Forest Collaborative Research   Economics

6-2019

Connecting Forests and Human Health Using the Demographic and Health Surveys (DHS)
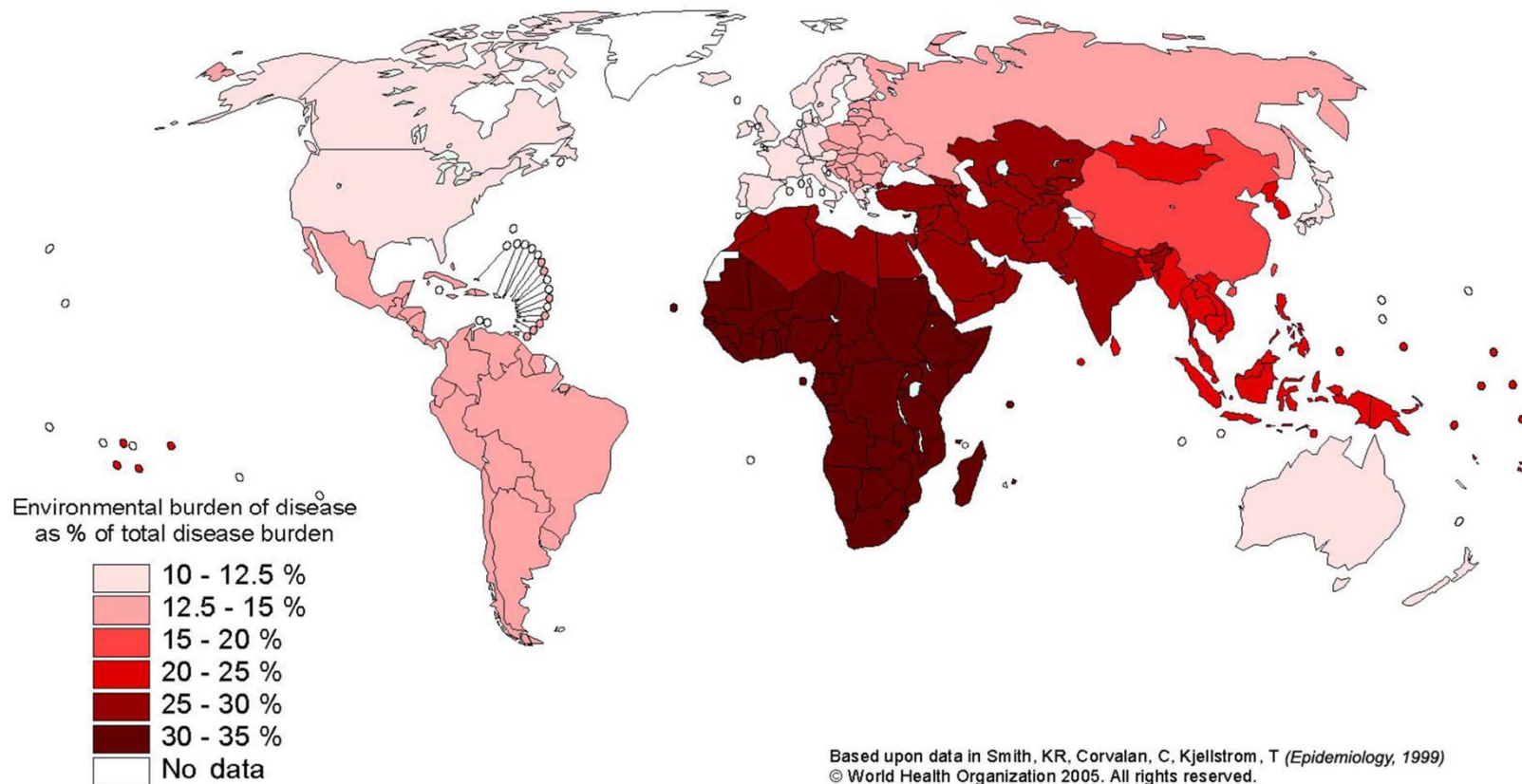
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Connecting forests and human health using the Demographic and Health Surveys (DHS)

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Environment and health

Environmental burden of disease globally

Environmental burden of disease as % of total disease burden

- 10 - 12.5 %
- 12.5 - 15 %
- 15 - 20 %
- 20 - 25 %
- 25 - 30 %
- 30 - 35 %
- No data

Based upon data in Smith, KR, Corvalan, C, Kjellstrom, T *(Epidemiology, 1999)*
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Heterogeneous impacts

Ecological transition
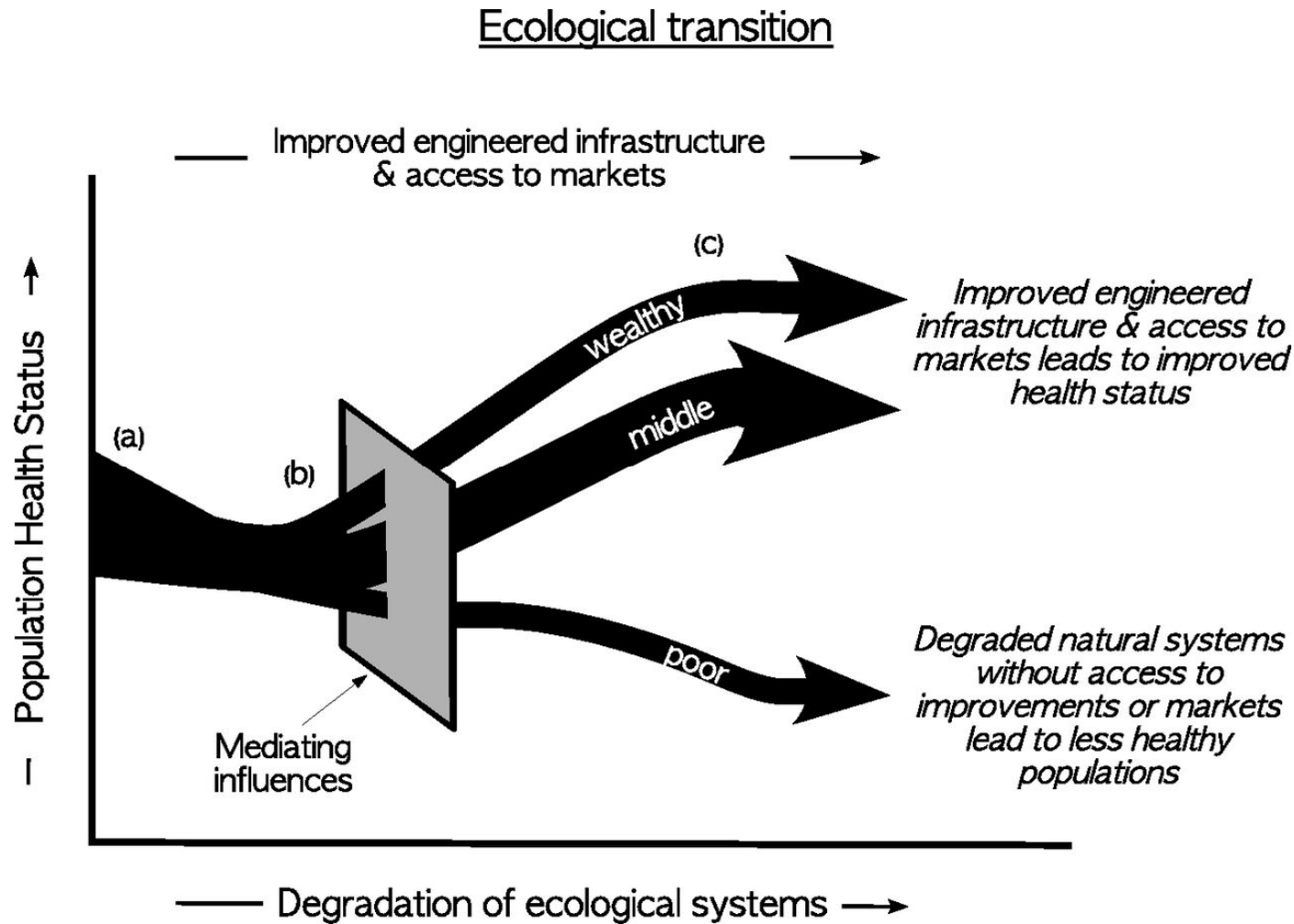
Myers et al. 2013 - PNAS

# Evidence: Ecosystem alteration – human health

- Evidence on relationships between ecosystem alteration and human health is thin.

- Existing evidence is mainly anecdotal or isolated case studies.

- Generating robust evidence is challenging because of confounding factors.

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Big data

The DHS Program — Demographic and Health Surveys

- Nationally representative samples of households in over 90 countries
- Data on health outcomes: diet, diarrhea, stunting, anemia…
- Data on potential confounding factors: socioeconomic data (wealth, education, sanitation and water facilities….)
- Georeferenced data: possibility to be linked to spatial data on ecosystem attributes (forest cover…) and other potential confounding factors (distance to market town…)

Big data: working version
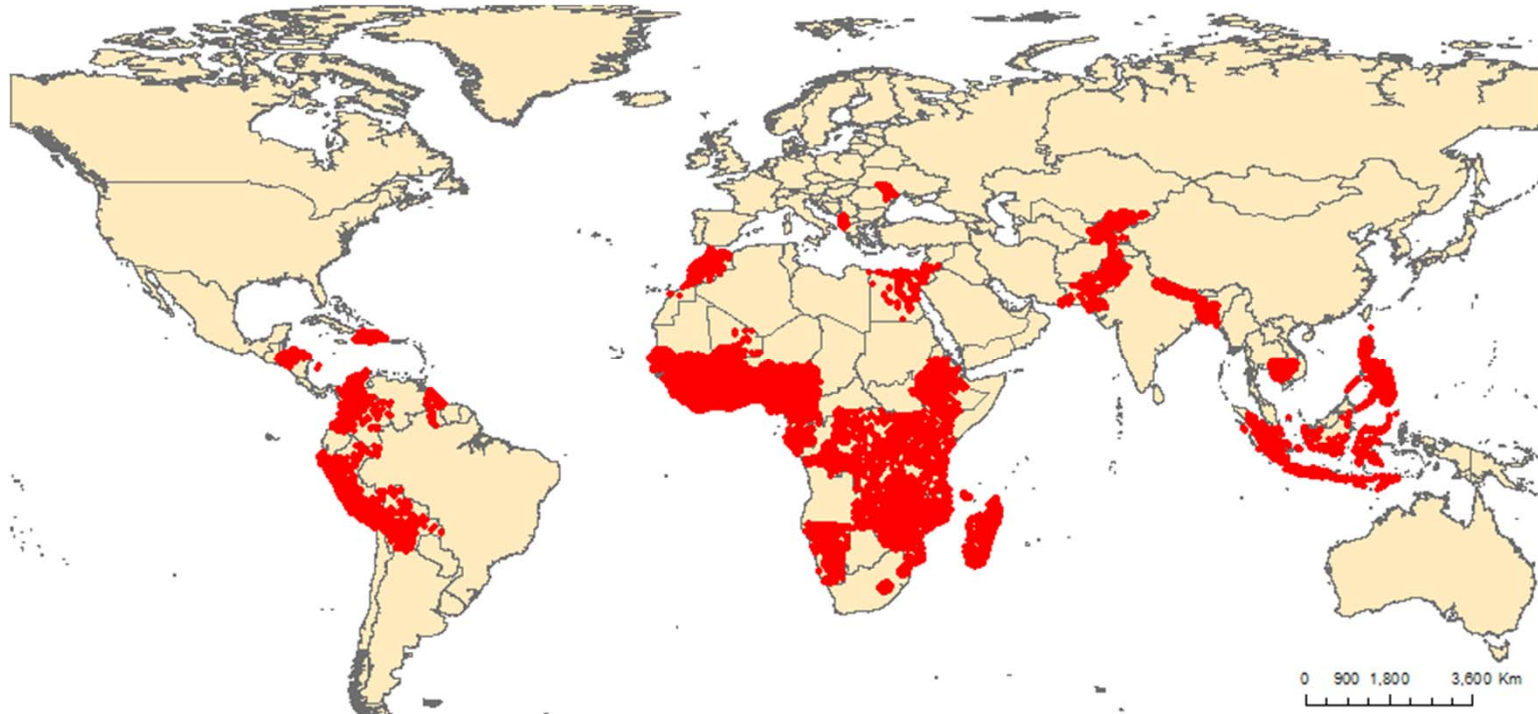
- 49 countries, 500Ks households, 800Ks children
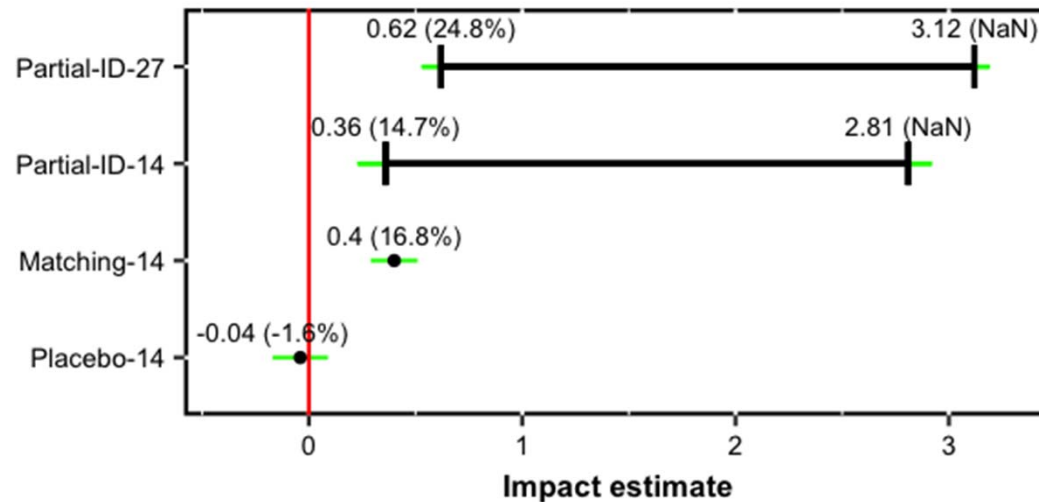- Ecosystem attributes: forest cover, watershed condition

Forests, childhood diarrhea, stunting, anemia
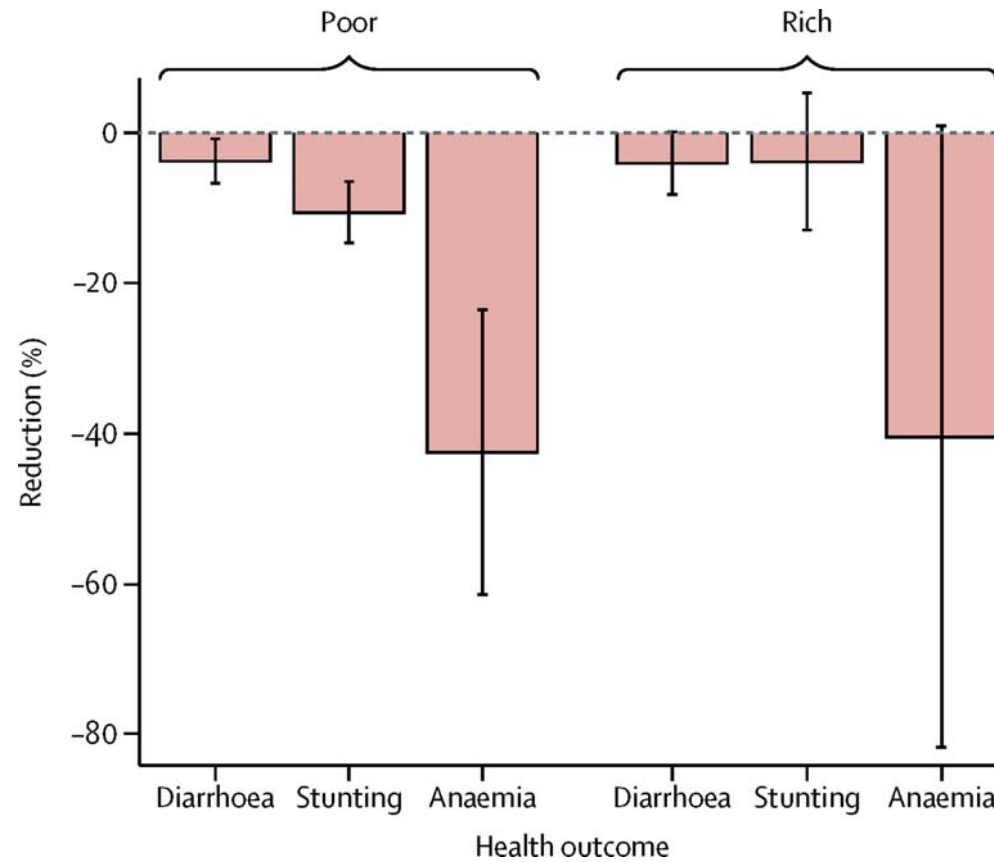
Reduction in the probability of childhood diarrhea, stunting, and anemia given 30% increase in tree cover across 35 developing countries (Fisher et al. 2019)

Forests and children's dietary diversity

Estimated impacts of forests on dietary diversity.
Partial-ID-27: partial identification for 27 countries; Partial-ID-14: partial identification for 14 African countries; Matching-14: matching design for 14 African countries; Placebo-14: placebo test for the matching design for 14 African countries. In parentheses: impact expressed in percent of the average dietary diversity of non-forest households. Green bars: 95% confidence intervals (Rasolofoson et al. 2018)

Forests and children's dietary diversity
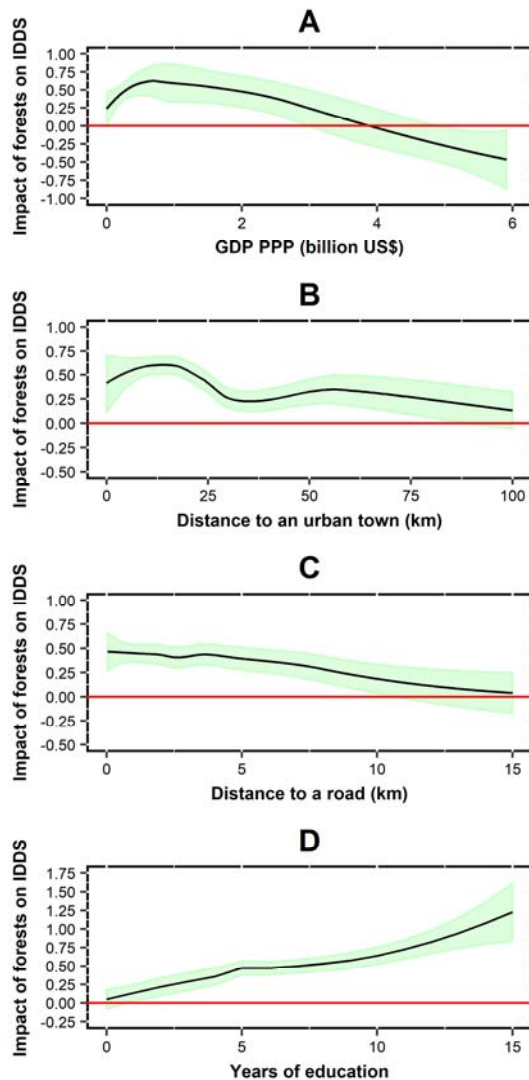
Heterogeneity of impacts for forests on dietary diversity. **(A)** Variation of impact with community GDP; **(B)** Moderating effect of distance to the nearest urban town; **(C)** Moderating effect of distance to the nearest road; **(D)** Moderating effect of the education of the head of household. Y axis represents the difference in dietary diversity (IDDS) between forest and similar non-forest households. Green bands: 95% confidence intervals (Rasolofoson et al. 2018)

Forests and effectiveness of piped water source at reducing childhood diarrhea

A

B
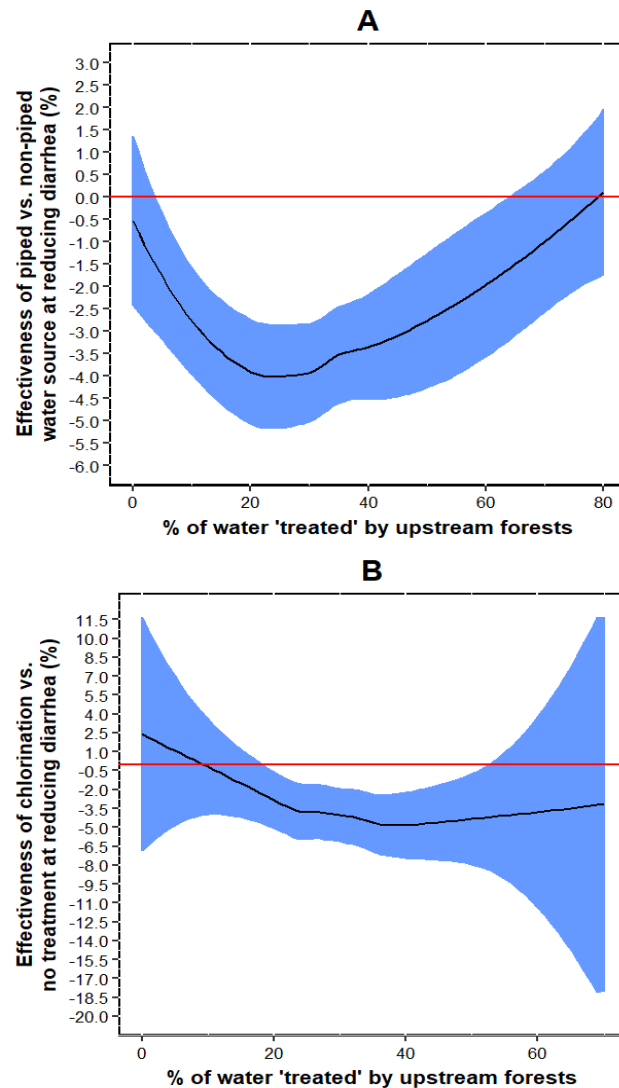
Specific moderating effects of upstream forests on the effectiveness of piped water source (A) and point-of use chlorination (B) at reducing the prevalence of diarrheal disease. Y-axis: difference in prevalence (in percentage points) of diarrhea between children using piped water source or chlorination and the matched children not using these technologies; blue bands: 95% confidence intervals (Rasolofoson et al. *in prep*)

Strengths of DHS Data

- DHS cover more than 90 countries.

- Multiyear data for each country.

- Data are collected at household or child level.

- Multiple potential confounding factors are available: wealth, age, education…

- Communities (clusters) are georeferenced.

- Rich documentation is available.

- Data are mostly uniformly coded across countries

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Weaknesses of DHS Data

- Panel data at country level and for large administrative areas, but not for individual, household, small administrative areas (but see Mapulanga and Naito 2019).

- Locations of communities (clusters) are not precise to maintain privacy of information.

- DHS data are good for investigating correlative associations, but challenging for causal associations (see Mapulanga and Naito 2019).

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THANK YOU ☺