Effects of forests on children's diets in developing countries: a cross-sectional study

Ranaivo Rasolofoson, Merlin Hanauer, Ari Pappinen, Brendan Fisher, Taylor Ricketts

Abstract

Background Micronutrient malnutrition affects about a third of the world's population, and children in low-income and middle-income countries are particularly vulnerable. Consequences include impaired cognitive and physical development, and increased childhood morbidity and mortality. Previous studies suggest that exposure to forests helps alleviate micronutrient malnutrition by increasing dietary diversity. However, evidence about the effects of forests on diet diversity is scarce and mostly based on case studies with poor study design and little relevance to global policies. Furthermore, how the effects of forests on diet diversity vary between and within communities has not received due attention; though such information could point to actions needed to improve the effects of forests on nutrition. Our study aims to strengthen the evidence of the effects of exposure to forests on dietary diversity, and establish how these effects vary among communities.

Methods In this cross-sectional study, we estimated the effects of exposure to forests on Individual Diet Diversity Score (IDDS) of children younger than 5 years. Data were from the Demographic and Health Surveys from more than 43 000 rural households across 27 developing countries. We defined forest households (ie, families with high exposure to forest) as those in communities located within 3 km of forest edges and with at least 30% of the community's land covered by forests. Non-forest households (ie, those without exposure to forest) are those further than 8 km from forest edges. We assessed the difference between the dietary diversity of forest households and different groups of non-forest households to provide information about effects of exposure to forests on dietary diversity. Our empirical designs strengthened the evidence by being attentive to assumptions necessary for causal interpretations. We also investigated how the effects vary with the downscaled (ie, from a national to a community level) gross domestic product (GDP) of communities and the specific moderating effects of access to capital, such as markets, roads, and education.

Findings Our dataset comprised 11 338 forest households and 31 673 non-forest households. We found that high exposure to forests causes children to have at least 25% greater dietary diversity than no exposure (mean IDDS of forest households 3·12 [SD 2·29] vs mean IDDS of non-forest households 2·50 [2·05]; difference 0·62 [95% CI 0·53–0·71]). An analysis of a subset of sub-Saharan African countries showed that the effects of close proximity to forests are significantly positive in communities with GDP less than US$3 billion (with a peak difference between IDDS of forest vs non-forest of about 0·63 [95% CI 0·38–0·88] at a community GDP of $0·7 billion), non-significant in communities with GDP $3–5 billion, and significantly negative in communities with GDP greater than $5 billion. At short distances to a market (up to 62 km) and road (up to 8 km), the effect of forests on dietary diversity is significantly positive; whereas the effect becomes non-significant at larger distances. At low education levels (0–1 years of education), effects are small and non-significant, but increase steadily and become significant as the time in education increases.

Interpretation Our results are similar to those of some nutrition-sensitive agricultural programmes. Our study establishes the relationship between exposure to forests and quality of diet, and thus strengthens the evidence for integrating forest conservation and management into portfolios of nutrition interventions. Our results also suggest that complementary measures giving households access to capital increase the nutrition sensitivity of forest-related interventions.

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Contributors
All authors designed the study and wrote the paper. RR and MH analysed the data.

Declaration of interests
We declare no competing interests.

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Gund Institute for Environment, University of Vermont, Burlington, VT, USA (R Rasolofoson PhD, B Fisher PhD, Prof T Ricketts PhD); **Sonoma State University, Rohnert Park, CA, USA** (M Hanauer PhD); **and University of Eastern Finland, Joensuu, Finland** (R Rasolofoson, Prof A Pappinen PhD)

Correspondence to:
Dr Ranaivo Rasolofoson, Gund Institute for Environment, University of Vermont, Burlington, VT 05405, USA
rrasolof@gmail.com