



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

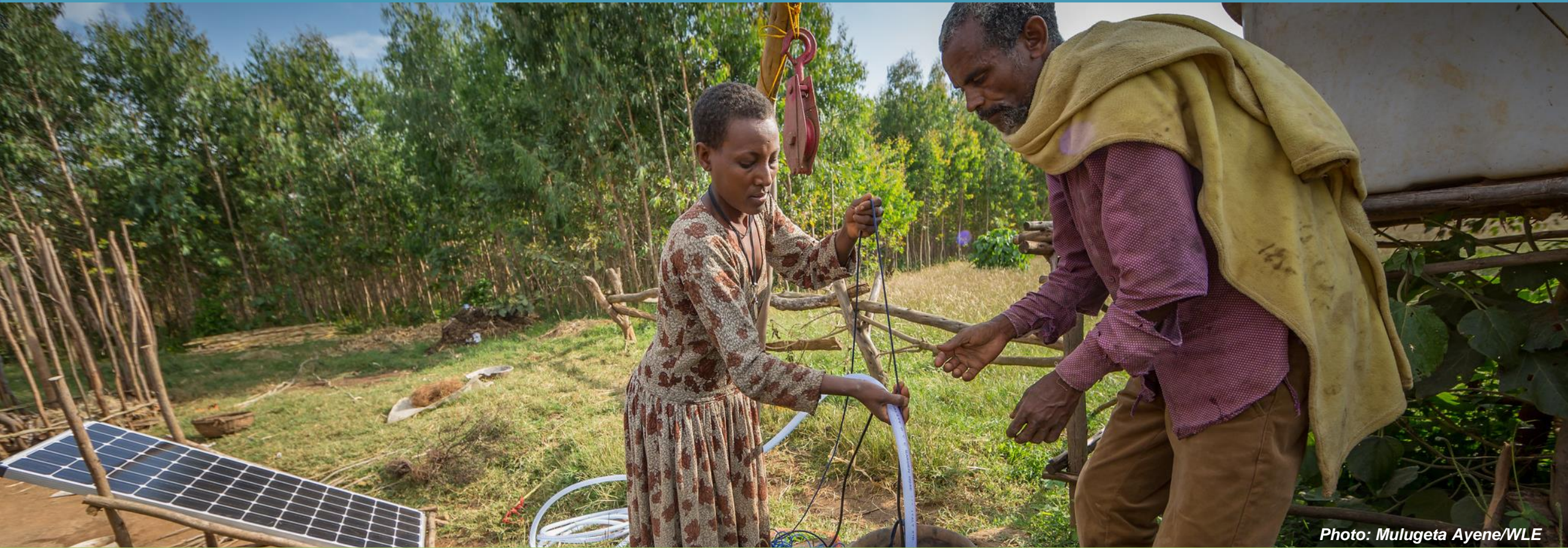


Photo: Mulugeta Ayene/WLE

Solar-powered irrigation: Constraints & opportunities under climate change?

Hua Xie and Claudia Ringler, IFPRI



POTENTIAL OF SOLAR GROUNDWATER IRRIGATION TO CONTRIBUTE TO SOCIO-ECOLOGICAL RESILIENCE

- Diesel pump sales continue to outpace investment in solar irrigation—but the tide might well turn toward solar! Based on a simulation modeling exercise, these factors help:
 - Having access to lots of sunlight! In fact, in more than 80% of GW irrigable area of Southern Africa solar is more cost-effective than diesel, also in large parts of Central Africa
 - Higher diesel cost turns the tide toward solar, and solar reduces
 - Diesel fuel costs increase linearly with irrigation water needs, whereas solar panels are sized to meet peak irrigation demands, solar more profitable for water guzzling crops
 - Connecting the pumps with different water-saving field application technologies can reduce solar and diesel pump size
 - *Also: sales points in rural areas, dedicated financing options, after sales-service, demonstrations, etc. can support uptake*

Xie et al. (2021)



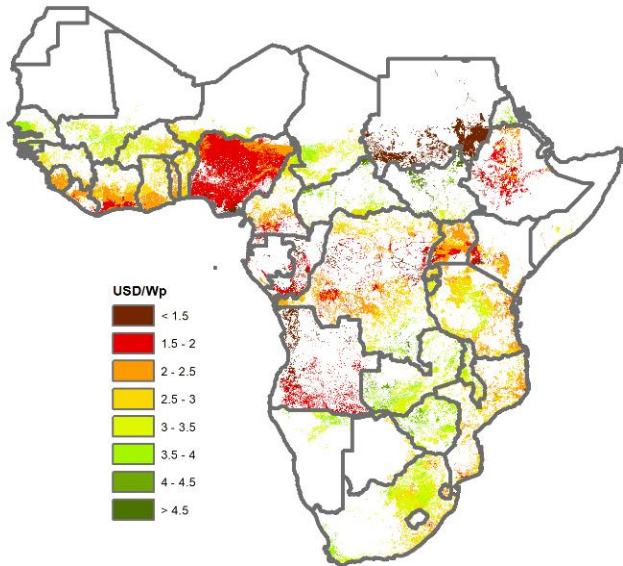
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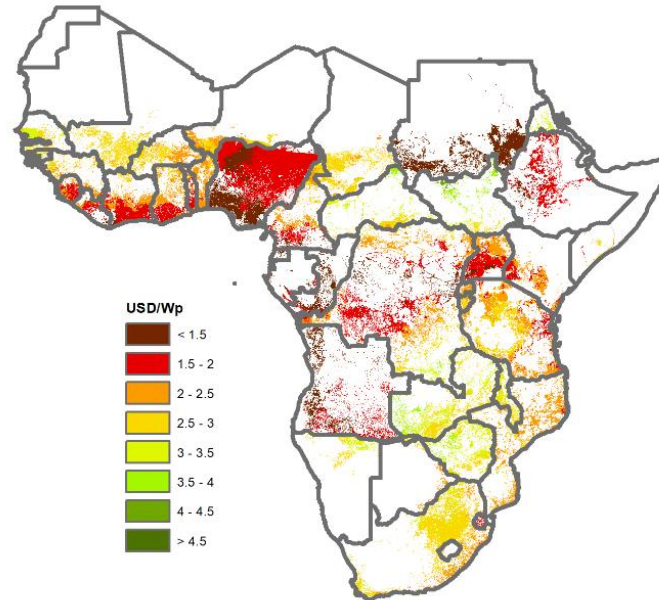
IMPACT OF CLIMATE CHANGE ON PERFORMANCE OF SOLAR IRRIGATION

- Impact of climate change on cost-effectiveness of solar irrigation relative to diesel irrigation is assessed under a recent CMIP6 scenario
- The analysis shows that climate change favors the use of solar over diesel irrigation

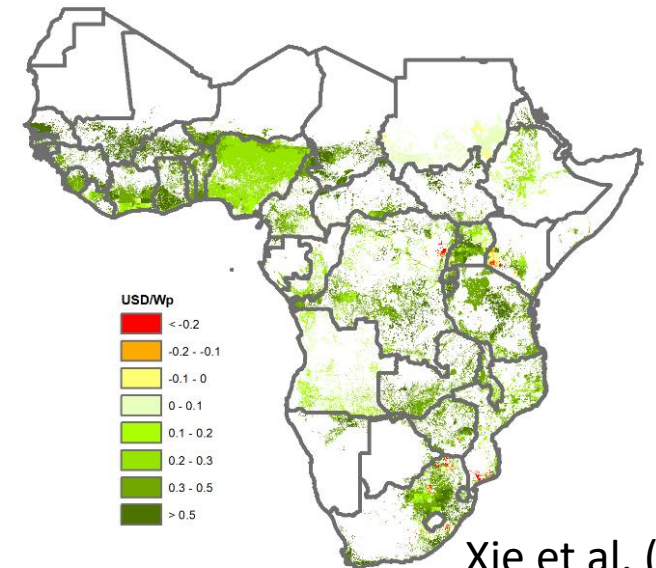
Future (2050-2060)



Historical (2006-2015)



Difference



Xie et al. (in prep)

KNOWLEDGE GAPS

- How does agricultural water use behavior change with solar pumps (compared to diesel or other agricultural water management technologies and practices)?
- How can women and poorer farmers be reached more effectively with this technology?
- How can we develop appropriate institutions for groundwater governance given (likely) more rapid depletion of groundwater with solar pumps?



Petra Schmitter, WB