Africa RISING in the Ethiopian Highlands

Soil and water managements and landscapes: Africa RISING science, innovations and technologies with scaling potential from the Ethiopian highlands

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Key messages

- Complementary LRWH technologies implemented across the landscape enhanced synergies and reduced trade-offs. (Fig. 1).
- Reduction in soil loss and increase in baseflow due to LRWH interventions provide sustainable intensification options for dry season production.
- Information on irrigation scheduling advice (e.g. WFD) increases crop & water productivity in the dry season (Fig. 1B).
- Solar and service provision of water are feasible technologies for smallholder irrigation in the Ethiopian highlands.

Objectives and approach to improve sustainable system productivity across landscapes

- Problem identification through participatory approaches with stakeholders
- Biophysical and socio-economic gender disaggregated data collection during rainfed and irrigated cropping seasons
- Seasonal feedback meetings and exchange visit with stakeholders
- Evidence generation at different scales using different approaches (Fig. 2).
- Comparison of technology performance against control/baseline

Key results

- Model estimation showed average soil loss of 15 t ha^{-1} year.
- Terraces with trenches on cropland reduced runoff and soil loss by 44% and 52%, respectively.
- Integrated soil and water conservation practices at landscape level can reduce soil loss by over 80% and improve baseflow by 30%.
- Vegetable yields increased by 55 %-83% with drip versus hoses or watering cans whilst access to irrigation advice increased vegetable yields by 20% & vetch yield by 50% (Table 1).
- Solar & water provision are both economically feasible technologies.

Significance and scaling potential

- Implementing complementary technologies across the landscape continuum enhances synergies wile reducing tradeoffs.
- Implementing technologies that provide economic, environmental and social benefits at household and community levels enhances adoption and out-scaling.
- Climate smart interventions at landscape level both directly benefit communities and simultaneously provide ecosystem services and enhance options for dry season intensification.
- The upscaling of solar pumps throughout the country is currently being explored by a private-public partnership whilst the scheduling advice is going to be used to update national ICT advice.

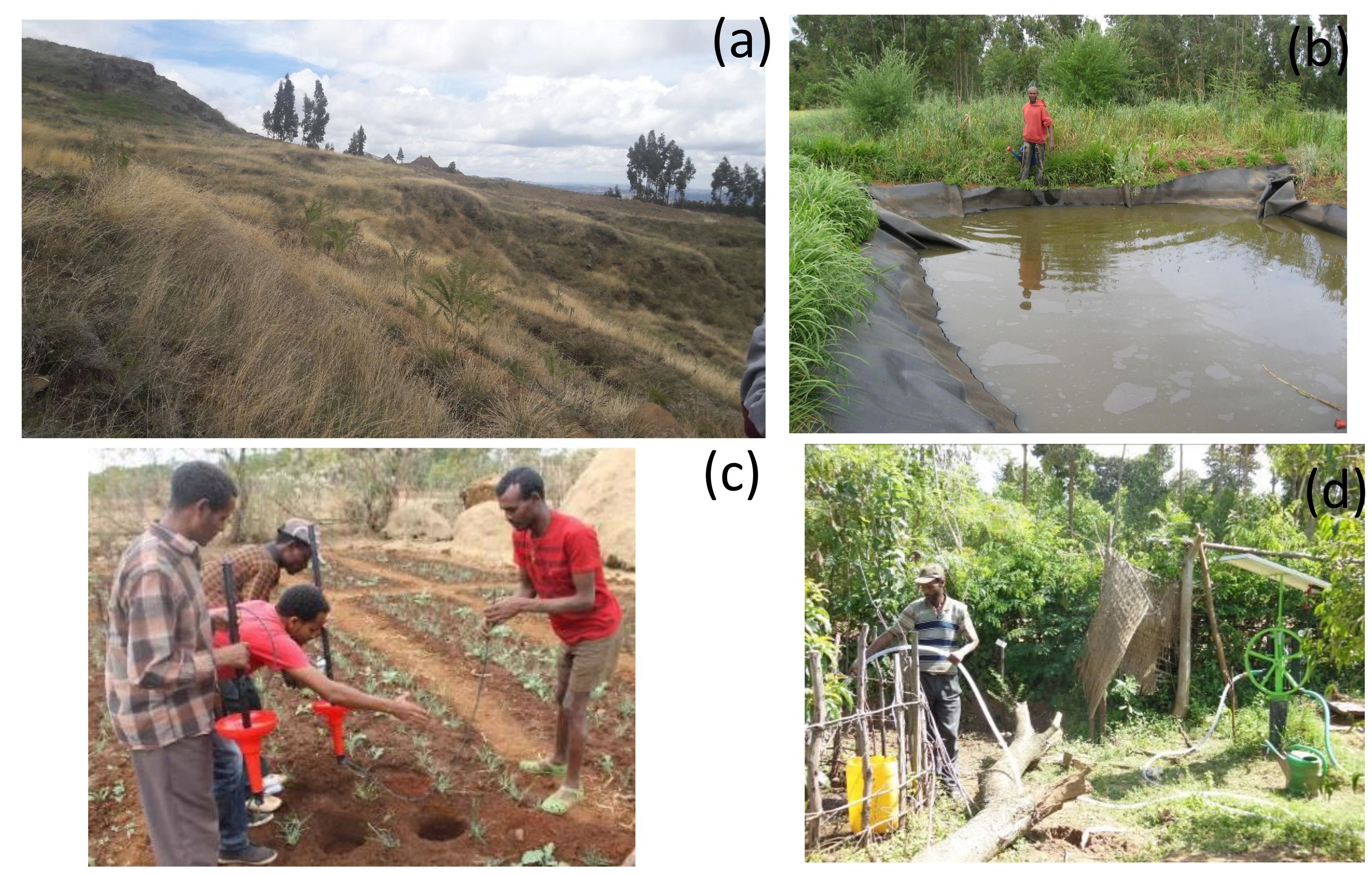

Figure 1: (A) Integrated physical and biological options, (b) water harvesting for supplemental irrigation, (c) wetting front detector (WFD), (d) Solar pump irrigation of avocado

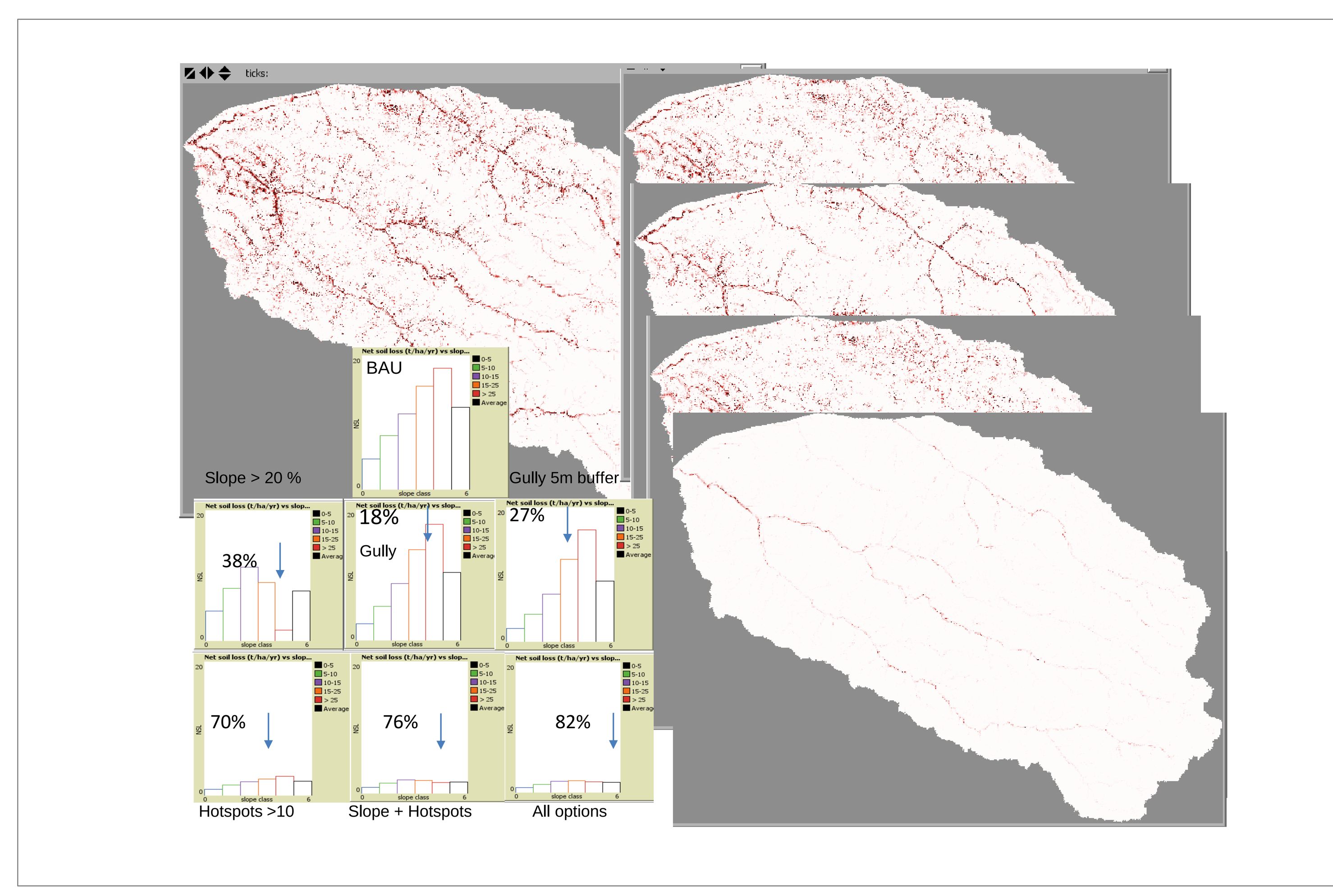

Figure 2: Evidence generation through simulating the impacts of different interventions in reducing sediment yield.

Table 1: Comparison of the produces grown with different water lifting technologies (rope & washer (R&W), solar, tractor mounted pump) and irrigation scheduling (without (FP) and with (WFD)).

	Yield (t ha^{-1})				
	Control	R&W		Solar	Tractor & drip
WM	FP	FP	WFD	FP	FP
Cabbage	40 ± 11^a	41 ± 12^a	48 ± 6^{ab}	49 ± 4^b	62 ± 4^c
Carrot	36 ± 8^a	37 ± 10^a	43 ± 7^b	38 ± 10^a	66 ± 5^c
Oats[1]	-	6 ± 1^a	7 ± 1^{ab}	5 ± 1^a	-
Oats[2]	-	13 ± 3^a	13 ± 2^a	-	-
Vetch[2]	-	4 ± 2^a	6 ± 1^b	-	-

Core partners

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