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A Binational Journey Toward Sustainability

How a unique collaboration between the US and Mexican academies of science evolved over the course of a decade.

The border between the United States and Mexico is both a political boundary and a demarcation of different ideological representations of a shared binational landscape. Both sides of the border share climate, geography, environment, resource bases, and increasing urbanization, but there are wider divisions among cultures, languages, economies, law, politics, education, and infrastructure. The two sides of the border are even further removed when considering demographic trends; degrees of political autonomy; the relative vigor of civil society; the diversity of institutions in the public, private, and civil sectors; and ability to cope with environmental stress. These multifaceted challenges along the US-Mexico border require collaborative approaches that extend beyond immediate geographical boundaries and across scientific disciplines.

Today, as this binational region undergoes multiple interlinked social, political, and environmental transitions, collaboration around regional sustainability is urgently necessary. Climate change is just one of the factors contributing to deteriorating air and water quality, compromised health, and limited opportunities for sustainable development for those who live in the region. These problems are complex and cross not only international borders, but also interstate and local jurisdictions, impacting Native tribal entities' relationships with both governments. Finding ways to make life in the area more sustainable requires a systemic understanding of the region through engagement with local residents, including Indigenous groups, decisionmakers at multiple levels of governance, and experts from many disciplines.

An additional context for the border must be considered as well. In the capitals of both countries, the boundary is cast as violent and unruly—a problem rather than an opportunity. An ongoing challenge for a collaborative partnership is to redress this misleading and unhelpful approach. The flow of economic migrants and refugees into the United States occurs both legally and illegally, dominating the political conversation in both countries. Illegal activities in the region—such as drug trafficking into the United States and weapons trafficking into Mexico—have generated violence, corruption, and political tensions, intensifying the continued vulnerability of the people and landscape in this area.

In response to the challenges facing the region, the US National Academies of Sciences, Engineering, and Medicine (NASEM), Mexican Academy of Sciences (Academia Mexicana de Ciencias, or AMC), Mexican Academy of Engineering (Academia de Ingeniería de México), and National Academy of Medicine of Mexico (Academia Nacional de Medicina de México) joined together to appoint a committee of experts from the United States and Mexico to conduct a consensus study in 2020. The committee's report, *Advancing United States–Mexico Binational Sustainability Partnerships* (*Avances de las Alianzas Binacionales para la*

Sostenibilidad entre Estados Unidos y México), addresses select sustainability challenges in the binational region and makes recommendations on how to build partnerships to advance shared sustainable development goals. Importantly, the study does not focus on border policy per se, but considers the complex relationship of such policies in the context of broader binational sustainability challenges.

The report and the process behind it represent a pioneering example of binational cooperation in which both countries' national academies jointly identified drylands sustainability as a challenge. More importantly, both countries' national academies recognized that diagnosis, assessment, engagement, and solution needed to be not just binational but also interdisciplinary, involving experts with varied training as well as transdisciplinary perspectives, building on expertise from civil society and the private sector.

The path to producing the consensus report took nine years, revealing the necessity of such binational work as well as its challenges. In particular, what began as a relatively focused study of climate change shifted and adapted to become a consensus study about the sustainability of the fragile, shifting cross-border drylands region. Along the way, the project scrambled for funding while navigating the two countries' shifting politics and a global pandemic.

Lessons from this partnership extend beyond the specific challenges addressed in the consensus study. We would like to highlight the importance of flexibility and adaptability in the face of evolving circumstances, and the challenges of keeping such an initiative going in a turbulent political landscape. In addition, the experience demonstrates the importance of broadly considering sustainability challenges: this binational collaboration succeeded in part because leaders understood that environmental concerns are interrelated with social, economic, cultural, and political implications for border policies, trade, civil society, urbanization, and migration.

A long path to partnership

The sustainability partnership was new for both nations' academies, but the two countries had many earlier shared frameworks for environmental policy. Past efforts to develop tailored responses that consider the nuances of both sides of the border have involved establishing institutions for binational governance including the International Boundary and Water Commission, the North American Development Bank (NADBank), the Border Environment Cooperation Commission (now merged with NADBank), and the Commission for Environmental Cooperation (based in Montreal to address trinational environmental policy). However, the latter three institutions were developed in response to environmental concerns in the context of the North American Free Trade Agreement, or NAFTA, which was supplanted by the United States-Mexico-Canada Agreement in 2020.

Another long-standing element of cross-border collaboration involves the myriad civil society movements, initiatives, and projects addressing social, environmental, and other challenges that play critically important roles in this region. On the Mexican side of the border, political and economic conditions often imply inadequate environmental stewardship and weak enforcement of environmental protections for conservation; however, recent policy changes include modifications to land and water law. The evolving social-environmental landscape demands adaptive approaches to address the complex issues facing the region.

From our work, it is clear that building shared understanding of problems and sustainability goals creates opportunities for collective responses and solutions, potentially synergizing the expertise and coordinating actions in both countries. In other words, the border is a good place for science diplomacy. With that in mind, several precursor collaborations between NASEM and AMC and the academies of other countries helped pave the way for the 2021 sustainability partnership initiative.

The AMC became interested in engaging with climate change and related sustainability challenges in 2014, after *Climate Change: Evidence and Causes*, a report by NASEM and the Royal Society in the United Kingdom, was translated into Spanish. Subsequently, AMC and NASEM, along with other academies, established the office of the Inter-American Network of Academies of Sciences (IANAS) at the AMC premises in Mexico City. IANAS led workshops and published books on water and energy. In June 2014, the New Horizons in Science Symposium—a three-academy initiative of AMC, NASEM, and the Royal Society of Canada (Academies of Arts, Humanities, and Sciences of Canada)—followed in Mexico City. This further solidified the collaborative spirit by bringing together young Canadian, Mexican, and US scientists on topics including astrophysics, biotechnology, green chemistry, hazards and disasters, oceanography, and marine biology. These invigorating collaborations highlighted the role of science in addressing regional challenges and sparked enthusiasm among the younger generation of scholars.

In 2015, the community shifted to focus on binational partnerships, with NASEM and AMC beginning to work on the challenges and opportunities of climate and development. By February 2016, when the first organizational meeting was held in Mexico City, the initial framing centered on climate change, ecological dynamics, use of natural resources, and societal vulnerability to climate stressors in the transboundary drylands.

A critical point in the budding collaboration occurred at the 2016 meeting held in Washington, DC. Participants included representatives from key US federal agencies as well as the Mexican embassy's science attaché, who all demonstrated a keen interest in shared challenges for

public policy around resilience in the drylands of the border area. This meeting, which was one of the last formal acts of NASEM president Ralph Cicerone, laid the groundwork for the subsequent efforts of the binational committee. However, even though there was consensus among participants that the study was needed, there was agreement that it might not lead to any programmatic change. At the time, no funders could be secured, given the challenging political environment presented by the upcoming US presidential election. That the initiative succeeded despite these hurdles is a testament to the dedication of stakeholders in both countries.

Without funding, the efforts languished until NASEM's Board on Environmental Change and Society became involved in finding a solution. Conversations with binational experts explored the factors that influence social-ecological resilience in the border region, with an eye toward considering the effects of a changing climate. Themes that came up included exploring applied research, setting priorities for actionable solutions, and identifying pathways forward by highlighting promising collaborative efforts, all of which reflected a commitment to addressing real-world challenges faced in the region.

changes in climate, land degradation, social instability, and other binational challenges make achieving the SDGs in the US-Mexican transboundary region both daunting and urgent. Recognizing that the transboundary collaboration would be key to reaching the SDGs in the region, the group also began to focus on SDG17, which pinpoints the importance of global partnerships in sustainability.

The collaboration gained further momentum in November 2017, when the partnership was able to facilitate engagement between experts and the highest levels of policymaking in Mexico. The AMC skillfully opened doors for the committee to make a presentation at the Senate office in Mexico City to three Senate subcommittees (water, climate change, and the Mexico-US border) on the ongoing process of the study and efforts aimed at policymaking. This and a subsequent event showcased the potential policy and political impacts that could accrue from the study.

As the collaboration developed, the vision expanded to acknowledge land beyond what might strictly be considered the border region. A May 2018 workshop in San Luis Potosí, Mexico, held at an interdisciplinary research center raised the question of whether the border can be considered in

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In mid-2017, however, the priorities of the project began to crystallize around sustainability science. This framing enabled researchers to view the climate challenge in the context of exploring environmental, economic, political, cultural, and social challenges that characterize the broader transboundary region. Institutional and financial support was secured through NASEM's sustainability office and the Cynthia and George Mitchell Foundation. The new framing also provided an opportunity to advance the underexplored academic subject of sustainability science. In describing the future work, José Franco, past AMC president, said, "The aim has always been to examine and deepen our analyses and point to initiatives that will help address sustainability issues in the transboundary region in both the public and private sectors."

But as the focus on sustainability evolved, it came to line up with an emerging shared institutional emphasis on the Sustainable Development Goals (SDGs) at both NASEM and AMC. Although the SDGs have more widespread institutional support in Mexico than in the United States, NASEM has long been a strong proponent of them. Ongoing

isolation. At this meeting, the focus of the project extended to encompass the larger dryland region of Mexico and the United States. This change also proved to be significant later, when the consensus committee drew its members from this wider geographic area.

This workshop pioneered a design approach that laid the foundation for the subsequent consensus study. At the meeting, the participants steered clear of doing analysis strictly by sector or geographic region. Instead, they began to look at complex interactions among the economic, environmental, and social dimensions of the broader region. Rather than considering each sector in turn, the committee's approach emphasized understanding the transboundary region through its multiple systemic interconnections.

Constructing a consensus study

In August 2019, members of the committee reconvened at the Biosphere 2 in Arizona to plan for next steps, including the proposal for a first-of-its-kind formal consensus study between NASEM and AMC. With funding in place from the Mitchell Foundation, and a sustainability focus that

coalesced around SDG17, the way was paved for the official approval of the consensus study. Initial meetings were held virtually, with a March 2020 in-person meeting scheduled at AMC headquarters in Mexico City—just as the SARS-CoV-2 virus was declared a global health emergency. The ensuing shutdown prevented several committee members from traveling to the meeting, while others had to rush home before their flights were canceled. Overall, the experience demonstrated the resilience and adaptability of the effort. The July 2020 meeting with stakeholders, designed to serve as the primary data collection process to augment background documents and committee members' expertise, was held entirely in virtual mode. Subsequently, writing teams met virtually to draft their chapters, with the full committee meeting virtually periodically for cross-pollination and to take stock of overall progress.

When it was completed in 2021, the consensus report argued for more global partnerships structured around social science theory, and for applied research to explore potential strategies and mechanisms of improving coordination between institutions on both sides of the border. The report's completion also exposed the limitations of the process. For example, SDGs offer a particular way of dealing with complex issues, but they do not lend themselves well to constructing a persuasive account that fits all desired goals. Native American participants in the process voiced concern that constructing a more compelling narrative to encourage accomplishing SDGs would need to take into account considerations of Indigenous communities, who have deep and long-standing precolonial ties across the border and remain committed to those relationships in spite of the imposition of arbitrarily divisive nation-state boundaries. Future partnerships can build on this realization and work to address it.

A road map for partnership

Over the last nine years, the path forward has not always been clear, requiring constant readjustments and adaptations. Stakeholders found themselves navigating through an ever-evolving landscape of challenges and priorities. Despite the uncertainties, the joint efforts of NASEM, AMC, and the consensus study team members, along with the commitment of other stakeholders, have yielded significant progress in addressing sustainability challenges in the US-Mexico border region. Today, in the context of rapid global change, we see an unprecedented opportunity to create new partnerships that collaboratively address shared binational sustainability challenges and inform the development of national policies and management capacity to promote sustainable development.

The principles synthesized by the joint academies study provide a road map for building effective partnerships in achieving broader SDG targets. From identifying context-specific partnerships to ensuring coproduction of agendas and strategies, the principles emphasize the importance of collective involvement, trust building, resilience, and adaptability. What holds partnerships and the binational region together are the interrelationships among stakeholders and the environment that supports them.

Central to these principles is leadership that ensures partners and the stakeholders they represent are collectively involved in pursuing common goals. Coproduction of knowledge, activities, and assessments helps to ensure effective relationship building and capacity sharing among partners. This is not only essential to the immediate socio-environmental challenge at hand, but also to sustaining partnerships beyond the scope of a particular initiative. The capacity of partnerships for planning and decisionmaking is linked to external policymaking and must ensure flexibility, adaptability, and responsiveness to changing conditions.

The collaborative journey stands as a model for addressing complex and interconnected challenges through sustained partnerships. Moving forward, it can serve as a beacon for other regions facing similar challenges, highlighting the power of international collaboration, adaptability, and a shared commitment to sustainability. In sum, what holds partnerships—indeed, the binational region—together are the relationships we build with each other.

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