

# Chapter 33 In Brief

**Connecting and sharing diverse knowledge systems to support sustainable pathways in the Amazon**



Manifestação dos Povos Indígenas, Largo São Sebastião, Manaus, Brazil (Foto: Alberto César Araújo/Amazônia Real)



**THE AMAZON WE WANT**  
Science Panel for the Amazon

# Connecting and sharing diverse knowledge systems to support sustainable pathways in the Amazon

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## Key Messages & Recommendations

- 1) Indigenous and local knowledge (ILK) has been critical for conservation and sustainable development across the Amazon. However, ILK systems, best practices, and lessons are often overlooked and unrecognized.
- 2) Many inspiring solutions to the problem of unequal knowledge production, sharing, and articulation in decision-making exist at the local scale and must be scaled up, in combination with policy recommendations and guidelines stemming from global experiences. We recommend the following first steps towards this direction:
  - a) Recognizing and guaranteeing the fundamental rights of people and nature, and the knowledge systems of Indigenous people and local communities (IPLCs).
  - b) Strengthening the design and implementation of open, collaborative knowledge principles, through policies, agreements, and protocols. These should be targeted, specific, and adapted to local contexts, objectives, and needs.
  - c) Promoting collaboration between IPLCs, practitioners, and academics to compile and disseminate knowledge in order to increase collective understanding of the contribution of ILK and public engagement to science and Amazonian solutions.
- d) Investing in infrastructure for public participation in knowledge dialogues.
- e) Collaboratively creating normative frameworks, agreements, and protocols for open knowledge.
- f) Strengthening and scaling up intercultural knowledge platforms.
- g) Promoting structural change and training for decision-making institutions to encourage engagement with IPLCs and public participation, and to ensure transparency and accountability.
- 3) The proposed efforts should build on progress made by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and should involve leaders from IPLCs, grassroots organizations, academia, civil society, and national science councils or ministries.

**Abstract** This chapter highlights the under-recognized importance of ILK to conservation and sustainable development efforts across the Amazon, utilizing the conceptual framework of public parti-

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icipation in scientific research. It reviews a range of illustrative examples which articulate ILK and mainstream scientific and technical knowledge systems in conservation and development initiatives. We also consider recent policy recommendations and guidelines by professional associations and civil society organizations.

**Introduction** Different worldviews and knowledge systems co-exist in the Amazon, often with contrasting definitions of well-being and sustainable development<sup>1-3</sup>. Despite the enormous diversity of knowledge systems connected to Amazonian cultural and biological diversity (Chapter 10), there are still few investigations into how these knowledge systems work, and how they can inform decision-making processes at different scales to facilitate sustainability<sup>3-6</sup>. Lahsen and Nobre<sup>6</sup> highlight that this research gap is particularly important in less developed countries, which contain a great part of the world's cultural and biological diversity.

Over the past 30 years, different stakeholders, from civil society to government agencies, have increasingly acknowledged the contribution of ILK to the Amazon's conservation and sustainable development. The number of documented contributions of ILK to decision making in Amazonian countries seems to increase year to year.

Many times, knowledge exists in silos, failing to be effectively articulated or connected across the region, across disciplines, and across stakeholders<sup>7,8</sup>. On the one hand, knowledge seems to be insufficient, or sufficient but not readily accessible by decision makers (from community managers to government agencies). On the other hand, ILK and participatory science and monitoring (under many names) have a long tradition in producing valuable knowledge, but this knowledge has not been sufficiently acknowledged, learned from, and internalized by decision makers in academia, government, and civil society<sup>9</sup>. For instance, DuBay *et al.*<sup>10</sup> describe how avian scientific and common names reflect a Western or colonial bias, with many initiatives looking to change this.

To further promote the sharing and articulation of diverse knowledge systems for sustainable development, McElwee *et al.* 2020's<sup>11</sup> extensive review finds that the IPBES "Global Assessment demonstrated the importance of Indigenous Peoples and Local Communities (IPLC) to global biodiversity conservation and ecosystem management. (...) Successfully bringing ILK into assessment processes and policy arenas requires a deliberate framework and approach from the start that facilitates recognition of different knowledge systems, identifies questions relevant at various scales, mobilizes funding and recognizes time required, and engages networks of stakeholders with diverse worldviews."

In addition, we propose that stakeholders involved in this process ask critical questions, such as for whom, by who, and for what purpose should science investments and policies be promoted in the Amazon? What conditions are needed for a thriving science and knowledge sharing environment? How can barriers be broken to facilitate genuine knowledge dialogues that recognize, credit, and legitimize ILK knowledge and other contributions from non-academics<sup>12</sup> to inform decisions and policies? Answers to these and other questions are context-based, and the result of negotiations among stakeholders, ideally through transparent, just, and equitable processes.

This chapter uses an appreciative inquiry approach<sup>13</sup> to highlight success stories and use them to develop best practices and lessons learned, acknowledging and expanding them. It is informed by a stakeholder engagement process which identified core elements of a future Amazon vision (see Chapter 25); including acknowledgement and respect of fundamental human rights and the rights of nature, and the acknowledgment and incorporation of ILK in decision making. The vision also includes incorporation of ILK in natural resource management policies and planning, territorial governance (see Chapter 31), conservation of the Amazon (see Chapter 27), and addressing ecosystem destruction and degradation (see Chapters 19-21).

**Inspiring experiences and pathways** Existing experiences and programs offer success stories and learnings on generating, connecting, and sharing knowledge to inform and guide decisions and policies. We propose a framework to reflect on public participation (including IPLCs, civil society organizations, and individuals) in knowledge generation and sharing. This framework builds on Shirk et al.<sup>14</sup>, which poses: “Projects must balance inputs from scientific interests and public interests, but each project negotiates that balance differently. Projects also exhibit different outcomes for science, individuals (researchers or volunteers), and socioecological systems, which may relate to the particular balance of inputs.”

To adapt the Shirk et al.<sup>14</sup> framework to the context of the Amazon, we propose to incorporate, first, the level of acknowledgement and respect of IPLCs rights over land, resources, and knowledge, which shapes the negotiation between scientific interests and public interests, and ultimately influences outcomes<sup>15–18</sup>. Second, existing institutions, political structures, and civil society also influence the ability of knowledge to inform decisions and, thus, outcomes and impact.

This framework becomes useful to analyze experiences of public participation in knowledge generation and sharing, but also to design projects and explicitly question the effectiveness of public engagement or the dialogue between diverse knowledge systems. Core decisions ultimately come down to who participates in different steps of the process.

The examples included in this chapter represent three of the five categories proposed by Shirk et al.<sup>14</sup>

*“Collegial contributions, where non-credentialed individuals conduct research independently with varying degrees of expected recognition by institutionalized science and/or professionals.*

*Co-created projects, which are designed by scientists and members of the public working together and for which at*

*least some of the public participants are actively involved in most or all aspects of the research process.*

*Collaborative projects, which are generally designed by scientists and for which members of the public contribute data but also help to refine project design, analyze data and/or disseminate findings.”*

### **Collegial contributions**

*The history of the Matapi: Documentation of local knowledge (Colombia)* Uldarico Matapí, an Indigenous traditional knowledge holder, collaborated with his son Uldarico Matapí to transcribe historic Matapí (also known as Upichía) knowledge and draw maps of the ancestral Matapí territory. This work was published in 1997<sup>19</sup> and contributed to understanding Indigenous macro-territories and promoting use of this concept to inform governance in the Colombian Amazon.

*Peasant knowledge for territorial planning in conflict (Colombia)* “Colono” settlers arrived in the Amazon piedmont in Caquetá, Colombia, towards the turn of the 20th century. After conflict arose between their historic use of land for agriculture and the more recent creation of protected areas in the region, peasant knowledge informed reviews of land use planning and conservation policies, overcoming conflict and promoting conservation.

*Visions of Chiribiquete from the Shamanic World (Colombia)* With a research grant from Tropenbos-Colombia, traditional knowledge holder Uldarico Matapí documented Indigenous views of Chiribiquete National Park<sup>19</sup>. He described how Chiribiquete’s famous pictographs depict the origin of the world and its rules; territories, animals, water, plants, and shamanic knowledge were distributed to maintain the order of the rainforest. This knowledge informs national park management and promotes conservation.

*Kukama Indigenous peoples’ underwater world (Peru)* Leonardo Tello and Radio Ucamara (a civil society organization) led a 5-year participatory process with Kukama Kukamiria Indigenous communities

in the Lower Marañón River (Loreto, Peru), to map and document their ancestral knowledge and vision about sacred places, history, and culture. With support from landscape ecologists, this knowledge was compiled into a story map<sup>20</sup>. The Kukama People use the story map to inform government agencies about the potential impacts of infrastructure on their territories and lives.

### Co-created projects

*The territory of the Jaguars of Yurupari (Colombia)* ACAIPI (2014)<sup>21</sup> compiled ILK from dozens of traditional knowledge holders from five Indigenous peoples in the Pirá Paraná River (Vaupés, Colombia). The book resulted from a collaboration between ACAIPI (an Indigenous organization), Fundación Gaia Amazonas, an intergenerational and intercultural group of Indigenous wisemen (*sabedores*) and youth, and western researchers. It describes the origins, livelihoods, and territorial management practices of five Indigenous peoples, and aims to share this knowledge with other Indigenous peoples in the Pirá Paraná River and with foreigners.

*Fisherfolk's local knowledge (Colombia)* Biologist Carlos Rodríguez, fisherman Luis Angel Trujillo, and other researchers collaborated to compile and document ILK about the Amazon's giant catfishes in the Lower Caquetá River (Colombia). Trujillo contributed significantly to the research design and of shared knowledge of the giant Piraiba catfish (*Brachyplatystoma capapretum*), identifying 93 prey species (prior scientific research had identified only 17). Then, Trujillo, Rodríguez, and Confucio Hernández, an Uitoto illustrator, collaboratively published the book *Piraiba: Illustrated ecology of the great Amazon catfish* in 2018<sup>22</sup>, which was awarded the highest Colombian National Research Award.

*Biodiversity and human health (Colombia)* Indigenous Elder nipodimaki Oscar Romualdo Román-Jitdutjaaño and anthropologist Juan Alvaro Echeverri collaborated in an intercultural study<sup>23</sup> of the human condition. They researched plant species from which alkaloid vegetable salts can be

extracted. Increased understanding of these plant species and the services they provide (e.g., food, tobacco, money, tools) guides behavior and promotes human health and fertility.

### Collaborative projects

*Training Indigenous Environmental Agents in the southern Brazilian Amazon* In 2020, 73 Indigenous Environmental Agents (AAIs for the Portuguese acronym) participated in a training program led by the Institute of Education of Brazil and the Parintintin, Jiahui, Tenharim, and Apurinã Indigenous peoples. AAI participants increased their technical and political capacities to address a range of socio-environmental challenges that affect their territories. As a result, the AAIs are shifting perceptions of Indigenous peoples as essential for environmental protection and sustainable development.

*Citizen science for fisheries monitoring: The Ictio App in the Madeira River basin (Brazil)* Before this project, the only entity that generated and held fisheries data in Rondônia was a hydroelectric dam concession holder; this limited fisherfolk' and government agencies' access to data and inhibited effective decision making. However, over 25 partners, including scientists and fisherfolk, recently agreed to test citizen science approaches, developing the Ictio App<sup>24</sup> to support state decision makers and fisherfolk in generating and accessing fisheries data. Community members monitor and co-manage fisheries, uniting formal and traditional governance models. Using low cost, user-friendly digital tools and transparent data sharing agreements, users have generated and shared 38,000+ observations across the basin. This data also helps assess real and potential impacts from hydroelectric projects.

*Collaborative knowledge production and coalition building* Over 20 years of rapid inventories by the Chicago Field Museum of Natural History (USA) has informed conservation recommendations in the region. Recommendations are co-created with local people and decision makers on the basis of rapid inventory results; the inventories themselves

are syntheses which engage local people in field-work<sup>25</sup>.

**Additional Recommendations** Open, collaborative knowledge policies should follow the guidelines of OCSDNet<sup>26</sup>, UNESCO (2021)<sup>27</sup>, and others; they should also include free, prior, and informed consent (FPIC) and participation agreements that clearly outline the risks and benefits of participation, as well as where decision making authority lies<sup>15–17</sup>. Where data management is involved, including data quality assessment, interoperability and aggregation of data across scales and countries is critical (see Bowser *et al.*<sup>28</sup> on the Research Data Alliance). Partnerships should also be supported by transparent and effective instruments for equitable benefit sharing, including crediting contributions<sup>29</sup>, and equitably sharing intellectual property and licensing opportunities. Initiatives should ensure new technologies are low-cost and user-friendly to facilitate public participation, transparency, and scaling-up.

To address imbalances of power with respect to knowledge, academia and government agencies should build bridges for equitable and just collaboration with IPLCs and non-academic knowledge holders. This includes training on intercultural contexts and knowledge dialogues, and strengthening intercultural platforms for dialogue. Initial knowledge dialogue platforms may start at universities and research centers through the inclusion of ILK holders and local experts on their faculties.

We recommend organizing a recurrent Amazon Congress on ILK, co-led by the Coordinator of Indigenous Organizations of the Amazon River Basin (COICA), the Amazon Cooperation Treaty Organization (OTCA), and other Amazon multilateral organizations; national- and local-level Indigenous organizations; science and technology ministries or councils; and civil society organizations. This will ensure continuity over time, and strengthen intercultural networks. It will also support the effective use of ILK in decision making. Weak and unequal access to information, communication technologies, and connectivity threatens the success of

basic research. The COVID-19 pandemic has heightened these gaps, highlighting the urgency with which they must be addressed.

**Conclusions** Sustainable pathways for the Amazon require recognition and respect of ILK. ILK has, and continues to, significantly inform territorial and natural resource management, as well as conservation and sustainable development initiatives, especially those led by IPLCs themselves. However, lack of appropriate recognition or internalization of the knowledge and lessons offered hinders just knowledge production and informed decision making at national and international scales. Local and global professional associations and organizations are producing critical policy recommendations and guidelines that can inform the pathways forward. In order to address these inequities in knowledge production, sharing, and informed decision making, interventions at various scales are recommended, emphasizing the need to guarantee fundamental human and nature rights.

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