



Sustainable Energy combating Fragility

DIHAD 2023



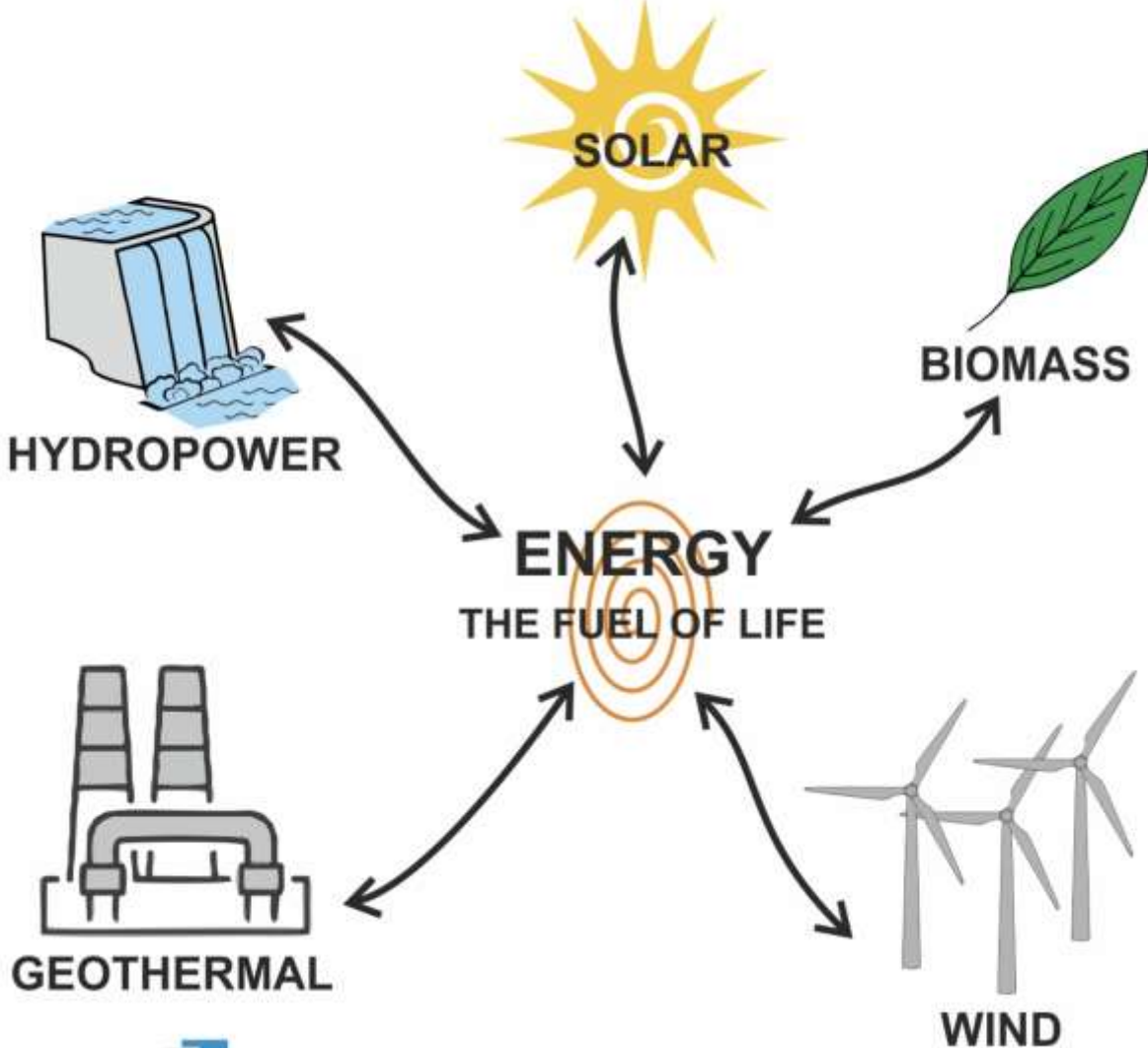


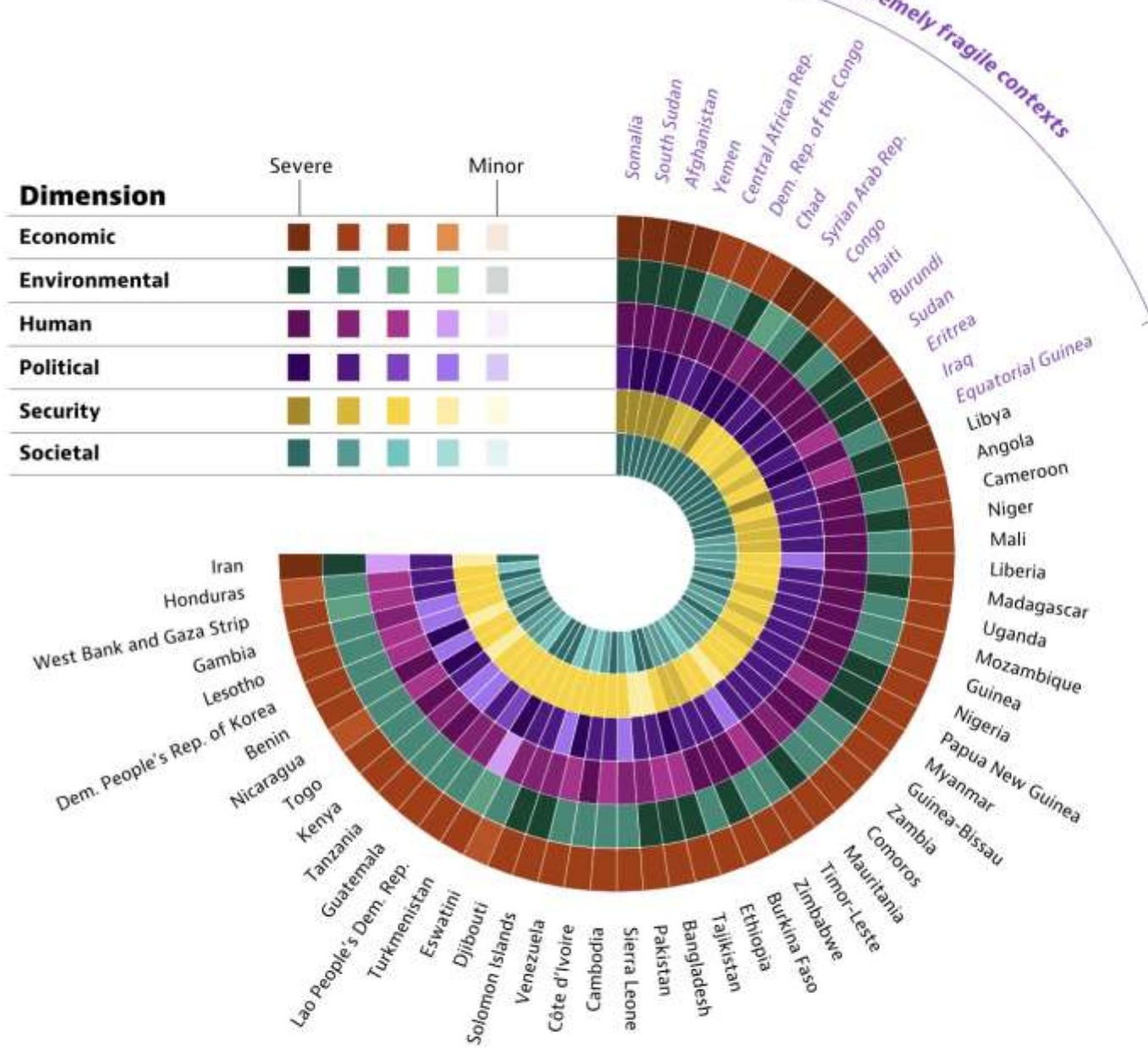
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Renewable energy sources



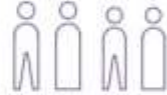


WHAT IS FRAGILITY ?

Population

1.9 billion people, or 24% of the world's population, are living in fragile contexts in 2022. This figure is projected to grow to 2.2 billion people by 2030 and 3.1 billion people by 2050, which will represent 26% and 32%, respectively, of the total world population.

24% of the world's population live in fragile contexts



Source: UNDESA World Population Prospects, 2019

Poverty

An estimated 501 million people were living in extreme poverty in fragile contexts at the start of 2022, accounting for 73% of the world's extreme poor. By 2030, this share is expected to increase to 86%.

73% of the world's extreme poor live in fragile contexts



This is expected to increase to **86%** by 2030

Source: World Bank

Economic growth

Thirty-three of 60 fragile contexts are middle-income economies, with five of them being upper-middle income.

55% of fragile contexts are middle-income economies



Source: World Bank

Food insecurity

Of the 53 contexts worldwide with acutely food insecure people in 2021, 48 are fragile, including the top 10 contexts with the largest number of people in food crisis or worse conditions.



Source: Food Security Information Network

Climate and environment

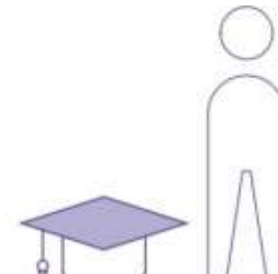
Fragile contexts have accounted for only 4% of cumulative CO₂ emissions, but they are home to 29% of disaster events and 46% of deaths from disasters globally from 2019 to 2021.



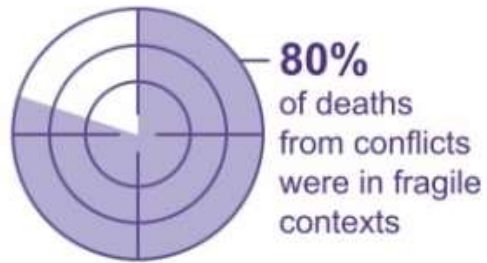
Fragile contexts are home to **29%** of disaster events

Youth

Youth (ages 15-24) account for one out of every five people in fragile contexts. On average, 26% of the youth population in fragile contexts are not in employment, education, or training.



In the 60 fragile contexts that experienced war in 2021, and in 2020, twenty-three contexts did not experience violent conflict. Yet, 15% of deaths from conflict were in fragile contexts in 2021.



Governance

Fragile contexts account for 38 of the world's 59 authoritarian regimes. Nineteen fragile contexts are either hybrid regimes or flawed democracies.



Source: Economist Intelligence Unit

In fragile contexts, one out of three women reported experiencing physical violence from an intimate partner in 2018, compared to 15% worldwide.

1 in 3 women suffered physical violence in fragile contexts



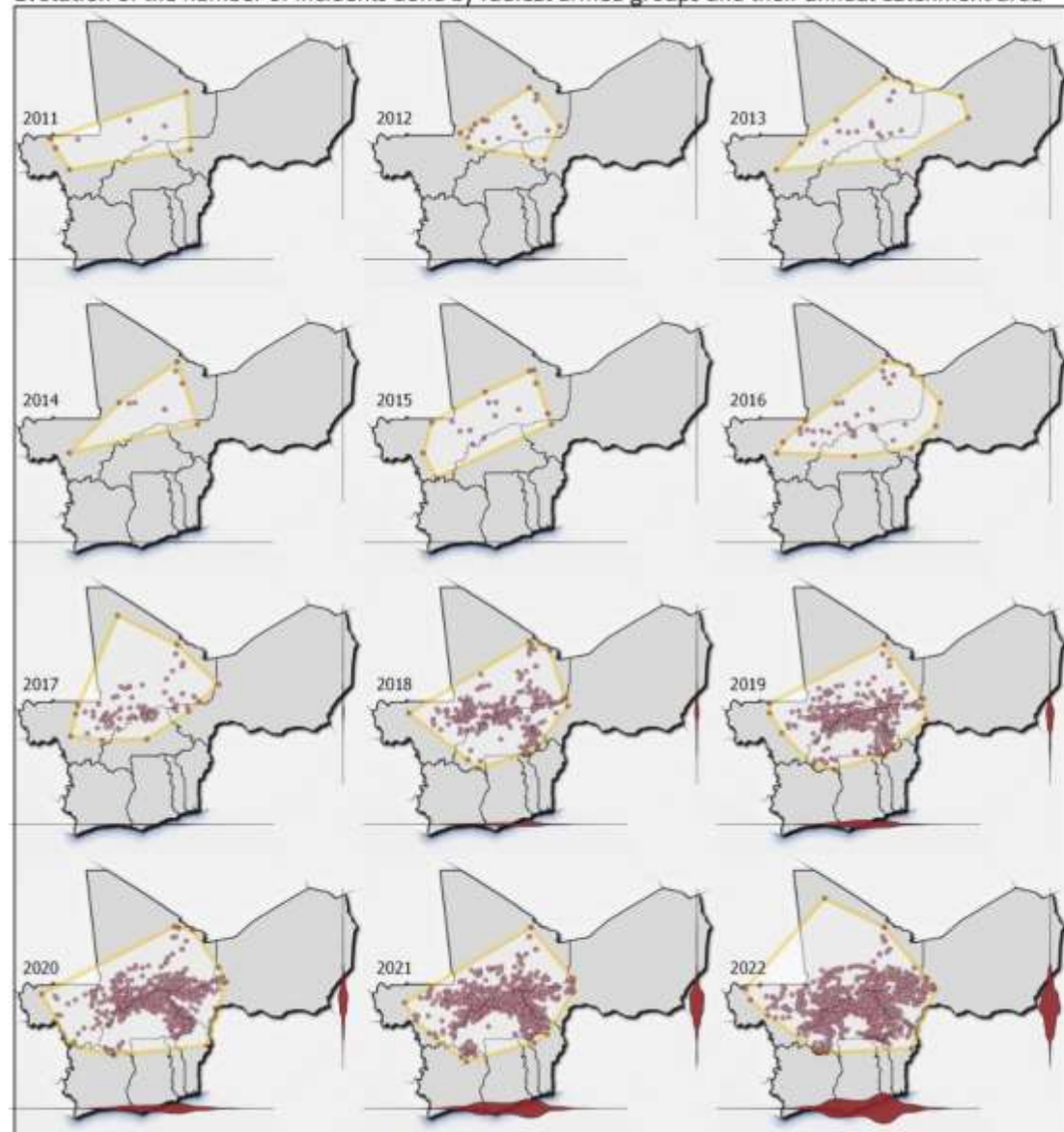
Forced displacement

Fragile contexts host 64% of the world's forcibly displaced population, including 80% of all internally displaced persons. 78% of all forcibly displaced persons world-wide have fled from fragile contexts.



Evolution of the number of incidents done by radical armed groups and their annual catchment area

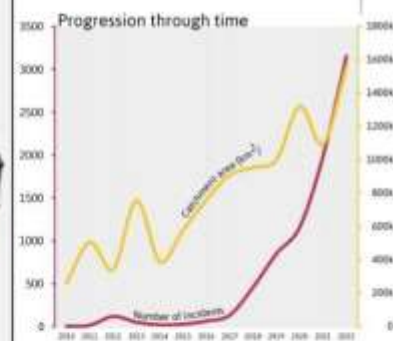
Central Sahel | 2011 - 2022 period



Area of catchment (convex envelop)

Incident

Distribution: latitudinal
longitudinal



The catchment areas are obtained by making convex areas around the incidents. Therefore, they do not represent the areas of influence of the concerned armed groups, but they do allow to estimate the evolution of a situation on a macro scale.

Note: data does not show any incidents in Ghana, but it is not clear whether this is factual or if it corresponds to a lack of data.

Made with: RStudio, QGIS, Inkscape, Rawgraphs.

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2030: SDG 7

- Target 7.1: Universal access to affordable, reliable and modern energy services.
- Target 7.2: Increase substantially the renewable energy in the global energy mix.
- Target 7.3: Double the energy efficiency

Energy Justice

- 800 million no access to electricity
- 86% live in fragile countries
- conflict,
- lack of security,
- weak government capacity,
- divided societies
- climate change
- Biomass constraints
- environmental destruction

TRIPLE GAIN?

- Energy justice
- Climate carbon footprint
- Stability and progress

Figure 2.15 Total final energy consumption in Africa by sector and source, 2018

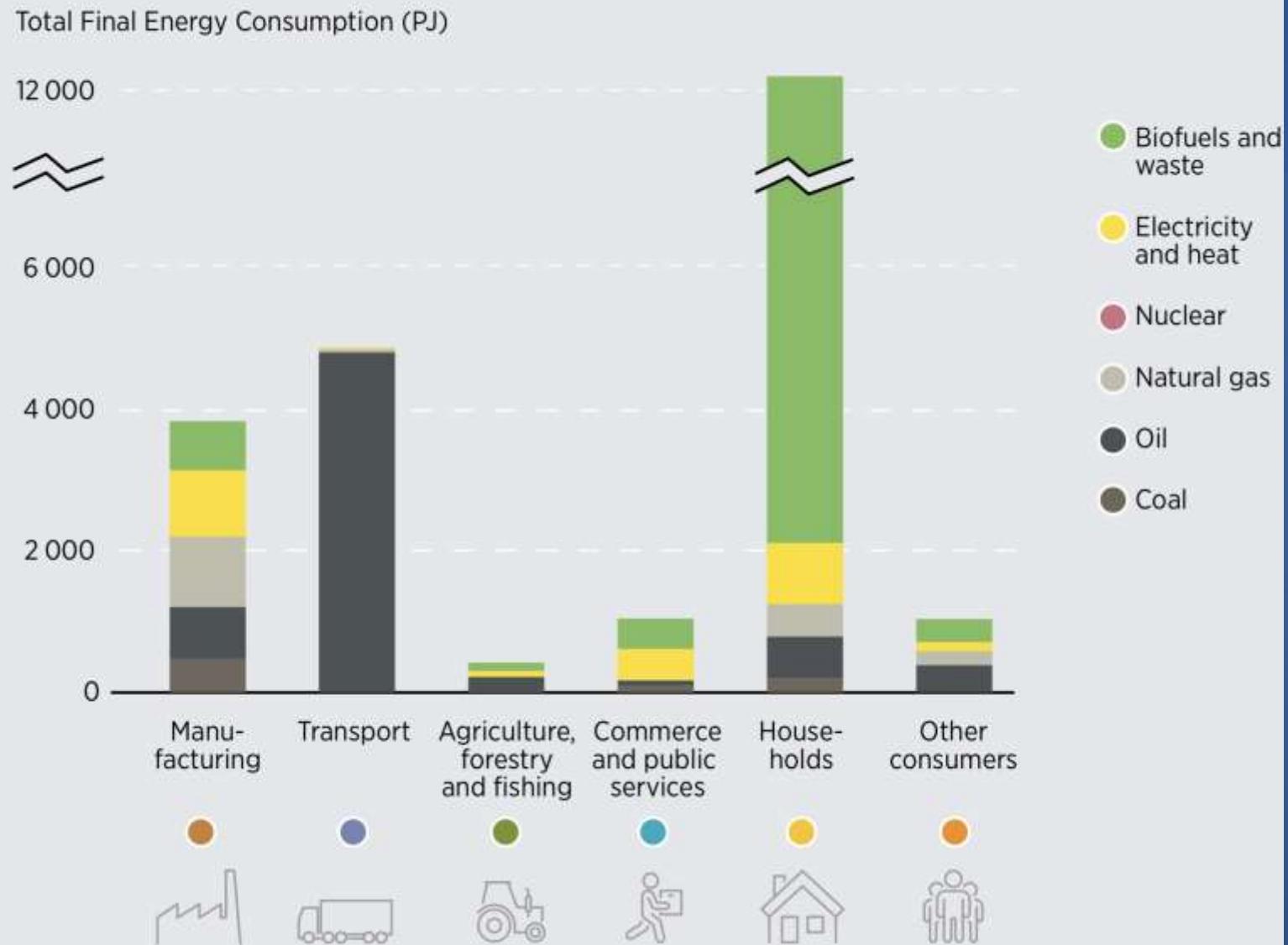
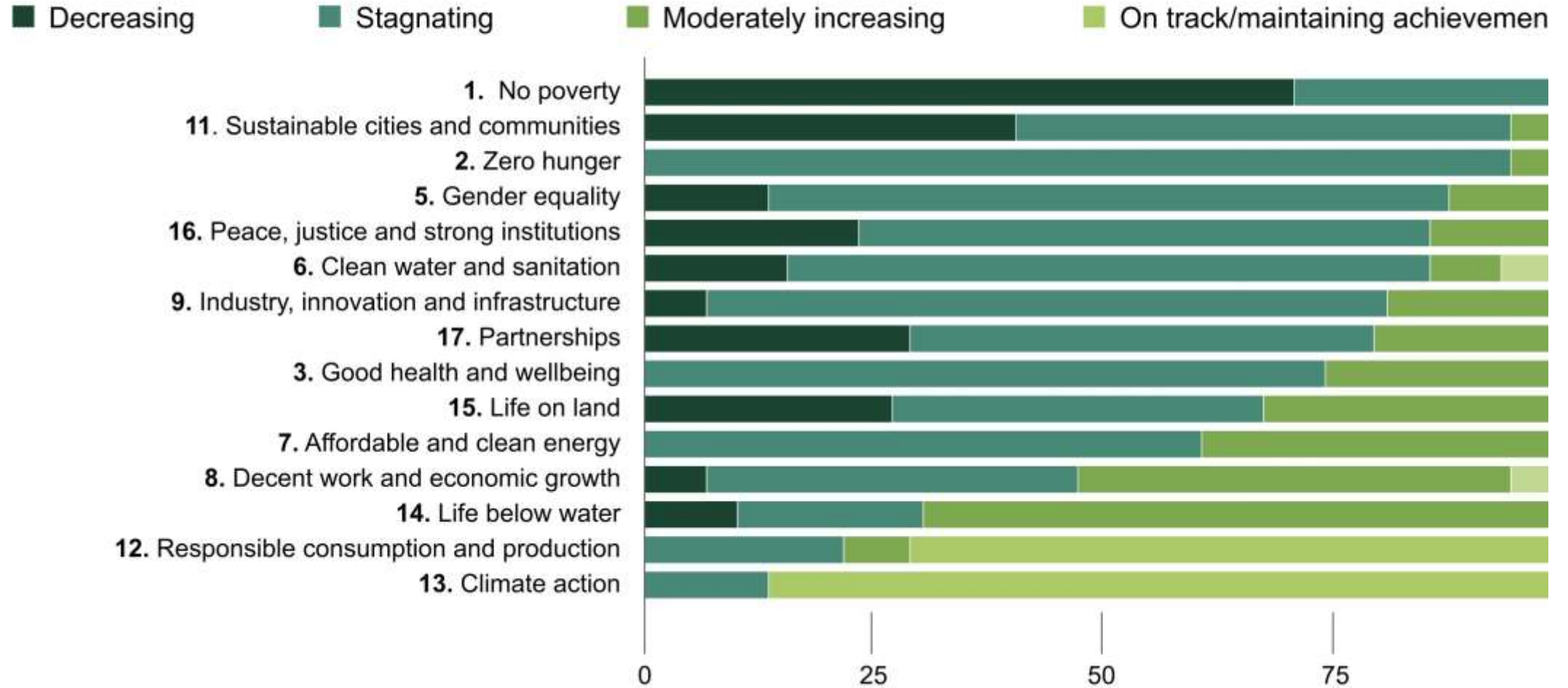


Figure 1.6. Progress towards the Sustainable Development Goals varies considerably, but fragile contexts overall are at risk of being left behind

Extremely fragile contexts

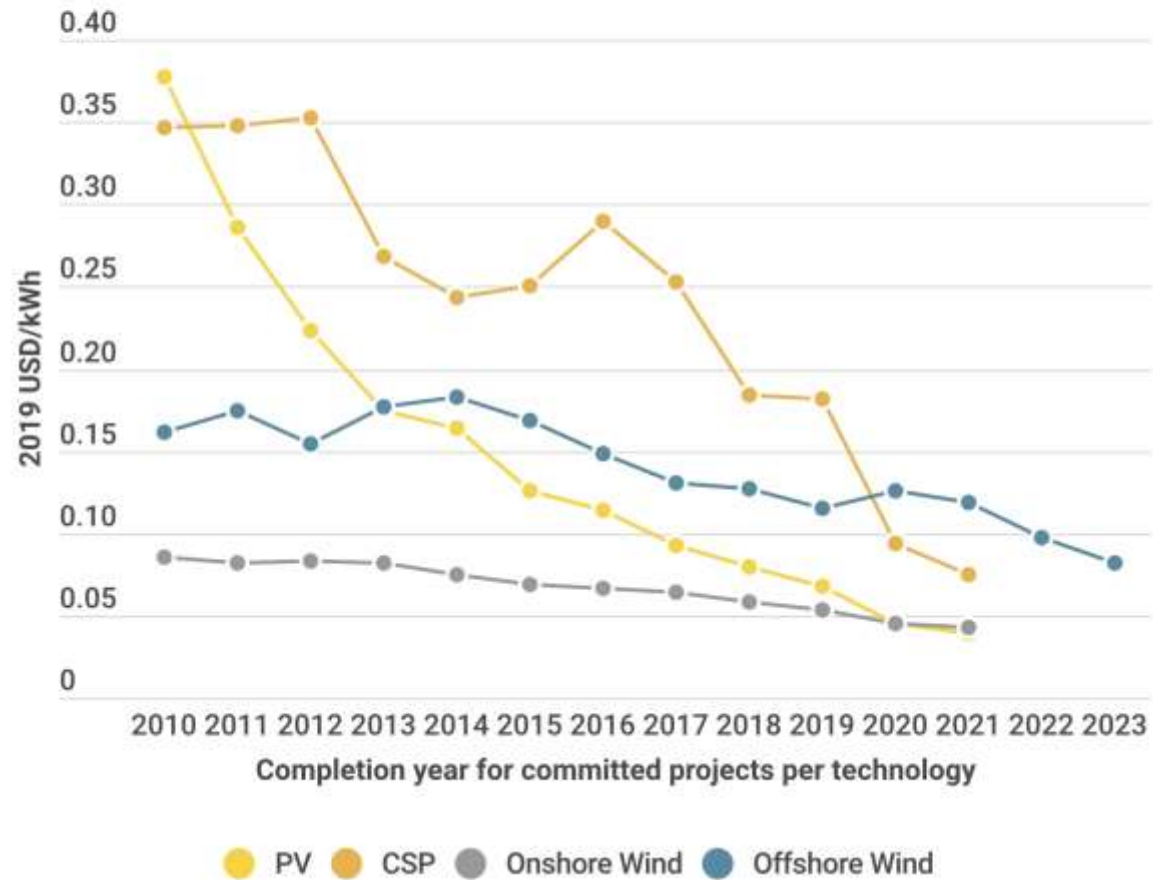


Power planning in extreme fragility or conflict

- Forced outages
- Power system assets attacked
- repair times increase
- labour shortages
- unavailability of spare parts
- Fuel shortages
- disruption of imports and transportation
- currency depreciation and fluctuation
- extra security measures
- suspension of funding

POWER GENERATION COSTS IN 2019

Costs continued to fall in 2019 for solar and wind power technologies



Solar PV Mini Grid

- Small-scale electricity generators and energy storage
- distribution network
- small, localised group of customers
- Independent from the national transmission grid
- Powered by renewables (solar PV, wind, hydro), or diesel-renewable hybrids.

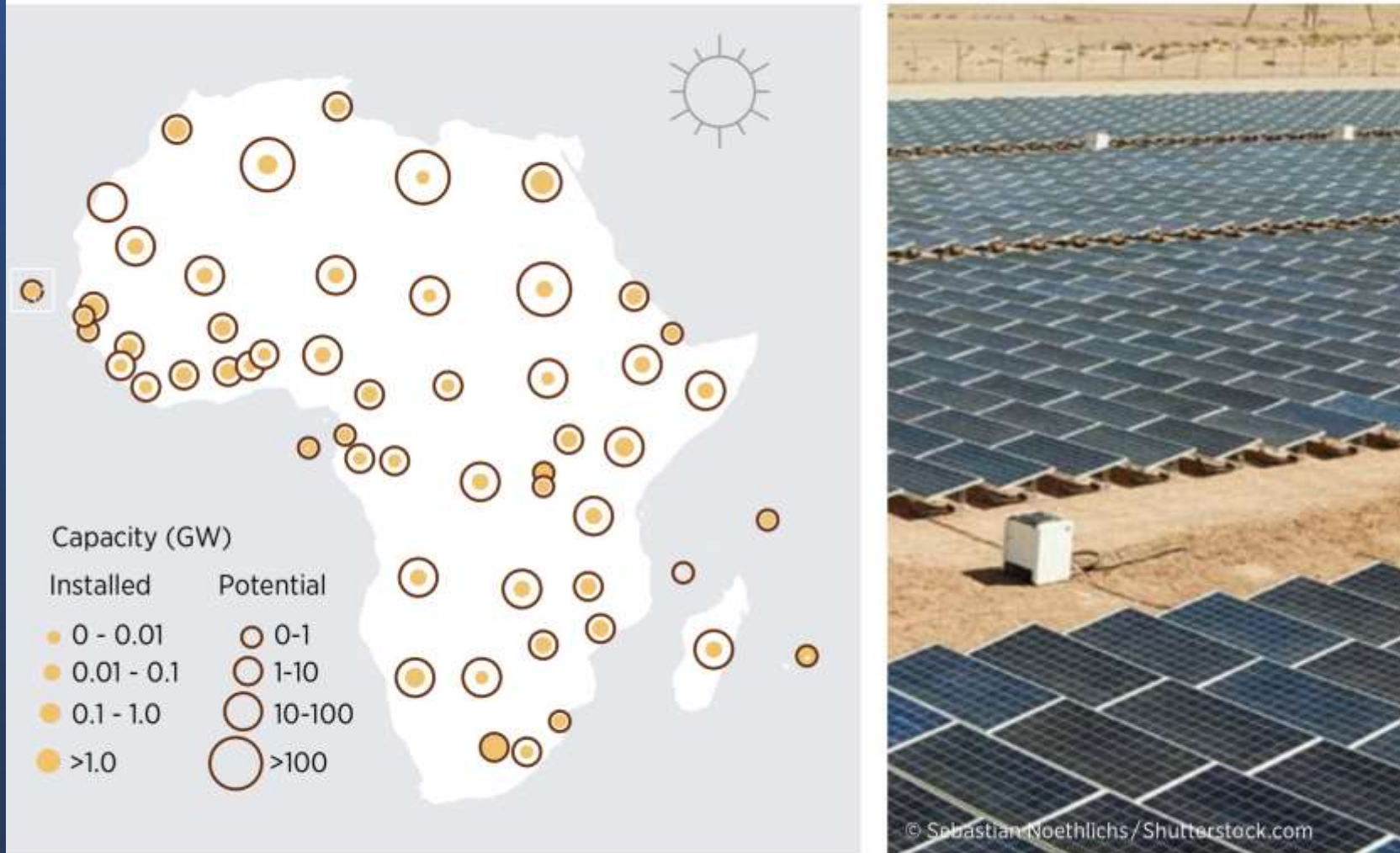


Solar PV Mini Grid

- Irrigation,
- grinding mills,
- Mobile recharging
- Moped recharging,
- Household Lighting,
- Longer working hours
- School work
- Food preservation
- Medical cold chain



Figure 2.10 Solar PV potential and installed capacity, Africa



Source: Solar potential, Africa: IRENA; Installed solar capacity, Africa: IRENA, 2021a; Base map: UN boundaries

Note: GW = gigawatt; km = kilometre.

Solar PV Mini Grid

- Maintenance
- Spare parts
- Finance
- Micro credit
- User pay-as-you-go (PAYG) model
- Climate finance
- COP 28 AE AE UAE
- Multi partner Trust Funds

FUELWOOD SOVEREIGNTY ?



Tanzania: Fuelwood sovereignty?

- 90 % population use fuelwood
- Harvested 63 million cubic Meters
- Sustainable harvest 42 million cubic Meters
- Deforestation deficit 19 million cubic Meters



(b)



(c)



Cooking

- Deforestation,
- Fuelwood, charcoal
- Collection burden
- Gender inequality
- Liquefied petroleum gas (LPG) or liquefied natural gas (LNG)
- On farm Biomass
- Cooking techniques



Sustainable Energy in Fragile settings

- Proximity
- Agency
- Cost efficiency

FINANCE RISKS ?

Table 3.6 Key investment risks and mitigation tools to address them

Risk	Definition	Risk-mitigation tools
Policy or regulatory risk	Risks associated with changes in legal or regulatory policies that have significant, adverse impacts on project development or implementation (e.g., incentive programmes, taxes, interconnection regulations, permitting processes).	Government guarantees, potentially backed by partial risk/credit guarantees, export credit guarantees and political risk insurance.
Resource risk	Risks associated with uncertainties around the availability, future price and/or supply of the renewable energy resource (e.g., resource risks related to geothermal projects).	Government guarantees and grants, convertible grants, geothermal exploration insurance.
Technology risk	Risks associated with use of nascent technology or unexperienced labour deploying it.	Specialised insurance products.
Grid and transmission risk	Risks associated with limitations in interconnection, grid management and transmission infrastructure (including curtailment risk).	Government guarantees, liquidity guarantees, natural disaster insurance.
Counterparty risk (power off-taker risk)	Credit and default risk by a counterparty in a financial transaction. For renewable energy investments, this category is related to the risk of default or non-payment by the power off-taker, typically the electric utility.	Government guarantees, political risk insurance, partial risk/credit guarantees, export credit guarantees, liquidity facility, options and termination clauses in power purchase agreements.
Currency Risk	Risks associated with changing or volatile foreign exchange rates that adversely impact the value of investments and arises when there is a mismatch between assets (revenues) and liabilities (debt financing).	Government guarantees, currency risk hedging (swap, forward), loans in local currency or covered in the power purchase agreement, partial credit guarantees.
Re-financing risk	Risk that a borrower is unable to re-finance the outstanding loan during the life of the project owing to inadequate loan terms (high cost of borrowing, mismatch between loan maturity and lifetime of the asset).	Larger supply of capital market instruments for re-financing (e.g. green bonds/funds), partial credit guarantees.
Liquidity risk	Possibility of operational liquidity issues arising from revenue shortfalls or mismatches between the timing of cash receipts and payments.	Government guarantees, letters of credit, fully funded escrow accounts, liquidity guarantees, options.
Political risk	Risks associated with political events that adversely impact the value of investment (e.g., war, civil disturbance, currency inconvertibility, breach of contract, expropriation, non-honouring of sovereignty obligations).	Government guarantees, political risk insurance, partial risk/credit guarantees.
Natural disasters	Risk that a natural disaster will affect the ability of a counterparty to fulfil its obligations (e.g. produce power, make payments).	Property, casualty and specialty insurance.

Political Dynamite ?

- Decentralisation resisted by central governments
- Loss of central control
- Empowerment of opposition groups
- Citizens wary of state expansion
- Decentralisation either strengthening or weakening stability or national sentiment.
- Equality: fairness and preferential treatment of some groups will likely arise.
- Factor in dynamics
- Work closely with all stakeholders.

Key take aways

- Energy HELPS, but
- Cannot stand alone
- Good governance
- Work nationally as well as locally
- Involve stakeholders
- Adapt finance to context (Mega credit...Micro credit, De-risking)
- Protect investments
- Pay-back schemes

Urban illegal Slum Spider networks



Rural Solar grand Mothers





THANK YOU!