Food and Agriculture Organization of the United Nations

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Kenya

Irrigation market brief

COUNTRY HIGHLIGHTS

FAO INVESTMENT CENTRE

GAFSP
The global agriculture & food security program

Kenya

Irrigation market brief

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COUNTRY HIGHLIGHTS
prepared under the
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TABLE OF CONTENTS

FOREWORD

In Africa, agribusiness has the potential to reduce poverty and drive economic growth more than any other sector. Agriculture accounts for nearly half of the continent's gross domestic product, and employs 60 percent of the labor force. The World Bank estimates that by 2030, agriculture could develop into a USD 1 trillion market in Sub-Saharan Africa, up from USD 313 million in 2010. For the International Finance Corporation (IFC), a member of the World Bank Group, agriculture is a top priority. With USD 4 billion in agribusiness investments worldwide, IFC believes that the private sector plays a crucial role in addressing agriculture's pressing challenges. Recognizing the importance of agricultural productivity for food security and the role of public-private partnerships to unleash the sector's production potential, FAO supports its member states to ensure that investments in the agricultural sector improve the inclusiveness and efficiency of agrifood systems, in line with the Organization's new strategic framework.

Achieving Africa's agricultural growth potential will require a significant increase in historically low levels of productivity. This is an area where irrigation can play a critical role. Modern, efficient irrigation systems can substantially increase crop yields, resulting in improved livelihoods, reduced risk associated with drought, efficient use of limited water resources, and greater food production.

Currently, modern irrigation systems play a very limited role in Sub-Saharan Africa's agricultural sector. Food production in the region remains almost entirely rainfed and only two percent of the total cultivated area is irrigated (FAO Aquastat, 2013). However, in some parts of the continent this situation is changing.

This report is the fourth in a series of market briefs produced jointly by IFC and the Food and Agriculture Organization of the United Nations (FAO). It is targeted primarily at private sector investors and companies interested in expanding investment in irrigation in Sub-Saharan Africa, with particular focus on modern irrigation technologies, but may be of wider interest to all stakeholders engaged in irrigation development in the country. The report assesses the current state of the irrigation market in Kenya, recent performance, and opportunities for future growth. In order to provide a wider regional perspective, irrigation market reports for Ethiopia, Senegal, Ghana, and Zambia were also prepared.

This market brief summarizes key findings in the FAO/IFC "Africa Irrigation Diagnostic Report" on Kenya. The full version of the report is available on request.

IFC is the largest global development institution focused exclusively on the private sector. Working with private enterprises in more than 100 countries, IFC uses its capital, expertise, and influence to help eliminate extreme poverty and promote shared prosperity. In FY13, IFC investments climbed to an all-time high of nearly USD 25 billion, leveraging the power of the private sector to create jobs and tackle the world's most pressing development challenges. For more information, visit www.ifc.org.

Achieving food security for all – making sure people have regular access to enough high quality food to lead active, healthy lives – is at the heart of FAO's efforts. FAO's mandate is to raise levels of nutrition, improve agricultural productivity, better the lives of rural populations, and contribute to the growth of the world economy. For more information, visit www.fao.org.

ACKNOWLEDGEMENTS

This study was carried out under an FAO and IFC cooperation program, a joint initiative to promote responsible private agribusiness investment in lower income countries. The main authors of the study were Diogo Machado Mendes, Agricultural Specialist, and Lisa Paglietti, Economist, from FAO's Investment Centre Division. Lisa Paglietti was also responsible for the coordination of the study team, while Abdi Ahmed, Irrigation Engineer, provided local support, data gathering, and information. The study benefited from previous research conducted on irrigation aspects by FAO colleagues, both at headquarters and in regional offices, and substantial discussions and information exchanges with private sector actors engaged in irrigation development in country.

For IFC, Richard Colback provided comments and technical input to the report. IFC would also like to thank Brad Roberts and Ivan Ivanov who led the preparation of the concept, scope, and funding for the study.

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ACRONYMS AND ABBREVIATIONS

AFC	Agricultural Finance Cooperation
AFK	Amiran farmers' kit
AGOA	African Growth and Opportunity Act
ASAL	Arid and semi-arid areas
COMESA	Regional Common Market for Eastern and Southern Africa
EAC	East African Community
EIU	Economist Intelligence Unit
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross domestic product
GoK	Government of Kenya
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IWMI	International Water Management Institute
KRC	Kenyan Red Cross
KSh	Kenyan Shelling
JICA	Japan International Cooperation Agency
MFI	Microfinance institution
MWI	Ministry of Water and Irrigation
NCPB	National Cereals and Produce Board
NGO	Non-governmental organization
NIB	National Irrigation Board
PPP	Public-private partnership
SWOT	Strengths, weaknesses, opportunities, and threats
TARDA	Tana and Athi River Development Authority
USD	United States dollar
VAT	Value-added tax

Chapter 1 – Overview

Agriculture and the economy

Kenya has a total surface of around 580 000 km². In 2013, it had a population of nearly 44.35 million people, with almost 30 million people considered part of the agricultural population. There were 224 economically active rural persons per km² of arable land.

Kenya has the largest, most diversified economy in East Africa. It was classified as a middle-income country after a statistical reassessment of its economy (gross domestic product [GDP] rebase).[1] Real GDP growth is expected to rise to 5.7 percent in 2015, from an estimated 5.2 percent in 2014, driven by stronger performances in both agriculture and industry, and closer economic integration within the East African Community (EAC). Constraints such as weak infrastructure and insecurity will persist in 2015. Growth will also depend on rainfall, which determines the size of the harvest and hydroelectric capacity (EIU 2015).[2]

Agriculture[3] is a key sector in Kenya's economy and it is one of the main sectors supporting the economic pillar in Kenya's Vision 2030, with a sector annual growth projection of 5 to 6 percent. The sector is expected to rise to 5.1 percent in 2015 from an estimated 4.5 in 2014.

Agriculture currently accounts for 24 percent of GDP and 65 percent of total export earnings (Figure 1). Kenya's fresh produce exports (fruit, vegetables, and cut flowers) have also grown exponentially over the past 20 years. In 2009, Kenya was the second largest horticultural exporter in Sub-Saharan Africa after South Africa.[4] The livestock subsector, which is an integral part of the agricultural sector, contributes about 10 percent of the GDP and accounts for over 30 percent of the agricultural GDP. This subsector employs over 50 percent of the agricultural labor force and is responsible for ensuring self-sufficiency in livestock products.

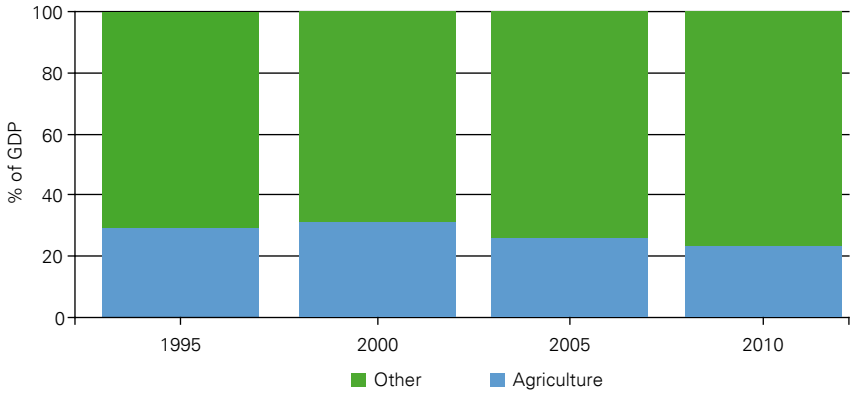
1 An increase of about 25 percent due to the rebase (base year changed from 2001 to 2009).

2 Economist Intelligence Unit (EUI), Country Report: Kenya, December 2014.

3 Agriculture comprises crops, livestock, fisheries, and related activities.

4 Horticultural Crop Development Authority's *Brief on the Horticulture Industry in Kenya*, http://www.hcda.or.ke/downloads/BRIEF%20ON%20THE%20HORTICULTURE%20INDUSTRY%20IN%20KENYA.pd

Figure 1: Share of agriculture value added in total GDP in Kenya



Source: World Bank, Accessed on August 20, 2010. http://databank.worldbank.org/home.do

Land, crop production, and water

The country's population density is moderate, with 73 people per km^2, compared with 15 in neighboring Somalia, 18.8 in Sudan, and 30 in the Democratic Republic of Congo. Kenya has scarce water resources – nearly 947 m^3 of water per inhabitant, compared with 2 251 in Somalia, 1 879 in Somalia, and 23 577 in the Democratic Republic of Congo.[5]

Milk, mangoes, guavas, and maize are the dominant commodities in Kenya by volume and value, followed by flowers, vegetables, rice, bananas, and sweet potatoes (Table 1). The next group includes coffee, tea, sisal, and sugar, which are important for foreign currency earnings and are dominated by large-scale farmers and a structured private sector. Livestock production plays a major role in food security and in the country's economy as it sustains the livelihood of the population living in the arid and semi-arid areas (ASAL).

5 FAO AQUASTAT data. Renewable internal freshwater resources per capita are calculated using the World Bank's population estimates.

Table 1: Largest agricultural sectors by production and value in Kenya, 2012

Production	Tons	Production	Value USD 000
Sugarcane	5 822 633	Mangoes, guavas	1 666 706
Milk, whole fresh cow	3 732 960	Milk, whole fresh cow	1 164 911
Maize	3 600 000	Meat, indigenous, cattle	1 110 396
Potatoes	2 915 067	Maize	483 817
Mangoes, guavas	2 871 706	Potatoes	472 655
Bananas	1 394 412	Tea	392 848
Milk, whole fresh camel	933 616	Bananas	392 710
Cassava	893 122	Beans, dry	361 192
Sweet potatoes	859 549	Milk, whole fresh camel	318 336
Cabbages	684 000	Sugarcane	191 198
Flowers	117 000		

Source: FAOSTAT, 2012.

Agricultural land covers about 33 percent of the country. The agricultural sector provides livelihoods to 75 percent of the country's workforce. About 80 percent of employed people living in rural areas work in this sector.

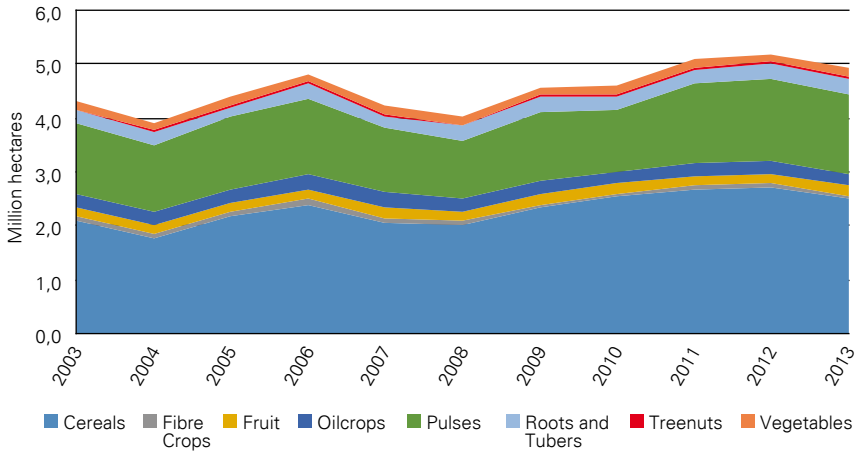
Smallholder farmers, pastoralists, and fisher folk with land sizes averaging one hectare dominate Kenya's agricultural sector. A variety of staple and cash crops are grown in the country. Cash crops include coffee, tea, sisal, and sugar, while staple crops such as maize, pulses/beans, millet, sorghum, bananas, and sweet potatoes are mainly produced by smallholder farmers and are important for food security. Surpluses, when available, are traded locally to supplement household income. The country also has a well-developed horticultural subsector experienced in exporting to European countries.

Irrigation development in Kenya has a long history, with records indicating the existence of irrigation systems in the 16th century along the coast and the Kerio Valley (Marakwet Escarpment). Rainwater harvesting is a common practice for improving food security in the country's medium and low potential areas. This is done through the construction of individual water pans and the diversion of roadside runoff, as is the case in the Lare division of Nakuru district. Flood recession agriculture is widespread along the lower parts of the Tana River, where the Pokomo and the Malakote tribes exploit the seasonal flooding of the Tana for the production of bananas and other food crops. Smallholder irrigation plays an important role in Kenya's irrigation activities. Tea, coffee, rice, and

horticulture are the main sectors where smallholders have a major share in the irrigated produce.

Both large- and small-scale farmers' agricultural activity is strongly oriented to high-value and marketable crops, and therefore depends largely on irrigation. However, the cost of high-tech irrigation systems, increased by the costs of developing water resources, could be prohibitive and limit the adoption rate of such irrigation systems. Unreliable water supplies in most parts of the country, particularly in the ASAL, could pose a challenge to production. Conversely, the use of low-cost small-scale irrigation technology is relatively widespread, and (financial) infrastructure and access to markets are relatively well developed (FAO, 2013). The figure below shows the area for crops commonly produced in Kenya from 2003 to 2013

Figure 2: Harvested area by crop group in Kenya, 2003–2013



Source: FAOSTAT.

Scope to develop irrigation

In Kenya, there is potential to expand investment in modern irrigation systems. Kenya is a water-scarce country: high competition over limited water resources and a need to consider the environmental sustainability of agricultural investment mean water-saving, ***advanced irrigation systems*** are increasingly in demand. Modern systems include pressurized drip and sprinkler irrigation for high-value horticultural crops. Improving existing furrow irrigation systems with lined canals and introducing improved irrigation water management systems and drought-resistant crop varieties will increase water use efficiency. Table 2 presents existing and new irrigated areas to be potentially developed in the catchment areas.

Table 2: Irrigation capacity by geographic area (hectares)

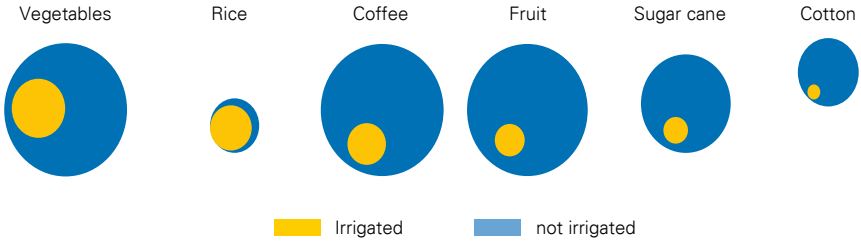
Catchment Area	Existing Area in 2010	New and Extension Area	Total in 2030
Lake Victoria North	5 600	99 700	105 300
Lake Victoria South	17 965	165 236	183 201
Rift Valley	11 402	41 598	53 000
Athi Valley	51 937	51 964	103 901
Tana	70 092	441 208	511 300
Ewaso Ng'iro	8 834	3 766	12 600
Total	**165 830**	**803 472**	**969 302**

Source: The Project on the Development of the National Water Master Plan 2030, 4th Progress Report.

Small-scale private irrigation investment is promising in areas endowed with adequate infrastructure and markets, such as around Nairobi and in the Thika, Western Kenya, Coast, and Mount Kenya regions. One of the main drivers for arable crop irrigation in Kenya is the horticultural subsector, followed by rice.

In Figure 3, the inner (yellow) circles represent the estimated current irrigated area of crops in Kenya. For rice, almost all production is irrigated while vegetables, coffee, fruit, sugarcane, and cotton are partially irrigated. The outer circles are proportionate to the relative total area sown of these crops: vegetable, coffee, and fruit are the dominant crops. About 20 percent of all vegetable production is irrigated (31 000 hectares), and 71 percent of rice production is irrigated (18 000 hectares). The percentages of irrigated production are smaller for the other crops.

Figure 3: Relative size of irrigated area by crop in Kenya, 2013



Source: FAOSTAT, 2013.

Major market players

There are various public and private players in irrigation development (Annex 3); however, there are no private organizations responsible for transporting and/or distributing irrigation water in Kenya.

The National Irrigation Board (NIB) is a public irrigation service provider under the Ministry of Water and Irrigation (MWI), employing a number of field level operators. These operators play a large role in Kenya's irrigation systems. The Water Resources Management Authority is responsible for the planning, regulation, and management of water resources. The regional development agencies have a far-reaching mandate for the development of their respective regions, including the development of irrigated agriculture.[6]

Some international development agencies run technical cooperation programs with a focus on irrigation. Examples include the Japan International Cooperation Agency (JICA), focusing on horticulture and rice production and extending its technical assistance to the development and rehabilitation of irrigation facilities; and the Dutch cooperation, with projects on market access, entrepreneurship, and improvement of the value chain of several horticultural and other crops. The donors actively engaged in the irrigation subsector are:

- World Bank
- African Development Bank
- JICA
- International Fund for Agricultural Development (IFAD)
- Department for International Development, UK
- Embassy of the Kingdom of the Netherlands
- FAO

Intermediary non-governmental organizations (NGOs) are key potential partners for upscaling technical assistance in irrigated agriculture. Examples of NGOs active in small-scale irrigation development include: Kenya Red Cross (KRC), Action Aid, World Vision, and OXFAM. KRC, after the 2009/10 drought recovery, developed relief projects supporting farmers with irrigation. To date, KRC has helped develop 2 000 acres (810 hectares) of irrigation through 22 irrigation-related projects around the country.

Several private companies deal with large irrigated commercial farms, notably Delamere (fodder, flowers, and passion fruit), Delmonte (pineapples), Kakuzi,

6 These authorities initially developed large public commercial schemes and subsequently developed community-based irrigation systems, some of which are still in operation. Irrigation Diagnostic Phase I, FAO, 2013.

James Finlay, Homegrown, Oserian flowers, and several other vegetable and flower companies (see Annex 3 for detailed list and contacts). These companies use high-tech efficient technologies and produce high-value crops for export, mainly to European markets. These are mainly located in medium rainfall zones around Lake Naivasha, Mount Kenya, Thika, and Nairobi and its environs.

A great number of manufacturers and a wide variety of irrigation equipment can be found in Kenya. Distributors reach all of the Kenyan territory through their headquarters in Nairobi and a wider network of local branches (Figure 14).

Investment opportunities

Kenya offers joint venture opportunities for export-oriented agribusiness, horticulture, floriculture, processing of oil crops and investment in large-scale irrigation schemes. Kenya's competitive advantage for irrigated agriculture is supported by various investor factors that include:

- Availability of a well-established export market for agricultural products
- Proximity to input and output markets
- Availability of irrigable areas and affordable labor
- Availability of large private commercial farms

However, inadequate infrastructure and high competition over limited water resources might limit the scope for expansion in some areas of the country. These areas could also suffer from poor road infrastructure.

Kenya has several private companies dealing with large irrigated commercial farms producing and marketing high quality flowers, vegetables, and fruit for local and international markets. The country has substantial experience with private companies utilizing high-tech efficient technologies to produce and process high-value crops, and steps are being taken to create an enabling environment for investment.

Market prospects are good for most Kenyan agricultural products, whether to supply domestic, regional, or international markets. Vegetable, fruit, and flower supply chains present significant opportunities for the domestic and world markets. The flower industry is currently the most dynamic component of the horticultural sector in Kenya, and the one with better growth prospects in the immediate future.

One of the key investment opportunities for the sugarcane sector is the introduction of irrigation to increase yields. This is especially useful in facing the dry spells that occur from December to March. The sector is slowly starting to

introduce flood irrigation. There is potential to turn to more modern systems such as drip irrigation and centre pivots.

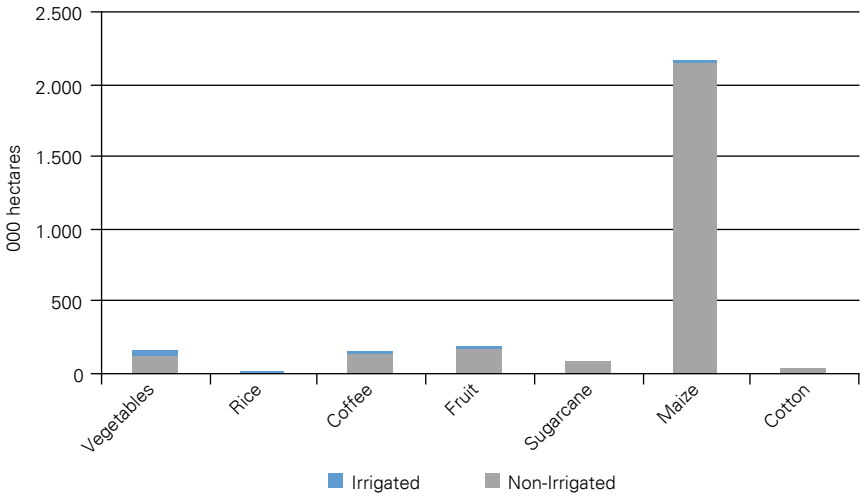
Government-supported irrigation programs are targeting small-scale farmers. These programs provide farmers with credit to purchase irrigation equipment, which can return the capital invested in these technologies within several crop cycles. This will provide a broader market for irrigation technologies outside of the more developed areas around Nairobi.

Chapter 2 – Market analysis

Untapped potential

FAO estimates that Kenya's potential irrigable land amounts to 353 000 hectares. The sector, however, is growing and the total irrigated area has reached about 165 900 hectares, about 47 percent of the total potential (estimates of 2010).[7] Figure 4 shows the estimated harvested area for the main irrigated crops.

Figure 4: Area estimates for the main irrigated crops in Kenya - 2012



Source: Authors' estimates based on historical FAO data and study findings.

Kenya depends largely on rainfed agriculture. In most parts of the country, rainfall is inadequate to meet crop water requirements for more than a single crop per year. Indeed, river flows are average to low during the dry season.

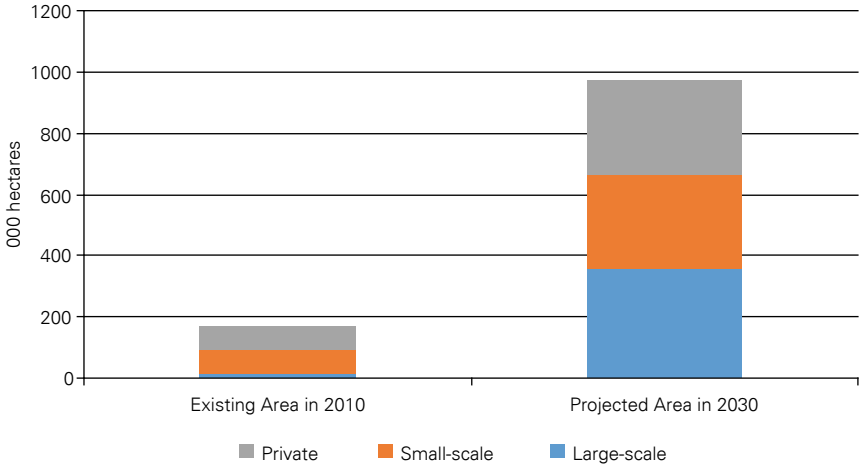
To develop the irrigation potential, irrigation water management, water storage, and high-tech efficient irrigation are required.

7 Kenya's MWI and JICA.

Low levels of public and private investment in irrigation in the past have generally hindered its development in Kenya. Poor physical infrastructure and land tenure constraints have contributed to low private sector participation. However, over the past few years the Government has initiated a number of measures intended to increase irrigation development in the country, notably the increase of the MWI's budget for developing publicly managed irrigation. The National Water Master Plan 2030 projects a massive investment in large-scale irrigation, as shown in Figure 5.

Currently, irrigation development is led by the private sector and by smallholder irrigation schemes with great emphasis on sustainable development. The private sector has spearheaded irrigation development in areas close to urban centers for local vegetables and high-value horticultural produce for the export market. Areas endowed with an adequate level of infrastructure and markets (for input supply and commercialization of produce) have potential for high-tech efficient irrigation. Such areas include the zones around Nairobi and in the Thika, Western Kenya, Coast, and Mount Kenya regions (Figure 6). With the exception of Coast and Western Kenya, these are areas where large private commercial companies and most small-scale private farms are concentrated.

Figure 5: Projected evolution of irrigation capacity by scheme typology



Source: The Project on the Development of the National Water Master Plan 2030, 4th Progress Report.

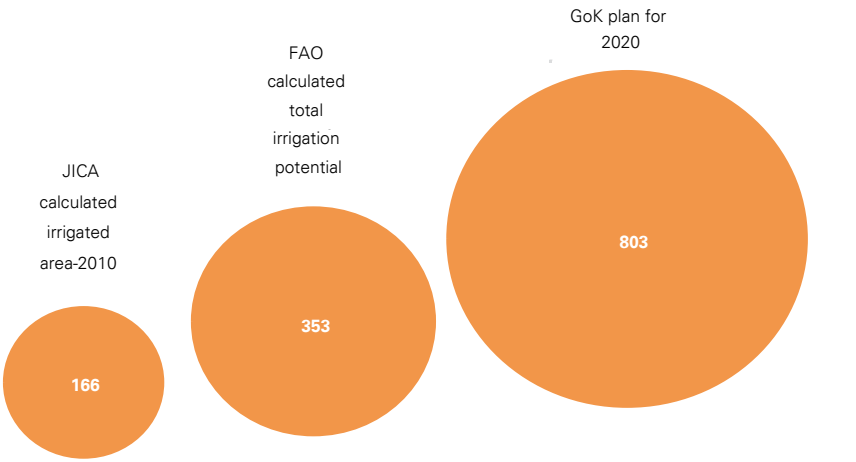
Figure 6: Map of Kenya and its neighboring countries

Source: FAO Aquastat 2005.

Figure 7 shows Kenya's estimated irrigable land in hectares. In 2014, the Government of Kenya (GoK) launched its National Water Master Plan 2030, with targets to increase the irrigated area up to approximately 970 000 hectares in 2030. This plan raises the calculated irrigation potential of the country by 2.75 times.

If we conservatively estimate that 33 percent of the Government targets were developed, the market for irrigation would be worth an estimated annual average of USD 100 million between 2015 and 2025. This would correspond to an additional 77 000 hectares of irrigated land. Given the enormous financial effort involved and also the environmental constraints and social conflict that may arise over competition for a scarce resource such as water in Kenya, prudence is advisable when calculating the future market size for irrigation equipment in the country.

Figure 7: Estimated irrigable land Kenya ('000 ha)



Source: FAO Aquastat, JICA, GoK.

Technology trends

Investment in water-saving, advanced irrigation systems is increasing due to high competition over limited waters resources. Modern systems include pressurized drip and sprinkler irrigation for high-value horticultural and flower crops (Table 3). Sprinkler systems could be considered for sugarcane and other field crops. Improving the water conveyance and distribution of existing surface irrigation systems with lined canals can increase water use efficiency.

Water sources and lifting technologies for small-scale private sector investment include: (i) water harvesting and storage reservoirs; (ii) pumping from lakes, mainly Lake Tana and Lake Victoria; and (iii) pumping groundwater from shallow wells. To ensure high water use efficiency and production of high-value cash crops, these bulk water systems should be combined with localized drip or sprinkler irrigation systems, depending on crop type, soil, wind, and related factors.

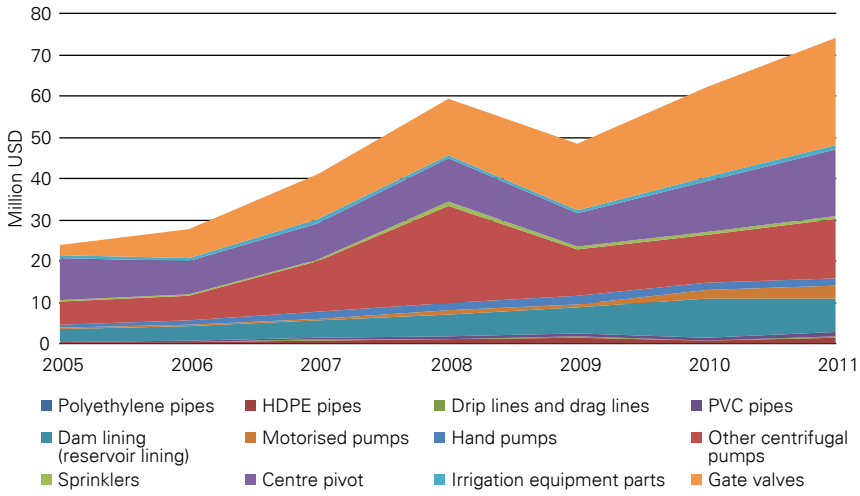
Table 3: Suggested irrigation systems

Crop	Irrigation system
Food crops	Improved surface irrigation
Industrial crops (cotton, sugarcane, sunflower)	Sprinkler, improved furrow, drip irrigation
Vegetables, flowers, spices, and fruits	Drip (flowers), sprinkler, centre pivots (vegetables)
Fodder crops	Sprinkler

Source: Field findings, 2014.

Kenya's imports of irrigation material have been growing in the last years, reaching USD 74 million in 2011. A share of these products is then re-exported to other countries in the region. The combined value of Kenya's exports was nearly USD 11 million in 2011, about 15 percent of the value of imports. Kenya also exports equipment produced in the country, such as HDPE, PVE, and PPE pipes. Net imports were valued at USD 63 million. The dominant equipment categories (Figure 8) are gate valves (USD 26 million, equivalent to 41 percent), centre pivots (USD 15 million, equivalent to 24 percent), and other centrifugal pumps (USD 12 million, equivalent to 19 percent). Commercial farms account for most of the centre pivot imports.

Figure 8: Kenya imports of selected irrigation equipment



Source: International Trade Centre.

Opportunities and challenges

Kenya's agribusiness is a vibrant sector and a key driver of agricultural sector growth. Continuous innovation and new investments have contributed to this strong growth.

The domestic market and regional trade provide good market opportunity for major food products. In particular, the country has a well-developed horticultural subsector experienced in exporting, primarily to European countries. The Netherlands import the bulk of the flowers, and Britain, Germany, the Netherlands, and France are major importers of fruits and vegetables.

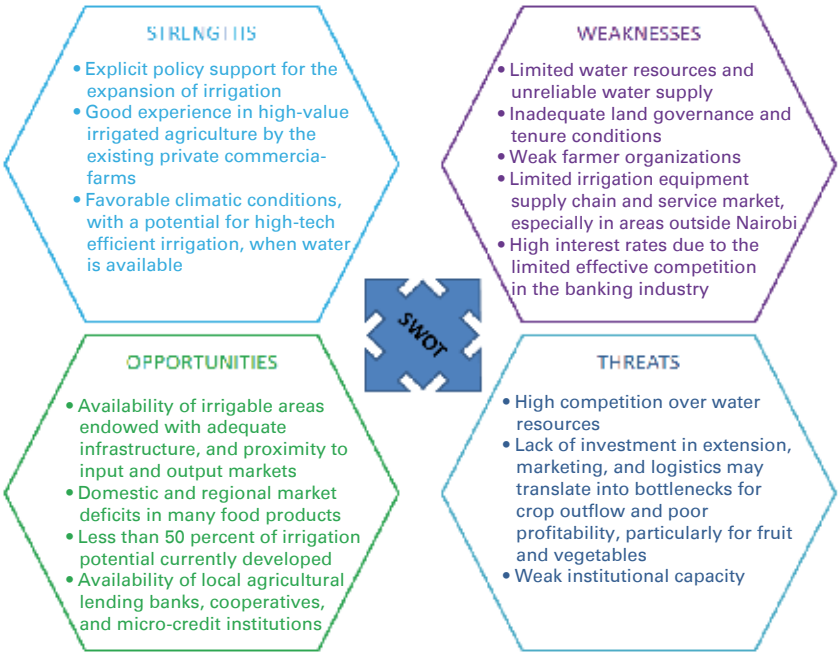
Steps have been taken to expand irrigation in the country, including a new irrigation policy and a large irrigation program. This ambitious program, if implemented correctly, is in itself an opportunity for irrigation development and provides critical business opportunities for irrigation supply and service companies.

Several factors contribute to the underperformance of the agricultural sector's growth. These include:

- Land and water scarcity, conflicts, particularly in the ASAL areas, and limited farming land;
- Frequent drought leading to rapid depletion of some of the water resources, with a devastating impact on agricultural economies and livelihoods;
- Poor agricultural extension and irrigation water management-related service delivery, particularly for small-scale farmers; irrigation service providers and NGOs are expanding extension networks, but services remain limited outside core commercial agriculture districts;
- Low access to affordable credit and capital investment; some commercial banks are addressing these issues and private-public partnerships (PPPs) are emerging between financial service providers and irrigation dealers;
- Weak farmer organizations and associations, including water user associations; some donors run technical programs aimed at strengthening farmer organizations;
- Inadequate storage and lack of post-harvest facilities, poorly organized markets, and lack of processing and other marketing infrastructure; the Government and a number of donors are addressing, in particular, the issue of cold storage;
- Lack of access to technical and market information (leading to high transaction costs); web-based and phone-based services have been developed to bridge the knowledge gap created by the reduced presence of public sector extension services. In addition, private service providers (irrigation dealers, private agribusinesses) are increasingly providing technical assistance on technical and marketing issues; and
- Poor road infrastructure to potentially irrigable ASAL areas, limiting both operational and input/output market access.

The figure 9 below sets out Kenya's strengths, weaknesses, opportunities, and threats (SWOT). These are explored in further detail in Chapter 4 and 6.

Figure 9: SWOT analysis for irrigation development in Kenya



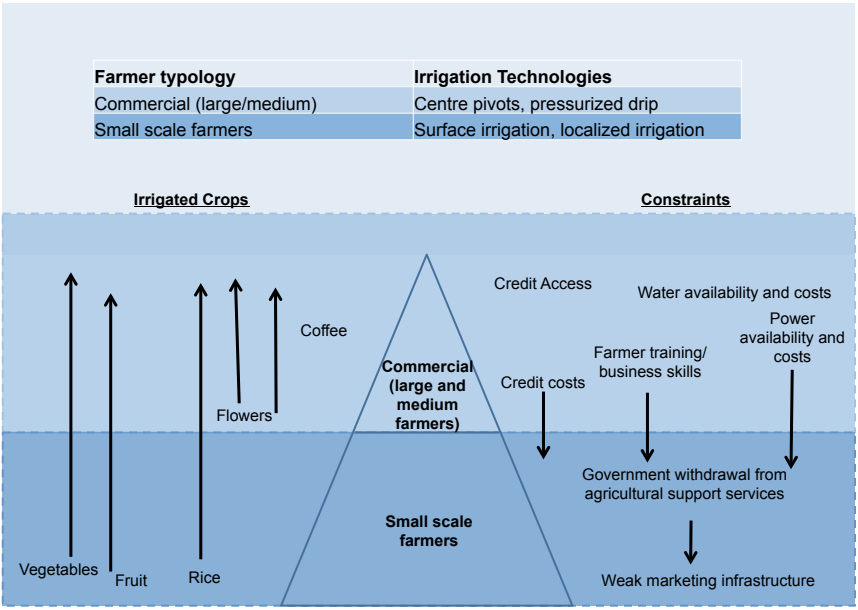
Source: Authors' compilation, 2014.

Figure 10: VP Group Farm, Naivasha

Source: Diogo Machado Mendes, FAO (2014).

Figure 11 sets out key data on the different levels of agricultural production. By far the most commonly used irrigation technique in Kenya is sprinkler irrigation. Figures from 2003 indicate that sprinkler irrigation constitutes around 60 percent. Surface irrigation accounted for approximately 38 percent. Localized irrigation was negligible.

Figure 10: Farmer typologies, irrigated crops, and constraints



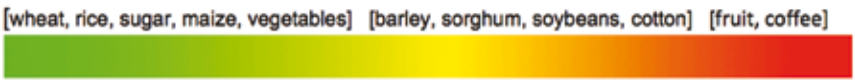
Source: Authors' compilation, 2015.

Expanding the crop market

Expanding the irrigated crop market in Kenya will create more opportunities for private sector investment. The figure 12 below shows the crops that present opportunities and threats to the domestic, regional, and world markets. The heat bar reflects the ease with which crops could be absorbed into these markets, with green representing the most easily absorbed crops.

Figure 12: Market absorption of crops – opportunities and threats

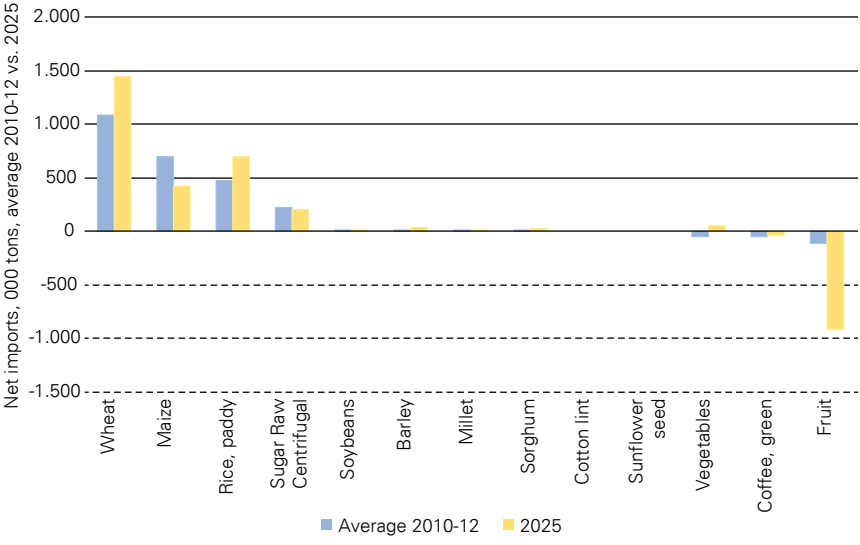
	Domestic Market	Regional Market	World
Opportunity	wheat, rice, sugar, maize	maize	fruit, vegetables, coffee
Threat	fruit, coffee	unclear	unclear



Source: Authors' compilation, 2014.

In assessing whether market size constraints are likely to undercut the expansion of irrigated crop areas, the main consideration is whether there is likely to be demand for increased Kenyan production on national, regional, and world markets. The figure below identifies Kenya's current net import and forecast import requirements in 2025 for a range of important crops.

Figure 13: Current Kenya net imports (average 2010-12) versus forecast import requirement in 2025



Source: Authors' estimates based on historical FAOSTAT data.

Kenya is a large net importer of wheat, maize, rice, and sugar, and, to a lesser extent, soybeans, barley, millet, and sorghum. The country is self-sufficient in crops such as cotton and sunflower seed, and currently a net exporter of vegetables, coffee, and fruit.

The domestic market and regional trade blocks represent large markets with deficits in major food products. Wheat, rice, and sugar will be able to expand production and be absorbed in the domestic market most easily. The same is true for maize. In terms of market opportunity, vegetables can be attractive and present minimal risks. The domestic demand for vegetables is increasing markedly and likely to continue until 2025.

Fruits and vegetables face some challenges with regard to logistics and marketing. If these issues are rightly addressed, Kenya has all of the conditions

to continue to tap into the European, American, and other emerging and quality demanding markets, while supplying the growing domestic market.

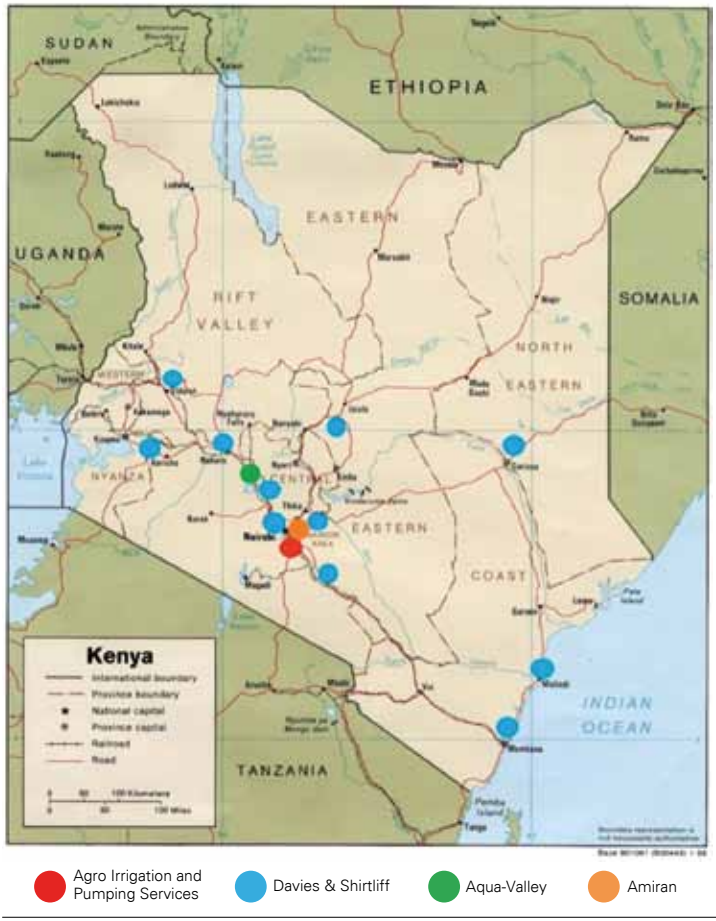
The flower industry is currently the most dynamic component of the horticultural sector in Kenya, and the one with better prospects to contribute to the irrigation sector's growth in the immediate future. The industry has grown tremendously in the last decade and the area of production was estimated at about 3 400 hectares of flowers in 2011 (greenhouse and outdoors), with 117 000 tons of annual exports. The success of the industry has been linked to a strong euro (most exports are to Europe) and relatively low labor and energy costs.

Chapter 3 – Supply chain and services

Supply chain

The supply chain of irrigation equipment is well developed in the southern part of the country where irrigated agriculture is most prevalent. The location of most distributors is shown in the map below (Figure 14).

Figure 14: Location of major irrigation equipment suppliers



Source: Authors' compilation, 2014.

Distributors operate from their offices in Nairobi with mobile teams that cover the whole country and sometimes the wider region. Exceptions are Davis & Shirtliff, which has a network of branches around the country, and Aqua-Valley, which is based close to Lake Naivasha.

There is a shared view amongst private sector stakeholders that business volumes in irrigation equipment are growing, especially for drip systems of larger greenhouses producing flowers and smaller greenhouses producing vegetables. This view is corroborated by the trend data in Kenya's imports of irrigation material, which reached USD 74 million in 2011.

Imported irrigation equipment is sourced from Asia, different European countries, South Africa, Australia, and the United States, among others (Table 4). Consignments usually enter the country through the Mombasa port, and may take up to six weeks to arrive from the time of order from the Far East, or six to eight weeks from Europe. Transport costs from Mombasa to Nairobi are KSh 100 000 (USD 1 120) for a standard container, plus 14 percent for clearing charges.

The supply chain and service market for the drip and sprinkler irrigation systems adopted by large commercial farms function relatively well. However, for small private farms there is definitely a challenge in the supply chain and service market, especially for those outside of Nairobi, where dealers are located.

High interest rates due to the limited effective competition in the banking industry limit access to credit, particularly for smallholders. Some irrigation equipment distributors partner with financial institutions and NGOs[8] to make their products more accessible to farmers. Distributors have called for international donors to underwrite farmer bank loans to lower interest rates and increase farmer adoption of modern irrigation systems.

In Kenya, there are a number of tax-based incentives available, mainly covering exemptions from duty and valued-added tax (VAT) on capital equipment and machinery to be used in the investment project. Other incentives include capital deductions and investment allowances. The incentives are granted on a case-by-case basis and approved by the Ministry of Finance. Importing a complete irrigation system into Kenya is granted exemption on duty and VAT; however, importing spare parts is subject to 16 percent VAT, according to the schedule in force. Similarly, pumps are duty-free but subject to VAT.

8 See paragraph on advisory services.

Manufacturers and distributors

A wide variety of irrigation equipment from a great number of manufacturers can be found in Kenya. They have a good contact network with manufacturers in different parts of the world as shown in Table 4. Competition is fairly high but the local manufacturing of irrigation equipment is limited. Generally, suppliers keep good stock levels in Kenya. Agro Irrigation keeps a rotating stock of machinery and parts valued at KSh 200 million at any one time, of which KSh 90 million are irrigation pumps and equipment (4 900 items stocked). The company has a production line of HDPE, PVE, and PPE pipes in Nairobi.

Figure 15: Desire Flora Kenya Ltd., Isinya

Source: Diogo Machado Mendes, FAO (2014).

Most distributors have a broad range of clients: institutional clients such as government/parastatal (by tender above a given threshold); international organizations[9]; NGOs[10]; and traders who buy to resell (industry drillers, plumbers), wholesalers, and farmers.

Irrigation equipment dealers cater to farmers of all enterprise sizes and crops: coffee, maize, horticulture, and floriculture. In particular, Amiran Kenya developed the Amiran farmer's kit (AFK) to enable small-scale farmers to have affordable access to modern agricultural technologies, methods, and high quality

9 These include FAO, EU, and the International Agency for Migration.

10 Notably, KRC, World Vision, and the Adventist Development and Relief Agency.

inputs. Amiran claims to have 85 percent of the drip market share for export farms that use computerized hydroponics.

Table 4: Summary of suppliers, the irrigation equipment supplied, and its origin

Suppliers	Main irrigation equipment supplied	Origin
Agro Irrigation	Submersible pumps	Grundfos (Denmark); ATX (India)
	Surface pumps	Allweiler GmbH (Germany)
	Sprinklers	Naandan Jain (India/Israel); Rainbird (USA)
	Drip systems	Metzerplas (Israel)
	Controllers, computerized fertigation machines	Talgil (Israel); Gavish Control Systems Ltd. (Israel)
	Valves, water meters and accessories	Dorot (Israel)
	Greenhouses	Yamko Yadpaz (Israel)
	PPR, PVC, HDPE pipes and fittings, water pump spares, aluminium and steel pipe fittings	Own production; Finolex Plasson (India)
Amiran	Drip irrigation	Netafim (Israel)
	Greenhouses	Own production (Israel)
Aqua-Valley Services	Centre pivots, pumps, pipelines, borelines	Valmont (USA and others)
Davis & Shirtliff	Pumps	Grundfos (Denmark); Pedrollo (Italy); Dayliff (assembled in Kenya); Davey (Australia); KSB (Germany); Koshin (Japan)
	Generators, engines, motors	Dayliff (assembled in Kenya); Elemax (Japan); Lister Petter (UK); Cooper (India); Kohler (USA)
	Water treatment equipment	Dayliff (assembled in Kenya); GE (USA)
	Water supply equipment and accessories	Dayliff (assembled in Kenya); Watertech (Italy); WACS (Italy); Sollatek (UK); Smart Controls (USA); Varem (Italy); Sensus (USA); Novasfer (Italy)

Source: Fieldwork, 2014.

Retail pricing

The table 5 below summarizes the estimated retail prices for irrigation equipment supplied in Kenya based on fieldwork conducted for this report.

Table 5: Irrigation equipment pricing in Kenya, 2014

Main irrigation equipment supplied	Per hectare cost
Small drip systems (0.4 ha)	USD 7 750
Larger drip systems (4 ha)	USD 6 225
Small sprinkler movable systems (0.4 ha)	USD 4 700
Larger sprinkler movable systems (4 ha)	USD 4 150
Centre pivot (larger than 40 ha)	USD 2 750

Source: Fieldwork, 2014.

Some of the irrigation equipment most commonly referenced includes irrigation pumps, drip irrigation, particularly for greenhouses, sprinklers, centre pivots, pipes and fittings, and different product lines.

The investment cost for centre pivots ranges between USD 2 500 and USD 3 000 per hectare for those covering an area larger than 40 hectares. The smallest single span pivot from Aqua-Valley covers 1.5 hectares, while the largest single span pivot covers 2.6 hectares. No costs were made available for the small pivots. Seed maize producers are mainly installing centre pivots in Kenya. These farmers grow on contract for companies such as Kenya Seed, Seed Co, Western Seed, and Alfega.

A company has adopted a controlled feeding hydroponics system as it offers many advantages for the soil and a better control of the quantity of water applied through the use of pressure compensated drip lines. The cost of installing one new hectare of pressure compensated drip line irrigation is calculated at USD 7 750.

Solar pump costs vary from USD 2 000 to USD 10 000. Sales are also reported to be expanding for Government and individual farmers – mostly simple small-scale solutions. International NGOs are buying solar pumps for shallow boreholes (high flow, low-head pumps) in order to provide communities with sustainable drinking water facilities.

NGOs mostly buy pumps and equipment for farmers. NGOs are reported to be broadening the type of products to include solar pumps of up to 30kW for irrigation. Because of the high cost and unreliability of power supply, farmers and

NGOs prefer to purchase diesel and solar powered pumps, even though the price can be substantially higher than the price of a comparable electric powered pump.

Most distributors provide borehole drilling services. The cost of borehole drilling ranges on average from USD 112/m where the water table is at 150 m (more common in the east) to USD 168/m where the water table is a depth of 200 m (common in the northeast).[11]

Assistance and maintenance services

Distributors provide a broad scope of services to farmers, from project design, to equipment supply, installation, maintenance and after-sale assistance, to farmer training and irrigation management. Most companies reach all of the Kenyan territory but have headquarters in Nairobi. Some place resident technical staff at the project's location.

Amiran has more than 60 agronomists providing agricultural training and coaching to farmers all over the country. Amiran's drip kits include a full array of support services to ensure a successful system operation. Backed by its professional staff of agronomists and service personnel, support is offered on-site as well as at a drip irrigation training center in Kenya. Support services include installation of the drip kit; on-site visits during the first year of operation; soil preparation guidelines; variety and seedling selection; irrigation scheduling; advice on manure and nutrient application; and advice on pest and disease control application.

Davis & Shirtliff trains clients free of charge at its premises and in the field. Support for products include stocking spares and having 40 service vehicles that go to project sites. What cannot be repaired on-site is brought in for repair at the workshop in Nairobi (e.g., broken down pumps, bearing replacement, etc.). Aqua-Valley visits its clients regularly, performing maintenance on irrigation systems and training farmers on their operation. In-country work revealed that farmers are generally satisfied with the maintenance provided by irrigation equipment companies. The table 6 below identifies supplier services and coverage.

11 These costs do not include pumps or equipment.

Table 6: Supplier services provided and coverage

Company	Main services provided	Coverage
Agro Irrigation and Pump Services Limited	Manufacturer of PPR, PVC, HDPE drainage and sewerage pipes and fittings, water pump spares, aluminium and steel pipe fittings	The company operates from Nairobi, with teams traveling around the country and into Uganda
	Sales, design, and installation of drip and sprinkler irrigation systems	
	Supply, construction, and installation of greenhouses	
	Borehole drilling and equipping	
	Sales, installation and service of submersible and surface water pumps	
	Supply and installation of dam lining, computerized fertigation machines, and manual and self-cleaning filters	
Amiran Kenya Ltd	Pressurized drip irrigation systems for farms using computerized hydroponics	The whole of Kenya from offices in Nairobi
	Gravity-based drip irrigation system (the family drip system)	
	Tailor-made greenhouses to suit the needs of large-scale growers	
	Mini-greenhouse tunnels for small-scale farmers	
	AFKs providing small-scale farmers affordable access to modern agricultural technologies and high quality inputs	
Aqua-Valley Services Ltd	Design and installation of centre pivots, pumps/ pipelines, and borelines	Kenya and surrounding countries from Naivasha office
	Training on safety and operation of the complete system	
	Maintenance scheduling	
	Basic system repairs	
Davis & Shirtliff	Distribution of high quality equipment from a number of industry leading companies	The whole of Kenya, with offices in Thika, Machakos, Meru, Mombasa, Malindi, Kisii, Nakuru, Naivasha, Eldoret, Garissa, and four offices in Nairobi
	Manufacturing and assembling of various water-related products	
	Training of clients free of charge at its premises and in the field	
	Support for products, including stocking spares and running 40 service vehicles to project sites	
	Equipment maintenance and repair at farms and at the workshop in Nairobi Borehole drilling and equipping	

Source: Fieldwork, 2014.

Figure 16: Del Monte - Pineapple Farm, Thika

Source: Diogo Machado Mendes, FAO (2014).

Financial services

The financial sector in Kenya is relatively well developed and sound. Despite this, credit access in the country is a major challenge. The financial sector can be classified as formal, semi-formal, and informal financial service providers. The formal providers include private commercial banks, Government-owned financial institutions, and microfinance institutions (MFIs). The semi-formal providers are the saving and credit associations, private sector players such as exporters, input suppliers, and marketing cooperative societies that provide credit inputs to their farmers, particularly in the tea, coffee, and horticultural sectors. The informal providers are individuals who provide small cash to farmers at local level.

Commercial and rural banks charge high interest rates, generally between 16 and 24 percent, making access to credit unaffordable for most farmers. The Government's financial corporation provides subsidized loans at an interest rate of 10 percent per year.

Over the past few years, commercial banks in Kenya have increasingly shown interest in providing credit to small-scale farmers, especially those involved in horticulture (including flower production), and recently extended to maize and

rice farmers through a program dubbed Kilimo Biashara (farming as a business) promoted by the Ministry of Agriculture. Other banking institutions involved in lending include the Kenya Commercial Bank and the Cooperative Bank. The Agricultural Finance Corporation (AFC) is piloting the development of two irrigation schemes in the Tana River (Bura and Hola Schemes). Its intention is to then replicate these projects in 44 clusters throughout the country. The range of agricultural credit services by Equity and AFC Banks is presented in table 8 (over).

Financial services are, however, rarely available to poor smallholder farmers, as most of the financial institutions concentrate on financing input for crop production, and products are not adapted to the requirements of small-scale farmers. Small-scale farmers have access to credit mainly from cooperatives, NGOs, and community-based lending institutions.

The microfinance industry plays a pivotal role in deepening financial markets and enhancing access to financial services and products for the majority of Kenyans. A list of financial institutions is presented in the table 7 below.

Table 7: Kenya MFI Market Profile (2013, annual values)

MFI name	Gross loan portfolio (USD Million)	Number of active borrowers (Million)	Deposits (USD Million)	Number of depositors (Million)
AAR Credit Services	6.06	-	-	-
Century MFB	1.02	-	0.76	-
Equity Bank	1 819.89	0.704	1 836.26	7.39
Family Bank	334.67	-	400.40	-
Faulu MFB	102.56	0.073	100.45	0.34
Jamii Bora	0.00	-	40.85	-
Juhudi Kilimo	5.75	0.014	-	-
K-Rep	107.38	0.000	112.38	-
KWFT MFB	172.72	0.257	149.84	0.53
Musoni	2.78	0.011	1.48	0.01
Opportunity Kenya	6.08	-	3.04	0.02
Rafiki MFB	22.00	0.005	16.42	0.06
VisionFund Kenya	5.88	0.013	3.66	0.05

Source: MixMarket.org.

Table 8: Range of Agricultural Credit Services by Equity and AFC Banks

Bank	Product	Description
AFC	Seasonal crop credit	Designed for *smallholder commercial farmers*. This provides for production of maize, wheat, and other food crops that mature within a period of 12 months. Items financed include production and harvesting costs, with a repayment period of up to 12 months. Eligibility includes tangible security for the loan, and the minimum acres financed are 5 acres for maize and wheat.
	Cash crops loan	Designed for tea, coffee, and sugarcane. This type of loan aims to address the huge capital investment for the establishment of the crop. Items financed include crop establishment and maintenance, operating costs, and processing equipment. The repayment period is 2 to 5 years with annual installments targeting both individuals and groups. Eligibility includes tangible security, availability of a processing facility and approved crop variety.
	Horticultural and floricultural loan	This type of loan is designed to finance horticultural and floricultural crops. Items financed include production costs, greenhouses and equipment, water and electricity systems, and harvesting and processing equipment. The repayment period is 2 to 5 years. Eligibility includes tangible security, relevant experience, market availability, and compliance with market requirements.
	Oil crops loan	Mainly for growing oil crops such as cotton, soya, ground nuts, and sunflower
Equity Bank	Kilimo Biashara Loan	Designed for *small-scale commercial farmers*. The loan is intended for the purchase of farm inputs such as seeds, fertilizer, and chemicals as well as land preparation services. Eligibility includes bank account, demonstrated ability to repay, commercial farming, proof of farm plot ownership, mortgage over household or farm assets. The repayment period is 1 year or crop production cycle.
	Kilimo Biashara loan-agribusiness	This type of loan is designed to assist value chain players in the business of manufacturing, stocking, importing, and exporting. Eligibility includes both account and non-account holders. The repayment period is 3 years.
	Kilimo-Supa loan	Designed for customers who may not have regular remittance. Target group includes farmers, agrodealers, and processors. Eligibility includes account, existence of reliable income, commercial farming for at least 2 years. The repayment period is 12 to 24 months.
	Farm-input loan	This loan targets farmers who are operating monthly remittance accounts with the Bank. Eligibility includes remittance account holder with the bank for 3 months, 1 month remittance and 6 month account statement from previous banks, ability to repay, 3 moths pay slip, mortgage over household assets, livestock etc.

Source: Field Findings, 2014.

Figure 17: Greenhouse irrigation system

Source: Diogo Machado Mendes, FAO (2014).

Public private partnerships (PPPs) in the sector have been emerging to increase farmers' accessibility to financial services. For example, Amiran Kenya partners with local banks to offer farmers a comprehensive finance package for acquiring the Amiran drip kit. Amiran also partners with Youth Enterprise Development Fund to support young farmers in acquiring a tailor-made AFK.

According to a distributor, the best way to increase sales of centre pivots is for international donors to underwrite farmer bank loans. The same distributor noted that Valley is proposing to underwrite the pivot by agreeing to buy it back in case of farmer default. Unlike other irrigation systems, centre pivots have a lifespan of 25 years on average in developing countries, thus retaining an important share of their initial value after being in use. Farmers would take both machine and crop insurance,[12] providing them with ownership of the investment. This form of asset finance is seen as a means to lower interest rates on loans, which is particularly important for young farmers starting up.

12 Crop insurance is available in Kenya from the Syngenta Foundation for Sustainable Agriculture (SFSA) and Swiss Re, among others.

Advisory services

The Kenyan extension system has been evolving in recent years with the entry of the private sector, NGOs, and civil society players. Measures were planned in the new Kenyan constitution to encourage the private sector to take over the extension services where established commercial farming is in place. Moreover, web-based and phone-based services have been developed to bridge the gap created by reduced public sector extension services. Agricultural shows, field days, and open forums are also important sources of agricultural knowledge and information.

However, the devolution of official agricultural support services has created a gap that has not been satisfyingly filled by the public or the private sector.

NGOs and farmer groups are key potential partners for the upscaling of technical assistance in irrigated agriculture. Some NGOs are already partnering with irrigation equipment distributors (Amiran Kenya in Turkana North, and Davis & Shirtliff in Garissa), offering agronomic support to communities and accompanying the development of the projects. One such example is the KRC, which currently runs 22 irrigation-related projects around the country. Others such as CARE have formed a joint venture agribusiness company with VegPro called VegCARE, which would act as a business consultancy through several principal activities such as technical advisory, business support, marketing, and financial services to all existing farmer groups in the Makueni district.

Private international development agencies run technical cooperation programs with a focus on irrigation. JICA is an example of this, focusing on support for horticulture and rice production and extending its technical assistance to the development and rehabilitation of irrigation facilities, strengthening of farmer organizations, and improvement of productivity and market access. The World Bank-funded irrigation scheme on the Lower Nzoia River includes a strong institutional component aimed at improving institutional capacity to develop and manage large-scale investments. Capacity building is also envisaged at scheme level.

Farmer groups are all over the country and used as a primary channel for the provision of public extension and other services. The Kenya National Farmer Federation of Agricultural Producers represents the interests of 1.8 million large-scale to small-scale farmers from 42 counties and about 5 000 farmer groups.[13]

13 IFAD, 2013.

Chapter 4 – Barriers and constraints

Irrigation in Kenya is hindered by various systemic and market barriers. The main **systemic barriers** are water availability and quality, power availability and costs, and the provision of agricultural support services.

The heat bars reflect the ranking of the main barriers as perceived by the stakeholders, with green representing the least important. For some companies, power costs and water quality carried the same weight.

[Agricultural support service] [Power availability and cost] [Water availability and quality]

Water availability and quality

Different stakeholders expressed concerns over water availability and water quality. Treating water for excess conductivity, namely through reverse osmosis, is an expensive operation in practice only affordable to flower producers. All activities related to climate-smart agriculture and the sustainable use of scarce resources should be encouraged. This includes modern technology irrigation systems with high efficiency water application rates. Irrigation is increasingly threatened by serious environmental problems. Some of these, such as soil salinity and malaria, could be caused by irrigation itself, i.e., through poor water use efficiency and management practices. Other irrigation-triggered environmental challenges may include high water abstractions and unsustainable agricultural practices. On the one hand, these factors make irrigation less desirable, while on the other hand, addressing food insecurity, poverty alleviation, and economic development needs makes irrigation increasingly necessary. Tackling these paradoxical challenges requires more resources, capacity building, and commitment from all sides.

Power availability and cost

For producers and processors of low margin crops, such as cotton, the cost of power is prohibitive and the reliability of power supplies limited. Their representative body is calling for the Government to help with concessions in power costs, arguing the pulling effect in industrial production. Equipment suppliers claim this is one of the reasons why farmers and NGOs prefer to purchase diesel and solar powered pumps, even though the price can be substantially higher than the price of a comparable electric powered pump.

Extending the energy grid and improving its reliability are paramount to the success of irrigation, especially for groundwater projects. The cooperation of Government and international donors is important in securing grants or soft

loans for investment in public goods, such as the extension of the power grid into rural areas. Equipment suppliers should be given financial aid with outreach activities where they can demonstrate new and alternative technologies.

Agricultural support service provision

Some players, such as the Cotton Development Authority, see the Government's current policy of structural adjustment as a barrier to the expansion of irrigation. It is claimed that the withdrawal of the Government from the input supply system, extension service, marketing, primary processing, and ginneries has been detrimental to the industry. This policy was adopted under the premise that the private sector would step in and provide these services, which has not happened yet. More support is needed for the development of Kenya's agricultural support services at county level.

The main **market barriers** are credit access, farmer knowledge, value chain support and marketing, and trade regime for cotton and textiles.

[Trade regime] [Value chain support] [Farmers' skills] [Credit access]

Credit access

Low access to affordable credit and capital investment is one of the biggest barriers to irrigation development, particularly for smallholders. Banks in Kenya charge abnormally high interest rates because of the limited effective competition in the banking industry, despite the large number of banks. Small-scale farmers have access to credit mainly from cooperatives, NGOs, and community-based lending institutions.

Local suppliers of irrigation equipment call for international donors to provide guarantees to farmer bank loans. Farmers would take insurance on the machine and the crops produced,[14] giving them ownership of the investment. This form of asset finance is seen as a way to lower interest rates on loans, which is especially important for young farmers starting up. There is the need to develop new financial products and increase knowledge of the agricultural sector, particularly in the use of non-traditional forms of security.

Farmer technical / business skills

The inadequate technical capacity of both technical staff and farmers limits the uptake of irrigation technologies. Banks and other stakeholders contacted called

14 Crop insurance is available in Kenya from the Syngenta Foundation for Sustainable Agriculture (SFSA) and Swiss Re, among others.

for investment in farmer capacity building, particularly in business management, water-saving technologies, and on-farm water management. Due to the complexity of the high-tech irrigation systems, local technicians would need to be trained on installation as well as operation and maintenance to provide a better service to farmers.

Capacity building programs should be designed with institutions already engaged with farmers on a day-to-day basis. These include MFIs as well as most irrigation equipment distributors that already provide ad hoc training to farmers at the implementation stages of the irrigation systems supplied.

Value chain support and marketing

Inefficient infrastructure and marketing are hampering sustainable value chain development. In order to create a conducive environment for business, investment is needed for tarmac roads, airport development, cold storage, and improved power distribution and lower power costs. Capacity building will also be required at both upstream and downstream ends of the relevant value chains.

A positive example is the creation of a centralized produce collection point with cold chambers by the Horticultural Crops Directorate. Strong support is also sought from the NGOs and private companies interested in extending post-harvest and marketing assistance to smallholders in remote locations.

Trade regime for cotton and textiles

A big cause for the decline of the cotton industry is the untaxed imports of second-hand clothes, which compete on price with the national industry. In parallel, cotton produced in the Regional Common Market for Eastern and Southern Africa (COMESA) is exported to Asia where it is turned into grey fabric, and then returned to Africa for the production of clothing. Companies that invested in grey weaving capacity closed their business because those products were imported from Southeast Asia. Kenya was hit hard because of its larger processing capacity and because it is a member of the World Trade Organization.

Kenya has access to the African Growth and Opportunity Act (AGOA)[15] market but according to the industry it has not yet accomplished its full potential, as incentives favor imports of raw materials to satisfy this market. The AGOA market was expected to trigger a backward linkage but, according to the industry body, links with small farmers in Kenya are still amiss.

15 AGOA is a United States Trade Act, enacted on 18 May 2000 as Public Law 106 of the 200th Congress. The Act offers tangible incentives for African countries to continue their efforts to open their economies and build free markets. It significantly enhances market access to the US for qualifying Sub-Saharan African countries.

Chapter 5 – Irrigation business models

This section identifies irrigation business models in Kenya that have been developed to address some of the barriers outlined in the previous section, particularly access to finance and inputs.

State-owned and large agribusiness companies (growing sugarcane, rice, wheat, flowers, tea, coffee) in Kenya have explored a range of business models to integrate smallholder farmers into their raw material supply chains, including contract farming (centralized and outgrower models), management contracts, and joint ventures (Table 9). There is a long experience in contract farming and joint ventures[16] between smallholder farmers and private companies, particularly in the tea and sugar sectors.

An example of joint venture model and contract farming is found in the Mwea Irrigation Scheme, a state-run scheme mainly dedicated to smallholder rice production. The NIB has annual contracts with farmers concerning the provision of services and inputs (such as seeds and fertilizer), which are provided on credit. Water is also provided on credit. Water management and operation and maintenance services are systematically underfunded and not performed to a satisfactory level. Irrigation water is sourced and distributed by gravity, and growers calculate that its efficiency could be improved by 70 percent if the main canals were lined. Farmers feel they have no say in decisions concerning prices for inputs, services, and water use, as well as purchase prices. Although they own a 45 percent equity stake in the milling plant, this does not translate into significant leverage vis-à-vis the NIB (Cotula, L. & Leonard, R. 2010).[17] The benefit-sharing mechanism in this model is so complex that for benefit-sharing to be successful, robust capacity building within the cooperatives would still be needed [18] (Table 10).

There are some examples of irrigation business models that include smallholders, such as the revolving fund credit-input supply model and the model for irrigation equipment supply. These models have a multipartite agreement where the parties have different roles (see Annex 2). These

16 A joint venture is a business agreement in which two independent market actors, for example an agribusiness company and a farmer organization, agree to develop a new business by contributing equity and, therefore, sharing assets, ownership, revenues, and expenditures. The particular features of this arrangement are the sharing of financial risks and benefits and, in most but not all cases, the sharing of decision-making and equity.

17 Cotula, L. & Leonard, R. 2010. Alternatives to land acquisitions: Agricultural investment and collaborative business models. London, IIED; Berne, SDC; Rome, IFAD; and Maputo, Mozambique, Centro Terra Viva.

18 Full details of this model are found in the main study in Chapter 7, FAO 2015.

models have been initiated by the Government in food-insecure areas and face a number of issues. The farmers are required to contribute to operation and maintenance activities after the project is handed over to them. This model, however, is applicable in areas where food insecurity has been a major challenge and the farmers are considered unable to contribute to the initial capital investment. Most of the farmers in this category are also former pastoralists trying to diversify their livelihoods and the support is intended to get them to embrace irrigated agriculture. Most of these schemes are currently underperforming.

Outgrower schemes initiated by private agribusinesses also face the same issues to some extent:

- The provision of irrigation systems and equipment without any farmer contribution is an unsustainable approach that does not entrust farmers with ownership of the scheme, leading to problems of underperformance and deferred maintenance.
- Farmers' participation as clients is a prerequisite for the sustainability of irrigation schemes.
- Strong producer organizations are important to outgrowers for effective coordination of crop production, quality control, marketing, and negotiation.
- The lack of operation and maintenance and scheme organization follow-up support leads to underperformance.
- Land-use rights.
- Most outgrowers lack the technical capacity to manage a quality crop.
- There is inadequate and/or unreliable production to meet contractual obligations, especially when dealing with multinational marketing companies.
- Competition is high over limited water resources between downstream and upstream users, e.g., around Mount Kenya (upper Ewaso Ng'iro catchment) and Lake Naivasha.
- There is limited decision-making for outgrowers concerning prices for inputs, services, and water use, as well as purchase prices.
- There are long delays between crop delivery and payment of purchase prices in some public schemes (e.g., MWEA Scheme).
- Outgrowers default on credit by side-selling their produce. This applies especially when the companies are not offering competitive prices or effect delayed payment where the outgrowers may have pressing needs.

Historically, irrigation developments were mostly designed to address food insecurity and poverty alleviation, especially the large publicly funded irrigation schemes where farmers participated as tenants. These schemes had mixed

results and most of them have been underperforming, if not abandoned. Based on the literature review and some in-country work, one of the main reasons appears to be the supply-driven nature of the schemes, whereby the Government policy decided where, what, and how to produce it. Lack of marketing is another underlying cause for failure, which is partly due to limited training and research in marketing within ministerial and Government offices. The positive results of irrigation development spearheaded by the private sector in Kenya are linked to the increased awareness of market opportunities in the country. Developing horticultural production targeted at urban markets as well as international markets is an example of this.

It is critical to evaluate past and current irrigation development and improve the database on irrigation to ensure efficient and successful irrigation development. Moreover, the Government should place higher priority on efforts to improve its capacity to regulate and control access to water resources, and to transfer the responsibility of operating and maintaining the schemes to farmers and communities.

The regulation of water resources is critical in a water-scarce country such as Kenya to avoid water conflicts, which have exacerbated in recent years due to increased drought.

For all existing organizational types of irrigation in Kenya, special challenges are to be considered to ensure their success in the long term. While the major concerns of smallholder schemes are improved marketing conditions and better access to credit, which call for special lines of credit and the creation of marketing cooperatives, the crucial factors for public schemes would include the consistent implementation of the current reform plans and effective and fair cooperation with farmers. In addition, the two key issues to be addressed include assigning (provisional) land use rights and training for farmers.

Commercial schemes, on the other hand, are mostly concerned with maintaining their international competitiveness. Commercial operators see effective transportation infrastructure and a reliable power supply as the most important preconditions needed for a sustainable and profitable business. Particular attention needs to be paid to developing the national market, which has a larger future growth potential for vegetable crops than the export market.

Table 9: Benefits and challenges of irrigation scheme and outgrower business models

Benefits	Challenges
• Large-scale schemes can break the relationship between agricultural growth and rainfall • Access to credit and inputs • Assured market outlet • Significant yield increases with irrigation and income of farmers • Allow for medium- and long-term planning • Water and farm equipment provided via credit • Nucleus farm provides inputs and technical assistance to outgrowers • Nucleus estate provides water to smallholders • Irrigation providers offer technical support and equipment on credit • Minimize defaulters and enhance loan recovery	• Initial funding required for smallholder irrigation developments • Water management and deferred operation and maintenance • Limited local markets • Knowledge gaps and lack of improved irrigation technologies • Long delays between crop delivery and payment of purchase prices • Quality requirements and supermarket specifications • Time-consuming training of farmers in high quality products • Higher overhead costs (extension staff) • Smallholders provided with inputs subsidized by nucleus farm initially, but eventually having to pay themselves • Power shortages and high tariffs • Effective and fair cooperation with farmers • Inequitable distribution of benefits and risks

Source: FAO.

Table 10: Joint venture: advantages and disadvantages

	Advantage	Disadvantage
Agribusiness company	Allows companies to enter new businesses or geographic markets while sharing the risks with a venture partner	Difficult to implement as it takes time and effort to build the right relationship and partnership with another business
	Can be flexible in that it has a limited lifespan and covers only part of the business operation, thus limiting both commitment and the business's exposure	Can have imbalances in terms of the amount of expertise, investment, or assets contributed to the venture by the various partners
	Companies can eventually sell their share of the business to other partners	Can have poor integration and cooperation due to different cultures and management styles
	Companies benefit from reduced legal, political and reputational risks	
Farmers' cooperative	Enables access to greater resources, including specialized staff and technology	
	Enables co-ownership of business assets, including processing facilities	Allows sharing of risks with a venture partner
	Provides equitable returns to smallholders and landowners	Distributes small or no dividends (depending on the number of farmers involved)
	Is part of the decision-making process	
	Decision-making process is transparent	

Source: FAO.

Chapter 6 – Market opportunities

Kenya's agricultural sector offers significant market opportunities for irrigation in both the smallholder and commercial sectors. Key areas of opportunity are outlined below.

Natural resources

Availability of irrigable areas endowed with favorable climatic conditions, adequate infrastructure, and proximity to input and output markets make it a potential for high-tech efficient irrigation.

Food security

Frequent droughts have had a devastating impact on agricultural economies and livelihoods. Addressing food insecurity and poverty alleviation make irrigation increasingly necessary.

Crop markets

Based on the analysis in Section 2, market prospects are good for most agricultural products, whether for domestic, regional, or international markets. Wheat, rice, and sugar will be able to expand production and be absorbed in the domestic market most easily. The same is true for maize. In terms of market opportunity, irrigation specifically for vegetables can be attractive and present minimal risks.

The flower industry shows the most promising growth potential. The industry and other exporters to the EU showed relief with the successful completion of the EAC - EU Economic Partnership Agreement negotiations held in October 2014, in Brussels, which included Kenya for duty-free, quota-free status for all its exports to the EU market. This process is expected to take two to six months.

There are also new market opportunities for flowers outside the European markets. These destinations include the Middle East (already a major market for fruit), Japan, Australia, Russia, other African countries, and the United States, the latter benefiting from newly opened direct flights from Nairobi.

Irrigation in sugarcane estates

Kenya is a net importer of sugar as the country is a high cost producer of sugar, compared with other regional producers. Economies of scale are seen as one

way to cut costs, and certainly the introduction of drought- and disease-resistant sugarcane varieties can improve efficiency. One of the key opportunities for the sector is the introduction of irrigation to increase yields, especially useful in facing the dry spells from December to March.

Fiscal incentives

Imported irrigation equipment is exempt from customs duties and VAT, making it an attractive market opportunity. Other incentives include capital deductions and investment allowances, details of which may be accessed on the Kenya Revenue Authority's Web site.

Investment in irrigation

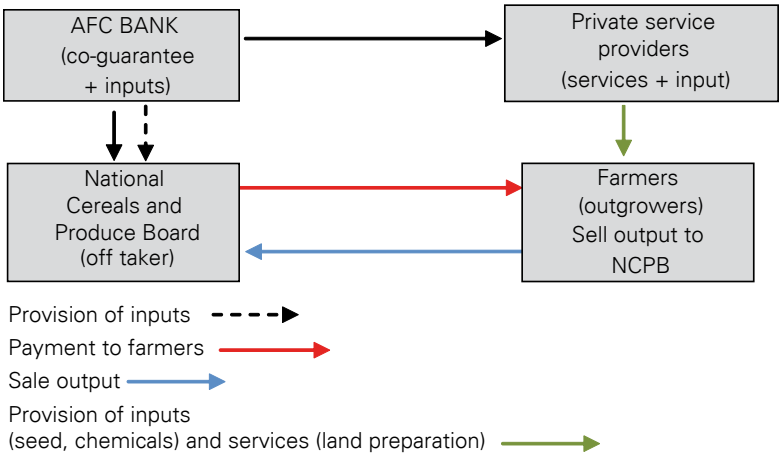
A new irrigation policy and a large irrigation program have been developed, aimed at the expansion of irrigation in the country. This ambitious program, if implemented correctly, is in itself an opportunity for irrigation development and provides critical business for irrigation supply and service companies.

Annex 1 – The Kenya transmission network (2014)

Source: Kenyan Ministry of Energy and Petroleum (2014): Draft National Energy Policy, as of 27/11/2014 at http://www.energy.go.ke/downloads/National%20Energy%20Policy%20-%20Final%20Draft.pdf

Annex 2 – Examples of Government irrigation business models

Revolving fund credit-input supply model. The Government-led model in public irrigation schemes is an interrelation of three Government institutions,[19] private service providers, and farmer groups.



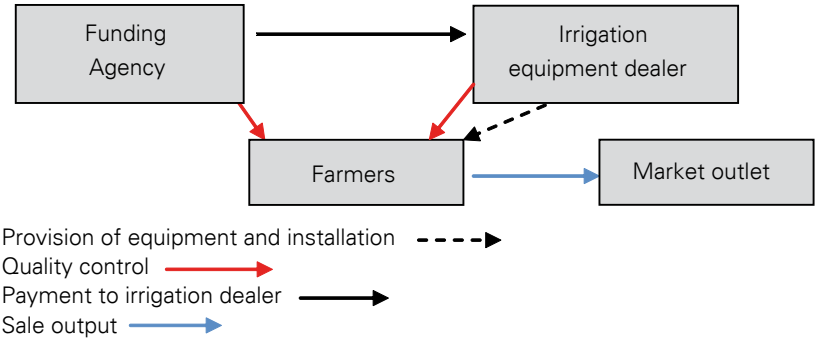
The financial provider facilitates the provision of inputs (mainly subsidized fertilizer) through the National Cereals and Produce Board (NCPB); private service providers jointly identified by the parties provide land preparation, seeds, and chemicals. Cash advances are provided to the farmers through their respective groups. The farmer groups in turn collectively sell their production output to NCPB, which deducts the loan owed to AFC and the remaining fund is paid to the farmers through their respective groups. The private service providers are directly paid by AFC upon receipt of invoices and certification of service rendered from the farmer groups on behalf of the farmers.

Examples of this Government-led financing model are currently implemented in two public maize irrigation schemes (Bura and Hola Irrigation Schemes). In order to fast-track cropping activities, the NIB created a revolving fund within AFC Bank, which acts as credit guarantee. Under this arrangement, farmers are provided credit loans of up to KSh 24 000/acre at an interest rate of 10 percent. The finance is intended to meet the cost of land preparation, operation and

19 The Government institutions are the NIB, AFC and NCPB.

maintenance, and agricultural inputs (seed, fertilizer, and chemicals). The AFC Bank provides the management and recovery of the input credit for subsequent production. To overcome the challenges related to loan recovery the farmers were required to form farmer groups to act as co-guarantee as precondition for lending. The NCPB acts as an off taker to minimize defaulters and enhance loan recovery for the continuation of the revolving fund (Ministry of Agriculture, 2013).

Model for irrigation equipment supply. This is a tripartite model that has the following players: small-scale farmers, funding agency, and irrigation equipment dealers. Small-scale farmers must be organized in a farmer group or organization to be eligible for support from the funding agency. The funding agency undertakes initial financial assessment of the farmers' proposal. If the proposal is approved, the funding agency contacts the irrigation system and equipment dealers to implement the request through a competitive process. The selected company provides the irrigation equipment and installs the system or delivers the service required. In turn, it receives payment from the funding agency after completion of the job upon certification from the beneficiary farmers. Quality control is jointly carried out by the farmers and funding agency, sometimes in collaboration with local Government officials (Ministry of Agriculture, 2013).



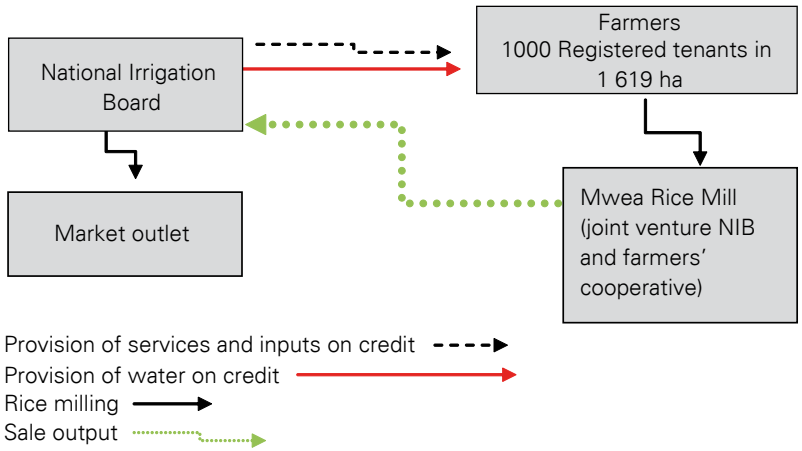
Mwea Rice Irrigation Scheme. This scheme is the largest rice irrigation scheme in Kenya, involving about 3 400 farmers. The Mwea is located about 100 km northeast of Nairobi and is mainly dedicated to rice production. The scheme's total area is 12 282 hectares, 6 475 hectares of which are developed for paddy production. In addition, the scheme has 1 619 hectares of outgrower and Jua Kali[20] areas under paddy production. The rest of the scheme is used for settlement, public utilities, and farming of subsistence and horticultural crops.[21]

20 "Jua Kali" farmers cultivate rice outside the original irrigation scheme, frequently diverting water from the scheme's canals to their plots.

21 NIB website accessed the 28/11/2014 at HTTP://WWW.NIB.OR.KE/SCHEMES-STATIONS/MWEA-IRRIGATION-SCHEME.HTML

Rice milling is undertaken by the Mwea Rice Mill, the joint venture between the NIB (55 percent) and the Mwea Farmers Multipurpose Cooperative Society Ltd (45 percent), a cooperative established by local farmers. Irrigation water is diverted from the Nyamindi and Thiba Rivers with fixed intake weirs, and then conveyed through open unlined channels.

Local farmers were settled as registered tenants on public land, each with a holding of at least 4 acres (1.6 hectares) when the scheme was started in 1956, but since then most of the holdings have been subdivided among family members and in other cases transferred to new farmers. The NIB has annual contracts with farmers concerning the provision of services and inputs (such as seed and fertilizer), which are provided on credit. Water is also provided on credit. Debt repayment is ensured by deductions from the purchase price at harvest. No financial credit is provided. Farmers feel they have no say in decisions concerning prices for inputs, services, and water use, as well as purchase prices. Although they own a 45 percent equity stake in the milling plant, this does not translate into significant leverage vis-à-vis the NIB. Long delays exist between crop delivery and payment of purchase prices. Since price and marketing controls were removed in 1993, a large number of rice mills have started to operate in the immediate surroundings of the irrigation scheme. This has offered new options to the farmers, who can now divert rice paddy to the private mills, but also raised questions as to the regularity of supplies to the NIB (Cotula, L. & Leonard, R. 2010).[22]



22 Cotula, L. & Leonard, R. 2010. Alternatives to land acquisitions: Agricultural investment and collaborative business models. London, IIED; Berne, SDC; Rome, IFAD; and Maputo, Mozambique, Centro Terra Viva.

Annex 3 – Main players in the irrigation market

NAME	PHYSICAL AND POSTAL ADDRESS	LOCATION	DESCRIPTION
	DEALERS IN IRRIGATION SYSTEMS AND EQUIPMENT		
G. NORTH & SON	Mitchell Cotts Logistics Centre, Mombasa Road Email gsales@gnorth.co.ke Contact: Samuel Ndunga (Sales Engineer Tel: +254 721 636 183	Based in Nairobi but also operating in the wider East African market	Importation and exportation of agricultural and irrigation equipment, farm machinery, farm input, greenhouses, irrigation systems, agronomy services, and trainings
AMIRAN KENYA LTD	Old Airport Road, P.O. Box 30327-00100, NRB+254 719 095000	Based in Nairobi	Farm input, greenhouses, irrigation systems, agronomy services, and trainings
ELGON KENYA LTD	East Gate Road, Off Mombasa Road, Email: info@elgonkenya.com Contact:VaibhavDeshmukh, (Technical Sales Manager, +254 786 165 715)	Based in Nairobi	Agriculture input supply, agronomy services and trainings Packaging materials for exports and greenhouse sheeting etc.
GRUNDFOS KENYA LTD	4th Floor Cape Office Park Kilimani Ring Road Email: sps@spares_4pumps.com Contact Hillary Towett (Country Manager EA +254 725 519 823)	Branch in Nairobi	Major suppliers of irrigation pumps
DAVIS & SHIRTLIFF LTD	Industrial Area, Dundori Road, P.O. Box: 41762-00100, Nairobi. Email:d&s@dayliff.com Sales Office +254 020 6968 200 / 0711 079 200 Service Lines +254 020 6968 350 / 0711 079 350	Based in Nairobi	Major dealers in design, installation, and maintenance of water supplies equipment, including irrigation pumps
KSB Kenya	P.O. Box 2286-00621 Village Market Tel: +254 (20) 234 9308 Mob: +254 (0) -705 984088/-787 635592	Based in Nairobi (technical support office)	Pumps, valves, and related systems. Offers wide range of services and activities from pump and valve selection to consultancy for pumps and valve application

NAME	PHYSICAL AND POSTAL ADDRESS	LOCATION	DESCRIPTION
IRRICO INTERNATIONAL LTD	Road A, off Enterprise Road, Industrial Area. P.O. Box 38974 – 00623, NRB Email:info@irricointernational.com Contact Stephen Wambua (Tel: +254 20 2393583, Mob: +254 721 388 444)	Based in Nairobi	Dealers in irrigation systems design, supply, installation, maintenance, and consultancy
AGRO IRRIGATION AND PUMPS SERVICES	Embakasi, North Airport Road, AggreyChoreyLwugi, Sales, +254 723 467790	Based in Nairobi	Suppliers of irrigation equipment (sprinklers, drip irrigation system) for large flower and vegetable farms
WILMAG KENYA LTD	Junction Enterprise Road and Commercial Street Industrial Area, P.O. Box 6346-00300, NRB +254 20 2034493	Based in Nairobi	Ground and surface water development, borehole drilling and rehabilitation, groundwater surveys, supply and installation of pumps
AGRITECH FARMING SYSTEMS AND SUPPLIES CO LTD	Mehisa Godowns, Mlolongo, Mombasa Rd P.O. Box: 59624-00200 City Square Email:agritechnolfss@gmail.com +254 724636069	Based in Nairobi	Irrigation/greenhouse material (greenhouses, dam liners, irrigation accessories, agrochemicals, certified seed, and soil treatment services)
KICKSTART INTERNATIONAL INC (APPROTEC)	Kalson Towers, 6th Floor, Crescent Road, off Parklands road, P.O. Box 64142-00620, NRB Email:kickstart@kickstart.org +254 20 3740175	Based in Nairobi	Distributors of irrigation equipment and tools to small-scale farmers Develop and provide small pumps (low tech) to smallholder farmers
GREENER EARTH LTD	Mombasa Road, Wall Street Business Park Contact: Nancy Muhoro, Marketing +254 20 2511824	Based in Nairobi	Specializes in manufacturing of drip lines for irrigation, installation of greenhouses, supply of liners for dams and ponds
	PRIVATE COMMERCIAL FARMS		
CARZAN FLOWERS KENYA LTD	a Box 1801 – 20117, Naivasha	Based in Naivasha	Cut flowers production
FINLAY FLOWERS LTD	Kericho	Based in Kericho	Cut flowers production
HOMEGROWN LTD	Naivasha	Based in Naivasha	Cut flowers and vegetable production
KIJABE LTD	Moi South Lake Road, P.O. Box 358-20117, Naivasha, +254-060-2021008	Based in Naivasha	

NAME	PHYSICAL AND POSTAL ADDRESS	LOCATION	DESCRIPTION
FINLAY HORTICULTURE KENYA LTD – FLAMINGO FARM	Moi South Lake Rd, P.O.Box: 530-20117 Naivasha, Tel: +254-5020220418. Mobile: +254-722204830	Based in Naivasha	Vegetables
LONGONOT HORTICULTURE LTD	Moi South Lake Road, P.O. Box 1271-20117, Naivasha	Based in Naivasha	Horticulture
MAGANA FLOWERS KENYA LTD	P.O. Box 14618 – 00800, Westlands, Nairobi Nairobi, +254 - 20 - 2017651	Nairobi	Flowers production
OSERIAN LTD	P.O. Box 2010-20117, Naivasha 43340-00100, Nairobi,+254 (0) 727 534 550	Naivasha	Flowers production
TAMBUZI LTD	P.O. Box 1148-10400, Nanyuk Tambuzi.sales@tambuzi.co.ke +i254 722 716158, +254 734 600062	Nanyuk	Horticulture, forestry, beekeeping, vegetable, and livestock
KAKUZI LIMITED	P.O. Box 24-01000, Thika Richard Collins, Chief Executive Operations Tel: Mobile: +254 722 205895 / +254 733 400025 rcollins@kakuzi.co.ke	Thika	Tea, pineapples, avocado, macadamia, livestock, and forestry
SUNRIPE (1976) LTD	Cargo Village, JKI Airport, P.O. Box 41852 Tel: +254.2.825232-4, Fax: +254.2.822709 Email: info@sunripe.co.ke	Nairobi	Fresh fruits and vegetables
EAST AFRICAN GROWERS LTD	P.O. Box 49125-00100, Nairobi Telephone 020-822017/25/29/34 Fax 822014/822155/334999 Email info@eaga.co.ke	Nairobi	Mainly vegetables
EVEREST ENTERPRISES LTD	P.O. Box 52448-00200, City Square Tel: +254-206823715., Fax: +254-206824195. Mobile: 722848120	Nairobi	Mainly vegetables

NAME	PHYSICAL AND POSTAL ADDRESS	LOCATION	DESCRIPTION
DEL MONTE KENYA LTD	P.O. Box 147-010000, Thika, +254 20 2141600	Thika	Fruits
DELAMERE ESTATES LTD	P.O. Box Private Bag, Naivasha William Rotich – Manager +254 50-2020675		Livestock, hay, silage, and vegetables
MARULA ESTATES LTD	Naivasha, P.O. Box 466-2011 Samson Mugwe, Sales Administrator, +254 733 577566	Naivasha	Livestock, hay, silage, vegetables, and irrigation systems (center pivot)
SWERA FLOWERS	P.O. Box 2099 - 20300. FAX: +254 20 216 5973 E-mail: info@suera.co.ke, sales@suera.co.ke	Nyahururu	Roses and callas lillies
MBOGATUU LTD	P. O. Box 47070-00100, Othaya Rd. +254-20-3877988 / 3861824 / 3561196 mtl@mbogatuu.com	Nairobi	Mainly vegetables
NON - GOVERNMENTAL ORGANIZATIONS			
WORLD VISION KENYA	Karen Road, off Ngong Road, P.O. Box 50816-00200, NRB. Wv_kenya@wvi.org Deputy National Director: Pauline Odunga +254 732 1260000	Nairobi	World Vision began its operations in Kenya in 1974 and currently provides assistance to children and communities in 35 of the 47 counties in Kenya. Provides support to irrigation farmers in Turkana county
CARE KENYA	Tel: +254 20 2585381 Mob: +254 723 151081 +254 722 509870	Nairobi	CARE is one of the lead agencies for water and hygiene, food distribution, and formal education in the three refugee camps in Dadaab, near the Kenya-Somalia border.
ACTION AID	All African Conference of Churches (AACC) Waiyaki Way, P.O.Box 42814-00100 Phone: +254 20 4440440/4/9 Mobile: +254 (722) 518 220 Info.kenya@actionaid.org	Nairobi	A non-political, non-religious organization working in Kenya since 1972 to end poverty and injustice. Provides minimum support to irrigation farmers

NAME	PHYSICAL AND POSTAL ADDRESS	LOCATION	DESCRIPTION
FINANCIAL INSTITUTIONS (BANKS AND MICRO-FIANCIAL INSTITUTIONS)			
EQUITY BANK LTD	Head Office. Equity Centre, Hospital Road, Upper Hill. Address: P.O.Box 75104-00200, +254 - 0711 026000, +254 - 0732 112000	Nairobi	Private bank that provides input loans to farmers
AGRICULTURAL FINANCE CORPERATION (AFC)	Agricultural Finance Corporation, Development House, Moi Avenue Nairobi	Nairobi	Government-owned bank that offers loan products to farmers, including asset financing
AFRICAN BANKING CORPORATION LTD	ABC Bank House, Mezzanine Floor, Koinange Street Telephone: +254 20 4263000, 2223922, 22251540/1, Email: headoffice@abcthebank.com Website: http://www.abcthebank.com	Nairobi	
KENYA WOMEN MICROFINANCE BANK LTD	Postal Address: P. O. Box 4179-00506, Telephone: +254-20- 2470272-5, Email: info@kwftdtm.com Website: www.kwftdtm.com	Nairobi	**Date Licenced:** 31st March 2010 Branches: 24
UWEZO MICROFINANCE BANK LTD	Park Plaza Building, Ground Floor, Moktar Daddah Street Telephone: 2212917 / 9 Email: info@uwezodtm.com Website: www.uwezodtm.com	Nairobi	**Date Licensed:** 08 November 2010 Branches: 2
CENTURY MICROFINANCE BANK LTD	KK Plaza 1st Floor, New Pumwani Road, Telephone: +254-20- 2664282, 20 6768326, 0722 168721, 0733 155652 Email: info@century.co.ke	Gikomba	**Date Licensed:** 17th September 2012 Branches: 1
RAFIKI MICROFINANCE BANK LTD	2nd Floor, El-roi Plaza, Tom Mboya Street Telephone: 020-216 6401 Cell - phone: 0719 804 370/0734 000 323 Email: info@rafiki.co.ke Website: www.rafiki.co.ke	Nairobi	**Date Licensed:** 14th June 2011 Branches: 3

NAME	PHYSICAL AND POSTAL ADDRESS	LOCATION	DESCRIPTION
	GOVERNMENT INSTITUTIONS AND DONORS		
MINISTRY OF AGRICULTURE, LIVESTOCK & FISHERIES	P.O. Box 30028-00100, Nairobi.	Nairobi.	Parent ministry for the irrigation department
NATIONAL IRRIGATION BOARD	P. O. Box 30372-00100 Woodlands Rd, Tel: +254 722 321653, +254 202711380, 2711468 Fax: +254 20 2722821, 2711347	Nairobi	Government parastatal that deals with irrigation development in the country
KENYA AGRICULTURAL RESEARCH INSTITUTE	Kaptagat Rd, Loresho Nairobi Kenya Post Office: P.O.Box 57811-00200, City Square, NAIROBI, Tel: +254 20 4183720 Fax: +254-020-4183344 Resource.center@kari.org		
TANA & ATHI RIVERS DEVELOPMENT AUTHORITY (TARDA)	P.O BOX 47309-00100, Tel: +254 20 341782/4/7/8 Email: info@tarda.co.ke	Nairobi	A state corporation, under the Ministry of Environment, Water and Natural Resources (MEW&NR) established to undertake integrated planning, development coordination, and management of the resources within the Tana and Athi river basins.
KERIO VALLEY DEVELOPMENT AUTHORITY (KVDA)	Eldoret, +254 53 2063361-2	Nairobi	Regional development authority covering Turkana, West Pokot, Elgeiyo Marakwet, Baringo, and parts of Samburu and Nakuru counties
LAKE BASIN DEVELOPMENT AUTHORITY	P.O. Box 1516, KISUMU TEL. 254 57 2027227 EMAIL: info@lbda.co.ke	KIsumu	A regional development authority established in 1979 by an Act of Parliament.
EWASO NG'IRO SOUTH DEVELOPMENT AUTHORITY	ENSDA, P.O BOX 213- 20500 md@ensda.go.ke Tel: +254 20 2383053 Fax: +254 202336560	Narok	
FAO	Kenya Contact FAO Representative: e-mail: FAO-KE@fao.org		

NAME	PHYSICAL AND POSTAL ADDRESS	LOCATION	DESCRIPTION
WORLD BANK	Delta Center Menengai Road, Upper Hill P.O. Box 30577-00100, NRB		International financial institution that provides loans to developing countries for development programs
AFRICAN DEVELOPMENT BANK	Khushee Tower Longonot Road, Upper Hill Nairobi, Tel: +254 20 2712925 Fax: +254 20 2712938		Regional development bank that provides loans
JICA	The Rahimtulla Tower, 10th &11th, Upper Hill Road.P.O.Box 50572-00200, NRB Tel:+254 20 2775000		Involved in providing funding for irrigation, water harvesting, and storage development projects

Please address comments and inquiries to:
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Viale delle Terme di Caracalla – 00153 Rome, Italy
investment-centre@fao.org
www.fao.org/investment/en

Report No. 24 – September 2015

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