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Development Priorities of the Water Sector in Africa placed in the context of
Agri-Energy sectors

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Acronyms and abbreviations

ACE-Water	African Networks of Centres of Excellence on Water Sciences and Technology
AfDB	African Development Bank
AIP	Africa Water Investment Programme
AMCEN	African Ministerial Conference on the Environment
AMCOW	African Ministers' Council on Water
ARMC	African Resources Management Satellite Constellation
AU	African Union
AUC	African Union Commission
AUDA	African Union Development Agency
AU-HoS	African Union Heads of State and Government
AWV 2025	African Water Vision 2025
CAADP	Comprehensive Africa Agriculture Development Programme
CEMA	(African Union) Conference of Ministers in Charge of Energy
ClimDev-Africa	Climate for Development Initiative for Africa
DG DEVCO	Directorate General for International Cooperation and Development of the European Commission
DG ENV	Directorate General for Environment of the European Commission
DREA	Department of Rural Economy and Agriculture, African Union Commission
EAC	East African Community
ECA/UNECA	United Nations Economic Commission for Africa
EC-JRC	European Commission Joint Research Centre
ECOWAS	Economic Community of West African States
EU	European Union
HLPW	High Level Panel on Water
NBI	Nile Basin Initiative
NEPAD	New Partnership for Africa's Development
PIDA	Programme for Infrastructure Development in Africa
PRC	Permanent Representatives Committee of the African Union
RLBO	River/Lake Basin Organisation
REC	Regional Economic Community
SADC	Southern African Development Community
SIDS	Small Island Developing States
STC-ARDWE	Specialised Technical Committee on Agriculture, Rural Development, Water and Environment
TIGER	Technology Informatics Guiding Education Reform [initiative]
UNESCO-IHP	United Nations Educational, Scientific and Cultural Organisation International Hydrological Programme
WACDEP	Water, Climate and Development Programme
WASSMO	African Water and Sanitation Sector Monitoring and Reporting System
WEFE	Water, Energy, Food and Ecosystems
WHYCOS	World Hydrological Cycle Observing System
WMO	World Meteorological Organization
WRM-PAP	African Water Resources Management Priority Action Programme 2016 - 2025

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Executive Summary

As one of the activities under the ACE-Water project, the Water and Marine Resources Unit of the Institute on Sustainable Resources commissioned a review of available information to prepare a report on the *Development Priorities of the Water Sector in Africa placed in the context of Agri-Energy sectors*. The requirement was to analyse both the information gathered by the European Commission Joint Research Centre; and information from strategic documents of the project partner institutions and organisations. This report synthesises the development priorities of the water sector in Africa within the context of the express plans for productive use of water in the sectors of energy and agriculture. They are drawn from a review of the following policy, planning and programme documents for assuring water, food, energy and ecosystems security in Africa.

- i) the African Union agenda 2063: “the Africa we want”;
- ii) the Africa water vision 2025 and framework for action;
- iii) reports from the African Water and Sanitation Sector Monitoring and Reporting (WASSMO) System;
- iv) the Africa water investment programme;
- v) the comprehensive Africa agriculture development programme (CAADP);
- vi) the programme for infrastructure development in Africa (PIDA);
- vii) the water, climate and development programme (WACDEP);
- viii) the African water resources management priority action programme 2016 - 2025 (WRM-PAP);
- ix) the AMCOW strategy 2018 – 2030; and,
- x) various decisions and declarations of the policy organs of the African Union and the African Ministers’ Council on Water (AMCOW).

The key emerging priorities from the analysis can be summarised as follows:

- i) Promoting a new narrative on water that recognises the full potential of water in the economy to further Africa’s future development needs. The new narrative should foster an appreciation of the vitality of water in economic growth; job creation; and industrialisation.
- ii) Strengthening the business case for water investments, as well as raising the profile of water in national and regional development in Africa. The economies of many countries in Africa are extremely vulnerable to climate variability and climate change as they are largely based on natural resources (water, land, energy, forests/ecosystems). Lack of investments to enhance human and institutional capacities; build infrastructure; and improve information systems to support water management exacerbate the difficulties. To overcome these challenges – and achieve the SDGs – it is imperative for governments, societies and the private sector to fully embrace the concept of environmental security. A paradigm shift in the approach to developing, utilising and managing Africa’s water and related resources is urgently required.
- iii) Water infrastructure development should be advocated for and promoted as a means to provide a service – which is water – to the economy in order to enable growth and development to happen. Water sector interventions, especially for such resource management functions as water storage and flood control, should not be designed and marketed from the perspective of ‘water sector development’. Rather, the approach to packaging them for investment should be centred on their eventual utility – from an economic perspective – in terms of providing water for food and energy production. This should be extended to the opportunities for employment and wealth creation: not to mention peace, social security and political stability.

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- iv) Strategies to improve the investment outlook for water and related resources development will also benefit from the application of the High Level Panel on Water (HLPW)¹ principles for valuing water. The principles provide a guideline for determining the real value of proposed investments; the associated costs; and the benefits that can be expected. In essence, they serve the purpose of improving the appreciation of the economics of water in a country, river basin or region. The application of the principles – together with targeted interventions to catalyse change – holds promise for delivering sustainable solutions for assuring water for energy, food and environmental security in Africa.
- v) Application of the Water-Energy-Food-and-Ecosystems nexus approach to promote and facilitate investment led transboundary management and governance of water and environmental resources. The aim is to consolidate and capitalise on the achievements to-date of implementing the principles of Integrated Water Resources Management. It is thus important to revitalise implementation of the following ongoing initiatives:
- a. establishing economic accounting for water as a discipline to, among others, improve the financing and investment outlook for water resources management in Africa;
 - b. improving national-level capacities for collecting complete and reliable hydro-meteorological and piezometrical data in all of Africa's 64 shared river basins;
 - c. applying nexus perspective solutions to assure water, food and energy security in Africa;
 - d. improving agricultural water management;
 - e. implementing the PIDA priority transboundary water and energy projects;
 - f. enhancing use of wastewater and sludge, as appropriate and acceptable, for nutrient recovery in agriculture and bio-gas energy production;
 - g. standardising regulatory frameworks for agricultural water management across Africa;
 - h. developing and adopting legal, policy and institutional frameworks for the collection and treatment of wastewater to a minimum water quality standard before discharge into transboundary water courses and aquifers; and,
 - i. supporting Member States, R/LBOs and RECs to conduct water resources assessments as well as supporting them to monitor and manage groundwater use.

¹ The High Level Panel on Water (HLPW) was co-convened in 2016 by the UN Secretary General and the World Bank President to provide the leadership required to tackle one of the world's most pressing challenges – an ever growing water crisis. It identified ways in which the world could accelerate progress towards ensuring availability and sustainable management of water and sanitation for all (SDG 6).

1. Introduction

The European Commission's Joint Research Centre (EC-JRC) – in collaboration with UNESCO-IHP – is supporting and coordinating implementation of the African Networks of Centres of Excellence on Water Sciences (ACE WATER) project. As one of the activities under the project, the Water and Marine Resources Unit of the Institute on Sustainable Resources commissioned a review of available information to prepare two reports on: i) the *Human Capacity Development priorities in the Water Sector in Africa*; and ii) the *Development Priorities of the Water Sector in Africa placed in the context of Agri-Energy sectors*.

This report synthesises the development priorities of the water sector in Africa within the context of the express plans for productive use of water in the sectors of energy and agriculture. They are drawn from a review of relevant continental policy, planning and programme documents for assuring water, food, energy and ecosystems security in Africa.

1.1 Relevance of Water, Food and Energy Nexus perspectives to EU-AU Cooperation Priorities

The Water, Energy, Food and Ecosystems for Development (WEFE4Dev) work programme of the Water and Marine Resources Unit implements initiatives in collaboration with the directorates of International Cooperation and Development (DG DEVCO) and Environment (DG ENV) on WEFE Nexus assessment in relevant river basins in Africa. The integrated multi-sectoral approach to water management at river basin level is combined with proactive and all-inclusive cooperative dialogues. The dialogues draw participation from the policy organs and decision makers of such African institutional partners as River Basin Organisations (RBOs); Regional Economic Communities (RECs); and research and academic institutions – including the AU-NEPAD Water Centres of Excellence.

Ongoing areas of cooperation include:

- i) developing regional knowledge management systems and decision support tools to support institutions and policy-makers in Africa;
- ii) encouraging collaborative research to understand and quantify the inter-linkages between WEFE resources; and,
- iii) building the capacity of existing institutions and decision-makers to implement such an integrated approach.

2. Water for Africa's economic growth and transformation: a situation analysis

The political agenda of the Member States of the African Union is currently dominated by the urgent need to industrialise as a first step to alleviating persistent poverty². The ambition is to build robust, competitive and climate resilient economies; accelerate employment and labour productivity growth; and, as a result, deliver inclusive socio-economic development and livelihoods improvement. It is also to ameliorate the current situation that is summed up by the facts and figures in

- a) Floods, droughts, and water pollution are the greatest threats to water resources in Africa. In only the 8 most prone countries in Africa (Algeria, Egypt, Ethiopia, Gabon, Madagascar, Morocco, Nigeria and Tunisia), flooding is projected to cause direct losses of an estimated US \$1.4 billion per annum*.
- b) Information available from the African Water and Sanitation Sector Monitoring and Reporting (WASSMO) System indicates Africa's installed hydropower capacity as ranging between 45,936 and 90,696MW out of a reported economically and technically feasible hydropower potential of 304,350 MW .

² Whereas most recent estimates show that the share of the African population living on \$1.90 a day or less did decline from 56% in 1990, it was still at 43% in 2012 (Beegle, Christiaensen, Dabalén, & Gaddis, 2016).

c) Water use in the agricultural sector was reported as 275 km³, in 2016, accounting for about 73.4% of the total water withdrawals in Africa. Coupled with a generally continuing trend of a diminishing contribution of the sector to GDP in Africa, significant challenges and limitations are noted in efforts to achieve the targets of the Africa Water Vision 2025 relating to increasing agricultural water productivity; and increasing the size of the area under irrigation in Africa.

d) Member States that provided data to the *2014 Africa Water and Sanitation Sector Report* indicated having satisfied, in 2013, just 26.05% of the minimum economic, social and environmental water demands, which in turn gives an indication of the extent to which Africa's water infrastructure is underdeveloped. Similarly, as an indicator of the long-term sustainability of Africa's socio-economic growth and transformation, the figure raises major concerns for Africa's development aspirations especially when it is considered that the underdevelopment of water infrastructure accounts for up to 2% of Africa's lost annual GDP growth !

e) Rainwater harvesting to, on the one hand, augment supply for domestic and agricultural uses, and, on the other hand, manage storm water, is yet to be fully capitalised on by Member States. The continent reported that the contribution of rainwater to the total municipal water consumption accounted for only 1.49% in 2013, compared to the set target of 10% by the year 2015.

f) More than 340 million Africans are still lacking potable water – let alone access to sufficient water to satisfy their basic daily needs – while more than 547 million Africans lack access to basic sanitation! The failings in this respect are shown to contribute significantly to: (i) a significant number of the 5,000 people that die each day due to water and sanitation diseases that are easily preventable being from Africa; (ii) estimates of annual losses of 5% of the continent's GDP being due to inadequate provision of basic sanitation services, and, (iii) reductions in household incomes and savings, as well as school attendance – due to the impacts of ailments related to poor sanitation on the labour force – which, in turn, adversely affect economic productivity and the pursuit of poverty eradication goals.

g) These challenges have been further exacerbated by the COVID-19 crisis. Frequent washing of hands with soap is a key protective measure against the virus. By contrast though, World Bank figures show that 63% of the urban population in sub-Saharan Africa cannot wash their hands due to constraints in accessing basic water services. It is noteworthy that urban centres are the main clusters of the virus. It, therefore, goes without saying that ensuring the availability of safe water for all is vital to keep up the fight against the spread of COVID-19 and future pandemics. Improving access to water, sanitation, and hygiene systems holds promise for bringing down the overall disease burden; and reducing the number of deaths to disease.

h) In Eastern Africa, the COVID-19 pandemic is one aspect of a triple crisis that includes the worst locust outbreak in 70 years; and disease outbreaks associated with flooding due to exceptionally high rainfall in 2019 and 2020. In 2018/19, the impacts of climate variability over the Indian Ocean; the Arabian Peninsula; and Eastern Africa contributed to a locust outbreak. Combined, the two factors – climate variability and a locust outbreak – underlie the growing hazard of acute food insecurity in the Eastern Africa region. The result is increased COVID-19 vulnerability given the reduced capability of the population to engage in social distancing and to practice basic hygiene!

i) 153 million individuals, about 26% of the population above 15 years of age in sub-Saharan Africa, suffered from severe food insecurity in 2014/15**

j) Moreover, Africa's water and environmental resources, which are critical to the release of Africa's development potential as well as sustaining growth and development, are faced with severe degradation in part due to inadequate sanitation. Whereas it is yet to be covered within the scope of data collection of the Africa Water and Sanitation Sector Report, information from the Member States indicates that about 90% of wastewater is discharged directly into rivers and lakes without any treatment!

k) The total domestic expenditure in the water and sanitation sector in Africa for 2013 was reported as US \$18.48 billion, falling way short of the annual requirement of US \$50 billion determined by the AfDB and AMCOW as the minimum required to assure the actualisation of the Africa Water Vision 2025. That, in turn, threatens Africa's aspirations for social progress and productivity of its population.

Sources: *The African Water and Sanitation Sector Monitoring and Reporting (WASSMO) System*, <http://www.africawater-sanreports.org/IndicatorReporting/report?view=overview&category=fact&level=region>

AUC-AMCOW (2016), African Water Resources Management Priority Action Programme 2016 – 2025 (WRM – PAP).
** UN (2015). The 2015 Global Assessment Report on Disaster Risk Reduction. New York: United Nations Office for Disaster Risk Reduction.***
FAO (2017). Regional Overview of Food Security and Nutrition in Africa 2016. The challenges of building resilience to shocks and stresses.
Accra: United Nations Food and Agriculture Organisation

Text Box 1 below:

- a) Floods, droughts, and water pollution are the greatest threats to water resources in Africa. In only the 8 most prone countries in Africa (Algeria, Egypt, Ethiopia, Gabon, Madagascar, Morocco, Nigeria and Tunisia), flooding is projected to cause direct losses of an estimated US \$1.4 billion per annum (UN, 2015)*.
- b) Information available from the African Water and Sanitation Sector Monitoring and Reporting (WASSMO) System indicates Africa's installed hydropower capacity as ranging between 45,936 and 90,696MW out of a reported economically and technically feasible hydropower potential of 304,350 MW (AMCOW, 2016).
- c) Water use in the agricultural sector was reported as 275 km³, in 2016, accounting for about 73.4% of the total water withdrawals in Africa (AMCOW, 2016). Coupled with a generally continuing trend of a diminishing contribution of the sector to GDP in Africa, significant challenges and limitations are noted in efforts to achieve the targets of the Africa Water Vision 2025 relating to increasing agricultural water productivity; and increasing the size of the area under irrigation in Africa.
- d) Member States that provided data to the *2014 Africa Water and Sanitation Sector Report* indicated having satisfied, in 2013, just 26.05% of the minimum economic, social and environmental water demands, which in turn gives an indication of the extent to which Africa's water infrastructure is underdeveloped. Similarly, as an indicator of the long-term sustainability of Africa's socio-economic growth and transformation, the figure raises major concerns for Africa's development aspirations especially when it is considered that the underdevelopment of water infrastructure accounts for up to 2% of Africa's lost annual GDP growth (AUC - AMCOW, 2016)!
- e) Rainwater harvesting to, on the one hand, augment supply for domestic and agricultural uses, and, on the other hand, manage storm water, is yet to be fully capitalised on by Member States. The continent reported that the contribution of rainwater to the total municipal water consumption accounted for only 1.49% in 2013, compared to the set target of 10% by the year 2015 (AUC - AMCOW, 2014).
- f) More than 340 million Africans are still lacking potable water – let alone access to sufficient water to satisfy their basic daily needs – while more than 547 million Africans lack access to basic sanitation (AMCOW, 2016)! The failings in this respect are shown to contribute significantly to: (i) a significant number of the 5,000 people that die each day due to water and sanitation diseases that are easily preventable being from Africa; (ii) estimates of annual losses of 5% of the continent's GDP being due to inadequate provision of basic sanitation services, and, (iii) reductions in household incomes and savings, as well as school attendance – due to the impacts of ailments related to poor sanitation on the labour force – which, in turn, adversely affect economic productivity and the pursuit of poverty eradication goals (AUC - AMCOW, 2014).
- g) These challenges have been further exacerbated by the COVID-19 crisis. Frequent washing of hands with soap is a key protective measure against the virus. By contrast though, World Bank figures show that 63% of the urban population in sub-Saharan Africa cannot wash their hands due to constraints in accessing basic water services (Ndaw, 2020). It is noteworthy that urban centres are the main clusters of the virus. It, therefore, goes without saying that ensuring the availability of safe water for all is vital to keep up the fight against the spread of COVID-19 and future pandemics. Improving access to water, sanitation, and hygiene systems holds promise for bringing down the overall disease burden; and reducing the number of deaths to disease.
- h) In Eastern Africa, the COVID-19 pandemic is one aspect of a triple crisis that includes the worst locust outbreak in 70 years; and disease outbreaks associated with flooding due to exceptionally high rainfall in 2019 and 2020 (Marsham, et al., 2020). In 2018/19, the impacts of climate variability over the Indian Ocean; the Arabian Peninsula; and Eastern Africa contributed to a locust outbreak (Gilliland, 2020). Combined, the two factors – climate variability and a locust outbreak – underlie the growing hazard of acute food insecurity in the Eastern Africa region. The result is increased COVID-19 vulnerability given the reduced capability of the population to engage in social distancing and to practice basic hygiene!
- i) 153 million individuals, about 26% of the population above 15 years of age in sub-Saharan Africa, suffered from severe food insecurity in 2014/15 (FAO, 2017)**

j) Moreover, Africa's water and environmental resources, which are critical to the release of Africa's development potential as well as sustaining growth and development, are faced with severe degradation in part due to inadequate sanitation. Whereas it is yet to be covered within the scope of data collection of the Africa Water and Sanitation Sector Report, information from the Member States indicates that about 90% of wastewater is discharged directly into rivers and lakes without any treatment!

k) The total domestic expenditure in the water and sanitation sector in Africa for 2013 was reported as US \$18.48 billion, falling way short of the annual requirement of US \$50 billion determined by the AfDB and AMCOW as the minimum required to assure the actualisation of the Africa Water Vision 2025 (AUC, AMCOW, AfDB, GWP, 2019). That, in turn, threatens Africa's aspirations for social progress and productivity of its population.

Sources: *The African Water and Sanitation Sector Monitoring and Reporting (WASSMO) System*, <http://www.africanwater-reports.org/IndicatorReporting/report?view=overview&category=fact&level=region>

AUC-AMCOW (2016), *African Water Resources Management Priority Action Programme 2016 – 2025 (WRM – PAP)*.

* UN (2015). *The 2015 Global Assessment Report on Disaster Risk Reduction*. New York: United Nations Office for Disaster Risk Reduction.**

FAO (2017). *Regional Overview of Food Security and Nutrition in Africa 2016. The challenges of building resilience to shocks and stresses*. Accra: United Nations Food and Agriculture Organisation

Text Box 1: Situation Analysis

3. Underlying policy environment for Africa's water development in a WEF nexus context

As highlighted in the *Africa Water Investment Programme (AIP)* (AUC, AMCOW, AfDB, GWP, 2019, pp. 6 - 7), a number of continental policy decisions and declarations have been taken by the African Union (AU) and AMCOW to foster the implementation of the African water agenda in pursuit of the Africa Water Vision 2025 (AWV2025). These include:

1. Ex/Assembly/AU/Decl. 1(II): Sirte Declaration on the Challenges of implementing integrated and sustainable development of agriculture and water in Africa. Second Extraordinary Session, 27 February 2004. Sirte, Libya;
2. the 2008 Tunis Ministerial Declaration on Accelerating water security for Africa's socio-economic development;
3. Assembly/AU/Decl.1(XI): Declaration: Sharm El-Sheikh Commitments for Accelerating the achievement of Water and Sanitation Goals in Africa, Eleventh Ordinary Session, 30 June – 1 July 2008, Sharm El-Sheikh, Egypt;
4. the 2008 Sirte Declaration on Water for Agriculture and Energy in Africa: the Challenges of Climate Change; and,
5. the 2010 Maputo Declaration (AU/MIN/Energy/Decl.) that not only adopted the AU Conference of Ministers in Charge of Energy (CEMA) but also resolved to cooperate with AMCOW and AMCEN "to promot[e] cross-border river basins development and regional electric energy production and exchange networks" and to request AUC to "mobilise the Regional Economic Communities (RECs) and Member States to participate actively in the conduct of the study on the Programme for Infrastructure Development in Africa (PIDA) and to spare no effort to ensure implementation of the policies and programmes deriving therefrom".

Deriving their mandate from the policy framework in the foregoing, the mandated institutions – in collaboration with partners and stakeholders – have conducted various studies; and prepared plans and programmes to mobilise action and funding towards in-country implementation of the declarations. Key among these initiatives have been:

1. the *Africa Food Crisis Response* and the *Comprehensive Africa Agriculture Development Programme (CAADP)* to enhance access to agricultural water and irrigation, as well as improving rural infrastructure as part of activities to intensify agricultural production and productivity;

2. the **20-point Action Plan on Economic Growth** through water and energy of the African Ministerial Conference on Hydropower and Sustainable development that focussed on planning and construction of water infrastructure, including 130 dams, to support Africa's growth aspirations. In collaboration with the AfDB, a target was set to increase Africa's water storage capacity by at least 8.5km³ in the period 2008 - 2013;
3. **Regional Strategic Action Plans** for integrated water resources development and management in the SADC and ECOWAS regions; the **Nile Basin Initiative (NBI)**; the **World Hydrological Cycle Observing System (WHYCOS)** project; the **TIGER (Technology Informatics Guiding Education Reform) Initiative**; the **Water, Climate and Development Programme (WACDEP)**; and the **Climate for Development Initiative for Africa (ClimDev-Africa)**, all developed with the overarching goal of improving day-to-day water management and, in turn, contributing to the delivery agenda of economic, social and environmental change;
4. the **Programme for Infrastructure Development in Africa (PIDA)**, the Priority Action Plan of which includes nine transboundary water infrastructure project; and,
5. the **African Water Resources Management Priority Action Programme 2016 - 2025 (WRM-PAP)** of targeted interventions to achieve four broad goals, namely: i) ensuring water security in Africa; ii) enhancing resilience to climate change and water related disaster risks; iii) strengthening information systems for water resources monitoring and assessment; and iv) improving environmental integrity through wastewater and water quality management.

Additional relevant EU-AU policy initiatives framing the demand for the WEFÉ nexus approach to water development in Africa are summarised in Text Box 2 below.

Text Box 2: Summary of the AU-EU policy basis framing the demand for the WEFÉ Nexus

1. **Sustainable Development Goals:**
 - a. SDG 2: *End hunger; achieve food security and improved nutrition; and promote sustainable agriculture*
 - b. SDG 6: *Ensure availability and sustainable management of water and sanitation for all*
 - c. SDG 7: *Ensure access to affordable, reliable, sustainable and modern energy for all*
 - d. SDG 9: *Build resilient infrastructure; promote inclusive and sustainable industrialisation; and foster innovation;*
 - e. SDG 13: *Take urgent action to combat climate change and its impacts*
 - f. SDG 15: *Protect, restore and promote sustainable use of terrestrial ecosystems; sustainably manage forests; combat desertification; and halt and reverse land degradation; and halt biodiversity loss*
2. **The Joint Africa-EU Strategy (JAES) Roadmap for 2014-2017** which provides for: "... *ensur[ing] better management of water resources for greater access to drinking water and sanitation and strengthen the water-energy-food nexus ...*";
3. **The Final Declaration of the 5th AU-EU Summit 2017 on Investing in Youth for Accelerated Inclusive Growth and Sustainable Development** in which the political leadership of the AU and EU commit to, among others, "*increase efforts in research and innovation for sustainable development, including through the launch of a partnership on climate change and sustainable energy, and to deepen collaboration between researchers and innovators*".
4. **The Joint Consultation Paper (2015)** "Towards a new European Neighbourhood Policy", and **MEMO_15_4143** "A global partnership for poverty eradication and sustainable development" identify the need for "... *fostering synergies across economic, social and environmental policy areas*" to address "*health security, threats to the environment and climate change as common challenges with impacts across borders*", while addressing cross-sectoral issues in Africa and neighbouring countries in the Mediterranean region.
5. **The Joint Declaration of the 7th AUC-EC College-to-College meeting** (Brussels, 2015) in which the leadership of both institutions undertake to "... *continue ... in-depth cooperation on infrastructure and jointly ensure cross sectoral coordination in relation to transport, energy, water and... access to drinking water and sanitation (item #27)*".
6. **The New European Consensus on Development**, which integrates the social, economic and environmental dimensions of sustainable development around People, the Planet, Prosperity, Peace and Partnership. It includes the following commitments, among others:
 - a. "*The EU and its Member States will support the poorest communities in improving access for all to land, food, water, and clean, affordable and sustainable energy avoiding any damaging effects on the environment, the sustainable and integrated water management as well as more efficient use of water and water recycling including through a more strategic approach to regional development and integration*".

b. *“The EU will support the conservation and sustainable management and use of natural resources, and the conservation and sustainable use of biodiversity and ecosystems, including forests, oceans, coastal areas, rivers basins and other ecosystems, for the provision of ecosystem services”.*

7. **The Framework for Action to actualise the Africa Water Vision 2025**, of ‘an Africa where there is an equitable and sustainable use and management of water resources for poverty alleviation, socio-economic development, regional cooperation and the environment’ sets clear targets for all elements of the WEFE nexus as follows:

Actions	Targets for 2025
1. <i>Proportion of people without access</i> <ul style="list-style-type: none"> • to safe and adequate water supply • to safe and adequate sanitation 	Reduce by 95% Reduce by 95%
2. <i>Water for achieving food security</i> <ul style="list-style-type: none"> • Water productivity of rain-fed agri. and irrigation • Size of irrigated area 	Increase by 60% Increase by 100%
3. <i>Development of water for agriculture, hydropower, industry, tourism & transportation at national level</i>	Increase by 25%
4. <i>Conservation and restoration of environment, in biodiversity, and life-supporting ecosystems</i> <ul style="list-style-type: none"> • Allocation of sufficient water for environmental sustainability. • Conserving and restoring watershed ecosystem 	Implemented in 100% of river basins

Adapted from: the WEFE African Flagship Report

4. Emerging water development priorities vis-à-vis the energy and agriculture sectors

Projections of an African population of 1.6 billion by 2030 translate into a need to produce at least 50% more food, and, at least, a tenfold increase in water needs for energy production to support modernisation of economies and social progress. Rapid urbanisation and industrialisation will both increase the water demand and, on the basis of current trends in sanitation services provision, increase environmental degradation and the pollution of water bodies. Coupled with the anticipated impacts of climate change on water availability, the need to protect and better manage Africa's freshwater resources – to avert the growing risks and uncertainties to economic productivity and political stability – cannot be overemphasised.

Source: 2014 Africa Water and Sanitation Report

Collectively, the above-mentioned initiatives are comprehensive and hold promise for achieving the goals of Agenda 2063. Focus is, therefore, on developing and operationalising delivery mechanisms at a scale required to assure water, food and energy security for the people of Africa. Necessary first steps include, first, addressing challenges of weak institutional capacities. And, secondly addressing the absence of a compelling business case for investments in water that can catalyse sustained financing commensurate with Africa's development ambitions. In this respect, ongoing and planned interventions have strategically been prioritised as highlighted in the

sections that follow.

4.1 A new narrative: “Investing in Water is investing in Jobs”

Africa's economic growth is challenged and highly vulnerable to water availability, commodity prices and weather patterns (AUC, AMCOW, AfDB, GWP, 2019). The two examples on Zambia and Ghana in the text boxes that follow illustrate this.

In 2016, Zambia made international headlines as droughts devastated the economy on account of low water levels in the country's Kariba Dam on the Zambezi River. According to reports by Bloomberg and the New York Times, Kariba Dam reached dangerous water levels with only 14% in 2016 compared to 51% in 2015. With 95% of Zambia's electricity generation from hydropower, low dam water levels resulted in unprecedented energy deficits forcing the mining sector to shut down some operations. Over 10,000 jobs were lost while several households and small scale businesses endured power rationing for as long as 14 hours a day.

To avert an impending economic and political crisis, the Zambian government spent \$480 million on emergency power imports in 2016 alone. Of great concern is that despite the evidence of low water levels precipitating energy deficits, the crisis was widely reported by senior government officials and media as an energy crisis rather than a water crisis.

Source: Africa Water Investment Programme, 2019

In 2011, Ghana's economy grew at 14% with the onset of its first production of oil (GSS, 2012). However, in 2015 the growth rate was expected to be only 3.9% (Okudzeto, Mariki, Senu, & Lal, 2015). This can be attributed to a great extent to the failure to provide the basic water and energy infrastructure to meet the needs of a rapidly growing economy. Ghana is mainly dependent on the Akosombo hydroelectric dam on the Volta River for electricity. Due to reduced inflows from low rainfall, the hydroelectric dam was operating merely at half of its capacity in 2015 (The Africa Report, 2015). This was exacerbated by disruptions mainly in geothermal plants. In June 2015, all electricity was being rationed at 12 hours on, and 24 hours off. Though this is extreme, it reinforces the need for water infrastructure to sustain production and jobs in the nascent African economies. Anecdotal evidence from Trade Unions and Employers in Ghana indicate that tens of thousands of stable jobs were lost in 2015, the investment climate turned sour, forcing Ghana to seek IMF macro-economic bailout.

Source: The United Nations World Water Development Report 2016

A new narrative on water that recognises the full potential of water in the economy is thus urgently required to further Africa's future development needs. This is especially given, and as posited by the AIP (AUC, AMCOW, AfDB, GWP, 2019) that:

1. three out of four jobs are water-dependent;
2. up to 80% of ailments impacting on the productivity of the labour force in Africa can be attributed to poor hygiene and sanitation;
3. water scarcity and supply disruptions limit economic growth and, in turn, jobs;
4. water scarcity (exacerbated by climate change) is a contributing factor to migration; and,
5. the transition to a greener economy enhances opportunities for decent jobs.

The new narrative on water should foster an appreciation of the vitality of water in economic growth; job creation; and industrialisation. It should also raise the business case and profile of water in national and regional development. Indeed, aggressive efforts are required to:

- i) position water better in the economy;
- ii) accelerate the pace of water infrastructure investments;
- iii) increase awareness of water's critical role in enhancing job creation; and,
- iv) build on the foundations of integrated water resources management to advocate for approaches such as the water-energy-food-ecosystem nexus.

4.2 Strengthening the business case for water investments in Africa

Africa's sustainable development largely depends on goods and services derived from its environment and natural resources. As Africa pursues rapid and sustainable growth pathways via structural transformation, the management of natural capital, especially water resources, is critical. Water is at the core of Sustainable Development Goals given its vitality to nearly every aspect of sustainable generation of social, economic, financial and other wellbeing related benefits.

There are challenges, though, facing AU Member States. With a rapidly growing population, by 2050 more than 60% of Africa's population will reside in urban areas. The population is young, with more than 40% below 15 years old in most countries: a large proportion of which is unemployed (AUC, 2014a). Migration within Africa and across the Mediterranean to southern Europe has reached crisis levels, in part, due to political instability in some parts of Africa, but also due to a general lack of economic opportunities (AUC, AMCOW, AfDB, GWP, 2019).

Over the last decade, Africa has recorded sustained and impressive economic growth on the back of rising commodity prices. A dip in commodity prices during 2015 combined with droughts in the Horn of Africa and part of southern Africa, revealed structural challenges in African economies with most economies not diversified and heavily dependent on mineral resources. Most countries now face fiscal challenges with mounting debts and low absorption capacity. Although one quarter of the countries grew an average of about 7% or more, and some were among the fastest-growing countries in the world, future sustained growth will need to be diversified and inclusive, building on Africa's natural capital endowments especially agriculture – the largest employer on the continent (AfDB, 2018). The limiting factor is undeniably water insecurity, exacerbated by complex hydrology and climate change.

The economies of many countries in Africa are extremely vulnerable to climate variability and climate change as they are largely based on natural resources (water, land, energy, forests/ecosystems). Lack of investments to enhance human and institutional capacities, build infrastructure and improve information systems to support water management exacerbate the difficulties. As highlighted in Section 2 of this report, only 15 – 30% of Africa's hydropower potential is tapped (AMCOW, 2016). Neither is the huge irrigation potential in its 64 shared river basins being harnessed to assure food and nutritional security.

a. Many SIDS are faced with rising sea levels and coastal erosion, which threatens their territorial integrity and – in some cases – their very existence.

b. A single natural disaster could, due to its disproportionate impact relative to SIDS' national capacities, destroy vital infrastructure, displace a significant number of the national population or impact on a nation's sustainable economic growth trajectory.

c. Climate change [is] a risk multiplier: exacerbating existing security and development challenges. Rising sea levels, dying coral reefs and the increasing frequency and severity of natural disasters exacerbate the conditions leading to community displacement and migration. They also threaten to increase tensions over resources and affect domestic and regional stability.

d. SIDS are faced with the challenge of energy insecurity caused by dependence on expensive fossil fuels. Up to a third of the total import bill of SIDS is the cost of oil for electricity: on average 10% per cent of their GDPs!

e. The size of the SIDS also contributes to their vulnerabilities. Often with Exclusive Economic Zones larger than their land areas, SIDS face the challenge of managing fisheries and preventing illegal, unreported and unregulated fishing, which undermines economies and contribute to insecurity. Indeed, their size and capacity limitations make them a target for transnational criminal networks, including those involved in piracy or the smuggling of people, among others.

Source: Excerpts adapted from the United Nations Security Council Open Debate 30 July 2015: Peace and Security Challenges Facing Small Island Developing States

Also deserving of specific mention are the challenges to the attainment of sustainable development by Africa's Small Island Developing States (SIDS), which are particularly exacerbated by exposure to global environmental issues. Concerted efforts are required for African SIDS to combat climate change; promote sustainable development; and address their environmental and natural resources related vulnerabilities.

In order to achieve rapid, sustained growth in a climate change context, strategic partnerships for water infrastructure development; institutional strengthening; and political leadership are urgently required. Coupled with measures to assure inclusivity of the vulnerable, especially women and youth, resilience to the shocks caused by climate risks will be enhanced. And nowhere more so than in Africa's SIDS where building resilience is integral to deriving full benefit from their often limited resource base. In turn, climate resilient development will lead to sustainable growth and improved livelihoods.

To achieve the SDGs, it is imperative for African Union and AMCOW to champion a paradigm shift in the approach to developing, utilising and managing Africa's water and related resources. The urgency and need for governments, societies and the private sector to fully embrace the concept of environmental security cannot be overemphasised.

4.3 Re-examining water, development, the economy and society: the development of water as a means-to-an-end

Recent advances in the appreciation of the principles of Integrated Water Resources Management (IWRM) have necessitated broadening the perspective to an outcome-oriented notion of:

- i) harnessing water's productive potential;
- ii) mitigating its destructive risks;
- iii) improving the sustainability of the natural resources base; and, thus,
- iv) spurring national and regional development as a whole.

This is confirmed by the findings of the *Africa Water and Sanitation Sector Reports*; and the 2012 and 2018 editions of the *AU/AMCOW Status Report on the Application of Integrated Approaches to Water Resources Management in Africa*. They indicate significant improvements in – on the one hand – the Member States' internalisation and involvement in the implementation of international and regional policies and strategies; and – on the other hand – the application at a national level of generally accepted principles of effective water resources development, management and utilisation. An urgent need, though, is highlighted for targeted interventions to overcome particular challenges in mobilising the investment required to meet the targets of the Africa Water Vision 2025 for:

- i) water productivity in industry, irrigated agriculture, energy, tourism and transport;
- ii) conservation and restoration of environments; and

- iii) developing appropriate tools and indicators for measuring the contribution of water to development, and thus provide a basis for highlighting the pivotal role of water resources as an essential ingredient in the advent of a green economy and sustainable development in Africa.

In this respect, water infrastructure development should be advocated for and promoted as a means to provide a service – which is water – to the economy in order to enable growth and development to happen. Water sector interventions, especially for such resource management functions as water storage and flood control, should not be designed and marketed from the perspective of ‘water sector development’. Rather, the approach to packaging them for investment should be centred on their eventual utility – from an economic perspective – in terms of providing water for food and energy production. This is to make use of the synergies between these three sectors optimising efforts towards water, food and energy security. This should be extended to the opportunities for employment and wealth creation: not to mention peace, social security and political stability.

4.4 Promoting the application of the UN High Level Panel on Water Principles on Valuing Water

Strategies to improve the investment outlook for water and related resources development will also benefit from the application of the High Level Panel on Water (HLPW) principles for valuing water. The principles provide a guideline for determining the real value of proposed investments; the associated costs; and the benefits that can be expected. In essence, they serve the purpose of improving the appreciation of the economics of water in a country, river basin or region.

The High Level Panel on Water (HLPW)³ was co-convened in 2016 by the UN Secretary General and the World Bank President to provide the leadership required to tackle one of the world's most pressing challenges – an ever growing water crisis. It identified ways in which the world could accelerate progress towards ensuring availability and sustainable management of water and sanitation for all (SDG 6). A summary of the Panel’s headline recommendations is provided below.

Text Box 3: HLPW headline recommendations

FOUNDATIONS FOR A WATER SAFE, SECURE, RESILIENT, SUSTAINABLE AND INCLUSIVE ACCESS WORLD	
Understand Water	Commit to making evidence-based decisions about water, and cooperate to strengthen water data, such as through the HLPW World Water Data Initiative
Value Water	Use the <i>HLPW Principles on Valuing Water</i> to recognize the values that societies accord to water and its uses, to shape how water is allocated, how water and sanitation services are priced, and how water resources are managed and sustained.
Manage Water	Implement integrated approaches to water management at local, national and transboundary levels, strengthen water governance, and ensure social inclusion.
LEADING AN INTEGRATED AGENDA AT THE LOCAL, COUNTRY AND REGIONAL LEVELS.	
Ensure Universal Access to Safe Water & Sanitation	Address gaps in service delivery models, technology and behavior change which limit access to sustainable drinking water and sanitation for all – including the needs of women, girls, people with disabilities and communities in vulnerable situations.
Build Resilient Societies and Economies, Reducing Disaster Risk	Shift focus of disaster management from response to preparedness and resilience.
	Take action where water-related risks may exacerbate fragility, conflict, or migration.
	Create incentives for water users, including irrigators, to not waste or pollute water, and promote its reuse.

³ The HLPW membership comprised of 11 sitting Heads of State and Government from Australia, Bangladesh, Hungary, Jordan, South Africa, Mauritius (co-chair), Mexico (co-chair), Netherlands, Peru, Senegal and Tajikistan; and a Special Advisor.

Increase Water Infrastructure Investment	Improve the enabling environment for investment in sustainable water-related infrastructure and services to attract the greatly increased levels of investment required.
Nurture Environmental Water	Value environmental contributions to water management, prevent degradation and pollution of watersheds, rivers, lakes and aquifers, and where necessary, restore and maintain acceptable environmental conditions and water quality.
Develop Sustainable Cities	Implement an integrated approach to urban water management in line with the Habitat III New Urban Agenda.
CATALYSING CHANGE, BUILDING PARTNERSHIPS AND INTERNATIONAL COOPERATION	
Promote Innovation	Support programs, such as the HLPW Water Innovation Engine, which foster the uptake of new water-related business models and technologies.
Strengthen Partnerships	Motivate all water use sectors to embrace water stewardship, strengthen their collaboration, and participate in integrated water resource management.
Increase Global Water Cooperation	Strengthen the UN-System's support to member states and its coordination of water matters, and use the UNGA <i>Water Action Decade</i> as a platform for exchanges of best practices and building partnerships, dedicating each year of the Water Action Decade to one of the above ten HLPW Action Areas.

Source: *HLPW Outcome Document, March 2018*

The HPLW Principles on valuing water are summarised in the table below:

Table 1: HLPW Principles on valuing water

Headline Recommendation	Use the <i>HLPW Principles on Valuing Water</i> to sustainably, efficiently and inclusively allocate and manage water resources, and to deliver and price water services accordingly.
Detailed Recommendations	Apply the "HLPW Principles on Valuing Water" in order to recognise the various values that societies accord to water and its uses, take these into account in political and business decisions, and in decisions to price water and sanitation services appropriately.
	Conduct all processes to reconcile values in ways that are equitable, transparent, and inclusive, and value, manage, and protect all sources of water, including watersheds, rivers, aquifers, associated ecosystems, and used water flows for current and future generations.
	Promote education and public awareness about the intrinsic value of water and its essential role in all aspects of life and ensure adequate investment in institutions, infrastructure, information, and innovation to realize the many different benefits derived from water and reduce risks.
Principles for valuing water	
Recognise and Embrace Water's Multiple Values	Identify and take into account the multiple and diverse values of water to different groups and interests in all decisions affecting water.
Reconcile Values and Build Trust	Conduct all processes to reconcile values in ways that are equitable, transparent, and inclusive.
Protect the Sources	Value, manage, and protect all sources of water, including watersheds, rivers, aquifers, associated ecosystems, and used water flows for current and future generations.
Educate to Empower	Promote education and public awareness about the intrinsic value of water and its essential role in all aspects of life.
Invest and Innovate	Ensure adequate investment in institutions, infrastructure, information, and innovation to realise the many different benefits derived from water and reduce risks.

The application of the above listed principles, together with targeted interventions to catalyse change, holds promise for responding to the three generally accepted bottlenecks in the delivery of sustainable solutions for assuring water for energy, food and environmental security in Africa, namely:

- i) the need for investment guarantees for water management, the fundamental aspects of which are not only a public responsibility, but also require 15 – 25 years for the tangible benefits to be realised;
- ii) the need for effective transaction management to enable development planning to be effectively translated into both tangible infrastructure assets and related solutions, which will contribute to sustainable growth and prosperity for all; and,
- iii) the need for Member-States-led, integrated economic analyses to:
 - a. highlight the pivotal role of effective water management and adequate sanitation and related services provision in the economy; and,
 - b. where development is most urgently required to facilitate growth.

4.5 Investment led transboundary management and governance of water and environmental resources

The focus of transboundary water management in Africa has so far been on the application of the principles of Integrated Water Resources Management (IWRM) planning at basin level to facilitate regional dialogues promoting transboundary and regional cooperation. Prominent examples of such interventions include:

- i) the 2011 – 2013 and 2014 – 2016 AMCOW Work Programmes, as well as the AMCOW Strategy 2018 – 2030;
- ii) the ANBO project on “Strengthening of Institutions for Transboundary Waters in Africa (SITWA)”;
- and,
- iii) the work of Regional Economic Communities (RECs) and River and Lake Basin Organisations (R/LBOs) to strengthen institutional capacities for IWRM planning.

The cooperation and governance arrangements that have been born of these initiatives form a firm foundation for the application of WEFÉ nexus perspectives to determine intersectoral trade-offs and implement solutions that optimise overall benefit. To consolidate the achievements to date of those interventions, focus must now shift to facilitating investment in strategic water management solutions with transboundary, if not regional, benefits. To this end, the African Water Resources Management Priority Action Programme 2016 – 2025 (WRM-PAP); the AMCOW Strategy 2018 – 2030; and the Africa Water Investment Programme (AIP) promote the following strategic initiatives:

4.5.1 Establishing economic accounting for water as a discipline to, among others, improve the financing and investment outlook for water resources management in Africa

The strategy was adopted by AU Member States as part of ongoing efforts to revitalise and inject new approaches into delivering on the commitments of the Sharm el-Sheikh declaration relating to financing transboundary cooperation. The aim is to make an economic case for:

- i) better prioritisation of water resources management in domestic economic planning and financial allocation; and,
- ii) cross-sector financing/investment to assure viability of investments in water dependent productive sectors (municipal water supply, energy, agriculture, agri-processing, mining, tourism).

The concept and framework of economic accounting for water, once institutionalised in Africa – and direct linkages made with the African Water and Sanitation Sector Monitoring and Reporting (WASSMO) System – has potential for a paradigm shift in the water sector financing policies through:

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- i) reforming regulations to promote efficiencies in current reporting arrangements;
 - ii) identifying and quantifying water flows and their relationship with both climatic variables and economically valued inputs – if not limiting factors – to domestic supply, agriculture, industry, mining, energy production and various service industries;
 - iii) supporting strategic planning processes for use of land and related resources so that water resource utilisation and environmental conservation are optimised; and
 - iv) providing instruments to support public and investor confidence in the amount of water being traded, extracted for consumptive use, recovered and managed for environmental and other public benefit outcomes.

4.5.2 Improving national-level capacities for collecting complete and reliable hydro-meteorological and piezometrical data in all of Africa's 64 shared river basins

The success of plans to establish economic accounting for water as a framework for identifying, measuring, recording and reporting information about water in Africa depends to a large extent on the availability of reliable, complete and legitimised primary source data. Similarly, the African Water and Sanitation Sector Monitoring and Reporting System is designed to extract information from data in the custody of the Member States. Therefore, its functionality – as well as the utility and completeness of the information generated – depends on the availability at a national level of reliable hydrological, meteorological, piezometrical (groundwater), water quality and other resource monitoring data.

Information from the majority of Member States' departments and agencies responsible for the function of water resources monitoring and assessment points to inadequate gauging of both surface water basins and groundwater aquifers. This has highlighted a pressing and urgent need for support towards the efforts of Member States to establish and operate representative and reliable networks of hydro-meteorological, river gauging and water quality stations to monitor the state of the quantity and quality of the water resources in their territory.

The goal is to rehabilitate and expand national monitoring systems for water resources to meet the internationally accepted minimum, if not optimum, standards for collecting complete and reliable data and information. Also related to this, and taking into consideration the impacts – both ongoing and projected – of climate variability and climate change on the hydrological cycle, plans are underway to update and recalibrate the rating curves of many surface water resources gauging stations in Africa.

4.5.3 Applying nexus perspective solutions to assure water, food and energy security in Africa

The WRM-PAP posits that water and energy resources are essential drivers of investments in land. This is highlighted by the fact that in Africa about 66% of large-scale foreign investments in land are directed to energy crops. Invariably all the foreign investments in land are subject to the availability of water. Large-scale foreign investments in land lead to changes in land use and, consequently, in hydrological fluxes through abstraction of water for irrigation and changes in the pattern of rainfall. The impacts go beyond the externalities on water resources and include severe changes in local livelihoods and surrounding ecosystems.

Adopting approaches informed by the nexus perspective is, therefore, emphasised as being important to:

- i) ensure effectiveness and sustainability of government programmes, and,
- ii) provide the private sector with safeguards to mitigate risks while seizing opportunities.

Water, energy and food security can only be achieved if the cross-sectoral interlinkages are taken into account. The nexus perspective is crucial to deal with trade-offs and identify synergetic solutions to pressing resource issues. Furthermore, investment and funding are needed to implement innovative solutions at large-scale.

Responding to this additional demand in a manner that does not jeopardise immediate and long-term food security goals is still a challenge in several countries in Africa. It is in this regard that regional approaches are being undertaken to address trade-offs amongst water, energy and food security, as well as the implications to private and public investments. Focus has also been turned to capacity development activities relating to valuing ecosystem services, trade-offs and payment for ecosystem services at regional and sub-regional levels.

4.5.4 Improving agricultural water management

The African Union's aspirations to increase nutrition levels while, at the same time, assuring food security for a rapidly growing population, translate into an exponential increase in the demands and pressures on Africa's water resources. None more pronounced than the demand to meet the required increases in agricultural production. Innovative mechanisms to manage demand and improve efficiency in the production, supply and utilisation of water in agriculture are therefore required.

The need is not only to increase productivity, but also to assure resilience of the sector to anticipated limitations to water availability due to climate uncertainties. This is in line with the Africa Water Vision 2025 target to increase the agricultural water productivity by 60% in the period 2000 to 2025, while at the same time doubling the area under irrigation.

Yet against such aspirations, monitoring of water use in the agriculture sector in Africa is largely based on estimates relying on secondary information sources. Mechanisms are required to empirically monitor agricultural water extraction in Africa as a first step to providing targeted, evidence-based – and therefore impactful – incentives to improve agricultural water use efficiency and productivity. Against a backdrop of:

- i) agriculture accounting for over 73.4% of water withdrawals in Africa (AMCOW, 2016); as well as,
- ii) taking into consideration the chemical and fertiliser pollution potential of the agricultural water returned to the environment,

it goes without saying that improvements in agricultural water use and management are a critical factor in efforts to sustainably assure availability of freshwater resources for other sectors.

Related interventions include:

- i) promoting innovative mechanisms, at national level, to manage demand and improve efficiency in the production, supply and utilisation of water in agriculture to increase productivity, but also assure resilience of the sector to floods and droughts;
- ii) instituting mechanisms to facilitate the use of waste as a resource in agriculture at national level;
- iii) turning the tide against the pollution of Africa's water and environmental resources, and,
- iv) sustainably and ecologically increasing agricultural production at all levels.

4.5.5 Implementing the PIDA priority transboundary water and energy projects

As highlighted by the Programme for Infrastructure Development in Africa (PIDA), Africa has the lowest water storage capacity and irrigated agriculture in the world. In contrast: i) an estimated 250 million people in Africa are currently exposed to increased water stress; and, ii) about half of the continent is either water stressed or facing water scarcity.

Through the *PIDA Water Programme*, efforts are underway to leverage US \$10 billion in investments (AUDA, GWP-SA, AMCOW, 2018) to 9 water projects; 3 water aquifer projects; 1 river basin management project; 5 multipurpose water reservoir projects; and 10 hydropower projects by 2025 (see Annexes 1 and 2). Activities are aimed at:

- i) advancing planned water storage infrastructure under PIDA; and

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- ii) promoting and facilitating multifunctional “green” basin development centred on natural and built infrastructure to provide a continuum of water storage solutions.

Given the relatively lower investment requirements and higher probability of sustainability, natural options spanning household rainwater harvesting, ponds and tanks through to the utilisation of wetlands, lakes and natural or artificial groundwater recharge, among other methods are being promoted. Similarly, the development of multi-purpose reservoirs optimising the total benefit stream – water, food, energy, trade, ecosystems and disaster management – is vigorously promoted.

4.5.6 Enhancing use of wastewater and sludge, as appropriate and acceptable, for nutrient recovery in agriculture and bio-gas energy production

Experiences on planned reuse and the technologies applied to assure safety of effluent for return to the environment in AU Member States, including South Africa, Tunisia and Namibia, are being documented, promulgated and replicated. The activities are centred on:

- i) instituting tariff systems targeted towards better cost recovery in wastewater collection and treatment, while at the same time safeguarding affordability;
- ii) facilitating safe use of wastewater in urban farming; and,
- iii) bio-gas energy production.

4.5.7 Other related initiatives

These include:

1. Standardising regulatory frameworks for agricultural water management across Africa.
2. Developing and adopting legal, policy and institutional frameworks for the collection and treatment of wastewater to a minimum water quality standard before discharge into transboundary water courses and aquifers.
3. Supporting Member States, R/LBOs and RECs to conduct water resources assessments – including assessing the availability of groundwater resources and the impact of climate change on freshwater availability – as well as supporting them to monitor and manage groundwater use.

5. Conclusion

On the basis of the information in the foregoing sections of this report, it is evident that political attention is being dedicated to the vitality of investing in activities to assure water, food and energy security. It is recognised that environment and natural resources, particularly freshwater, are critical to the productivity of sectors such as energy, agriculture, industry and fisheries.

In the preceding sections, a review is provided of the key policy priorities and initiatives comprising of i) the African Water Resources Management Priority Action Programme 2016 – 2025 (WRM-PAP); ii) the Comprehensive Africa Agriculture Development Programme (CAADP); and the priority water and energy projects of the Programme for Infrastructure Development in Africa (PIDA). From a WEF nexus perspective, the emerging water sector development priorities can be summarised as presented in Table 2 below.

Table 2: Summary of water sector development priorities from a WEF nexus perspective

Priority for the water sector	WEFE nexus synergies and opportunities		
Water	Food	Energy	Environment
Strengthening the business case for water investments in Africa	Aspirations for increased agricultural production and productivity, espoused by the CAADP are dependent on commensurate and reliable water access. Its thus imperative that investments into land for agricultural production factor in water development.	Projections of an African population of 1.6 billion by 2030 translate into, at least, a tenfold increase in water needs for energy production to support modernisation of economies and social progress. Implementation of the 19 PIDA water and energy projects (see Appendix 1) is vital not only to increase energy production and access, but also to improve navigation and irrigation development.	Water investments are a precursor to environmental security and, in turn, climate resilient – and therefore – sustainable development
Application of the UN-HLPW Principles on Valuing Water	Create incentives for water users, including irrigated agriculture, to not waste or pollute water, and to promote its reuse	Prioritise investment in innovative development of energy infrastructure to serve multiple purposes including reducing water related disaster risks and economic shocks.	Value environmental contributions to water management; prevent degradation and pollution of watersheds, rivers, lakes and aquifers; and, where necessary, restore and maintain acceptable environmental conditions and water quality
A new narrative: “Investing in Water is investing in Jobs”	Utilise the water-energy-food-ecosystem nexus approach to: <ul style="list-style-type: none"> i) position water better in the economy; ii) accelerate the pace of water infrastructure investments; and, iii) increase awareness of water’s critical role in enhancing job creation; economic growth; and industrialisation. 		

Priority for the water sector	WEFE nexus synergies and opportunities
Development of water as a means-to-an-end	Pursuit of the Africa Water Vision targets of: <ol style="list-style-type: none"> i) realising, by 2025, at least 25% of the development potential of water for agriculture; hydropower; industry; tourism and transportation ii) putting in place and fully implementing mechanisms and measures for the conservation and restoration of environment, biodiversity, and life supporting ecosystems
Investment led transboundary management and governance of water and environmental resources	<ol style="list-style-type: none"> i) cross-sector financing/investment to assure viability of investments in water dependent productive sectors (municipal water supply, energy, agriculture, agri-processing, mining, tourism) ii) identifying and quantifying water flows and their relationship with both climatic variables and economically valued inputs – if not limiting factors – to domestic supply, agriculture, industry, mining, energy production and various service industries; iii) supporting strategic planning processes for use of land and related resources so that water resources utilisation and environmental conservation are optimised; and iv) providing instruments to support public and investor confidence in the amount of water being traded, extracted for consumptive use, recovered and managed for environmental and other public benefit outcomes v) capacity development vis-à-vis valuing ecosystem services, trade-offs and payment for ecosystem services at regional and sub-regional levels vi) managing demand and improving efficiency in the production, supply and utilisation of water in agriculture – including use of waste as a resource in agriculture vii) promoting and facilitating multifunctional “green” basin development centred on natural and built infrastructure to provide a continuum of water storage solutions viii) instituting tariff systems targeted towards better cost recovery in wastewater collection and treatment, while at the same time safeguarding affordability; ix) facilitating safe use of wastewater in urban farming; and, x) bio-gas energy production.

It evident in the foregoing that freshwater availability is critical to releasing Africa’s development potential, as well as sustaining economic growth and social transformation. It is a key determining factor in efforts to ensure food and energy security as well as for increasing industrial production. The quality of freshwater ecosystems has a direct impact on the wellbeing and productivity of the population and, by inference, on the sustainability of economic growth and development at a national level. The benefits of investing in improved water resources management and access to clean water and sanitation therefore remain clear and germane.

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Appendix 1: PIDA Water projects

Project Name	Sector	Sub Sector	Location	REC	Stage
Sambangalou Hydropower Plant	Energy	Hydro Power Plant	Guinea, Senegal	ECOWAS-CEDEAO	S4A: Tendering
Ruzizi III Hydropower Plant	Energy	Hydro Power Plant	Democratic Republic of Congo, Rwanda	EAC	S3B: Transaction Support & Financial Close
Rusumo Falls III Hydropower Plant	Energy	Hydro Power Plant	Rwanda	EAC	S4A: Tendering
Polihali Hydropower Dam and Transfer Tunnel to Katse Dam	Energy	Hydro Power Plant	Lesotho	SADC	S2A: Pre-Feasibility
Mpanda Nkuwa Hydropower Plant (HMNK)	Energy	Hydro Power Plant	Mozambique	SADC	S3B: Transaction Support & Financial Close
Kobong Pumped Storage Dam and Hydropower Plant	Energy	Hydro Power Plant	Lesotho	SADC	S1: Project Definition
Kaléta Hydropower Plant	Energy	Hydro Power Plant	Guinea	ECOWAS-CEDEAO	S4C: Operation
Inga 3 Hydropower Plant	Energy	Hydro Power Plant	Democratic Republic of Congo	SADC	S3A: Project Structuring
Grand Ethiopian Renaissance Dam (GERD)	Energy	Hydro Power Plant	Ethiopia	COMESA	S4B: Construction
Batoka Gorge Hydro Electric Power Scheme	Energy	Hydro Power Plant	Zambia, Zimbabwe	SADC	S3A: Project Structuring
Palambo Multi-purpose Dam	Water	Multi-purpose Reservoir	Central African Republic, Democratic Republic of Congo	CEEAC-ECCAS	S2A: Pre-Feasibility
Noumbiel Multi-purpose Dam	Water	Multi-purpose Reservoir	Burkina Faso, Ghana	ECOWAS-CEDEAO	S2B: Feasibility
Koukoutamba (ex-Gourbassy) Multi-purpose Dam	Water	Multi-purpose Reservoir	Mali, Senegal	ECOWAS-CEDEAO	S3A: Project Structuring
Fomi Multi-purpose Dam (Niger River Basin)	Water	Multi-purpose Reservoir	Guinea	ECOWAS-CEDEAO	S3B: Transaction Support & Financial Close
Okavango Basin Opportunity Studies	Water	River Basin Management	Angola, Botswana, Namibia	SADC	S4C: Operation
Nubian Sandstone Aquifer System	Water	Water Aquifer Management	Chad, Egypt, Libya, Sudan	IGAD,UMA-AMU	S4A: Tendering
North-West Sahara Aquifer System (NWSAS)	Water	Water Aquifer Management	Algeria, Libya, Tunisia	UMA-AMU	S3A: Project Structuring
Iullemeden Aquifer System	Water	Water Aquifer Management	Mali, Niger, Nigeria	ECOWAS-CEDEAO	S2A: Pre-Feasibility
Lesotho Highlands Water Project (LHWP) Phase II	Water	Water Supply	Lesotho	SADC	S4B: Construction