Technical Guidance Note

Bridging Traditional and Scientific Knowledge in Climate Activity Design

CWS Technical Unit

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About CWS

Church World Service (CWS) is a faith-based organization transforming communities around the globe through just and sustainable responses to hunger, poverty, displacement, and disaster. Our vision is a world where all have food, voice, and a safe place to call home.

Introduction

Around the world, CWS responds to the needs of families and communities who are highly vulnerable to climate hazards, or already feel the adverse effects of climate change. Our work incorporates Locally Led Adaptation (LLA) principles and aims to increase community voice, leadership, and control of resources in adaptation efforts. This includes using strength-based approaches that value local and Indigenous knowledge alongside technical and scientific knowledge, and that encourage building the capacity of impacted communities to assess their own climate risk and risk management options.

This technical guidance note provides a working definition of "traditional knowledge" as it relates to climate-related activities and outlines opportunities and challenges to bridging traditional and scientific knowledge that CWS teams and partners could consider in program design. It intends to contribute toward organization-wide approaches that reflect LLA Principle 5 in our adaptation and risk reduction activities: "Building a robust understanding of climate risk and uncertainty: Informing adaptation decisions through a combination of local, traditional, Indigenous, generational, and scientific knowledge that can enable resilience under a range of future climate scenarios."[1]

Since 2022, CWS country programs and their partners have been including traditional and scientific knowledge in their local climate adaptation programming, indicating demand for these approaches among our partner communities.

"Traditional Knowledge" and "Scientific Knowledge" in the Climate Change Context

Traditional ecological knowledge (TEK) and scientific knowledge both refer to ways that people come to know their natural environment.[2] Scientific knowledge refers to the collection of observable and measurable data and information, and use of this data to test and validate theories about the natural environment. Traditional knowledge includes both Indigenous knowledge and local knowledge, which together UNESCO describes as "the understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings.[3]" In many of our rural partner communities, traditional knowledge is a significant basis of environmental management practices and technologies.

Like scientific knowledge, traditional ecological knowledge systems rely on methodologies, use observable data, and are continually evolving. Indigenous and local knowledge provides inter-generational perspectives on how people interact with their environments, and often include cultural and spiritual practices that reflect these perspectives. They can be particularly valuable in assessing changes that scientific tools cannot easily measure, or

[1]World Resources Institute, "Principles for Locally Led Adaptation,"accessed May 10, 2023, https://www.wri.org/initiatives/locally-led-adaptation/principles-locally-led-adaptation
[2]Clarence Alexander, et al., "Linking Indigenous and Scientific Knowledge of Climate Change," BioScience, Vol. 61, No. 6 (2011): 477-484.
[3]In its special report on "Climate Change and Land," the IPCC notes: "Indigenous knowledge (IK) refers to the understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings. Local knowledge (LK) refers to the understandings and skills developed by individuals and populations, specific to the place where they live." It goes on to share examples of how these traditional knowledges can be applied in land-based climate adaptation. (https://www.ipcc.ch/srccl/)

may be slow to identify (e.g., unexpected extreme rains, changes in plant flowering or animal migrations), or in remote locations where access to scientific tools is limited.[4] Scientific tools can be especially valuable in assessing changes that are not easily observed visually or tactilely.[5]

Both the Intergovernmental Panel on Climate Change (IPCC) and the Paris Agreement recognize TEK's value, and the importance of integrating it with scientific knowledge to advance climate change solutions. The IPCC's 2022 assessment report on adaptation notes that "a wide range of top-down, bottom-up and co-produced processes and sources can deepen climate knowledge and sharing, including … Indigenous knowledge and local knowledge." In 2022, the U.S. government issued new guidance to federal agencies on Indigenous knowledge and its incorporation into policies, research and decision-making. Adaptation quality standards, such as Friends of Ecosystem-based Adaptation (FEBA) standards for ecosystem-based adaptation, also call for local and traditional knowledge to be reflected in project design. In short, there is growing recognition of the need to bridge knowledge systems for adaptation and other climate change responses to succeed, and the adaptation community is taking steps to systematically incorporate traditional knowledge in responses, alongside (not in place of) efforts to increase access to scientific knowledge.

Challenges in Bridging Traditional and Scientific Knowledge

Ideally, efforts to bridge traditional and scientific knowledge will respect the value and integrity of each system, while encouraging exchange and mutual understanding across knowledge systems and their practitioners. Research papers on TEK identify some practical challenges that CWS and our partners may face in building or strengthening these bridges:

- Knowledge practitioners and users of information may be sceptical about new or unfamiliar "ways of knowing," especially if they do not trust the source. This can cut in various directions: technical experts may be unconvinced about Indigenous knowledge, just as farmers may be doubtful about scientific information or new technical approaches.

- TEK is typically based on historic observations, which may no longer match new and changing climate conditions. If traditional knowledge is not reinterpreted and updated regularly, it risks becoming unreliable. Environmental changes, including those related to climate change, are decreasing opportunities for "learning by doing" that are often a key part of revising and updating traditional knowledge.[6]

- TEK is place-specific. Its methodologies, while rigorous, may not be easily replicated in other locations.

- In many contexts, there is limited dissemination of scientific information and technical knowledge products, such as seasonal weather forecasts. This means that smallholder farmers and Indigenous communities cannot access or use this information – and low use rates tend to correspond with low confidence in the information source.[7]

- Low literacy communities cannot easily use scientific or technical information if it is only shared in written formats. Integrating other visuals, such as icons or photos, or audio communication can improve access and use of knowledge products.[8]

- TEK is shared from generation to generation and may only exist in oral forms. If people migrate out of communities, or if younger generations lose interest in cultural traditions, the audience for knowledge

[6]Tania Carolina Camacho-Villa, Tania Eulalia Martinez-Cruz, Alejandro Ramírez-López, Matias Hoil-Tzuc, and Silvia Terán-Contreras, "Mayan Traditional Knowledge on Weather Forecasting: Who Contributes to Whom in Coping With Climate Change?" Front. Sustain. Food Syst. 5:618453 (2021). See also: Myuri Basdew, Obert Jiri, and Paramu L Mafongoya, "Integration of indigenous and scientific knowledge in climate adaptation in KwaZulu- Natal, South Africa," Change Adaptation Socioecol. Syst., 3 (2017): 56–67.
[7]Muthoni Masindi and Portia Naledi Tholetha, "ITIKI Plus: A Mobile Based Application for Integrating Indigenous Knowledge and Scientific Agro-Climate Decision Support for Africa's Small-Scale Farmers," IIIE Xplore (2019).
[8]Ibid.

transmission will grow smaller. This increases the risk that valuable knowledge may be lost to current and future generations.[9]

- In many places, community activities and social events in which TEK would be used or learned are themselves related to the natural environment, such as activities that are part of agricultural cycles. In addition to climate change, broader environmental pressures such as land degradation or deforestation, or losing access to land and natural resources altogether, make it more difficult for people to interact with and renew traditional knowledge and to pass it to younger generations.[10]

Program Design Bridging TEK and Scientific or Technical Knowledge

There are documented approaches that have bridged traditional knowledge with scientific and technical knowledge. When designing climate-related programs, CWS and our partners may consider these in program design:

- Include opportunities for participatory research that engages traditional knowledge holders in assessing climate risks and designing adaptation activities. One case study described documentation of local calendars, through daily observation of rainfall, river levels, flowering plants, and animal migrations. This allows for systematizing traditional knowledge in written formats, which can facilitate exchange of ideas and information between TEK practitioners and scientists.[11]

- Encourage respect and space for multiple ways of knowing in program activities. This could include creating opportunities for scientists or technical staff to meet with traditional knowledge practitioners and share about their respective ways of knowing. Scientists and technical staff can be encouraged to enter community venues, when and where appropriate, to learn more about TEK systems and processes.[12]

- Knowledge production should not be extractive. Ensure that knowledge systems help climate-impacted communities take actions toward local adaptation goals and reflect the urgency of adaptation and risk management needs that communities face.[13]

- Begin by identifying the goals for producing knowledge – and acknowledge that these may be different across different systems. Some systems may seek to "learn to adapt," while others may intend to "understand to manage".[14]

- Information, Communication, and Technology (ICTs) offer new ways to connect farmers with scientific knowledge and forecasting; and can gain users' trust by integrating and complementing local knowledge systems. Mobile apps can also serve as a bridge across knowledge systems by offering ways for various groups (e.g., TEK knowledge holders, agronomists, climate scientists, and farmer end-users), a way to upload and exchange information.

- Support inter-generational knowledge transfer and invest in community-based organizations that maintain traditional methods for collecting and interpreting information from the natural environment, including through cultural and spiritual practices.

[11]Aloisio Cabalzar, "Annual Cycles in Indigenous North- Western Amazon: A Collaborative Research Towards Climate Change Monitoring," in Indigenous Knowledge for Climate Change Assessment and Adaptation, eds. Douglas Nakashima, Igor Krupnik, and Jennifer T. Rubis, (Cambridge and Paris: Cambridge University Press and UNESCO, 2018).Also see: Richard Ochieng, Charles Recha, and Bockline Omedo Bebe, "Living with Climate Change in ASALs: Integrating Scientific Forecasts with Indigenous Knowledge," in Handbook of Climate Change Management, eds. Walter Leal Filho, Johannes M. Luetz, and Desalegn Ayal (New York City: Springer, 2021).
[12]Patricia Cochran, Orville H. Huntington, Caleb Pungowiyi, Stanley Tom, F. Stuart Chapin III, Henry P. Huntington, Nancy G. Maynard, and Sarah F. Trainor, "Indigenous frameworks for observing and responding to climate change in Alaska," Climatic Change 120 (2014).
[13]Ibid.
[14]Olga Lauter, "Challenges in Combining Indigenous and Scientific Knowledge in the Arctic," 2018.

How CWS Has Addressed These Themes in Recent Project Design

- *Georgia*: Community-led surveillance mechanism to systematize local knowledge of environmental hazards, and to communicate this knowledge with government offices, non-governmental organizations (NGOs), and humanitarian actors.

- *Indonesia*: Climate change vulnerability and capacity assessment (CVCA) activities that draw on and prioritize local knowledge of climate risks and adaptation strategies.

- *Kenya*: Organizing linkage meetings between pastoralist community groups and technical staff from meteorological and agricultural departments to identify Indigenous knowledge that could be incorporated into climate-smart agriculture practices. Using bulk SMS platforms to increase access and use of data-driven weather prediction systems and technical tools.

- *Paraguay*: Facilitating direct participation by Indigenous knowledge users, particularly women, in climate change technical roundtables.

- *United States*: Documenting strategies that immigrants and refugees have used to cope with extreme weather events in places of origin and first asylum, and lessons that they could apply to risk reduction and risk management in contexts where they now live.

Next Steps

Among potential institutional donors (e.g., government agencies, foundations), there is growing interest and resources to bridge scientific and traditional knowledge in climate responses, including adaptation and risk reduction. While this note highlights learnings from research literature, CWS and our community partners have a wealth of practical experience that can be synthesized and applied more systematically in program design. Actions that we can take toward this goal include:

- Identifying and resourcing intentional learning in plans and project proposals for all CWS activities that seek to bridge scientific and technical knowledge as part of their approach.
- Understanding existing Indigenous or local knowledge systems in places where we work, including answers to the following questions: Who is involved? How is knowledge tested, updated, and shared? What opportunities and challenges do traditional knowledge holders see in strengthening these systems?
- Reviewing whether and how local governments incorporate traditional knowledge in climate-related planning in places where CWS works and identifying opportunities to connect partner communities with planning processes and to support their effective participation.
- Inviting technical partners (e.g., agricultural extension officers) to share their experiences engaging with local and Indigenous knowledge holders, and vice versa, focusing on what has worked and what has not and making recommendations for improvement.
- Establishing or expanding relationships with Indigenous networks and/or researchers and identifying forms of partnerships that would be mutually beneficial.
- Documenting CWS experiences and lessons learned, and sharing these in relevant learning forums, such as the annual International Conference on Community-Based Adaptation to Climate Change or the biennial Adaptation Futures conference, and other regional and global platforms.

Conclusion

By demonstrating our ability to materialize locally led adaptation through including traditional and scientific knowledge in program design, CWS will be better positioned to grow our climate-related programs and partnerships in ways that build on our long history of community-based approaches to resilience and adaptation. Incorporating both scientific and traditional knowledge in our activities ensures that partner communities increase access to the best possible information and technology available, increases local adaptive capacities, and contributes to more positive outcomes for adaptation and risk reduction efforts.

CWS Technical Program Briefs

Provide a description of global standards and/or best practices related to a particular technical area and establish minimal technical guidance that CWS should consider when designing, implementing, or monitoring a program related to that area.

Resources

CARE. Decision-making for climate resilient livelihoods and risk reduction: A Participatory Scenario Planning approach. 2018. Practice brief on participatory planning for climate adaptation, with descriptions of how combining local and scientific knowledge can improve adaptation planning and increase community adaptive capacity.

CBA16. Hidden possibilities: how local knowledge rooted in cultural heritage enhances LLA and NBS. October 2022. Recording of workshop session (1 hr 30 min.) at 16th International Conference on Community-based Adaptation to Climate Change (CBA16). This session addresses how Indigenous and local knowledge enhances locally led adaptation and nature-based solutions, and how Indigenous practices can be blended with new practices to strengthen adaptation and resilience.

Fionula Creegan. What's in a Map? CWS Chaco Program helps Indigenous communities recover land and plan for the future. 2016. This CWS Blog piece describes how Indigenous knowledge of land-based resources, including flora and fauna, were used for territorial planning and increased land tenure security.

CWS Japan, Integrating Indigenous Knowledge and Technology to Build Resilience Against Droughts—A Step by Step Guideline. 2022. Technical guidance based on a pilot project in Pakistan to enhance the resilience of drought-affected communities, using a model that integrates technology and science with Indigenous and local knowledge to identify underground water sources. Includes description of specific steps that could be adapted in other locations.

Executive Office of the President, Council on Environmental Quality. Guidance for Federal Departments and Agencies on Indigenous Knowledge. November 2022. See "Appendix C. Example of Approach to Indigenous Knowledge as Source Materials in Highly Influential Scientific Assessments Under the Information Quality Act," which provides a checklist of criteria for considering Indigenous knowledge as a source of information for the U.S. National Climate

Assessment, including transparency and traceability, objectivity, integrity and security, and reproducibility.

Rajib Shaw, Noralene Uy, and Jennifer Baumwoll. Indigenous Knowledge Disaster Risk Reduction: Policy Note. 2008. This policy note provides a directional path for mainstreaming Indigenous knowledge in DRR by relevant government authorities and NGOs in Asia.
Tebtebba Foundation. Community-Based Monitoring and Information Systems (CBMIS). Process through which Indigenous peoples generate data and information for the analysis, monitoring, and use of the community. Through CBMIS, Indigenous communities are actors and managers of the entire process of producing a baseline information and deciding what to make out of the data they generate.

United Office for Disaster Risk Reduction (UNDRR). Words Into Action 11: Using Traditional and Indigenous Knowledges for Disaster Risk Reduction. 2022. Provides guidance for translating the Sendai Framework into credible and implementable DRR actions in ways that apply traditional knowledge. This WiA Guide also provides a methodology to include aspects of traditional knowledge in decision-making, and practical guidance to build the DRR capacity of local and Indigenous stakeholders.

United Nations Educational, Scientific and Cultural Organization (UNESCO). Local and Indigenous Knowledge Systems programme (LINKS). This UN program promotes local and Indigenous knowledge and its inclusion in global climate science and policy processes. It includes short descriptions of activities to revitalize Indigenous knowledge, as a complement to other forms of education and training.

United States Geological Survey (USGS). Webinar Series: Incorporating Indigenous Knowledges into Federal Research and Management. Live and recorded training webinars, held from April to June 2023. This series centers Indigenous voices to explore ethical, legal, and scientific considerations for working within different knowledge systems and provides guidance reflecting best practices.

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