vulnerable to climate change. The First National Communication of Nigeria to the UNFCCC (Ministry of Environment of the Federal Republic of Nigeria, 2003) proposes the following measures to adapt and cope with climate change: (1) alteration of planting calendar and crop choices; (2) increased irrigation and number of watering points; (3) use of terraces, ridges, and minimum tillage; (4) careful use of agrochemicals and supplementary feeding; (5) reference of polyculture over monoculture; (6) reduction of stocking rates or livestock density; (7) restoration and expansion of grazing areas and (8) provision of effective extension services.

## 2 NATIONAL STRATEGIES FOR WATER, AGRICULTURE AND ENERGY

### Overall development strategies

Nigeria's overall development agenda is guided by its **Vision 20:2020 (NV20:2020)** that was launched in 2010. The country's goal is to become one of the top 20 economies in the world by 2020. Income per capita would rise from the current (2008) US\$1 230 to \$US\$4 000 by the end of the vision's implementation period.

NV20:2020 aims to transform agriculture to a sustainable profitable sector by increasing yields and productivity. It is expected that agriculture and industry would drive economic growth over the medium term of the vision period, while the manufacturing and service sectors would take over in the long term. Although agriculture will still be a key sector in Nigeria's economy, its relative importance will experience a decline. In terms of food security, the country will adopt supporting initiatives to protect long-term use of farmlands and put in place clear property rights. It will also support agricultural research and promote greater dissemination/adoption of appropriate agricultural technologies and the development of infrastructure (Federal Government of Nigeria, 2010b).

In order to realize Nigeria's vision and the MDG goals, the country prepared other important policy documents like the second **National Economic Empowerment and Development Strategy 2008-2011 (NEEDS II)**<sup>6</sup>, and the **7-Point agenda**.

The **NEEDS** focused in four key areas: poverty reduction, wealth creation, employment generation and value reorientation. The strategic approach to reach the NEEDS' goals was: (i) the promotion of the private sector as the engine of growth; (ii) the government to take the role of an efficient and effective catalyst, enabler and regulator; (iii) huge and productive

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<sup>6</sup> The NEEDS hasn't been further updated after 2011

investments in human capital; (iv) adoption of frontier shifting development approach and (v) commitment to international economic diplomacy.

In order to realize its goals by 2020, the **7 Point Agenda** stands on the following pillars (after Dode 2010): (1) *Critical Infrastructure*: with a focus on developing adequate power supply to facilitate industrialization and the development of rail, road, air and water transportation; (2) *Niger Delta*: the objective is to ensure provision of physical infrastructure and empowerment of the people in the region; (3) *Food Security*: by enhancing agricultural and water resources to ensure adequate food supply for local consumption and export; (4) *Human Capital Development*: this would involve the reform of the education sector; (5) *Land Tenure and Home Ownership*: land use laws would be reviewed and citizens' access to mortgage services will be facilitated; (6) *National Security and Intelligence*: the administration intends to give adequate attention to the provision of security to lives and property; (7) *Wealth Creation*: by diversifying the nation's revenue base and increasing job opportunities.

### Agriculture and irrigation

Under the framework of overall development policies (mentioned above) and the **Comprehensive Africa Agriculture Development Programme (CAADP)**, Nigeria has prepared different policy documents and investment plans regarding agriculture and food security. In 2008, it launched the **National Food Security Programme (NFSP)** and one year later, the **5-Point Agenda** for agriculture and national development. Later on, in 2010, Nigeria prepared its **National Agriculture Investment Plan (NAIP)**. In addition to this, the country is currently drafting its **Irrigation Policy and Strategy**.

The **Comprehensive Africa Agriculture Development Programme (CAADP)** has the main goal of eliminating hunger and reducing poverty through agriculture. To achieve this goal, African leaders' agreed to increase public investment in agriculture by a minimum of 10 percent of their national budgets and to raise agricultural productivity. The CAADP is articulated around 4 pillars: (1) Land & water management; (2) Market access; (3) Food supply and hunger; and (4) Agricultural research.

Nigeria started its CAADP process in 2001 after the Maputo Declaration and established a CAADP Process Steering Committee in 2005. The country has set a target of 10 percent annual growth rate for the agricultural sector, compared to the 6 percent annual rate agreed by CAADP in Maputo in 2003. The following policy documents were prepared in line with CAADP's goals and objectives.

The **National Food Security Programme (NFSP)**, issued by the Federal Ministry of Agriculture and Water Resources<sup>7</sup> aims to attain food security, by granting access to all Nigerians to good-

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<sup>7</sup> In April 2010 the [Ministry of Water Resources](#) became separate from the Ministry of Agriculture

quality food, and to transform Nigeria in a major food exporter. The priority crops for achieving food security are cassava, rice, millet and wheat. The focus of the programme is to increase value in production, particularly downstream in the chain, by improving storage and processing facilities, and access to agricultural markets. The programme also plans the development of about 450 000 ha of irrigation schemes (Grandval and Douillet 2011).

In order to achieve the objectives of the NFSP, the Federal Ministry of Agriculture and Water Resources also prepared the **5-Point Agenda** for agriculture and national development. It proposes 5 key steps for developing the agriculture sector of the country. These are:

1. Developing Agricultural Policy and Regulatory System (DAPRS);
2. Establishing a Agricultural Commodity Exchange Market (ACCOMEX);
3. Raising Agricultural Income with Sustainable Environment (RAISE);
4. Maximising Agricultural Revenue in Key Enterprises (MARKETS);
5. Water, Aquaculture and Environmental Resource Management.

The water management agenda (fifth point in the strategic agenda) includes the development of 1 500 targeted RAISE (Raising Agricultural Income with Sustainable Environment) sites with small dams and irrigation infrastructure facilities (Federal Republic of Nigeria 2010a).

The NFSP, the 5-Point Agenda and the CAADP, were the basis for the development of the **National Agriculture Investment Plan (NAIP)**. One of the specific objectives of this Plan is to increase the irrigated area from 1 to 10 percent of cultivated land by 2015.

The NAIP concentrates on five key components that are critical to meeting the country's food security objectives. Each component includes sub-components in the form of ongoing programmes / projects and developmental interventions which require up-scaling in terms of geographical coverage, increased number of beneficiaries and enhanced output (Federal Republic of Nigeria 2010a). These are: (1) Agricultural Productivity Enhancement; (2) Support to Commercial Agriculture; (3) Land Management and Water Control; (4) Linkages and Support for Inputs and Product Markets; and (5) Programme Coordination, Monitoring and Evaluation.

Component (1) is focused on raising crop production, which is central to the country's food security. The description of component one includes the following goal: "Increasing functional irrigated land from 40 000 ha to 200 000 ha by 2013." This seems extremely ambitious<sup>8</sup>; indeed a technical review under the CAADP compact suggested it needs a "reality check" (CAADP

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<sup>8</sup> The baseline figure used to establish this goal has to still be clarified. Aquastat talks about 218 000 ha already under irrigation in the country in 2005. It has to be specified whether the 40 000 ha mentioned refer to public systems.

Technical Review Panel 2010). Similar ambitious targets are found in the briefing note of the 19<sup>th</sup> meeting of the National Council on Water Resources (NCWR 2008). The “Action Memorandum of the Plan for Irrigation Development in Nigeria from 2008 to 2020” proposes to develop over 854 000 ha under irrigation during the 2008-2020 to boost food production and alleviate poverty. This Council uses 3.14 million ha as the irrigation potential of Nigeria—the higher end of the range of estimates. The memorandum also mentions in passing in its last sentence, “the establishment of a National Irrigation Development Fund to manage part of the Natural Resources Fund.” We are not aware of the current status of this proposed fund.

The projects within component 1 most related to agriculture water management are the Third *National Fadama Development Project (Fadama III)* and the *NERICA<sup>9</sup> Rice Dissemination project*.

*Fadama III* aims at expanding irrigation and reducing land degradation. The project, funded by the World Bank, started in 2009 and is currently about to close (2014). The NAIP proposes project up scaling in order to increase project’s beneficiaries and add components related to major crop processing and marketing (cassava, cereals, oil palm, etc), fish feed production and livestock (cattle and small ruminants) production.

The NERICA Project focuses on supporting small scale rice farmers to improve production by transferring NERICA varieties and complementary technologies. The NERICA intervention under NAIP will result in cultivation of an additional 108 000 ha by the end of the project life in four years (2014). The NAIP estimated that approximately US\$10 million was required for upscaling the project.

Component 3, ‘Land Management and Water Control’, has multiple programmes and projects, most continuing from previous years. Most of the activities are aimed at improving the performance and sustainability of existing irrigation schemes. Included are efforts to restructure the River Basin Development Authorities along public-private-partnership (PPP) principles, and extension and upgrading of a number of larger-scale irrigation schemes. The NAIP estimated that approximately US\$230 million was required for the implementation of those projects between 2010 and 2014.

The chapter on monitoring and evaluation (M&E) discusses rehabilitation of about 300 micro earth dams and construction of 200 new dams (including watershed management interventions) as a program under a “Community Development Fund” supported by Chinese technicians.

The country is currently preparing a National Irrigation Policy and Strategy. It recommends integrated water resource management, consolidation of existing investments where commercially viable, institutional change and reform for the river basin development

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<sup>9</sup> New Rice for Africa

authorities (RBDA's), land and water legislation, and the development of beneficiary-led irrigation schemes. Its primary goal is to improve the performance of irrigation services. It is meant to support efforts by other irrigation service providers, for example FMARD and state organizations, and to provide an overall supportive policy context for reform and development. There is a strong emphasis on providing incentives to private irrigation development and services. It also includes a chapter on investment plans that are supportive of the thrust of the NAIP.

### Water resources

The National Water Policy (NWP) was promulgated in 2004, based on the principles of Integrated Water Resources Management. The country's vision is to optimize the use of its water resources at all times and to ensure their sustainability. The NWP advocates the use of a river basin management approach and the regulation of allocations of water resources. The government would still play an important role in the management of water resources but with a greater participation of water users (Federal Republic of Nigeria 2004).

### Energy and hydropower

The **National Energy policy (NEP)** was promulgated in April 2003 with nine objectives between them targeted at cost effectiveness, technological diversity, reliability and international cooperation (Energy Commission of Nigeria 2003). With specific respect to hydropower, the policy recognizes that the country's vast potential, estimated to be some 10 000 MW, is under-utilized. Accordingly it calls for the full development of this potential, but does not limit the technology merely to large scale dams. Instead it promotes min-hydro as an alternative, while insisting that any development should be environmentally responsible while, in the case of transboundary rivers, without compromising any applicable agreements. Finally, it is important to note that Nigeria has developed detailed and comprehensive mitigation and adaption strategies with respect to climate change (FAO 2008).

In an effort to implement the renewable energy component of the NEP, the Energy Commission of Nigeria (ECN) developed the **Renewable Energy Master Plan (REMP)** in 2005. It aims to create the appropriate enabling environment for the promotion of renewable energies, by putting in place financial and legal instruments, developing technology, raising awareness and building capacities. The REMP aims for renewable energies to contribute to a 10 percent in the national energy mix by 2020 (Mshelia 2012).

### 3 INVESTMENT ENVELOPE

The **investment envelope** is a matrix that presents current and planned investment in the development of water resources for agriculture and hydropower production in a given country.

The investment envelope is produced through the application of a **Financial Diagnostic Tool**. This tool processes project-based information (section 4) to derive the investment estimates at country level. The necessary project information to plug in the tool includes: project description, funding partners, time-scale, total cost, type of project, etc. Project types that are included in the tool are the following:

1. Small/medium scale irrigation development
2. Rehabilitation/modernization of irrigation
3. Large Scale Irrigation development<sup>10</sup>
4. Small/medium scale hydropower development
5. Rehabilitation of hydropower plants
6. Large scale hydropower development<sup>11</sup>
7. Others (drinking water supply, flood control structure-dykes, culverts, bridges etc)

The Financial Diagnostic Tool incorporates a number of assumptions amongst which are the project cost distribution over time and the relevance of the water component as a percentage of the total cost. A conversion rate (yearly average) to change to US dollars any other base currency has also been applied and projections have been made for the period after 2013 with the use of an exponential regression.

The tool also helps conducting **complementary financial analysis** including: investment by type of project, contribution of different sources of financing, hectares to develop/rehabilitate by crop, etc. This complementary financial analysis is also presented in this section in Figures 6 to 12.

The investment envelope can be found in Table 2. It presents investment estimates according to the project typologies mentioned above and three time scales: short term (less than 4 years), medium term (between 4 and 8 years), and long term (more than 8 years)<sup>12</sup>.

In the case of Nigeria, the investment envelope has been calculated based on 45 on-going projects and 56 pipeline projects listed in Annex 1. The on-going projects range from a cost of

<sup>10</sup> Large scale irrigation is considered over 1000 ha.

<sup>11</sup> Large scale hydropower is considered when installed capacity is over 10 MW.

<sup>12</sup> The baseline year considered for the analysis is 2013. Therefore investment in the short term would be executed from 2014 to the end of 2017, in the medium term, from 2018 to the end of 2021 and in the long term, from 2021 onwards.



about US\$10 000 to about US\$472 million. The pipeline projects have, on average, much lower average investment costs and range between a minimum of about US\$10 000 and a maximum of US\$66 million (Table 1).

Table 1. Summary statistics of the Projects Portfolio		
	On-going	Pipeline
Number of Projects	45	56
Min (million US\$)	0.01	0.01
Max (million US\$)	472	66
Average (million US\$)	40.3	3.0
Mode (million US\$)	0.01	0.02

A close look at the distribution of costs amongst on-going projects (Figure 4) shows that six projects (13 percent of the projects) have costs above US\$100 million. There are 11 projects (24 percent of total projects) with costs between US\$100 million and a US\$10 million and 28 projects (63 percent of total projects) that have investment costs lower than US\$10 million. As for projects in the pipeline (Figure 5), only six of them (11 percent of the projects) have costs above US\$10 million, 17 projects have investment costs between US\$10 million and US\$1 million, and the remaining 33 projects cost less than US\$200 000. Of those, 31 projects have costs around US\$20 000.

Figure 4. Project Cost distribution – On-going Projects

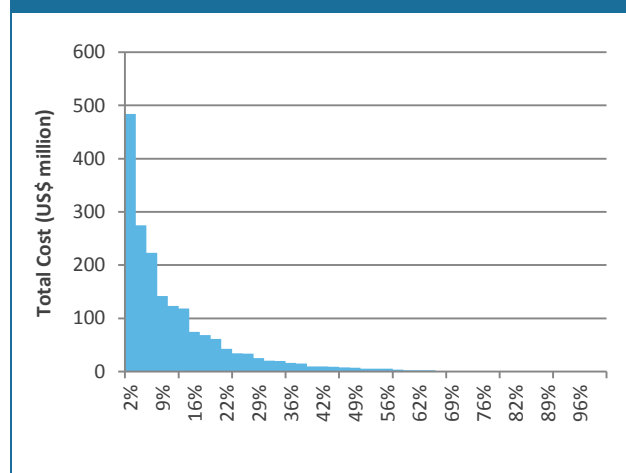
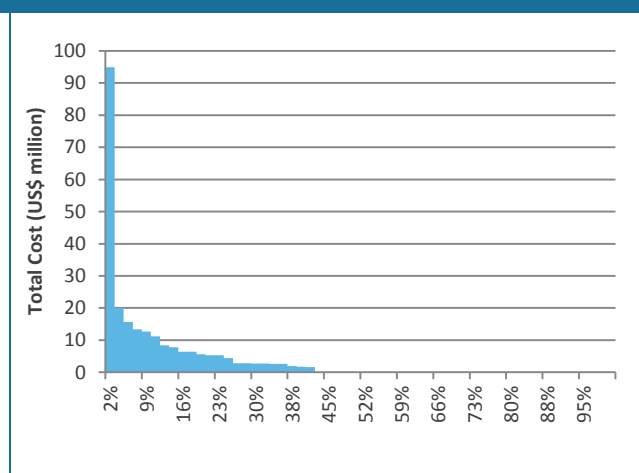


Figure 5. Project Cost distribution – Pipeline Projects



The total investment envelope for Nigeria has been estimated at almost US\$720 million (Table 2), where US\$11.5 million are allocated to the development of small scale irrigation systems, about US\$182 million to the rehabilitation and modernization of irrigation schemes, US\$250 million to large scale irrigation development, US\$24 million are allocated to the development of small/medium scale hydropower, US\$68 million to the rehabilitation of hydropower plants and US\$111 million to the development of large scale hydropower. There is a total of US\$73.84 million dedicated to *Others*, which in the case of Nigeria mainly refers to drinking water supply or flood control. If this last category is not considered the total envelope would add up to about US\$645 million.

The total amount of the three irrigation categories is US\$443 million (62 percent of the envelope), while the hydropower categories would add up to US\$202.5 million (28 percent).

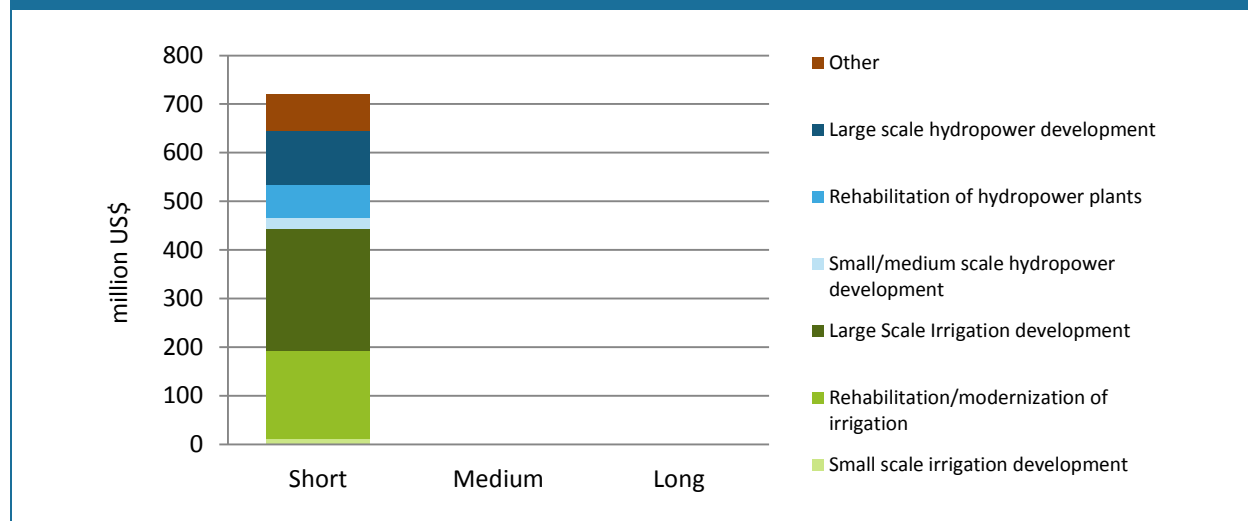
The totality of the investment is expected to take place in the short term. It is anticipated that on-going projects would end by 2016. As for pipeline projects, if funds are secured this year or the next (which is likely), none of them will go beyond 2017.

Time Frame Size of project	Short-term		Medium-term		Long-term		Total	
	M US\$	%	M US\$	%	M US\$	%	M US\$	%
Small Scale irrigation development	11.48	2%	0.00	0%	0.00	0%	<b>11.48</b>	2%
Rehabilitation/modernization of irrigation schemes	181.97	25%	0.00	0%	0.00	0%	<b>181.97</b>	25%
Large Scale Irrigation development	249.31	35%	0.00	0%	0.00	0%	<b>249.31</b>	35%
Small/ medium scale hydropower	23.85	3%	0.00	0%	0.00	0%	<b>23.85</b>	3%
Rehabilitation of hydropower plants	67.95	9%	0.00	0%	0.00	0%	<b>67.95</b>	9%
Large scale hydropower development	110.66	15%	0.00	0%	0.00	0%	<b>110.66</b>	15%
Others	73.84	10%	0.00	0%	0.00	0%	<b>73.84</b>	10%
<b>Total</b>	<b>719.06</b>	<b>100%</b>	<b>0.00</b>	<b>0%</b>	<b>0.00</b>	<b>0%</b>	<b>719.06</b>	<b>100%</b>

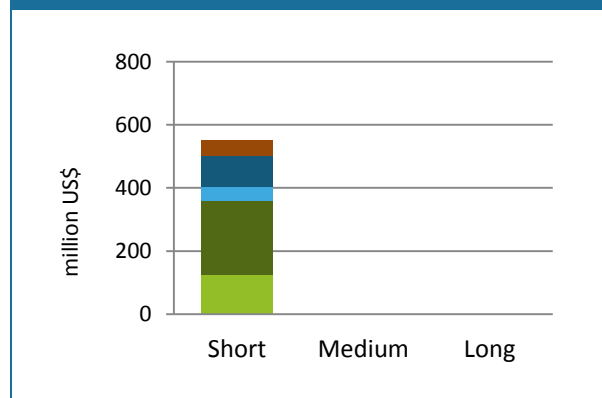
### Cost distribution

Figures 6 to 8 illustrate the distribution of project costs in time by type of project for those on-going and in the pipeline. As it was mentioned before, it can be seen that the totality of the investment would take place in the short term.

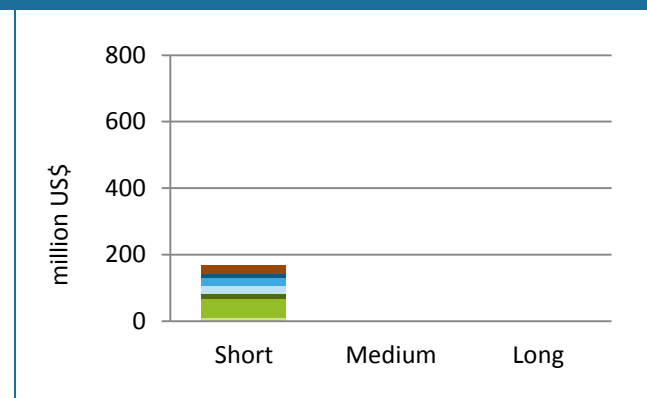
**Figure 6. Cost distribution in time per typology – All Projects (US\$ million)**



**Figure 7. Cost distribution in time per typology – On-going Projects (US\$ million)**



**Figure 8. Cost distribution in time per typology – Pipeline Projects (US\$ million)**



Figures 9 to 11 show the distribution of costs by type of project. At a first glance, it can be seen that the investment envelope is dominated by projects on large scale irrigation development (35 percent) and the rehabilitation/modernization of irrigation (25 percent). When looking into on-going projects a similar trend can be found, whereas for pipeline projects, it seems that categories are more evenly distributed, when excluding projects on irrigation modernization that account for 34 percent of the total costs.

Figure 9. Cost share per typology – All Projects (%)

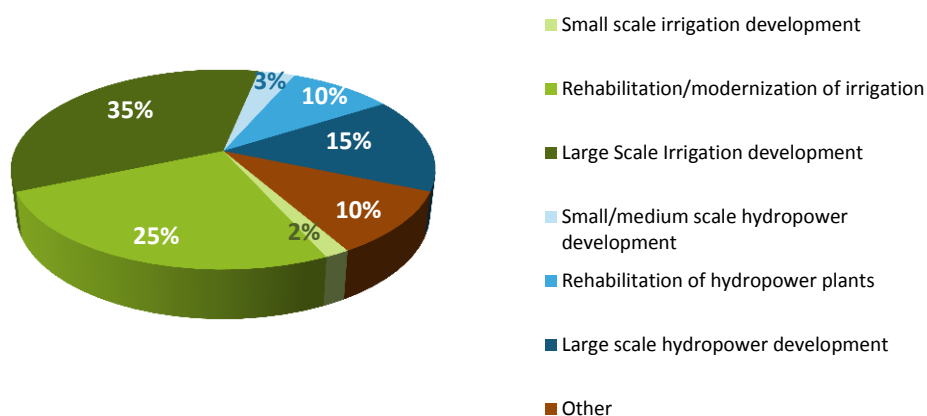


Figure 10. Cost share per typology – On-going Projects (%)

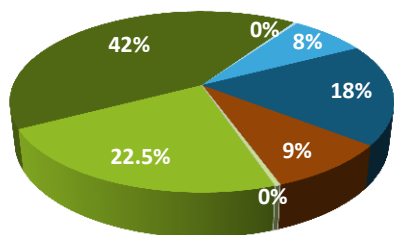
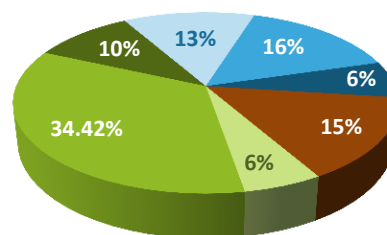


Figure 11. Cost share per typology – Pipeline Projects (%)



### Source of funding

Regarding the sources of funding for projects, the envelope is dominated by public sources, i.e. the Federal and State Government of Nigeria. There are eight on-going projects funded by the World Bank and the farmers, related to the development of Fadama areas. For most of the pipeline projects, funds are still to be approved, therefore the investor would be still unknown, but it is likely that the Federal/State Government of Nigeria would execute those investments.

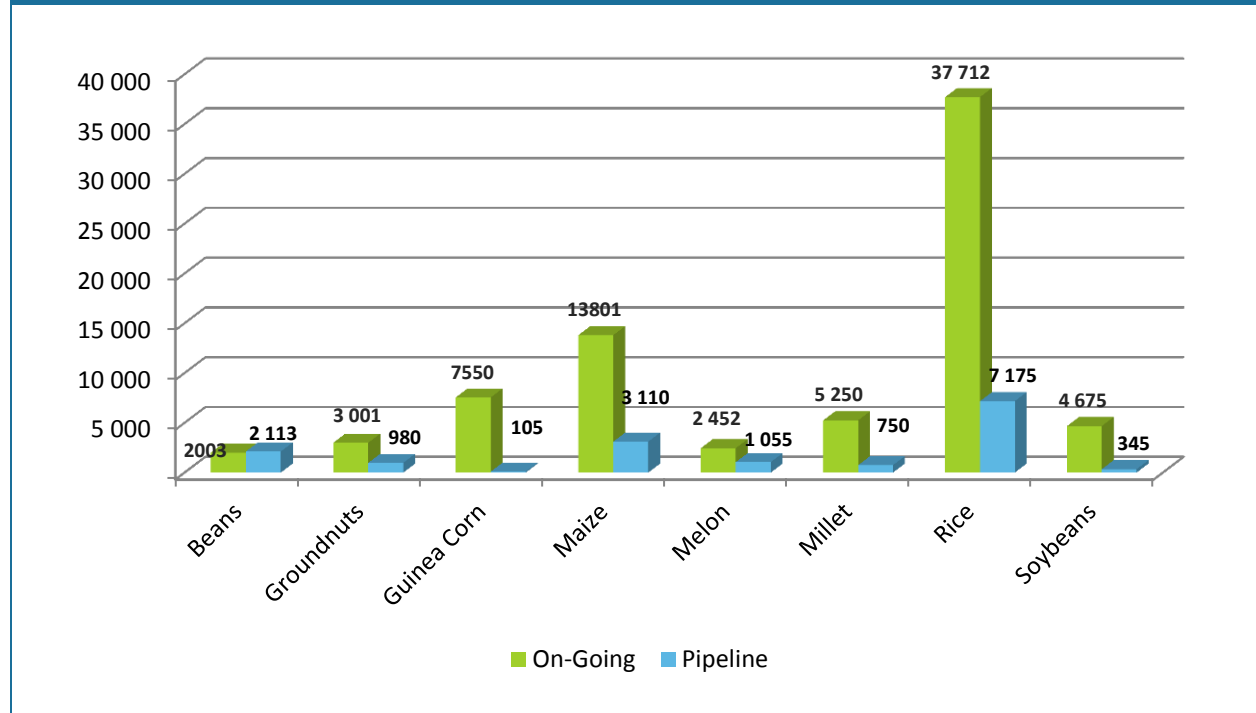
### Hectares to develop/rehabilitate

The project portfolio is bringing changes to about 92 079 ha of crop land in the country, 76 446 ha from on-going projects and 15 633 ha from pipeline projects.

Once all projects in the portfolio are implemented, the additional area developed under irrigation would add up to 34 881 ha, while the surface benefitting from the rehabilitation of irrigation schemes or dams would be 57 198 ha.

Figure 12 shows the cropping pattern (percentage of area to be developed/rehabilitated per crop) derived from the projects in the portfolio. Rice is the predominant in both on-going and pipeline projects. The rest of crops covered by projects are maize, beans, groundnuts, melon, millet and soybeans.

Figure 12. Distribution of hectares by crop (ha)



## 4 PROJECT PORTFOLIO AND THE NATIONAL INVESTMENT PLAN (NAIP)

As it was explained before, the investment envelope was built with information from a national inventory of irrigation and hydropower projects currently on-going or in the pipeline. These projects are presented in Annex 1 (table 1.1 for on-going projects and 1.2 for pipeline projects). The main sources used to obtain the information presented are: Federal Ministry of Agriculture and Rural Development, the Federal Ministry of Water Resources, Fadama development offices, River Basin Development Authorities, State Governments, etc.

### The project portfolio and the projects in the National Agriculture Investment Plan

When looking into irrigation/agriculture water management (AWM) projects, the portfolio in this report includes most of those projects mentioned in the National Agriculture Investment Plan (Table 3). The ones that have not been included have probably been implemented or are still in the design phase. One can also find among the on-going projects, those related to Fadama III that are about to end. There are also a number of projects dedicated to rice (either for rehabilitation or development of new areas) that are probably linked with the NERICA programme.

The NAIP also mentions the rehabilitation of 300 earth dams and 200 new dams. So far, the country is rehabilitating (or planning to rehabilitate in the short term) 30 earth dams and there are formulated projects for the constructions of 3 dams and 2 weirs.

This means that the country is actually implementing/formulating those project ideas envisaged in the investment plan, although it seems that is doing it at a higher cost (Table 3).

**Table 3. Comparison between irrigation/AWM related projects in NAIP and the project portfolio**

National Agriculture Investment Plan (NAIP) (2010)			Project portfolio - Country Investment Brief (CIB) (2013)		
Title	Time frame	Total cost (m Nairas)	Title	Time frame	Total cost (m Nairas)
Fadama III (C 1.1) <sup>13</sup>	2011-2014	10 823	Fadama projects (On-going #: 2, 3, 9, 17, 25, 30, 36, 37)	2011-2014	1.5
NERICA (C 1.3)	2011-2014	14 79	There are a number of projects to develop the area under rice production but it has not been specified whether these projects are part of NERICA		
Zauro polder Irrigation project (C 3.4)	2012-2014	15 060	Zauro Polder Irrigation Project (On-going #45)	2010-2016	18 586
Middle Ogun Irrigation project (C 3.5)	2012-2014	3 320	Middle Ogun Irrigation project (On-going #28)	2002-2015	8 400
Ukwa Land Reclamation and Irrigation scheme (C 3.7)	2012-2014	750	-		
South Chad Irrigation project(C 3.8)	2012-2014	2 800	South Chad Irrigation project (On-going #43)	1992-2015	2 800
Girinyan Irrigation project (C 3.9)	2011-2013	1 700	Girinyan Irrigation project (Pipeline #30)	2014-2015	2 000
Construction of weir and Irrigation Scheme (C 3.10)	2011-2014	800	-		
Tunga-Kawo Dam and Irrigation Project (C 3.11)	2011-2013	1 000	Tunga-Kawo Dam and Irrigation Project (Pipeline #53)	2015-2018	1 200
Illa-Ebu Irrigation project (C 3.12)	2011-2013	1 300	-		
Dadin Kowa Dam and Irrigation project (C 3.12)	2011-2014	1 100	Dadin Kowa Dam and Irrigation project (On-going #8)	2010-2014	3 000
Challawa Karaye Irrigation project (C 3.13)	2011-2013	1 100	Challawa Karaye Irrigation project (Pipeline #12)	2014-2015	1 000
Small Scale Irrigation project Delta (C 3.14)	2011-2014	3 000	--		
Itu Irrigation/Drainage/flood control project (C 3.15)	2011-2014	870	Itu Irrigation/Drainage/flood control project (On-going #21)	2012-2014	870
Ofu-Imabolo Irrigation project (C 3.16)	2011-2013	1 120	-		
Small Scale Irrigation Scheme Goronyo (C 3.17)	2011-2013	1 000	Small Scale Irrigation Scheme Goronyo (On-going #29)	2009-2014	21 200

<sup>13</sup> C .1.1. refers to the component (1) and subcomponent (1.1.) in the NAIP. The same applies for the rest of the NAIP projects.

## 5 CONCLUSIONS

Based on the information and analysis presented in this report, the following can be concluded:

- a) It appears that Nigeria is over investing in large scale irrigation as opposed to small scale irrigation schemes, with US\$250 million investment for the former and US\$11.5 million for the later. Historically, large scale irrigation systems in the country have underperformed, therefore measures should be put in place to ensure the success of these on-going and planned investments.
- b) The totality of the expected investment in irrigation and hydropower will take place in the short term (until 2017). This highlights the lack of long-term strategic investment in the country in contrast with some plans, like the “Action Memorandum of the Plan for Irrigation Development in Nigeria from 2008 to 2020” that proposes to develop over 854 000 ha under irrigation for the same period.
- c) Public sources of funding are predominant in the Nigerian investment envelope, thus the country seems to be neglecting the potential role of the private sector<sup>14</sup> (i.e. small farmers as well as more commercial ones). This would contradict the country’s objective of *arriving at a private sector led growth agenda* in the water and agriculture sector. Mechanisms should be put in place to attain this goal.
- d) Irrigation projects are mostly targeting rice production, reflecting the need to reduce import dependency on this crop (Nigeria is the largest net importer of rice in Africa).
- e) Investment/expenditure in operation and maintenance (O&M) of irrigation schemes has not been specified in the list of projects in the portfolio. Countries should not forget about the importance of O&M for the correct functioning and performance of irrigation systems.
- f) There is some contradiction regarding figures on current area under irrigation in the country. FAO-Aquastat, which draws its data from official sources, estimates that in 2005 there were 293 000 ha under irrigation, whereas the *National Agricultural Investment Plan (NAIP) 2011-2014*, provides a very different figure. It claims that the irrigated area is just 40 000 ha. Although it seems that the NAIP’s figure is probably referring to only public irrigation systems, this has to be clarified in future planning. The consistency of data is very important since this type of information is used as a baseline to establish future targets. The better the information on the current situation, the better the planning for the future.
- g) The targets set by the different investment plans seem unrealistic and inconsistent. For example, the NAIP includes two different targets for the development of irrigation. The first one: to increase the size of irrigated land from current 1 per cent of cultivable land to 10

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<sup>14</sup> The reader has to take into account that it is generally more difficult to track investments undertaken by the private sector, thus the envelope maybe biased towards public investment.



percent by 2015. This would mean that irrigated land should either increase from 293 000 ha to 2 930 000 ha, if the FAO-Aquastat baseline figure is considered, or from 40 000 ha to 400 000 ha, if the NAIP figure is considered. In both cases, the target seems unlikely to be reached (even more unlikely in the first case).

The second target mentioned in the plan aims at increasing functional irrigated land from 40 000 ha to 200 000 ha by 2013, thereby using a different end year and a different final target.

- h) Regardless of the figures provided as baseline or targets, the area developed under irrigation by the projects identified in the portfolio are far behind established goals, since they only add up to 34 881 hectares.
- i) The project portfolio reflects most of the projects proposed under the NAIP, however there is an apparent cost increase in those projects reported in the portfolio (table 3). The reasons of this are unknown.
- j) It appears that irrigation planning is mainly focused on irrigation development, overlooking possible country's needs in the rehabilitation and modernization of schemes. However, investment projects seem to not go in line with planning as the portfolio includes the rehabilitation of irrigation schemes or dams benefitting around 57 198 ha.
- k) The main scope of this profile was to conduct a financial analysis of on-going and planned projects to develop/rehabilitate irrigation and hydropower infrastructure in Nigeria. Although the supporting policy and institutional environment is very much necessary to make sure these type of investments are successful, the available time and financial resources did not allow for such an analysis. The authors also wish to acknowledge the importance of undertaking additional investments in research and capacity building in order to promote innovation and optimize returns.

## ANNEX 1. PROJECT PORTFOLIO

**Table 1.1. ON-GOING PROJECTS**

#	Project title	Funding Partners	Time Scale	Total Budget (million US\$)	Description
1	Ada-Rice Irrigation Project	Federal Government of Nigeria	2013-2015	7.3	The Ada-Rice Irrigation Project is located in Adani area of Enugu State. It consists in the rehabilitation of an irrigation system and a dam with a command area of 500 ha used for rice production and a hydropower capacity of 1 MW. <i>Typology: Rehabilitation of irrigation systems (60%) and Rehabilitation of hydropower (40%)</i>
2	Agbeloba FCA	World Bank & Farmers/Beneficiaries	2013-2014	0.01	The project is located at Epe, Lagos State. It is a Fadama Project that involves drilling boreholes for the irrigation of maize (0.5 ha) and rice (1 ha). <i>Typology: Small scale irrigation development</i>
3	Ajara Farm Settlement FCA	World Bank & Farmers/Beneficiaries	2013-2014	0.01	The project is located at Badagary, Lagos State. It is a Fadama Project that involves drilling boreholes for the irrigation of maize (1 ha) and rice (1 ha). <i>Typology: Small scale irrigation development</i>
4	Azara-Jere Irrigation Project	Federal Government of Nigeria	2008-2014	223	The Azara-Jere Irrigation Project is located in Jere LGA of Kaduna State. It consists in the rehabilitation of a multi-purpose dam with a hydropower capacity of 20 MW, and a sprinkler irrigation system with a command area of 2500 ha of rice. The dam is also to supply water to Abuja. <i>Typology: Rehabilitation of irrigation systems (40%), Rehabilitation of hydropower (40%) and Others: drinking water supply (20%).</i>
5	Babanla Irrigation Scheme	Kwara State Government, Nigeria.	2013-2014	0.5	This is a project designed to develop a surface irrigation system for rice (50 ha) and maize (50 ha) at Babanla in Ifelodun LGA of Kwara State. <i>Typology: Small scale irrigation development</i>
6	Bagwai Irrigation Project	Federal Government of Nigeria	2006-2014	42	The Bagwai Irrigation Project is located in Bagwai LGA of Kano State. It consists in the development of a surface irrigation system with a command area of 1250

					ha used for rice production. <i>Typology: Large scale irrigation development</i>
7	Chauchi Irrigation Project	Federal Government of Nigeria	2009-2014	33.5	The Chauchi Irrigation Project is located along Yola future road in Adamawa Borno State. It consists in the rehabilitation of a surface irrigation system with a command of 750 ha for rice (500 ha) and soybeans (250 ha). <i>Typology: Rehabilitation of irrigation systems</i>
8	Dadin-Kowa Irrigation Project	Federal Government of Nigeria	2010-2014	19.86	The Dadin-Kowa Irrigation Project is located in Dadin-Kowa area of Gombe State. It consists in the development of an irrigation system with a command area of 3750 ha used for beans (1000 ha), ground nut (500 ha), maize (750 ha), rice (1000 ha) and soybeans (500 ha). The project will include the rehabilitation of a dam with a generation capacity of 34 MW of hydropower. <i>Typology: Large scale irrigation development (30%) and Rehabilitation of hydropower (70%)</i>
9	Dashen Gwamna FCA	World Bank	2013-2014	0.01	The project is located at Lafia, Nasarawa State. It is a Fadama Project that involves drilling boreholes for the irrigation of guinea corn(0.8 ha). <i>Typology: Small scale irrigation development</i>
10	Duku-Lade Irrigation Project	Federal Government of Nigeria	2008-2015	16	The Duku-Lade Irrigation Project is located at Duku-Lade in Patigi LGA of Kwara State. It consists in the rehabilitation of the reservoir dam that supplies water to an irrigation system of 1250 ha used for rice production. The reservoir of the dam needs to be de-silted due to its siltation level that has reduced the storage capacity of the dam. <i>Typology: Rehabilitation of irrigation system</i>
11	Echi-Wada Irrigation Scheme	Kwara State Government, Nigeria.	2013-2014	0.67	This is an irrigation project designed to Irrigate Rice farm at Gazun in Patigi LGA of Kwara State. The area to develop under irrigation is about 300 ha for rice production. Water will be pumped from a tributary of River Niger (Gazun river). <i>Typology: Small scale irrigation development</i>
12	Ejule-Ejebe Irrigation Project	Federal Government of Nigeria	2009-2014	0.24	Ejule-Ejebe Irrigation Project is located inlbaji LGA of Kogi State. It consists in the rehabilitation of a surface irrigation scheme of about 350 ha. It commands guinea corn (50 ha), melon (200 ha) and rice (100 ha). <i>Typology: Rehabilitation of irrigation system</i>
13	Hadejia Valley	Federal Government of	1987-2015	118.6	The Hadejia valley irrigation project is located in Auyo, Auyo LGA of jigawa state.

	Irrigation Project	Nigeria			The project consists in the rehabilitation of a surface irrigation system with a command area of about 6 000 ha dedicated to rice production. <i>Typology: Rehabilitation of irrigation system</i>
14	Ibu Irrigation Project	Federal Government of Nigeria	2013-2015	5	The Ibu Irrigation Project is located in LGA of Imo State. The project consists in the rehabilitation of a surface irrigation system with a command area of about 850 ha dedicated to rice production. <i>Typology: Rehabilitation of irrigation system</i>
15	Ijara-Isin Irrigation Scheme	Kwara State Government, Nigeria.	2013-2014	0.53	This is an irrigation project designed to irrigate maize at Ijara-Isin in Isin LGA of Kwara State. It will involve the construction of a weir on Abolumo River that will impound water for irrigation. It is going to majorly command maize (100 ha). A sprinkler Irrigation system has been proposed. <i>Typology: Small scale irrigation development</i>
16	Ikere Gorge Multipurpose Dam	Federal Government of Nigeria	2013-2016	9.42	The Ikere Gorge dam is located in the North East of Iseyin in Oyo State. It is a multipurpose dam that supports Irrigation (12000 ha of guinea corn and maize), water supply and power generation (6 MW). <i>Typology: Rehabilitation of irrigation system (50%), Rehabilitation of hydropower (35%) and Others: water supply (15%)</i>
17	Ikweyigbayi FCA	World Bank & Farmers/Beneficiaries	2011-2014	0.013	The project will construct a small water control structure (small bridge) located at Doma of Nasarawa State. The area to irrigate is 1 ha of beans through surface irrigation. <i>Typology: Small scale irrigation development</i>
18	Ilala Irrigation Scheme	Kwara State Government, Nigeria.	2013-2014	0.53	This is an irrigation project designed to irrigate maize and soy beans farm at Ilala in Irepodun LGA of Kwara State. It will involve the construction of a weir on Otin River that will impound water for irrigation. It is going to majorly command maize (50 ha) and soybeans (50 ha). Surface irrigation would be used. <i>Typology: Small scale irrigation development</i>
19	Ilushi-ega Irrigation Project	Federal Government of Nigeria	2012-2014	5.35	The project is located in Edo State. It consists in the rehabilitation of a surface irrigation system with an area of 750 ha presently used for rice production. <i>Typology: Rehabilitation of irrigation system</i>
20	Ito-ikin Irrigation Project	Federal Government of Nigeria	2012-2014	3.62	The Ito-ikin Irrigation Project is located in Epe LGA of Lagos State. It consists in the rehabilitation of a surface irrigation system with an area of 450 ha presently use for maize production.

					Typology: Rehabilitation of irrigation system
21	Itu Irrigation Project	Federal Government of Nigeria	2012-2014	5.5	This is a drainage and irrigation project located at Itu village in Akwa Ibom state. It consists in the rehabilitation of a surface irrigation scheme with a command area of 1265 ha used for the production of maize (1000 ha) and soybeans (265 ha). The purpose of the project is to check incessant flooding of large expanse of agricultural land by the bank of Cross River. Typology: Rehabilitation of irrigation system
22	Jibiya Irrigation Project	Federal Government of Nigeria	2012-2014	2.4	The Jibiya Irrigation Project is located in Jibiya LGA of Katsina State. It consists in the rehabilitation of a surface irrigation system with an area of 2750 ha presently use for rice production. Typology: Rehabilitation of irrigation system
23	Kano River Irrigation Project	Federal Government of Nigeria	2002-2016	274.7	The Kano River Irrigation Project is located in Bunkure LGA of Kano State. The project consists in the expansion and rehabilitation of an existing dam with a command area of 3750 ha to irrigate rice through surface irrigation. Typology: Rehabilitation of irrigation system
24	Kashimbilla Multipurpose Dam	Federal Government of Nigeria	2007-2014	483.8	The project consists in the construction of a multipurpose dam for water supply, hydropower production (40 MW) and the irrigation of about 2000 ha to cultivate ground nut (1000 ha) and melon (1000 ha). Typology: Large scale irrigation development (30%), Large scale hydropower development (45%) and Others: water supply (25%)
25	Loko East FCA	World Bank	2013-2014	0.011	The project is located at Lafia, Nasarawa State. It is a Fadama Project that involves drilling boreholes for the irrigation of beans through surface irrigation (0.8 ha). Typology: Small scale irrigation development
26	Lower Anambra Irrigation Project	Federal Government of Nigeria	2008-2014	14.76	The Lower Anambra Irrigation Project is located at Omoo in Agumuleri LGA of Imo State. The project consists in the rehabilitation of a gravity irrigation system of 850 ha, presently used for rice. Typology: Rehabilitation of irrigation system
27	Lower Ogun Irrigation Project	Federal Government of Nigeria	2002-2015	61.3	The Lower Ogun Irrigation Project is located in Mokoloki area of Ogun State. It consists of rehabilitation of an irrigation scheme and a dam with a command area of 1500 ha used for maize (1000 ha) and soybeans (500 ha). It is a

					combination of both sprinkler and surface irrigation system. <i>Typology: Rehabilitation of irrigation system</i>
28	Middle Ogun Irrigation Project	Federal Government of Nigeria	2002-2015	68.7	The Middle Ogun Irrigation Project is located in Ogun along Oyo-Iseyin road. The project consists in the rehabilitation of an irrigation system of 1750 ha, presently used for maize. The system combines both sprinkler and surface irrigation. <i>Typology: Rehabilitation of irrigation system</i>
29	Small Scale Irrigation Scheme Goronyo / Middle Rima Irrigation Project	Federal Government of Nigeria	2009-2014	141.83	The project is located in Goronyo LGA, Sokoto State. It consists of some rehabilitation works on the dam and development of a surface irrigation scheme with a command area of 3250 ha that would be used for millet production. <i>Typology: Large scale irrigation development (70%) and Rehabilitation of irrigation system (30%)</i>
30	Muchu FCA	World Bank	2013-2014	0.01	The project is located at Akwanga, Nasarawa State. It is a Fadama Project that involves drilling boreholes for the irrigation of beans (1 ha). <i>Typology: Small scale irrigation development</i>
31	Nkari Dam	Federal Government of Nigeria	2011-2014	20.56	The Nkari Project is located in Akwa Ibom State. It consists in the construction of a multipurpose dam to provide drinking water, produce hydropower (2MW) and to irrigate an area of 2500 ha of guinea corn (1500 ha) and maize (1000 ha) by gravity. <i>Typology: Large scale irrigation development (50%), Small/medium scale hydropower development (30%), Others: water supply (20%)</i>
32	Oke-oyi Irrigation Projects	Federal Government of Nigeria	2012-2014	2.2	The Project is located in Oke-oyi, Ilorin East LGA of Kwara State. It consists in the rehabilitation of a surface irrigation scheme and a dam with a command area of 300 ha used for maize production. <i>Typology: Rehabilitation of irrigation system</i>
33	Oloru Irrigation Project	Federal Government of Nigeria	2006-2014	0.13	The Oloru Irrigation Project is located in Moro LGA of Kwara State. The project consists in the rehabilitation of a surface irrigation scheme of 50 ha of rice. <i>Typology: Rehabilitation of irrigation system</i>
34	Owiwi Irrigation Project	Federal Government of Nigeria	2005-2014	74.34	The Owiwi Irrigation Project is located in Akinjola/ashipa area of Ogun State. The project consists in the rehabilitation of a sprinkler irrigation scheme of 250 ha for maize production. <i>Typology: Rehabilitation of irrigation system</i>

35	Oyan Multi-purpose Dam	Federal Government of Nigeria	2012-2014	8.82	The project is located in Ogun State. It consists in the rehabilitation of a dam and a sprinkler irrigation scheme of 7000 ha. The dam is also used for hydropower, with a capacity of 9 MW, and for drinking water supply. <i>Typology: Rehabilitation of irrigation system (55%), Rehabilitation of hydropower (35%) and Others: water supply (15%)</i>
36	Oyinlegbewa FCA	World Bank & Farmers/Beneficiaries	2013-2014	0.01	The project is located at Ibeju Lekki, Lagos State. It is a Fadama Project that involves drilling boreholes for the irrigation of beans (0.5 ha) and groundnuts (1 ha). <i>Typology: Small scale irrigation development</i>
37	S/Birni South FCA	World Bank & Farmers/Beneficiaries	2011-2014	0.01	The project is located at Birni, Sokoto State. It is a Fadama Project that involves drilling boreholes for the irrigation of melons (2 ha). <i>Typology: Small scale irrigation development</i>
38	Sepeteri Irrigation Project	Federal Government of Nigeria	2011-2014	0.23	The Sepete Irrigation Project is located in Sepete LGA of Oyo State. It consists in the rehabilitation of an sprinkler irrigation system of 750 ha, used for rice production. <i>Typology: Rehabilitation of irrigation system</i>
39	Shagari Irrigation Project	Federal Government of Nigeria	2011-2014	7.5	The Shagar Irrigation Project is located in Shagar LGA of Sokoto Stat. It consists in the development of a surface irrigation system with a command area of 1250 ha with ground nut (1000 ha) and melon (250 ha). <i>Typology: Large scale irrigation development</i>
40	Small Drip Irrigation Schemes at Pambo, Lasoju, Oke-Aye, Oyun, Shao, Oloru and Ganmon	Kwara State Government, Nigeria.	2010-2014	2.51	These are irrigation projects designed to Irrigate Maize and Soybeans at various places such as Pambo, Lasoju, Oke-Aye, Oyun Ilorin East, Shao, Oloru and Ganmon in Kwara State. It will involve the use of drip irrigation kits (local and off-shore components). The hectares covered in each site within the State ranges from 20 ha to 40 ha, with a total are of 210 ha, with 100 ha for maize, 110 ha for soybean. <i>Typology: Small scale irrigation development</i>
41	Sheshi-Tsaha Irrigation Scheme	Kwara State Government, Nigeria.	2013-2014	0.72	This is an irrigation project designed to Irrigate Rice at Sheshi in Patigi LGA of Kwara State. It will involve construction of a dam and a surface irrigation scheme of 200 ha of rice. <i>Typology: Small scale irrigation development</i>
42	Shonga (New	Federal Government of	2008-2015	25.3	The project is located at Shonga, Edu L.G.A of Kwara State. The project includes

	Nigerian Farmers) Irrigation Project	Nigeria & Kwara State Government			the construction of boreholes, weirs and night storage reservoirs (it is a dam that stores water from the boreholes during the night to be used during the day for irrigation). The project is to irrigate 1560 ha in the first phase. It is expected that maize, soybeans and rice will be planted. <i>Typology: Large scale irrigation development</i>
43	South Chad Irrigation Project	Federal Government of Nigeria	1992-2015	34.37	South Chad Irrigation Project is located in LGA of Borno State. The project consists in the rehabilitation of a surface irrigation system of 750 ha, presently used for rice production. <i>Typology: Rehabilitation of irrigation system</i>
44	Tada-Tsonga Irrigation Scheme	Federal Government of Nigeria	2011-2014	9.3	The project consists in the development of a flood control scheme located in Edu Local Government Area of Kwara State. It is situated within the flood plain on the right bank of the River Niger. Essentially the project is a dyke of 32km long; when completed it will support the development of an irrigated field with a total command area of 3000 ha of rice. The water will be released to the field by gravity-surface method. <i>Typology: Large scale irrigation development (78%) and Others: flood control (22%)</i>
45	Zauro Polder Irrigation Project	Federal Government of Nigeria	2010-2016	123	The Zauro Polde Irrigation Project is located in Argungu LGA area of Kebbi State. The project will develop 10500 ha using different irrigation methods such as surface, drip and sprinkler, to irrigate beans, groundnuts, melon, millet, rice and soybeans. <i>Typology: Large scale irrigation development</i>



Table 1.2. PIPELINE PROJECTS

#	Project title	Funding Partners	Time Scale	Total Budget (million US\$)	Description
1	Ado Awaye Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Ado Awaye of Oyo State. The project consists in the rehabilitation of an embankment dam for water control and the irrigation of about 60 ha of maize. <i>Typology: Rehabilitation of irrigation systems.</i>
2	Afuma Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.017	The project is located at Afuma of Cross River State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 5 ha of beans through surface water pumping. <i>Typology: Rehabilitation of irrigation systems.</i>
3	Akusho Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.017	The project is located at Akusho of Yobe State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 30 ha of ground nuts through surface water pumping. <i>Typology: Rehabilitation of irrigation systems.</i>
4	Alalubosa Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.022	The project is located at Ilorin-East LGA of Kwara State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 50 ha of maize and 50 ha of rice through surface water pumping. <i>Typology: Rehabilitation of irrigation systems.</i>
5	Alau Dam Irrigation Project	Federal Government of Nigeria (FGN)	2014-2015	7.8	The Alau Dam Irrigation Project is located in LGA Alau of Borno State. It includes the development of a gravity irrigation system and the rehabilitation of a dam with a command area of 1750 ha used for the production of millet (750 ha) and rice (1000 ha). <i>Typology: Large scale irrigation development (70%) and rehabilitation of irrigation (30%)</i>
6	Aye Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located in Aye of Ondo State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 20 ha of melon through surface water pumping. <i>Typology: Rehabilitation of irrigation systems.</i>

7	Bada Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.017	The project is located at Bada of Yobe State. The project consists in the rehabilitation of an embankment dam for water control and the irrigation of about 25 ha of soybeans through surface water pumping. <i>Typology: Rehabilitation of irrigation systems.</i>
8	Bakolori Multipurpose Project	Federal Government of Nigeria (FGN)	2014-2015	2.7	This Project is located in Talato-Mafara LGA of Sokoto State. It consists in the rehabilitation of an irrigation system and a dam with a command area of 750 ha used for rice production and a hydropower capacity of 3MW. <i>Typology: Rehabilitation of irrigation systems (70%) and Small scale hydropower development (30%)</i>
9	Balanga Dam Irrigation Project	Federal Government of Nigeria (FGN)	2014-2015	4.4	The Balanga Dam Irrigation Project is located in LGA of Borno State. It consists of small scale irrigation development and dam rehabilitation with a command area of 500 ha to be used for beans production. <i>Typology: Small scale irrigation development (70%) and Rehabilitation of irrigation systems (30%)</i>
10	Bare Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Bare in Gombe State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 30 ha of beans through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
11	Bewa Wawa Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Bewa in Gombe State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 60 ha of rice through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
12	Challawa Karaye Irrigation project / Challawa Gorge Dam Project	Federal Government of Nigeria (FGN)	2014-2015	5.6	The Challawa Gorge Dam is in Karaye Local Government of Kano State. It consists in the development of 6MW of hydropower capacity in the dam. <i>Typology: Small scale hydropower development</i>
13	Doma Dam Project	Federal Government of Nigeria (FGN)	2014-2015	2.7	The Doma Dam is located in Doma L.G.A of Nasarawa State. It consists in the development of 3MW of hydropower capacity in the dam. <i>Typology: Small scale hydropower development</i>

14	Ekan Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Ekan in Oke-Ero LGA of Kwara State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 80 ha of maize through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
15	Erin-ile Irrigation Project	Federal Government of Nigeria (FGN)	2014-2015	0.14	The Erin-ile irrigation project is located in Erin-ile, Oyun Local Government Area of Kwara State. It consists in the development of an irrigated area of 50 ha for maize production. <i>Typology: Small scale irrigation development</i>
16	Ezumoha Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.016	The project is located at Ezumoha of Imo State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 10 ha of guinea corn through surface water pumping. <i>Typology: Large scale irrigation development</i>
17	Galma Dam Irrigation Project	Federal Government of Nigeria (FGN)	2015-2017	13.4	The Galma Dam Irrigation Project is located in Igabi LGA of Kaduna State. It consists in the development of an irrigation systems and the construction of a dam with a command area of 1750 ha to be used for rice production. Gravity system would be used. <i>Typology: Large scale irrigation development</i>
18	Gari Irrigation Project	Federal Government of Nigeria (FGN)	2015-2016	6.4	Gari Irrigation Project is located in Gari LGA of Katsina. It consists in the rehabilitation of headworks with a total command area of 3150 ha. Crops cultivated are maize (2000 ha), melon (1000 ha) and soyabeans (150 ha). <i>Typology: Rehabilitation of irrigation systems</i>
19	Gerkwami Small Earth Dam (I)	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Gerkwami in Gombe State The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 68 ha of beans through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
20	Gerkwani Small Earth Dam (II)	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Gerkwani in Gombe State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 40 ha of beans through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>

21	Giriyan Irrigation Project	Federal Government of Nigeria (FGN)	2014-2015	0.2	The project is located in Giriyan Baruteen Local Government Area of Kwara State in the north-central of Nigeria. The project will develop a center pivot irrigation system with a command area of 50 ha of guinea corn. <i>Typology: Small scale irrigation development</i>
22	Icheke- Ajokphadi Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.016	The project is located at Ajokphadi of Kogi State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 40 ha of soybeans through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
23	Ikare Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Ikare of Ondo State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 30 ha of maize through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
24	Ila Osa Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Ila of Osun State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 30 ha of maize through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
25	Ila-ljesha Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Ila-ljesha of Osun State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 20 ha of soybeans through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
26	Iminriga Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Iminriga of Bayelsa State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 30 ha of guinea corn through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
27	Isijogun Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Isijogun of Ondo State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 30 ha of rice corn through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
28	Jada Dam Project	Federal Government of Nigeria (FGN)	2014-2015	1.8	The Jada Dam is located in Jada L.G.A of Adamawa State in the North Eastern Part of Nigeria. It consists of small hydropower development of 2MW for electricity. <i>Typology: Small scale hydropower development</i>

29	Jibiya Dam Project	Federal Government of Nigeria (FGN)	2014-2015	2.7	<p>The project is located in Jibiya local government area of Katsina State in the north of Nigeria. It is an earth-fill dam lined with geomembrane. It is planned for energy generation with a capacity of 3MW.</p> <p><i>Typology: Small scale hydropower development</i></p>
30	Girinyan Irrigation project / Kampe (Omi) Dam	Federal Government of Nigeria (FGN)	2014-2015	11.2	<p>The proposed irrigation scheme and dam is located in Omi village a community in Yagba West of Kogi State. The dam and scheme are designed to command up to 1250 ha of groundnut (250 ha) and rice (1000 ha) through surface irrigation. The dam is to have a capacity of 2MW.</p> <p><i>Typology: Large scale irrigation development (50%) and Small scale hydropower development (50%)</i></p>
31	Katalie Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	<p>The project is located at Katalie of Yobe State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 60 ha of beans through surface water pumping.</p> <p><i>Typology: Rehabilitation of irrigation systems</i></p>
32	Kidda Jauro Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	<p>The project is located at Kidda Jauro in Gombe State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 35 ha of melon through surface water pumping.</p> <p><i>Typology: Rehabilitation of irrigation systems</i></p>
33	Kilankwo Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	<p>The project is located at Kilnkwo of FCT, Abuja. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 50 ha of rice through surface water pumping.</p> <p><i>Typology: Rehabilitation of irrigation systems</i></p>
34	Kiri Dam Project	Federal Government of Nigeria (FGN)	2014-2015	15.6	<p>The Kiri Dam is in Guyuk local government area of Adamawa State in the north east of Nigeria. The dam is proposed to generate 20MW.</p> <p><i>Typology: Large scale hydropower development</i></p>
35	Kpeng Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.025	<p>It is located at Kpeng in Plateau State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 100 ha of soybeans through surface water pumping.</p> <p><i>Typology: Rehabilitation of irrigation systems</i></p>

36	Mangu Dam Project	Federal Government of Nigeria (FGN)	2014-2015	1.95	The Mangu Dam is located at the Headquarter of Mangu L.G.A of Plateau State in the North Central Part of Nigeria. The project consists in the rehabilitation of the dam with a total capacity of 2 MW to generate micro-hydro power for electricity. <i>Typology: Rehabilitation of hydropower</i>
37	Ngurore Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Ngurore in Adamawa State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 65 ha of beans through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
38	Oda Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Oda of Ondo State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 15 ha of beans through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
39	Ogwashi-Uku Multipurpose Dam	Federal Government of Nigeria (FGN)	2014-2015	20.1	It is a multipurpose dam (Water supply, Irrigation and Hydropower). It is located in Delta State. It consists of rehabilitation of a surface irrigation system and a dam with a command area of 500 ha to be used for both groundnut and maize production and rehabilitation of the hydropower plant with a capacity of 1MW. <i>Typology: Rehabilitation of irrigation systems (40%), Rehabilitation of dams and hydropower (30%) and Others: water supply (30%)</i>
40	Ohiong Ndom Scheme	Federal Government of Nigeria (FGN)	2014-2015	8.4	The project is located at Akwa Ibom. It is designed to lower the water table and the same time exploit ground water for irrigation purposes. It would irrigate by gravity method a command area of 450 ha of maize. <i>Typology: Small scale irrigation development</i>
41	Omasi Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.016	The project is located at Omasi of Anambra State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 15 ha of guinea corn through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
42	Otuasega Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Otuasega of Bayelsa State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 30 ha of maize through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>

43	Otueko Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Otueko of Bayelsa State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 30 ha of maize through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
44	Otukpo Multipurpose Dam	Federal Government of Nigeria (FGN)	2014-2015	95	Otukpo is a multipurpose dam (Water supply, Irrigation and Hydropower). It is located in Benue State. The project consists in the rehabilitation and modernization of the dam, its hydropower plant (3 MW) and its associated irrigation scheme with a command area of 500 ha of beans by surface irrigation. <i>Typology: Rehabilitation of irrigation systems (40%), Rehabilitation of hydropower (30%) and others (30%)</i>
45	Owena Dam Project	Federal Government of Nigeria (FGN)	2014-2015	2.8	The project consists in the construction of the Owena Multipurpose Dam, located in Owena L.G.A of Ondo State in the South West of Nigeria. It is designed to generate micro-hydro power for electricity with a total capacity of 3 MW. <i>Typology: Small scale hydropower development</i>
46	Pambegwa and Saminaka Irrigation Project	Federal Government of Nigeria (FGN)	2015-2017	5.36	The project is located in Pambegwa-Saminaka LGA of Kaduna State. It consists in the rehabilitation of a surface irrigation system of 350 ha for rice production. <i>Typology: Rehabilitation of irrigation systems</i>
47	Qua Falls Multipurpose Dam	Federal Government of Nigeria (FGN)	2014-2015	2.7	The Project is located in Cross River State. It consists in the construction of a multi-purpose dam to provide drinking water and hydropower (with a total capacity of 3 MW). <i>Typology: Small scale hydropower development (80%) and others (30%)</i>
48	Sabke Irrigation Project	Federal Government of Nigeria (FGN)	2014-2015	12.65	The Project is located in Sabke LGA of Katsina Stat. It consists in the rehabilitation of a gravity irrigation system with a total command area of 2750 ha (beans, 750 ha, ground nuts, 500 ha, and rice, 1500 ha) <i>Typology: Rehabilitation of irrigation systems</i>
49	Tappi Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.22	The project is located at Tappi in Gombe State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 40 ha of beans through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>

50	Tiga Dam Project	Federal Government of Nigeria (FGN)	2014-2015	5.35	The Tiga Dam is located in Kano State in the Northeast of Nigeria, constructed in 1971-1974. It is a major reservoir on the Kano River. The project consists in the installation of hydropower generation facilities with a total capacity of 6MW. <i>Typology: Small scale hydropower development</i>
51	Umuwala Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.016	It is located at Umuwala of Imo State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 10 ha of soybeans through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
52	Waya Dam Project	Federal Government of Nigeria (FGN)	2014-2015	0.03	The Waya Dam is located in Waya L.G.A of Bauchi State in the North Eastern Part of Nigeria. The project consists in the rehabilitation of the dam to generate hydropower with a total capacity of 0.15 MW. <i>Typology: Small scale hydropower development</i>
53	Tunga-Kawo Dam and Irrigation Project / Wushishi Irrigation Project	Federal Government of Nigeria (FGN)	2015-2018	6.43	The project is located in Wushishi LGA of Niger State. It consist in the rehabilitation of a surface irrigation system with a total command area of 385 ha for rice production. <i>Typology: Rehabilitation of irrigation systems</i>
54	Zange Small Earth Dam	Federal Government of Nigeria (FGN)	2014-2014	0.02	The project is located at Zange in Gombe State. The project consists in the rehabilitation of an embankment micro dam for water control and the irrigation of about 40 ha of beans through surface water pumping. <i>Typology: Rehabilitation of irrigation systems</i>
55	Zaria Kalakala Irrigation Project	Federal Government of Nigeria (FGN)	2014-2015	1.7	The project is located in Zaria Kalakala LGA of Kebbi State. It consists in the development of an irrigation system of 250 ha under rice production. It is a fadama area, therefore only tube wells will be constructed. <i>Typology: Small scale irrigation development</i>
56	Zobe Dam Project	Federal Government of Nigeria (FGN)	2014-2015	2.8	The Zobe Dam is in Dutsin-Ma local government area of Katsina State in the north of Nigeria. It is an earth-fill structure to have a capacity of 3MW of hydropower. <i>Typology: Small scale hydropower development</i>



## ANNEX 2. MAP OF NIGERIA



FAO - AQUASTAT, 2005

**NIGERIA**

**Disclaimer**

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