

# 2021 Compendium of Indigenous Knowledge and Local Knowledge:

*Towards Inclusion of Indigenous Knowledge and Local Knowledge in Global Reports on Climate Change*

## Editors:

Mustonen, Tero  
Harper, Sherilee  
Rivera Ferre, Marta  
Postigo, Julio C.  
Ayansina, Ayanlade  
Benjaminsen, Tor  
Morgan, Ruth  
Okem, Andrew

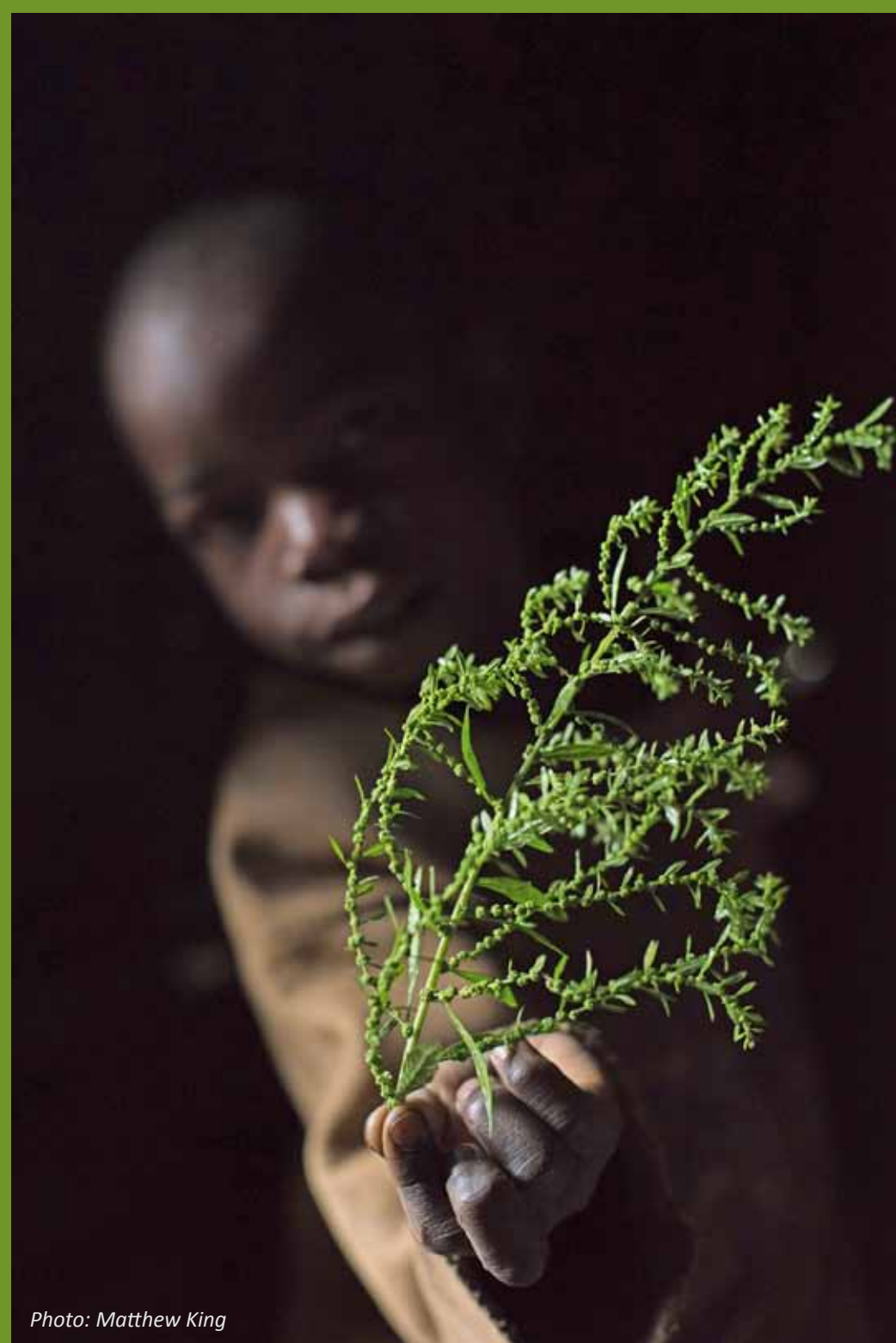


Photo: Matthew King

**Suggested Citation:**

Mustonen, T., Harper, S.L., Rivera Ferre, M., Postigo, J., Ayanlade, A. Benjaminsen, T., Morgan, R., & Okem, A. (Eds.). (2021). *2021 Compendium of Indigenous Knowledge and Local Knowledge: Towards Inclusion of Indigenous Knowledge and Local Knowledge in Global Reports on Climate Change*. Snowchange Cooperative: Kontiolahti, Finland.





## Table of Contents

<b><i>Introduction: Increasing Inclusion of Indigenous Knowledge and Local Knowledge in International Assessment Reports</i></b> .....	4
<b><i>Regional Cases and Submissions</i></b> .....	5
<b>North America</b> .....	6
Indigenizing Environmental Law .....	7
“Our health comes from our culture and our culture comes from our lands, our waters. To make good decisions, these connections must be acknowledged.” –Swinomish Elder .....	11
<b>South America</b> .....	14
Rural experiences in the communal landscapes of the Mishquiyacu watershed in the Peruvian Amazonia .....	15
Agricultural knowledge of the Uwøttüjä people in the ecological restoration of the Amazon rainforest .....	20
<b>Africa</b> .....	26
Listening to the waters, learning from the wisdom of the Elders: Climate change and the future of coastal small scale fishing communities in KwaZulu Nata l .....	27
<b>Europe</b> .....	29
Indigenous Female Bodies as Indicators of Change .....	30
Climate Change and the Swedish Sámi People .....	32
<b>Arctic</b> .....	34
Climate Change, Nomadic Lifestyles, and Preservation of Traditions .....	35
<b>Appendices</b> .....	38
Articles presented in the language of submission .....	38

## *Introduction: Increasing Inclusion of Indigenous Knowledge and Local Knowledge in International Assessment Reports*

This compendium represents steps towards the inclusion of Indigenous Knowledge (IK) and local knowledge (LK) into international assessments. The contributions within this compendium document how holders of IK and LK observe, project, and respond to anthropogenic climate change. In doing so, this compendium constitutes an invaluable resource to be considered in international assessment reports, including the Working Group II contribution to the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6) and beyond.

The need to include IK and LK in understanding climate change impacts, developing adaptation and mitigation strategies, and governing climate change actions has been called for years. Indeed, in 2011-2012, the IPCC worked with the United Nations University to create forums where IPCC Lead Authors and Chairs from the Fifth Assessment Report (AR5) met and interacted directly with Indigenous Peoples and local communities, both in Mexico and in Australia. These interactions aimed to create, among other things, opportunities for shared learning and to identify ways to increase the inclusion of both IK and LK in IPCC assessment reports.

Then, in preparation for AR6, a group of IPCC AR6 WG2 authors met in Faro, Portugal in January 2020, and agreed on steps to further increase the participation of local communities and Indigenous Peoples, and their knowledges, in international assessment reports. Specifically, the AR6 authors aimed to mobilise IK and LK contributions in formats that are “eligible” for inclusion in the IPCC assessment process, capturing knowledge and evidence from these varied and diverse knowledge holders. To achieve this goal, a call for contributions for this compendium was launched. Importantly, the call for contributions prioritized and privileged the voices and knowledges of Indigenous Peoples and local communities. As such, this compendium only includes contributions submitted by Indigenous Peoples and local community knowledge holders, and includes first-person narratives, oral histories, and other formats.

While this compendium does not solve the challenges and shortcomings related to the lack of meaningful inclusion of IK and LK in global assessment reports, it is intended to serve as a starting point. Indeed, shortly after the planning meeting in Portugal, the globe was shocked and continues to be affected by

the COVID-19 pandemic. Therefore, given the context of these tumultuous pandemic times, the editors felt that the 2020 call for submissions to the Indigenous knowledge and local knowledge compendium can serve as a model and a starting point for yearly uptake. This open process applies principles of equity, diversity, and inclusion to develop a rich evidence base covering a range of voices, statements, and unfiltered and intact knowledge in a format that can exist and dialogue with the IPCC processes, policies, and procedures.

We opened a call for contributions from knowledge holders from March to September 2020. We, the editors, wish to thank the authors from across the world who, despite the challenges, contributed to this compendium. Your contributions are an important first and are intended to pave a pathway to a broader and more meaningful engagement of IK and LK within international assessment processes, including the IPCC processes. Through the publication of this compendium, your materials are available for use in the on-going 6th IPCC Assessment Cycle.



## Regional Cases and Submissions



Photo: Eero Murtomäki



Photo: Carl Johan Utsi



Photo: Matthew King



Photo: Sherilee Harper



Photo: Snowchange



Photo: Snowchange



Photo: Snowchange



# North America



## Indigenizing Environmental Law

Authors: Jo Belasco, Esq., Dawn Hill Adams, Ph.D. (Choctaw)

Organisation: Tapestry Institute, USA

*“You would think that there would be concern that the ice is melting so fast, the waters are rising, and we’re experiencing real change, severe change. You’re not going to fix that. There’s no screwdriver, there’s no wrench, there’s no instrument that’s going to fix that. That’s only the conduct of the people working with nature and its own laws that will bring that back into any kind of a peaceful, comprehensive way of life.”*

Chief Oren Lyons, Faithkeeper of the Turtle Clan of the Onondaga Nation and a Chief of the Onondaga Nation Council of Chiefs of the Six Nations of the Iroquois Confederacy, the Haudenosaunee<sup>1</sup>

The modern environmental movement began in earnest in the United States (US) in 1970 when President Richard Nixon signed the National Environmental Policy Act on January 1. The Environmental Protection Agency was created in July of that year and received its first administrator in December. According to the National Oceanic and Atmospheric Admin-

istration (NOAA) data, the CO<sub>2</sub> level in January of 1970 was 325.03. In July of 2020, it was 414.38.<sup>2</sup> In an effort to protect wildlife, the US Congress passed the Endangered Species Act in 1973. According to the recent Living Planet Report 2020 compiled by the World Wildlife Fund, there has been a “68% average decline of birds, amphibians, mammals, fish, and reptiles since 1970.”<sup>3</sup> The climate change data and loss of earth’s natural biodiversity during the very period when environmental laws were passed to protect the natural world show that the environmental laws as they exist right now do not work. These dire warnings don’t mean that we should repeal these laws. They mean that we need environmental laws that provide actual protection. The only way to do that is to Indigenize environmental laws. To begin

this process, three things must happen: Indigenous knowledge must inform environmental law; Indigenous law must guide environmental law; Indigenous rights must be protected and be included in environmental law.

### Indigenous knowledge must inform environmental law

Western law is rooted in Western worldview, which holds that the natural world is not alive and it does not have agency. Therefore, humans are given power to make laws concerning the Land without any input from the Land itself. Such a belief is in stark contrast to Indigenous worldview in which the natural world is alive and has agency. In fact, the Land gives rise to the law within Indigenous worldview because all things come from the Land.

When Western environmental laws were passed, they were based on input from Western science. That input may have contained data that justified such laws but it did not contain Indigenous knowledge and worldview that would allow for actual participation in the lawmaking by the natural world. Western environmental law does not enter into relationship

### Suggested citation:

Belasco, J., & Hill Adams, D. (2021). Indigenizing Environmental Law. In T. Mustonen, S.L. Harper, M. Rivera Ferre, J. Postigo, A. Ayanlade, T. Benjaminsen, R. Morgan, & A. Okem (Eds.), *2021 Compendium of Indigenous Knowledge and Local Knowledge: Towards Inclusion of Indigenous Knowledge and Local Knowledge in Global Reports on Climate Change*. Snowchange Cooperative: Kontiolahti, Finland.

with the land, the air, the water, the plants, and the creatures with whom we share this planet. Instead, it uses the term “natural resources” to describe the natural world because the foundation of law in Western culture is the belief that the land is there for the use of humans above all else, even if that means the Land is harmed or destroyed in the process. Indigenizing environmental laws would mean that Indigenous knowledge would play a pivotal role in determining how best to protect the natural world. As Indigenous author, researcher, activist, and lecturer of American Indian studies at California State University San Marcos Dina Gilio-Whitaker (Colville Confederated Tribes) has written *“Indigenous knowledge is a vital aspect of indigenizing environmental justice. A Green New Deal that recognizes Indigenous worldviews will help create a paradigm shift based on relationship to the natural world, not its reckless exploitation.”*<sup>4</sup>

Indigenizing environmental law means that lawyers and others working to protect the Land would go out onto the land to interact with it and listen to it. As it stands now, environmental lawyers spend most of their time in offices and court rooms, which cuts them off from the very client they are trying to protect. Indigenous worldview also incorporates Indigenous ways of knowing so Indigenizing environmental law means that experiential, mythic, and spiritual ways of knowing combine with intellectual ways to create a more comprehensive and collaborative body of law.



Photo: Eero Murtomäki

### Indigenous law must guide environmental law

Indigenous law recognizes that Indigenous people have their own legal systems, rooted in stories that involve relationship to and reciprocity with the Land. As such, this area of law can provide invaluable insight into how to protect the Land. The foundation of Indig-

enous law is based upon the very creation that environmental law is seeking to protect. John Burrows (Anishinaabe, Ojibway and a member of the Chippewa of the Nawash First Nation), a leading researcher in Indigenous law, professor of Indigenous law at the University of Victoria Faculty of Law, British Columbia, and the Canada Research Chair in Indigenous Law has stated that *“I’ve been taking students from law*



*schools to my own reserve and helping introduce them to the law that's sourced in the rocks and the water and the plants and the animals.”<sup>5</sup>*

Indigenous law recognizes the unique stories from each place and doing so allows for specific environmental laws that keep those areas in balance based on what those areas require. The stories show how people are supposed to live on and with the Land.

Because Indigenous law relies heavily on story, relationship, reciprocity, and collaboration to benefit the entire community of beings, it provides a model as to how Western environmental law can be Indigenousized. It shows that law can exist within a different paradigm and still provide the protection and benefit that Western law, at its best, provides. It does not speak about the Land but instead, listens to it and includes it in law itself. If environmental law is ever going to protect the Land, it must do so as well.

*“I hope that with this resurgence of Indigenous law, that connection comes back understanding that the political world, the legal world, is bigger than these human to human relationships but it extends to a relationship and a*

*responsibility, an obligation to plants, animals, spiritual beings that we don't see on a daily basis.”* Spencer Greening, Gitga'at Nation<sup>6</sup>

### **Indigenous rights must be protected and be included in environmental law**

One part of Indigenizing environmental law is the recognition of Indigenous rights and the incorporation of these rights into environmental law. As the United Nations Indigenous Permanent Forum on Indigenous Issues has recognized, “Indigenous lands make up around 20

per cent of the earth's territory, containing 80 per cent of the world's remaining biodiversity – a clear sign that indigenous peoples are the most effective stewards of the environment.”<sup>7</sup> If Indigenous rights are not recognized and upheld, then these lands will not be preserved, and even more of the Land's biodiversity will be lost. By preserving Indigenous rights, we allow not only the Land under the protection of Indigenous people to survive and thrive but we also allow Indigenous knowledge and Indigenous worldview to survive and thrive as well.

### **The path forward**

In 2007, Chief Oren Lyons gave a talk about climate change before the United Nations Permanent Forum on Indigenous Issues. In that talk, he stated *“Value change for survival. It came right down to four words. You're either going to change your values or you're not going to survive. I tell you, the Earth has no mercy. You abide that law or suffer the consequence. Business as usual is over. Carbon is over. Oil is over. We better find something else. We better find some equity.”<sup>8</sup>*



Photo: Eero Murtomäki

Indigenizing environmental law can be an important path to finding that equity, but the process must begin now. The Nations of the world must incorporate Indigenous knowledge into their legal systems and Indigenize their environmental laws in order to come into compliance with the Land's law if we have any hope of combatting climate change. Indigenous knowledge, worldview, law, and rights must be used to Indigenize environmental law and protect the Land.

## References

1. Oren Lyons, "Value Change for Survival," YouTube, published September 17, 2015. <https://youtu.be/yU5el61JFUK>.
2. Pro Oxygen, "Monthly CO<sub>2</sub>," CO<sub>2</sub>.earth, accessed September 27, 2020. <https://www.co2.earth/monthly-co2>.
3. World Wildlife Fund, "Living Planet Report 2020," World Wildlife Fund, accessed September 9, 2020. <https://www.worldwildlife.org/publications/living-planet-report-2020>.
4. Dina Gilio-Whitaker, "How to Indigenize the Green New Deal and Environmental Justice," High Country News, published September 10, 2020. <https://www.hcn.org/articles/tribal-affairs-how-to-indigenize-the-green-new-deal-and-environmental-justice>.
5. Ash Kelly, "Prestigious award for leading researcher in Indigenous law," CBC News, published May 07, 2017. <https://www.cbc.ca/news/canada/british-columbia/prestigious-award-for-leading-researcher-in-indigenous-law-1.4102133>.
6. Spencer Greening, "RELAW: Living Indigenous Laws," YouTube, published September 27, 2017. <https://www.youtube.com/watch?v=3Q8zkz25Rj8>.
7. The United Nations Permanent Forum on Indigenous Issues, "Indigenous peoples' collective rights to lands, territories and resources," The United Nations, accessed September 15, 2020. <https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/04/Indigenous-Peoples-Collective-Rights-to-Lands-Territories-Resources.pdf>.
8. Oren Lyons, "Chief Oren Lyons speaks about Climate Change," YouTube, published April 14, 2010. <https://youtu.be/TWiRFAvxu3k>.



*Photo: Eero Murtomäki*



*“Our health comes from our culture and our culture comes from our lands, our waters. To make good decisions, these connections must be acknowledged.” –Swinomish Elder*

Author: Jamie Donatuto and Swinomish Indian Tribal Community

Organisation: Swinomish Indian Tribal Community, Washington State, USA

Climate change health assessments rely primarily on technical data from climate models, and focus on individual, physiological health impacts. These assessments do not reflect how many Indigenous Peoples define health. The Swinomish Indian Tribal Community (Washington State, USA) developed and implemented a climate change community health assessment founded on Swinomish beliefs and values -- what health means, health priorities, and preferred practices and actions to maintain or improve health.

For Swinomish people, harvesting, preparing, and using first foods and resources (al-

so called traditional foods, or “our foods” by community members) are an integral part of the social and cultural community fabric. The Swinomish are fishing, hunting, and gathering people; generations since time immemorial have been and continue to be integrally connected to the land, water, air, and natural resources. Akin to many other Indigenous communities, Swinomish people characterize a healthy community by referencing countless generations of knowledge and practices developed via these connections. In other words, ‘health’ is shaped by the many interrelated relationships between humans, non-human beings, nature, local natural resources, and the spiritual realm (i.e., social and cultural values). Moreover, health is thought of on familial and community scales, rather than an individual scale. And while biophysical health certainly plays a role in Swinomish views of health, it is not the sole or primary factor. In Swinomish beliefs, physical health status is often the outcome of health status in the social, cultural, mental, environmental, and intellectual realm.

Swinomish developed a set of health indica-

tors derived from community input to reflect the nonphysical aspects of health important to the community. The six Swinomish Indigenous Health Indicators (IHI) include: cultural use, community connection, self-determination, resiliency, education (intergenerational knowledge transfer), and natural resource security (Figure 1; Donatuto et al. 2016). The IHI presents a positive vision of health, in lieu of a status of disease. The grouping of words for each term can be considered a distillation of meaning from one worldview to another — at the top is the term in the Swinomish language, Lushootseed, which often does not have a direct English translation, yet embodies the land, water, animals, stories and people in a manner that English terms are unable to capture in definition. The Lushootseed term is summarized by the English words commonly used by community members at the base of each IHI group. The English words are then ‘translated’ into phrases more easily understood by researchers and decision-makers outside of Swinomish, as seen in the middle phrase.

#### **Suggested citation:**

Donatuto, J., & Swinomish Indian Tribal Community. (2021). “Our health comes from our culture and our culture comes from our lands, our waters. To make good decisions, these connections must be acknowledged.” In T. Mustonen, S.L. Harper, M. Rivera Ferre, J. Postigo, A. Ayanlade, T. Benjaminsen, R. Morgan, & A. Okem (Eds.), *2021 Compendium of Indigenous Knowledge and Local Knowledge: Towards Inclusion of Indigenous Knowledge and Local Knowledge in Global Reports on Climate Change*. Snowchange Cooperative: Kontiolahti, Finland.

**Figure 1:** Swinomish Indigenous Health Indicators. This infographic depicts a scene on the beach that demonstrates all 6 of the IHI in action. Families are working together beach seining (fishing with nets from the beach), steaming shellfish in a fire pit, and crab fishing in the bay. Elders are telling stories to younger generations; youth are exploring, and helping harvest, cook, and preserve the catch; the natural resources are accessible; people are asserting their sovereignty by being out on their lands and waters and engaged in culturally important practices, which 'feed the body and the spirit' in the Swinomish way.





The distillation of terms exemplifies the work involved in developing Swinomish-specific health values, and how Swinomish health priorities are not present in conventional health measures. The IHI are meant to be employed in parallel with other health assessments already in use, such as technical data-based community health assessments. The purpose of the parallel assessment technique is to ensure that the information, and values, in the IHI are not subsumed piecemeal into an established framework, which cannot and will not value the unique indicators and the values they represent.

To assess impacts to community health from climate change, Swinomish chose to use first foods as proxy indicators of health. Modeling results determined sea level rise and storm surge impacts on key first foods habitats. Next the projected impacts were mapped onto Swinomish lands and waters. The maps were brought to community meetings with Elders, youth, fishers, clam diggers, and political leaders. Community members studied the maps then made determinations as to which IHIs and locations to focus on first, knowing that they are all important and that the Tribe has limited resources.

The results indicated that Education is the first indicator on which to focus limited time and funds. Education in the Swinomish sense does not constitute graduation rates, but is about Swinomish Indigenous knowledge and ensuring that Elders are able to pass on that

knowledge to younger generations. When choosing Education, one participant explained, *“Traditional teachings from Elders explain our relationship to the land, how to connect with the world, and help [us] understand the world.”* Another stated, *“Our Elders taught us how to heal ourselves with our foods, taught us to be proud of who we are. We are proud people and want generations coming up to learn too.”*

Natural resources security and cultural use indicators were second and third, respectively, also with strong agreement throughout the community. This is not to say that the other IHI are not important, it simply suggests that these 3 IHI are the ones to focus on first.

Cultural use and practice rely on Swinomish land and waters, and as one Elder reminded us, *“Carrying on the knowledge and celebrating is very important.”* A participant explained that *“[Resource Security] is a priority because without any of the foods to harvest, it would affect health, economy and cultural practice.”* Relating this to climate change, *“Having sustainable food has been a way of life for us. If we can learn to adapt with the climate, we can learn to understand it.”*

With the IHI health evaluation method, Swinomish are able to provide results to project partners and climate change allies outside of the community in a format that is understood by all, while protecting proprietary information. The assessment results protect and strengthen Swinomish community health and well-being by elevating health priorities,

focusing limited energy and resources, ensuring that community members and others are working toward common goals, and establishing agreement around intended outcomes/results. These results inform the Swinomish Climate Change Adaptation Action Plan and have directed staff and adaptation experts to creatively modify or improve adaptation responses. Furthermore, while the IHI and results are specific to Swinomish, the framework used to develop the IHI can be easily adapted by other communities who wish to develop and implement their own IHI in climate change assessments.

### **This summary paraphrases the following paper:**

Donatuto, J., W. Trousdale, and L. Campbell. 2019. The ‘value’ of values-driven data in identifying Indigenous health and climate change priorities. *Climatic Change* 158(2): 161-180 DOI: 10.1007/s10584-019-02596-2

### **References:**

Donatuto, J., R. Gregory, and L. Campbell. 2016. Developing Responsive Indicators of Indigenous Community Health. *Int. J. Environ. Res. Public Health* 13, 899 doi:10.3390/ijerph13090899

## South America





## *Rural experiences in the communal landscapes of the Mishquiyacu watershed in the Peruvian Amazonia*

Author(s): Rider Panduro Meléndez and Mishquiyacu watershed Indigenous communities

Organisation(s): Rural Amazonian Association Choba Choba (ARAA/CHOBACHOBA), Tarapoto, San Martín, Peru

The rural ways of life of Indigenous and migrant families of the Mishquiyacu watershed, that are closely tied to the conservation and sustainable use of biodiversity, and carry detailed knowledge of their biocultural, biologically diverse and heterogeneous landscapes, are threatened by plans of monocultural land use. In this context, the Rural Amazonian Association Choba Choba (*Asociación Rural Amazónica Choba Choba*) participates in and supports the communities in strengthening their traditional ways of life, and in mitigating the aforesaid threats.

### **Suggested citation:**

Panduro Meléndez, R. & Mishquiyacu watershed Indigenous communities. (2021). Rural experiences in the communal landscapes of the Mishquiyacu watershed in the Peruvian Amazonia. In T. Mustonen, S.L. Harper, M. Rivera Ferre, J. Postigo, A. Ayanlade, T. Benjaminsen, R. Morgan, & A. Okem (Eds.), *2021 Compendium of Indigenous Knowledge and Local Knowledge: Towards Inclusion of Indigenous Knowledge and Local Knowledge in Global Reports on Climate Change*. Snowchange Cooperative: Kontiolahti, Finland.

### **The Mishquiyacu watershed**

The Mishquiyacu watershed, covering 41,460 hectares, is located in the Pilluana and Tres Unidos districts, on the western side of the Cordillera Azul National Park (PNCAZ), in the Picota Province, Department of San Martín, Peru.

Around 70% of the farming, fishing, and hunting families living in the area (approximately 6,000 inhabitants) belong to Amazonian Indigenous groups that are a mix of families of *kechwas de Lamas* and families from riverside villages of the Huallaga river, and during the past three decades, families from different parts of the Andes in Northern Peru.

The families practice agrosilviculture in ecological conditions that are shaped by the altitude, topography and climate, that again determine the types of vegetation, microclimates, fertility, as well as the structure and texture of the soil. In this sense, five distinct altitudinal zones, each containing a spectrum of agroecological microzones, are represented in the Mishquiyacu watershed.

The first altitudinal zone is a flat area reaching from the shores of the watershed to 400

meters of altitude. This zone is home to the settlements of Pilluana, Mishquiyacu and Tres Unidos, where there are fruit tree cultivations as well as small pastures with native grasses - such as sourgrass (*Digitaria insularis*), Bermuda grass (*Cynodon dactylon*), and St. Augustine grass (*Stenotaphrum secundatum*) - where chickens, pigs and sheep, as well as some horses and cattle, are raised. In the second altitudinal zone, reaching from 400 to 600 metres above sea level, some areas with native grasses, fruit trees, and introduced grasses, such as bread grass (*Brachiaria brizantha*) and elephant grass (*Pennisetum purpureum*), as well as some maize cultivations, can be found. The third zone (600-800 m MSL) is characterized by steep slopes. It is home to large pastures with introduced grasses, where cattle are raised. There are also large monoculture fields of hard yellow corn, cacao fields, and some coffee cultivations. The fourth zone (800-1000 m MSL) is the area of hard yellow corn and coffee. The fifth zone, starting from 1000 m, forms the highest areas of the communities of Sapotillo, El Paraíso and San Juan. It is the zone of coffee, cassava and other native root vegetables. It borders forest concession areas as well as

the Cordillera Azul National Park where old-growth forests can still be found.

The plant species conserved by the families are grown in different parts of the area. Dividing the species between different sectors improves their conservation, as the presence of seeds becomes communal or intercommunal, and the genetic diversity is easier to maintain when then species are growing in their appropriate ecological niches.

46% of the cultivations are on agricultural lands and 54% in forests (28% being old-growth forest). Cash crops, such as coffee and hard yellow corn, take up a major part of the land, followed by cacao, banana and cassava. However, there are 92 crop varieties on the di-

verse agrisilvicultural lands: six types of peanuts, 24 types of beans, eight types of maize, 23 types of bananas or plantains, 15 types of cassavas and 16 types of chilis. Furthermore, the farmers preserve a wide range of other crops, such as medicinal, ornamental and industrial plants as well as fruits, that all together add up to around 150 varieties.

The intercultural relations between the people from the Andes and the Amazonia keep enriching the knowledge and practices. Agroforestry is an ancestral practice that improves farming conditions. It simultaneously represents a healthy return from the farm to the forest, as within the agrosilvicultural cycle food is produced in harmony with the renewal of the

nature. To improve the agroecological conditions of the farms, the farmers are growing a great diversity of trees. 43 tree species can be found on the farms.

The rural families wish to recover and strengthen their traditional knowledges and ways of life. Instead of damaging the environment, the healthy ways of farming keep enriching and invigorating the surrounding natural ecosystems with higher plant density and diversity. Likewise, the people recognize the importance of strengthening the connection between the families and the communities, in order to share the successes and discoveries for the common good.



Photo: Matthew King



Photo: Sherilee Harper



## Before the loss of diversity and knowledges

Despite the above described, it needs to be noted, however, that the diversity of species does not apply anymore to the majority of the families. The traditional ways of life are threatened by industrial loggings, the traffic, land-use pressures as well as the already-present climate change. Within the past few years, the rural families have noticed changes in temperatures, rains as well as the reliability of natural indicators. They tell us:

- *Before one sowed little and harvested plenty, nowadays the sowing of large areas results in small harvests. It rains less which makes growing a diversity of crops difficult. The landscape has been deforested. Soils have degraded. Crops are moving towards the higher zones, for example, sweet rice or native bean varieties cannot be grown in the lower zones anymore. The monsoons, that used to last for 15 days, now last for maximum two days. Light and frequent rain, or warmi tamya, or female rain (lluvia hembra) or gentle rain come rarely nowadays. People are migrating from the lower to the higher zones for coffee farming; they sell their lands that have become unsuitable for maize farming in the low regions and move up. There are very heavy, short-term rains as well as long summers that affect the first sowings of maize. Frost and hail are now occurring outside of the season. The elders say*

*that the lack of respect of the youth has led us to the current situation. It rains less in almost the whole area which reduces the water flow of the rivers and puquios. New insects are appearing and attacking the maize and the beans. New herbs are competing with the native species in the lower regions. It is warmer nowadays. There are a lot of mosquitos. Crops are rotting because of the heavy rains. Winds don't blow the way they should. The amount of little animals, such as toads and hummingbirds, that have been showing "signs" of climate change, has diminished. There are increasing amounts of vegetable leaf miners that damage the fruits.*

However, some adaptive responses and practices can be witnessed, such as the restoration of forests and degraded areas. Traditional household farms are set up on degraded lands. Biomass is being recovered by planting trees, shrubs and herbs as well as raising animals. Soil is brought to the sites from other areas to improve soil fertility. Rural associations, such as the *minga* and the *choba choba*, are strengthening. Different "signs" need to be paid careful attention to. The knowledges related to conservation, known as "secrets", are recovering, which helps in re-learning how to "discuss" with the natural and human environment. The rural "peace of mind" has not been

disrupted. There is a difference between men and women; women are more closely tied to the nature and to taking care of water and crop diversity, for the food security of the family.

Related to the problems, such as deforestation, farmer Edwin Gamonal Sarmiento tells us:

- *The secret of agriculture is not to burn the dead plants but instead, to let them decompose on the ground. In that way our soils will not dry out. Instead, the humidity stays in the soil and takes care of the plants. It prevents our soils from eroding during storms and the soil minerals from washing out. As long as there is rain, the flowering of the plants is secured, as otherwise the plant dries out in the summer. If there is permanent rain, the harvest is guaranteed. Another alternative would be the afforestation of deforested areas. In that way we are able to have green areas and protect the waters of our lands.*

## The contribution of a Cultural Assertion Centre

Against this backdrop, and in order to strengthen the process of restoration, conservation and sustainable use of biodiversity as well as the related knowledge and practices, Choba-Choba, in the role of a Cultural Assertion Centre has taken action by implementing a project called Management of Initiatives for Cultural Assertion (*Gestión de Iniciativas de Afirmación Cultural*, GIAC). The project is funded by the Inter-American Foundation (IAF) and supported by the local governments of the Pilluana and Tres Unidos districts, as well as the Teacher Network of the Mishquiyacu watershed, the Local Education Unit of Picota (UGEL) and the Program of Productive Knowledges (Pensión 65) of the Ministry of Development and Social Inclusion. Among others, the following strategies are highlighted:

- a. The recovery of regional and interregional pathways of agrobiodiversity by organizing activities such as workshops of knowledge and seed exchange, where the experts are the peasants themselves (called *yachaq's*). The knowledge exchange covers a variety of topics: agroforestry, agro-silvopastoral systems, forest conservation, restoration of degraded areas, diversity of animal breeds, basic processing of agricultural products, as well as the improvement of housing and cooking facilities on the farms.
- b. The implementation of a variety of ancestral skills that foster the restoration and sustainable use of water, forests and farms, which, in turn, strengthens communal and ancestral organizations as well as household economies.
- c. The intergenerational transmission of ancestral knowledge through formal educational institutions as well as communal education. There is a need for dialogue between teachers and community elders, as well as instruments to contextualize education within the local reality.
- d. A Strategic Communication Plan for Social Change based on successful experiences of the families and communities of the watershed that are presented and reflected in various meetings and communal events.



Photo: Matthew King



Photo: Sherilee Harper



Moreover, we are implementing a few activities, such as the strengthening of Andean-Amazonian wisdoms related to climate. We are:

- Providing intercommunal and intercultural internships.
- Supporting the Centers for Mutual Learning.
- Enhancing the appreciation of knowledge related to biodiversity conservation with the help of primers and communal biodiversity calendars in educational institutions.
- Helping the locals and migrants to get to know each other.
- Restoring the diversity and variability of native crops and their wild relatives.
- Forming alliances between public and private entities and local governments.
- Strengthening the respect between deities, humans and the nature.
- Knowledge exchange between teacher networks.
- Recovering traditional festivities and rituals.
- Sharing cooking skills and exchanging seeds.
- Gathering ancestral music, songs and dances.
- Meeting up with elders to recover knowledge, landscapes and stories of the regions.
- Restoring springs and degraded areas such as *shapumbales* (areas with *Pteridium aquilinum*).
- Building up respect between kids and adults.
- Strengthening the respect towards the nature.
- Interinstitutional exchange of experiences.
- Supporting traditional organizations such as the *mingas* and *choba chobas*.
- Conserving and nurturing the mountains.
- Recognition of local communities.
- Editing videos.
- Afforestation with native plants.

Three years of implementation of the project have resulted in the participation of 26 communities and 2,807 individuals (43% being women and 61% youth). 68 traditional-communal initiatives have been established, supported and guided by two Local Management Committees and a Network of Elders. Small, traditional processing facilities have been built for five native crop species and 10 animal breeds, where different types of cheese, flours and pastries are produced. Moreover, approximately 150 varieties of 10 native crop species have been preserved, and 12 types of

crafts have been produced. More than 6 800 hectares of natural forests have been conserved.

The focus of the project that has contributed to the restoration and strengthening of the traditional ways of life, is based on the ancestral experiences that have now been recreated in a new context. In the worldview of the rural families, all that exists is perceived as the “living world”, in which humans lives in symbiosis with the forest-water-farm entity. One is continuity of the other and there is no separation from the human-nature-deity complex, where the whole is greater than the sum of its parts.

## References

ARAA/CHOBACHOBA (2007). Cosecha de agua de lluvia. Lima.

ARAA/CHOBACHOBA (2010). Informe de Sistematización y Análisis de Resultados del Proyecto: Promoción de diversidad agrosilvícola para la estabilización de las familias campesinas en las comunidades de la Zona de Amortiguamiento (ZA) del Parque Nacional Cordillera Azul (PNCZA). Tarapoto.



Photo: Matthew King

## *Agricultural knowledge of the Uwøttüjä people in the ecological restoration of the Amazon rainforest*

Authors: Zolaida Camico (Chejerume), Miguel Díaz (Pada), Ana Felicien & Noemí Chacón

### Introduction

The Amazon rainforest – biodiversity reservoir, net climate sink and climate regulator of the Amazon basin – is being affected by climate change, which will continue to increase for the rest of the century (1). It is predicted that the situation will aggravate with an increase in wildfires in the area (2).

According to western literature, we, the Indigenous communities of the Amazon rainforest and our ways of life are affected by climate change, particularly in what is referred to as our agricultural production system (3). However, our ancestral knowledge has enabled us to adapt and maintain ourselves resilient to the changes (4). In this context, according to

the literature, these findings are not surprising, as the current structure and biodiversity of the forest is the result of our age-old agricultural activity, based on detailed, ecological knowledge, that has enabled us to manage the agrobiodiversity of this ecosystem (5). Ecological restoration is an option for climate change adaptation that has been introduced to build robust and resilient systems in the face of a changing climate (6). The recommended restoration options for the Amazon rainforest fall under the conceptual adaptation framework, based on the ecosystem and the community (7,8). However, to our knowledge, there are no references about the role of agroforestry (in western literature commonly known as shifting cultivation, or slash and burn, among others) in forest restoration. In this context, and with the objective to contribute to the ecological restoration of the Amazon rainforest from the perspective of Indigenous, agricultural knowledge, we, two students from the National Experimental Indigenous University of Tauca (UNEIT), Venezuela, and members of the Indigenous group Uwøttüjä, will describe in this paper the key findings of our theses, associated with forest restoration strategies related to our practice of *conuco*. These strategies are

associated with the stewardship and conservation of the agrobiodiversity in the “Pätta” (*conuco* of the Uwøttüjä) as well as the spatial-temporal dynamic and governance of the seed network in the Uwøttüjä territory. The first strategy is based on the local level and has a successional dynamic, while the other has a seasonal dynamic and operates both on the local and regional levels.

### Brief description of the Uwøttüjä people and their territory

In western literature, we, the Uwøttüjä (our self-designation in our Indigenous language, belonging to the Saliban language family) are known as people with knowledge of and/or owners of the forest. We are also identified by other names, such as Piaroa, Huottöja, and De’aruha (9). According to the latest Indigenous census of Venezuela (2011), the Uwøttüjä make up 2.6% of the Indigenous population of the country. We consist of 19,293 individuals, out of which 81% are living in the state of Amazonas, 18% in the state of Bolívar, and the remaining 1% dispersed in other parts of the country.

### Suggested citation:

Camico, A., Díaz, M., Felicien, A., & Chacón, N. (2021). Agricultural knowledge of the Uwøttüjä people in the ecological restoration of the Amazon rainforest. In T. Mustonen, S.L. Harper, M. Rivera Ferre, J. Postigo, A. Ayanlade, T. Benjaminsen, R. Morgan, & A. Okem (Eds.), *2021 Compendium of Indigenous Knowledge and Local Knowledge: Towards Inclusion of Indigenous Knowledge and Local Knowledge in Global Reports on Climate Change*. Snowchange Cooperative: Kontiolahti, Finland.



The Uwøttüja territory covers an area of 30,000 km<sup>2</sup>. It is home to the states of Amazonas and Bolívar, located in the southeastern part of the country (9). In the Amazonas State the Uwøttüja live in the central and northern parts of the state, in an area of four large watersheds, called **deiyu** in our language: *Cuao deiyu* (Cuao River watershed), *Autana deiyu* (Autana River watershed), *Sipapo deiyu* (Sipapo River watershed) and *Guayapo deiyu* (Guayapo River watershed).

The watershed of the Cuao River has crystal-clear waters and many torrents. The vegetation consists of mountain forests, the area is home to many mountains. The watershed of the Autana River, on the other hand, has murky and brown waters with few torrents. The vegetation is a mix of floodplain forests, savannas and moriche palm swamps. The watershed of the Sipapo River has murky and brown waters, with higher temperatures than the Cuao or Autana rivers. The vegetation is a mix of floodplain forests and savannas. The waters of the Guayapo River watershed, in turn, are crystal-clear and the vegetation is a mix of mountain forests and savannas.

## Methodology of the study and the participation of the Uwøttüja communities

Data for our theses were collected in our home communities, and regarding one particular case, in neighboring communities as well. To study the *stewardship and conservation of the agrobiodiversity in the "Pätta"*, data was collected in the community of Caño Uña (Sipapo watershed). To study the *spatial-temporal dynamic of the seed network in the Uwøttüja territory*, in turn, information was gathered in Mavaco de Autana and the neighboring communities of Caño Grulla and Caserío (watershed of the Cuao, Autana and Sipapo rivers). Consent to participate was requested from the leaders of the communities involved, prior to carrying out the work.

In Caño Uña, semi-structured interviews were conducted with two groups of farmers: community elders who carry the primary responsibility for the conuco, and young people who are currently practicing this type of agriculture. In the community of Mavaco de Autana, a community gathering was organized to identify the elders with most experience in the topic, recognized by the community, after

which interviews, dialogues, visits to the conucos as well as voluntary work was carried out with the elders in question. In both studies, visits and direct observation took place in the conucos of the communities involved.

Our own reflections of our experiences as Uwøttüja farmers are also present in the results. Referring to the right to one's own education and intercultural education, defined in the Constitution of the Bolivarian Republic of Venezuela from 1999, both theses were carried out under the supervision of both Indigenous teachers and non-indigenous professors from the UNEIT.

The findings of the studies were presented both in our Indigenous language, in front of community elders, and in Spanish in front of an academic, non-indigenous jury. In this final occasion, both theses received a special recognition due to their unprecedented contributions in generating visibility for the restoration strategies of the Amazon rainforest regarding the practice of conuco.



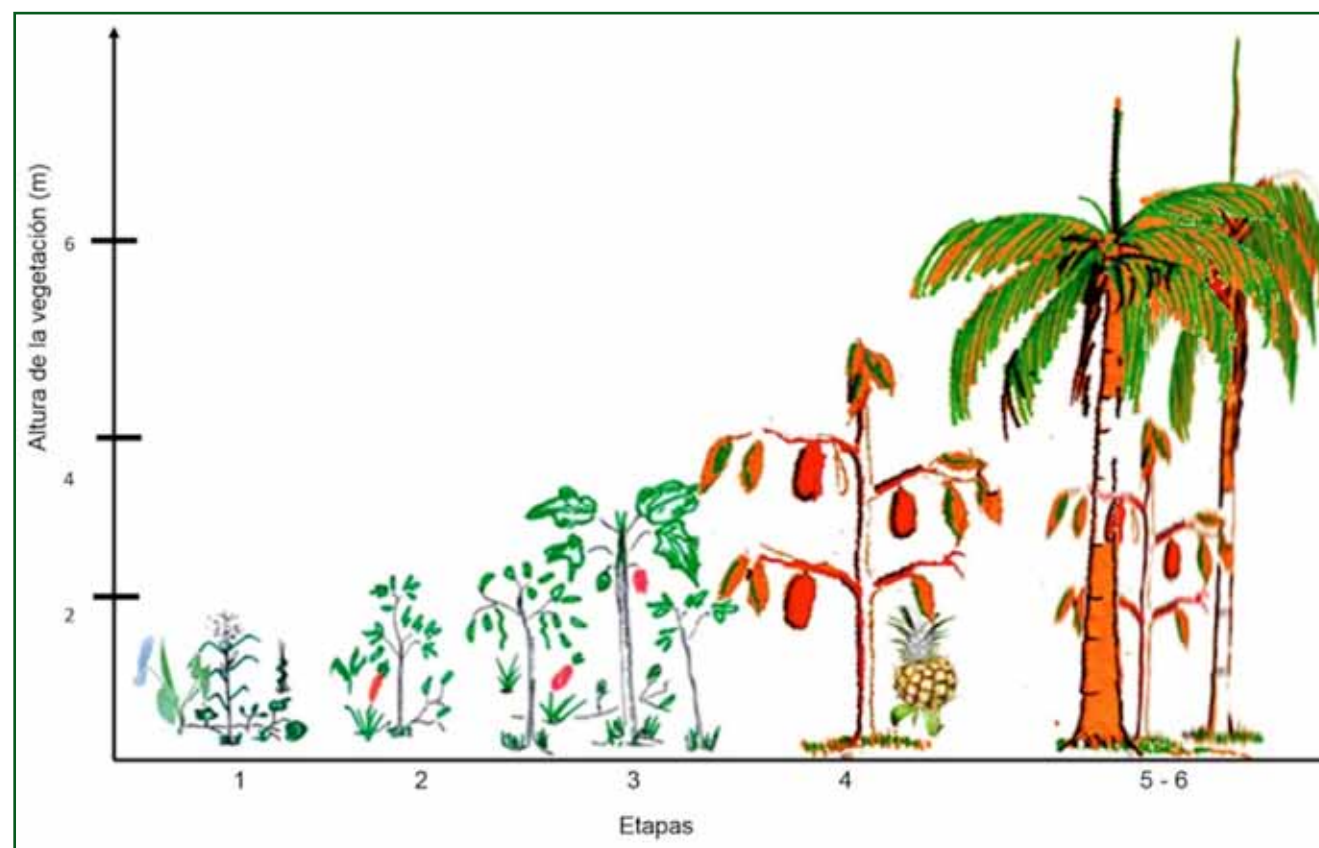
## Results and discussion

### Successional-Local Restoration Strategy

In the Pätta Uwõtütüjə the forest restoration begins from the establishment of a new conuco. After clearing an area, short-cycle species are planted, followed by perennial species that will start fulfilling the task of re-establishing the structure and functions of the initial forest. The seeds for starting a new Pätta stem from the other Pättas of the community that are in different successional stages. A total of six successional stages can be found in the stewardship of the Pätta: *Jareäka* (new conuco), *Pä'i bawäyu* (growing conuco), *Muäyu - 'kiyä'chäyu* (conuco in production), *Resabä juächa'a* (early conuco-forest transition), *Dea'a jua'ächa'a* (developed conuco-forest transition), and finally the stage of *Dea'a* (restored forest) (Figure 1). During all the mentioned stages 34 crops are cultivated, that apart from feeding us, help us restore the forest. The structure and ecological complexity of the Pätta is changing along the different stages: short-cycle species are predominating in the early phases, followed by growing layers of perennial plants, primarily fruit crops. Cassava (*Manihot esculenta*) is the predominant species, with the greatest abundance in the first stages of the conuco. It also represents diversity as it is cultivated in 13 different varieties, being the most important foodstuff for the community. Moreover, there are other species of critical importance, despite being less abundant, as their consump-

tion is important for the community. Finally, there is a group of species that are present all the way until the last stage of the Pätta (*Dea'a*), out of which among the most important ones are peach palm (*Bactris gasipaes Kunth*), copoazú (*Theobroma grandiflorum (Willd. ex Spreng.) K.Schum.*), avocado (*Persea americana*

*Mill.*) and cashew tree (*Anacardium occidentale L.*). Among these species, the peach palm is an indicator of the renewal of the forest; the death of this species is considered a sign of a recovering forest. Seed supply for new conucos, as well as food provision for the community is ensured along all the successional stages of the Pätta.

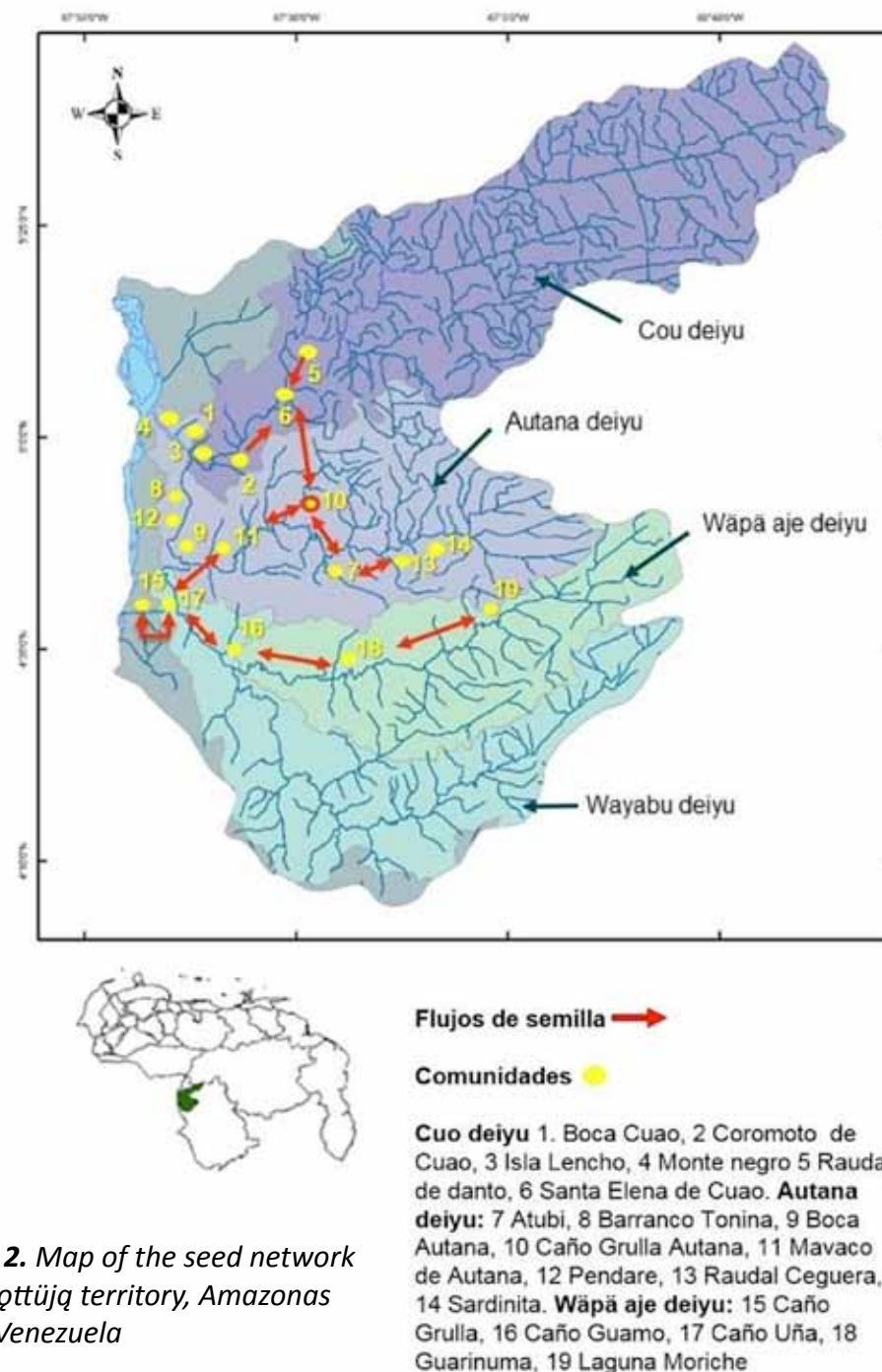


**Figure 1.** Successional stages of the Pätta Uwõtütüjə: 1 *Jareäka*, 2 *Pä'i bawäyu*, 3 *Muäyu - 'kiyä'chäyu*, 4 *Resabä juächa'a*, 5 *Dea'a jua'ächa'a* and 6 *Dea'a*.



### Seasonal-Local/Regional Restoration Strategy

To ensure the supply of seeds of the plants cultivated in the Pättä, there is a seed network in all communities that is based on seasonal exchanges. This strategy works through two key mechanisms: the *Päroäkuäwä* that takes place at the beginning of the rainy season when the sowing starts, and the *Iyäkuäwä* that comes into play at the end of the rainy season, during the harvest. The first one of the mentioned mechanisms is determined by the need of seeds by the farmer. It involves exchanging low amounts of seeds as well as knowledge related to the sowing of the exchanged seeds. The second mechanism, which is determined by the abundance of the harvest, involves exchanging high numbers of seeds and knowledge related to the storage and conservation of the seeds. Seed exchange takes place at the local level, between communities of the same *deiyu* (watershed) as well as at the regional level, between different *deiyus* (Figure 2). A greater number and diversity of seeds are exchanged between communities within the same *deiyu* than between different *deiyus*. This is because only seeds that are able to adapt to different ecological conditions, can be exchanged between *deiyus*.



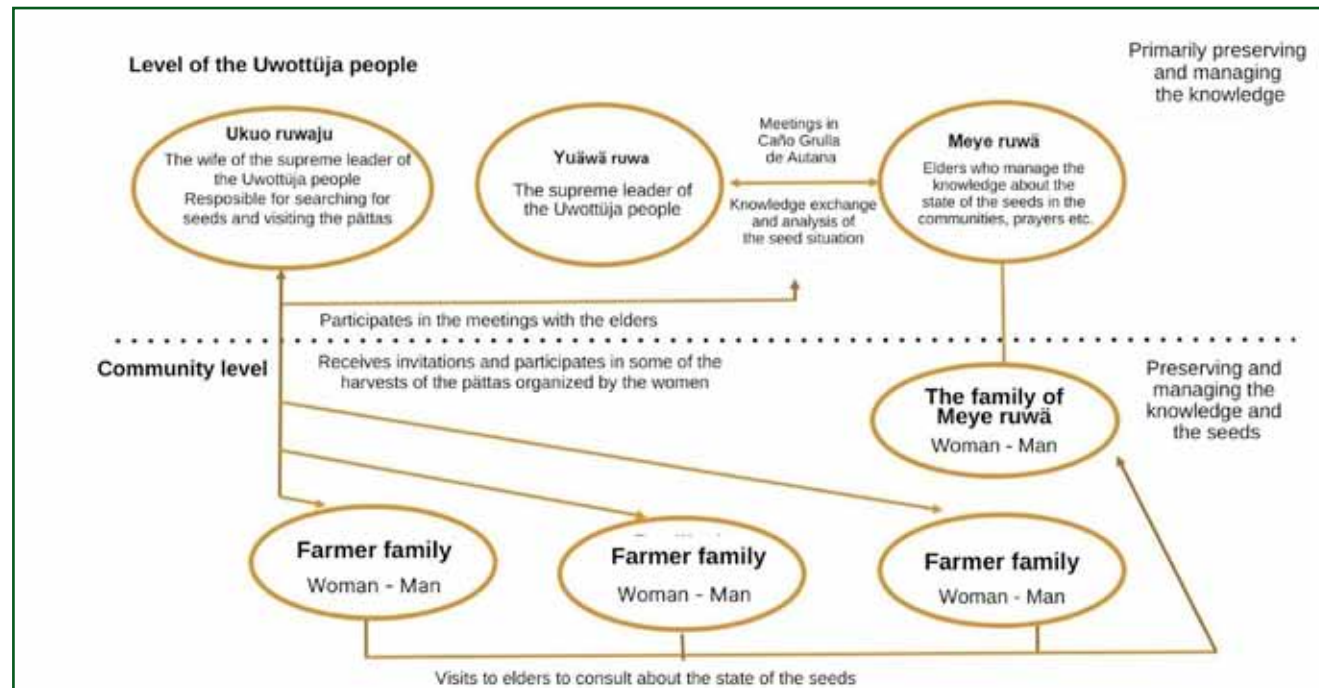
**Figure 2.** Map of the seed network on Uwqttöj territory, Amazonas state, Venezuela

In the seed network two levels of governance can be identified, that operate on two distinct spatial scales, and manage different types of knowledge: (i) Community scale; the families, especially the women and elders are constantly examining the state of the seeds in the Pätta, while simultaneously managing the knowledge and practices about their reproduction, maintenance and storage. (ii) The scale of the whole territory; the supreme leader of the Uwøttüja, together with the community elders regularly examine the state of the seeds in all communities and manage the knowledge on threats, diseases, pests and the condition of the cultivations, among others (Figure 3).

Within this governance framework it can be demonstrated that the Uwøttüja leaders both on community and regional levels play an essential role in the protection and preservation of the seeds in the Pätta Uwøttüja.

The local and regional governance are interrelated through meetings held among the supreme leaders and community elders, informal relations, as well as the Warime ceremony, which is the most important ceremony of the Uwøttüja. In the ceremony, it is primarily the women who take care of the seed exchange.

The seeds that are exchanged are collected from different successional stages of the Pätta. In general the exchange is based on a set of community norms that control the flow of seeds and keep safeguarding the functioning of the network: (i) no family can be left without seeds (early warning) (ii) all elders need to monitor the state of the seeds in their communities and report the findings to the supreme Uwøttüja leaders (control), and (iii) seeds must not be exchanged with non-indigenous or other Indigenous Peoples (prohibition).



**Figure 3.** Governance framework of the Uwøttüja seed network.



## Conclusions

With regard to our agroforestry system, we are suggesting a socio-ecosystemic forest restoration strategy based on the following nexus: successional stages of the Pätta – seed network – governance of the network. In this strategy, the stewardship of the Pätta ensures the supply of seeds for the new Pättas as well as guarantees the restoration of the forest to a similar state where it initially was. On the other hand, the seed network provides an annual dynamic on the local and regional levels where a flow of seeds is moving between the Pättas, and knowledge is exchanged between the farmers. The governance, in turn, guards the state of the seeds and the threats and risks that they are facing as well as controls the flow of seeds through community norms and relations.

Forest restoration based on our agroforestry stewardship, summarized in the suggested nexus, secures the food supply for the communities and enables monitoring and maintaining control over the Uwøttüjå territory, unlike other proposed restoration strategies, such as plantations that foster dependence on exogenous knowledge and resources, and has an impact on indigenous governance of their territory.

As each component of the proposed nexus is reliant on each other, any shock on one of them negatively affects the restoration of the forest as a whole.

Climate change with its impacts on our ecosystems poses a potential threat on our agroforestry stewardship and therefore on our forest restoration strategy. However, with our governance system of the Pätta and the associated norms, such as early warnings, control and prohibition, we will be able to cope with the changes and stay resilient.

## References

- Marengo JA, Souza Jr C (2019) Climate change: impacts and scenarios for the Amazon Technical Report
- Sampaio G, Borna LS, Cardoso M, Alves LM, Randow Cv, Nobre C & Alexandre FF (2019) Assessing the possible impacts of a 4 OC or higher warming in Amazonia. In Nobre C, Marengo J, Soares W. (eds) *Climate Change Risks in Brazil*. Springer, Cham.
- Pinho PF, Marengo JA, & Smith MS (2015) Complex socio-ecological dynamics driven by extreme events in the Amazon. *Regional Environmental Change*, 15 (4), 643-655
- Oviedo AFP, Mitraud S, McGrath DG, & Bursztyn M (2016) Implementing climate variability adaptation at the community level in the Amazon floodplain. *Environmental Science & Policy* 63: 151-160
- Balée W. (2013) *Cultural forests of the Amazon: a historical ecology of people and their landscapes*, 268 p. Tuscaloosa, AL: The University of Alabama Press
- Stanturf J, Mansourian S, Kleine M (eds.) (2017) *Implementing forest landscape restoration, a practitioner's guide*. International Union of Forest Research Organizations, Special Programme for Development of Capacities (IUFRO-SPDC). Viena, Austria 128 p
- Schmidt IB, de Urzedo DI, Piña-Rodrigues FCM, Vieira DLM, de Rezende GM, Sampaio AB & Junqueira RGP (2019) Community-based native seed production for restoration in Brazil - the role of science and policy. *Plant Biology* 21: 389-397
- Nunes S, Gastão M, Cavalcante RBL, Ramos SJ, Caldeira Jr. CF, Silva D, Rodrigues RR, Salomao R, Oliveira M, Souza-Filho PWM & Siqueira JO (2020). Challenges and opportunities for large-scale reforestation in the Eastern Amazon using native species. *Forest Ecology and Management*, 466, 118120
- Freire G, & Zent S (2007) Los Piara (Huottuja/De' aruhua). In G. Freire & A. Tillett. (Eds.), *El estado de la salud indígena en Venezuela* (pp. 137–198). República Bolivariana de Venezuela: Coordinación Intercultural de Salud de los Pueblos Indígenas (CISPI)-Ministerio de Salud y Desarrollo Social

# Africa





## *Listening to the Waters, Learning from the Wisdom of the Elders: Climate Change and the Future of Coastal Small Scale Fishing Communities in KwaZulu Natal*

Author: Thomas Nkuna

Organisation: Community of Nibela, KZA, South Africa

We who represent the small-scale fishing communities of the province of Kwazulu Natal on the Eastern seaboard of South Africa are observing significant changes in the coastal forests, rivers and near shore waters of the coast upon which we and our ancestors have depended on for livelihoods for millennia.

The ancestors of these communities settled these coastal areas hundreds of years ago. The close relationship that these communities have to the marine and coastal ecosystems in their territories that provide them with food and which form part of their culture is reflected in our customary systems of law and in our Indig-

enous-traditional knowledge which is handed down from one generation to another.

However, these systems of Indigenous knowledge have been greatly impacted by a century of colonialism and apartheid based conservation and spatial planning which has separated many of these communities from their lands and waters or has restricted their interaction and interdependence with nature, dispossessing them of access to resources and cutting them off from the source of their wisdom. Our fishers recall the wisdom of their forefathers and mothers and know how important it is for them to live in sync with their environment.

We the traditional Zulu fishing communities of the province of Kwazulu-Natal (South Africa) strive for a return of traditional governance of our marine and freshwater areas. This is because we feel that the present-day management is not respecting our rights and the current urgencies like climate change. A solution would be the re-establishment of traditional community-based governance:

*Our parents and even we have witnessed*

*these climate changes and seen the negative impact on the St. Lucia lake where we fish. In the face of a range of climate changes that result in limited fishing days due to severe storms and unusually high winds, drought in some places, unseasonal flooding, rising waters and the disappearance of certain previously common species upon which we relied on for food, the fishers are finding it difficult to rely on traditional knowledge. This is made worse by the fact that the Government has introduced stringent criteria for the allocation of fishing rights and many youth are excluded on the grounds that they do not have ten years of experience. This then makes it difficult for the fishers to share their indigenous knowledge with the next generation.*

The introduction of the extractive 'Ocean Economy' policy, known as Operation Phakisa in South Africa has further exacerbated this situation. The state is introducing off-shore oil and gas and mining and industrial style aquaculture projects. Many of our fishers feel trapped in a fast-changing environment and unable to impart the wisdom of the Elders on to the youth of the future generation.

### **Suggested citation:**

Nkuna, T. (2021). Listening to the waters, learning from the wisdom of the Elders: Climate change and the future of coastal small scale fishing communities in KwaZulu Natal. In T. Mustonen, S.L. Harper, M. Rivera Ferre, J. Postigo, A. Ayanlade, T. Benjaminsen, R. Morgan, & A. Okem (Eds.), *2021 Compendium of Indigenous Knowledge and Local Knowledge: Towards Inclusion of Indigenous Knowledge and Local Knowledge in Global Reports on Climate Change*. Snowchange Cooperative: Kontiolahti, Finland.

We are deeply concerned about the impact of these developments on the fish and other sea life. In our culture the Elders have knowledge of these resources. We want to once again become the guardians and caretakers of the lake, forest and our lands.

In our Zulu culture it is very important for

young persons to learn from their elders. We have a lot of traditional rituals and processes to ensure that the young ones learn the practice of *ukulondaloza* and other practices that enable knowledge of how to fish, to use resources from the coastal forest for medicine and traditional healing practices, how to use grass and

wood for building and so on are transferred from one generation to another.

Our dream is that we can participate in the co-management of our lands, lakes and forests so that we can ensure that these natural resources are managed sustainably and will be there for our children and future generations.



Photo: Snowchange, 2019



Europe





## Indigenous Female Bodies as Indicators of Change

Author: Pauliina Feodoroff, Skolt Sámi, Finland

Organisation: Snowchange Cooperative and Saa'mi Nue'tt Cultural Organisation, Finland

I have noticed that many Sámi women of my generation - who have been born in the intersecting moment of an interrupted traditional world and a transfer into the modern world - have found ourselves, in different scales, working either in defending our waters or our land. We are being guided by the pain that we feel in our bodies. Our bodies act as gauges of environmental change: the first indicators and first responders of something happening.

I lead catchment-wide ecological restoration work in Näättämojoki river in the Sámi home area in Finland. It is based on the knowledge and observations of human-induced change by our traditional fishermen and reindeer herders. Indigenous knowledge and Western Science offer us concepts and possibilities to reflect on those changes that the wa-

ters in our bodies have known and reminded us of what has happened already much earlier. Changes in temperature, pain and the gradual passing of pain, waves, and intrusions within our bodies are knowledges that are difficult to communicate. It seems that especially women are more sensitive to receiving messages from their home environments. And, thus, our Indigenous conservation work ends up being no longer a choice but a bodily commitment. This realisation raises a lot of difficult questions of what or who controls our bodies, especially in this modern space of broken traditions. Indigenous waters and lands strive to be well and prosper just like our human communities.

These lingering impacts of global environmental damage that has not been dealt with or addressed leads to real pain in our bodies and minds, feeling nauseated and ultimately making us fade, wilt, wither and extinguish.

### Suggested citation:

Feodoroff, P. (2021). Indigenous Female Bodies as Indicators of Change. In T. Mustonen, S.L. Harper, M. Rivera Ferre, J. Postigo, A. Ayanlade, T. Benjaminsen, R. Morgan, & A. Okem (Eds.), *2021 Compendium of Indigenous Knowledge and Local Knowledge: Towards Inclusion of Indigenous Knowledge and Local Knowledge in Global Reports on Climate Change*. Snowchange Cooperative: Kontiolahti, Finland.



Photo: Snowchange





*Photos: Snowchange, 2021*



*Photos: Eero Murtomäki*





## Climate Change and the Swedish Sámi People

Author: Stefan Mikaelsson

Organisation: Sámi parliament plenary assembly Swedish branch & also board member of Udtjá Forest Sámi community (residing in Jokkmokk municipality) 1978-2014 with a 3 year break 1994–1997.

The Circumpolar Arctic and a large part of Sámi homeland Sápmi is hit by climate change, i.e. global warming, twice as fast as the rest of the world's different regions.

A logical conclusion to be drawn from this is that all measures to prevent the negative effects of warming of the climate – both prevention as well as actions for resilience and coping locally and thus carrying the Sámi culture to the unknown future - with the current rapid pace of warming must be at least twice as extensive in the Arctic as on the rest of the Earth.

Those cultural Sámi landscapes in four countries which have been used by Indigenous Peoples for a long period of time without being overexploited or plundered by accelerating industrial extraction, possess greater biodiver-

sity and resilience than nature elsewhere that is utilized by the governing nation states and corporations.

Reducing the amount of carbon dioxide and other gases contributing to the climate change which makes itself visible and tangible through circulation of water, is essential from the Sámi perspective. Good quality of waterbodies in Sápmi can only then maintained and with that Indigenous food sovereignty which relies on access to clean non-industrial waters and healthy fisheries.

Simultaneously, harmful and escalating emissions of humus particles from industrial extractive activities in the Boreal forests and wetlands to the waterbodies can be reduced as the flow of water is kept within the limits of healthy ecosystems, without extreme flooding, drought and drainage operations.

### Suggested citation:

Mikaelsson, S. (2021). Climate Change and the Swedish Sámi People. In T. Mustonen, S.L. Harper, M. Rivera Ferre, J. Postigo, A. Ayanlade, T. Benjaminsen, R. Morgan, & A. Okem (Eds.), *2021 Compendium of Indigenous Knowledge and Local Knowledge: Towards Inclusion of Indigenous Knowledge and Local Knowledge in Global Reports on Climate Change*. Snowchange Cooperative: Kontiolahti, Finland.



Photo: Ari Hiltunen



Photo: Johanna Roto





Photos: Carl-Johan Utsi



# Arctic





## Climate Change, Nomadic Lifestyles, and Preservation of Traditions

Author: Vyacheslav Shadrin, Chief of the Yukaghir Council of Elders

Organisation: Russian Association of Indigenous Peoples, Sakha-Yakutia, Russia

Traditional practices, such as reindeer herding, hunting, fishing, and gathering, form the basis of Siberian Indigenous cultures and societies. Climate change threatens these practices, which makes Indigenous Peoples particularly vulnerable to climate change. Nomadic herding lifestyle has built on Indigenous knowledge which has accumulated over millennia. Indigenous knowledge, including the ability to predict weather, has played a substantial role in the adaptation to the extreme conditions in the North. But now, the rapid changes under way are changing our reality; Indigenous Peoples are increasingly finding themselves in situations where their practice, experience, and knowledge cannot help them. An Elder and knowledge holder in our community expressed this by stating that “*nature does not trust us anymore*”.

### Suggested citation:

Shadrin, V. (2021). Climate Change, Nomadic Lifestyles, and Preservation of Traditions. In T. Mustonen, S.L. Harper, M. Rivera Ferre, J. Postigo, A. Ayanlade, T. Benjaminsen, R. Morgan, & A. Okem (Eds.), *2021 Compendium of Indigenous Knowledge and Local Knowledge: Towards Inclusion of Indigenous Knowledge and Local Knowledge in Global Reports on Climate Change*. Snowchange Cooperative: Kontiolahti, Finland.

The capacity to predict weather using Indigenous knowledge is the basis of stable and effective reindeer herding (e.g., choosing nomadic routes over large land areas), successful hunting (e.g., locating animals), and fishing. Weather prediction has become extremely difficult due to the unprecedented fast changing conditions.

A major problem for reindeer herding in the tundra is the degradation of reindeer pastures. The expansion of willows and shrubs into the tundra has resulted in some nomadic communities, such as Turvaurgin in the Nizhnekolymsky district of Sakha-Yakutia in Northeastern Siberia, losing up to 30% of their reindeer lichen pastures. In other nomadic communities, these changes have led to the expansion of moose into tundra area and deterioration of reindeer populations. Unpredictable changes in the migration routes of wild reindeer has also led to the destruction of domestic reindeer pastures. Additionally, wild deer have also started mixing with the reindeer more frequently.

Due to the steady increase in precipitation in recent years, a deeper than usual snow cover has formed. This has made it more difficult for the reindeer to access lichen, their primary

food source. Moreover, the late onset of cold weather has led to difficulties in the herds moving to their winter pastures. In the summer, increased rainfall has led to waterlogging of low-lying pastures.

The most important challenge is the instability of the weather. These include, for example frequent, never-before-seen warming, combined with occasional rains in the late winter and early spring. Sharp temperature drops of over 30 degrees occurring within a few hours leads to formation of an ice crust on the ground which becomes a challenge for reindeers, especially in autumn. Rain-on-snow events are also more frequent. Furthermore, the number of summer storms and rapid cooling accompanied with snowfall during in July has increased. All of these events lead to increased risks in the lives of Indigenous Peoples, as the number of dangerous weather events grows.

Degradation of the quality of surface waters has increased, resulting from new floods and the melting of permafrost, which leads to an increase in gastrointestinal diseases. Warming has expanded the distribution of diseases, the carriers of which are insects and ticks that spread to new territories. Ancient cemeteries and campsites, as well as the burial sites of cattle

and reindeer, are dangerous sites as permafrost melts and coastal erosion proceeds. These sites contain Siberian anthrax, plague and smallpox cells from the populations who died in the past epidemics, which are re-emerging as the permafrost thaws. Consequentially, in 2016, a small Nenets boy and thousands of reindeer died in Yamal as a result of an anthrax release. The region of Yakutia experiences the same risks.

Traditional food security is under threat. Permafrost-based storage facilities have deteriorated, resulting in a sharp decline of food quality. There is an increase in the number of people who are forced to abandon the consumption of raw fish, which is now often infected with diseases. As a result, the likelihood of losing cultural traditions is growing as traditional foods are an integral part of the traditional way of life and culture in Siberia. These combined climate change-induced changes force people to lose their traditional knowledge, eventually abandoning their nomadic way of life, thus, losing their identity as distinct Indigenous Peoples.



*Photo: Snowchange*





Photos: Tero Mustonen



## *Appendices*

### **Articles presented in the language of submission**

The original submissions in the original language can be found online at  
<http://www.lumi.fi/sivut/wp-content/uploads/2021/06/Original-Spanish-Submissions.pdf>

Translation: Noora Huusari. Snowchange, 2021

Photo credit: Matthew King and Indigenous Health Adaptation to Climate Change project;  
photo taken and used with informed consent, cover and page 5, 16, 18

Photo credit: Matthew King and Indigenous Health Adaptation to Climate Change project, page 3, 14, 19

Layout: Rita Lukkarinen and Eero Murtomäki