

Rethinking the poverty–environment nexus through natural capital accounting: evidence from Ghana

32nd Meeting of the
London Group on Environmental-Economic Accounting
Guatemala City · 7–9 September 2026

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Ghana's accounts

Started

Ghana

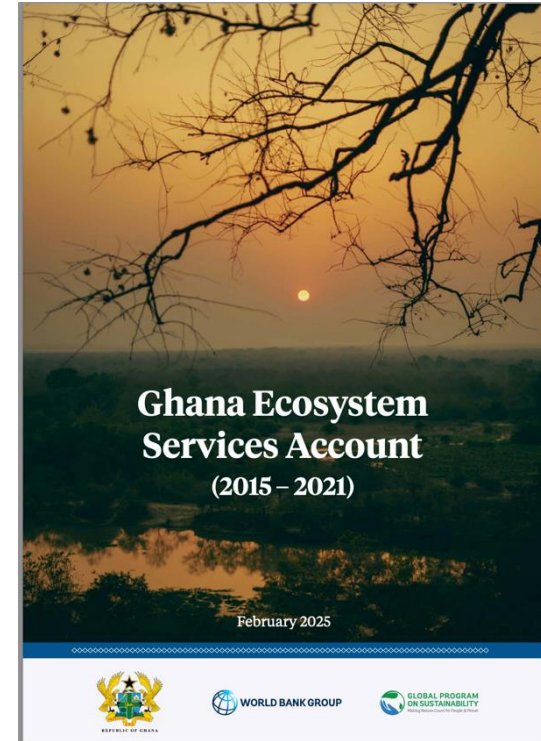
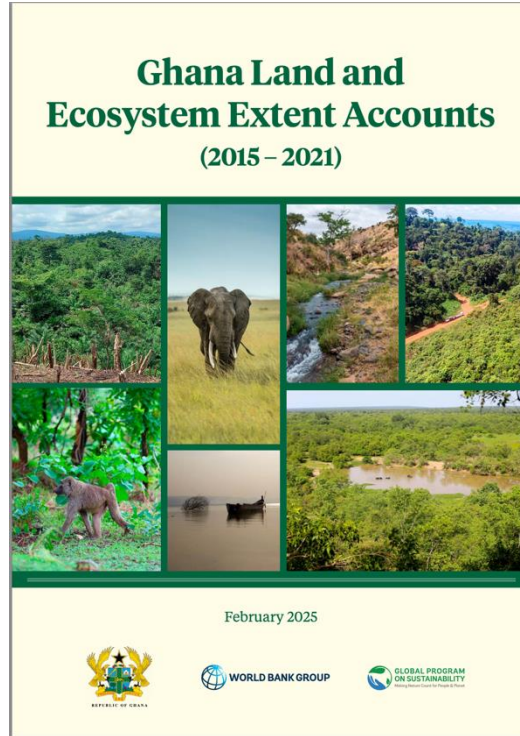
- Environmental Protection Authority
- Ghana Statistical Service
- Forestry Commission Ghana
- University of Cape Coast

Support

- United Nations
- UK Office of national statistics
- World Bank

Published

- February 2025



Does poverty degrade the environment?

The poverty–environment trap

Our Common Future (WCED 1987)

- Poor households deplete their natural resource base to meet immediate needs, which deepens their poverty

The evidence is contested

- Duraiappah (1998): weak support for a direct causal link — market and institutional failures are more proximate drivers
- Cavendish (2000): environmental income is a large share of poor households' livelihoods
- MA (2005): the costs of degradation fall disproportionately on the poor

Testing it needs spatially disaggregated data

Eigenraam and Choi (2016)

- Poverty–Environment Accounting Framework,
- Untested at national scale
- Ghana's accounts and population statistics make a test possible



Data and methods

Land cover change matrices from Ghana's land

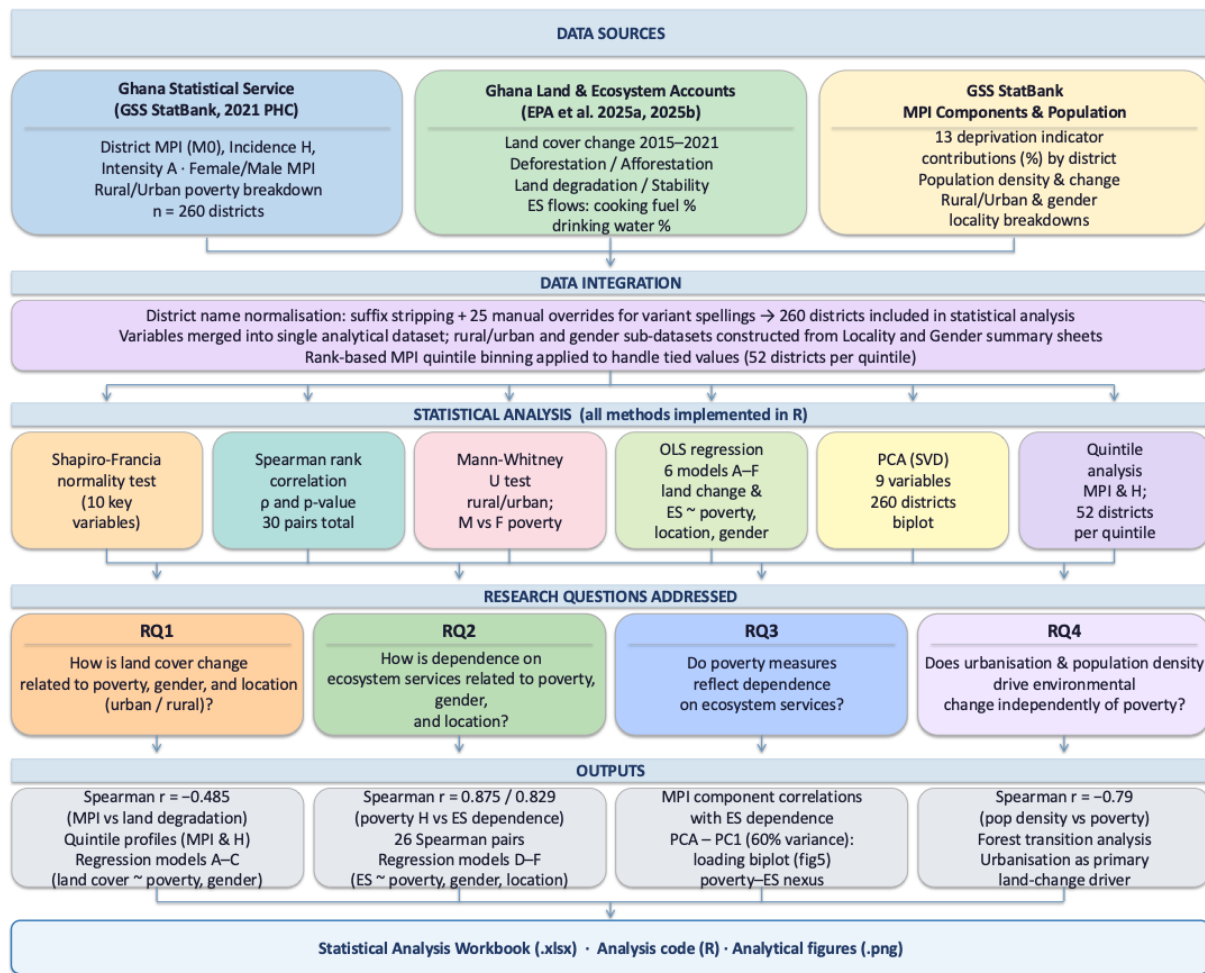
Two ecosystem services : biomass for cooking fuel and water provisioning for drinking water (EPA et al. 2025b)

Poverty from the 2021 census: Multidimensional Poverty Index, 13 indicators across health, education and living standards Indicators and tests

Land degradation (aligned with UNCCD and SDG indicator 15.3.1), land stability, afforestation and deforestation

Spearman rank correlation, Mann–Whitney U, OLS regression and principal component analysis

Indicators are landscape scale: they compare districts, but do not measure ecosystem condition within them



Land cover change matrix for 260 districts

Green = afforestation, Red = deforestation,
Landscape stability and degradation

GHANA land cover (sqkm)	Closed Forest	Open Forest	Water	Grassland	Settlement	Mono Cocoa	Shaded Cocoa	Other Tree Crop	Food Crop	Bare Surface	Mangrove	Total
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Opening 2015	14504	43819	7331	87817	4503	17999	6498	11659	44405	295	88	238916
Closed Forest		2113	5	270	23	524	101	141	202	12	0	
Open Forest	-2113		73	-818	0	755	162	408	1254	139	-3	
Water	-5	-73		-480	0	-1	-1	0	-22	105	1	
Grassland	-270	818	480		1764	338	48	-336	2276	82	-6	
Settlement	-23	0	0	-1764		0	4	0	-458	0	0	
Mono Cocoa	-524	-755	1	-338	0		656	-268	662	80	-3	
Shaded Cocoa	-101	-162	1	-48	-4	-656		-113	110	10	0	
Other Tree Crop	-141	-408	0	336	0	268	113		203	47	-8	
Food Crop	-202	-1254	22	-2276	458	-662	-110	-203		8	0	
Bare Surface	-12	-139	-105	-82	0	-80	-10	-47	-8		0	
Mangrove	0	3	-1	6	0	3	0	8	0	0		
Net Change	-3392	145	476	-5194	2241	488	964	-410	4218	483	-20	0
Closing 2021	11112	43963	7807	82623	6744	18487	7462	11249	48623	778	68	238916



Land change and ecosystem service use

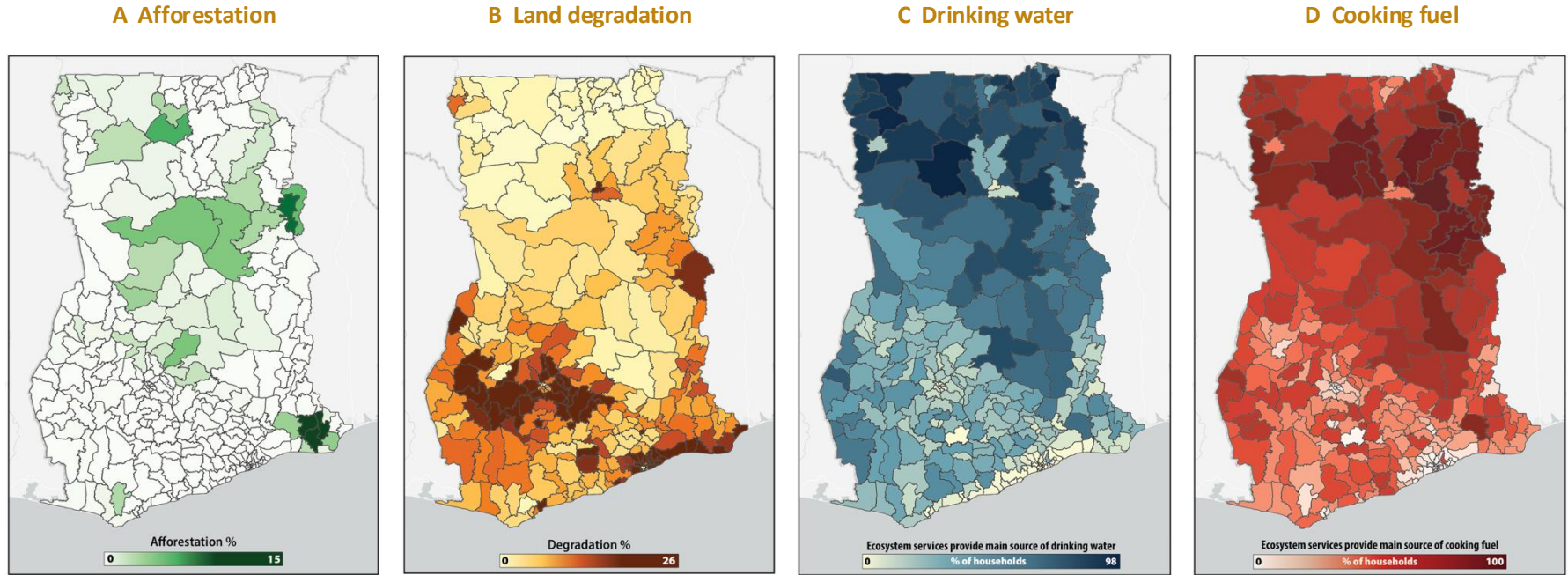


Figure 1. Indicators from the land cover extent and ecosystem service accounts. (A) and (B) percentage change 2015–2021; (C) and (D) share of households in 2021 whose main source is an ecosystem service.

Poverty is not the driver

Land degradation falls as poverty rises

Afforestation is higher in poorer districts

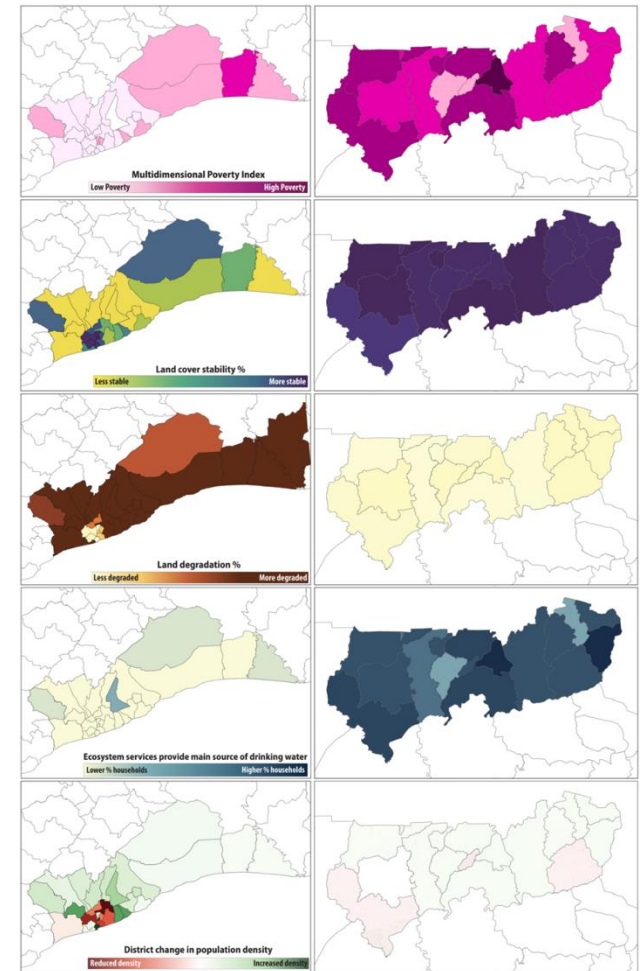
Degradation is concentrated in wealthier, rapidly urbanising districts near Accra and Kumasi

Growth in population density predicts degradation

Population density is a near perfect inverse proxy for poverty

The pattern is more consistent with community stewardship than with overexploitation, and with forest transition theory (Mather 1992)

Female headed households are poorer but cluster in urban districts with higher degradation — location, not causation



Poverty measures miss ecosystem services

Dependence rises with poverty

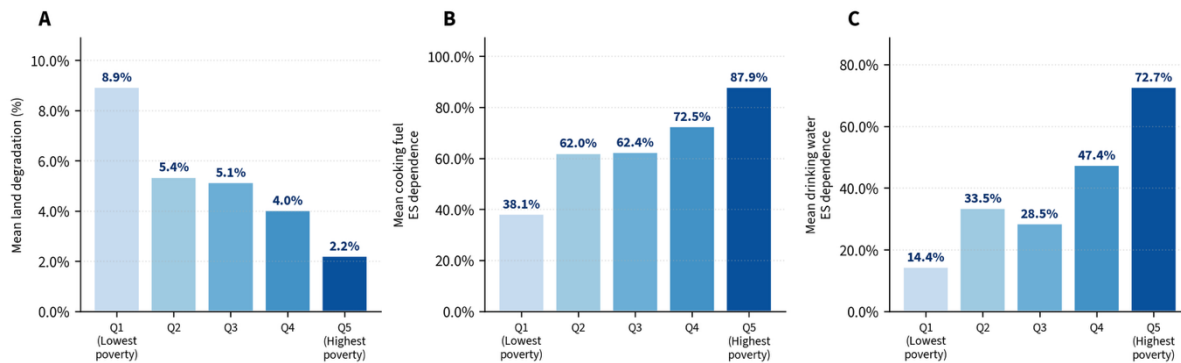
Cooking fuel and drinking water

Regressions explain 68–72% of the variance

Woodfuel counts as a deprivation

A household gathering free firewood ranks as poorer than one buying bottled gas

Land degradation and ES dependence by MPI quintile — 260 districts



Policy implications and conclusions

Redirect land management investment

- To the peri urban growth zones around Accra, Kumasi and other growing cities, not to poor rural districts

Recognise and reward stewardship

- Payments or market-based instruments for the stewardship already happening, with most income flowing to local communities

Extend poverty measurement

- Bring ecosystem services and natural capital condition into poverty assessment — SDG 1.2.2 and SDG 17.19, beyond GDP

The infrastructure already exists

- Ghana's published SEEA accounts can carry this analysis
A route other countries with comparable data can replicate

SEEA can be
applied to
poverty



Thank you for your attention



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Fenner School of Environment and
Society, Australian National
University

The paper summarises a journal
article currently in review



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What the accounts show

Association	Spearman ρ
Poverty (MPI) $\times$ land degradation	-0.49
Poverty (MPI) $\times$ afforestation	+0.40
Poverty (MPI) $\times$ cooking fuel dependence on ecosystems	+0.79
Poverty (MPI) $\times$ drinking water dependence on ecosystems	+0.77
Population density $\times$ poverty (MPI)	-0.79
Change in population density $\times$ land degradation	+0.43

Table 1. Selected district-level associations, Ghana 2015–2021. $n = 260$ districts; all $p < 0.001$.

Poverty runs with ecosystem service use, and against degradation — the opposite of the trap.

