

Research Paper

Validation of the UNICEF fiscal diagnostic tool for SDGs 6.1 and 6.2 in East and Southern Africa using the analytical hierarchy process (AHP)

Samuel Godfrey^{a,*}, Mary Wambugu^b, Priti Parikh^c and Farai Tunhuma^d

^a UNICEF, Regional Water and Sanitation Advisor, UNICEF East and Southern Africa Regional Office

^b Water and Sanitation Specialist, Nairobi, Kenya

^c Engineering for International Development Centre, Bartlett School of Sustainable Construction, UCL, UK

^d WASH Specialist, UNICEF East and Southern Africa Regional Office

*Corresponding author. E-mail: sgodfrey@unicef.org

 PP, 0000-0002-1086-4190

ABSTRACT

The UN High Level Panel on Water notes that a total annual capital expenditure (CAPEX) of \$114 billion and operation and maintenance expenditure (OPEX) of \$129 billion is required globally to meet the safe drinking water and sanitation targets 1 and 2 of Sustainable Development Goal 6 (SDG 6). In Sub-Saharan Africa, \$36 billion is required and UNICEF estimates \$15 billion is required to meet these targets in 21 countries in East and Southern Africa. Currently, only 15% of the financial investments in the sector are accounted for, which falls significantly short of delivering SDG 6. Consequently, innovative finance tools that maximise taxes, tariffs and transfers (3ts) are required to mobilise finances for the region's sector. This paper presents a diagnostic methodology for identifying bankable and blended finance projects in East and Southern Africa's water and sanitation sector. Potential projects were identified in Malawi, Mozambique and Ethiopia. Findings from applying the AHP (analytical hierarchy process) analysis recommend the use of the decision-making tool for prioritisation and selection of water and sanitation projects in the context of multiple projects requiring blended finance. The methods are applicable to other parts of Sub-Saharan Africa to enhance project pipelines whose collective cost and revenue mitigate investment risk.

Key words: Africa, AHP, infrastructure finance, SDG 6, UNICEF, water and sanitation

HIGHLIGHTS

- A shortfall in finance in East and Southern Africa is a significant barrier to realising equitable water and sanitation services for all.
- To address the financial gaps, the sector will need to apply innovative finance mechanisms such as blended finance.
- Multicriteria decision-making tools such as the AHP provides a valuable technique for evaluating countries' potential for blended finance in the region.

INTRODUCTION

The WHO/UNICEF Joint Monitoring Programme (JMP) states that 5 years into the Sustainable Development Goals (SDGs), current progress rates for water and sanitation under SDG 6, targets 1 and 2 must be quadrupled if equitable and sustainable access to safe water and sanitation is to be realised by 2030 (WHO & UNICEF 2021). In Africa, this off-track trend is apparent, with access estimated at 39% for safely managed drinking water, 27% for safely managed sanitation and 37% for basic hygiene (UNICEF & WHO 2022). The East and Southern Africa Region (ESAR) presents among the lowest coverage estimates, accounting for 30% of the global population lacking basic water and 32% lacking basic sanitation (UNICEF 2019a).

Current costs of meeting targets 6.1 and 6.2 far exceed current annual investment, with only approximately 15% of the need being met (Goksu *et al.* 2017). An assessment of the global costs of meeting the water and sanitation targets (Hutton & Varughese 2016) estimated the total capital cost requirements at \$114 billion per year. Annual operation and maintenance costs are estimated to increase, reaching up to \$129 billion in 2030. Sub-Saharan Africa (SSA) accounts for \$36 billion per year of the required capital costs (Hutton & Varughese 2016). Within the ESAR, the required cost to deliver the goals

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for water and sanitation is estimated at \$14.7 billion every year until 2030 (UNICEF 2019a). The ESAR estimates are based on a financial study that applied the water, sanitation and hygiene (WASH) SDG costing tool (SWA & UNICEF 2020).

The three main traditional sources of funding for water and sanitation are taxes, tariffs and transfers, known as the 3ts (Figure 1). Tariffs are revenues from charges on water users for the service. Taxes are subsidies allocated from local, regional or national taxes, whereas transfers are funds predominately from foreign sources and could be in the form of grants or concessional loans (Goksu *et al.* 2017). Ideally, tariffs ought to be the largest source (Goksu *et al.* 2017), with insufficiencies covered by taxes and transfers. However, as observed in Pories *et al.*'s study (2019), in developing countries, the three sources, even combined, do not meet water and sanitation service needs.

There are examples of countries that have achieved some level of success in utilising the 3t sources to fund water and sanitation service provision. Uganda's National Water and Sewerage Corporation (NWSC)'s ambitious service delivery expansion through upgrading infrastructure was financed by government taxes and subsidised concessional loans at low-interest rates. This allowed the utility to expand services, improving its operational efficiency (from 85% in 2001 to 95% in 2011) and increasing operating cash flow. Currently, NWSC services commercial loans from operational revenue surplus (Van den Berg & Danilenko 2017; UNICEF 2019). High financial performance affords utility resources that can be allocated to further investment in operations, allowing other sources to cover other capital costs (SWA & UNICEF 2020).

Although historically using rates to cover water and sanitation costs, most European countries today apply volumetric tariffs. Most Irish and almost half of British households still pay by rates (Barraqué 2020). The 1989 privatisation of water utilities in England and Wales established improved efficiency in the sector. Under pressure to meet costs for infrastructure renewal, privatisation opened private capital market access for utilities (Bakker 2001). An autonomous regulatory framework, the Office of Water Services (Ofwat), was created to protect consumers and ensure water companies can finance their functions, especially through returns on their capital (Water Industry Act 1991). This exemplifies the importance of regulation (Hutton 2020) to ensure water utilities can still generate sufficient income while ensuring efficient and affordable services. Good governance is, however, pertinent to effective sector regulation. An analysis of the performance of utilities in Africa (van den Berg & Danilenko 2017) found that the existence of a regulatory agency did not necessarily translate to improved utility performance; though effective in consumer protection, utilities with regulation performed poorer in financial and operational performance compared with those that did not have regulators in place. While the analysis attributed this disparity in part to regulators' underprioritising financial and operational functions, the findings support the argument that the mere institution of a regulator can be ineffective without good governance through strong policy and its implementation.

Transfers are widely used in most developing countries to cover investment expenditures, as tariffs are socially priced to subsidise access to the poor, thus usually only able to cover operation and maintenance costs for water and sanitation

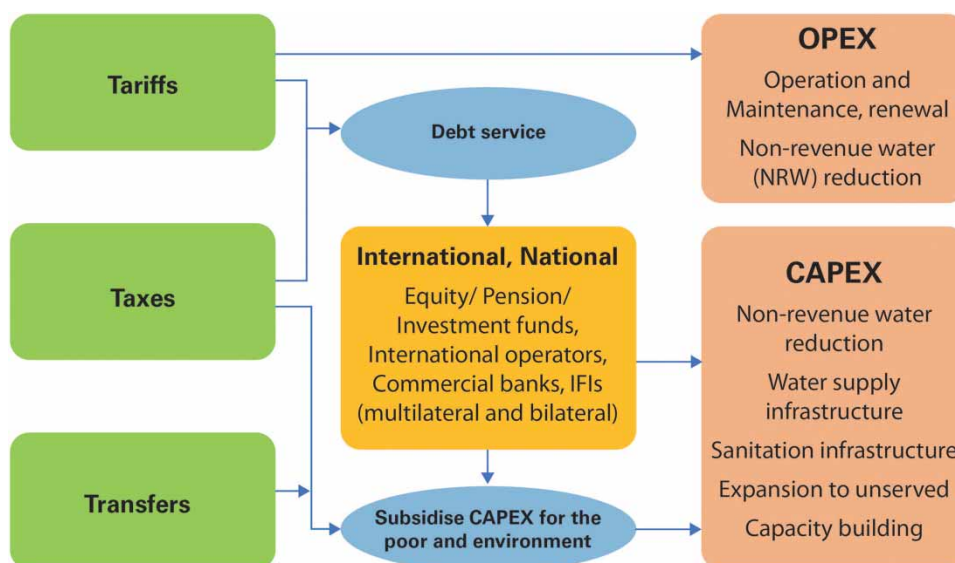


Figure 1 | Fiscal flow of the 3ts in the water and sanitation sector (adapted from Frade 2022).

services (Banerjee *et al.* 2010). The Water Resources Development Fund (WRDF) in Ethiopia is a transfers example. Established by the government in January 2002, the fund provides long-term loans to town water utilities for WASH infrastructure and capacity building. As of 2015, the fund had supplied loans to 36 town utilities and seven projects have been completed (Frade 2019). The WRDF is, however, faced with challenges, mainly concerning government potential interference and a lack of autonomy. With due attention given to addressing the fund's challenges, the WRDF has a key role in channelling funds to Ethiopia's urban utilities to expand water and sanitation services (Frade 2019).

As the primary providers of water and sanitation services in developing countries, governments are obligated to budget and plan for the sector's financial requirements. Duly, the national government budget and spending on WASH have been increasing globally at an average rate of 4.9% every year. However, even with this increase, a majority (80%) of countries still report insufficient finance for their national targets and imminently for SDG service levels (UN-Water & WHO 2017). This is evidenced vastly in Africa – of the \$13.2 billion overall budget commitment to water and sanitation infrastructure in Africa in 2018, the government investment budget was \$5.6 billion (AMCOW 2021). Considering against SSA's estimated capital cost requirements of \$35 billion per annum for SDG targets 6.1 and 6.2 (Hutton & Varughese 2016), this echoes that finance from the government is still straggling. Not only is government investment low but also disproportionately allocated; sanitation is often underfunded, expenditure is heavily inclined to capital investments and insufficient proportions of recurrent budgets are spent on operation and maintenance (White & Boateng 2018). Therefore, as the case for increased government budgetary allocation is made, this should be in tandem with a clear focus on increased absorption capacity.

Official development assistance (ODA) to Africa, though decreasing in commitment, remains a significant source of financing for the water sector. Of the overall \$45 billion of ODA to Africa in 2017, an estimate of \$4 billion was received by the WASH sector – the ESAR received approximately \$1.5 billion (UNICEF 2019a). Between 2012 and 2015, ODA spending commitments for water and sanitation in SSA declined from \$3.8 billion to \$1.7 billion (UN-Water & WHO 2017). China's overseas assistance to the water sector in Africa is both as ODA (China is the largest non-OECD financier of ODA for infrastructure and water in Africa) and as 'other official flows', OOF (Godfrey & Ross 2016). However, compared with other infrastructure sectors, China's allocation of investment spending in the water sector is low, at 4.4% in Africa and 2.8% in East Africa (UNICEF 2019a). Nevertheless, there is a need for Africa to reduce dependency on development aid and work towards strengthening the water and sanitation enabling environment, improving revenues and building domestic financial capacity.

Sector-wide approaches (SWAPs), a process that enhances donor-government coordination, have been applied in WASH finance by development partners to pool donor funding and government funds towards sector development (de la Harpe 2010). The approach involves financing for sector policy, accountability and performance monitoring, public financial management and aid alignment. Though reporting successes in some countries, SWAPs have been argued to experience challenges in others including a lack of donor coordination and relaxed domestic financial commitment (UNICEF 2019a). Additionally, SWAPs require to focus on addressing weak institutional capacity at a local level, as impact in poverty reduction through service provision is most needed at this level (de la Harpe 2010).

Favoured by International Financing Institutions (IFIs) for depoliticising service provision, improving sector efficiency and infusing skills, private sector participation (PSP) plays an important role in bridging the service provision gap in areas underserved by utilities. Private capital can be applied to boost infrastructure development and extend service provision to the poor (Herrera 2019). However, private sector involvement in a sector that is perceived to provide a public good is often criticised for that very reason; placing an economic value on water is viewed as somewhat conflicting with the human right to water. PSP across SSA in water and sanitation is limited and where present it is mostly applied in small-scale urban WASH. According to the World Bank's database for Private Participation in Infrastructure (PPI), between 2012 and 2021, water and sanitation accounted for only \$0.5 billion of the total \$57 billion PPI investment in SSA (World Bank 2022). In the ESAR, though a few countries have engaged in PSP projects, the region has still largely been unable to harness this potential for the water and sanitation sector (UNICEF 2019a). Associated with risk, PSP engagement has been hindered by weaknesses in credible risk-sharing mechanisms, performance predictability and contract management. Low returns and poor monitoring in the sector have also discouraged PSP without supporting data on commercial value, it is difficult to leverage for private investment. However, with appropriate structures in place, the WASH sector carries a lower risk (Porjes *et al.* 2019). Therefore, strengthening these areas can encourage private sector investment consideration in the ESAR.

Commercial financing offers the potential to supplement existing finance. Despite having higher immediate costs, it provides ready access to finance for water and sanitation, bypassing the need to wait for the availability of resources from other sources. Commercial financing also offers greater flexibility in the use of funds (Goksu *et al.* 2017), in contrast to concessional loans that may carry preconditions. However, commercial financing in many developing countries is translating to greater debt. Sovereign borrowing in foreign currency is costly and volatile, making it vulnerable to shocks. An increase in sovereign borrowing costs also increases domestic private sector borrowing costs. Policy options, including establishing good governance and efficient spending of resources mobilised can contribute to reducing risk, volatility and cost of commercial financing (UN IATF 2022).

Despite government finance and donor assistance, there remains a significant shortfall in water and sanitation finance to meet national and sector goals. Presently, only 15% of the sector's needs are being financed (Goksu *et al.* 2017). The authors approximate that using this current investment, a gearing ratio of 6, is required to meet the gap. Central to bridging the gap is the recognised need to increase investment in ESAR's water and sanitation sector and attract more commercial financing. This means optimising the existing 3t sources and adopting innovative finance mechanisms, both to mobilise additional finance.

Blended finance is one such innovative mechanism that can be used to bridge the finance gap in water and sanitation. It refers to the combination of public funds – grants, concessional loans, IFI guarantees and philanthropic donations – with private funds such as commercial loans, equity from investment and pension funds or other risk-sharing mechanisms, to finance a project (Goksu *et al.* 2017; UNICEF 2020). The intention is to make water and sanitation investment more attractive through catalysing commercial finance with public finance (Pories *et al.* 2019), thus reducing the risk from individual projects. Large donors are shifting their lending approach towards blended finance. Furthermore, global financial events have led to reduced sector funding. The impact of COVID-19 was also forecasted to setback global water sector investments, including reductions in capital expenditures and losses in utility revenues (IFC 2020). Thus, for larger schemes to be implemented, it would require blending from a combination of public and private finance sources (Global Water Partnership n.d.). However, the use of blended finance in the water sector, particularly in low- and middle-income countries (LMICs), is yet to reach scale (Goksu *et al.* 2017) and application has mostly been in middle-income countries. A review of the lessons from countries and sectors that have been able to tap into blended finance, such as the energy and financial service sectors (OECD & UNCDF 2019), will be beneficial in learning the causes of the low scalability of blended finance in the water sector and informing how the mechanism can be structured to promote future uptake.

Climate finance is another tool that provides a potential source of finance for the sector through combining different funding sources and mobilising additional donor and private funds to support climate resilience and adaptation for water and sanitation services (Global Water Partnership n.d.; Goksu *et al.* 2017). Together with the Kyoto Protocol (1997) and the Convention, Article 9 of the Paris Agreement (United Nations Climate Change n.d.) commits developed financially able country parties to support less able and vulnerable developing country parties, through financial resources. The European Investment Bank (EIB) has attached climate resilience conditions to its lending. Presently, most funds are channelled towards renewable energy. However, through packaging water and sanitation projects with a climate resilience focus (Goksu *et al.* 2017), the sector can tap into this resource.

The UN 2030 Agenda (UN Water 2016) acknowledges interlinkages between various SDGs with the potential to leverage wide-ranging benefits. Parikh *et al.* (2021) reviewed evidence from over 500 publications to demonstrate synergies between sanitation and all Goals and 130 out of 169 SDG targets. Achieving the provision of water and sanitation services is therefore not just about tackling the water and sanitation crisis denoted within SDG 6 but also addressing health, education, climate change and other key issues presented within the other 16 Goals. This makes the case for increased investment in the sector.

The water and sanitation sector is geared to shift its approach on finance mechanisms, to realise the targets set out in SDG 6 for 6.1 and 6.2. There exist numerous studies on traditional sources of finance (3ts) that detail the successes and failures of these sources. On innovative finance mechanisms, finance institutions have their diverse sectoral experiences documented. Innovative finance in the water and sanitation sector has also been documented in various institutional reports and literature. For example, the Sanitation and Water for All handbook (SWA 2020) on public investment for the sector presents diverse case studies across the globe on innovative finance for WASH. This paper adds to existing literature and studies on WASH financing while contributing to addressing the limited academic literature gap on innovative finance in WASH specifically focused on Africa. The paper presents the methodology and findings of the fiscal diagnostic analysis undertaken on WASH investment in the ESAR. The study by UNICEF explored the potential for bankable and blended finance in countries

within the region to identify projects that can be developed for this finance mechanism. This paper, along with the existing fiscal diagnostic report, documents the processes and learning, which can be reviewed and contextually adopted by other regions on the continent and globally.

METHODS

The Water Sector Fiscal Diagnostic study was initiated by the UNICEF to analyse the investment environment in the ESAR and identify bankable and blended finance projects in the region. A bankable project was defined as *one that has sufficient collateral, future cashflow and high probability of success to be acceptable to institutional lenders for financing* (UNICEF 2020). Blended finance refers to the combination of public funds – grants, concessional loans, IFI guarantees and philanthropic donations – with private funds such as commercial loans, equity from investment and pension funds or other risk-sharing mechanisms, to finance a project (Goksu *et al.* 2017; UNICEF 2020). The ESAR as classified by the UNICEF, in this study comprises 21 African countries, namely Angola, Botswana, Burundi, Comoros, Eritrea, Eswatini, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Rwanda, Somalia, South Africa, South Sudan, Tanzania, Uganda, Zambia and Zimbabwe.

The study's methodology (Figure 2) applied a three-part assessment of the countries in the region. That is (1) eligibility screening and country risk assessment, (2) sector risk assessment and (3) project level assessment. This was further supported by semi-structured interviews and focus group discussions during field missions to country offices in the region. Subsequently, this study applied the analytical hierarchy process (AHP), which was used to evaluate the findings from the assessments undertaken in identifying bankable and blended finance potential within countries. Figure 2 illustrates the methodology.

Eligibility screening and country risk assessment

Eligibility screening was undertaken for each country against global indicators that assessed countries' economic state, including income, debt levels, ability to borrow and future economic growth projections. The six indicators used, including the adherence article (Article 96 of the Cotonou Agreement), are presented in Table 1.

Sector risk assessment

The sector risk assessment focused on the water sector structure, i.e., the enabling environment that impacts on the sector's ability to generate revenue to be invested in infrastructure development, operation and maintenance. Thus, the study defined the enabling environment as the presence and function of structures that support sector finance, including the institutional framework, sector policy and strategy, sector planning and monitoring and economic and financial systems. Without addressing the enabling environment, innovative finance mechanisms are unlikely to be sustained (Pories *et al.* 2019). Furthermore, a steady water sector structure indicates safeguards against risk, ensuring debts are serviced. For development and financing institutions such as the EIB, this is critical.

The sector risk assessment evaluated each country against four indicators: (1) institutional framework, (2) sector policy and strategy, (3) sector planning, monitoring and review and (4) sector financing. This was done as a rapid assessment, reviewing two UNICEF reports; the WASH in Schools Report (2018) and the 2019 WASH in Health Care Facilities Report (2019b). Both study reports were used for the rapid assessment as they presented sector risk at a country level and reviewed

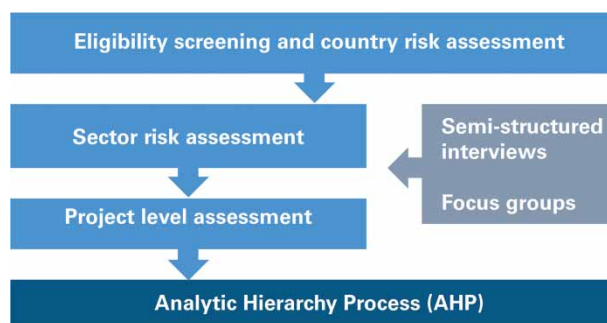


Figure 2 | Methodology for the water fiscal diagnostic study in the ESAR.

Table 1 | Eligibility screening and county risk assessment

Indicator	Description	Reference
World Bank classification	The World Bank classifies countries annually by income levels, under four groups – low, lower-middle, upper-middle and high-income countries.	2019 World Bank classification (World Bank 2019)
Fragile States Index	The Fragile States Index report is released annually (since 2015) by the Fund for Peace and the magazine, Foreign Policy. It assesses the vulnerability of sovereign states against 12 indicators in four categories: social, cohesion, economic and political.	2018 Fragile States Index (The Fund for Peace (FFP) 2018)
OECD country risk classification	The Organisation for Economic Cooperation & Development (OECD) Country Risk Classification measures a country's credit risk. A scale of eight risk categories (zero to seven) is used. Zero (0) being the rating for high-income OECD countries and other high-income Euro zone countries (low risk) and 7 being the highest level of risk.	OECD Country risk classification – Oct 2018–Feb 2019 (OECD 2019)
IMF country debt levels	This index is a measure of the total stock of debt liabilities issued by central government as a share of the gross domestic product. This result in a percentage referred to as the debt level.	IMF central government debt levels 2017 (IMF 2017)
Debt Sustainability Assessments (DSAs)	Assesses the ability of a country to meet its debt obligations without requiring debt relief or accumulating arrears. There are four risk ratings for external public debt distress: <i>low risk, moderate risk, high risk, in debt distress</i> .	IMF Article IV country reports, July 2019 (IMF 2019a)
Real GDP growth projections	Indicates the potential generation of new revenue. This reflects the ability of a country to fulfil its debt requirements.	The IMF's World Economic Outlook database, April 2019 (IMF 2019b).
Adherence to Article 96 of the Cotonou Agreement	The Cotonou Agreement is a treaty between the European Union and the African, Caribbean and Pacific (ACP) Group of States ('ACP countries'), signed in June 2000 in Cotonou, by 78 ACP countries (Council of the European Union 2021). Article 96 of the Cotonou agreement provides for consultations on human rights where political dialogue under articles 8 and 9 (4) of the agreement have been exhausted.	

performance against indicators including institutional, legal and regulatory frameworks, sector policy and strategy, tariff policy and practice and economic and financial aspects(not exclusive to institutions).

Project level assessment and status of project financing

Following the eligibility screening, country risk assessment and sector risk assessment, countries with potential projects were identified for project level assessment. The concept of a 'project' referred to one or more schemes in different locations, with hard (infrastructure) and soft (e.g., capacity, financial sustainability) components (UNICEF 2020). Project level assessment was also used to evaluate financial risks on a project-by-project basis and develop measures that reduce or mitigate these risks.

Using a semi-structured interview format, the status of project finance in countries was examined. This involved examining finance from: European Union (EU) grants, other EU countries, EIB financing and bilateral financing from EU agencies. The assessment aimed to (1) identify existing projects and whether alternative finance mechanisms could be applied in future projects phases, (2) identify which bankable projects UNICEF is involved in and what stages they are in and (3) evaluate the capacity and willingness of government partners at country level for uptake of blended finance projects. Owing to the COVID pandemic impacts, not all stakeholders were available, thus a limitation of the information gathered during the semi-structured interviews.

Analytical hierarchy process

AHP analysis was applied to the results of the diagnostic study to further evaluate the assessment process and findings. The AHP is a decision-making tool, developed by Saaty (1980), and applied in multicriteria decision-making. The technique

allows for calculating the priorities of alternatives based on a set of criteria, hence ranking alternatives or selecting the best among the alternatives (Leal 2020). Owing to its simplicity and flexibility, the AHP has found wide applications ranging across diverse sectors and studies, including transport policy and climate change evaluations (Berrittella *et al.* 2007), ground-water exploration studies (Josephs-Afoko *et al.* 2018) and selection of contractors (Balubaid & Alamoudi 2015).

Quantitative in nature, the AHP was applied in this study to complement the qualitative data obtained from the assessments undertaken, that is the country’s risk assessment and the sector risk assessments. The analysis followed the process outlined in Saaty (1980) and described by Leal (2020). Criteria against which each ESAR country was considered were selected from the assessment indicators based on WASH sector expert guidance. From the eligibility and country risk assessment indicators, the following four criteria were selected: World Bank classification, OECD country risk, IMF country debt levels and debt sustainability levels. All four indicators from the sector risk assessment, i.e., institutional framework, sector policy and strategy, sector planning, monitoring and review and sector financing, were selected as criteria for the AHP analysis.

Two AHP models were developed, one for each assessment. Figure 3 shows the model developed for the eligibility and country risk assessment. The goal (level 1) was outlined as countries with ‘potential for bankable and blended financing’ projects for water and sanitation. The criteria are presented in the second level of the hierarchy model and the third level illustrates the 21 ESAR countries assessed.

For m number of criteria and n alternatives, the weight of each alternative was computed using pairwise comparison. Thus, for each model, for the four criteria and 21 countries in ESAR ($n = 21$), four pairwise comparison matrices ($n \times n$) were developed, one for each criterion. Using Saaty’s fundamental scale (Table 2), the relative importance of each country against another, based on the criteria under review was measured.

An a_{ij} entry in the matrix relays the importance of criterion i with respect to criterion j , such that if $a_{ij} > 1$, then i is considered of stronger importance than j and a value of $a_{ij} < 1$ shows i is less important than j with respect to the criteria. Therefore:

$$a_{ji} = \frac{1}{a_{ij}} \tag{1}$$

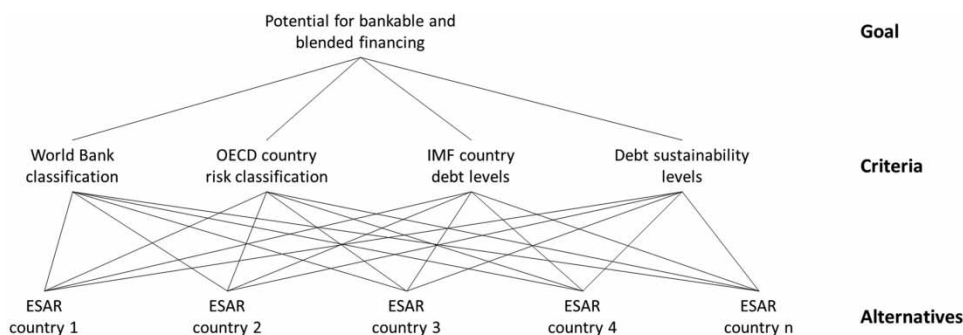


Figure 3 | AHP hierarchy model for analysis of ESAR countries’ fiscal risk assessment.

Table 2 | The fundamental scale

Scoring system for pairwise comparison

Less important					More important			
Extremely	Very strongly	Strongly	Moderately	Equally important	Moderately	Strongly	Very strongly	Extremely
1/9	1/7	1/5	1/3	1	3	5	7	9

Source: Josephs-Afoko *et al.* (2018).

The pairwise comparison matrix was then normalised by dividing each element of the matrix with the sum of its columns. For each normalised matrix, the priority vector – which expresses the priority of each alternative with respect to the criteria under consideration – was obtained through averaging each geometric row from the normalised pairwise comparison matrix.

To check the consistency of the comparisons, the consistency index (CI) was calculated using the principal Eigen value (λ_{max}). Following Saaty’s method (1980), for n alternatives, the CI is calculated as

$$CI = \frac{\lambda_{max} - n}{n - 1} \tag{2}$$

The consistency ratio (CR) is checked against the requirement that for inconsistency to be acceptable, then $(CI/RI) < 0.1$, where RI is Saaty’s Random Consistency Index.

RESULTS

Eligibility screening and country risk assessment

World Bank Classification and Fragile States Index

The 2019 World Bank classification based on countries’ Gross National Income (GNI) per capita analyses that within ESAR, 12 countries are classified as low-income countries (LICs), a 60% majority. Six countries are classified as LMICs, and the three remaining countries as upper-middle income countries (UMICs) (Figure 4).

In the past 5 years from the assessment year, only three countries have been reclassified; Zimbabwe and Kenya upgraded from LICs to LMICs in 2018, Angola from UMIC to LMIC. South Sudan oscillated between LIC and LMIC from 2011 to 2016.

The Fragile State Index assesses countries against 12 indicators across social, cohesion, economic and political characteristics, including human rights, security, internally displaced persons, demographic pressures and public service. Based on the 2018 Fragile State Index, South Sudan, Somalia and Zimbabwe rank among the 10 most vulnerable states.

OECD country risk classification

From the OECD country risk classification examined, Botswana has the lowest risk in the region with a risk default rate of 2, followed by Namibia, whose risk default was rated at 4. Except for Comoros (no data are available), the rest of the ESA countries rate in the higher risk default rates 6 and 7. Eight countries ranked in the default rate of 6: Angola, Eswatini,

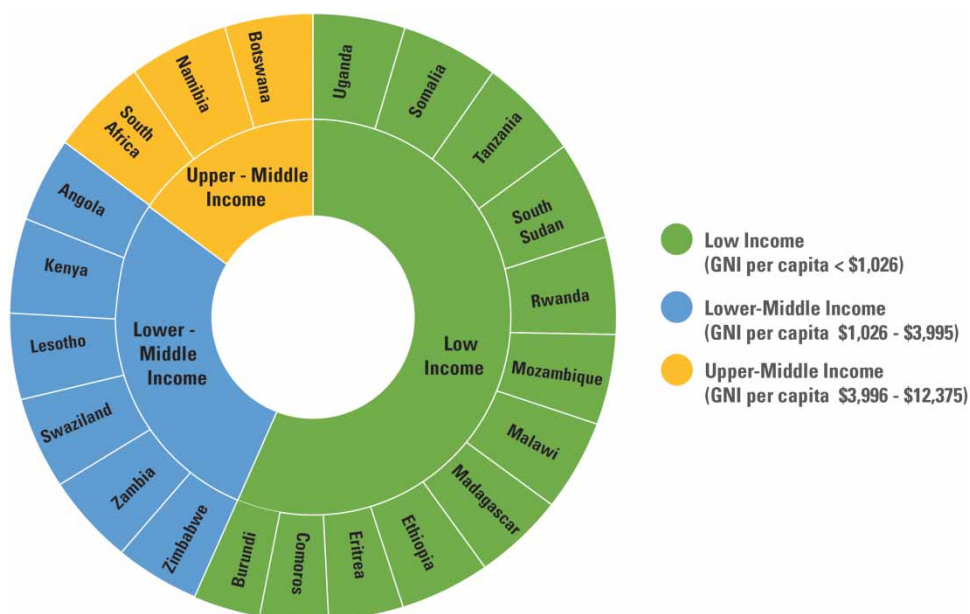


Figure 4 | World Bank classification of countries in the ESAR.

Kenya, Lesotho, Rwanda, Tanzania, Uganda and Zambia. Ten countries – Burundi, Eritrea, Ethiopia, Madagascar, Malawi, Mozambique, Somalia, South Africa, South Sudan and Zimbabwe – occupy the highest risk category 7.

IMF country debt levels and Debt Sustainability Assessment

The IMF country debt levels for the ESAR countries are from the 2017 IMF central government debt levels (IMF 2017) and Debt Sustainability Assessment (DSA) results from 16 July 2019 (IMF 2019a). Table 3 summarises the results of both assessments.

Real GDP growth projections

From the world economic outlook database (IMF 2019) reviewed for the 2019–2022 period, all countries in ESA showed potential for increased revenue, though at varying rates. Five countries, Uganda, Kenya South Sudan, Ethiopia and Rwanda fall within the 6–10% growth rate. Countries with a growth rate projection between 3 and 6% are Comoros, Namibia, Somalia, Botswana, Mozambique, Zimbabwe, Tanzania, Eritrea, Madagascar, Malawi. The real GDP growth of Burundi, Eswatini, South Africa, Angola, Lesotho, Zambia was reported to fall between 0 and 3%. It is worth noting that the GDP projections presented are reported from April 2019, before the COVID-19 pandemic and the Ukraine war effects, both of which have significantly impacted global economic growth.

Adherence to Article 96 of the Cotonou Agreement

Failure to ‘fulfil an obligation stemming from respect for human rights’ triggers European Union-ACP States to enter into ‘consultations that focus on the measures taken or to be taken by the Party concerned to remedy the situation’ (Gathii 2008). Only two countries in the region, Zimbabwe and Madagascar have previously had Article 96 instituted on them, in 2002 and 2010, respectively. EU assistance to Zimbabwe was reoriented in 2002 and again in 2010. In 2014, the EU Corporation was restored to Madagascar following the lifting of Article 96 measures.

It is important to note that a new Partnership Agreement between the EU and the Organisation of African, Caribbean and Pacific States (OACPS), formerly the ACP Group of States, was set to succeed the Cotonou Agreement, following the lapse of the latter on 30 November 2021. This is, however, after the diagnostic study, thus the paper reports from the previous agreement.

Sector risk assessment

The sector risk assessment examined the strength of countries’ water and sanitation sector enabling environment (Figure 5).

Table 3 | IMF country debt level and Debt Sustainability Assessments (DSAs) in ESA

IMF country debt levels	
No data	Ethiopia, Somalia and Tanzania
< 20%	Botswana (14.3%)
20–50%	Comoros, Eswatini, Lesotho, Madagascar, Namibia, Rwanda, Uganda
50–65%	Angola, Burundi, Kenya, Malawi, South Africa, South Sudan, Zambia,
65–100%	Zimbabwe (82.3%)
> 100%	Mozambique (102.1%) and Eritrea (131.2%)
DSAs	
No data	Angola, Botswana, Burundi, Eswatini, Namibia, South Africa, Eritrea, Somalia
Low risk	<i>Debt burden indicators are below baseline and stress test threshold</i> Tanzania, Uganda and Rwanda
Moderate risk	<i>Stress tests indicate that thresholds could be breached if exposed to external shocks or macroeconomic policy changes</i> Kenya, Lesotho, Madagascar, Malawi, Comoros
High risk	<i>No repayment difficulties, but one of more baseline thresholds are breached</i> Ethiopia and Zambia
In debt distress	<i>Struggling to service debt, evidenced by arrears, debt restructuring, high future debt-distress probability.</i> Mozambique, South Sudan and Zimbabwe

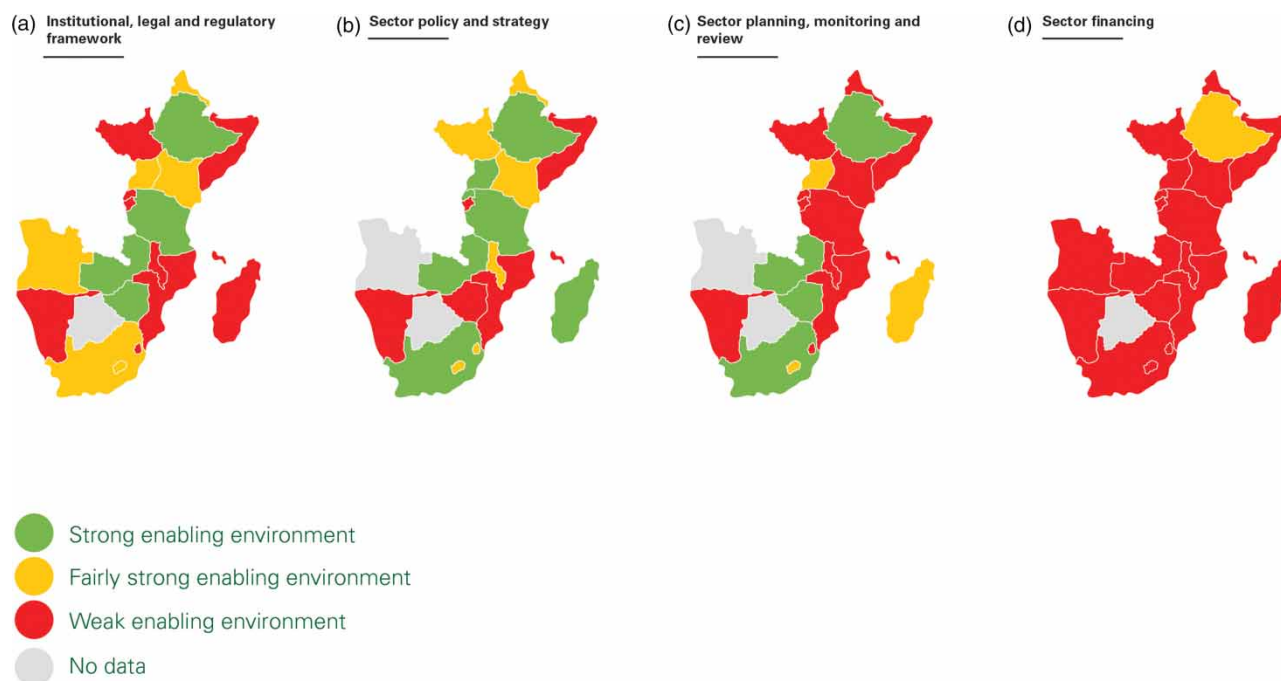


Figure 5 | The enabling environment in the WASH sector in the ESA region (UNICEF 2020).

Institutional, legal and regulatory framework

A strong institutional framework allows governments to clearly affect their mandates in accordance with sector policies and strategies. It also ensures funds are rightly allocated to meet the sector requirements. Additionally, where sound policy reforms are propelled by donors, the ability of institutions to aptly translate and apply these policies is a key factor when considering potential investment from private capital. Based on the assessment of the 21 countries, most (11) of the countries in the region have weak institutional systems. Only four countries have a strong institutional system, while the remaining six having fairly strong institutional systems (Figure 5(a)).

Sector policy and strategy

Evidence of quality services, performance and clear-and-adhered-to regulations on tariffs are crucial to attracting PPP. These efficiencies are only supported through strong water and sanitation policies and strategies that outline principles and sector mandates for realising long-term goals. From the assessment of the 21 countries in the ESAR, seven countries have strong policies and strategies, six countries have fairly strong policies and strategies. Weak policy and strategy were observed in six countries. Two countries did not have sufficient data (Figure 5(b)).

Sector planning, monitoring and review

Effective planning, monitoring and review indicates a sector's ability to efficiently allocate resources and track the progress of investment spending, its impact towards national targets, policy mandates and cost recovery. Of the 21 ESA countries' sector planning, monitoring and review systems assessed, four countries emerged as having a strong system, six as fairly strong and nine as having a weak system. Two countries did not present sufficient data (Figure 5(c)).

Sector finance

A sector finance strategy is critical in outlining what the sector's investment needs are, what resources are available, what the gaps are and how additional funds are to be mobilised to reduce the gap. The analysis evaluated what financial systems exist in both public and private water and sanitation services, including evidence of innovative finance mechanisms. The increase in budgetary allocation for WASH at national and subnational levels was also assessed. A review of countries' financial

profiles showed that of the 21 countries in ESA, only Ethiopia has a fairly strong financial system. The other 20 countries have weak financial systems and deficit in finance mobilisation (Figure 5(d)).

Status of financing in ESAR countries

Malawi, Mozambique and Angola presented potential blended finance projects, all in the development phase. Potential bankable projects in the concept development stage were identified in Angola, Ethiopia and Malawi. Four countries, Angola, Malawi, Ethiopia and Mozambique, presented potential for the development of bankable and blended finance projects.

Analytical hierarchy process

Eligibility and country risk assessment AHP

The AHP country risk assessment results indicated a preference for different countries for each criterion. Rwanda and Uganda, however, emerged among the higher ranked countries in all four criteria, followed by Tanzania, Comoros, Lesotho and Madagascar who have high rankings in three of the four criteria (Table 4). Botswana presents the highest favourability in both OECD risk and IMF country debt criteria, with 24.1 and 18.5% of the weighting, respectively. Namibia ranks second under the same criteria, with 13.1 and 7.2%, respectively.

The countries with the highest ranking in the AHP analysis for eligibility and country risk differ from the three countries (Ethiopia, Malawi and Mozambique) selected for potential bankable and blended financing projects from the diagnostic assessment. Figure 6 illustrates the AHP results of ESAR countries' eligibility and country risk favourability.

Sector risk assessment AHP

From the AHP analysis for sector risk assessment, Ethiopia ranked highest in all four criteria of the enabling environment, followed by Zambia, South Africa, Zimbabwe and Tanzania, respectively. Angola scored the least in enabling environmental favourability. Burundi, Comoros, Mozambique, Namibia and Somalia also ranked low. Table 5 summarises the sector risk AHP results for ESAR countries.

DISCUSSION

The results and findings from the study diagnostic assessments identified three countries with potential for bankable and blended finance projects in the ESAR, namely Mozambique, Malawi and Ethiopia. This was also based on UNICEF's evaluation of countries' fiscal environments and UNICEF's own engagement with IFIs and partners such as the EIB.

In Mozambique, the study led to the definition of a new bankable project, along with the proposal for a revolving fund to attract private investment for blending with public finance. Another project, under feasibility stage that packaged 30 new water supply schemes, was under consideration, but uncertainties about the conditions favoured the development of a new project with better prospects for bankability and blended financing. In Ethiopia, the proposed project involved a

Table 4 | AHP summary of weightings for top ranked ESAR countries' eligibility and country risk

World Bank country classification		OECD country risk classification		IMF country debt level		Debt sustainability level	
Country	Weight	Country	Weight	Country	Weight	Country	Weight
Rwanda	0.069	Botswana	0.241	Botswana	0.185	Rwanda	0.151
Uganda	0.069	Namibia	0.131	Namibia	0.072	Uganda	0.151
Burundi	0.069	Rwanda	0.054	Rwanda	0.072	Tanzania	0.151
Comoros	0.069	Uganda	0.054	Uganda	0.072	Comoros	0.080
Eritrea	0.069	Angola	0.054	Comoros	0.072	Kenya	0.080
Ethiopia	0.069	Eswatini	0.054	Eswatini	0.072	Lesotho	0.080
Malawi	0.069	Kenya	0.054	Lesotho	0.072	Madagascar	0.080
Madagascar	0.069	Lesotho	0.054	Madagascar	0.072	Malawi	0.080
Mozambique	0.069	Zambia	0.054				
Tanzania	0.069	Tanzania	0.054				

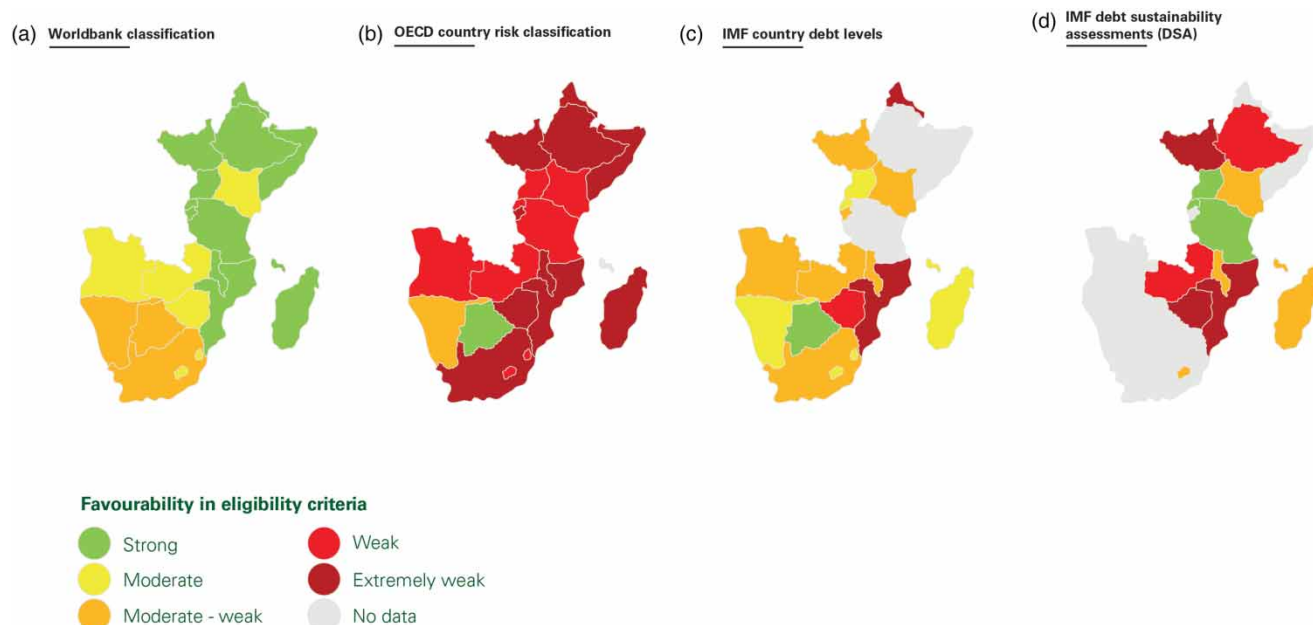


Figure 6 | AHP results of ESAR countries’ favourability in eligibility and country risk.

Table 5 | AHP summary of weightings ESAR countries’ sector risk

Country	Institutional	Sector policy, strategy	Planning, monitoring, review	Sector financing	Cumulative weight	Ranking
Ethiopia	0.126	0.098	0.139	0.136	0.500	1
Zambia	0.126	0.098	0.139	0.045	0.409	2
South Africa	0.052	0.098	0.139	0.045	0.334	3
Zimbabwe	0.126	0.015	0.139	0.045	0.325	4
Tanzania	0.126	0.098	0.022	0.045	0.291	5
Uganda	0.052	0.098	0.060	0.045	0.256	6
Madagascar	0.019	0.098	0.060	0.045	0.223	7
Lesotho	0.052	0.038	0.060	0.045	0.195	8
Rwanda	0.019	0.098	0.022	0.045	0.184	9
Eritrea, Kenya	0.052	0.038	0.022	0.045	0.156	10
Eswatini, Malawi, South Sudan	0.019	0.038	0.022	0.045	0.123	11
Burundi, Comoros, Mozambique, Namibia, Somalia	0.019	0.015	0.022	0.045	0.100	12
Angola	0.052	0.00	0.000	0.045	0.097	13

combination of hard and soft components, packaged for future consideration by UNICEF and IFIs such as EIB. Both projects involve components to strengthen the service provision framework. Malawi was identified to be already piloting a co-financed partnership with the EIB, forming the basis to develop a larger, bankable project. The financing for the project would be co-funded by the EIB. The proposed project will use private resources and a sanitation revolving fund to finance faecal sludge management (FSM) systems.

The three countries, Mozambique, Malawi and Ethiopia are LICs and LMICs. Though no middle-income country was considered for blended finance projects, there is an identified need to maintain gains and work towards sustainable services in these countries. This means looking into technical and financial capacities in the government departments of these countries

and providing support through possible technical assistance and forming finance packages suited to their economic characteristics. In Botswana, efforts could focus on climate resilience to mitigate climate change impacts on water and sanitation services. Fragile states would require conflict prevention interventions, including significant technical support and financial input, to maintain existing infrastructure and extend services.

Most countries in ESAR have a weak enabling environment, with a majority evidencing deficiency in strong financial management systems. Countries in the region also presented poorly in planning, monitoring and review systems. This study focused on four enabling environment indicators within the sector. Previous studies (Pories *et al.* 2019) have also outlined other areas of the enabling environment in the water and sanitation sectors that need to be strengthened in order to establish an environment that attracts, supports and retains commercial investments. These included aligning commercial banks' risk profiles to the realities of the WASH sector. For example, service providers may propose funding requests whose value is either not large enough or the structure too intricate. Yet development banks would be aiming for high value investments to realise economies of scale (Pories *et al.* 2019). As such, providers require to restructure their approach to develop projects that would be attractive in scale and returns. This includes placing just as much focus on financial structuring of projects as is given to technical feasibility when developing projects. Countries in ESAR therefore require deliberate strengthening of the enabling environment, including economic financial systems, sector policy and strategy, tariff policy, in order to be ready for bankable and blended finance projects. A strong enabling environment signifies reduced risks, resulting in attracting further investment in the sector.

All three countries identified for potential bankable and blended finance projects fall within the highest risk category (i.e., category 7) under the OECD country risk classification. Under project level assessment, it is necessary to consider this risk to determine the type of financing for each project. The type and application of blended financing will be determined on a project-by-project basis, following the establishment of financial risks and the structuring required. Measures applied to each project should aim to reduce the risk of investment.

An assessment of the associated project risk of each proposed project should be undertaken. The technical, social and environmental impact of the project with respect to economic and financial sustainability inputs to a project' bankability, with the suite of financial instruments used in the blended finance mechanism for the project adjusted to offset the sustainability risks and losses identified. While other screened risks could be low, the project needs to meet the populations' acceptability and benefit economic, social and financial aspects.

Sufficient technical support is required for the three identified project countries and ESAR countries at large, to further develop their projects for bankability and blended financing. To maximise existing finance, support should be channelled towards initiatives including budget reviews, establishing financial management and monitoring systems within government structures, improving operational performance and technical capacities of service providers. Support to mobilise additional resources includes engaging in sector regulation strengthening that would promote financial autonomy and creditworthiness of service providers, collaborating with governments to improve the enabling environment and identifying and engaging with potential donors.

The higher-ranking countries from the AHP analyses differ from the three countries (Ethiopia, Malawi and Mozambique) selected for potential bankable and blended financing projects based on the eligibility, sector risk and project level assessments. Among the three countries identified from the assessments, only Ethiopia ranked high in AHP enabling environment favourability, whereas Malawi and Mozambique did not score favourably. This contrast may be attributed to the AHP being only applied to eligibility and country risk and sector risk assessments. However, the AHP findings justify the importance of sector risk assessments in country evaluations for potential bankable and blended financing. This is because while a country may rank favourably in country risk assessment, its water and sanitation sector's enabling environment inputs pertinently on its ability to attract finance. For example, a country with a high sector absorption capacity risk, though financially qualified based on OECD, country risk or DSA assessment, may not be able to absorb funds into the sector (WaterAid n.d.). An example is the Comoros – though having a country debt level between 20 and 50% and moderate DSA risk, the Comoros has high sector and absorption capacity risks. Similarly, a country's domestic budget absorption for its water and sanitation sector weighs in on the sector's financial capacity. Applying the AHP technique to all assessment indicators for country eligibility, sectoral risk and project-risk assessment will provide a comprehensive evaluation of technique results against assessment findings. AHP analysis can also be used as a tool for prioritisation and selection of projects in the context of multiple projects requiring funding from the government and investors.

CONCLUSION

The finance gap in water and sanitation service provision in the ESAR can be reduced through innovative mechanisms that maximise existing resources and utilise taxes, tariffs and transfers to mobilise more resources for the sector. The study, through identifying potential bankable and blended finance projects in three countries in the ESAR, demonstrates that innovative finance mechanisms such as blended finance are a potential source of the much-needed finance in the sector and ought to be considered for the region. The use of decision-making tools such as the AHP can be applied to strengthen the prioritisation and selection of projects in the context of multiple projects requiring finance from public funding and investors. To aid the success of attracting alternative finance, the sector needs to develop a pipeline of projects whose collective costs and revenues mitigate investment risks. Applicable to the three identified countries and other countries in ESAR, technical and financial support from development partners and IFIs would go a long way in building the capacity of governments to be able to develop portfolios of bankable projects capable of leveraging for alternative financing. The financial strategies and tools applied will need to be assessed on a country-by-country basis, considering each country's socio-economic, political government and institutional arrangements, among other key criteria. For any investment to catalyse safe and sustainable services, a strong enabling environment is a necessity. Hence, strong institutional frameworks, economic and financial systems, sector policy and strategy, tariff policy, monitoring and other key elements of a strong enabling environment need to be established. Africa is being vulnerable to the impacts of climate change ought to tap into the potential of climate finance to develop climate resilient water and sanitation systems that ensure services keep running amid exacerbated climatic events. Key lessons from implementing the identified projects in the ESAR should be documented to allow learning and adaptation to be applied to future projects. While the paper focuses on innovative finance mechanisms, it highlights other challenges to realising universal safe and sustainable WASH services that need to be addressed in line with the sector's finance gap.

ACKNOWLEDGEMENTS

The authors would like to thank the contribution of the following people to this study: José Frade (WASH Independent Consultant); Oliver Jones; Goufrane Mansour; Peter Burr (Oxford Policy Management); Bo Viktor Nylund and Matthew Cummins, UNICEF ESARO; Guy Hutton, Senior Adviser WASH, UNICEF NYHQ.

DATA AVAILABILITY STATEMENT

All relevant data are included in the paper or its Supplementary Information.

CONFLICT OF INTEREST

The authors declare there is no conflict.

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First received 2 June 2022; accepted in revised form 7 September 2022. Available online 28 September 2022