

THE AMAZON SUSTAINABLE FUTURE:

INTEGRATING HUMAN HEALTH, ECONOMY AND ENVIRONMENT.

POLICY BRIEF



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HIGHLIGHTS

- The environmental, social, economic and health dimensions of the Amazon are closely interrelated. It is crucial to consider them together in territorial planning and regional development policies;
- In a highly sensitive biome such as the Amazon, intersectoral integration of concepts and data is one of the transversal strategies that should be prioritized when considering direct and indirect impacts of policies on climate, hydrology and biodiversity;
- The *Trajectoria* database includes 36 environmental, socio-economic and epidemiological indicators covering the period between 2000 and 2017 for all 772 Brazilian Legal Amazon municipalities. The data are available on an open basis to support systemic socio-environmental decision-making for the region.



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DIFFERENT DEVELOPMENT PATHWAYS IN THE AMAZON

In the Amazon, human health and social, economic and environmental transformations are strongly intertwined with the dynamics of the agrarian economy. Different agricultural production systems lead to different human-nature relationships (**techno-productive trajectories**), socio-economic vulnerabilities and risks of infectious diseases classified as **neglected diseases**.

Agro-extractivist practices based on family farming (peasant trajectories), which are based on the accumulation of local knowledge and historical adaptation to the biome, dominate in half of the Amazonian territory and are concentrated in areas with good forest cover preservation, where diseases such as malaria and American trypanosomiasis (Chagas disease) are important causes of morbidity. Municipalities with recent urban expansion at the southern edge of the biome, in the transition to the Cerrado, are at increasing risk for outbreaks of urban arboviruses and leishmaniasis. Municipalities whose agrarian economy is based on large rural properties, dedicated to extensive cattle ranching (farmers and ranchers trajectories), had the highest rates of deforestation and biodiversity loss, and are vulnerable to cutaneous leishmaniasis, among other zoonoses.

Peasant Trajectories	Farmers and Ranchers Trajectories
Permanent (cocoa, pepper, coffee) or temporary (cassava, maize, rice and beans) production systems that rely on ecological diversity. There may be small-scale livestock production. The landscape is heterogeneous, with crops, forest in different succession stages and pasture with shrubs.	Production systems that converge almost exclusively to beef cattle raising and large-scale grain plantations. Intensive use of agricultural machinery, plant and animal breeding, and chemical inputs. Create homogenized landscapes with low diversity.

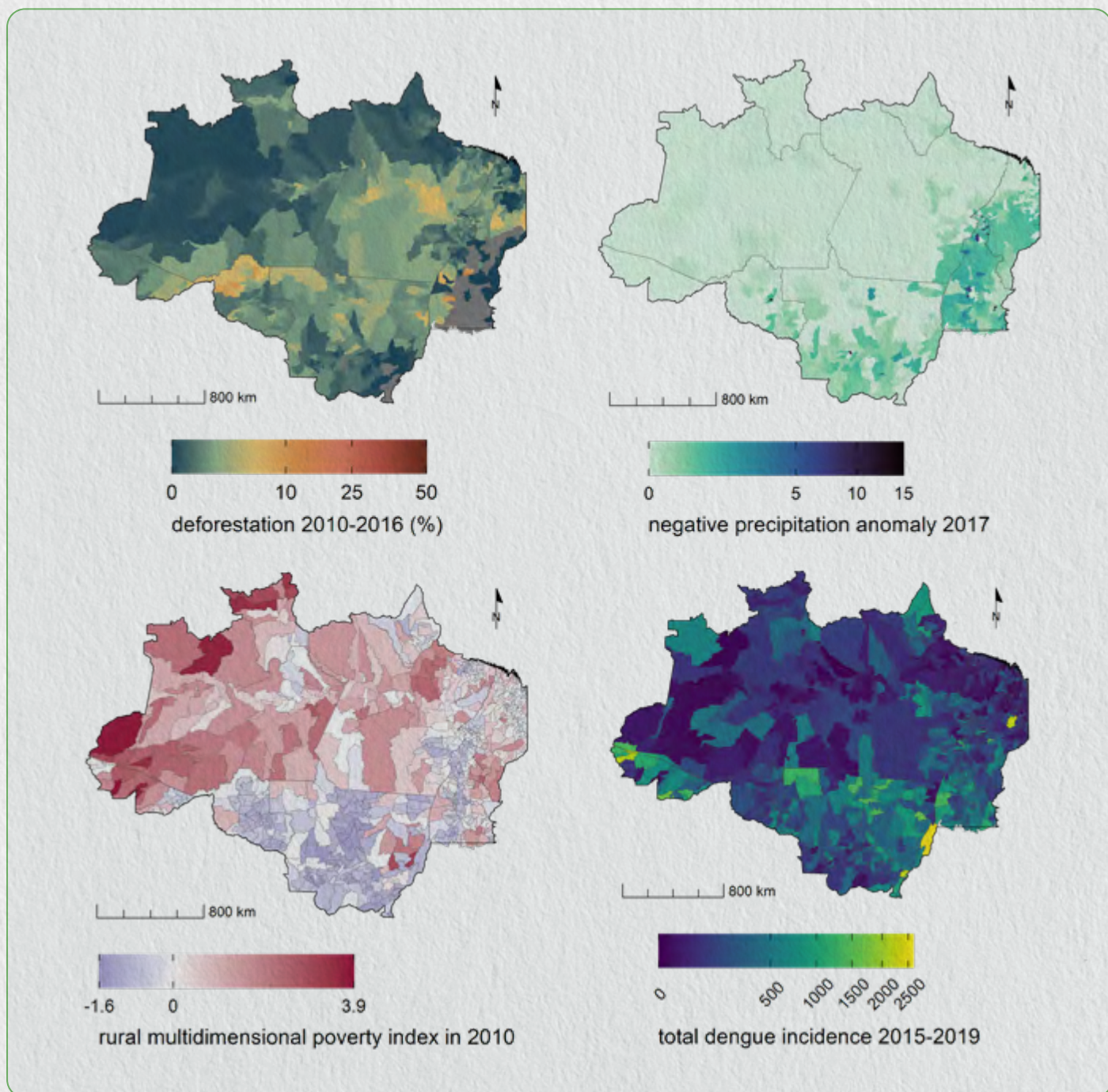


Figure. *Trajektorias* dataset covers environment, climate, poverty, and vector-borne diseases indicators.

Technoproductive trajectories: concept developed by Francisco de Assis Costa (2009) that integrates the notions of technological paradigms and trajectory-dependent development to analyze the patterns of relationship between society and nature in different types of economy in the Amazon.

Action Plan for Prevention and Control of Deforestation in the Legal Amazon (PPDCDAm): created by the Brazilian government in 2004, then extinguished in 2019, and finally renewed in 2023. The purpose of the PPDCDAm is to continuously reduce deforestation and promote a sustainable development model in the Brazilian Amazon. One of its main challenges is to integrate the fight against deforestation into all government policies.

Neglected Diseases: are diseases caused by infectious agents or parasites that predominantly affect vulnerable populations. They are also characterized by little investment in research, medication and control. Malaria, Chagas' disease, leishmaniasis, dengue are some examples.

***Trajektorias* database:** brings together 36 environmental, socioeconomic and epidemiological indicators referring to the period 2000 and 2017 for all 772 municipalities in the nine states of the Brazilian Legal Amazon. The data is openly available for consultation and can assist in decision making through integrated analyses.

“DE-SECTORING” THE AMAZON POLICIES

It is urgent to take advantage of the Brazilian public policies' transversality in institutional arrangements. The current framework shows that public policies in the Amazon are fragmented and face difficulties in their integration. An emblematic example is the resumption of the **Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPDCDAm)**, which does not include the Brazilian Ministry of Health in its Permanent Interministerial Commission. This has a direct impact on the integration of health and environmental policies and on the distribution of public resources.

It is also crucial to rethink how poverty is measured in the Amazon. Indicators have traditionally focused on income and access to markets, which does not reflect the reality of the people who live in the region. It motivated the elaboration of the Multidimensional Poverty Index (IPM - Trajetorias) through a regionalized model that takes into account the differences between urban and rural areas, including access to education, health and living conditions.

The development of indicators that integrate the economic, environmental and health dimensions in the Amazon is necessary both to understand the complexities of the agrarian economy and to project a sustainable development future for the region, especially under the bioeconomy agenda. From a public health perspective, interventions to prevent and control disease must take into account the way people in the region live and their relationship to the environment, which is mediated by the economy.



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MULTIDIMENSIONAL POVERTY INDEX FOR THE AMAZON (IPM-TRAJETORIAS)

The Multidimensional Poverty Index, IPM-Trajektorias, is composed of 15 to 19 indicators related to health, education and living conditions (housing, access to public services, employment and consumption of goods). It covers rural and urban populations of the Brazilian Amazon municipalities. According to IPM-Trajektorias, a family is multidimensionally poor if its deprivation score exceeds a poverty threshold. At the municipal level, the index shows the prevalence and intensity of poverty in urban and rural areas. It is worth noting that between 2000 and 2010, public policies have led to a significant improvement in these indicators.

The indicators used to calculate the index are publicly available in the *Trajektorias* database (link in References).



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RECOMMENDATIONS



- Monitor technoprodutive, environmental and health trajectories of the municipalities in the Amazon region by indicators that bring together the environmental, economic and health (epidemiological) dimensions;



- Foster intersectorial dialogue for the Amazon region, through technical debates on the scientific evidence obtained from the integration between health, economy, territories, environment and development strategies;



- Strengthen the integration of epidemiological and environmental surveillance at national and state levels through the CIEVS (Centro de Informações Estratégicas em Vigilância em Saúde);



- Introduce the Ministry of Economy into discussions on environmental and health conditions to properly leverage the bioeconomy agenda for the region;



- Include the Ministry of Health in the Permanent Interministerial Commission on the Action Plan for Prevention and Control of Deforestation in the Legal Amazon (PPCDAm).

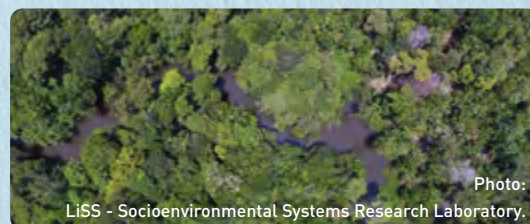


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ABOUT THE PROJECT

The Trajectories project aims to synthesize knowledge on ecosystem services and their relationship to the economic system and human health in the Amazon. It informs the joint debate on the economic, environmental and health dimensions and increases the visibility of local people's lifestyles, structures and production systems.

ABOUT SinBiose

The Brazilian Synthesis Center on Biodiversity and Ecosystem Services (SinBiose) supports the development of knowledge synthesis to tackle current issues in biodiversity and ecosystem services. The initiative is led by CNPq, with the support from the Ministry of Science, Technology and Innovation (MCTI) and state research foundations. Learn more at www.sinbiose.cnpq.br

References

Codeço, C. T., Dal'Asta, A. P., Rorato, A. C., Lana, R. M., Neves, T. C., Andreazzi, C. S., Barbosa, M., Escada, M. I. S., Fernandes, D. A., Rodrigues, D. L., Reis, I. C., Silva-Nunes, M., Gontijo, A. B., Coelho, F. C., & Monteiro, A. M. V. (2021). Epidemiology, Biodiversity, and Technological Trajectories in the Brazilian Amazon: From Malaria to COVID-19. *Frontiers in Public Health*, 9. <https://doi.org/10.3389/fpubh.2021.647754>

Rorato, A. C., Dal'Asta, A. P., Lana, R. M., dos Santos, R. B. N., Escada, M. I. S., Vogt, C. M., Neves, T. C., Barbosa, M., Andreazzi, C. S., dos Reis, I. C., Fernandes, D. A., da Silva-Nunes, M., de Souza, A. R., Monteiro, A. M. V., & Codeço, C. T. (2023). Trajetórias: a dataset of environmental, epidemiological, and economic indicators for the Brazilian Amazon. *Scientific Data*, 10(1), 65. <https://doi.org/10.1038/s41597-023-01962-1>

Costa, F. de A. (2009). Trajetórias Tecnológicas como Objeto de Política de Conhecimento para a Amazônia: uma metodologia de delineamento. *Revista Brasileira de Inovação*, 8(1), 35. <https://doi.org/10.20396/rbi.v8i1.8648975>

Trajetorias Dataset: <https://zenodo.org/record/7098053#.ZFo1pc7MJD8>

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