United Nations
Economic Commission for Africa

12th ARFSD
Twelfth Session of the Africa Regional Forum on Sustainable Development
28 - 30 April 2026
Addis Ababa, Ethiopia

Africa Regional Dialogue on Advancing Integrated Solutions for Sustainable Development: Climate–Water–Energy–Food Nexus Solutions

Setting the scene

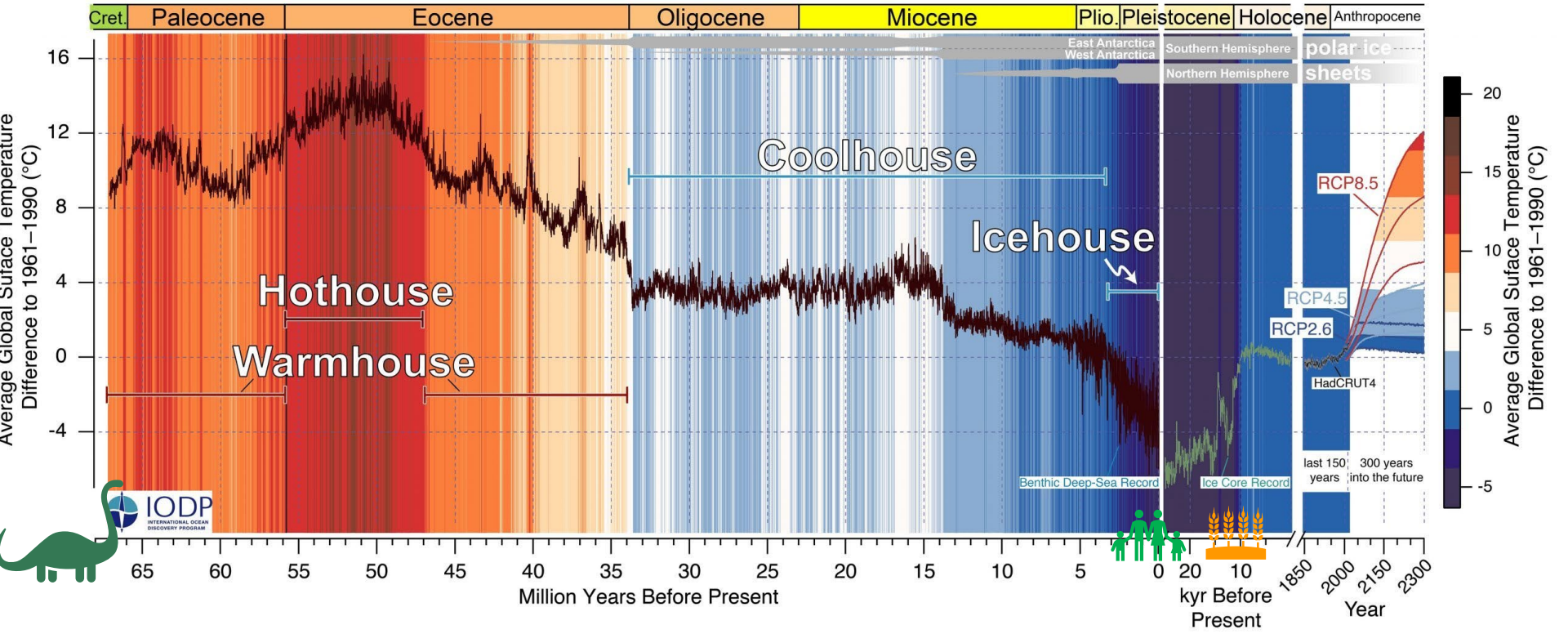
Sara Castro de Hallgren,
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Office for Sustainable Development,
Division for SDGs, UN DESA

United Nations
Economic Commission for Africa

African Union

Federal Democratic Republic of Ethiopia

Climate Change = long term changes in average temp. + weather



- **Start of Human population ~300,000 years ago.**
- **Start of Human agriculture ~12-14,000 years ago.**

- Source: van den Bergh, J. C. J. M. (2018). Prehistory Until the Rise of Agriculture. In *Human Evolution beyond Biology and Culture: Evolutionary Social, Environmental and Policy Sciences* (pp. 321–363). Cambridge University Press.

Image: Westerhold et al. (2020) doi: 10.1126/science.aba6853

Climate State

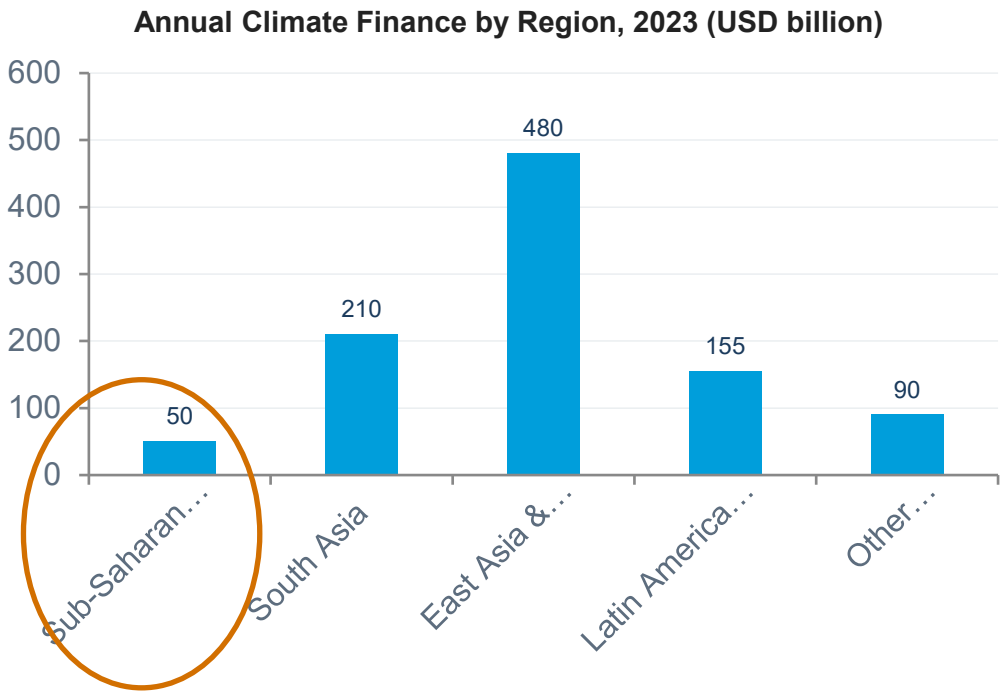
- **2015 Paris Agreement:** ***NDCs*** *to keep long-term* ***global average surface temperature well below 2°C*** *above pre-industrial levels and pursue efforts to* ***limit it to 1.5°C*** ***by the end of this century***

- Global average surface air **temperature has already risen to 1.54°C above pre-industrial level.**



Source: Africa Minigrids Program

The Climate Finance Landscape: Flows, Gaps, and Inequities



NDCs and Finance Inequity Highlights

- **NDC 3.0:** Currently, **28 African countries** (13 from West and Central and 13 from East and Southern)
- USD ~1.3T/yr needed for submitted NDCs
- **Sub-Saharan Africa receives just 23% of its NDC investment needs** despite high climate vulnerability.
- **Top 10 recipients capture 46% of all Africa climate finance**
- **10 most-vulnerable countries receive 11%.**

KEY POINT: *The WEFE Nexus offers a pathway to* ***greater efficiency****, integrating investments to* ***maximize impact per dollar spent*** *and ease pressure on overstretched budgets.*

What is the Climate-Water-Energy-Food Nexus?



The “Water-Energy-Food Nexus” approach emerged in the late 2000s, as a way of framing cross-sector and cross-scale interactions in a context marked by growing concerns about the global economic and food security crisis (Allouche et al., 2014).



Climate link adds resilience and adaptation angle.

The way Water-Energy-Food resources and systems are governed depends on **institutions.**

Barriers to scaling solutions:

1. **Siloed ministries**,
2. **Fragmented mandates**,
3. **Uncoordinated financing**

Context: The Resource Security Crisis in Sub-Saharan Africa

~565M

people lack access to electricity (665 globally)

22.3%

of the population faces chronic undernourishment
1 in 5 (Our World in Data)

31.3%

only have access to safely managed drinking water (SDG 6.1.1)

70-80%

freshwater withdrawals for agriculture, competing demand from energy ++

Potential vs. Investment Imbalances

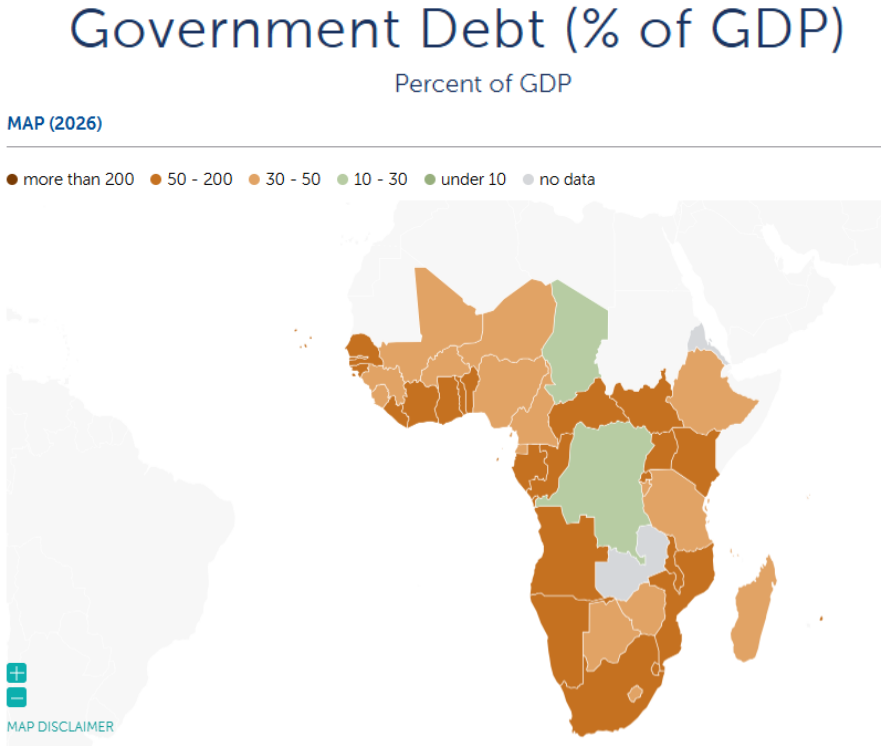
- Hydropower provides 40% of Africa's electricity supply, yet nearly 90% of its potential remains untapped
- Africa holds 60% of the world's solar resources, yet has attracted only 2% of global renewable energy investment over the past two decades.

Context: High Climate Vulnerability, Debt & Tight Fiscal Space

United Nations | Department of Economic and Social Affairs

UNOSD

- **African nations** need USD ~1.3T/yr for NDCs
- Countries have high recurrent expenditure (e.g. debt interest) compared to development expenditure (e.g. infrastructure)
- **20% of countries spending +25% of revenue on interest.**
- **In limited fiscal space context WEFE Nexus = efficiencies in finance and impact**



Sub-Saharan Africa Average is 56.05% (IMF,2026)



Percentages have been rounded and may not sum to 100% Source: *Financial statistics of consolidated general government, 2023/2024* (Table C)

stats sa
Department: Statistics South Africa
REPUBLIC OF SOUTH AFRICA

IMPROVING LIVES THROUGH DATA ECOSYSTEMS

United Nations | Department of Economic and Social Affairs

UNOSD

- **South Africa: 15% of public budget expenditure for debt servicing in 2023/2024 v. 12% for health**
  (e.g. R356 billion debt service v. R276 billion for health).
- **Several sub-Saharan African countries now spend more on debt service than health or education**
  (e.g. Ghana, Zambia, and Kenya)
- **Budgetary consolidation recommended.**
- **Assess budget vs. expenditure**
- **WEFE Nexus solutions can help!**
- **Optimize resources, break silos.**

7. What do you think are some of the **top 3 challenges** to implementing integrated approaches for **managing** Water-Energy-Food-Ecosystem (WEFE)-related sectors in your country and region?

More details

13
Responses

Latest Responses

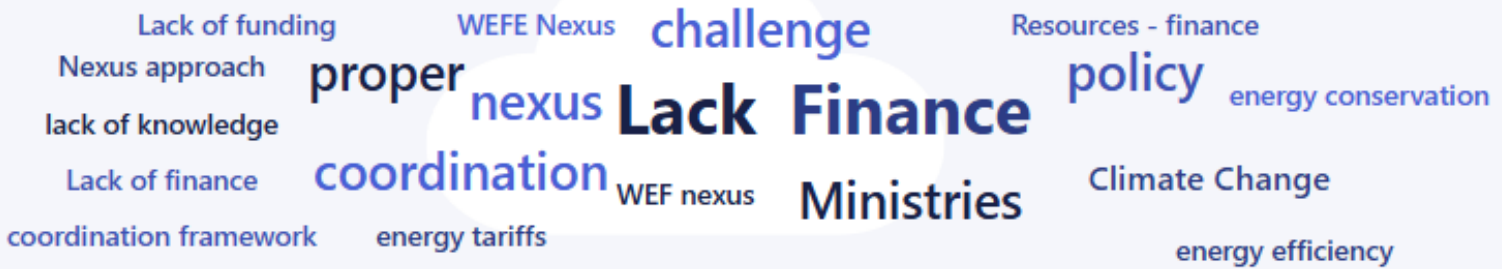
"1. Specific silod mandates 2. Conflicting policies 3. Resources - finance and h..."

"1. Funding. 2. Lack of proper Sensitization of the public on energy consumpt..."

"knowledge of the resource(ecosystem)/Humanand materials resources/Fina... "

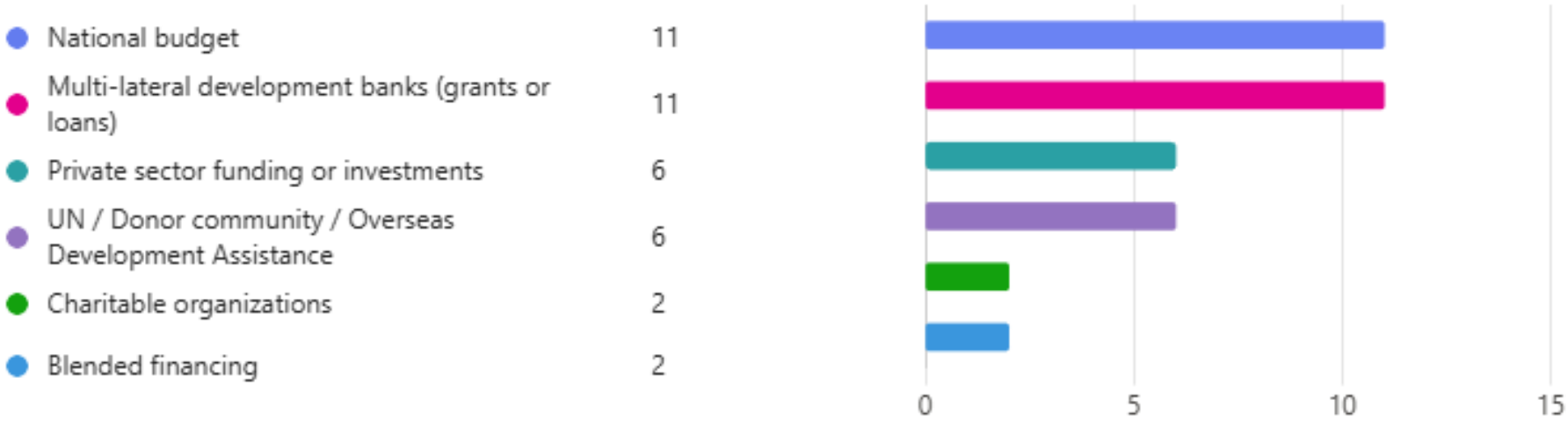
...

4 respondents (31%) answered Lack for this question.



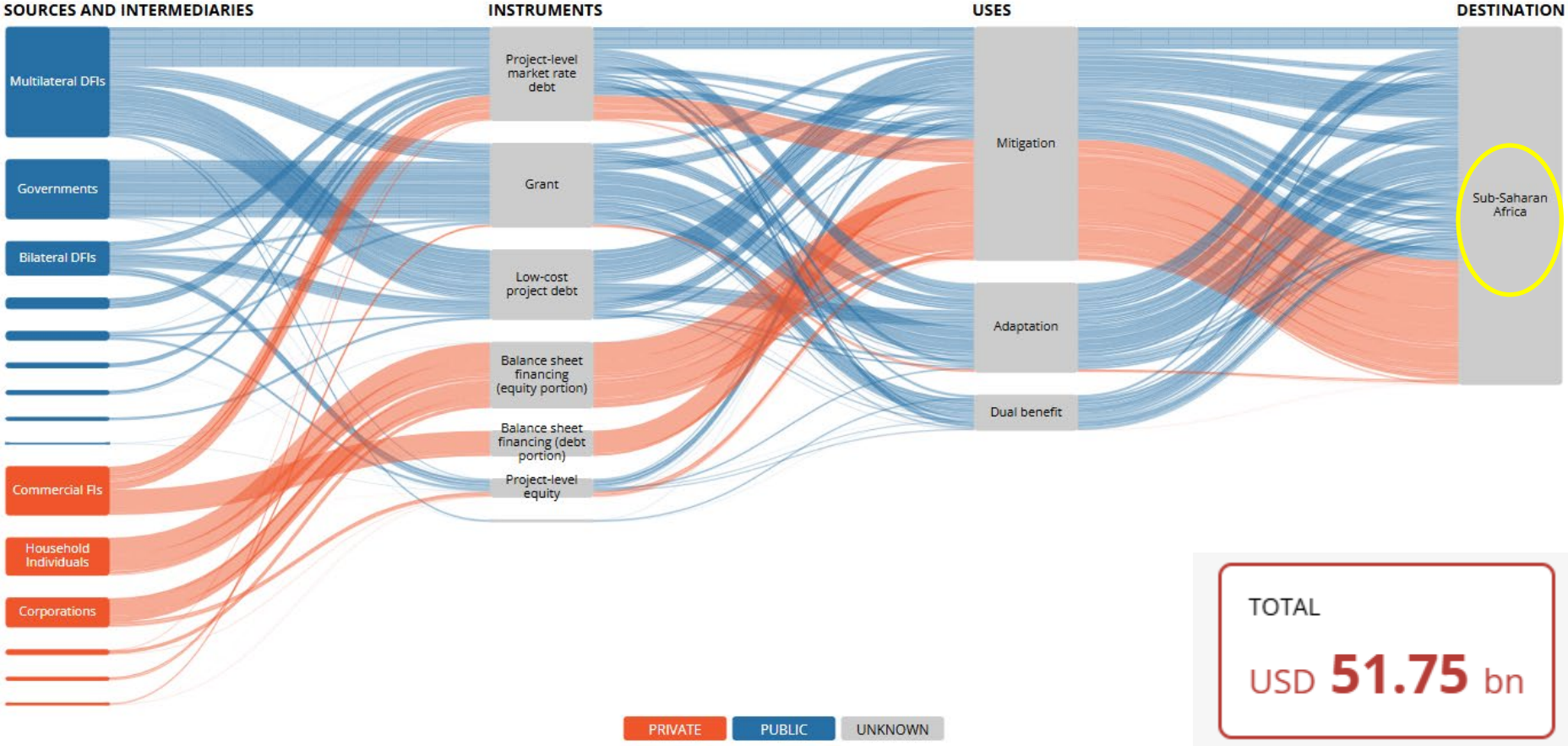
Source: UN WEFE Nexus State of Play — SSA, March 2025 https://unosd.un.org/sites/default/files/2026-04/wefe_nexus_state_of_play_in_ssa_-_guidebook.pdf

22. What are the main/key sources of finance for major projects related to climate and Water-Energy-Food-Ecosystem (WEFE)-related sectors in your country and region? *Choose all that apply*



Source: UN WEFE Nexus State of Play — SSA, March 2025 https://unosd.un.org/sites/default/files/2026-04/wefe_nexus_state_of_play_in_ssa_-_guidebook.pdf

GLOBAL CLIMATE FINANCE LANDSCAPE



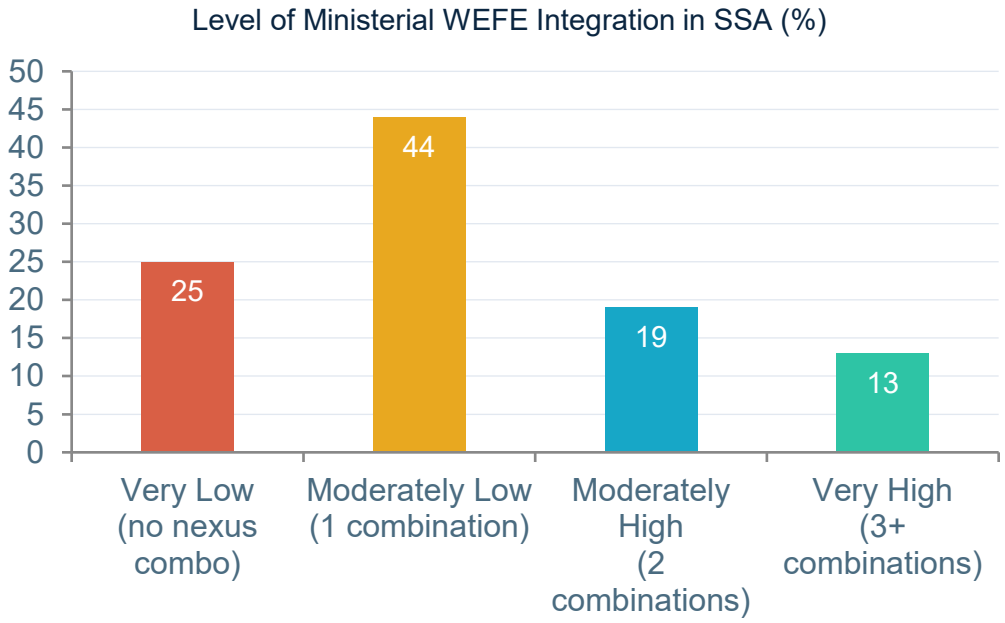
TOTAL

USD **51.75** bn

DESA | The United Nations Office For Sustainable Development

Source: Climate Policy Initiative, 2024

Evidence from Sub-Saharan Africa Ministerial Integration Mapping



KEY FINDINGS

- Food–Ecosystem pairing is most common integration (36% of combinations)
- Water–Energy pairing next most common (28%)
- Several countries lack explicit water or energy ministries
- Duplicated mandates (e.g. water in 2+ ministries) creates conflict, not coordination
- Only 4 countries have Water–Food–Ecosystems trios: CAR, Djibouti, Namibia, Zimbabwe

Why we train inter-ministerial delegations!

- **Implication for Governance Design**: Data confirms **institutional fragmentation**, not lack of political will alone, is primary governance barrier.
- **Capacity-building must target cross-ministerial coordination, not just individual sector knowledge.**

Source: UN WEFE Nexus State of Play — SSA, March 2025 https://unosd.un.org/sites/default/files/2026-04/wefe_nexus_state_of_play_in_ssa_-_guidebook.pdf

Regional governance context

Water

The Continental Africa Water Investment Programme (AIP) raise US$30 billion annually by 2030 for water security and sustainable sanitation

Energy

African Continental Master Plan (CMP) collaborative strategy for single connected African electricity market

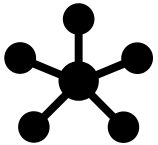
Food

AU 10-year CAADP Strategy and Action Plan (2026–2035) adopted 2025 Kampala Summit for agrifood systems

Climate and Ecosystems

AU Biodiversity Strategy and Action Plan (ABSAP) 2023-2030

AU Climate Change and Resilient Development Strategy and Action Plan (2022-2032).



Opportunities for efficiency? Synergistic investments?

Governance context …

PLANNING BASIS

- National Development Plans (NDPs) as primary integration vehicle
- Sector strategies must reference cross-cutting SDG linkages (SDG 6, 7, 2, 13, 15)
- NDC 3.0 provides an entry point for joint water–energy–food planning
- Integrated River Basin / Watershed Management plans bridge sectors

OVERLAPPING COMPETENCIES

- Complementary or clashing: Water ministries can oversee irrigation; but energy ministries may own hydro policy
- Agricultural ministry sets land-use policy affecting ecosystems under another mandate
- Climate finance often governed by separate environment or finance ministry

HARMONISATION OPPORTUNITIES

- Formal policy coherence reviews before sector legislation is adopted
- Shared data infrastructure and joint indicator frameworks
- Combining intra-sectoral mandates (e.g. agriculture + livestock + fisheries)
- Explicit nexus clauses in ministerial mandates and cabinet resolutions
- NDC harmonization

NDCs as Vehicles for WEF Finance: Country Evidence (*from policy brief*)

Country	NDC WEF Integration	Key Nexus Commitments	Finance Status	Priority Gaps
Ethiopia	HIGH	Dam construction, solar irrigation, watershed management	USD 50M FP243 Safe Water RE nexus pilot; USD 463M Urban WSS project	Cross-border water finance; equity in rural access
Kenya	MODERATE	Safe water access for 50% by 2030; geothermal expansion	M-KOPA off-grid solar; Menengai Geothermal; USD 10M Upper Athi Water Security	WEFE integration in NDC planning; smallholder finance
Rwanda	HIGH	52% grid / 48% off-grid; solar cold chain	ACES solar cold chain active; strong policy environment	Ecosystem services finance; watershed investment
South Africa	HIGH	Just Energy Transition; water recycling; conservation agriculture	JETP USD 8.5B; USD 1.5B FP209 SA Water Reuse Programme	Adaptation finance; just transition equity; water-energy integration
Nigeria	HIGH	Renewable energy expansion; water infrastructure; Em-Hydro pilot	USD 495M P123112 Transforming Irrigation (IWRM)	Private sector mobilisation; community-level WEFE finance
Niger	HIGH	Solar irrigation, water harvesting, agrivoltaics pilot	RETO-DOSSO pilot demonstrates proof of concept	Scale-up capital; governance and risk frameworks
Senegal	HIGH	Renewable energy; sustainable agriculture; integrated resource management	GCF/BOAD FP138: off-grid solar to 1,000 villages	Domestic capital mobilisation; food system investment

Source: CPI Landscape of Climate Finance in Africa 2024; UNDP; country NDC submissions; UNOSD analysis; GCF; World Bank; GEF.

SDG 6 & 7 progress and finance split

Progress vs. finance in 48 Sub-Saharan African countries | Latest available year | 2015–2024

Table 1: Top Sub-Saharan African Countries Progressing by SDG 6 & 7 Indicator Rankings[1]

Source: Author's analysis based on data from the UN SDG Global Data Portal (SDG 6 and 7), not adjusted for population and data: unstats.un.org/sdgs/dataportal.

Note: *Rwanda: reported 6.1.1 data is urban-only; reported 6.2.1a data is rural-only.*

		Top-5 Classification (count)		SDG split		ODA & finance flows (latest, USD M)	
No.	Country	Progress (2015-2024)	Latest Rank	SDG 6	SDG 7	6.a.1 (water)	7.a.1 (energy)
1	Rwanda*	7	7	11	3	86.0	315
2	South Africa	5	9	10	4	9.2	935
3	Benin	8	4	9	3	66.4	23.4
4	Mauritius	3	9	7	5	66.2	3.7
5	Tanzania	7	4	8	3	297	558

SDG 6.a.1 & 7.a.1 Financing Progress

(baseline to latest year e.g. 2024)

6.a.1 Water and sanitation ODA:
The proportion of total water and sanitation-related ODA disbursements that are included in the government budget. *Covers all SDG 6 target areas including WASH, wastewater, water efficiency, water resources management, and ecosystems.*

1. Seychelles: $0.08M → $0.21M (+13.3%/yr)

2. Equatorial Guinea: ~$0 → $0.07M

3. Mauritius: $5.8M → $66.2M (+35.6%/yr in final year)





7.a.1 International clean-energy finance:
All official loans, grants and equity investments received by countries. *Covers OECD/DAC CRS sector codes: 23210–23280 (RE generation by tech.), 23410 (hybrid plants), 23631 (isolated mini-grid transmission), 23182 (energy R&D).*

1. Nigeria: $68.7M → $828.8M (+$760.1M abs)

2. Tanzania: $40.4M → $558.2M (+$517.8M abs)

3. Rwanda: ~$0M → $314.5M (+$314.5M abs)



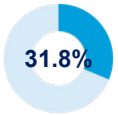



SDG 6: Clean Water & Sanitation

Sub-Saharan Africa | 48 Countries | 12 Indicators | Regional Averages | 2015–2024

Source: UN SDG Global Data Portal, World Bank, WHO, UNICEF | Unweighted country averages | ▲ = Progress Leaders | ▼ = Challenges

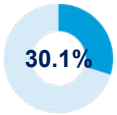
REGIONAL AVERAGES



6.1.1 Safely Managed Drinking Water

+2.9 pp since 2015

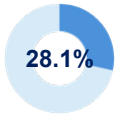
▲ Ghana +12.1pp, Rwanda +10.8pp, Tanzania +10.3pp
▼ Botswana -5.4pp (continuous), Zambia -2.8pp, Zimbabwe -1.7pp



6.2.1a Safely Managed Sanitation

+4.9 pp since 2015

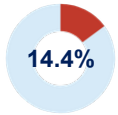
▲ South Africa +16.5pp (#1 all ranks), Malawi +14.5pp, Rwanda +12.4pp
▼ Gambia -4.2pp (worst), Zimbabwe -2.5pp, Mauritius -2.3pp



6.2.1b Basic Handwashing

+5.9 pp since 2015

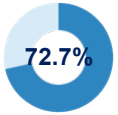
▲ Kenya +42.3pp (largest any indicator), Lesotho +17.2pp, Comoros +14.5pp
▼ Somalia -13.7pp (continuous), Mauritania -10.7pp, Ethiopia -2.9pp



6.3.1 Wastewater Safely Treated

–1.3 pp (declining)

▲ Zimbabwe +32.3pp (doubled), Mauritius +13.6pp, Tanzania +1.7pp
▼ South Africa -39.7pp (most severe in dataset), Nigeria -7.6pp



6.3.2 Water Bodies Good Quality

+8.6 pp since 2017

▲ Sierra Leone +28.3pp, South Africa +23.8pp, Lesotho +23.0pp
▼ Burkina Faso -88.7pp (extreme), Ethiopia -24.1pp, Kenya -49.4pp

$26.8
USD/m³

6.4.1 Water-Use Efficiency

+$2.3/m³ since 2015

▲ Guinea-Bissau +$2.36, Ethiopia +$2.30, DRC +$19.63 (high + growth)
▼ Congo -$35.65, Angola -$15.76; oil economies declining

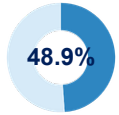


6.4.2 Water Stress

+1.4 pp (worsening)

Lower = better

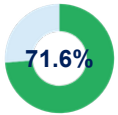
▲ Namibia -0.19pp (only genuine stress reduction in region)
▼ Cabo Verde +22.4pp, Zimbabwe +14.2pp, South Africa +7.8pp



6.5.1 IWRM Implementation

+8.5 pp since 2017

▲ Rwanda +33pp (#1 progress + level), Angola +25pp, Somalia +24pp
▼ South Africa -5pp (regression), Uganda -2pp; pace halved



6.5.2 Transboundary Cooperation

+17.0 pp since 2017

▲ Sierra Leone +93pp (to 100%), Senegal +65pp, Guinea-Bissau +57pp
▼ Cameroon -16pp, Chad -5.6pp; 3 countries still at 0%

$54.7M
avg/country

6.a.1 ODA for Water & Sanitation

+$1.6M (flat in real terms)

▲ Ethiopia $337M, Tanzania $297M, Kenya $154M (top 3, 2023)
▼ Nigeria/Ghana/DRC halved; regional avg flat since 2015



6.b.1a Community Participation Level

Plateaued since 2019

Scale 0–3

▲ Botswana, Comoros, Lesotho, Senegal: Low to High (1→3)
▼ Congo, Liberia, Ethiopia, S. Sudan: High to Low (3→1)



6.b.1b Participation Defined in Law

+0.26 (recovered)

Most at score 10

▲ Cameroon, Comoros, DRC, Seychelles, S. Africa: rose to 10
▼ Congo, Gabon, Senegal: 10→5; Côte d'Ivoire dropped to 0

KEY FINDINGS:

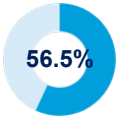
- Progress is uneven across SDG 6: governance indicators improved faster than infrastructure and service access.
- Regional averages are dependent on data coverage and may be biased upward where many low-capacity countries are missing.
- Drinking water, sanitation, and handwashing improved, but current levels remain far below universal access.
- Wastewater and water stress show that environmental outcomes are not improving uniformly.

SDG 7: Affordable & Clean Energy

Sub-Saharan Africa | 48 Countries | 6 Indicators | Regional Averages | 2015–2023

Source: World Bank, IEA, IRENA, WHO, UN Stats Division | Unweighted averages | ▲ = Progress Leaders | ▼ = Challenges

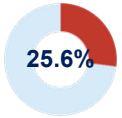
REGIONAL AVERAGES



7.1.1 Access to Electricity

+12.9 pp since 2015

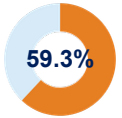
▲ Rwanda +41.1pp (on track), Kenya +34.6pp, Uganda +33.0pp
▼ Somalia -0.9pp (only decliner), S. Sudan 5.4% (lowest)



7.1.2 Clean Fuels for Cooking

+4.3 pp since 2015

▲ Nigeria +20.5pp (5.7→26.2%), Kenya +19.0pp, Côte d'Ivoire +18.2pp
▼ Zambia -4.8pp (consistent), S. Sudan at 0% all years



7.2.1 Renewable Energy Share

–2.8 pp (declining)

▲ Djibouti +11.8pp (genuine solar/wind), Gabon +9.0pp
▼ Comoros -27.8pp, Mali -14.0pp (may reflect modernisation)

4.74 MJ/USD

7.3.1 Energy Intensity

–0.06 (slight improvement)

▲ Ethiopia -2.34 MJ/USD (largest gain), Guinea-Bissau -1.27, Tanzania -1.27
▼ Liberia +1.89 (worst, worsening), Congo +1.71, Eq Guinea +1.62

$97.5M avg/country

7.a.1 Int'l Financial Flows (Clean Energy)

Highly volatile year-to-year

▲ Nigeria +$760M (to $829M), Tanzania +$518M, Rwanda +$315M
▼ Uganda -$1,395M (spike distortion), Liberia -$283M

48.9 W/cap

7.b.1 Installed Renewable Capacity

+14.2 W/cap (+12.4% CAGR)

▲ Seychelles +111 W/cap, South Africa +107.6, Mauritius +79.1
▼ Gabon -28.9, Eq Guinea -17.6; Chad at 0.25 W/cap

KEY FINDINGS:

- Progress is uneven across SDG 7: electrification and renewable capacity improved faster than energy efficiency.
- Electricity access improved.
- The falling renewable share partly reflects modernization away from traditional biomass.
- Finance and capacity averages are volatile and can be skewed by a few countries.

Solution: Budgetary Coordination & Pooled Financing for Cross-Sectoral Investment



Nexus governance = nexus finance. Institutional coordination mechanisms must be matched by fiscal instruments that incentivise integrated investment and break siloed budget lines.

Joint Budget Lines

Multi-ministry appropriations requiring co-signature; common in integrated watershed programmes

NDC-Linked Climate Finance

COP29 commitments to triple public finance for vulnerability; WEFE nexus investments eligible under GCF, GEF, AF, LDCF

Pooled Funding Mechanisms

Common fund managed by a coordinating body (e.g. national climate fund drawing on water + energy + agriculture allocations)

Results-Based Financing

Payment for verified co-benefits (e.g. water savings + GHG reduction + food productivity); REIPPPP: 130M kl saved

Blended Finance Structures

Public anchor investment de-risks private co-financing for nexus projects (infrastructure, solar irrigation, mini-grids)

Development Bank Co-financing w priority valuation for WEF solutions

World Bank, ADB, EIB multi-sector lending windows; IDA window for nexus-aligned national programmes

SDG 6 & 7: Sub-Saharan Africa - Water & Energy Projects

Key climate adaptation, WASH infrastructure & renewable energy funded projects | GCF, World Bank, AfDB, GEF funded

WASH & WATER RESOURCE MANAGEMENT

Project	Country	Focus	USD	Status
SA Water Reuse (FP209)	**South Africa**	Wastewater treatment & reuse	235M	est. completion Oct. 2033
Irrigation Reform (P123112)	**Nigeria**	Irrigation, drainage, IWRM	409M	Closed (30 Jun 2025)
Urban WSS (P156433)	**Ethiopia**	Urban water supply & sanitation	445M	Under implementation est. completion 30 June 2027
Simiyu Climate (FP041)	**Tanzania**	WASH, resilient water, CSA	203M	Under implementation; est. completion Aug 2025
Rural WSS (P164262)	**Senegal**	Rural WASH, WRM capacity	130M	Closed (2024)
Drought Resilience (FP058)	**Ethiopia**	Drinking water, small irrigation	50M	Under implementation

ENERGY ACCESS & MITIGATION

Project	Country	Focus	USD	Status
Solar Mini-grids (FP102)	**Mali**	Off-grid PV 4.83MW, 50 communities	82M	Under implementation; est. completion 2027
Solar + Storage (FP096)	**DRC**	~30MW solar capacity, 3 towns	60M	Under implementation, est. completion 11 Aug 2027
Off-grid Solar (FP138)	**Senegal**	1,000 villages off-grid solar	77M	Under implementation
REPP 2 Facility	**Multi-country**	Blended finance, 7.7M people	250M	est. completion 2044
Climate-Friendly Cooking	**Kenya/Senegal**	Improved cookstoves, 11.2M benef.	65.8M	Under implementation
Menengai Geothermal	**Kenya**	500K households, 300K businesses	Geothermal power (35MW plant)	Construction / under implementation

WATER-ENERGY NEXUS PILOT ETHIOPIA

FP243 Safe Water Powered by Renewable Energy (Ethiopia, USD 50M, 2024 approved)

Solar-powered water pumping for drinking water and irrigation.

Reduces diesel dependence + improving water access, irrigation efficiency, and resilience.

Pilot and potential Model for integrated nexus programming.

HYDROMET & EARLY WARNING SYSTEMS

Malawi: Flood warning systems

Mali: Hydromet modernization

Burkina Faso: Early warning systems and climate services

Volta Basin: Cross-border flood and drought management

Wider shift toward climate-information services and institutional resilience alongside infrastructure investment.

Key messages

① Break the silos in climate and public finance.

Africa receives only 23% of its NDC investment needs. Finance flows to water, energy, and food sectors in isolation, forfeiting critical multiplier effects. Expenditure can be optimized through nexus.

② To maximize impact ensure localized focus. Direct to needs essential with targeting women, youth, smallholders or vulnerable areas.

Climate finance must reach women, youth and smallholder farmers, both primary resource managers and primary climate victims and yield greatest impacts across SDGs

③ Blended finance and results-based mechanisms are essential.

Green bonds, payment-for-ecosystem-services, and PPPs must be scaled specifically for nexus projects, with standardised multi-sector valuation frameworks – working across ministries bridging budget silos

④ At regional level – bridge Continental plans and finance on water, energy, food

- **The Continental Africa Water Investment Programme (AIP)** raise US$30 billion annually by 2030 for water security and sustainable sanitation
- **African Continental Master Plan (CMP)** collaborative strategy for single connected African electricity market
- **AU 10-year CAADP Strategy and Action Plan (2026–2035)** adopted 2025 Kampala Summit for agrifood systems

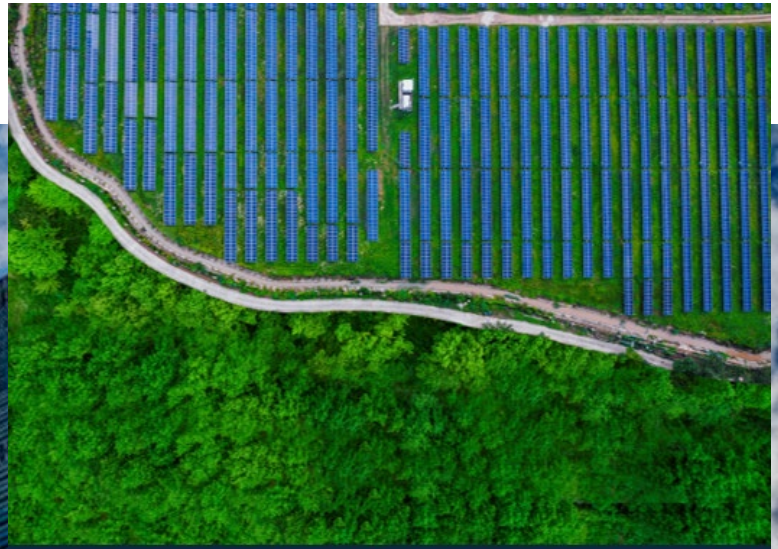
⑤ Ensure regional voice calls for more efficient/integrated WEF nexus finance in global agendas



United Nations

2026 UN Water Conference
2 - 4 December, United Arab Emirates

Thank you.



The Water-energy-food-ecosystems (WEFE) Nexus – Technologies and finance to address climate vulnerability in Sub-Saharan Africa

Inter-Agency Policy Brief – April 2026

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