Municipal administrators in Brazil know about NbS but rarely use them to reduce environmental inequality, study finds

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Study mapped knowledge of nature-based solutions among municipal staff responsible for projects in 20 Brazilian cities. The survey points to the need to adapt the approach used in the northern hemisphere to local conditions. Credit: Eduardo César/Pesquisa FAPESP

Initiatives involving nature-based solutions (NbS) are increasingly frequent in Europe and the United States, but still scarce in Brazil and rarely part of local public policy even when mayors are aware of the concept.

This is one of the findings of a survey conducted in Brazil by scientists at the University of São Paulo (USP) and the Federal University of the ABC (UFABC), also in São Paulo state. Based on questionnaires and a focus group of municipal technicians and project managers from all five regions of Brazil, the study aimed to help close the gap in knowledge of nature-based solutions, which address societal challenges via ecosystem protection, sustainable management and restoration, benefiting biodiversity and human well-being.

Although nature-based solutions are found at a range of scales and typologies, they comprise a coherent toolkit for cities that seek to decarbonize and reduce greenhouse gas emissions, while also becoming climate-resilient and ecologically healthy.

The concept was pioneered by the International Union for the Conservation of Nature (IUCN), created in 1948 and now the world's largest and most diverse environmental network, with more than 1,400 governmental and civil society member organizations in 160 countries. IUCN developed a formal definition of the concept of nature-based solutions and a global standard for its use.

Many countries in the northern hemisphere are currently implementing projects and studies involving nature-based solutions for city renovation and development. However, in several cases these initiatives have driven up house prices and forced residents of neighborhoods with adequate infrastructure to move to areas farther from the city center, making inequality worse.

"Among other aspects, our study set out to see whether these policies that come from the Global North are being adapted to conditions here and whether they're succeeding. We confirmed that nature-based solutions are becoming more frequent in Brazilian cities. Mayors and municipal administrators are familiar with the concept, but what to prioritize in decision-making is a problem," Pedro Henrique Campello Torres told Agência FAPESP.

Torres is first author of an article on the study published in the journal *Environmental Science & Policy*. He has a master's degree in urban and regional planning, holds a Ph.D. in social science, and is a professor at USP.

"If public policies that prioritize the implementation of nature-based solutions are introduced in areas where infrastructure already exists, an opportunity is missed to solve problems involving inequality of access to environmental improvements. This inequality affects public health in leisure areas and also relates to the issue of environmental racism," he said.

The survey was part of Torres' postdoctoral research supported by FAPESP. He is now conducting a project under the aegis of the FAPESP Research Program on Global Climate Change (RPGCC).

According to the World Cities Report published in 2022 by UN Habitat, although the pace of urbanization decelerated during the COVID-19 pandemic, urban areas are already home to 55% of the world's population, and the proportion is expected to grow to 68% by 2050, increasing the number of urban residents by 2.2 billion.

On the other hand, the report warns that the impacts of the pandemic, as well as global economic uncertainties, environmental challenges, and wars and conflicts in different parts of the world could have long-term

impacts on the future of cities, including a 30% increase in extreme poverty (213 million people) by 2030.

To meet these challenges, investment in sustainable urban development is the way forward, prioritizing a reduction in poverty and inequality; fostering productive and inclusive urban economies; and adopting environmental policies and actions that mitigate and adapt to climate change. Recommended initiatives ranging from rain gardens and linear parks to hillside stabilization and urban farms can help cities become more resilient to extreme weather events and produce benefits for society.

Methods

The researchers designed a questionnaire covering key elements of nature-based solutions relating to justice and "green gentrification"—urban renewal projects that result in changes to the profile of the residents of a given area due to removals and rising house prices.

Municipal administrators, technicians and project managers in selected Brazilian cities were asked to complete the questionnaire, with 14 items, six of them open-ended. The focus was on diagnosing the respondents' understanding of the concept of nature-based solutions, their stage of development, the references used in their practices, and any concrete cases. The eight multiple-choice questions were designed to find out how justice comes into play and can be integrated into the design and implementation of nature-based solutions.

Thirty-one people in 20 municipalities completed the questionnaire in the period November 9-27, 2020. Most were members of ICLEI—Local Governments for Sustainability, a global network of more than 2,500 local and regional governments in 130 countries committed to

sustainable urban development.

The survey covered cities in nine Brazilian states: Rio de Janeiro (Rio de Janeiro, Nova Iguaçu and Niterói), São Paulo (São Paulo, Boituva, Campinas, Sorocaba, Suzano, Santo André, Ribeirão Pires and Mogi das Cruzes) and Minas Gerais (Belo Horizonte) in the Southeast region; Rio Grande do Sul (São Leopoldo and Porto Alegre), Santa Catarina (Joinville and Lindóia do Sul) and Paraná (Curitiba) in the South; Ceará (Fortaleza) in the Northeast; Amapá (Macapá) in the North; and Mato Grosso (Cuiabá) in the Center-West.

After completion of the questionnaires, the researchers convened a focus group, which met on December 21, 2020, with one participant from each region to present the key results and verify possible regional differences.

In the third stage, the data from the survey and focus group were analyzed to identify the main barriers, challenges, gaps and limitations, as well as the opportunities presented by the implementation of nature-based solutions in Brazilian cities.

Results

More than a quarter (28.5%) of the respondents said they knew about nature-based solutions from academia. The next most frequent source of this knowledge was articles and books (22%), followed by outside courses (10%), and partnerships with non-governmental organizations (10%).

When asked to name municipal projects involving nature-based solutions, 18 out of 31 were able to identify the concept but not to name specific projects. They mentioned the following types of activity: reforestation to rehabilitate hydrographic basins, rain gardens, creation

of parks by reforestation, linear parks, restoration of contaminated areas, ecologically built parkways, and tree planting to combat heat islands.

With regard to the financing mechanisms that could promote more projects and works for nature-based solutions, 38% mentioned municipal environmental funds, 26% referred to public-private partnerships, and 10% cited individual or collective budget amendments.

On action to address inequality, 28% preferred collaborative governance, while 22% prioritized local community involvement in drawing up and implementing proposals.

"When we asked municipal administrators if the projects aimed to reduce deficits or improve deprived areas, they mainly responded in the negative. In other words, the initiatives weren't implemented in deprived areas, but in already green areas, leading to the maintenance of environmental privileges and leaving a proportion of the city's residents as badly off as before. We want the opposite: larger numbers of green areas and nature-based solutions for everyone to have access in a democratic manner," Torres said.

To move the discussion forward, the article advocates global and local networking to address structural and funding challenges; transparency and inclusion in designing and implementing instruments for protection and environmental justice; and participatory governance and project implementation processes involving engagement with multiple actors.

According to Torres, the Brazilian case can contribute to discussion of the subject in other parts of the Global South with similar inequalities and social vulnerabilities, especially Latin America, Africa and Asia.

Besides Torres, the other authors of the article are Pedro Henrique Campello Torres, Daniele Tubino Pante de Souza, Sandra Momm,

Luciana Travassos, Sophia Picarelli, Pedro Roberto Jacobi and Robson da Silva Moreno.

More information: Pedro Henrique Campello Torres et al, Just cities and nature-based solutions in the Global South: A diagnostic approach to move beyond panaceas in Brazil, *Environmental Science & Policy* (2023). DOI: 10.1016/j.envsci.2023.02.017

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