



ABInBev

AFRICA'S WATERSHED MOMENT

HOW BETTER WATER MANAGEMENT CAN UNDERPIN
AFRICA'S DEVELOPMENT



ABOUT THIS REPORT

Both AB InBev and WWF have a keen interest in building water-related resilience in Africa, for business, people and nature. This common interest led these global organisations into this collaboration, to understand and advocate for the importance of investment in the water sector to catalyse economic and social development and mitigate the impacts of climate change and water hazards. This initiative was supported by Pegasys Institute, an African think-tank, to develop a longer case-based technical report from which this document was derived (the technical report can be downloaded from the link below). These cases were largely focused on priority countries for AB InBev and WWF in Southern, East and West Africa, and therefore the report has a strongly Sub-Saharan Africa focus. The facts and statistics cited in this report are drawn from a variety of published academic and grey literature sources. A full list of references is included in the longer technical report:

www.wwf.org.uk/technical-report-Africas-watershed-moment

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FOREWORD



Fred Kumah,
WWF Director for Africa

By 2050, Africa will be a very different continent. Its population will have doubled, soaring by another billion. Its towns and cities will house more people than its rural villages. Its economies will have transformed. The question is not where Africa is going: it is whether the continent gets there by following a sustainable and inclusive development path.

And the answer will depend to a huge extent on how Africa manages its freshwater resources. Clean and reliable water supplies are essential for everything from increasing agricultural production to successfully diversifying countries' economies. Africa will also have youth on its side, but only if the continent's young women and men are healthy and educated, which they won't be without sufficient water.

As this report makes clear, meeting the increased demand for water will be a huge challenge and one that will be exacerbated by climate change. This is Africa's watershed moment. Decisions taken in the next few years will shape the

continent's development for decades to come. Africa urgently needs to invest in appropriate freshwater infrastructure, management, policies, institutions and transboundary collaboration to catalyse economic growth, mitigate water risks, and achieve its Sustainable Development Goals (SDGs) – or risk missing the boat.

It will not be easy. The development and management of water resources always result in trade-offs. This report highlights the need for water-related development to carefully consider the potential winners and losers of any intervention, particularly rural communities and indigenous groups whose livelihoods are closely dependent

on water resources. But it also pinpoints some opportunities: the momentum created by the SDGs, expanding interest in innovative financing mechanisms, increasing private sector support for collective action, and greater understanding of the need for basin-scale planning.

And critically, new partnerships. Governments, businesses, international organisations and development agencies all have a role to play in securing investments that ensure Africa's rivers, wetlands and aquifers continue to provide clean water supplies as the continent transforms. Indeed, this report is the result of one such partnership between

AB InBEV and WWF, which are both committed to building water resilience in Africa for business, people and nature.

I recommend this report to all politicians, bureaucrats and business leaders who influence investment decisions across the African continent, particularly those who are not directly involved in the water sector. WWF is committed to ensuring sustainable, inclusive growth across Africa, while conserving the health of the continent's priceless freshwater ecosystems. This report is an important contribution to the debate about Africa's future, because the continent's future will be shaped by water.





Tony Milikin,
Chief Procurement &
Sustainability Officer, AB InBev

At AB InBev, our dream is to bring people together for a better world. This purpose is deeply rooted in our global water conservation and stewardship efforts. More than just a key ingredient in our products, water is a precious resource for the economic, social, and environmental well-being of our communities.

We recognise the need to act as a responsible steward of water in the areas where we operate, in addition to brewing beer at the highest level of water efficiency possible. But we also recognise that the scale of the challenge is often bigger than the reach of our teams alone, and that long-term water security relies on partnership across sectors.

Water resource challenges – increasingly magnified by climate change, inadequate infrastructure, and poor governance – cannot be addressed in silos. Therefore, we continue to partner with key stakeholders such as World Wildlife Fund (WWF) to ensure that we have the knowledge, resources, and capabilities required to catalyse joint efforts to protect and restore shared water resources in high stress areas. We value the opportunity to collaborate with WWF in searching for scalable solutions and collaboration opportunities that will unlock innovative investment mechanisms, improve

infrastructure, and drive progress through partnerships to advance sustainable development and achieve the UN Sustainable Development Goals.

Africa is an important growth market for AB InBev. Many of our local operations have shown leadership in working with governments, NGOs, suppliers, consumers, communities, and other partners to promote water stewardship and influence policy. This publication aims to highlight the unparalleled value of freshwater in Africa's development, showcasing the importance of collective action, improved infrastructure and enabling policy environments.

It will take more than one organization, company or government to tackle the growing freshwater challenges in Africa. We invite you to learn more about how water resilience can accelerate growth, and join us in our efforts to build a Better World for generations to come.



SUMMARY

This report was commissioned by AB InBev and WWF to articulate their recognition that water, and the rivers, lakes and wetlands from which it is sourced, are fundamental to sustained economic development in Africa. The report is written as a briefing and call to action for politicians, senior bureaucrats, business leaders and development agencies to ensure that the continent's economic trajectory overcomes its climate challenges and variable water availability. Well-managed water resources will be critical to achieve a number of the Sustainable Development Goals (SDGs).

For most African countries economic growth is dependent upon agriculture, mining and manufacturing, and is likely to remain so for at least the next decade. Reliable water supply is critical to catalyse growth in these sectors. It is also needed to generate the energy and grow the crops that will support the development of the continent's cities, the population of which will treble over the next 35 years. The demands for and impacts on water resources are likely to increase rapidly as Africa's economy grows, people become more affluent, cities expand and the climate changes. Meanwhile, pressure on Africa's unique – and, in many places, largely intact – freshwater habitats and biodiversity grows.

However, large parts of Africa are subject to seasonally variable hydrology and geographically uneven distribution of water resources. This will be compounded by climate change, to which Africa is particularly vulnerable. The combination of natural variability and anthropogenic climate change both complicates the management of water resources and requires significant investment in water information, planning, governance and (grey and green) infrastructure.

Water-related investment choices made over the next decade will have a substantial influence on the long-term development trajectory of African countries. Trade-offs between water for agriculture, energy, cities and manufacturing will increasingly come to the fore. At the same time, access to water by rural people will influence the livelihoods and household security of half the African population. Extreme flood, drought and disease events will increase migration pressures on refugee settlements and urban informal areas.

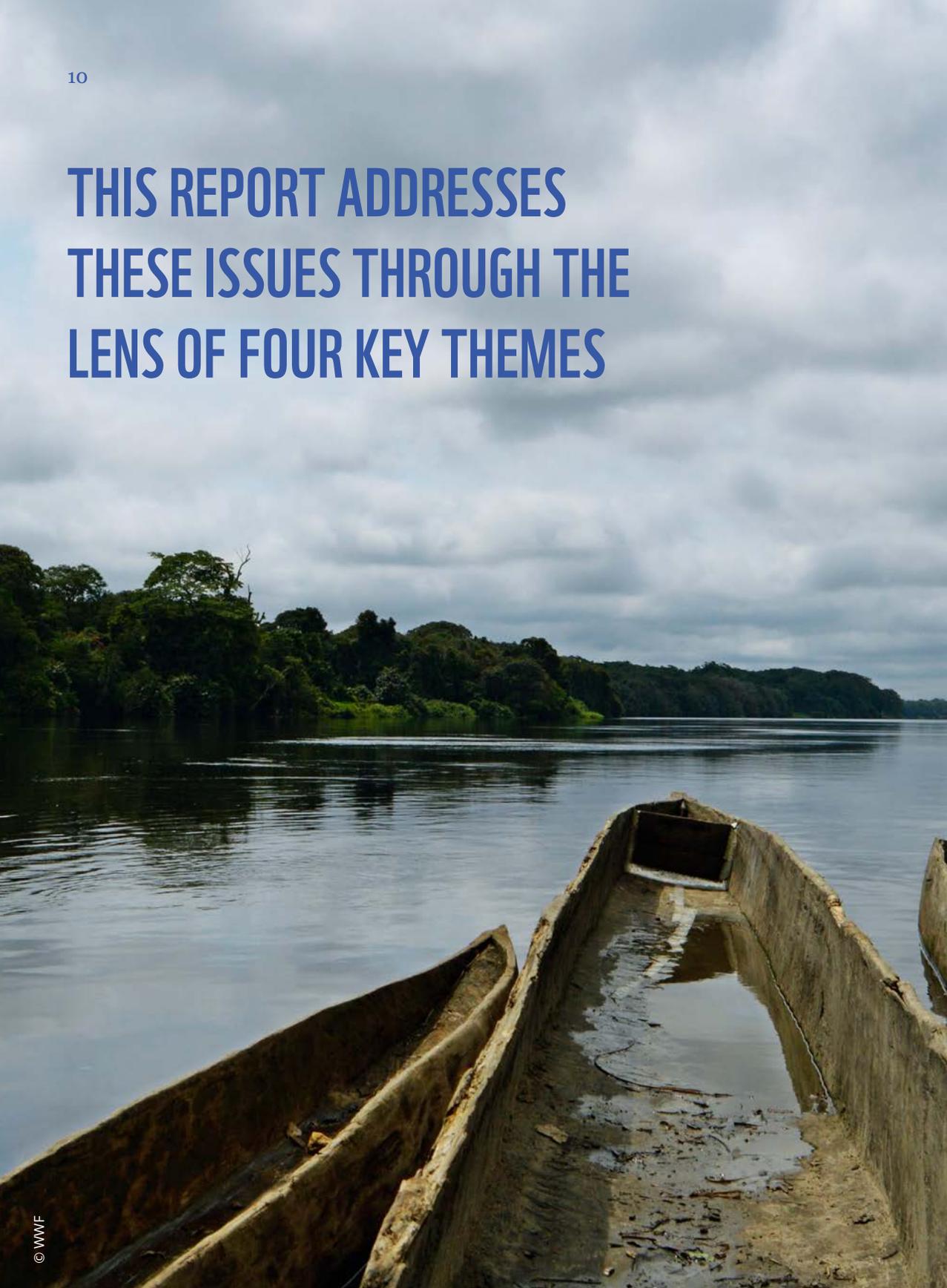
These decisions will play out differently for countries at different stages of development and with varying water availability. The relatively low level of water infrastructure and institutional investment in Africa presents a major challenge. It also means that African countries and organisations are well placed to learn from global experience, adapt successful solutions that have been applied elsewhere and avoid many of the expensive water management mistakes made by other countries.

Water is also fundamental to the achievement of many of the SDGs, not only SDG6 (Water and Sanitation for All). The SDGs and looming climate adaptation challenge provide the impetus now to make the right investments in water management across the continent, for the benefit of nature, people and business.

Areas for specific attention include the protection of natural infrastructure and associated aquatic ecosystems that attenuate disasters and provide food and resources for local people; the development of mechanisms for innovative financing that enables appropriate water investment; the holistic and systemic planning of water-related investment across countries, in watersheds and within cities; and the fostering of new partnerships between business, government and civil society to support the achievement of development goals.

A recent report compiled for the OECD makes the strong argument that both water endowment and investment in water information, institutions and infrastructure catalyse economic growth, which in turn enables further investment in water for productive purposes. However, growth also increases the economic value at risk from water-related hazards such as floods, droughts and disease. Inadequate investment in water management not only constrains development, but also increases the vulnerability of any growth. Africa's variable hydrology therefore poses significant risk to the development agenda of the continent and individual countries within it. Now is a critical time for Africa's development: building the water-resilience of countries and economies over the next decade will be essential for long-term sustainable development.

THIS REPORT ADDRESSES THESE ISSUES THROUGH THE LENS OF FOUR KEY THEMES



1) SUSTAINED GROWTH REQUIRES WATER INVESTMENT:

Water is required in some way for all economic production and consumption, whether it is used in business operations and their supply chains, or to ensure healthy and educated workers and customers. Current economic growth rates will require a dramatic increase in water use by 2030. Achieving the SDGs in Africa will require careful balancing of the needs of economic growth and industrialisation with shifting demographics and the maintenance of functioning rivers, wetlands, lakes and aquifers to sustain a reliable and clean water supply to the developing continent.

2) FEEDING A BILLION MORE PEOPLE:

Over the next 35 years, the African population is expected to increase by more than a billion people. These people will need access to water for food, energy and water security, as well as hygiene. Moreover, water is crucial for many rural dwellers to sustain their agricultural livelihoods. This increasing population will have the greatest impact on water through agricultural use. Agriculture is the largest user of water in Africa, and improved water management will be required to support the development of agricultural and rural economies, as well as feeding the increasing African population to achieve SDG2 – Zero Hunger.

3) RURAL WATER VULNERABILITY, POVERTY AND MIGRATION:

The livelihoods of rural communities in Africa are highly dependent on water. The combination of climate variability, climate change, political instability, lack of economic opportunities and poor water resources management has far-reaching implications for vulnerable rural communities who are dependent on natural resources for subsistence livelihoods. Water-related drought and flood events contribute to the factors driving migration. Investment in water management and access for rural communities is critical to reduce poverty and support resilient livelihoods, contributing to SDG 10 – Reduced Inequalities.

4) CITIES AS THE ENGINE OF WATER-RESILIENT DEVELOPMENT:

Projected rates of urbanisation are expected to result in a trebling of the population in African cities by 2050, with the urban population exceeding the rural population of Sub-Saharan Africa by about 2040. African cities will be both the drivers of economic growth, diversification and trade, and will have an increasing requirement for water, food and energy, all of which require reliable water supply. The water-resilience and sustainable development of African cities will be dependent upon the management of their interactions with water resources, to achieve SDG 11 – Sustainable Cities and Communities.

The recommendations to build water resilience cannot be implemented by water managers alone. Five key stakeholder groups need to be aware of and respond to the importance of water for Africa's sustained development.

RECOMMENDATIONS

- **Economic planners** should seize the opportunity to catalyse development by investing in water management, and take a holistic view on the role that water plays in economic growth.
- **Business leaders** should increase investment in water management to reduce risks, advocate with governments for additional investment, and promote partnerships to support the achievement of the SDGs and resilient water management.
- **Investors** should explore mechanisms to finance water development that underpins sustainable and inclusive economic growth and link these to productive use of water, considering the threats of a changing climate.
- **City managers** should recognise the increasing direct and indirect vulnerability of cities to water and cooperate to ensure coherent planning between urban and rural areas.
- **Development agencies** should promote water-resilient development, with a focus on the livelihoods of the most marginal people in the least developed economies.

INTRODUCTION: A WATER-DEPENDENT CONTINENT



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AFRICA'S GROWTH IS DEPENDENT UPON WATER

Africa is richly endowed with relatively untapped natural resources. The remarkable growth in many African countries, averaging about 5% annually over the past decade, was largely underpinned by the development of agricultural and mineral resource exports to other parts of the world. It seems that this will be the basis for continued growth, at least in the medium term until African economies begin to diversify and process these resources for consumption and trade within Africa.

The growth of agriculture-based economies is highly dependent on water for irrigation. Most jobs in Africa and one-sixth of its GDP are related to agriculture, and it is the greatest source of rural employment and livelihoods for the 600 million rural inhabitants of Sub-Saharan Africa (SSA). While agriculture already uses 85% of the total water on the continent, 95% of Sub-Saharan agriculture is still rain-fed and is thus vulnerable to seasonal and inter-year rainfall variations. Dependence on agriculture is even more pronounced in the least developed and most fragile states: three-quarters of the world's poorest nations are located in Sub-Saharan Africa, while 14 African states are considered as fragile.

Mining economies are also dependent upon water, although more indirectly through energy requirements and the disposal of waste water. Most of Africa's energy is generated through hydropower and thermal plants, both of which require a reliable supply of water for

their turbines or cooling. With economic diversification, manufacturing industry is similarly dependent upon water supply, energy and waste disposal, as well as a reliable supply of raw agricultural and mineral inputs.

In order to meet the development needs of Africa, economic growth will need to continue. Where these needs are related to the primary agricultural and secondary manufacturing economies, the quantity and reliability of water required to sustain this growth will increase rapidly until growth is diversified and therefore decoupled from direct water dependency.

A BILLION MORE PEOPLE IN AFRICA

It is also expected that the African population will double by 2050. With expected urbanisation rates, 80% of these additional 1 billion people will reside in cities, with more urban dwellers than rural inhabitants by 2040. The manufacturing and services economies of these cities will need to grow rapidly to accommodate the aspirations of these people, while the supply of water, energy and food must increase accordingly. Experience in other parts of the world indicates that the water demand associated with a trebling of the urban population will be significant. The economic opportunity provided by an increasingly youthful population will only be leveraged if workers are healthy and educated. Water access for households has been demonstrated to be a critical enabling factor for the health and education of children and their long-term productive contribution to society, particularly for girls. Providing reliable services to cities can be more efficient

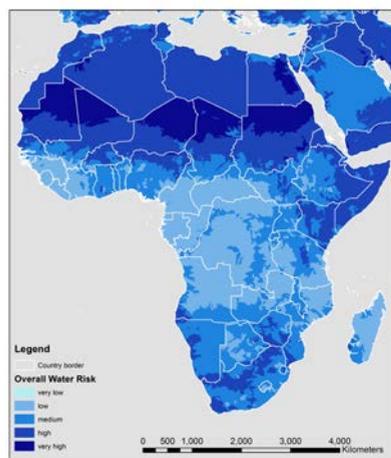


Figure 1: Overall water risk (WWF Water Risk Filter: waterriskfilter.panda.org)

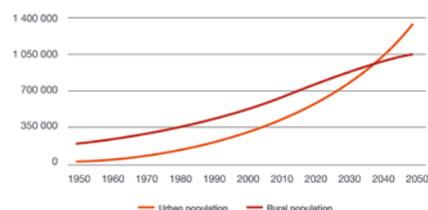


Figure 2: Urban and rural population (in 1000s) in Sub-Saharan Africa, 1950-2050 forecast

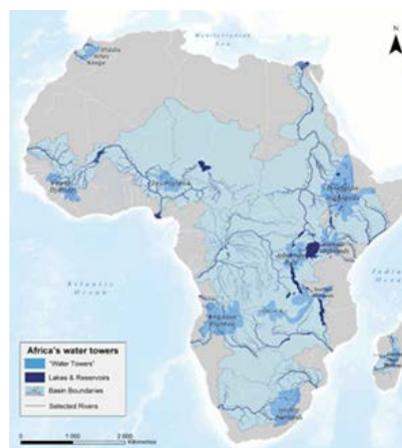


Figure 3: Africa's main river basins and water towers

than sparse rural settlements, but this requires coherent investment and urban planning. The converse is that sprawling slums without services contribute to the continued impoverishment of their inhabitants and the broader economy.

A CONTINENT WITH HYDROLOGICAL CHALLENGES

Africa has 10% of the planet's freshwater supplies to support 15% of the world's population, but only 3% of the world's GDP. Water supplies are very unevenly distributed in space and time, which makes the continent's water resources (hydrology) amongst the most challenging on the planet. A significant portion of the continent's water is generated in a few very wet parts, sometimes called 'water towers'. This unevenness is expected to become more extreme with climate change, with arid regions becoming drier and wet regions suffering more extreme floods. It is estimated that by 2025, half of the population of Africa will be living in areas of water scarcity or water stress. A further challenge is that 93% of the continent's freshwater is located within transboundary rivers or aquifers, so neighbouring countries have influence over each other's water-related development.

Harnessing this variable hydrology to enable social and economic development requires

substantial improvements to water resource management. This means better monitoring and information systems, strong institutions, governance and managerial capacity, coherent laws and regulations, appropriate pricing and financing regimes, robust infrastructure that can store and distribute water where and when it is needed, and corporate water stewardship. Healthy, functioning aquatic ecosystems are critical in buffering the most severe impacts of extreme climatic events and sustaining important resources and processes such as freshwater fisheries or the flow of sediment along rivers to low-lying coastal deltas. Unfortunately, there has been chronic underinvestment in water management across the continent over the past century.

NOT ALL WATER DEVELOPMENT IS INCLUSIVE

Economic development requires investment in infrastructure to ensure the predictable and stable supply of water, energy and food for a country, as well as reliable transport and communications networks. Investment in water management is a key aspect of a country's economic planning, and helps to reduce risks to strategically important infrastructure from extreme climatic events.

However, unlike most other resources, water is not only an economic good (or non-substitutable input to economic production), but it is also necessary for human life, rural livelihoods and the maintenance of aquatic ecosystems. Development and management of rivers to catalyse national economic development can degrade downstream

resources and thereby impoverish the people that depend upon them. Similarly, formalisation of water management systems and land rights can perversely marginalise the people that have been using these resources for years. Inclusive water-related development requires conscious attention to the winners and losers in any intervention, particularly for rural communities whose livelihoods are typically closely dependent on water resources.

THE OPPORTUNITY AND CHALLENGE OF THE GLOBAL SUSTAINABLE DEVELOPMENT GOALS

The adoption of the 17 global Sustainable Development Goals (SDGs) by 193 countries provides both an opportunity and a challenge for African water management. SDG 6 is explicitly linked with water, and aims at ensuring the availability and sustainable management of water and sanitation for all. Many of the other SDGs are impacted directly or indirectly by the management and health of water bodies. Through these linkages, it is apparent that achievement of many other SDGs will be dependent upon effective management of water resources and supply systems, particularly in Africa where water is such an important part of social and economic development, as well as environmental protection.

Africa's uneven and variable hydrology will be exacerbated by climate change, and the hazards associated with climate change will be manifest primarily through water. Water-dependent economic development and the achievement of the SDGs will be doubly jeopardised, as development pressures begin to stress currently under-utilised resources and the variability of



these resources becomes more uncertain. Building water-resilient economies and communities will be critical to sustaining development gains and ensuring markets and consumers that are able to drive and thrive with this economic growth, even under a changing climate.

THE OPPORTUNITY FOR BUILDING AFRICAN WATER-RESILIENCE OVER THE NEXT DECADE

A recent report compiled for the OECD makes the strong argument that both water endowment and investment in water information, institutions and infrastructure catalyses economic growth, which in turn enables further investment in water for productive purposes. However, growth also increases the economic value at risk from water-related hazards such as floods, droughts and disease. Inadequate investment in water management not only constrains development, but also increases the vulnerability of any growth. Africa's variable hydrology therefore poses significant risk to the development agenda of the continent and individual countries within it. Now is a critical time for Africa's development: building the water-resilience of countries and economies over the next decade will be essential for long-term sustainable development.

Resilience has two important dimensions, namely (a) the ability

to absorb or withstand climate-hydrological or developmental shocks and stresses and maintain function in the face of these, and (b) the ability to adapt, reorganise and evolve into new sustainable states that are more adapted to hydrological and development conditions and are better prepared for further changes. In the water resources context, the former depends upon appropriate water management and development, which requires the availability of financial and human resources. The latter requires that options to transform the system have not been foreclosed through poor planning or rigid infrastructure, as well as the resources required to transform the system or development pathway. This applies on a household, community, city, national and even continental scale.

Building on all of these challenges and on a review of case studies from across the continent, the following four sections each explore an important aspect of Africa's vulnerability to water and the opportunities for building water-resilience.

These themes are both topical and inter-related. They illustrate the fundamental importance of water in the African economy and society, and the need for increased investment in effective water management over the next decade.

- All economic activity requires water, and it is particularly important for sustaining the specific characteristics of Africa's emerging manufacturing and resource-based economic growth.
- Improved agricultural productivity requires water and this is necessary to feed the rapidly increasing African population.
- Rural livelihoods are dependent upon water and are particularly vulnerable to extreme floods and droughts, which cause migration and put pressure on other parts of the continent.
- Cities are central to Africa's development and for building resilience to water risks: they require water for supply, energy and food.

1: SUSTAINED GROWTH REQUIRES WATER INVESTMENT



Water is required in some way for all economic production and consumption, whether it is used in business operations and their supply chains, or to ensure healthy and educated workers and customers. Current economic growth rates will require a dramatic increase in water use by 2030. Achieving the SDGs in Africa will require careful balancing of the needs of economic growth and industrialisation with shifting demographics and the maintenance of functioning rivers, wetlands, lakes and aquifers to sustain a reliable and clean water supply to the developing continent.

WATER IS EMBEDDED IN EVERY PRODUCT

Water footprint is a measure of the water required to produce a commodity, considering the entire supply chain. The concept can be applied to understand the use of embedded water by businesses, cities or countries, as well as the economic productivity of water and the value of water traded between countries. Most water used in the production of agricultural and mineral commodities is related to water and energy used for their cultivation or extraction. Investors and businesses are increasingly taking a risk-based approach to understanding where water is used and the implications of this use for the broader water resource.

Where water is abundant, the efficiency of water use in production is of less relevance. However, for countries or regions with lower water endowments that are becoming increasingly stressed, such as Southern and East Africa, the comparative advantage and economic productivity of water used in production should be considered in economic and

trade policy. Increasing the economic productivity of water in the context of land and labour requirements should be the focus of policymakers, rather than simplistically arguing for shifting production patterns. This is an area for greater management effort and investment by government and business. It requires attention alignment between sectors and businesses, taking account of wider impacts and shared water challenges.

A RESOURCE-RICH BUT CLIMATE-CHALLENGED CONTINENT REQUIRES INVESTMENT IN WATER TO GROW

There is a water, energy, transport and communications infrastructure backlog in Africa, and significant investment will be required to build climate resilience over the next decades. A country without infrastructure cannot access, process or trade its natural resources, and for many landlocked African countries this requires regional or transboundary infrastructure. On the other hand, a country that is not prepared for water disaster management, response and recovery will be doomed to perpetual backsliding through loss of life and infrastructure.

Investment in water management and infrastructure needs to be viewed at an economy-wide scale, rather than only on a project-by-project basis, because the economic multipliers of investment in good water management and development have been shown to be significant. Traditional evaluation of investments in water management discounts future benefits against the current costs. However, without the initial investment the opportunities to

catalyse development and manage water risks are likely to be lost, with consequent negative impacts on business confidence and economic production.

Africa's water resources are currently under-developed, but in many places are not stressed. However, this situation is likely to change in the next decade as water demands increase and water availability alters with climate change. Unfortunately, lack of water stress can lead to complacency, even though it has been demonstrated across the world that early engagement on water issues, including transboundary cooperation, provides greater long-term benefits. The importance of proactive investment in appropriate policies, strong institutions, adequate information, robust infrastructure and healthy ecosystems cannot be over-emphasised, both to catalyse development and manage water hazards.

BUILDING ECONOMIC WATER RESILIENCE MUST REFLECT A COUNTRY'S STAGE OF DEVELOPMENT

Africa is home to (i) some of the most fragile states on the planet with limited capacity for investment and dramatic vulnerability to hydrological variability; (ii) largely agricultural and/or extractive economies that are highly dependent upon water resources for economic development; and (iii) diversifying emerging economies undergoing rapid urbanisation that are beginning to decouple from direct water dependence for their development. Countries at each of these stages of development have distinct challenges, as well as specific

opportunities to catalyse growth, limit hazards and achieve their SDGs. Building water-resilience for economic growth as well as to meet human needs depends on a country's stage in development, as well as on its particular water endowment and the nature of the water hazards it faces.

It is critical to note that shifting towards a resilient and diversified economy is not a linear or straightforward process. Vulnerabilities naturally increase with development as a country's value-at-risk from flood and drought grows and demand approaches the available supply. The impacts of development through manufacturing production introduce additional stressors, such as deteriorating water quality and over-abstraction of water resources. Furthermore, climate change is already contributing and is expected to result in more extreme events and increasing climate variability, which also increase vulnerability. Therefore, even with a general trend of increasing development, there is pressure on resilience that if not managed effectively may result in economic constraints or back-sliding.

BUSINESS OPPORTUNITIES AND RISKS ALSO CHANGE WITH A COUNTRY'S DEVELOPMENT TRAJECTORY

Every business leader understands that stability and predictability are critical for maintaining an investment climate, developing markets and ensuring a company's long-term economic value. Investment in water management and development to guarantee a reliable water supply is a key aspect of maintaining this stability in an uncertain climate,

as well as ensuring healthy workers and consumers. The challenge is that across Africa there has been massive under-investment in water, which will increasingly lead to physical, regulatory and reputational risks. Where capacity is low or investment is inadequate, it is in their direct interest for businesses to advocate for or even catalyse this investment and partner with government and civil society groups to improve water management.

In many parts of Africa, extractive or agricultural businesses find themselves developing infrastructure and becoming de facto municipal service providers to local communities in fragile states. There are huge opportunities to improve the resilience of this infrastructure and these services in collaboration with international development organisations, using new sources of global finance. In other developing countries, this role changes to one of advocacy and partnership to strengthen institutions and assist in financing infrastructure that serves both business and local communities.

Water Investment is Necessary to Catalyse Development in Uganda

Uganda is endowed with substantial natural resources including fertile soils, regular rainfall, forests, minerals and oil. Water is a key driver for agriculture, the most important sector of the economy and the employer of one-third of the country's workforce. Water is also central to other economic activities such as fishing and tourism, and hydropower provides 60% of the country's electricity. Uganda faces continuing challenges to natural resource management in light of climate change, demographic shifts and economic growth. It has been estimated that to meet the growth target outlined in the Uganda development strategy, the country will need to treble its reliable water supply. Significant water investment and good water management will be critical to ensure the growth of Uganda's manufacturing, agricultural and service sectors.

According to the Ministry of Water and Environment of Uganda, investments in water and environment goods and services would bring a return three to four times higher than under a 'business as usual' scenario, a significant benefit to the Ugandan economy. According to calculations based on two investment scenarios (a moderate one and a high one) GDP returns should be roughly eight to nine times the investment cost in undiscounted terms, and at least three to four-and-a-half times investment costs when benefits and costs are discounted at 10%. This GDP growth should benefit households as poverty alleviation, incomes and consumption increase over time. Better water management will also help protect ecosystems and facilitate certain economic activities. The population will also benefit from safer water consumption, which will translate into healthcare cost reduction for households and for the government.

Source: Strzepek, Kenneth; Boehlert, Brent; Willwerth, Jacqueline; Neumann, James, *The Contribution of Water Resource Development and Environmental Management to Uganda's Economy*, 2016, Industrial Economics, Cambridge, MA, USA



2: FEEDING A BILLION MORE PEOPLE



Over the next 35 years, the African population is expected to increase by over a billion people. These people will need access to water for food, energy and water security, as well as hygiene. Moreover, water is crucial for many rural dwellers to sustain their agricultural livelihoods. This increasing population will have the greatest impact on water through agricultural use. Agriculture is the largest user of water in Africa, and improved water management will be required to support the development of agricultural and rural economies, as well as feeding the increasing African population to achieve SDG2 – Zero Hunger.

AFRICA'S ROLE IN GLOBAL FOOD PRODUCTION AND FEEDING THE CONTINENT

Africa boasts 60% of the world's arable land and has an increasingly youthful population to develop this potential. The continent could therefore be expected to play a significant role in meeting the food requirements and changing consumption habits of the world. However, food insecurity is a challenge in many parts of Sub-Saharan Africa, with 50% of people living in extreme poverty and 25% of the population being malnourished. Under the current trajectory, food insecurity is likely to increase with population growth. Since the mid-60s, agricultural production in Africa has increased at a significantly lower rate than population growth. This trend, compounded by increasing urban incomes, is expected to treble cereal demands in Africa by 2050, which far outstrips the current rates of increase of cereal cultivation and productivity. The International Food Policy Research Institute (IFPRI)

estimates that total imports of cereals to Africa are likely to increase from a current 20% of demand to about 50% during this period: far from feeding the world, Africa would need to be fed by the rest of the world. As an example, cereal yields would have to increase from the current 20% of their potential to 80% just to maintain today's level of self-sufficiency. In other words Africa must increase investment in agriculture and improve productivity, simply to grow sufficient cereals to feed its future population.

COMMERCIALISATION OF AGRICULTURE, TRADE AND COMPARATIVE ADVANTAGE

To meet this global challenge, Africa needs to increase the production of crops, improve nutrition and raise rural incomes, all while working within the constraints of water availability. To achieve sustainable intensification, African states will require knowledge and technology, supported by sustainable investment. Despite rapid urbanisation, the African rural population is still expected to increase over the next few decades, and thus any commercialisation of agriculture will require a combination of commercial farms supported by outgrower schemes; displacement of rural people for commercial farming entrenches poverty.

Almost a fifth of total harvested land is dedicated to cash crops, a number that has remained constant since 1990. Cultivating cash crops rather than food crops can be part of a specialisation and commercialisation strategy to exploit comparative advantages. To ensure successful commercialisation,

investors must have confidence that the infrastructure throughout the supply chain is robust to external shocks and stresses, such as extreme climatic events, and this requires investment in disaster preparedness and management. In this sense, the interests of food and beverage businesses therefore potentially align with those of local communities, creating the opportunity for partnerships between business, government and civil society.

PRODUCTIVITY INCREASES THROUGH IRRIGATION

Improved water management and investment is necessary to ensure food security and increased agricultural productivity for a growing African population. Rain-fed agriculture in the more marginal regions of Southern Africa, East Africa and the Sahel is particularly vulnerable to a changing climate, so fragile and agrarian countries will require increased investment in viable and sustainable irrigation to ensure their economic and livelihood resilience. However, because it is starting from such a low base, a trebling of irrigated land in Africa is expected to only increase food production by 5 % annually by 2025.

Investing in irrigation is a rational choice for African states with limited financial resources, because where this is done appropriately and linked to institutional and management capacity, such investments have proven to have as much as four times more impact in terms of alleviating poverty. However, increasing irrigation also means increasing freshwater abstraction for the agricultural sector: this will impose

greater externalities on other sectors and ecosystems as water resources become increasingly developed. Managing irrigation expansion as part of the entire water management system is critical.

FRESHWATER FISHERIES, PROTEIN AND DISEMPOWERMENT

Terrestrial agriculture is not the only means of feeding Africa's increasing population. Indigenous freshwater fish provide a crucial source of animal protein and micronutrients to local communities throughout Africa. In many African communities, inland fish are the primary source of these vital food components; and overall they represent 40% of the continent's fisheries. This contributes to food security, provides livelihoods for the fishermen, and strengthens the viability of local rural economies. In Africa, fishing is usually done for subsistence and the fish consumed locally. There are however exceptions, such as in Lake Victoria where the fishing of (introduced) Nile perch is intensive and done at commercial levels, mainly for export.

Inland capture fisheries are economically and socially undervalued and biologically underappreciated, mainly due to a lack of data on fish consumption and production. Fishing is considered as less of a priority than other services provided by freshwater, such as hydropower, municipal supply and irrigation, largely due to inadequate information on the topic. Priority is given to water-development projects that can negatively affect the fish population in lakes and rivers, by changing flow dynamics and the connectivity of rivers, as well

as the landscapes that impact on the hydrology and quality of these water resources. These impacts, together with the introduction of alien species for commercial fisheries – such as the Nile perch in Lake Victoria – threaten wild fish populations and fisheries' productivity.

For local populations, a decrease in fish abundance and quality often leads to a decrease in protein consumption, as other sources may be too expensive or difficult to obtain. Local communities often see their traditional subsistence activity become unviable; while the infrastructure development project that triggers this decrease in fish populations might not create replacement jobs. Moreover, local populations do not often immediately enjoy new benefits from built infrastructure. Greater consideration needs to be given to the consequences of infrastructure and agricultural development: we need a better understanding of the hidden value of fisheries in Africa's rivers and lakes.

Agricultural Development and SAGCOT in Tanzania

Tanzania has a clear vision to transition from a predominantly agricultural to a mixed and semi-industrialised economy by 2025. Today, however, the country continues to rely heavily on agriculture, which accounts for 29% of GDP and 75% of all jobs. This means that Tanzania is highly reliant on water. Despite abundant water resources, availability is highly variable in space and time. Water stress is frequent and likely to increase with economic growth. Water insecurity has a negative impact on economic growth, as well as on livelihoods. It affects the viability of agricultural activities and increases food insecurity and water-related tensions.

To deliver economic growth and improved food security, the Southern Agricultural Growth Corridor, Tanzania (SAGCOT) has been created. SAGCOT helps develop clusters of farmers with access to infrastructure, markets and local agri-processing facilities. This allows farmers to increase their operations and build a more integrated and productive set of agricultural value chains. The corridor is expected to create 400,000 jobs and increase agricultural revenues by US\$1 billion. The realisation of these benefits requires a significant expansion in irrigated land. Water quality and equitable distribution will be crucial. The protection of ecosystems within the corridor is another key challenge; these ecosystems provide ecological goods and services on which local communities and indigenous fauna rely. This fauna attracts tourism, which helps grow and diversify the economy.

Because of competing demands for the country's finite water resources, farmers along SAGCOT are already experiencing water stress, thereby undermining the economic performance of the corridor. The next necessary step is for agrobusiness companies to assess their water footprint, to think about catchment stress as a whole, and to reflect on their ability to reduce basin-wide water stress by working in partnership with others. Some initiatives have tried to create space for increased collaboration to solve this public good problem, such as the Kilimanjaro Stewardship Initiative.

Source: Pegasys, 2014, Water Security Sector Study for Tanzania



3: RURAL WATER VULNERABILITY, POVERTY AND MIGRATION



The livelihoods of rural communities in Africa are highly dependent on water. The combination of climate variability, climate change, political instability, lack of economic opportunities and poor water resources management has far-reaching implications for vulnerable rural communities who are dependent on natural resources for subsistence livelihoods. Water-related drought and flood events contribute to the factors driving migration. Investment in water management and access for rural communities is critical to reduce poverty and support resilient livelihoods, contributing to SDG 10 – Reduced Inequalities.

CLIMATE/WATER HAZARDS EXACERBATE INSECURITY AND PUSH PEOPLE TO MIGRATE

In 2016, the World Economic Forum rated large-scale involuntary migration as the global risk most likely to have a massive impact. While the world's attention is primarily on conflict-driven refugees, it is highly likely that in Africa climate/water-driven migration will increase dramatically over the coming decades. A vicious circle plays out in Africa: water scarcity or flooding reduce agricultural productivity, harm fisheries, cause loss of life or damage property, and therefore act as threat multipliers in environments that are already socially, politically and economically vulnerable. These climate/water hazards push livelihood-driven migration, which in turn results in conflicts and competition between displaced populations and host communities. The cycle is particularly significant in fragile states, such as in the Sahel region.

Increasing trends towards water scarcity in the eastern and southern parts of the continent – whether due to climate change, over-abstraction or infrastructure-altered flow regimes – can disturb subsistence and customary practices of rural communities, forcing them to move away from their historical territory. On the other hand, losses and disease associated with water-related extreme flood or drought events can be a strong push-factor, making migration the most viable survival option. The movement of people as a result of natural disasters is often considered as environmental or climate migration. In the last decade, floods have displaced a significant number of people within or towards Nigeria, Ethiopia, Somalia, Niger, Chad, Sudan, South Sudan, Kenya and Mozambique.

COMMERCIAL RURAL DEVELOPMENT AND WATER REFORMS CAN ALSO IMPOVERISH COMMUNITIES

Development of Africa's rural economies requires the predictability and stability provided by water policy reform and associated formal water management regimes. However, where these and land tenure reform do not explicitly address the issues associated with the most marginal groups, people with limited livelihood options may lose their rights or access to water. This is given its ultimate expression in the leasing or sale of land to foreign commercial interests, commonly referred to as 'land-grabs', usually to supply export crops for non-African investors or corporate supply chains. Otherwise-well-intentioned policy reform

to support commercial investment may have perverse outcomes for rural people, who may have to move in order to survive.

INVESTMENT IN WATER SUPPLY HAS HUGE BENEFITS FOR THE POOR AND THE ECONOMY

Well-crafted water policy interventions and management regimes that enable commercial investment alongside public-sector-driven smallholder development provide more sustainable rural development models and reduce the vulnerability of communities to climate/water shocks and stresses. Investments in water supply, sanitation and wastewater services generate substantial benefits for public health, the economy and the environment, as well as being a platform for building household resilience to water-related climate and development impacts. The OECD indicates that the benefits of provision of basic water supply and sanitation services in developing countries outweigh the costs by up to seven times.

By freeing up time, particularly for women and girls, household access to a reliable water supply enables education, while the health benefits of water access are well documented. For companies, this means a healthy and educated labour force and customers. There is an increasing focus on livelihood-linked water access in rural areas, to enable decentralised small-scale irrigation that has been shown to provide greater relative returns than large-scale dam-based irrigation schemes. At the same time, investment in water governance and institutions is critical to ensure the

sustainable and inclusive development of these rural livelihoods and the protection of the interests of all stakeholders.

MIGRANTS OFTEN MOVE TO MARGINAL LAND, WHICH COMPOUNDS THEIR VULNERABILITY

Migrants tend to settle in marginal areas, vulnerable to water-related shocks or stresses. Parcels of land on which informal settlements or refugee camps are built often lack (functioning) water infrastructure and are more exposed to natural hazards than other land already occupied by locals. Informal settlements on the periphery of urban centres tend to be exposed to flash floods or landslides; refugee camps also tend to be vulnerable to water, climate and environmental shocks and stresses. These shocks and stresses are likely to be exacerbated by climate change.

Migration can present an unanticipated pressure on water resources and infrastructure in the host location. Such pressure often results in tensions between displaced communities and host populations. The current situation of migrants across Africa calls for increased investments to maintain and expand existing infrastructure to meet increasing demand. Investments are, however, often restricted due to a lack of financial, technical or institutional resources, or because of a lack of political will. This occurs not only because the beneficiaries may be foreign nationals, but also as the duration of their stay tends to be understated.

While most African migrants move within Africa, recent global events have highlighted the risks to refugees attempting to cross into Europe, a

situation which is exacerbated when risks in their places of origin or refuge are greater than the perceived benefit of attempting passage. Investment to build the water resilience of communities in fragile states is an important part of tackling this challenge.



Fragility, Climate Variability and Migration in Lake Chad Basin

A combination of increasing aridity and poor water management reduced Lake Chad from 25,000 km² in the early 1970s to its current 2,500 km². The droughts of 1972-1975 and 1982-1985 were significant events in the reduction of the size of the lake, but the situation was made worse by the construction of large irrigation schemes and a number of dams along the Chari-Logone and Kamadugu-Yobe rivers.

The riparian states of the lake suffer high levels of acute and chronic poverty, show low levels of labour productivity, have under-developed infrastructure, and are overly reliant on the informal sector and subsistence agriculture. Economic growth has been hampered by a series of civil wars. Water availability is variable geographically, and some regions are affected by scarcity. The population of the region is over 30 million people and growing fast, adding to the pressure on the resource. Migration outwards from the northern region of the lake also increases inter-ethnic competition and conflicts in the southern part.

The water scarcity and flooding in some areas, with the resulting loss of livelihoods, has been a contributing factor driving local people into a range of alternative behaviours that include drug trafficking and arms trading, and there is a strong argument that it has fed into the rise of Boko Haram. The extremist group has killed thousands of people (over 10,000 in the Nigerian portion of the basin), and this violence has led to 2.6 million displaced people in the Lake Chad basin. Eleven million people are estimated to be in need of humanitarian aid and seven million people are severely food insecure. To prevent further disasters and build adaptive capacity, the intergovernmental Lake Chad Basin Commission is working on setting up an early warning system to gather data and produce useful information and alerts for local communities.

Source: The Guardian, The Small African Region with More Refugees than All of Europe, 26 November 2016

Source: Okpara et al., Conflicts about water in Lake Chad: Are environmental, vulnerability and security issues linked? October 2015, Progress in Development Studies 15, 4 (2015) pp. 308-325

4: CITIES AS THE ENGINE OF WATER-RESILIENT DEVELOPMENT



Projected rates of urbanisation are expected to result in a trebling of the population in African cities by 2050, with the urban population exceeding the rural population of Sub-Saharan Africa by about 2040. African cities will be both the drivers of economic growth, diversification and trade, and will have an increasing requirement for water, food and energy, all of which require reliable water supply. The water-resilience and sustainable development of African cities will be dependent upon the management of their interactions with water resources, to achieve SDG 11 – Sustainable Cities and Communities.

CITIES ARE DEEPLY CONNECTED TO THEIR RURAL HINTERLAND THROUGH WATER

While roads and physical infrastructure are the most apparent linkage between cities and their hinterland, there is also a flow of people, water, energy, food and minerals to cities to support their economies and residents. In a symbiotic relationship, rural economies and people also depend on migrants' remittances, finance and goods from cities. Beyond their water footprints, cities can be prone to flooding and potentially disease from upstream water resources, while waste and wash-off from cities themselves can cause severe contamination of downstream rivers and estuaries. Inadequate municipal infrastructure and management may contribute to contamination of the groundwater resources upon which many cities depend.

Cities' dependency on and vulnerability to their neighbouring catchments means

that effective management of and timely investment in water resources is essential; considering the trade-offs between water use for supply, energy and food, and the management of flood, drought and disease hazards. Climate change will primarily impact on cities through water, so it therefore poses even greater hazards and potentially constraints to their sustained development. Urban leaders typically assume that their water demands will be met as a priority, but this overlooks the complex interactions between water and cities and the institutional arrangements that govern the management of water resources.

CITIES ENABLE EFFICIENT PROVISION SERVICES FOR ECONOMIC GROWTH AND PEOPLE'S WELLBEING

African cities face multiple challenges to meet the basic needs of their population, from the lack of robust infrastructure and efficient institutions, to poverty, slums and a growing informal sector. Over 60% of Sub-Saharan Africa's urban population lives in slums, and many urban jobs are in the informal sector. Within cities, the poorest people tend to be the most vulnerable to water-related hazards: their settlements are located on the steepest or most flood-prone land and they often have limited water supply, sanitation and waste infrastructure. This state of affairs is being exacerbated by rapid urbanisation and the influx of migrants to many African cities. Informal or intermittent employment hampers cost recovery through water tariffs and investment in municipal services, trends which are compounded by weak governance, lack of information, inadequate resources and limited

institutional capacity. This situation is particularly apparent in the most fragile or least developed states, but it is widespread across African cities.

The World Health Organisation (WHO) estimates that a small increase in investment in household access to safe water can have a three-to-seven-fold multiplier effect on GDP, due to improvements in the health and education of the working population. Because of their higher densities, cities provide the most efficient opportunity to provide services to poor inhabitants, as long as the water resources are effectively managed and spatial land use challenges are overcome. Where this is done effectively, cities become the drivers of sustained economic growth and opportunities, through increasing financial resources and capacity.

Conversely, the risk of not providing adequate services, affordable food and stable employment can lead to social instability and unrest, with a resulting drain on economic development. One of the greatest climate risks to urban utilities is the potential loss of long-term tariff revenue associated with the economic disruption of major flood disasters. However, inclusive growth requires investment to overcome the water-related vulnerability of all urban inhabitants, in addition to municipal spending that prioritises wealth at risk from water hazards. This balance requires a more structural approach to urban development than the project-based initiatives typical in African cities, and needs to be built on the resilience that natural infrastructure provides in the urban landscape.

DIVERSIFICATION SUPPORTS DECOUPLING FROM ECONOMIC WATER DEPENDENCE AND VULNERABILITY

Urban economies are typically diversified and built around manufacturing and services, even if in support of agriculture and extractives in the surrounding region. While these sectors require reliable and good quality water supply and energy, the economic value produced from water is much higher than in agriculture and the economic impact of droughts tends to be lower. Urban economic growth supports tax revenue which in turn can enable the development of water infrastructure and strengthen institutions to catalyse further development. If managed effectively this virtuous circle builds water resilience, and progressively the urban economy becomes less vulnerable to water variability. The challenge for African cities is to initiate this circle, particularly in the context of rapid urbanisation, limited resources and inadequate capacity prevalent in the most fragile and least developed economies. Development assistance is critical to support the initial investment, but once some degree of urban economic development is catalysed it is in the interests of business to advocate and support further investment in water management for production purposes, as well as domestic consumption for their workers and potential customers.

INVESTING IN SECONDARY CITIES PROVIDES A BUFFER AND CAN CATAPULT DEVELOPMENT

African capital cities are currently the destination of many grants, because of the perceived resources and opportunities to be found. These capitals already

extract significant water, energy and food from the countryside, and already have sprawling slums and severe service backlogs, all of which will be compounded if they remain the main destination for urbanisation. Many secondary cities throughout Africa have not yet developed significantly, but will need to attract more people through decentralised growth that initially builds on the water-dependent rural economies in which they are situated. Infrastructure development and the water footprint is more localised, can be decentralised and may be based on less-costly technologies. This decentralisation and diversification builds economic resilience for a country beyond a limited number of economic nodes. Through this process, African governments and businesses have the chance to build on global experience to avoid the problems faced by other countries.

Lusaka and its Water Vulnerability

The capital of Zambia, Lusaka, is a key economic growth hub, impacting the whole country's economic development. Lusaka is highly dependent on the water of the Kafue river, for three main reasons: for municipal water supply, for the irrigation of agricultural supplies, and for the production of energy (since hydropower represents 95% of total electricity generation). The water of the Kafue is not only key for the capital city; it is also key to rural and industrial areas. Water is critical for the livelihoods of the Kafue's 800,000 rural and agrarian inhabitants, not only for smallholder agriculture, but also for the functioning of ecosystems, providing goods and services. Further, mining – a key industrial sector driving the Zambian economy – relies on hydropower to fulfil its energy needs. Mining was responsible for 57% of the nation's total electricity consumption in 2015.

Despite this high dependence on water, Zambia has not been able to adequately protect its water resources. Challenges arise mainly around growing cities and groundwater. With an average annual population growth of 3.8%, and with uncontrolled urban development, the district of Lusaka is facing increasing pressure – and so are the water resources supplying the city. Lusaka is currently supplied partly by groundwater sources (~130,000 m³/day), which are polluted by sewage and other contaminants (e.g. solid waste dumps or industrial spills) percolating down to the Lusaka aquifer. The development of urban areas within the recharge areas of the Lusaka aquifer adds to these challenges. Treatment and disinfection of borehole water is not always adequate and thus some boreholes are regarded as unsafe sources. Therefore, water and sanitation has become a challenge in the city. To solve this challenge, Zambian civil society is starting to act. Moreover, businesses are becoming aware of shared risks, as can be seen by the increasing number of water security initiatives in Zambia.

Source: ZB, WWF Zambia and WARMA, 2017. The Social and Economic Value of Water in Zambia: Summary of Key Narratives.



Olifants Mine Water Cooperating Body

The Strategic Water Partnership Network (SWPN) is a national collaborative platform between the private sector and government in South Africa, which was partly initiated by SABMiller before its merger with AB InBev. As one of the central pillars of this partnership, the Thematic Working Group for Effluent and Waste Water Management (EWWM) has a focus on addressing the challenge of mine-water contamination and the problem of mine drainage from the Witbank coalfields in the upper Olifants River Catchment. Following a joint problem analysis between the regulators and the mining companies, it was recognised that coal mining in the region had 20 years of operations left after 100 years of mining that has left legacy issues of abandoned (ownerless) mines. Coordinated action is required to ensure the long-term sustainability of the catchment and clarification of post-closure liability for the industry. This will require a combined technical/institutional/financial response to address the complex web of problems and their underlying causes. As a first step, a formal partnership named the Mine Water Coordinating Body (MWCB) has been established and funded between government and the mines, to enable collaboration and to implement the required catchment-wide water management approaches.

Source: SWPN (2015) Institutional and financing models for the sustainable treatment and reuse of minewater



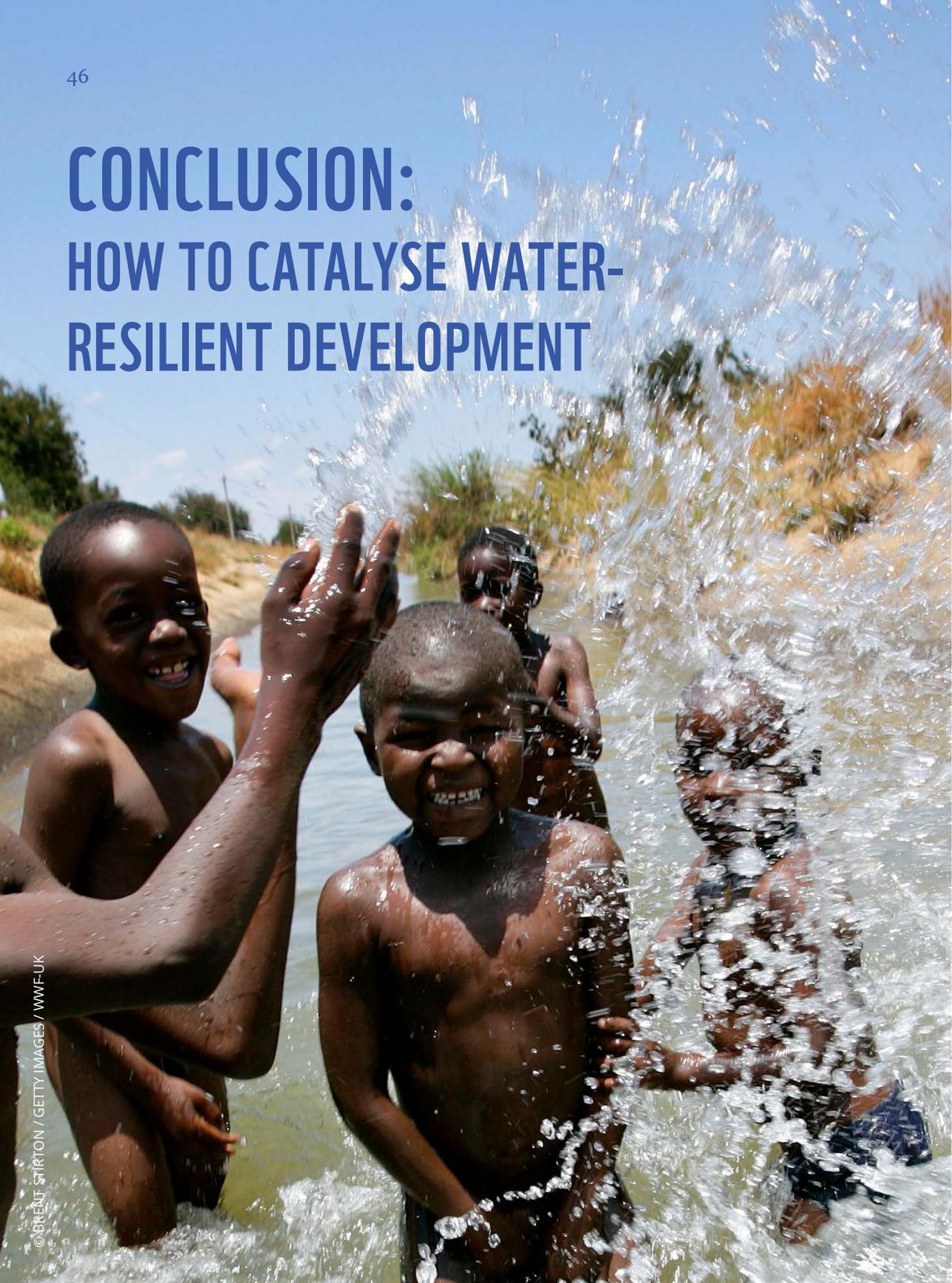
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Innovative Financing for Livelihoods Project in the Okavango River

While being endowed with the globally iconic Okavango Delta, the Okavango River basin – shared by Angola, Namibia and Botswana – remains subject to extreme poverty and under-development. The human population in the basin consists predominantly of rural communities who are dependent upon rain-fed agriculture. There are plans, particularly in Angola and Namibia, for the expansion of cultivated areas, hydropower and urban supply. If realised, these plans will have consequences for river flow, the delta and the people who make use of it to derive an income and livelihood for their families. The challenge for the neighbouring countries is to find the appropriate balance between conservation and development of the basin's resources. The transboundary Okavango Commission (OKACOM) has undertaken various basin studies, culminating in a multi-sectoral investment opportunity analysis which provides guidance for investments in the basin considering the economic and developmental objectives of the three countries. Significant attention was placed on livelihood interventions to build local water-resilience: this is the focus of the basin investment programme, and stakeholders are hoping to fund it through a Green Climate Fund application. This is being supported by the establishment of an endowment fund for the Okavango Delta that aims to attract contributions from high net-worth individuals and foundations as a means of translating the delta's ecosystem services into improvements in livelihoods that in turn protect the environmental integrity of the basin. The initiative provides an incentive for ongoing cooperation between the three riparian countries.

Source: The Permanent Okavango River Basin Water Commission, 2011. Cubango-Okavango River Basin Transboundary Diagnostic Analysis. Maun, Botswana: OKACOM, 2011

CONCLUSION: HOW TO CATALYSE WATER- RESILIENT DEVELOPMENT



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The thesis of this report has been that the effective management and development of water will be critical in catalysing Africa's economic development, as well as in alleviating climate/water-related risks; and that meaningful action on this front must be taken over the next decade. From our analysis, we propose eight conclusions to build the water-resilience of Africa's economies.

INVESTMENT IN ALL WATER MANAGEMENT ACTIVITIES MUST BE INCREASED TO ACHIEVE THE SDGs

Achievement of many of the SDGs in Africa is indirectly dependent upon sustainable management of the continent's water resources, supported by access to a reliable water supply for people and businesses. Development places increasing pressure on water resources, and this is compounded by the changing climate. The nature of these development pressures changes as a country develops. Current levels of investment in water information, institutions and infrastructure will need to be increased over the next decade, to build water-resilience and thereby contribute to achieving these goals.

THE APPROACH TO BUILDING WATER-RESILIENCE MUST EVOLVE WITH ECONOMIC DEVELOPMENT

The nature of the investment that is required to build resilience is dependent upon the particular context of a country, in terms of the water endowment and challenges it faces, as well as the stage of its development. Current investments

will either enable continued future development, or if done poorly may constrain future options. The least developed and most fragile countries require development assistance to provide access to water and develop livelihoods for both urban and rural inhabitants. Developing resource-based economies require water and energy infrastructure managed by effective institutions to enable cultivation and extraction of resources, without degrading the ecosystems on which rural communities depend. Emerging economies require effective institutions and instruments to manage water for a diversifying and urbanising economy, while protecting the natural ecosystems that attenuate extreme events.

THERE IS AN OPPORTUNITY TO LEAPFROG DEVELOPMENT PATHWAYS BASED ON GLOBAL LESSONS

Many African countries are only now beginning to develop their water resources for economic production and thus investment in infrastructure, and institutions can learn from the mistakes and lessons of countries that have already followed similar paths in other parts of the world. This is particularly relevant for the management and development of Africa's rivers, lakes, wetlands and aquifers (and the globally important biodiversity that depends on these habitats), considering the needs of people and nature while catalysing economic growth and commercial interests.

WATER-RESILIENCE AND ADAPTATION WILL BE NECESSARY TO SUSTAIN AFRICAN DEVELOPMENT

Climatic and hydrological variability already challenges economic development in most countries, and it must also be recognised that water is the primary pathway through which climate change will impact on African households, businesses, cities and infrastructure. Building water-resilience at all of these scales is therefore the primary means of adapting to climate variability and change. The requirements to build resilience relate to creating infrastructural, institutional, social and financial capital, while protecting natural capital. Creation of wealth at both country and household scales is fundamental to adaptation, because poverty limits adaptive options. For Africa creating wealth depends on effective water management, and thus increased investment in water management is critical for economic growth and climate resilience.

FUNCTIONING AQUATIC ECOSYSTEMS SUPPORT ECONOMIC DEVELOPMENT AND LIVELIHOODS

The ecosystems in rivers and dams support the subsistence and livelihoods of most rural Africans, whether through fish protein or harvesting. They also attenuate extreme climate events (floods and droughts) and assimilate waste that is disposed into water resources, thereby protecting life and property. At present, development pressures have not degraded Africa's aquatic ecosystems unsustainably,

but they are facing increasing pressure from upstream forest-clearing for agriculture and fuel, over-abstraction for water supply, changing flow regimes and connectivity from dams and hydropower, and contamination from mine, industrial and urban discharge. Management of water resources to ensure sustained functioning of these ecosystems is in the long-term interest of African development.

INNOVATIVE INVESTMENT AND FINANCING MECHANISMS WILL BE NEEDED

The investment climate in Africa has shifted dramatically over the past decade, with traditional development assistance being overtaken by climate finance, private sector finance, investment by countries in the global South and remittances from the global African diaspora, as well as national government finance. Most of this investment has gone into the communications, transport and energy sectors, but now is the time for the African water sector to develop innovative mechanisms to access and leverage these new sources of investment. At the same time, development assistance must be channelled into supporting the most fragile states to address their specific vulnerabilities. There is a need to build infrastructural, institutional and information networks, and to protect or restore critically important freshwater ecosystems, as the foundation upon which water-resilient economies can be constructed – and this must be done in a coordinated and coherent manner across countries and river basins. Water-resilience is needed to withstand the ongoing shocks and stresses of climate variability and adapt to the ravages of

climate change on the continent, as well as to achieve and maintain the African SDGs.

SYSTEMIC PORTFOLIO PLANNING MUST UNDERPIN INVESTMENT

There is increasing recognition that building water resilience requires systemic multi-sectoral investment planning, rather than more traditional sectoral or project-related planning. While basin strategies and water masterplans have delivered projects in the past, the changing financing environment and the uncertainty introduced by climate change requires investment planning with two important characteristics. Firstly, a portfolio of projects must be evaluated in terms of its developmental impacts as well as its robustness to alternative climate futures, rather than a project-by-project evaluation that may lead to unintended consequences, such as foreclosing options or sunk assets. These portfolios typically address a combination of water infrastructure, institutional strengthening and information systems that together create viable and sustainable interventions. They are also increasingly including other sector components that ensure that the productivity gains of water interventions can be sustainably leveraged, such as flood-resilient roads between improved irrigated or terraced farms and their commercial markets that meet commercial requirements for reliable agricultural products. Secondly, the relevant sources of finance for each component or suite of projects are evaluated early in the planning process, in order to ensure that the resulting portfolio of projects presented in an investment framework can attract

appropriate financing through innovative mechanisms, rather than remaining on shelves as a project wish-list.

NEW PARTNERSHIPS ENABLE THE ACHIEVEMENT OF DEVELOPMENT GOALS

Governments, businesses, international organisations and development agencies all have a role in advocating for and enabling water investment in Africa. SDG 17 recognises the need to create partnerships that will support the achievement of development outcomes, while the dramatic global adoption of corporate water stewardship reflects the appetite of business to collectively address the challenges of water management and development in water-vulnerable regions. This report is the result of one such partnership between a multinational corporation and an international environmental organisation, which has embraced collective action in river basins in which the two organisations have direct interest.

The recommendations to build water resilience cannot be implemented by water managers alone. Five key stakeholder groups need to be aware of and respond to the importance of water for Africa's sustained development.



RECOMMENDATIONS

- **Economic planners** should seize the opportunity to catalyse development by investing in water management, and take a holistic view on the role that water plays in economic growth.
- **Business leaders** should increase investment in water management to reduce risks, advocate with governments for additional investment, and promote partnerships to support the achievement of the SDGs and resilient water management.
- **Investors** should explore mechanisms to finance water development that underpins sustainable and inclusive economic growth and link these to productive use of water, considering the threats of a changing climate.
- **City managers** should recognise the increasing direct and indirect vulnerability of cities to water and cooperate to ensure coherent planning between urban and rural areas.
- **Development agencies** should promote water-resilient development, with a focus on the livelihoods of the most marginal people in the least developed economies.



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