

Nature-based Solutions in the US: A systematic review of concepts, applications, and policy relevance

BACKGROUND

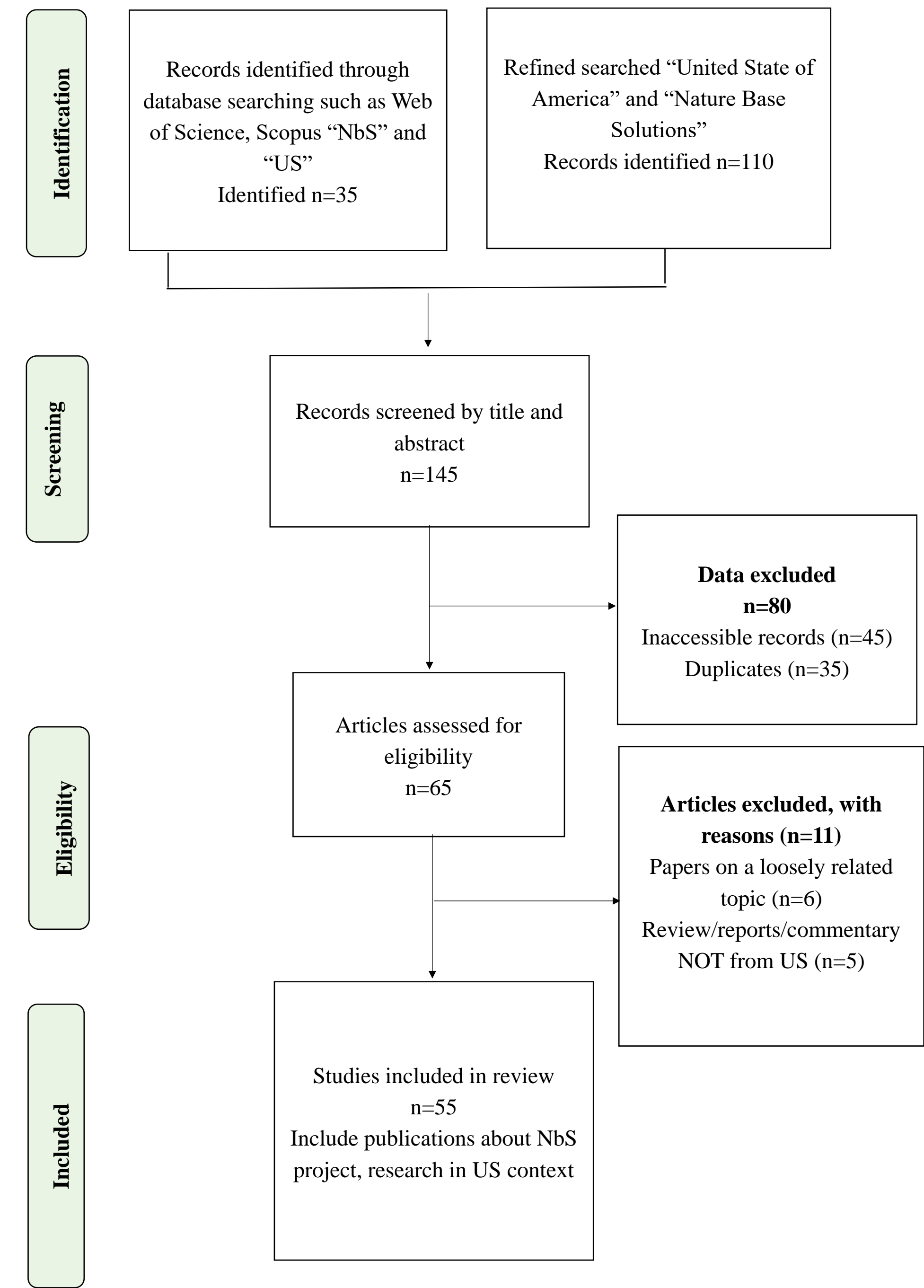
In the late 2000s, the term "NbS" emerged, promoting people's active involvement in sustainable environmental management to address climate change issues, supported by international organizations.

NbS are new ways of making things more flexible and resilient, and researchers believe they are more environmentally friendly than traditional gray infrastructure. Implementing sustainable management techniques of NbS in the U.S will advance the Sustainable Development Goals while simultaneously mitigating climate change threats (Wild et al., 2023).

Previous studies have been conducted considering different accounts of NbS. Scientists and policymakers increasingly acknowledge NbS as a sustainable method to address climate change problems. This transition further exacerbates the growing need for public approval for the planning, execution, and management of climate change initiatives (Anderson & Renaud, 2021).

The study seeks to i) understand the NbS concept in academic literature and government policy documents in the U.S ii) assess NbS challenges iii) the bottlenecks and opportunities identified in the literature and government policy documents.

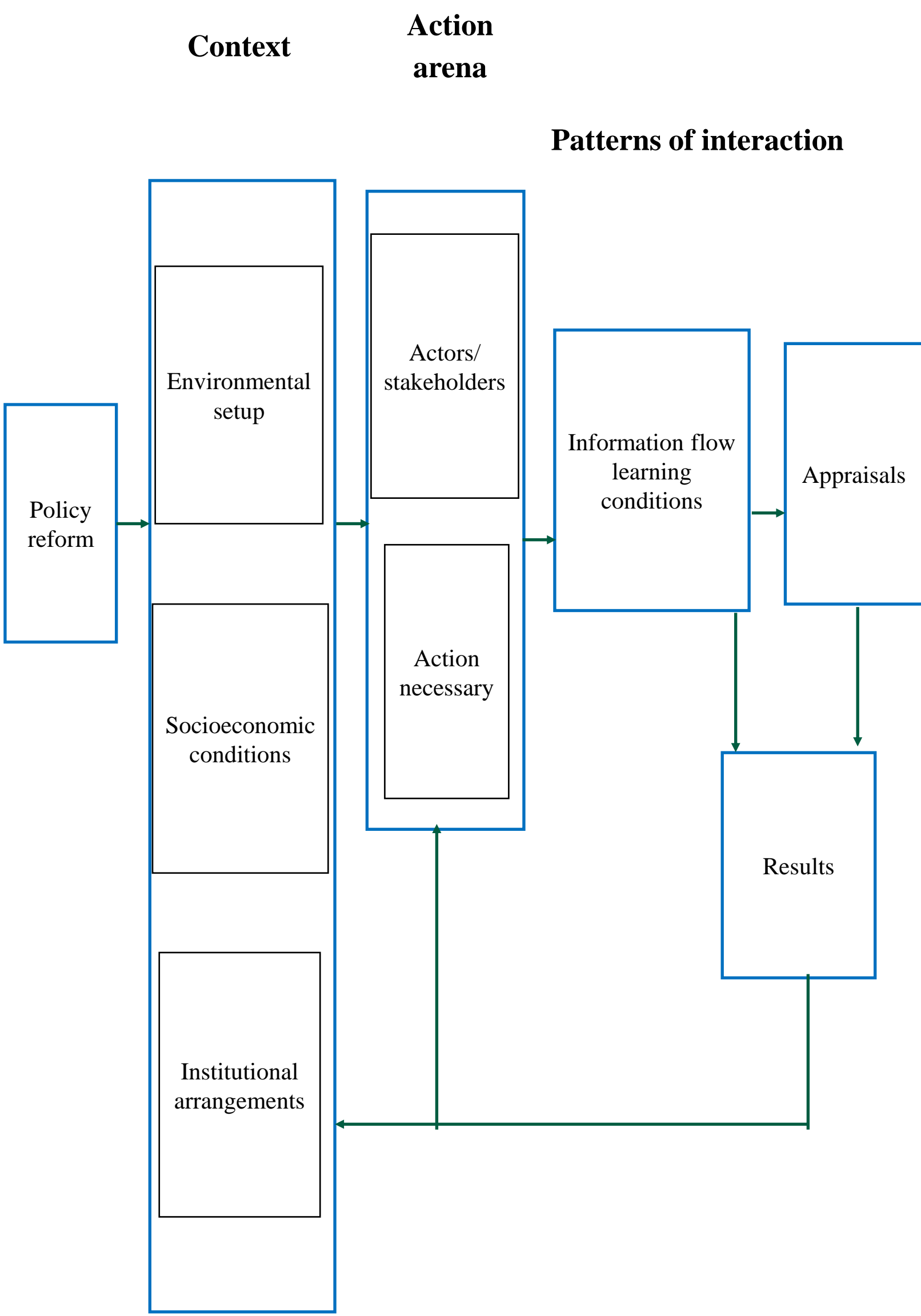
METHODS



RESULTS

- ❖ The Web of Science search yielded 145 documents.
- ❖ The PRISMA screening process found 35 duplicates and 45 inaccessible articles.
- ❖ The remaining papers (n = 65) were based on the inclusion/exclusion criteria.
- ❖ We removed articles (n = 11) discussing projects, research, or methodologies outside the U.S.
- ❖ The analysis incorporated a conclusive list of 55 articles.

Institutional analysis and development (IAD) framework



A Snapshot of NbS concept

Organization/Department	Definition of NbS	Sources
White House Council on Environmental Quality, White House Office of Science and Technology Policy, White House Domestic Climate Policy	Nature-based solutions “Are actions to protect, sustainably manage, or restore natural or modified ecosystems to address societal challenges, simultaneously providing benefits for people and the environment.”	White House Council on Environmental Quality et al., 2022.
United States. Department of Homeland Security: Federal Emergency Management Agency (FEMA)	Nature-based solutions “Are sustainable planning, design, environmental management, and engineering practices that weave natural features or processes into the built environment to promote adaptation and resilience.”	United States. Federal Emergency Management Agency, 2021.

Barriers and opportunities for greater integration of NbS in policy and practice

Barriers

- ❖ Inadequate research, data, and monitoring
- ❖ Challenge of navigating trade-offs
- ❖ The need for collaborative governance
- ❖ Inadequate coordinated policy frameworks

Opportunities

- ❖ The framework signifies the inclusion of varied stakeholders in policy analysis and formulation.
- ❖ Opportunity for a profound understanding of social circumstances.
- ❖ More effective policy and establishes a solid platform for fostering consensus for coordinated action.

CONCLUSION

The IAD approach simplifies policy analysis and design in the U.S., promoting inclusive and participatory practices. It enables the integration of NbS in academia and practice, addressing diverse contexts and societal backgrounds, thereby enhancing sustainability research.

REFERENCES

- Anderson, C. C., & Renaud, F. G. (2021). A review of public acceptance of nature-based solutions: The ‘why,’ when’, and ‘how’ of success for disaster risk reduction measures. *Ambio*, 50(8), 1552-1573. <https://doi.org/10.1007/s13280-021-01502-4>.
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- Wild, T., Baptista, M., Wilker, J., Kanai, J. M., Giusti, M., Henderson, H., ... & Kozak, D. (2024). Valuation of urban nature-based solutions in Latin American and European cities. *Urban Forestry & Urban Greening*, 91, 128162. <https://doi.org/10.1016/j.ufug.2023.128162>.

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Challenges of NbS in the US context

