Small-scale irrigation: the answer to ecosystem health?

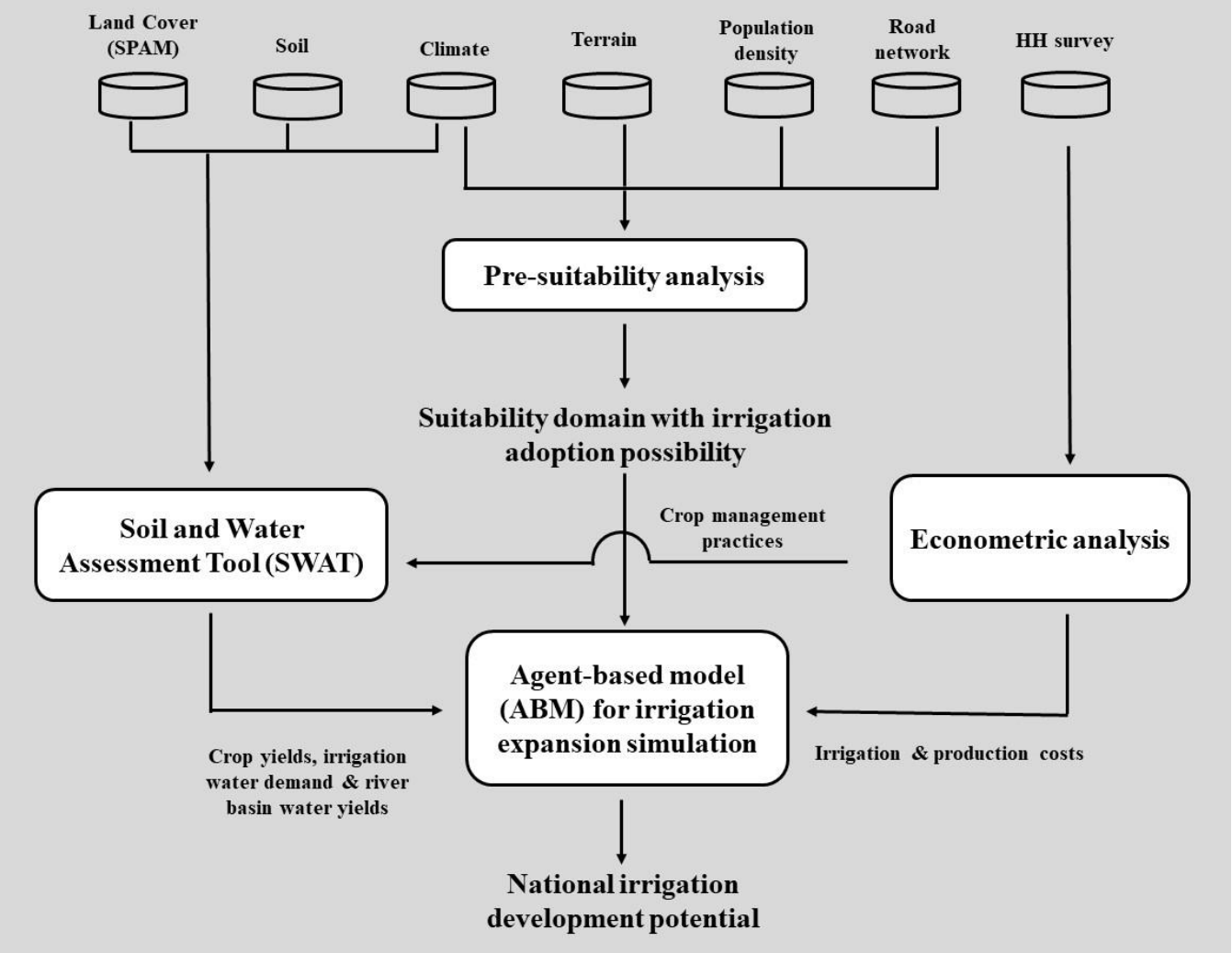
SIWI World Water Week 2018 – 26th August

Mapping small-scale irrigation for environmental sustainability and human prosperity: The case of Ethiopia

Claudia Ringler and Hua Xie

International Food Policy Research Institute

Mapping of small-scale irrigation in Ethiopia: Methodology



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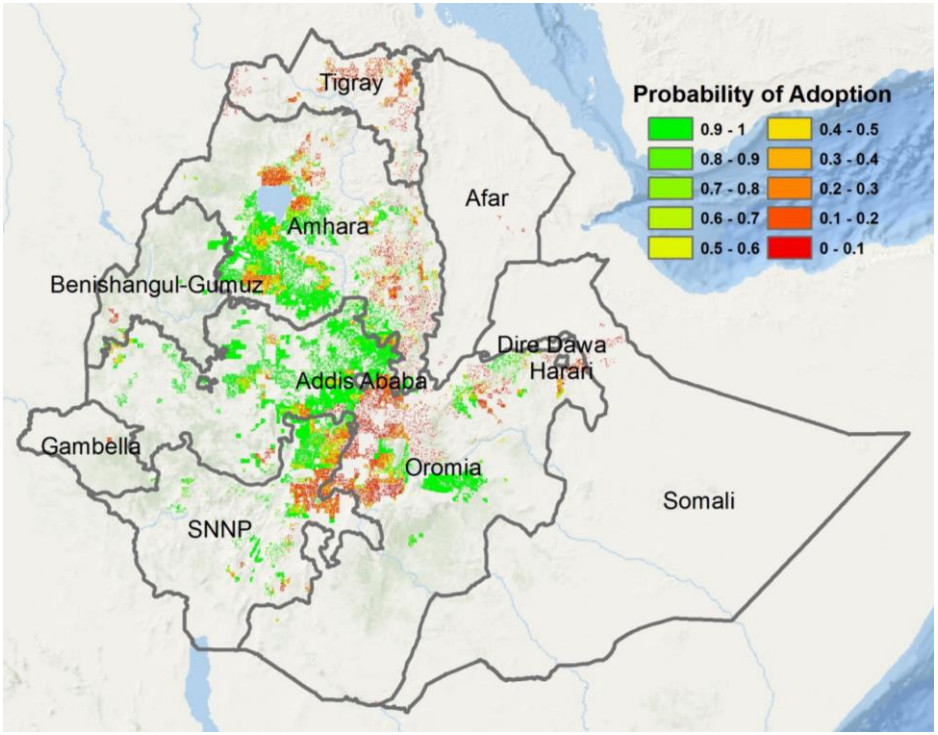
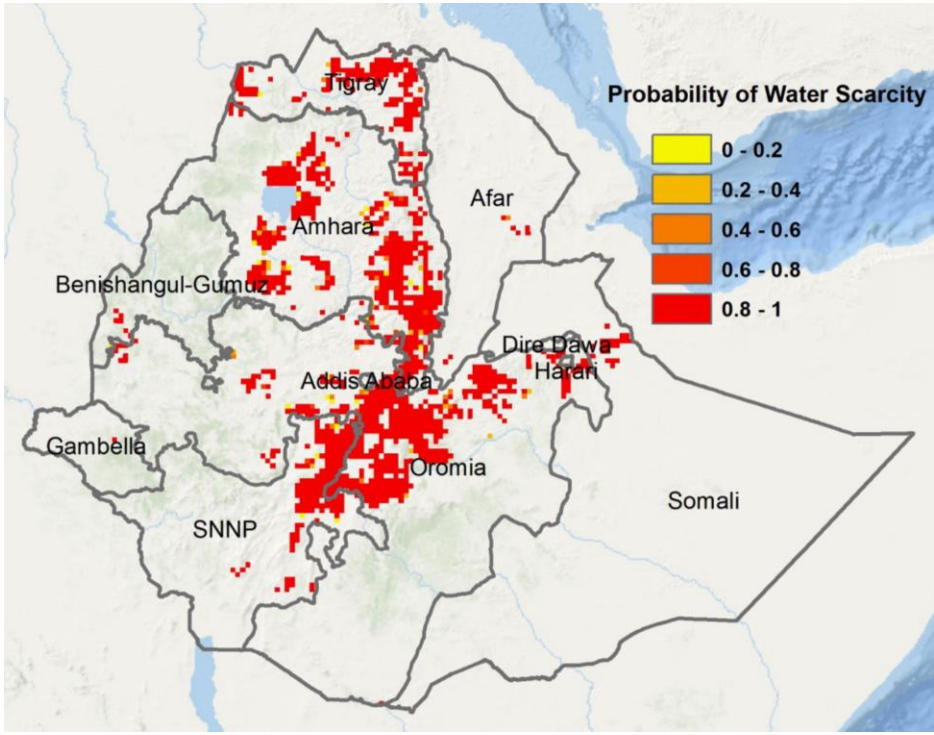
Probability of Irrigation Adoption and Water Scarcity





High adoption probability for SSI at Lake Tana and Ethiopian Great Rift Valley areas, and SSI development may pose widespread water scarcity.

Estimated Small-Scale Irrigation Adoption Potential--Ethiopia

	Potential area (thousand hectares)	Annual profits (million USD/ha)	Beneficiary rural population (thousand people)
Addis Ababa	0	0	0
Affar	0.07	0.1	0.4
Amhara	455	1,066	2,581
Benishangul-Gumuz	16	37	91
Dire Dawa	0.05	0.08	0.3
Gambella	0.6	2.3	3
Harari	0.05	0.2	0.3
SNNP	118	399	670
Tigray	12	45	70
Oromiya	434	1,041	2,457
Somali	0.2	1	1
Total	1,037	2,593	5,874

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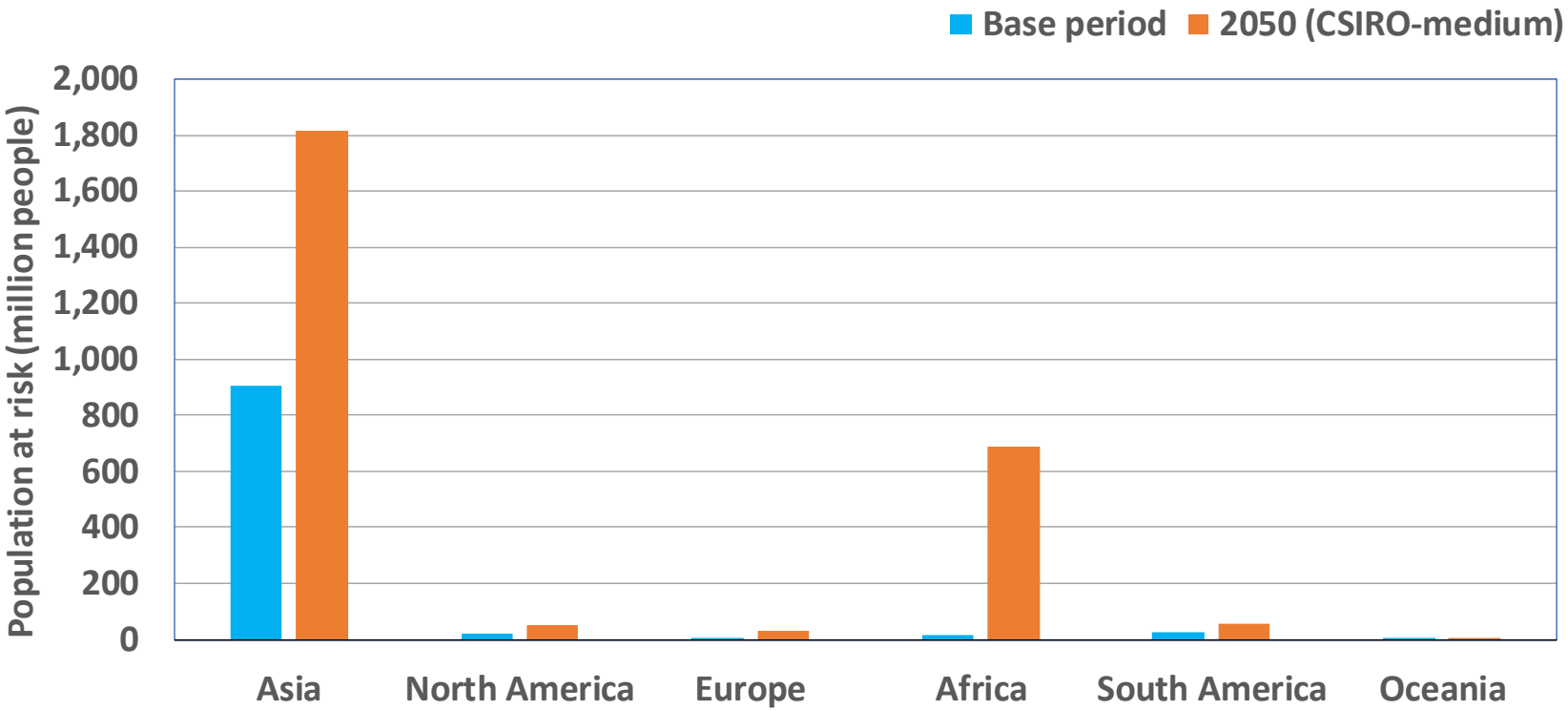
Potential environmental pollution: Growth particularly rapid in Asia and Africa

(Population living in basins with high N risk levels, all sources)



IFPRI and Veolia (2015)

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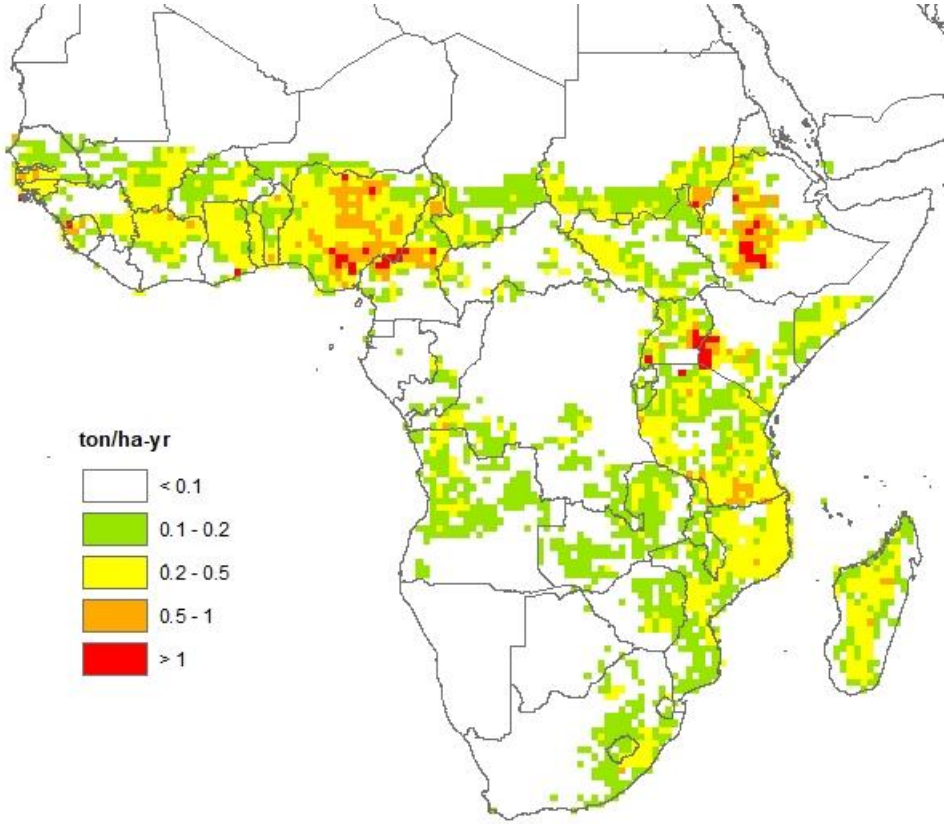
Agricultural nutrient loadings: rapid increases in SSA and Ethiopia, subject to climate uncertainties (among others)



Ethiopia

	CSIRO	MIROC
Optimistic	172%	341%
Medium	181%	343%
Pessimistic	163%	309%

Sub-Saharan Africa

	CSIRO	MIROC
Optimistic	76%	144%
Medium	78%	146%
Pessimistic	72%	138%

Xie and Ringler (2017)

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Case study key results

- About 1 million ha of land is economically and biophysically suitable for nutritious (vegetables/pulses/irrigated fodder) dry-season small-scale irrigation development in Ethiopia over the next 10 years; double the already rapid, historical increase of 0.5 million ha during 2004-2015
- Amhara, Oromia and SNNPR have the highest potential for adoption
- Net benefits from adoption are estimated at ~US$ 2.6 billion/yr
- Water consumption is limited at 1.7 BCM, ~35% of location available dry-season runoff, but dry-season runoff is a binding constraint in much of the high-potential agricultural areas
- Across Africa, irrigation expansion will further increase fertilizer applications (a good thing), putting more than 600 million people at risk of living in watersheds with high N pollution
- N loading increases from agriculture are expected to be particularly high in Ethiopia but vary substantially by climate change scenario

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Recommendations for ensuring small-scale irrigation and ecosystem health

- Use improved targeting and irrigation scheduling to address dry-season water shortages in small-scale irrigation expansion
- Strengthen governance mechanisms to ensure that potential environmental degradation can be addressed and poverty and food security gains sustained
- Implement now measures to address agricultural water pollution that are appropriate in the Ethiopian context (buffer strips, soil and stone bunds, low-cost precision agricultural methods, extension and training on appropriate fertilizer applications, etc.)

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Thank you

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