

PROMOTING KNOWLEDGE DIALOGUES IN AMAZONIA: LEARNING FROM BEST PRACTICES AND EXPERIENCES

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EXECUTIVE SUMMARY

In light of the current biodiversity and climatic crises, there is increasing recognition of the need to promote dialogues between different knowledge systems to improve our abilities to address complex issues and consequences and propose sustainable and feasible solutions. Leveraging the inclusion of Indigenous and local knowledge and Indigenous peoples and local communities in knowledge dialogues incorporates deep, place-based, holistic knowledge that can contribute to conservation and restoration efforts; adaptation to climate or other socio-environmental changes; and research, education, and health initiatives, among many others.

This white paper has several overarching goals, including (1) identifying experiences and actors involved with knowledge dialogues in Amazonia; (2) synthesizing their experiences and perspectives; and (3) consolidating key recommendations. A non-systematic review of published documents and online sources was conducted, aiming to identify initiatives, projects, and institutions working on knowledge dialogues and related topics across Amazonia. In parallel, 26 consultations were conducted with Indigenous and non-Indigenous actors working on knowledge dialogues in Amazonia, with the goal of documenting their firsthand experiences and perspectives.

Knowledge dialogues initiatives have different methodological approaches, objectives, and levels of participation from Indigenous peoples and local communities. The most salient objectives of these initiatives are territorial governance, sustainable resource management, knowledge co-production, intercultural education, research, and health.

Converging points and arguments that emerged from the review and the consultations include theoretical and epistemological considerations, challenges, and targeted actions for knowledge dialogues, which have been organized in a set of recommendations oriented toward decision-makers, researchers, and other actors involved in knowledge dialogues in Amazonia. These include:

- Safeguarding and promoting Indigenous rights through knowledge dialogues;
- Leveraging biocultural conservation through knowledge dialogues;
- Promoting knowledge dialogues for intercultural education;
- Assuring the representation of diverse social groups and actors in knowledge co-production and decision-making spaces;
- Embracing multiple worldviews and understandings of nature;
- Identifying place-based, locally relevant, and well-defined issues;
- Accommodating multiple formats for knowledge exchange;
- Building capacity for actors and intermediaries;
- Sharing and applying tools and approaches for knowledge dialogues; and
- Designing strategies to overcome funding-related barriers to knowledge dialogues.

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1. The potential of knowledge dialogues and the goals of this white paper

1.1 The relevance and potential of working across knowledge systems

In light of the current biodiversity and climatic crises, we must promote dialogues between different knowledge systems^a to improve our abilities to address complex issues and their consequences and to propose sustainable, feasible, and timely solutions^{1,2}. Indigenous peoples and local communities^b hold a rich, holistic, and detailed body of knowledge, practices, and beliefs (commonly referred to as “Indigenous and local knowledge”) developed through their close, place-based, and long-term relationship with their territories³. Leveraging knowledge dialogues^c between Indigenous and local knowledge and Western scientific knowledge can contribute to conservation and restoration efforts; adaptation to climate or other socio-environmental changes; and research, education, and health initiatives, among many others^{3–7}. Knowledge dialogues also bring Indigenous peoples and local communities into decision-making processes, empowering and recognizing them for safeguarding their territories and livelihoods, promoting inclusive governance, and bringing legitimacy to solutions that stem from the dialogue process^{2,8}. As Indigenous peoples and local communities are on the frontlines of socio-environmental disruptions⁹, explicitly including them in decision-making processes through knowledge dialogues could potentially foster their long-term survival and resilience and—at least partially—mitigate environmental injustices that affect them^d. Indigenous peoples and local communities also

bring unique conceptualizations, values, and practices concerning the relationships between people and nature, which are key to paving the pathway of transformative change toward more resilient and sustainable socio-ecological systems¹⁰.

There are, however, several challenges related to how knowledge dialogues occur in practice. Dialogue initiatives suffer from existing power and knowledge asymmetries and/or strong inequalities resulting from historical processes of exclusion and marginalization of Indigenous peoples and local communities. Political and institutional structures are also built and function according to Western knowledge systems^{11,12}, which biases the way knowledge is valued, interpreted, summarized, and disseminated. Additionally, choices on which issues to address are not value-neutral¹²; therefore, the definition of the problem and scope for knowledge dialogues might be more relevant to some actors^e than others. As a result, knowledge dialogue initiatives are still scarce, and the effective participation of Indigenous peoples and local communities in them remains low^{13,14}.

1.2 The goals and approach of this white paper

Across Amazonia, there are multiple and diverse projects, institutions, and initiatives that engage with knowledge dialogues. The overarching goals of this white paper are to identify these different experiences and actors and synthesize key recommendations based on their experiences and perspectives. Rather than conducting an exhaustive inventory of initiatives, this white paper provides an overview of the diversity of goals and contexts in which knowledge dialogue initiatives take place across

^a Knowledge systems are here defined as “sets of interacting agents, practices and institutions that organize the production, transfer, and use of knowledge”⁶⁸.

^b The definition of “Indigenous peoples and local communities” is based on the SPA working definition proposed by⁵¹ which includes “ethnic groups who are descendent from and identify with the original inhabitants of a given region”, several Afro-descendent groups and a diverse group of local communities who are “generally descendants of immigrants who intermarried with local Indigenous peoples”, and whose livelihoods are “strongly connected to place, territory and biodiversity, as well as with each other, in symbolic as well as physical, economic and political ways” (e.g., riverine communities, rubber-tappers, family farmers, some urban-based social groups, etc.).

^c Throughout the text the term “knowledge dialogues” is used in a very broad sense, referring to initiatives that promote, using different methodological approaches and with different goals, some sort of dialogue between academic knowledge and Indigenous and local knowledge. These include initiatives that have self-identified as “knowledge co-production”, “knowledge integration”, etc. Although there are relevant differences between these concepts (see¹⁴ for a recent review), here the term “knowledge dialogues” is used as a working definition, unless additional details are necessary.

^d Promoting inclusion of Indigenous peoples and local communities into decision-making process is also in line with the goals of the Escazú agreement (<https://www.cepal.org/en/escazuagreement>), which aims to guarantee rights of access to information, public participation in environmental decision-making and access to justice in environmental matters in Latin America and the Caribbean.

^e Throughout the text, the term “actors” was preferred instead of “stakeholders,” given that the latter has been increasingly contested, particularly in the context of work involving Indigenous peoples and local communities⁶⁹.

Amazonia^f and identifies some key actors involved in these efforts.^g Also, it draws from firsthand experiences from a broad set of actors to synthesize guidelines and recommendations for policy-makers, researchers, and other actors involved in knowledge dialogue efforts in Amazonia.

In order to identify initiatives working with knowledge dialogues in Amazonia, a non-systematic search of published documents and content available on websites of projects or institutions was conducted, including materials in English, Portuguese, and Spanish and covering all Amazonian countries. The search used keywords such as “knowledge dialogues,” “knowledge integration,” “knowledge co-construction,” and related concepts, and it was focused on initiatives that explicitly referred to knowledge dialogues as a major objective or step to achieve other goals. Mapped initiatives included spatially or temporally circumscribed case studies, as well as larger and longer “programs” (i.e., a collection of projects) or institutional-level initiatives. In total, 39 initiatives were identified, analyzed, organized into a [database](#) and spatially mapped (i.e., georeferenced according to their geographical scope; see Figure 1 and the [interactive map](#)).^h In addition, online consultations were conducted with a diverse set of actors (i.e., academic researchers, NGO practitioners, representatives of Indigenous peoples and local communities, etc.) involved in knowledge dialogues in Amazonia, with a total of 26 actors interviewed (six of whom were members of Indigenous groups and local communities). The full list of actors consulted can be viewed [here](#).ⁱ

2. The diversity of knowledge dialogues initiatives across Amazonia

Projects and initiatives on knowledge dialogues across Amazonia are diverse, including initiatives with different geographical scales, methodological approaches, objectives, and levels or types of engagement and participation of Indigenous peoples and local communities. Knowledge dialogues include “collegial contributions,” led independently by Indigenous peoples and local communities, as well as “co-created,” “collaborative,” and “contributory” projects¹⁵. Most initiatives that involve some form of knowledge dialogues do not engage Indigenous peoples and local communities in all phases of the process^{13,14}, and that seems to be the case among the initiatives surveyed. Knowledge dialogue initiatives across Amazonia are also diverse regarding the main objective that they want to address or achieve, and, most often, they simultaneously address multiple themes or objectives. Some of the most common themes and objectives of knowledge dialogues initiatives in Amazonia are:

Territorial governance – Several initiatives in Amazonia engage in knowledge dialogues with the goal of developing or improving territorial governance. These include initiatives aimed at establishing territorial management plans using participatory mapping approaches, protocols for accessing territories and knowledge developed by Indigenous peoples and local communities, and initiatives considering Indigenous worldviews and understandings into territorial planning, among others. Examples include the Indigenous-led organization *Conselho Indígena de Roraima*¹⁶, which supports the construction and implementation of participatory territorial management plans in northern Amazonia, and the cases of the Indigenous and local knowledge-based management plans of the natural parks *Yaigóje-Apaporis*¹⁷ and *Amacayacu*¹⁸ in Colombia;

^f The geographical scope used for this white paper is the same as the SPA 2021 Assessment Report, which includes the Amazon Basin River drainage *sensu lato*⁷⁰.

^g Some specific previous efforts deserve to be emphasized, as they provide the basis for and are complementary to this work: the SPA’s 2021 Amazon Assessment Report, in particular Chapter 33 (“Connecting and Sharing Diverse Knowledge Towards Sustainable Pathways in The Amazon”¹⁵) and Chapter 12 (“Milestones and challenges in the construction and expansion of participatory intercultural education in the Amazon”¹⁹); the review article “Bridging Indigenous and Western knowledge systems in knowledge co-production with Amazonian Indigenous communities: a systematic realist review”¹⁴; and the Convention on Biological Diversity’s publication “Local Biodiversity Outlooks 2: The contributions of indigenous peoples and local communities to the implementation of the Strategic Plan for Biodiversity 2011–2020 and to renewing nature and cultures”⁷.

^h Importantly, the assemblage of initiatives compiled here suffers from biases related to language (i.e., the lack of initiatives documented exclusively in languages other than Spanish, Portuguese, or English) and to the under-representation of Indigenous peoples and local communities such as Afro-descendants or migrants in documented initiatives.

ⁱ Oral Free, Prior, and Informed Consent (FPIC) was obtained from all consulted actors. Earlier versions of this text were circulated for their revision and approval.

Intercultural education – Intercultural education initiatives^j include projects—either institutionalized in state or national education plans and/or promoted by NGOs or research institutions—that foster educational approaches open to multiple understandings and interactions between different cultures and identities. Educational policies aiming to promote schools that are differentiated, specific, multilingual, and intercultural have been developed by some Amazonian countries such as Colombia, Brazil, and Ecuador, but their actual implementation is still lacking. In fact, contemporary educational and “capacity-building” processes across Amazonia still fall short in incorporating local knowledge, practices, and resources¹⁹.

Nevertheless, there are examples where intercultural education is constructed in more participatory ways and more open to Indigenous and local knowledge, in which pedagogical projects are based on local sociocultural realities, languages, and needs. These include examples in basic education, such as the Indigenous School *Coripaco/Pamaali* along the upper Negro River, and also at the university level, such as the post-graduate program in Social Anthropology at the Federal University of Amazonas, Brazil;

Natural resource management – Given the strict and long-term interactions between Indigenous peoples and local communities and their environment, and their high dependence on natural resources, most of the projects and initiatives of knowledge dialogues across Amazonia are related, at least to some extent, to the objectives of developing, improving, and monitoring natural resource management systems. One emblematic example is the community-based management of Arapaima (*Arapaima gigas*), which is based on a system of monitoring fish populations that was developed by combining scientific and local knowledge on the species’ behavior and ecology. Initially developed by the *Instituto de Desenvolvimento Sustentável Mamirauá* and implemented at the Reserva de Desenvolvimento Sustentável Mamirauá (Brazil), this system currently has spread to several regions across Amazonia and has led to multiple socio-economic and ecological benefits²⁰. In the Caquetá region of Colombian Amazonia, several decades’ worth of projects led by the

NGO *Tropenbos* have been demonstrating the potential of knowledge dialogues and knowledge co-production in the establishment of agreements on fisheries management and in participatory forest restoration (see below).

Knowledge co-production – Although most initiatives aiming to promote knowledge dialogues might result in some form of co-produced knowledge, some refer specifically to processes of “knowledge co-production,” which is here understood as “iterative and collaborative processes involving diverse types of expertise, knowledge and actors to produce context-specific knowledge and pathways towards a sustainable future”²¹. Knowledge co-production initiatives have become more common in the Amazon region in recent years¹⁴. One of the initiatives describes a process of knowledge co-generation about soils in the Kaxinawá territory in southeastern Amazonia, which was later used in the management plan of their territory²². Another project, conducted in the Xingu Indigenous Territory, involves the co-production of knowledge for the restoration of degraded areas based on a combination of ecological and Indigenous knowledge²³. Among the projects and initiatives inventoried for this work, most that refer to knowledge co-production focus on generating new knowledge or refined understandings about specific or relatively circumscribed phenomena or processes (e.g., soils, forest dynamics, climate change, fish cycles, etc.). For example, a recent initiative articulated between Instituto de Desenvolvimento Sustentável Mamirauá and local communities from the Sustainable Development Reserve Amanã (middle Solimões River) has synthesized community-based solutions for dealing with climate change impacts, such as the record-breaking drought of 2023²⁴.

Research – Some initiatives on knowledge dialogues in Amazonia are predominantly focused on producing and advancing scientific research,^k either as the only goal of the initiative or, as is often the case, together with multiple additional goals. These initiatives include either specific case studies or larger research programs involving multiple institutions, coordinated by (or with the participation of) universities and research institutes from Amazonia and

^j A comprehensive review of the history, development, and illustrative experiences with intercultural education in Amazonia has been conducted by Frieri et al.¹⁹ for the SPA’s 2021 Amazonia Assessment Report and is entitled “Milestones and Challenges in the Construction and Expansion of a Participatory Intercultural Education in the Amazon.”

^k Note that this category includes only initiatives whose *main* focus is scientific research, but research outputs have been produced from all other types of initiatives and are included in the reference database compiled for this work.

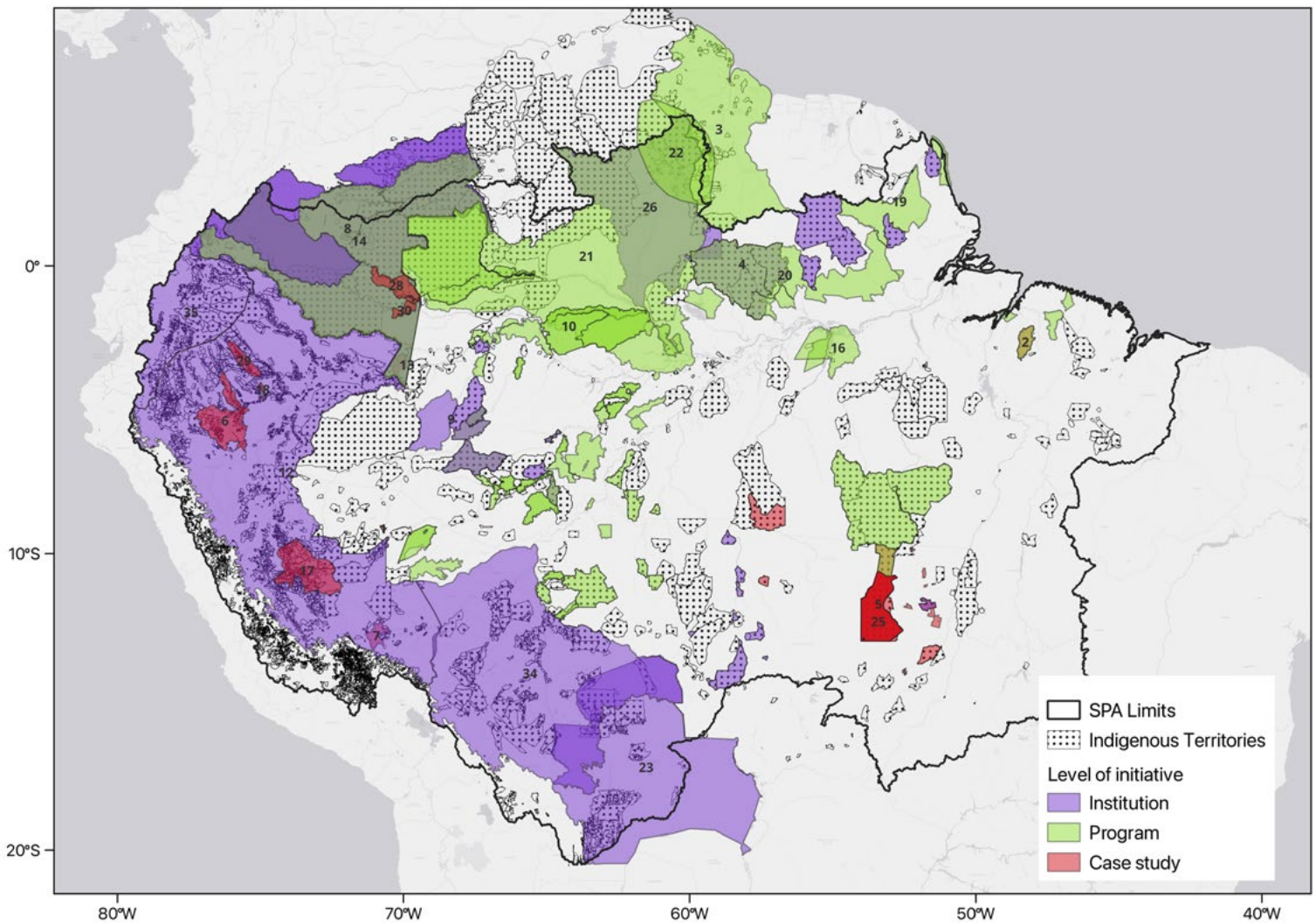


Figure 1. Map showing the approximate location where the knowledge dialogue initiatives mapped in this work take place. Numbers in the map correspond to the code of the initiatives in the [database](#). The layer of Indigenous Territories was obtained from RAISG (Amazon Geo-Referenced Socio-Environmental Information Network) and does not show territories of all local communities discussed in the text (e.g., riverine or Afro-descendent communities). An interactive version of the map, containing the full information on all initiatives, can be accessed through [this link](#).

abroad. This is the case, for example, of a collaborative research program developed between Canadian universities and Ashaninka and Yine-Yami people in Peru, focused on the co-development of consultation processes that are aligned with local understandings, knowledge, and worldviews ²⁵. An example of a larger research-focused initiative is *Acompañamento Territorial na Amazônia / Odyssey* ²⁶, a French-Brazilian research program that adopted participatory approaches for knowledge co-production about climate and environmental change.

Health – Some knowledge dialogue initiatives focus on health-related issues, usually incorporating local dimensions of health and wellbeing into health assessments. For example, an initiative in the Loreto Region of Peruvian Amazonia (IHACC – Indigenous Health

Adaptation to Climate Change)²⁷, involves knowledge co-construction for understandings of health and wellbeing, as does an international project led by ACTO (Amazon Cooperation Treaty Organization) aiming to build health contingency plans for vulnerable Indigenous peoples and local communities ²⁸. Another health-oriented initiative is a case study on heavy metals exposure in Peruvian Amazonia that reflects critically on the challenges of participatory health research ²⁹.

3. Key recommendations, guidelines, and pathways for knowledge dialogues in Amazonia

Based on the analysis of the initiatives mapped, and on the perspective of the actors stemming from their firsthand experiences, a few particularly salient points and arguments emerged. These include a diverse set of theoretical and epistemological considerations, challenges, and proposals and were organized in the form of recommendations and guidelines for decision-makers, practitioners, researchers, and other actors involved in knowledge dialogues.

Safeguarding and promoting Indigenous rights through knowledge dialogues. First and foremost, initiatives for knowledge dialogues should respect and purposefully work to guarantee Indigenous rights and self-determination in the broadest sense, including territorial rights, intellectual property rights, rights to data sovereignty, language rights, rights to their own knowledge systems, and the right to Free, Prior, and Informed Consent (FPIC), among others^{15,30–33}. Knowledge dialogues take place in territories and include communities that have suffered historical oppression and marginalization, who are often organizing their own movements of resistance and resilience against these processes. Knowledge dialogue initiatives need to not only understand and be attentive to these historical contexts, but also contemplate how the dialogues can provide support to community-based movements for Indigenous peoples and local communities' rights and against marginalization and oppressive processes.

Knowledge dialogues take place in complex institutional, legal, and socio-political contexts. This is key not only because these contexts may influence the form and content in which actors share their knowledge, but also because knowledge dialogues can potentially challenge current political and power structures. While this can be an important driver of transformational change, it may also expose groups or individuals; therefore, dialogues need to be promoted and conducted sensibly to assure that all actors involved are adequately informed and protected throughout the process. This is particularly relevant given the growing participation of Indigenous peoples and local

communities in initiatives involving economic valuations of natural resources (e.g., carbon, “bioeconomies,” etc.). In that sense, it is crucial to refine, disseminate, and ensure the implementation of policies, protocols, and frameworks to verify that knowledge dialogues occur ethically and legally while still being suited to the local context and needs^{4,10,14,34}. These include, for example: (1) enforcing and operationalizing legal and ethical guidelines established in agreements such as the Convention for Biological Diversity's Article 8 (J)³⁵ and its associated thematic program on “Traditional Knowledge, Innovations and Practices” (<https://www.cbd.int/traditional/>), the Nagoya Protocol on access and benefit-sharing, and the Code of Ethics for the International Society for Ethnobiology 33; (2) promoting and abiding to community-developed instruments to safeguard their rights and agreements on knowledge access and use, such as “biocultural community protocols”^{e.g., 36,37}; (3) developing frameworks and tools to support Indigenous peoples and local communities' governance and sovereignty regarding their data^{e.g., 38,39}; and (4) providing technical and legal support to local communities⁴⁰, as well as capacity building for researchers, members of communities, institutions, and all other actors involved in knowledge dialogues^{1,41,42}.

Leveraging biocultural conservation through knowledge dialogues. The biocultural diversity¹ of Amazonia is threatened by multiple drivers, including deforestation and urbanization, within a historical context of colonization with deeply negative impacts on Indigenous peoples and local communities. Historically, local populations and their knowledge have been both dismissed and marginalized, contributing to the further devaluation of their own knowledge and cultural expressions. As knowledge dialogues give visibility to local knowledge and contribute to the self-recognition and valuation of knowledge systems, identity, and culture, they can and should work as leverage for biocultural conservation, promoting social and ecological well-being through the conservation and restoration of biological and cultural diversity and their interrelationships^{43–45}. Positive biocultural outcomes should be achieved by supporting, in articulation with knowledge dialogues, the leadership, self-determination, and empowerment (both of women and the community) of Indigenous peoples and local communities; their

¹ Biocultural diversity is defined as “a dynamic, place-based aspect of nature arising from links and feedbacks between human cultural diversity and biological diversity”⁷¹.

informed and ethical coalitions and alliances with diverse other actors, such as scientists and governments; and their integrated territorial management and natural resource-based livelihoods ^{44,46}.

Promoting knowledge dialogues for intercultural education.

Intercultural education is key to promoting encounters between knowledge systems ¹⁹. Formal educational systems and structures are widespread across Amazonia (even in remote areas), and some countries, such as Colombia, Ecuador, and Brazil, have state educational plans tailored to Indigenous peoples and local communities. Overall, the level of “interculturality” in Indigenous schools is far from being fully realized, as these schools often suffer from limitations in physical and human resources, often reproducing “mainstream” and decontextualized educational content. Hence, several actors emphasize how Indigenous education can benefit from the opening of spaces to local knowledge through adopting curricula with Indigenous references, guidance, and content. Knowledge dialogues at school can provide the basis for education that relates to global and “modern” issues but is anchored in local, concrete demands.

Within higher education, Indigenous peoples and local communities’ access to university has improved due to affirmative actions (e.g., quotas specific to Indigenous peoples in Brazil or Peru) but suffers from structural barriers similar to those at the primary and secondary education levels. Some of the actors consulted for this report are young Indigenous leaders engaged in university graduate or postgraduate programs, and they reported how non-Western science knowledge systems are still invisible or considered inferior inside the university. Indigenous peoples and local communities also suffer from difficulties in establishing and maintaining themselves at the university given limited financial resources for accommodation, transportation, materials, etc., often resulting in high dropout rates. At the same time, and despite these structural and epistemological barriers for local knowledge at universities, Indigenous peoples and local communities are increasingly present at higher education spheres (e.g., in Brazil, a 374% increase in the number of Indigenous students in universities was documented between 2011 and 2021 ⁴⁷), and there are spaces being created at some Amazonian universities where more horizontal, dialogic, and constructive relationships between knowledge systems can be

promoted (e.g., the *Núcleo de Estudos da Amazônia Indígena – UFAM* in Brazil (<https://www.neai.ufam.edu.br>). Importantly, there are initiatives that do not necessarily fit into formal education structures but provide useful, inspiring, and potentially replicable examples of intercultural education programs led and designed by Indigenous peoples and local communities themselves, closely linked to local demands and emphasizing local knowledge systems and dialogues. Three examples include the *Universidad Autónoma Indígena Intercultural* in Colombia (<https://uaiinpebi-cric.edu.co/>), the *Escuela Viva Amazónica* in Ecuador (<https://confeniae.net/programas/escuela-viva-amazonica-eva/>), and the *Escuela de Gobierno Indígena y Desarrollo Amazónico* in Peru (<https://www.escuelaegida.com/>).

Assuring the representation of diverse social groups and actors.

Amazonia is home to immense biocultural diversity. Besides the diversity of native Indigenous groups (illustrated by the more than 410 distinctive ethnic groups and the 300-plus languages spoken today ^{44,48}), the region also hosts a wide variety of social groups, such as Afro-descendant communities, riverine populations, farming communities, and more, many of which have been historically marginalized and/or misrepresented in science and policy ^{49–51} and in knowledge dialogues. Knowledge dialogues in Amazonia should be cognizant of this immense linguistic and biocultural diversity, leverage their contributions, and ensure the representation of multiple social groups and their knowledge systems. Additionally, initiatives should also be attentive to the sociocultural diversity within communities, ensuring adequate representation of men and women, youth, elderly, and other context-specific sub-groups.

Embracing multiple worldviews and understandings of nature.

Working across knowledge systems should be based on mutual respect for the diverse ways of knowing, traditions, and worldviews. Thus, knowledge dialogues should be done horizontally and plurally by recognizing, respecting, and mutually empowering different knowledge systems and cultures ^{10,15,32,34,40,52}. Building and maintaining trust-based relationships between different actors is foundational to the building, leveraging, and success of knowledge dialogue initiatives ^{10,32,53}. Long-term projects involving long-term relationships between institutions and local communities provide highly favorable contexts for building trust and for knowledge dialogues in general.

While there is enormous cultural heterogeneity between different groups and communities across Amazonia, Indigenous peoples and local communities' relationships with nature and with each other are intimate and imbricate, often involving the recognition of multiple agents, spiritual dimensions, and non-human entities, which implies different ontologies, epistemologies, and worldviews^{54,55}, as well as differentiated notions of justice and "Indigenous environmental justice"⁵⁶. Acknowledging the existence of diverse ways of understanding, existing, and interacting with the natural and supra-natural worlds is an essential condition for knowledge dialogues to take place. This also includes the recognition that certain aspects of different worldviews and knowledge systems are contradictory, irreconcilable, or non-overlapping⁵⁷. Actors may not share worldviews, but they need to take each other's worldviews seriously and find common ground to jointly propose solutions and ways forward.

Identifying place-based, locally relevant, and well-defined issues. Knowledge dialogue and co-production initiatives should be situated and suited to their socio-ecological context, acknowledging idiosyncrasies in historical, cultural, and ecological dimensions^{4,21}. As Indigenous and local knowledge is place-based and context-specific, knowledge dialogues efforts should be as well; place-based initiatives are more likely to lead to sustainable pathways and transformative change⁵⁸. This is particularly relevant for Amazonia, given its immense sociocultural and ecological diversity. Knowledge dialogue initiatives should be based on a well-defined and/or agreed-upon issue between the actors involved, aiming to promote a solution-oriented process that engages and mobilizes knowledge holders^{42,53}. Importantly, the problems or issues addressed should be locally relevant, stemming from local needs and interests, and focus on bringing beneficial and tangible outcomes, which should be disseminated and shared in an equitable and fair manner. Lessons learned from local initiatives can be useful in informing dialogues occurring in other related contexts and in scaling up beyond site-specific situations.

Accommodating multiple formats for knowledge exchange. One important point of attention is the format in which knowledge dialogues take place. Different knowledge systems have different means of expression and transmission; while Western scientific knowledge focuses on written formats, local knowledge tends to be

orally transmitted and makes use of storytelling and other non-written or non-verbal communication forms⁵⁹. Project meetings tend to be short, objective, and product-oriented, while local customs of building trust, reciprocity, and decision-making often involve longer and "less focused" activities. Importantly, and often emphasized during the consultations, is the language in which dialogues occur. Effective communication is key for knowledge dialogues⁶⁰, and the dialogues are often conducted using national official languages. Given Amazonia's immense linguistic diversity⁴⁸, this poses important limitations on knowledge dialogues and the effective participation of Indigenous peoples and local communities in decision-making processes in which they are directly involved. Knowledge dialogues should use languages, formats, and ways of gathering and communicating that are appropriate to local contexts, are thoroughly understood, and promote engagement of all actors involved. The use of digital technologies in combination with the "traditional" formats of knowledge exchange are particularly promising to promote youth engagement.

Building capacity for actors and intermediaries. Working across knowledge systems is not trivial, requiring facilitation and mediation skills, as well as active listening and a thorough and open understanding of the roots and rationales of different knowledge systems. Indigenous knowledge systems, worldviews, and identities have historically been downplayed in Western society. There have been many important advances regarding Indigenous rights and self-determination, territorial management, representativeness of Indigenous peoples and local communities in decision-making spheres, and increased visibility of their claims and worldviews. Despite these advances, the participation of Indigenous peoples and local communities and the representation of their knowledge systems in decision-making processes is still limited, partly because institutions, governments, and society still lack the training and mindset to work in intercultural settings and conduct participatory and co-constructed processes. In that sense, all actors need to be better informed about the intrinsic value of different knowledge systems, the potential benefits of knowledge dialogues, and the respectful, horizontal, and participatory principles of knowledge dialogues and interculturality. Resources and efforts should be allocated to (1) the training and mentoring of actors who

are directly involved in the intermediation of knowledge dialogues, including government agencies and NGOs, as well as to (2) the creation of platforms and other spaces aimed at developing capabilities, sharing experiences, and promoting knowledge dialogues^{15,19,40,41}. Approaches and frameworks to mobilize Indigenous and local knowledge and to engage actors with multiple worldviews also should be more deliberate and explicit^{4,61}.

Sharing and applying tools and approaches for knowledge dialogues. Knowledge dialogues are participatory in essence, but levels of participation are highly variable and their success depends on the engagement of all actors in all phases of the process, including knowledge mobilization, translation, negotiation, synthesis, and application^{1,2,21}. Deeper engagement by knowledge holders, particularly by Indigenous peoples and local communities, should guide knowledge dialogue initiatives— especially in Amazonia, where most knowledge dialogue initiatives, in spite of their well-intended goals, still fall short in engaging local communities in all phases of the process¹⁴. Importantly, learning from well-documented existing knowledge dialogue experiences, at both local^{e.g., 62} and global levels^{e.g., 4} is key in the design and promotion of truly participatory knowledge dialogues.

Initiatives across Amazonia have been using a wide range of methodological approaches and tools in knowledge dialogues, which vary depending on the goal of the initiative or project, as well as in the type and level of engagement of actors. These include project-level experiences, such as the design of bottom-up participatory research projects^{e.g., 62,63} or intercultural research programs^{e.g., 64}, as well as more specific tools, such as participatory mapping, games, video/photographic tools^{e.g., 65}, and other methods to facilitate and catalyze actor engagement. Actors, in general, emphasize the importance of approaches that leverage the protagonism of Indigenous peoples and local communities, in which research and/or development initiatives are designed, led, and managed by Indigenous peoples and local communities themselves, including Indigenous research methodologies and epistemologies^{66,67}. These tend to result in dialogues and outcomes that

are recognized as more participatory, transparent, and legitimate and may help mitigate power and knowledge asymmetries or imbalances^{10,53,59}.

Designing strategies to overcome funding-related barriers to conducting and maintaining knowledge dialogues.

Funding-related issues pose important challenges for knowledge dialogue initiatives. The bureaucracy and level of formalization required for accessing funds often hinders Indigenous peoples and local communities' direct access to resources, which may produce asymmetries between actors regarding the definition of issues to be addressed. Also, funding agencies usually do not allow the flexibility required in certain participatory approaches where the definition of the issue itself is part of the knowledge co-construction process and/or when lengthier processes are required. Actors also referred to unpredictability in the availability of funds (which may vary substantially depending, for example, on political circumstances) and to the intermittent nature of projects as conditions that challenge knowledge dialogues. Overcoming these limitations would require designing changes in funding access mechanisms to suit the reality of Indigenous-led organizations, accommodate the unpredictability that is inherent to co-construction projects, and ensure constant and long-term funding support for maintaining and continuing knowledge dialogues.^m

^m For an example of a funding initiative designed for Indigenous peoples and local communities, see the Dedicated Grant Mechanism for Indigenous Peoples and Local Communities (<https://www.dgmglobal.org/home>), established by the Climate Investment Funds (CIF) and implemented by the World Bank. For an example of an Indigenous-led funding mechanism, see the Indigenous fund Podáali (<https://fundopodaali.org.br/>).

4. Case studies of knowledge dialogues in Amazonia

Box 1 – Kaiabi Araa: Cultural Revitalization Through Weaving Knowledge

The Kaiabi (also known as Kawaiwete) are an Indigenous group native to southern Brazilian Amazonia. Basket weaving using native fibers historically has been an important part of Kaiabi culture and identity. Over the decades, the Kaiabi's weaving knowledge has faced significant decline, exacerbated by the scarcity of the primary natural fiber, *Ischnosiphon gracilis*. In response, Kaiabi leaders initiated the Kaiabi Araa (“design of the Kaiabi”) project, an 8-year community-based cultural revitalization initiative involving Indigenous organizations and NGOs that included a range of activities like weaving workshops and field experiments. The project combined Indigenous knowledge and methodologies with academic approaches from the biophysical and social sciences and aimed to revitalize weaving knowledge and improve the management of native fibers. Central to the project were the “many-to-many” knowledge transmission workshops, where multiple elders taught numerous apprentices, fostering collaborative learning. This approach also highlighted the vital role of women in preserving and transmitting weaving knowledge. Additionally, efforts were made to regrow the essential natural fibers and identify substitutes in the field. The project also fostered the production of numerous and diverse outcomes (e.g., books and an award-winning documentary shot by the community) that gave visibility to the issue. Overall, the Kaiabi Araa project successfully revitalized essential aspects of the Kaiabi's cultural heritage, ensuring the transmission and preservation of their traditional weaving knowledge. It also had measurable outcomes in increasing the level of basketry knowledge by the Kaiabi. Some key elements essential for these successes were the long-term nature of the project, enabled by longstanding financial and educational support; the protagonism of communities on the definition of research questions; and methodological approaches, such as conducting interviews and organizing workshops. This example emphasizes the need for open, reflective, and interactive approaches for knowledge dialogues, particularly in supporting Indigenous strategies for adapting to changing social-ecological conditions and preserving cultural identities.

Box 2 – Indigenous and Local Knowledge, Community-Owned Solutions, and Policy in Guiana

From 2011 to 2015, the EU-funded project COBRA worked with local communities from the Guiana Shield to identify, document, and promote solutions for natural resource management based on their skills and knowledge. Using participatory methods and accessible visual technologies to engage actors in the research process, the project enabled communities to discuss ongoing challenges and identify, record, and share local solutions, demonstrating that community-owned approaches could address sustainable development and resource management issues effectively. Following these successful outcomes, a follow-up project involving a larger consortium of partners was established, aiming to promote the inclusion of Indigenous and local knowledge into conservation and sustainable development decision-making, monitoring, and policy in Guiana. The project involved numerous activities, including widening the evidence base of community-owned solutions based on local knowledge; building capacity for communities and other actors involved in knowledge dialogues; producing a “National Action plan for Traditional Knowledge”; and synthesizing and disseminating best practices for recognizing and including Indigenous and local knowledge into conservation plans.

Box 3 – Intercultural Research in the Upper Negro River

The Indigenous Environmental Management Agents (AIMAs) is a program developed over the past 15 years by Instituto Socioambiental in partnership with the Federation of Indigenous Organizations of the Negro River (FOIRN). It aims to systematically document climatic, biological, and ecological changes in the Negro River region. This long-term program promotes intercultural research on critical topics such as agrobiodiversity, climate change, and seasonal cycles, encouraging dialogues between Indigenous and local knowledge and academic knowledge to better understand the region's environmental dynamics. The program initially focused on fish management but expanded to include environmental monitoring in a broader sense, reflecting local understandings of the interconnectedness of ecological, biological, and ritual cycles. A key aspect of the program is the maintenance of a network of approximately 40 Indigenous Environmental Monitoring Agents, consisting of residents from several different rivers across this extensive region who systematically record observations of climatic, biological, and ecological changes in their territories. This network is crucial for continuous, accurate data collection, helping to create a detailed and nuanced picture of the environmental transformations occurring in the region. The data collected by the Indigenous agents are carefully systematized and analyzed, producing valuable insights into environmental conditions and their changes over time. These findings are shared within the communities for mutual learning and also externally through a publication called "Aru - Revista de Pesquisa Intercultural da Bacia do Rio Negro, Amazônia," which is an important channel for disseminating and documenting the program's co-generated knowledge. The program also strengthens local capacities by providing ongoing training and support to the Indigenous Environmental Monitoring Agents, improving data quality and ensuring local communities' active participation in managing and conserving their natural resources. Overall, the AIMA program is an illustrative example of how knowledge dialogues can simultaneously leverage multiple socio-ecological outcomes, such as improved environmental monitoring, enhanced community involvement, and preserved Indigenous and local knowledge.

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