



NEXUS Gains:
Realizing Multiple Benefits
Across Water, Energy, Food
and Ecosystems

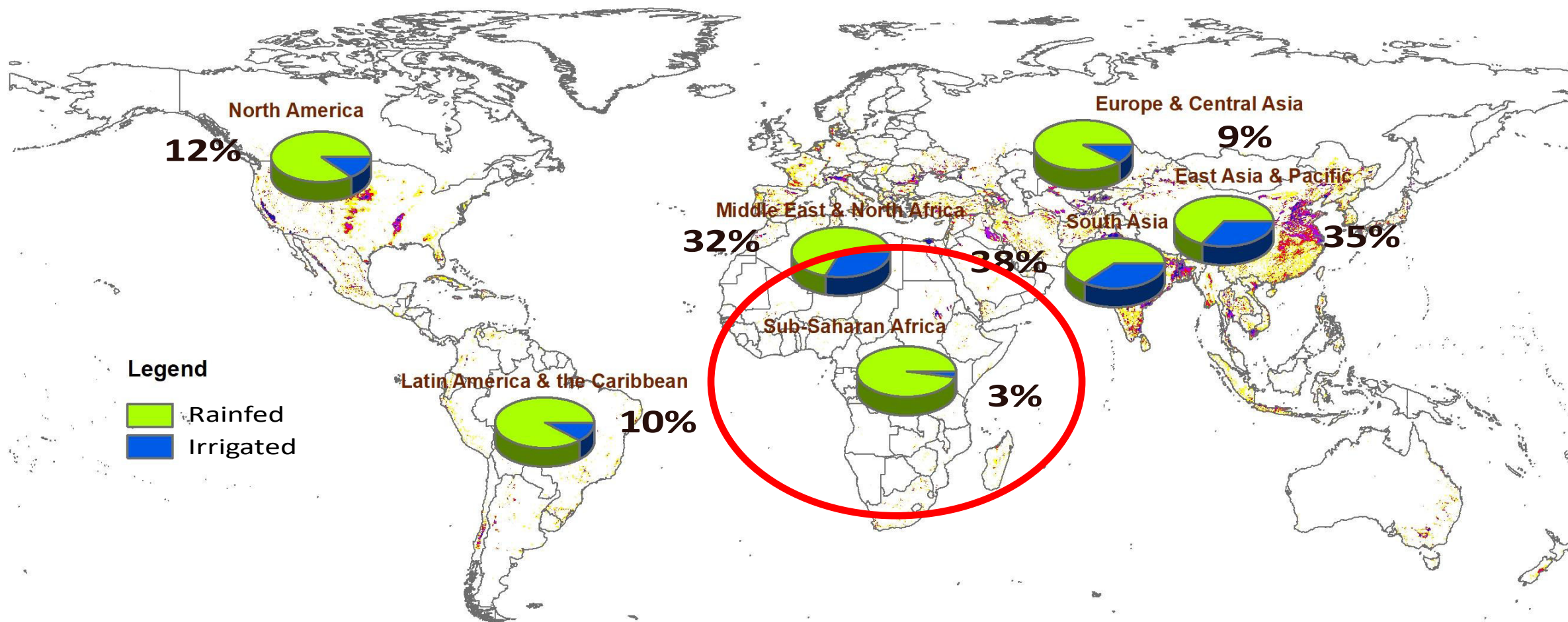


Understanding the Climate Risk in Investing in Solar Irrigation in Sub-Saharan Africa

Hua Xie with Claudia Ringler

XVIII World Water Congress Beijing - China

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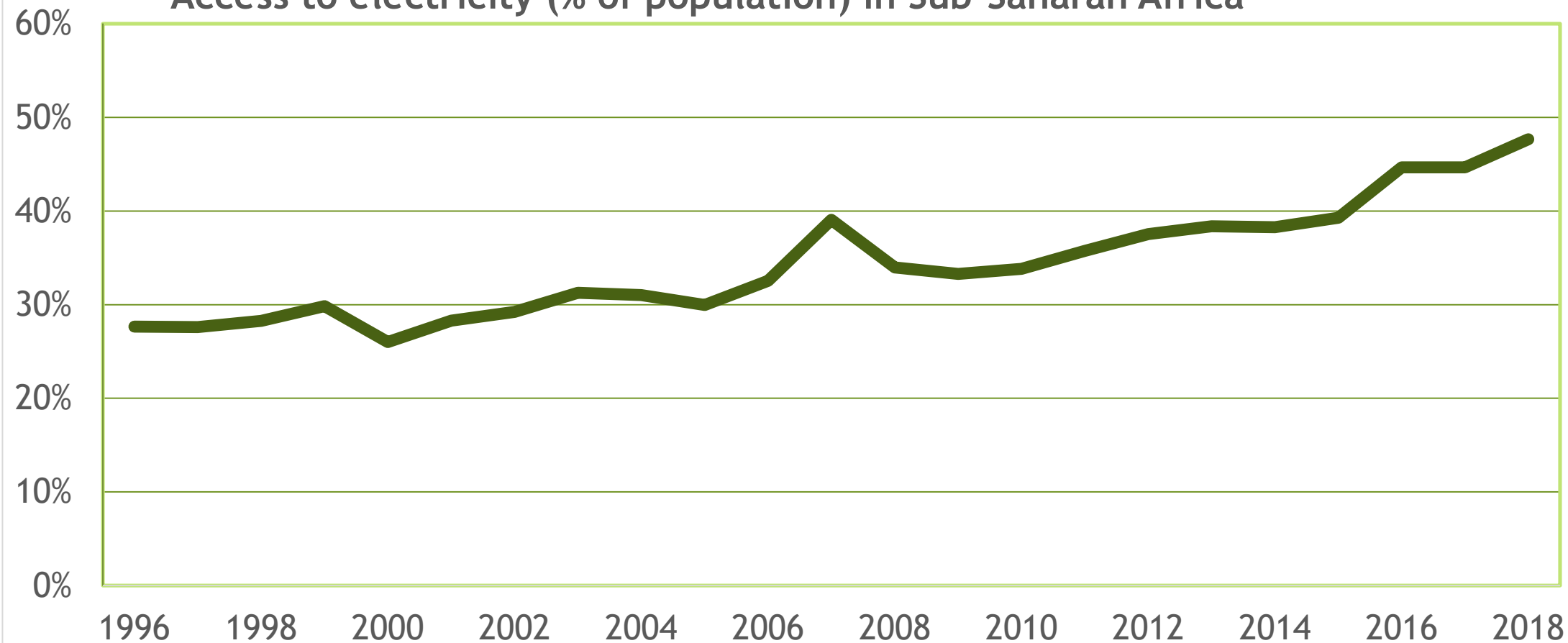
Legend

- Rainfed
- Irrigated

Data source: IFPRI&FAO



Access to electricity (% of population) in Sub-Saharan Africa

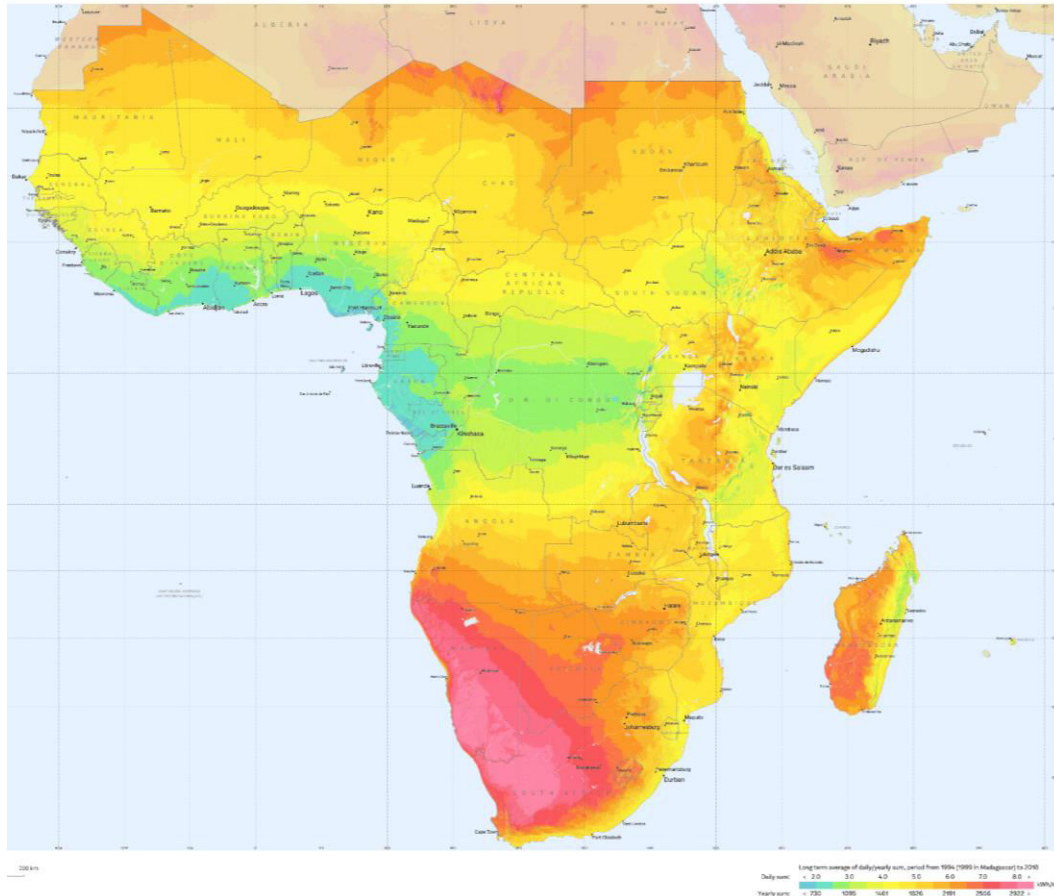


Data source: World Bank

Solar irrigation



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World Bank/Solargis



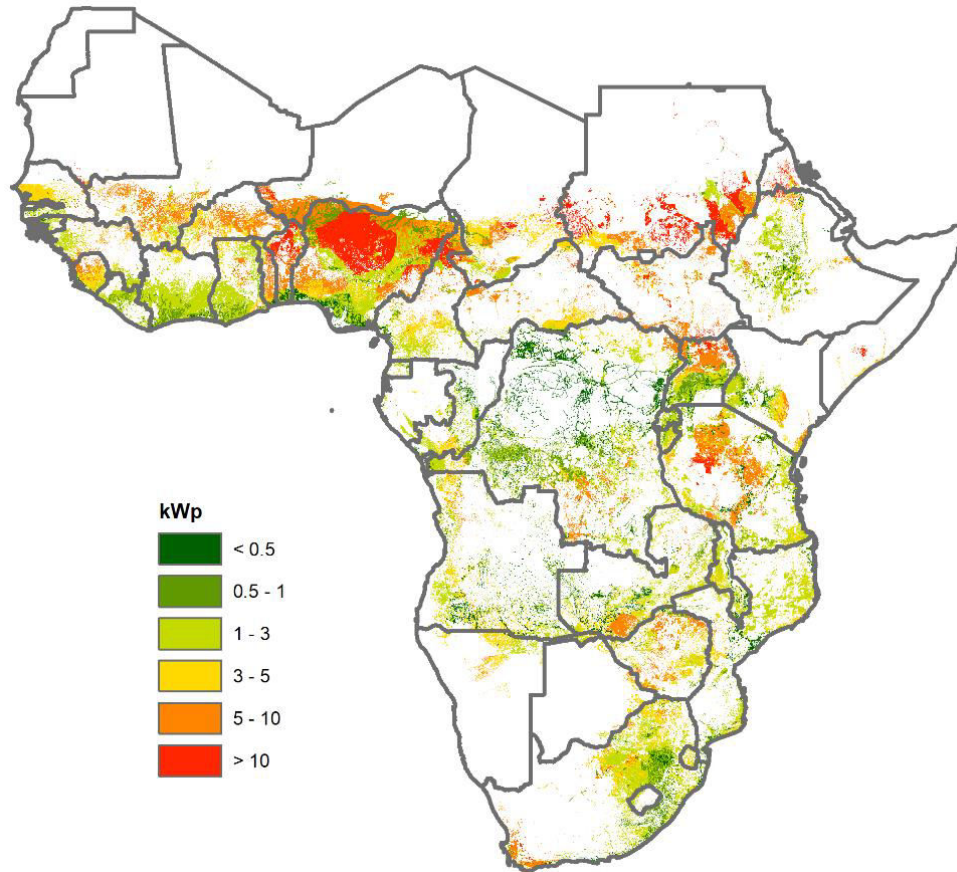
Jeffery M Walcott / IWMI

Cost efficiency of solar irrigation in SSA

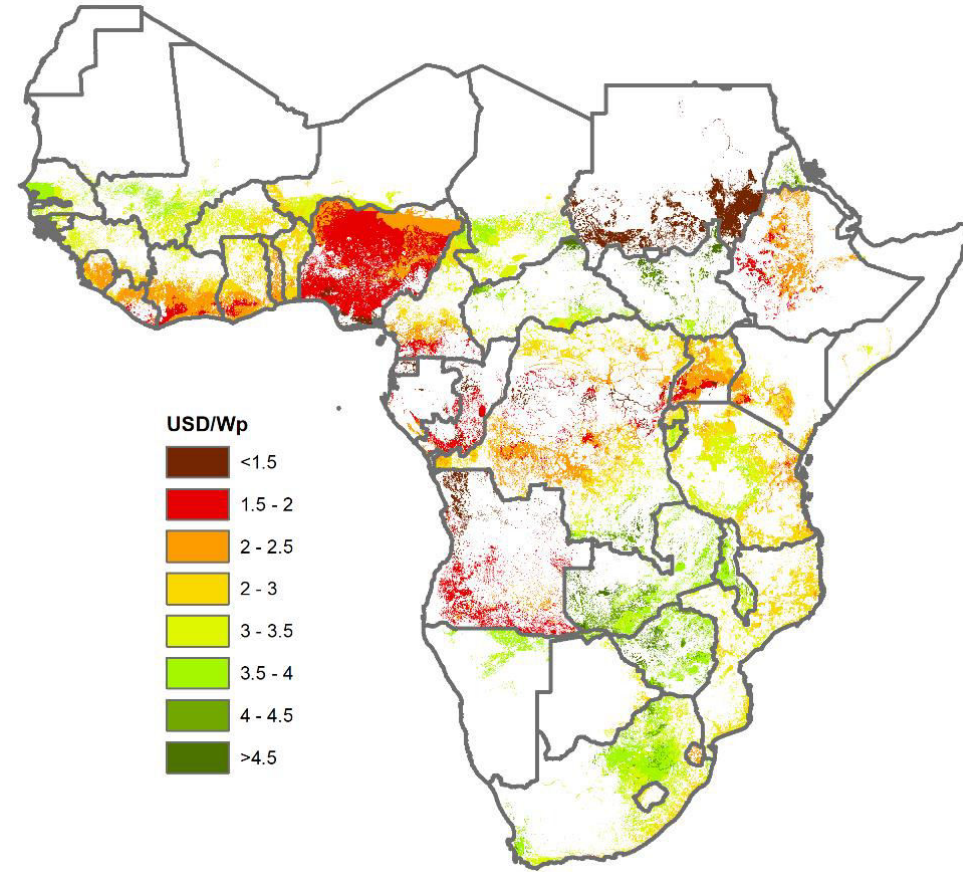


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(a) Solar module capacity requirement



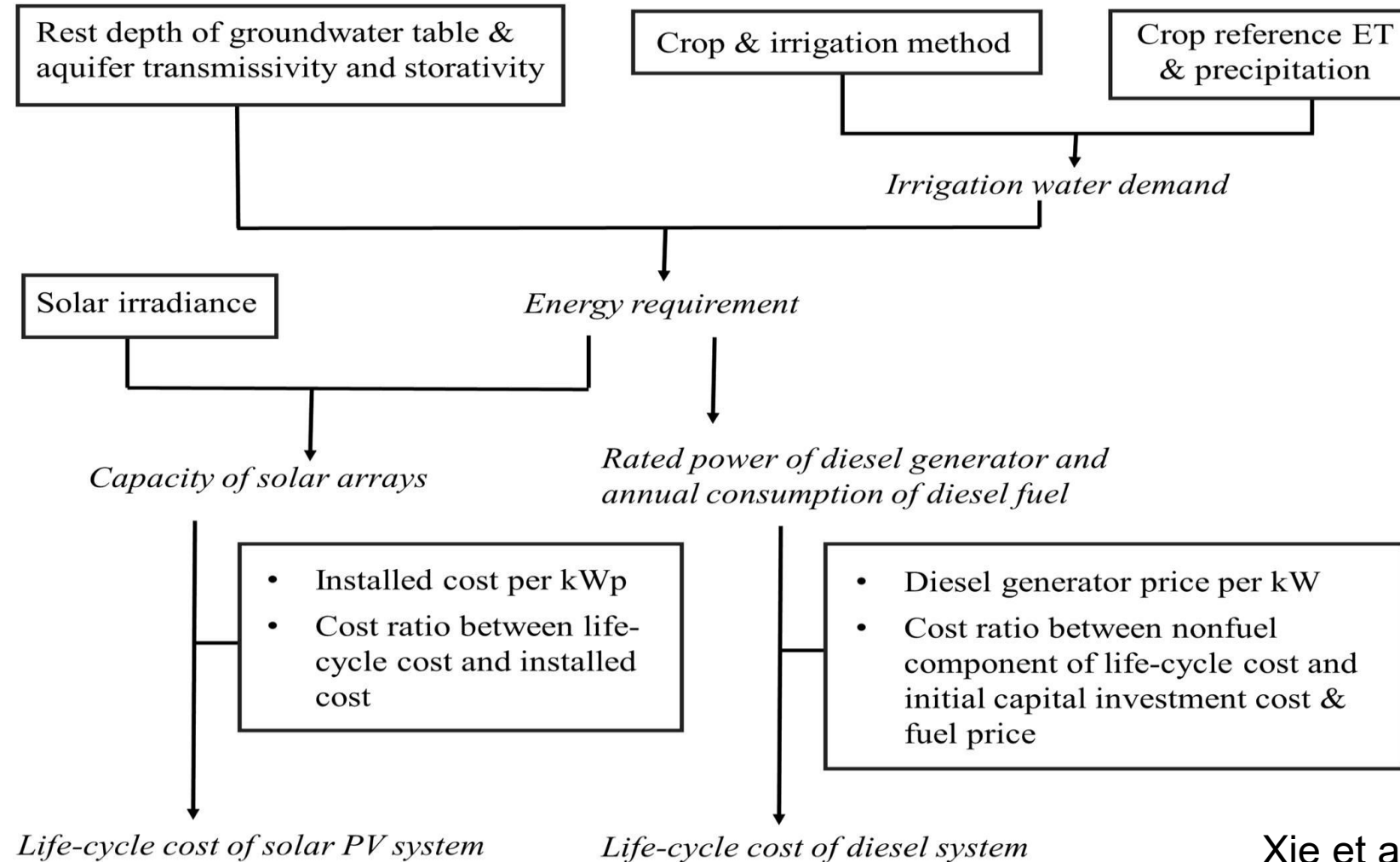
(b) Solar breakeven installed cost



System sizing and life-cycle cost estimation



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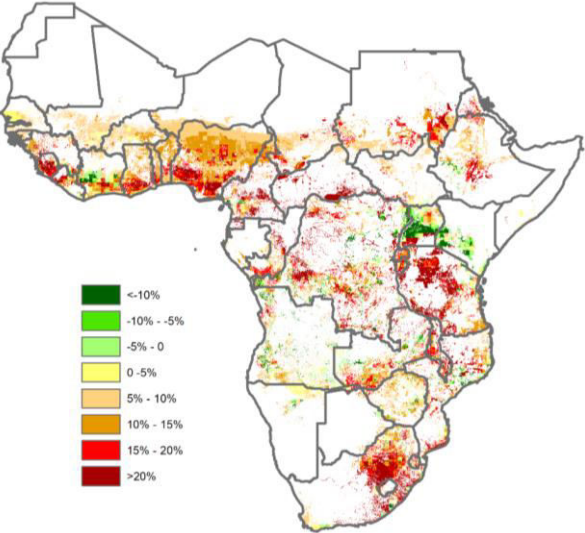
Xie et al. (2021)

Changes in solar module requirement

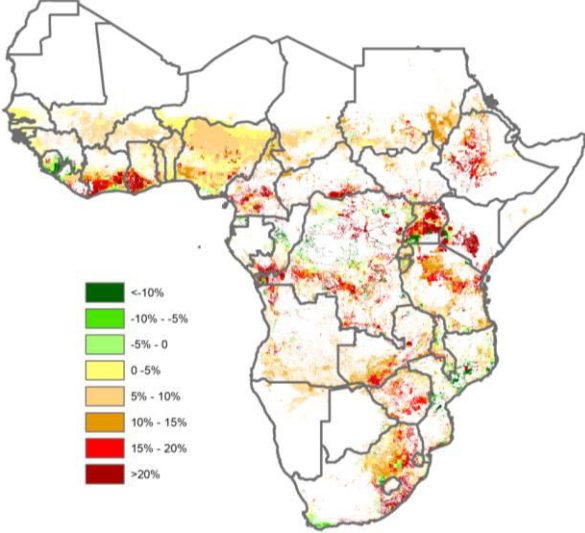


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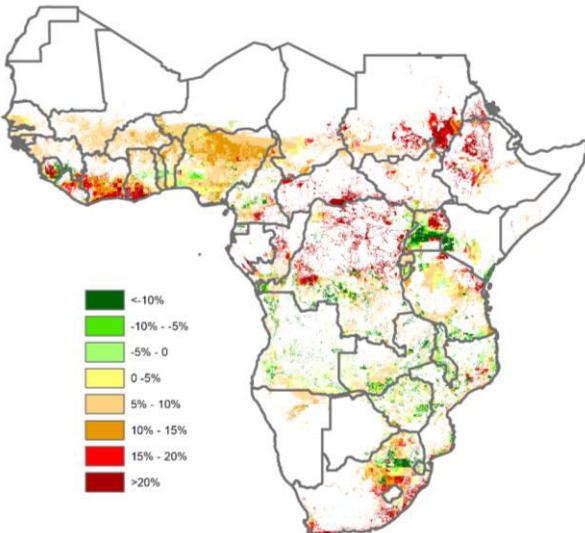
(a) IPSL



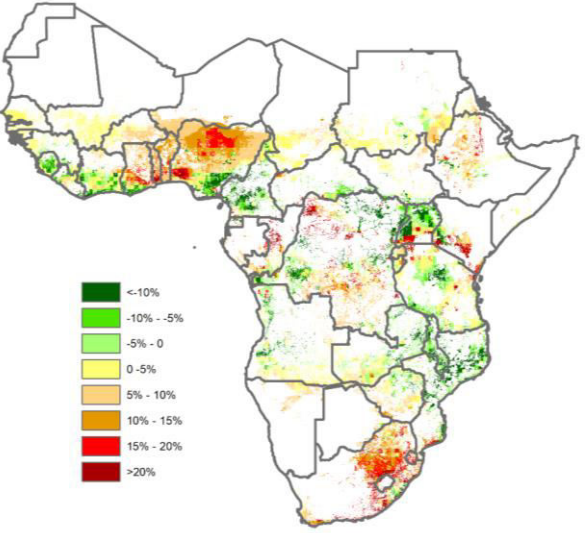
(b) GFDL



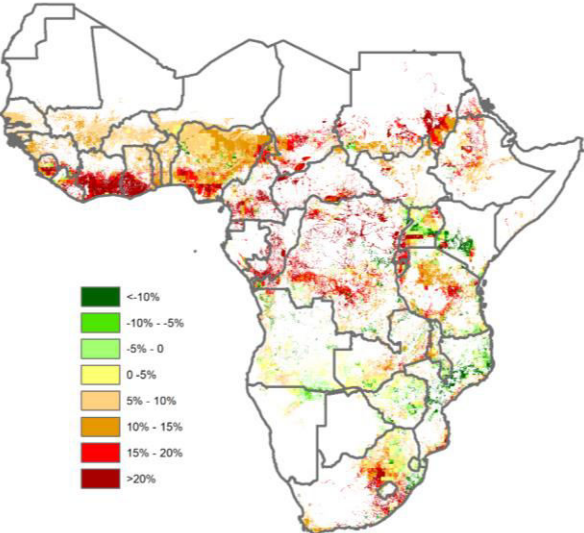
(c) MRI



(d) MPI



(e) UKESM1



– projected under climate change scenarios for 2060 and CMIP6 SSP5-8.5

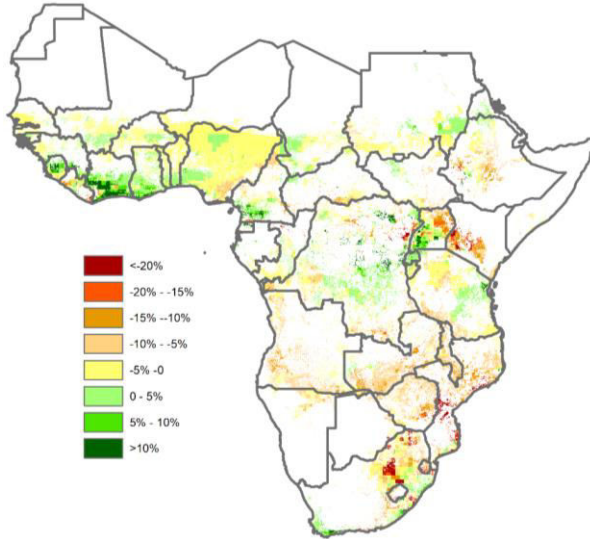
Xie et al. (2023)

Changes in solar breakeven installed cost

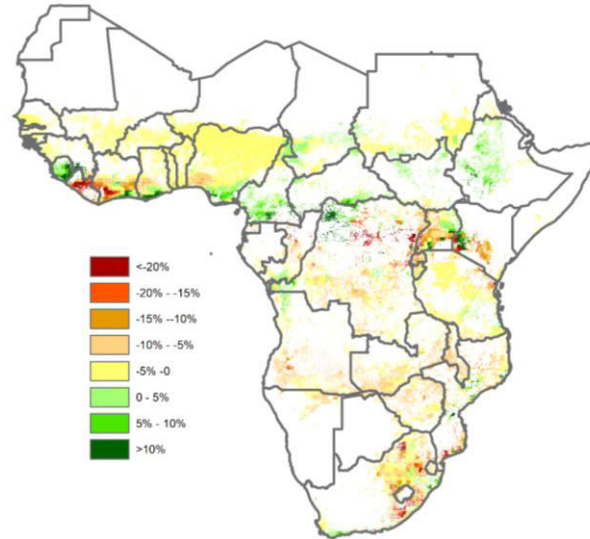


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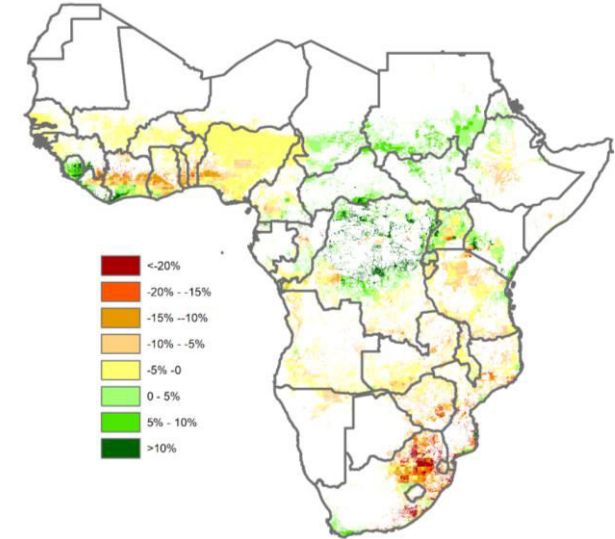
(a) IPSL



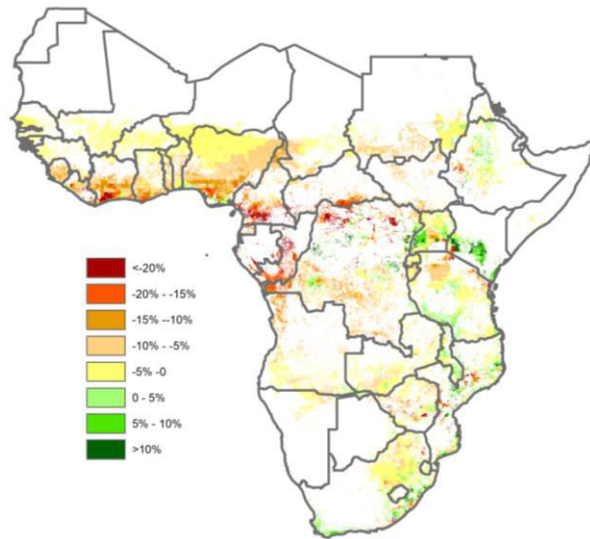
(b) GFDL



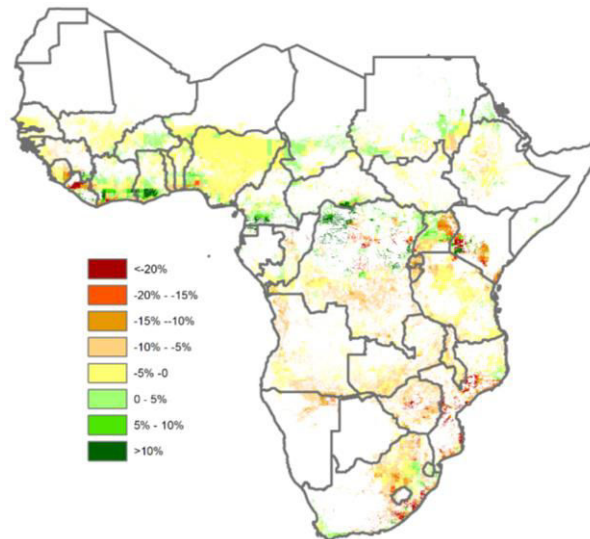
(c) MRI



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(e) UKESM1



– projected under climate change scenarios for 2060 and CMIP6 SSP5-8.5

Xie et al. (2023)

Summary

- Climate change will cause increased investment needs for solar irrigation in Sub-Saharan Africa
- Climate change will affect the cost efficiency of solar irrigation relative to diesel irrigation adversely
- The adverse impacts of climate change on cost efficiency of solar irrigation may be offset by the decline in costs of solar energy



Thank You !



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