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WORKSHOP REPORT

Mobilizing Indigenous and Local Knowledge Solutions: Addressing Climate Impacts and Vulnerabilities

A Perspective from the Caribbean Region

Georgetown, Guyana. 3-5 September 2019



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SUMMARY

The UNESCO workshop, *Mobilizing Indigenous and Local Knowledge Solutions: Addressing Climate Impacts and Vulnerabilities—A perspective from the Caribbean Region*, took place on 3 – 5 September 2019 in Georgetown, Guyana. It was the first interdisciplinary dialogue of its kind that brought together indigenous and local knowledge holders and weather and climate scientists from the Caribbean region.

The workshop was organized by the Small Islands and Indigenous Knowledge Section, Division of Science Policy and Capacity Building, Natural Sciences Sector of UNESCO, in cooperation with the UNESCO Kingston Office for the Caribbean and the Guyana National Commission for UNESCO.

The workshop consisted of presentations and discussions on perspectives from the Caribbean region regarding indigenous and local knowledge solutions to address climate impacts and vulnerabilities. It

proposed to focus on five aspects relevant to indigenous and local knowledge (ILK):

- Livelihoods of indigenous peoples and local communities of the Caribbean
- Observing and understanding impacts of climate change, including extreme events
- Mobilizing indigenous and local knowledge for Caribbean climate change adaptation planning
- Case studies of risk reduction, boosting ecosystem resilience, coping and recovery strategies
- Multi-stakeholder partnerships in support of indigenous knowledge in climate change policy, identifying best practices and challenges.



The workshop gathered 40 experts coming from 14 countries of the wider Caribbean region, including indigenous peoples and local communities' knowledge holders, government representatives, scientists, national and regional meteorological institutions. © UNESCO.

SETTING THE CONTEXT—CLIMATE CHANGE, INDIGENOUS AND LOCAL KNOWLEDGE AND THE CARIBBEAN

◆ Introduction

UNESCO, as a specialized agency of the United Nations System, has been dedicated to exploring, supporting and facilitating dialogue between the holders of indigenous and local knowledge with policy makers and scientists to bring together the different strands of human knowledge, values and understanding to address developmental and environmental challenges. The adoption of the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC) in 2015 has created an important opportunity to apply indigenous and local knowledge (ILK), in synergy with science and policy making, to the specific challenges of climate change and adaptation to its impacts.

The Paris Agreement marks a unique and historic milestone as it holds together a cluster of human needs brought about by climate change into a bundle of rights and obligations of different stakeholders. It addresses the technical challenges of reducing greenhouse gas emissions that are driving global warming and climate instability, while promoting pathways for adaptation to the changes that are already occurring. What is outstanding about this State-led process, is that it says that mitigation and adaptation need to be

framed in a rights-based approach, taking due consideration of human rights, the situation of the most vulnerable countries and communities, and gender analysis while appreciating the legitimate developmental aspirations held by the people of diverse sovereign States.

The Caribbean region knows much about the economic and environmental challenges posed by climate change. The region is unique in its cultural diversity, with layers of indigenous civilizations, European colonization, the heritage of slavery and liberation, and diverse migration from all parts of the globe. Together, the diverse geography and heritage of the islands have facilitated a flourishing of local cultures, knowledge systems which has allowed people to establish niches within the natural environment to achieve economic development. In the context of the current environmental crisis, the region is now faced with the challenge of navigating an unpredictable future while drawing on its cultural and natural resources, and most evidently, its intellectual capacity for problem solving and adaptation.



The workshop was organized together with the Guyana National Commission for UNESCO.
© Khalissa Ikhlef / UNESCO

♦ Initiating transdisciplinary dialogue

The Georgetown workshop was a valuable opportunity for UNESCO to support Caribbean actors to come together to examine the role of ILK in understanding and responding to climate change. It was put together based on an open call for contributions by indigenous peoples and local communities to tell their story of mobilizing knowledge of climate impacts and their adaptation actions. The participants came from Small Islands Developing States (SIDS) and countries of the American mainland.

The event demonstrated that the Caribbean is rich in complex ILK systems, and that there is interest by meteorologists and climate scientists to develop further understanding of those intellectual systems and improve cooperation with their holders. It highlighted the relevance that ILK approaches to food security, subsistence and economic innovations have for climate coping strategies, while shedding light on the gender aspects of how that knowledge is produced. Furthermore, it showed that there is potential for science – ILK cooperation on a range of important issues such as extreme weather events and slow onset changes (e.g. ocean warming and acidification), ecosystems-based adaptation, knowledge and management of aquatic weed infestation, invasive alien species, wildfires, flooding and storm surges. Important discussions were also held on the role of language in understanding and transmitting environmental information, as a contribution to the UN International Year of Indigenous Languages (IYIL 2019).



Regional scientific institutions like the Caribbean Community Climate Change Centre (CCCCC) were part of the dialogue. © Khalissa Ikhlef / UNESCO

UNESCO's work is undertaken with the objective of exploring knowledge cooperation and co-production to generate robust responses to climate impacts, risks to biodiversity and achieving the sustainable development goals (SDGs). The Georgetown workshop reaffirmed a message that UNESCO had been hearing in other regions of the world, namely that science and science policy needed to keep up with the accelerating pace of change and demands of the twenty first century. This implies improving capacity to generate new knowledge through careful and rights-based co-operation between the holders of ILK systems and scientists.

The participants of the Georgetown workshop emphasized that there is more work that can be done in the region and a need for capacity building with key actors. The future of cooperation between indigenous peoples and local communities, and the science and

research community should aim at building reciprocal and trusting relationships, respecting the distinctive characteristics of ILK, as well as the institutions that facilitate intergenerational transmission. Harnessing the diversity of human knowledge to achieve a sustainable and dignified life for all is the cornerstone of natural and cultural resilience, living in harmony with nature and successful climate adaptation.

Caribbean experience of climate change

The Caribbean, like other Small Island Developing States (SIDS) regions, is already feeling the impacts of climate change, including more extreme weather events with more frequent natural disasters, translating into severe floods, droughts, rising sea level, coastal erosion, salination of drinking water, coral bleaching and death, ocean acidification, and other ecosystems and biological impacts.

The recent hurricane seasons were the most destructive on record. In September 2019, Hurricane Dorian generated on the Bahamas damages and long-term impacts estimated by the Inter-American Development Bank at over three billion US dollars. While some communities are located in the coastal areas and practice artisanal fishing, others are located inland where they conduct traditional small-scale farming and manage their customary lands in the savannah or in their customary forests in the tropical Amazonian eco-zones. The contribution of these communities is key to the preservation of the region's unique biodiversity, particularly in areas that host high levels of endemic species.

As Caribbean States grapple with the impacts of climate change, the voices of indigenous peoples and local communities provide insights into what environmental and scientific policies and actions are needed to foster resilience across the region. Despite this, there has not been an opportunity for a major dialogue between scientists and holders of ILK about their potential cooperation and co-production of knowledge. The aim of the UNESCO workshop on Mobilizing Indigenous and Local Knowledge Solutions: Addressing Climate Impacts and Vulnerabilities—A Perspective from the Caribbean Region was to articulate how ILK can boost social and ecological resilience, and be mobilized for climate change adaptation, planning and recovery after environmental hazards.

Climate change poses risks to all societies across the globe however, these risks are disproportionately distributed. Groups such as indigenous peoples and local communities, including those from SIDS who have done the least to accelerate climate change, carry the greatest burden. To face challenges accelerated by climate change, indigenous peoples and local communities base their decision making on their own knowledge systems. These ILK systems are built on long-term, intergenerational observations and analyses of the natural and physical milieu, which lead to better understanding and management of this complex environment. The diverse systems of knowledge are generated and sustained in systems that are fed by different elements, including cultural worldviews, language, community institutions, and ways in which men and women interact and share responsibilities, including their complementary roles as custodians and transmitters of knowledge.



Recognition of ILK

Increasingly, the importance of indigenous peoples' and local communities' knowledge and the relevance of their contributions to environmental sustainability, have been recognized at national and international levels. For instance, in 2014, the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC) acknowledged that: "Indigenous, local and traditional knowledge systems and practices, including indigenous peoples' holistic view of community and environment, are a major resource for adapting to climate change [...] Integrating such forms of knowledge with existing practices increases the effectiveness of adaptation". In the context of unprecedented environmental transformations caused by climate change, ILK may provide a crucial foundation for community-based observations of change and adaptation measures.

Recognizing the key role of ILK, the Paris Agreement specifically calls on governments to mobilize indigenous knowledge for adaptation to climate change. It states that adaptation action "should be based on, and guided by, the best available science, and as appropriate, traditional knowledge, knowledge of indigenous peoples and local knowledge systems, with a view to integrating adaptation into relevant socioeconomic and environmental policies and actions, where appropriate". In order to facilitate the implementation of the ILK-related provisions contained in the treaty, the recent UNFCCC Conferences of the Parties (COP) have established the Local Communities and Indigenous Peoples Platform (LCIPP) to facilitate exchange and knowledge sharing.

Despite this increasing recognition, ILK remain mostly on the periphery of National Adaptation Plans (NAPs) and insufficient attention is paid to their valuable insights with regards to extreme events and other impacts of climate change. One way of addressing this lack of consideration to ILK is to promote dialogues between indigenous peoples, local communities, scientists, including meteorologists and climate experts, policy makers and other relevant actors, to enable co-production of knowledge, and sharing of coping strategies to address risks and maximize resilience.

The workshop in Georgetown was UNESCO's first effort to stimulate such interdisciplinary dialogues in the Caribbean region. UNESCO has engaged in this type of interdisciplinary dialogues and transdisciplinary research on climate, science and ILK in the Africa region. The [Knowing our Changing Climate in Africa](#) project took place over five years with indigenous pastoralists conducting research and engaging in ongoing science dialogue. The African experience and the Georgetown workshop demonstrate that further investment in ILK systems would be valuable for advancing national and regional policies in the Caribbean. This transdisciplinary process requires technical and policy support, with sufficient funding for key actors to conduct research. The investment would substantially improve Caribbean climate resilience at different scales as well as strengthen national science capacity.

WORKSHOP PROCEEDINGS

1. Workshop objectives

The Georgetown workshop set out to achieve the following objectives:

1. To compile and share case studies on ILK from the Caribbean region, including States and Non self-governing territories
2. To deliberate on the issues and key characteristics of ILK in the Caribbean
3. To generate relevant recommendations to strengthen ILK alongside science in policy and decision making
4. To contribute to the rolling work plan of the UNFCCC LCIPP

According to their evaluation of the workshop, participants were satisfied and considered it met its objectives. Their expectations of an initial dialogue were exceeded by the wealth and breadth of information exchanged. The meeting created a baseline for greater inclusion of ILK in policy-making processes at the regional and international level. Participants stressed the need for replication of such exchanges at national, regional and interregional level, as well as the need for a coordinated, programmatic continuation of this work in order to achieve the recommendations arising from the meeting.

2. Workshop overview

Caribbean indigenous peoples and local communities, as well as experts from meteorological and hydrological services, and institutions dealing with climate change from sixteen countries came together for three days to share their experiences of anticipating and responding to different environmental challenges, including natural disasters and climate change impacts (see Annex A, List of participants). This enabled the elaboration of a Caribbean-wide overview of how ILK is being used to predict, prepare for and tackle the impacts of climate change, and to consider ways in which ILK, science and policy making can better collaborate.

As guests of the Government of Guyana and the Guyana National Commission for UNESCO, the workshop involved two days of presentations of case studies by indigenous peoples and local communities on their experiences, the mobilization of their knowledge, and examples of the tools and methods they are using to understand, document and adapt to climate changes. It also involved presentations from climate scientists from the region, introducing the climate products and information they produce, including initiatives that aim to work with ILK systems.

On the third day, a high-level meeting was held, consisting of a panel of presentations by members of the scientific community, and representatives of the national government of Guyana and the United Nations System. A summary of the key messages and policy recommendations that were elaborated during the workshop was presented to the panel. The event offered an overview of the relevance of ILK for national policy

making in the region, and the potential of bringing the ‘best available knowledge’ into resilience planning and decision making, as recommended in the Paris Agreement of 2015.

The workshop and this report mark part of UNESCO’s contribution to the UNFCCC rolling work plan of the Local Communities and Indigenous Peoples’ Platform (LCIPP).

Funding was provided by UNESCO.

3. Summary of the Plenary session

The workshop was formally opened with a welcoming ceremony conducted by the host country, the Government of Guyana, and UNESCO. This ceremony was followed by the opening remarks offered by Gillian Smith, representative of the Food and Agriculture Organization (FAO) in her capacity of Acting United Nations Resident Coordinator. She noted that the workshop took place during the celebration of the Guyana Indigenous Heritage week, thus she invited the audience to reflect on “where we are coming from”, and “where we are going”. To elaborate, “where we are coming from” is relayed to us through stories of our ancestors, while “where we are going” is very much in our hands and workshops such as this one are an opportunity to identify and share the human assets needed to get where we want to go.

“We build on the recognition of indigenous and local knowledge as important systems contributing to the development agenda and as a way to address risks and vulnerabilities, including climate change”, Ms Smith said. As indigenous peoples and

local communities are at the forefront of these complex challenges, it is important that enabling mechanisms like the LCIPP provide an entry point for indigenous peoples’ and local communities knowledge and voice into the implementation of the Paris Agreement.

Patrice LaFleur, Secretary General of the Guyana National Commission for UNESCO, warmly welcomed the workshop participants to the host country, which is known as the land of waters and home to nine distinct indigenous peoples¹. She congratulated UNESCO for mobilizing this range of participants to share experiences and search for answers and solutions to climate issues.

The opening session was concluded with a speech by Khalissa Ikhlef, UNESCO SIDS Focal Point, who spoke on behalf of Peggy Oti-Boateng, Director of the Division of Science Policy and Capacity Building of UNESCO. She spoke of the Midterm Review process of the SIDS Accelerated Modalities of Action (SAMOA) Pathway which took place in 2018 and 2019, and the upcoming high-level event which was set to take place on 27 September 2019 at the UN Headquarters in New York, in the margins of the 74th session of the General Assembly. The review process aimed to take stock of the progress made by the international community on the implementation of the SAMOA Pathway for the sustainable development of the SIDS, and to look for the way forward on how to leverage potentials and knowledge systems to respond to the new challenges facing SIDS. As a contribution to the SAMOA Pathway review, this workshop provided an opportunity to join voices and harness knowledge, experiences, actions and solutions to climate change in the Caribbean region towards sustainability and resilience.

¹The indigenous peoples of Guyana are the Akawaios, Arawaks, Arecunas, Caribs, Makushis, Patamonas, Warraus, Wapishanas and Wai-Wais.

She highlighted that through this workshop, a new chapter on the Caribbean history of ILK was being written. This event represented an opportunity for scientists from the region to learn more about ILK, and for holders of such knowledge to learn more about science, a necessary step to promote collaboration and co-production of knowledge. While focusing on the achievements of the Sustainable Development Goals (SDGs), the needs of small-island communities and indigenous peoples should be adequately addressed. The absence of disaggregated statistics on indigenous peoples and local communities at the national level masked their specific conditions and development needs. If the SDGs were to fulfill their true objective of reducing global disparities, it would be a matter of urgency to address the needs of indigenous peoples and island communities.

Ms Ikhlef reminded participants that natural disasters were increasing in terms of frequency, complexity, scope and destructive capacity. Coping with their impacts had become one of the greatest challenges, and the recent extreme events in the Caribbean region bitterly reminded us of this reality: the Bahamian community representative who was intended to participate to this workshop was unable to travel to Georgetown because of the devastating impact of Hurricane Dorian in his home country. In this context, UNESCO and its partners are increasing their support for ILK to collaborate with science in understanding natural hazards, and enhance capacities for the design and the enforcement of sound disaster-resilience principles. This included strengthening natural disaster preparedness with insights from indigenous knowledge. The contribution of ILK systems to international, national and local policies and practices were essential to mitigate climate change impacts and promote environmental sustainability.

After the opening session, the workshop was structured into thematic presentations by participants, group work and plenary discussions (see Annex B for a detailed agenda of the event).

A high-level meeting was held on the third day of the workshop and was honored by the participation of three Cabinet Ministers of the Government of Guyana, namely Hon. Valerie Garrido-Lowe, Minister within the Ministry of Indigenous Peoples Affairs, Hon. Nicolette Henry, Minister of Education, and Hon. Raphael Trotman, Minister of Natural Resources. They made presentations reflecting on the importance of indigenous peoples and local communities' knowledge and its relevance for science, and resilience. Likewise, Peggy Oti-Boateng, Director of the Division of Science Policy and Capacity Building of UNESCO, and Patrice LaFleur, Secretary General of the Guyana National Commission for UNESCO, highlighted the relevance and importance of the workshop themes for the Caribbean region.

A summary of the results of the first two days' discussion was presented to the high-level meeting by Max Ooft, Policy Officer of the Association of Indigenous Village Leaders in Suriname (VIDS), in his capacity as rapporteur of the meeting. The briefing captured key ideas offered by participants. The high-level session was closed with a cultural performance by an indigenous group from St Cuthbert's Mission, an Amerindian village on the Mahaica River in the Demerara-Mahaica region of Guyana.

Finally, the three-day workshop was closed with a few words by Mr Jones Richards, an indigenous elder of Guyana, and final remarks by the organizers from UNESCO, Khalissa Ikhlef and Veronica Gonzalez Gonzalez, and the host country.

²State of the World's Indigenous Peoples, Volume IV. Implementing the United Nations Declaration on the Rights of Indigenous Peoples (<https://social.un.org/unpfii/sowip-vol4-web.pdf>)



4. Presentations and discussions

4.1 Key ideas and concepts

Indigenous and local community experts, as well as climate and meteorological services experts, dialogued for two days on aspects of ILK in relation to changes in climate, and its impacts on human populations, in particular on indigenous peoples and local communities, who are often dependent on nature and its resources for their livelihoods.

Owing to the centuries-long relationship with what some communities call “Mother Nature”, indigenous peoples and local communities have developed a large and complex body of knowledge about nature and natural phenomena. This traditional knowledge has been developed and enriched over the course of many generations and is rooted in direct observations, empirical experiences, cultural and spiritual beliefs and practices. These knowledge systems use specific protocols that are in many ways different from what the scientific disciplines are used to understand and weather and climate patterns and elaborate predictions. They have been recognized as being of crucial value for the world to understand climate change, to reduce the impacts of natural disasters, and to increase the resilience and adaptation capacity of human populations.

From the various presentations and discussions, a number of key ideas and concepts were captured, based on the themes of the agenda (see Annex B). These included two key values that underpin ethical collaboration between holders of different knowledge systems, namely the cultivation of mutual understanding, and the promotion of equity and rights.

Mutual understanding

Participants noted that this workshop dealt with complex issues and challenges for which there were no easy and uniform solutions. Dialogues such as this one, with participants from different geographical situations, livelihoods and perspectives, contributed substantially to bringing forth parts of the solution to the puzzle, and suggesting concrete steps to move forward on the path towards sustainability and resilience against climate change, particularly for indigenous peoples and local communities.

Participants remarked that such a sharing of experiences and solutions, by experts of different

knowledge systems, was a crucial mutual enrichment and provided great synergy towards what was needed, namely the best available scientific and indigenous knowledge that were needed to guide adaptation action, as agreed in the 2015 Paris Agreement, rather than the two knowledge systems functioning separately. In various instances, the indigenous and scientific knowledge systems have not established constructive exchanges, which was a missed opportunity, as cross-fertilization and synergies may have offered innovative solutions to face common problems. Climate and weather science and services did not necessarily reach indigenous peoples and local communities in appropriate or understandable forms and languages, although this was improving with modern technology.

Various participants stressed that ILK systems, while very different from science, were and must still be considered as equally valuable. ILK systems are of a holistic nature, involving a different worldview, cultural and spiritual beliefs and practices, and do not necessarily separate physical and natural elements in the environment and cosmos, or lands and waters into compartments that must be studied and addressed separately, as was often done by the scientific disciplines. Such a holistic approach provided opportunities to address weather and climate challenges in an equally holistic manner. Climate policies and measures often did not take into account fundamental interrelations of social, cultural, educational or ecosystem aspects, which often compromised their success. ILK, which has generated resilient practices for millennia, provided the best available knowledge, alongside scientific knowledge, and can reinforce decision making.

Yet, mainstream institutions, and especially educational systems, did not sufficiently value and respect or promote indigenous knowledge. Some scientific initiatives have tried to or have mobilized indigenous knowledge but not in an appropriate or collaborative way. Indeed, most of the time those initiatives mainstream given elements of indigenous peoples and local communities’ knowledge without collaborating with them to co-produce knowledge. Science policy and knowledge dialogues, as led by UNESCO, help to avoid fragmentation of ILK systems while encouraging science policy changes in favour with indigenous peoples and local communities, and systematically engaging with them.

Promoting equity and rights

A key concern was that science can be extractive and sometimes even predatory towards indigenous knowledge. Collaboration offered by science often seems to have the purpose of extracting information and knowledge from indigenous peoples and local communities with minimal participation or involvement

in decision-making from communities who hold the knowledge. Interactions between science and ILK systems do not always consider the rights of indigenous and local communities, and the benefits deriving from the research, as a central part of the collaboration. In some instances, the ILK is used by science for worthwhile purposes and the results of this collaboration are not shared back with the communities, or worse, are not used to improve their local conditions or to enable the development of appropriate policies that can improve their livelihoods and resilience. Participants explained that this perception of sciences leads to distrust, losing hope and unwillingness to cooperate among indigenous peoples and local communities.



Wayüü woman collects rainwater from the jagüey, for consumption by the community's animals. © "Wayüü woman in resistance", Luisa Fernanda Zapata Rodríguez

Collaboration between indigenous and scientific knowledge systems requires the development and application of long-term policies that promote ILK recognition, including acknowledging their underlying institutions, and establishing conditions to engage in an equitable dialogue. Promoting a non-extractive approach and constructive knowledge systems dialogue between indigenous and scientific knowledge holders benefits everyone. Indigenous peoples have the right to define, collect, protect, interpret, manage, and apply data in a way that respects indigenous ethics, values, and relational responsibilities. In various instances, it is necessary to restore authority over indigenous data, bringing it back to its inherent stewards. This right is clearly reflected in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), in Article 31.1:

"Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural

expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions."

A key field for policy elaboration consists in addressing formal education. The mainstream education system and sciences, while much needed by indigenous peoples, did not sufficiently promote indigenous knowledge and this has the effect of suppressing and even destroying indigenous cultures. If the mainstream education system and sciences do not create the necessary enabling environment for ILK to be valued, respected, promoted and transmitted, indigenous cultures, lifestyles and their knowledge will continue to decline.

Indigenous languages are the backbone of indigenous knowledge systems. Yet indigenous communities must speak dominant languages such as English, Spanish and Dutch, while indigenous languages are undervalued and underutilized in education and particularly science education. Understanding the deep correlations between languages and knowledge is fundamental when working with indigenous knowledge systems, as the disappearance of indigenous languages leads to the loss of complex and rich aspects of traditional knowledge, stories and wisdom. Workshop participants made statements about the impact and dominance of mainstream education, such as the need to "deconstruct colonialism", and that indigenous peoples might have to "unlearn and then relearn" to be able to keep their identity but also worldviews, wisdom and ancestral cultures and knowledge.

Participants welcomed the initiative and opportunity of this workshop to bring indigenous and scientific knowledge systems together. They expressed that more similar initiatives should be encouraged; the recommendation was that these initiatives should be implemented with full respect to the ILK shared by the communities, and that this should be based on mutual recognition of each other's rights and perspectives. Workshops like this one are crucial in building mutual understanding, respect, trust and cooperation, and such cooperation should grow to become more structural. There should also be more interaction with other influential sectors of societies, including the private sector, to align efforts on indigenous-defined priorities.



4.2 ILK on weather and climate in the Caribbean

Various presentations were given by the participants, showcasing the wealth of ILK that indigenous peoples and local communities hold to understand weather and climate patterns, and to adapt to changes.

In the Upper Mazaruni region of Guyana alone, almost 100 different ethno-meteorological and hydrological indicators are used by the Akawaio indigenous people to assess weather and climate, including 77 biological indicators such as signs from plants and animals, eight physical indicators and ten cosmological indicators. These indicators help them to know when, what and where to plant, to sow, to harvest and to fish, which kind of fishes, how to construct their houses, etc. Similar examples were given from Cuba, where, for

example, the moon and lunar cycles help fishermen predict seasonal changes and help plan ahead for sowing. The direction of the wind in January, for example, predicts a rainy or dry season, and plants with specific energetic characteristics can help restore the balance between humans and nature. The Cuban case study also showed that traditional knowledge is not uniform among different groups. For example, in the Contramaestre and Palma Soriano region of Cuba, different groups of campesinos give different importance to weather and climate influencing factors.

The Case Study from Cuba is developed in some detail in the next box, as an example that showcases how the environmental knowledge of local communities living in small islands in the Caribbean is mobilized to adapt to weather and climate dynamics (see case study 1 in the next box).



Turtle hatchling and boat in sargassum. © Amy Cox

Case Study 1: Cuban Farmers' Local Knowledge on Weather and Biodiversity

Presented by Juan Carlos Rosario Molina, Centro Universitario Municipal de Contramaestre, Universidad de Oriente, Santiago de Cuba

The Cabañuelas is a traditional forecasting system that for centuries has allowed Cuban farmers from the municipality of Contramaestre to elaborate annual weather predictions. Passed down from one generation to another, this widely used prediction method relies on the observation of atmospheric indicators (mainly wind direction and cloud accumulation) during the first days of the year. Cuban farmers organize the agricultural annual cycle by combining the predictions of the Cabañuelas with their knowledge about the lunar cycle and diversity of seeds. This knowledge enables them to identify what time of the year is the best to plant the available seeds.

Farmers know that if the Cabañuelas has announced that the rainy season is good they will be able to plant sweet potato, which needs much water. If the rain predictions are lower, then they know that corn might suit best, as it does not need as much water. In the case that the rain forecast is low, they will most likely plant cassava, as it is more resistant to dry conditions, while taro and yam can resist as long as the sapling is removed.

In addition to the Cabañuelas, from which annual weather can be predicted, farmers apply other methods to generate predictions on different time scales. These methods include the identification of the potential risks associated with the accumulation of the effects brought by the prolongation of heavy rain or drought periods, and hurricanes. This knowledge has been effective in enabling Cuban farmers to adapt to their island, however, with the increasing frequency and intensity of extreme events in the Caribbean, they experience problems with the accuracy of their forecasts, a problem also experienced by scientists. Workshop participants recognized the potential of engaging local and indigenous forecasting techniques and those of scientists, with the aim of enhancing local adaptive capacities.



Randall Alicea on his family farm in Cidra, Puerto Rico where he is harvesting tabaco seed and practicing rainfed, climate smart agriculture using indigenous knowledge and traditional techniques handed down through generations in his family. © Dominique M. David-Chavez

Mapping, in particular Participatory 3D Modeling (P3DM) of indigenous territories and natural resources in Belize, Suriname, Nicaragua and other countries, has proven to be a powerful tool for awareness, ownership and taking of responsibility by communities over their environment, and community adaptation measures, e.g. changes in forest harvesting and forest management. Participatory data mapping, such as in southern Belize, has shown to change the power dynamics by recognizing indigenous peoples as authorities and experts (see Case study 2 in the box below). The example highlighted that, thanks to the traditional knowledge of indigenous peoples, forest resources that were “unknown” to scientists could now be identified. Mapping practices also led to community awareness on the value of healthy forests and measures to maintain or restore that health. The availability of the data emerging from these different forms of mapping influences not only customary practices but also national and even international policies. Therefore, the need to strengthen those customary practices was mentioned.

The Belizean experience highlights the potential of ILK for further transdisciplinary cooperation relevant to science and climate policy and research.

Case Study 2: Maya resilience in the face of climate change in Belize

Presented by Ms Froyla Tzalam, indigenous representative and expert, Mopan and Q'eqchi Maya, Sarstoon Temash Institute for Indigenous Management, Belize, and Alternate representative of the SIDS Region for the UNFCCC Facilitative Working Group of the Local Communities and Indigenous Peoples Platform (LCIPP)

As forest peoples, the Maya of southern Belize are key observers of changes to their forests resulting from climate change. This case study illustrates how indigenous knowledge forms the foundation of local climate mitigation and informs data on forests and carbon inventories.

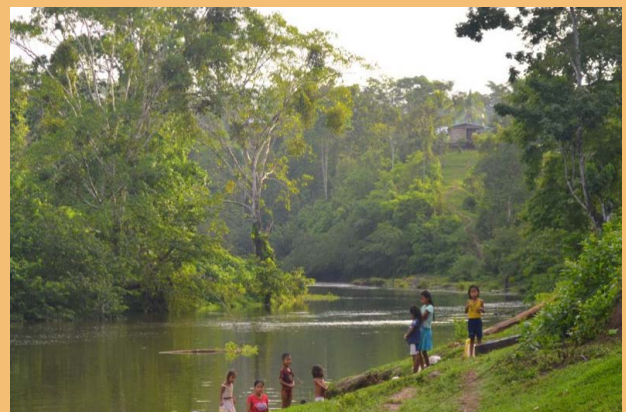
Maya ancestral climate observation, honed over millennia, is still practiced today: Indigenous farmers predict rain by watching flood flies and black army ants, and listening to howler monkeys. Cicadas announce the coming of the dry season, likewise heralded when the cotton trees drop their leaves. If the Maya see the moon surrounded by a ring of clouds at 8pm, rain is certain the following day—unless there is a rainbow.

After the Belize government declared their traditional lands a park, the Maya began to combine their traditional knowledge with science. Four Maya and one Garifuna community formed the Sarstoon Temash Institute for Indigenous Management (SATIIM) to co-manage the Sarstoon Temash National Park. These communities coordinated the first participatory data collection that led to the recognition of the Sarstoon Temash National Park as a wetlands of international importance under the Ramsar Convention on wetlands.

Maya community patrols have provided the only data on wetland ecosystems on the Ramsar site ever since.

As its organizational name implies, SATIIM is forging a unique path of climate change adaptation and mitigation based on Indigenous management and traditional knowledge. This synthesis of traditional knowledge and modern science won SATIIM recognition from both the World Bank's Indigenous Adaptation to Climate Change Fund and the Traditional Knowledge Initiative of the United Nations University. In 2012, SATIIM published the first collection of Maya climate change observations. A central finding was a growing uncertainty around when the seasons change and when to cultivate land, traditionally indicated by turtle nests, which are harder to find.

As they are increasingly engaged with the outside world, the Maya now understand that their traditional observation methods are important for climate science. SATIIM is now working to ensure that this culturally sensitive data collection contributes to climate change policy at both the community and national levels.



Children in the Uli River, Mayangna Sauni Bas, Indigenous Territory, Bosawas Biosphere Reserve, Siuna, Nicaragua. © Eileen Mairena Cunningham.

The position and role of women as holders of traditional knowledge and in transmitting it across generations was highlighted. This was exemplified by the case of southern Belize, where indigenous women are the traditional river fisher folk as well as forest gatherers, who can offer observations about the health of the rivers and forests and their interrelation. Similarly, indigenous Wayuu women and girls of the La Guajira department in the north of Colombia are the ones who have the responsibility to collect and classify seeds for the next sowing season, when the rains start.

In the Quintana Roo state of Mexico, the Maya indigenous peoples use their Xok k'iin, predictions of the climate, as the basic tool for management of native seeds and their agricultural plots. The elders observe the nesting of birds, the flowering of trees, the behavior of insects and the colors of the sky; they listen to plants, talk with the fire and feel the earth. Indigenous youth have been actively involved in intergenerational traditional knowledge transmission, participating in the work of elders and in ceremonies such as the ones to ask for rain or to show gratitude, and by using modern technology to make video-documentaries. The experience in Mexico underlined, however, that much ILK cannot be simply documented and can only be transmitted orally and through special rituals. This decision needs to be respected. In addition, most of humankind has ceased listening to nature and should return to paying more attention to its signs.

From the perspective of the Miskito indigenous people of Nicaragua, climatic changes can be rooted in the imbalances caused by human beings and their disrespectful behavior of the different spheres of existence. These represent

the cultural sphere, composed of human beings, knowledge and cultural practices, the natural sphere, composed of plants, animals, traditional knowledge reproduction system, protective spirits, and the political-social sphere, composed of government institutions, rules of relationship with the State, and alliances with other actors.

Imbalanced relationship between these three spheres may lead to the loss of habitat for protective spirits, with negative impacts such as punishment of spiritual beings, loss of solidarity and reciprocity practices, weaknesses of indigenous institutions, loss of capacity for responsible governance, loss of conflict resolution capacity, loss of control over ancestral territories, deforestation and droughts leading to change of land use and loss of traditional food, and loss of applicability of traditional knowledge. Restoring the balance is key and should be done through legalization and titling of indigenous territories, territorial governance, and integral indigenous cultural revitalization. Spirituality, revitalization of cultures and traditional leadership, indigenous education systems, recognition of indigenous peoples' territorial rights, stronger community solidarity and careful management of monetization within indigenous communities, are crucial factors to help restoring the current imbalance between humankind and nature. These factors must be strengthened to achieve Yamni Iwanka—good life or well-being, also known as “buen vivir”.



4.3 Community-based fisheries and coastal management

Local and indigenous community knowledge and adaptation issues were highlighted in relation to the problem of sargassum seaweed on Caribbean beaches, among others in Barbados, Anguilla and Montserrat and the Caribbean coast of Mexico. Since 2011, pelagic sargassum has invaded the region on a massive scale, forming a 8,850 kilometers-long belt³, with negative socio-economic impacts affecting the livelihood of fishermen and other coastal community groups. In certain instances, the failure to have effective participation of local communities resulted in a worsening of the situation, for example coastal erosion after heavy equipment removed the seaweed, and negative impacts on the local communities. In other cases, however, local fishers adapted to the situation by going after different fish species such as the Almaco Jacks and large pelagics around calmer sides of the sargassum, using different techniques such as fishing below the sargassum, and going to different fishing locations. A best practice guidebook compiling such experiences was produced by the Centre for Resource Management & Environmental Studies (CERMES) of the Cave Hill Campus, University of the West Indies, to be used for increasing resilience and to contribute knowledge on sargassum management.

Various coastal regions reported, in addition to the sargassum influx in areas critical to fisheries, there is also increased coastal erosion related to extreme weather and to sea level rise. These impacts negatively affect food security and fisheries-based livelihoods, including fishing gear and landing sites, coastal infrastructure and

supporting ecosystems like coral reefs, seagrass and mangroves. The importance of participatory community initiatives was highlighted by the experiences in Antigua, where wetlands that used to provide water and food, have in recent times become home to invasive species, rubbish and trash. In response, some community groups that are involved in tourism, and therefore depend on a healthy coastline, took initiatives to counter this, and they became important actors in co-managing the coastal areas after constructive dialogue with the government. The example shows that being able to have benefits from their active involvement, as well as the trust factor, is essential in small societies.



Sargassum along tideline at sunset. © Hazel Oxenford.

The use of participatory mapping and video has put local communities in a position of informing and participating in the taking of policy decisions on climate action in Anguilla and Montserrat. Fisheries departments have incorporated local knowledge in fisheries management plans, while respecting to only use information for which permission has been given by communities and not to share sensitive information. Stakeholders in the initiative have expressed their wish to take this further and develop local adaptation plans for their fishing communities.

In Suriname and Guyana, a Participatory 3D Modeling (P3DM) project promoted

integrated ocean and participatory governance of coastal regions under a European Union funded project. Work was undertaken with small-scale fishermen and larger fishing companies. Results of the project include an inventory of issues that need attention, such as conflicting interests of small and large scale fishers. The P3DM models documented places at sea where certain fish species are depleted, and fishing breeding zones. These maps were digitized and presented to the stakeholders for further discussion and decisions on next steps.

In the Quintana Roo state of Mexico, fishing communities that followed the rituals and traditions of the Maya peoples are disappearing, among others due to the strong influence of mass tourism. Quintana Roo has become a tourism state, which has changed the traditional lifestyle of indigenous communities and traditional fishing. Communities nowadays depend mostly on tourism which is putting stress on ecosystems. The traditional fishermen are now elders and the younger generation is no longer undertaking the traditional practices. The construction of infrastructure for tourism has also damaged wetlands, and underground waterways. The wider environment has become polluted, and certain species have disappeared. Drug abuse and delinquencies are reportedly increasing, and the traditional cultures and traditions are also under a lot of stress. While tourism can be pictured as a success story of income generation, it can also be to the detriment of indigenous peoples and local communities and their traditional lifestyles and knowledge. Similar developments have been reported in Belize. The workshop flagged that mainstream development models, often supported by international organizations that support economic growth, need to also give adequate consideration to

environmental and indigenous peoples' and local communities issues and interests. The need to promote ILK based development models was underlined.

A regional Central American initiative for the promotion of traditional knowledge to face climate change is currently being undertaken, coordinated by the Food and Agricultural Organization (FAO), the Consejo Indígena Centroamericano (CICA) and the Fondo para el Desarrollo de los Pueblos Indígenas (FILAC). At the time of the workshop, the initiative had had only two meetings, and efforts had been undertaken to establish a regional network of small-scale indigenous fishers⁴. The participants have highlighted different priorities in their respective countries, e.g. river fishing in Costa Rica, island fishing in Panama, and strengthening participation in the regional fisheries negotiations in Nicaragua, and the Garifuna fishing communities in Honduras.

4.4 Community-based inland farming

Climate and weather changes were signaled as major impacts on the region, including droughts impacting inland crops in Belize, the devastating impacts in Puerto Rico of the 2017 hurricane season on insect cycles and pollinators and loss of seeds that would have been harvested, and a similar depletion of seeds in Quintana Roo, Mexico after Hurricane Janet. Participants also shared their concerns about how the impacts of natural disasters are addressed after the events, as insurance payments to farmers can also constitute a threat, if those are invested in non-traditional crops or methods.

⁴FAO. Centroamérica consolida Red de Pescadores de Pequeña Escala de Pueblos Indígenas <http://www.fao.org/costarica/noticias/detail-events/es/c/1173973/> Last consulted on 3 Sept, 2020



Women of the village Brownsweg (Suriname) preparing for a ritual. © Debora

The need to reflect on how development projects are articulated to traditional practices was raised by participants. In the La Guajira region of Colombia, mining was signaled to have great impact on community agriculture, medicinal plants and animals. Other threats to community-based farming have been less visible but certainly not less serious, such as the replacement of traditional crops by monocrop cultivations for the tourism industry or for animal fodder. These practices result in the degradation of the soil, pesticide pollution, environmental degradation and the loss of diversity and traditional knowledge, leading to changes in social patterns that are no longer based on families and economies of solidarity.

The workshop participants mentioned various small and local initiatives that aim at tackling these issues. In Antigua, work is being done to highlight indigenous pollination conservation practices; in Puerto Rico, there are initiatives on climate smart agriculture, intercropping and composting; in Nicaragua, there is a cooperation between several indigenous communities and national universities on farmers' knowledge; in Guyana, indigenous

communities increasingly use short cycle cassava as an adaptation to the changes in seasonal rains; in Cuba, seeds are being protected and irrigation systems improved for the use of traditional maize and beans; in Colombia, underground water is used for irrigation systems.

As it was highlighted by the Anguilla and Montserrat case studies, ILK originates from various sources, ranging from forebears and elders, to the observation of insects, birds, cloud patterns, and farmers' almanac. In those islands, ILK forms one of the pillars of the impact database and reporting mechanism, which is embedded in the climate service and products of the meteorological institutions. There is a text messaging system where farmers send in their thoughts on the forecast and reports of impacts such as bushfire, drought and heat stress. There is also a WhatsApp messaging group where farmers share their local knowledge, which is sometimes used to guide the meteorological service's forecast.

4.5 Safeguarding community knowledge systems

Participants of the workshop discussed various methods being used to safeguard indigenous and local community knowledge systems, as well as challenges that have been experienced while undertaking those initiatives. In Colombia, there are initiatives to interview elders using recording techniques. The need to document and archive traditional agricultural systems was mentioned as a priority. In St Vincent and the Grenadines and St Lucia, community fishers worked with researchers using GIS technology to undertake local level environmental assessments.



Indigenous women's knowledge was highlighted as a crucial element for food security.
© Khalissa Ikhlef / UNESCO.

Intergenerational transfer of knowledge was highlighted various times as an important area of intervention. Another potential action to be undertaken could be the creation of knowledge databases by communities, researchers and institutions such as universities documenting the knowledge and experiences of indigenous, afro-descendent and farmer communities.

Various participants also stressed the need for a holistic approach to cultural preservation and valuation, traditional

practices including storytelling, visionary leadership and governance systems within communities. Communities empowerment was identified as a crucial factor in enhancing ILK, as only strong communities can keep indigenous and local community knowledge systems vital and resilient against the various threats of economy-oriented societies. In Nicaragua, such concerted action was undertaken through a package that included: titling and legalizing indigenous territories; strengthening the indigenous governance systems and systematizing customary laws; having indigenous-led universities; revitalizing cultures and recuperating the role of elders and leaders; strengthening systems for conflict resolution, including violence against women; and building alliances at national and international level, including on strengthening traditional knowledge.

4.6 Environmental hazards management: mapping hazard threats and damage, and recovery through ILK

Various examples were provided of emergency situations due to environmental hazards, and the role of ILK in recovering from them. In countries such as Mexico, Suriname, Belize, Puerto Rico, Cuba and Dominica, the resistance of traditionally built houses against extreme weather was highlighted. Whereas modern buildings were affected by hurricanes, traditional houses shook but stood strong. In Puerto Rico, for example, communities harvestwood in accordance with the lunar cycle to build more resilient houses. Sea-level rise and more frequent coastal flooding, combined with population expansion along coastal areas, also requires changes in architecture and spatial planning. However, it was also



noted that often the houses in indigenous peoples and local communities are no longer constructed traditionally and the surrounding vegetation is also not the same as before to provide protection.

In Nicaragua, there are periodic disaster preparedness exercises in communities and schools, and traditional shelters are being used. Ancestral knowledge is still being used for reading or predicting the weather, although much less so in suburban areas. River flooding is fairly common in Suriname, but coastal regions nowadays see an increase in strong winds and tails of hurricanes. Based on the experience of recent years, the tribal Saamaka communities in Suriname know approximately how high the flood water will be in the coming year.



Regional initiatives on indigenous knowledge and adaptation are being implemented through the Fund for the Development of Indigenous Peoples of Latin America and the Caribbean (FILAC).
© Khalissa Ikhlef / UNESCO

Self-help systems in case of weather emergencies are prevalent among the Caribbean indigenous peoples and local communities. Having community first responders can be critical, as shown in the example of Puerto Rico, where extensive family networks were employed to distribute food and water. A trend was also signaled

that indigenous communities, in the past resilient and self-sufficient, nowadays rely more on commercial purchases and do not have stocks of food in crisis situations. This can be critical after hurricane cut-offs and flooded roads, leading to isolation of communities. Long-range radio transmitters can be an adaptation measure in such situations. Policy foresight is needed with the appropriate input from indigenous peoples and local communities to feed this adaptation and resilience-strengthening process.

In Cuba, farmer networks in coordination with agriculture companies undertake seed protection initiatives. There is an impact assessment methodology in place in the Caribbean region, developed by the Caribbean Disaster and Emergency Management Agency (CDEMA) with the UN Economic Commission for Latin America and the Caribbean (ECLAC), but a practical challenge is that local and indigenous farmers often do not have exact quantitative data of how much they have planted as they do not use measurements that are compatible for quantifying investments per acre. Early warning systems in coastal regions and the use of GIS technology were mentioned as useful and can be replicated for inland indigenous farmers.

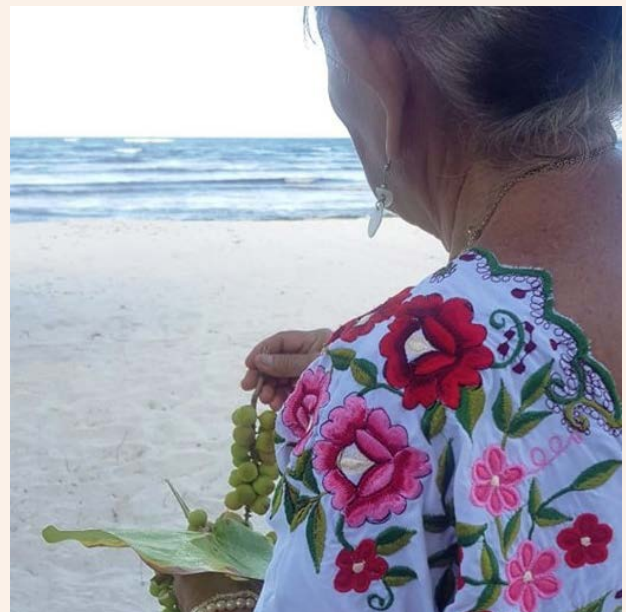
Governmental response and recovery action should include indigenous and local knowledge and perspectives. Examples were given where heavy equipment was used to remove sargassum, which led to rapid coastal erosion and even more negative impacts on the local communities. For instance, local communities in Cuba were temporarily relocated during recovery reconstruction but their traditional knowledge on certain needs for their livestock was not taken into account, resulting in sanitary issues.

4.7 Understanding vulnerabilities and resilience inside communities: a gender perspective

ILK is held by different actors within society: women, men and elders, young people and children. All these knowledge holders need to be heard, and their participation sometimes has to be actively enabled or facilitated. They mentioned the need to especially involve women, with children and domestic responsibilities, in decision-making processes, as they often do not have equal opportunities to participate in those decision-making processes. Sometimes they are even at risk, for example during longer walks to agricultural plots that are much further away from their village because of weather and climatic factors. Indigenous boys and men, on the other hand, can become more vulnerable due to increasing economic and development pressures in the Caribbean region, in a context of violent and complex masculine peer group relations.

The differences in gender perspectives, impacts and vulnerabilities, and in the impact that climate change has on women, men, girls and boys were deliberated during the three-day workshop. The key role of women in the transfer of knowledge was consistently underlined. Another consistent point was the need for women to participate more effectively in discussions related to traditional knowledge. Women have often been “the quiet part” of communities. A study in Belize showed that Maya women tend to stay in the domestic sphere, and their reticence during or absence from meetings and workshops is ascribed to them not having the time, as well as the cultural tradition of women not leaving their communities. The issue is not necessarily that they are not willing to

talk; under the appropriate circumstances they do so. In other instances, they speak “through the men” who voice what they have heard from the women. The experience in Belize emphasized active participation of women through the organization of their own discussion tables with translators during water ecosystem inventories, and the inclusion of young women to do the reporting.



U k'ubil k'áanáab (offering to the sea) is an act of gratitude of the Mayan people to the force of the sea. © Ángel Jesús Sulub Santos

Another experience from Nicaragua was presented, where communities signed written agreements to respect the participation of women, as women and children were not always heard by customary law administrators. There are yearly meetings where elders, midwives and other knowledge holders from different communities come together to define a plan of action for their communities.

The key role of indigenous women in the selection of seeds and decisions on what to plant was also mentioned. They are very often also the collectors of non-timber forest products. Older indigenous women were

mentioned by a few participants of having specific roles and knowledge, including in locating underground water resources and averting strong rains. Women also may use different weather and climate indicators than men. However, it was mentioned that the dominant society can be rather intimidating to indigenous women who would be unlikely to speak freely in a setting with male climate scientists.

Taking proactive measures to enable the participation of women was similarly brought forward in the experiences in Suriname. Increasingly, more women become chiefs of their villages in Suriname, which was seldom the case in the past. Women are also economically active and increasingly go out of the villages for income activities, even across the borders, which is commonly the case in the matriarchal societies of Guyana.

Participants stressed the need for political and economic empowerment of women as well as the need to ensure safe environments, in their daily life as well as in workshop or meeting settings. Weather, seasonal and climatic changes have been factors that have changed the lives of women. Many communities are seeing impacts on their traditional agriculture due to heat, intense drought, and exploitation of resources or changing access to vegetation. The community members, including women, must now travel longer distances to their agricultural plots, that are increasingly more remote from the communities. Female fishers now go fishing further out at sea. Such factors cause a lengthening of work hours for women and make them more vulnerable to assaults while traveling.

Workshop participants agreed that gender issues must be addressed with the full range of actors; it is not only an

issue for women but for all genders and generations, young and old. Participants also touched on lesbian, gay, bisexual and transsexual (LGBT) aspects, and single parent situations in which women have multi-generational responsibilities. They also referred to the fact that boys and men from indigenous and tribal communities have different types of vulnerabilities, due to economic pressures and the need to generate income for their families.

4.8 How can ILK enhance meteorological and climate information and services?

Various examples, as well as challenges, were mentioned during the workshop on how ILK holders interact with meteorological and climate information and services. There is in some countries increasingly a mutual enrichment of local and indigenous farmers' knowledge and meteorological sciences, albeit in a rather isolated and non-structural manner. In Trinidad and Tobago, the emergency management agency uses phone applications for exchange of information on soils, water and extreme weather warnings. In Colombia, resistant, protein-rich maize is produced using indigenous knowledge and materials with enhanced engineering; in Antigua there is legislation in place for consultation of local communities which is supportive for safeguarding community knowledge systems.

In a number of countries, it is clear that indigenous communities have timing, or use certain signs that announce the end or beginning of seasons, that is different from the "official" ones. Various communities are aware of and anticipate the variations due to the El Niño phenomenon. On the other hand, traditional methods of forecasting do

not always work as reliably due to the higher variability of seasonal patterns. The impact of this on nomadic peoples who practice seasonal migration was touched on.

Fishing communities can make good use of hydrometeorological services, but it was signaled that collaboration needed more efforts. There are mobile applications for fishers which are taken up by younger fishermen. In Anguilla and Montserrat some modeling has been undertaken, mostly on safety at sea for fishers. An example from Guyana showed hands-on collaboration between the Hydrometeorological Service of Guyana and indigenous communities where inland rainfall stations are located. The majority of those hinterland rainfall stations is managed by indigenous people, who collect the data and send it to the Hydrometeorological Services. Moreover, the indigenous communities also provided different information on the start and end of the rainy season than the scientific assumed start and end dates. Men in the forests provided different observations from women, who gave observations closer to their homes.

Practical barriers may impact the exchange between indigenous and local community knowledge holders, and meteorological and climate information and services. Language barriers, but also the availability of electricity and telecommunication facilities, were mentioned. Measures ensuring a meaningful participation need also to be elaborated with indigenous peoples and local communities. An example was provided, namely of the under-representation of indigenous and local farmers during a regional agriculture workshop because the organizers considered indigenous knowledge to be only “folkloric”. These projects also need to work with elders and traditional authorities.

5. Regional and international initiatives

The workshop participants emphasized the need to unite diverse knowledge systems and create coherence between the observations, needs and actions at local level, as well as in national and regional policies. The promotion of a regional approach to climate adaptation that highlights capacity building is also an important factor, that can be fostered by international actors such as UNESCO.



National Ministries of Guyana reflected on the importance of indigenous and local knowledge and its relevance for science, and resilience.

© Khalissa Ikhlef / UNESCO

The workshop brought together experts from various Caribbean science institutions including those associated with UN and global bodies, among whom was a representative of the vice-chair of the IPCC Working Group III. A number of initiatives undertaken by international and regional bodies related to ILK and climate change were mentioned during the workshop, and are summarized below.

- The work of the Local Communities and Indigenous Peoples Platform (LCIPP), a platform established under the UNFCCC, was highlighted. The role of the LCIPP is: to strengthen the knowledge, technologies, practices, and efforts of local communities and indigenous peoples related to addressing and responding to climate change; to facilitate the exchange of experiences and the sharing of best practices and lessons learned on mitigation and adaptation in a holistic and integrated manner; and, to enhance the engagement of local communities and indigenous peoples in the UNFCCC process.
- The Caribbean Disaster Emergency Management Agency (CDEMA) has been developing regional disaster management and preparedness strategies. In cooperation with the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), they have also been developing impact assessment methodology. Continuing to develop effective data gathering and communication strategies with local communities are seen as critical to the success of these efforts to mitigate the effects of climate change.
- A variety of projects, some of which benefit indigenous and local communities, are undertaken or supported by the Caribbean Community Climate Change Center (CCCCC). These include: strengthening of climate monitoring networks, climate modeling with research institutions, climate risk assessment tools and publications; development of adaptation strategies and country-specific projects; coordination of the Caribbean Region's negotiating positions, such as in the UNFCCC COP and in the Alliance of Small Island States (AOSIS); and, updating of CCCCC policy to have more interaction with indigenous peoples and local communities, and the potential to have observer status with the Center.
- Several actions are being undertaken by the Caribbean Meteorological Organization (CMO) to increase information exchange between hydrometeorological offices and indigenous peoples and local communities. Examples are: developing internships to allow indigenous youth to connect with their communities; reporting what fellow farmers are advising in the climate smart advisories from the meteorological office; reporting moon phases in the meteorological institute's monthly bulletin; encouraging the Caribbean Tourism Association, the Caribbean Public Health Agency (CARPHA), CDEMA and other institutions to incorporate indigenous delegates in their processes related to climate change sensitive sectors; promoting the incorporation of ILK in the annual meetings of the Caribbean Meteorological Council; and, connecting communities with funding opportunities and other kinds of climate support.
- The activities of the Fund for the Development of Indigenous Peoples of Latin America and the Caribbean (FILAC) were noted, particularly those activities that draw on ILK to develop adaptation strategies.
- The EU-funded project on participatory 3D mapping (P3DM) that was implemented with fishermen and fishing companies helps to provide a basis for adaptation planning. The P3DM project has as goal the promotion of integrated ocean and participatory governance in Guyana and Suriname as the "eastern gate to the Caribbean".

- Cooperative projects working to map, document, preserve and improve the genetic diversity of traditional food crops also benefit farmers, as such projects enhance their resilience options and overall adaptive capacity. The contribution of the Caribbean Agricultural Research and Development Institute (CARDI), including a project on traditional pepper species in Belize, was noted.

Presenters furthermore mentioned relevant provisions in international agreements. Among others, the Revised Treaty of Chaguaramas, that in Article 66 on the protection of intellectual property rights, trade and development, mentions the need to establish mechanisms to ensure preservation of indigenous Caribbean culture and legal protection of folklore, and heritage, particularly of indigenous knowledge. The 1994 Barbados Programme of Action for the Sustainable Development of SIDS also calls for the protection of indigenous knowledge, direct and fair benefit sharing, and support for the involvement of NGOs, women and major groups in biodiversity and biotechnology. The 2014 SAMOA Pathway moved its focus from biodiversity to bio-culture; and pledged to support domestic mechanisms to conserve, promote, protect and preserve their natural, tangible and intangible cultural heritage practices and traditional knowledge. The workshop participants were also informed of the Pawanka Fund, an indigenous-led programme supporting local initiatives to strengthen traditional knowledge, and of the proclamation, in 2017, of a Caribbean Network of Indigenous and Tribal Peoples.

Many participants touched on the need to improve communication with communities in understandable and useful forms, which encompasses not only the use

of easily understandable information in appropriate indigenous or local languages, but also information oriented to suggest actions that could be undertaken. This logic is often found in ILK transmitted by, for example, local sayings. In Cuba, local communities say, for example: “In January, keep your bread for May and fodder for your horse”. Another suggestion made for climate information to become meaningful consisted in communicating standard meteorological quantitative information, such as how many millimeters of rain is expected to fall, together with appropriate quantitative approaches, such as that the expected amount of rainfall will be “much more than average for this time of the year”. Information about what others are advising in this regard or giving specific preparatory warnings could also be considered.

The workshop stressed that knowledge exchange is of crucial importance. Knowledge and practices from indigenous peoples and local communities are increasingly used and shared to cope with climate change, for example, the use of bio-indicators, resistant native seeds, and agricultural and fishing management. The more elements, needs or interests that indigenous and local communities have in common and that are shared at national, regional and international level, the more impact they can have. A general conclusion echoed earlier observations that the development and implementation of policies to address the impacts of climate change and extreme climatic events has been done largely without the effective engagement of indigenous peoples and local communities.

6. Recommendations

The workshop generated recommendations, which have been grouped under the following categories. Their implementation will require multi-sectoral approaches and multiple actors at different levels.

- Mobilizing/engaging with ILK
- Needs of local communities and indigenous peoples
- Academic and scientific community
- Synergies between ILK systems and meteorological and climate information services
- Regional and international bodies and governments.



Indigenous peoples and local communities presented their recommendations during the Highlevel meeting. © Khalissa Ikhlef / UNESCO

6.1 Mobilizing/engaging with ILK

The general recommendations reflect the key issues brought up in relation to ILK and climate change in the Caribbean region, and the relation between traditional knowledge systems and mainstream sciences.

- Value and promote the recognition of indigenous peoples' rights, worldviews, cultures, languages, ancestral governance systems and own development models as vital conditions for using, maintaining and strengthening resilient ILK systems which in turn are vital for their existence, subsistence, cultures, integrity and food security, among others;
- Promote and foster greater understanding and respect for indigenous peoples' and local communities' traditional knowledge systems, within their holistic context involving their worldviews, cultural and spiritual beliefs and practices, and with a rights-based approach;
- Continue this work on creating spaces for discussion, experience sharing, knowledge exchange and supporting greater inclusion of ILK systems in policy-making processes, thus contributing to the best available scientific and traditional knowledge, as agreed in the 2015 Paris Agreement;
- Continue the work on the promotion and recognition of the relevance of ILK for policy making and resilience;
- Promote the recognition of ILK systems as equal in value to mainstream sciences;

- Avoid “extractive” research or knowledge exchange models in which traditional knowledge is only extracted and separated from its holistic context to be used by others, but rather adopt models that are geared towards mutual benefits and based on respect for the rights and interests of indigenous peoples and local communities;
- Engage spiritual and ceremonial aspects and respect for Mother Earth in knowledge exchanges, and increase opportunities for intercultural and intercommunity knowledge exchanges;
- Promote the recognition of the fact that ILK is held and transmitted differently by different actors and different holders including women, men, elders, youth, fishers, farmers, hunters etc., and supporting interventions should accordingly and consistently consider gender, children and LGBT issues in such processes;
- Respect that not all components of ILK can or should be shared outside the community, and empower indigenous peoples and local communities to take informed decisions on what to share or not.
- Create spaces for intergenerational dialogue with and within indigenous peoples and local communities; Undertake a series of capacity-strengthening, information-exchange and strategizing workshops for indigenous and local community leaders in the Caribbean region to update on global processes, climate change, the Sustainable Development Goals (SDGs), the UN Convention on Biological Diversity (CBD) and its Nagoya Protocol on Access and Benefit-sharing, the International Year of Indigenous Languages (IYIL), the recently adopted International Decade on Indigenous languages (IDIL), as well as to coordinate international indigenous agendas with regional and national ones;
- Continue and strengthen advocacy and contribution of ILK to policy-making processes, among others through strategic partnerships and a “civil society agenda on climate change”;
- Proactively take measures for the effective participation of indigenous and local community knowledge holders, especially women, in policy-making processes;

6.2 Needs of indigenous peoples and local communities

- Continue and strengthen indigenous peoples’ and local communities’ work on indigenous, local and traditional knowledge;
- Promote cross-cultural and intercommunity knowledge exchanges;
- Proactively engage indigenous and local community youth and support the intergenerational transmission of indigenous languages, because ILK is embedded in language;
- Include indigenous languages in mainstream education and enhance the recognition of indigenous models of education as a viable and legitimate form of education;

- Increase capacity-building opportunities for indigenous and local community scientists, and traditional knowledge holders, both traditional and mainstream, including possibilities of scholarships and internships for indigenous and local community students, among others, in national and regional meteorological and climate institutes and universities;
- Develop methods for ensuring security and access for indigenous and local community women working in climate services and for vulnerable women when traveling longer distances due to climate impacts;
- Value and recognize indigenous governance systems in coastal management and fisheries management systems;
- Continue to support participatory data mapping activities by indigenous peoples and local communities to promote the use of data to strengthen customary decision-taking processes, and to advocate in national and international policy spaces;
- Promote local actions focused on local level solutions for weather and climate challenges, e.g. forest monitoring by local forest communities;
- Promote the establishment of cultural institutions to bolster the transmission of indigenous peoples' and local communities' traditional knowledge and practices;
- Maintain the diversity of livelihoods and activities to adapt to unforeseen climatological situations, e.g. in hunting, fishing and gathering;

- Ensure that hydrometeorological information is shared with indigenous peoples and local communities, in understandable forms and languages and that it is also accessible for remote indigenous peoples and local communities;



The Caribbean Community (CARICOM), through the Caribbean Meteorological Organization, aims to increase information exchange between hydrometeorological offices and indigenous peoples and local communities. © Khalissa Ikhlef / UNESCO

- Strengthen the adequate representation and effective participation of indigenous peoples and local communities and inclusion of their perspectives and knowledge in disaster management bodies and processes;
- Strengthen the networking of Caribbean indigenous peoples and local communities and their involvement in information exchange with global policy debates;
- Strengthen the work of the LCIPP in the Caribbean region and improve mechanisms to reach the local and indigenous community level;

6.3 Academic and scientific community

- Undertake and facilitate more collective work between indigenous peoples and local communities and academic institutions, including on indigenous peoples' practices and research methodologies that are sensitive to the rights and perspectives of indigenous peoples and local communities;
- Include indigenous peoples' perspectives in formal education and research institutions, but also promote indigenous educational models, including on, among others, indigenous governance, natural resources management, cultures, and importantly, indigenous languages;
- Strive to build a critical mass of scientists that cooperate on equal footing with traditional knowledge holders and their communities;
- Promote the awareness of government bodies on differences in adaptation needs and actions, diversified to different peoples, locations, vulnerabilities and solutions;
- Include indigenous peoples' perspectives and methodologies in mainstream science education, research and practices, while respecting indigenous peoples' data knowledge governance.

6.4 Greater synergy between ILK systems and meteorological and climate information services

- Proactively create more spaces and opportunities for dialogue between actors of ILK systems and mainstream sciences;
- Establish an observer status for local communities and indigenous peoples within the Caribbean Community Climate Change Center (CCCCC) and other relevant Caribbean institutes;
- Strive towards greater cooperation of indigenous peoples and local communities within the Caribbean meteorological institutes as well as in relation with and within the African, Caribbean and Pacific Group of States (ACP);
- Promote the wider provision in the Caribbean region of climate services in which there is participation of or cooperation with indigenous peoples and local communities;
- Include traditional knowledge indicators, as appropriate and with the consent of the knowledge holders, in meteorological bulletins and other informational materials, including in indigenous languages;
- Recognize, and where appropriate, formally use traditional forecasting knowledge systems as a local coping mechanism through cross-fertilization with scientific forecasting.

6.5 Regional and international bodies and governments

- Promote the inclusion of gender aspects in the LCIPP.
- Present the outcomes of this dialogue to future UNFCCC COPs as well as to pre-COP indigenous caucus meetings;
- Undertake an inventory on whether and how regional and international processes/conventions/institutions related to climate change are implementing indigenous peoples' participatory mechanisms in their decision-making processes, in order to enable the contribution of ILK to the "best available knowledge" as encouraged by the Paris Agreement;
- Promote and facilitate further dialogues such as this workshop where indigenous and local community participants, as well as experts from meteorological and hydrological services and institutions dealing with climate change, share and exchange their perspectives, experiences and proposals;
- Ensure that the climate interventions are agreed with indigenous peoples and local communities from the beginning of the process and that the benefits of these interventions are shared with them at the local level;
- Promote strategic partnerships, such as the one recommended by the WMO Geneva Declaration of 2019 on public-private-academia partnerships, including citizen scientists from indigenous peoples and local communities.



Presentations by indigenous peoples and local communities put forward common problems they face in the region. © Khalissa Ikhlef / UNESCO

Annex A: List of participants

INDIGENOUS AND COMMUNITY KNOWLEDGE EXPERTS

Mr Ángel Jesús SULUB SANTOS

(Mexico Case Study)

Institutional affiliation: Raxalaj Mayab

angel.sulub.santos@hotmail.com

Ms Candice RAMKISSOON

(Anguilla and Montserrat Case Study)

Institutional affiliation: The Caribbean Natural Resources Institute (CANARI)

candice@canari.org

Ms Debora LINGA

(Suriname Case Study)

Institutional affiliation: Tribal Peoples Development

deboralinga@gmail.com,

deboralinga@tribalpeoplesdevelopment.com

Ms Dominique Mariflor DAVID-CHÁVEZ

(Puerto Rico Case Study)

Institutional affiliation: Native Nations Institute/National Science Foundation Postdoctoral Fellow, Udall Center for Studies in Public Policy at University of Arizona Colorado State University Postdoctoral Research Fellow, Forest and Rangeland Stewardship Dept. (located on Nunt'zi (Ute), Inunaina (Arapaho), and So'taa'e (Cheyenne) traditional homelands)

dmdchavez@email.arizona.edu

Ms Froyla TZALAM

(Belize Case Study)

Institutional affiliation: Alternate representative of the SIDS Region for the UNFCCC Facilitative Working Group of the Local Communities and Indigenous Peoples Platform (LCIPP) Sarstoon Temash Institute for Indigenous Management

fetzalam@gmail.com

Mr Juan Carlos Rosario MOLINA

(Cuba Case Study)

Institutional affiliation: Centro Universitario Municipal de Contramaestre, Universidad de Oriente, Santiago de Cuba

juank@uo.edu.cu

Ms Kristie Sheneice ALLEYNE

(Eastern Caribbean Case Study)

Research Assistant, Centre for Resource Management and Environmental Studies, Barbados

kstalleyne@gmail.com

Mr Maximiliaan OOF T

(Rapporteur of the event)

Institutional affiliation: Association of Indigenous Village Leaders (Vereniging van Inheemse Dorpshoofden in Suriname – VIDS)

ooftmax@hotmail.com

Ms Myrna CUNNINGHAM

(Nicaragua Case Study)

Institutional affiliation: President of the Fund for the Development of Indigenous Peoples of Latin America and the Caribbean (FILAC)

myrna.cunningham@cadpi.org

Mr Nathaniel RODNEY GILBERT

(Bahamas Case Study)

Institutional affiliation: Young Marine Explorers (YME)

Nathanielgilbert1962@outlook.com

Ms Remedios URIANA

(Colombia Case Study)

Institutional affiliation: Pueblo Wayúu

remediosuriana@hotmail.com

Mr Romario Dwayne HASTINGS

(Guyana Case Study)

Institutional affiliation: Environmental Officer, Land Resources Management, Environmental Protection Agency (EPA)

romario_hastings@yahoo.com

Ms Ruth SPENCER

(Antigua and Barbuda Case Study)

Institutional affiliation: GEF/SGP National Coordinator, Deputy Director-voluntary for the MEPA Trust

ruthspencer5@gmail.com

Ms Zoila BROWNE

Institutional affiliation: Technical Director of the Garifuna Heritage Foundation of St. Vincent and the Grenadines Garifuna Heritage Foundation

yurumeiconference@gmail.com

SCIENTIFIC EXPERTS

Ms Arlene LAING

Institutional affiliation: Coordinating Director of the Caribbean Meteorological Organization (CMO)

alaingcmo@gmail.com

Mr Carlos FULLER

Institutional affiliation: International and Regional Liaison Officer, Caribbean Community Climate Change Centre (CCCCC)

cfuller@caribbeanclimate.bz

Ms Gladys HERNÁNDEZ-PEDRAZA

Institutional affiliation: Center for Research on the World Economy (Centro de Investigaciones de la Economía Mundial, CIEM)

gladys@ciem.cu

Mr Mannava SIVAKUMAR

Institutional affiliation: Independent Senior Consultant for the World Meteorological Organization, World Bank and UNESCO, Founding Editor-in-Chief, Weather and Climate Extremes (Elsevier)

mannavas@gmail.com

GUYANESE INSTITUTIONS

Ms Alona SANKAR

Institutional affiliation: Commissioner (ag), Guyana Wildlife Conservation

Ms Anette ARJOON-MARTINS

Institutional affiliation: Head, Guyana Marine Conservation Society

Mr Calvin BERNARD

Institutional affiliation: Dean, University of Guyana, Centre for the Study of the Biological Diversity

Mr Dane GOBIN

Institutional affiliation: Head, Iwokrama International Centre

Mr David JAMES

Institutional affiliation: Special Assistant on legal issues, Ministry of Indigenous Peoples Affairs

davidjames.lawgy@gmail.com

Mr David SINGH

Institutional affiliation: Former Commissioner, Conservation International

Ms Deirdre JAFFERALLY

Institutional affiliation: In Country Coordinator, Darwin Initiative: Integrating Traditional Knowledge into National Policy and Practice, Ministry of Indigenous Peoples Affairs

Ms Denise FRASER

Institutional affiliation: Commissioner, Protected Areas Commission

Ms Janelle CHRISTIAN

Institutional affiliation: Head, Office of Climate Change

Mr Joseph HARMON

Institutional affiliation: Director General, Ministry of Presidency

Ms Kezia RICHARDS

Institutional affiliation: Subject Specialist (Science), National Centre for Education & Research Development (NCERD)

Mr Kemraj PARSRAM

Institutional affiliation: Executive Director (ag), Environmental Protection Agency

Mr Komalchand DHIRAM

Institutional affiliation: Specialist meteorologist (on behalf of Mr Garvin CUMMINGS, Director General of the National Meteorological Services in Guyana)

Ms Ndibi SCHWIERS

Institutional affiliation: Director, Department of Environment

Hon. Nicolette HENRY

Institutional affiliation: Minister of Education, Responsibilities for Guyana National Commission for UNESCO

Ms Odacy DAVIS

Institutional affiliation: Deputy Commissioner, Protected Areas Commission

Ms Patrice LAFLEUR

Institutional affiliation: Secretary General, Guyana National Commission for UNESCO

Ms Paulette BYNOE

Institutional affiliation: Senior Lecturer, University of Guyana

Hon. Sydney ALLICOCK

Institutional affiliation: Vice President & Minister, Ministry of Indigenous Peoples Affairs

Mr Raphael TROTMAN

Institutional affiliation: Minister, Guyana
Geology & Mines Commission

Mr Trevor BENN

Institutional affiliation: Commissioner,
Guyana Lands & Survey

Hon. Valerie GARRIDO-LOWE

Institutional affiliation: Minister within the
Ministry, Ministry of Indigenous Peoples
Affairs

**INTERNATIONAL
ORGANIZATIONS**

Ms Amrikha SINGH

Institutional affiliation: Programme Manager,
Sustainable Development, CARICOM,
amrikha.singh@caricom.org

Ms Gillian SMITH

Institutional affiliation: FAO Representative,
Acting UN Resident Coordinator (tbc)

Mr Kareem SABIR

Institutional affiliation: CARICOM
kareem.sabir@caricom.org

Ms Shunae SAMUELS

Institutional affiliation: CARICOM
shunae.samuels@caricom.org

Ms Vanessa KEWLEY

Institutional affiliation: CARICOM
vanessa.kewley@caricom.org

Ms Khalissa IKHLEF

Institutional affiliation: SIDS Focal Point,
Small Islands and Indigenous Knowledge
Section (SII/PCB), UNESCO
k.ikhlef@unesco.org

Ms Peggy OTI-BOATENG

Institutional affiliation: Director, Division of
Science of Policy and Capacity Building
(PCB), UNESCO
p.oti-boateng@unesco.org

Ms Veronica GONZALEZ GONZALEZ

Institutional affiliation: LINKS programme,
Small Islands and Indigenous Knowledge
Section (SII/PCB), UNESCO
v.gonzalez-gonzalez@unesco.org

Annex B: Agenda

WORKSHOP WITH LOCAL COMMUNITIES AND INDIGENOUS PEOPLES 3-4 September, 2019

Day 1: Tuesday 3 September, 2019

Session 1	09:00 – 10:00	Opening session <ul style="list-style-type: none">• Welcoming Ceremony by a Guyanese indigenous elder• Introductory speech by Ms Gillian SMITH, FAO Representative, Acting UN Resident Coordinator• Welcome by Ms Patrice LAFLEUR, Secretary General, Guyana National Commission for UNESCO• Opening remarks by Ms Khalissa IKHLEF, Small Island and Indigenous Knowledge Section, UNESCO• Overview of UNFCCC's Local Communities and Indigenous Peoples Platform (LCIPP) by Ms Froyla TZALAM, Alternate Representative of the SIDS region for the UNFCCC Facilitative Working Group of the LCIPP
Session 2	10:00 – 10:30	Introductions <p>Ice-breaker and introductions Setting the Scene: Introduction, meeting objectives and expected outcomes</p> <ul style="list-style-type: none">• Ms Khalissa IKHLEF, UNESCO• Ms Veronica GONZALEZ GONZALEZ, UNESCO
	10:30 – 11:00	Coffee break
Session 3a	11:00 – 12:30	ILK systems in the Caribbean <p>Case studies will be presented in three sessions in order to identify key unique characteristics about ILK in the Caribbean</p> <ul style="list-style-type: none">• Presentation on Guyana Case Study by Mr Romario Dwayne HASTINGS• Presentation on Belize Case Study, by Ms Froyla TZALAM• Presentation on Suriname Case Study, by Ms Debora LINGA• Presentation by Nicaragua Case Study, by Ms Myrna CUNNINGHAM
	12:30 – 14:00	Lunch
Session 3b	14:00 – 15:30	ILK systems in the Caribbean (continued) <ul style="list-style-type: none">• Presentation on Eastern Caribbean Case Study, by Ms Kristie Sheneice ALLEYNE• Presentation on Cuba Case Study, by Mr Juan Carlos MOLINA• Presentation on Bahamas Case Study, by Mr Nathaniel RODNEY GILBERT (Skype)• Presentation on Antigua and Barbuda Case Study by Ms Ruth SPENCER• Presentation on Anguilla and Montserrat Case Study, by Ms Candice RAMKISSOON
	15:30 – 16:00	Coffee break

Session 4 16:00 – 17:00 **Parallel sessions of working groups 1, 2 and 3**
Participants will be divided into 3 working groups

Working Group 1: Community-based fisheries and coastal management

Moderator: Ms Khalissa IKHLEF, UNESCO

This session explores indigenous and local, small-scale fisheries knowledge and its relevance for improved science and management in fisheries. The aim is to develop key messages that address:

- Case studies/examples on how Caribbean fishers' knowledge is already being used to expand and strengthen fisheries, science and management.
 - A reflection on the impacts of climate change in fishers' resources and communities of the Caribbean – what is your experience?
 - The measures and initiatives that are being undertaken within and with fishers' communities – are there ways that their knowledge can be brought into national, regional and international discussions/decisions/assessments?
 - What new actions or partnerships could help improve fishers' community resilience?
-

Working Group 2: Community-based inland farming

Moderator: Mr Mannava SIVAKUMAR, Independent Senior Consultant

This session explores indigenous and local, inland farming knowledge and its relevance for improved science and management in farming. The aim is to develop key messages that address:

- Case studies/examples on how Caribbean farmers' knowledge is already being used to expand and strengthen agriculture, science and management.
 - A reflection on the impacts of climate change in the inland farmers' resources and communities of the Caribbean – what is your experience?
 - The measures and initiatives that are being undertaken within and with inland farmers' communities – are there ways that their knowledge can be brought into national, regional and international discussions/decisions/assessments?
 - What new actions or partnerships could help improve farmers' resilience?
-

Working Group 3: Safeguarding community knowledge systems

Moderator: Ms Peggy OTI-BOATENG, UNESCO

This session aims to develop key messages that address the following topics:

- A reflection on the state of ILK of the environment and climate in the Caribbean
 - Is community knowledge at risk? Are there threats to inter-generational transmission of knowledge?
 - What activities or partnerships could help reinforce ILK and the institutions that sustain and transmit such knowledge?
-

Session 5 17:00 – 18:00 **Reporting from working groups 1, 2 and 3**

Day 2: Wednesday 4 September, 2019

Session 3c 09:00 – 10:30

ILK systems in the Caribbean (continued)

- Presentation on Puerto Rico Case Study, by Ms Dominique Mariflor DAVID- CHÁVEZ
- Presentation on Colombia Case Study, by Ms Remedios URIANA
- Presentation on Mexico Case Study by Mr Ángel Jesús SULUB SANJOS
- Presentation on an African perspective, by Ms Veronica GONZALEZ-GONZALEZ

10:30 – 11:00

Coffee break

Session 6 11:00 – 12:30

Parallel sessions of working groups (continued)

Working Group 4: Environmental hazards management: mapping hazard threats and damage recovery through ILK

Moderator: Mr Mannava SIVAKUMAR

Develop key messages that address:

- What are the main risks faced by local and indigenous communities in the Caribbean?
- How are ILK mobilized in order to be prepared to cope with those events?
- How do ILK assess damage and facilitate recovery after the events?

Working Group 5: Understanding vulnerabilities and resilience inside communities: a gender perspective

Moderator: Ms Myrna CUNNINGHAM

Develop key messages that address:

- Are men and women holders of different sets of knowledge?
- Do they make different observations? Do they have different concerns?
- Are women and men vulnerable in different ways?
- What is women's role in regards to ILK transmission?
- How could ILK boost women and girls' resilience?

Working Group 6: How can ILK enhance meteorological and climate information and services?

Moderator: Mr Carlos FULLER

Develop key messages that address:

- What experience do communities have with scientific weather information and services? Do they have access to them? Can they mobilize them in their decisions?
- What do communities need to know about weather and climate in order to cope and adapt to climate change in a way that respects their livelihoods?
- Can scientific climate information provide relevant information for communities to adapt to climate change?
- Gaps and synergies between scientific and indigenous and local weather and climate information.

12:30 – 14:00

Lunch

Session 7 14:00 – 15:00 **Reporting from Working Groups 4, 5 and 6**

Session 8 15:00 – 16:00 **Climate change and the Caribbean**
Presentations will discuss the overall impacts of climate change for the region, and major global and regional initiatives to address climate change at the local level

- Mr Garvin CUMMINGS, Director General of the National Meteorological Services in Guyana
- Ms Froyla TZALAM, Alternate representative of the SIDS Region for the UNFCCC Facilitative Working Group of the Local Communities and Indigenous Peoples Platform (LCIPP)
- Mr Carlos FULLER, Caribbean Community Climate Change Centre (CCCCC)
- Ms Arlene LAING, Coordinating Director of the Caribbean Meteorological Organization (CMO)

16:00 – 16:30 Coffee break

Session 9 16:30 – 17:30 **Dialogue between ILK holders and scientific experts**
Review the key messages from participants on what lessons are relevant for the Caribbean, what are the baselines for the region and what kind of collaboration in knowledge co-production? What are the pathways for linking ILK and resilience strategies with policy making and working at larger scales?
Moderators: Ms Veronica GONZALEZ GONZALEZ and Ms Khalissa IKHLEF, UNESCO

- ‘Lessons learned’ from ILK resilience to climate change
- Opportunities for knowledge collaboration between ILK holders, scientists/experts/national or regional science-based systems

Session 10 17:30 – 18:00 **Recommendations and ways forward**

HIGH-LEVEL MEETING

5 September, 2019

09:00 – 09:30 **Opening**

- Welcome Ceremony by a Guyanese indigenous elder
- Welcome by Ms Patrice LAFLEUR, Secretary General of the National Commission for UNESCO
- Hon. Valerie GARRIDO-LOWE, Minister within the Ministry, Ministry of Indigenous Peoples Affairs
- Hon. Dr. Nicolette HENRY, Minister of Education
- Hon. Raphael TROTMAN, Minister of Natural Resources
- Ms Peggy OTI-BOATENG, Director, Division of Science Policy and Capacity Building, UNESCO
- Mr Max OOFI, Chief Rapporteur of the event

09:30 – 12:00 **Roundtable of experts: Mobilising knowledge systems to enhance community resilience – Ways Forward**

Moderator: Representative of the Guyanese Ministry of Indigenous Affairs

- Ms Froyla TZALAM, Alternate representative of the SIDS Region for the UNFCCC Facilitative Working Group of the Local Communities and Indigenous Peoples Platform (LCIPP)
- Mr Komalchand DHIRAM, Specialist meteorologist, on behalf of Mr Garvin CUMMINGS, Director General of the National Meteorological Services in Guyana
- Ms Gladys HERNÁNDEZ-PEDRAZA, Center for Research on the World Economy, on behalf of Mr Ramón PICHES MADRUGA, Vice-Chair of IPCC Working Group III
- Ms Amrikha SINGH, Programme Manager, Sustainable Development, CARICOM
- Ms Myrna CUNNINGHAM, President of the Fund for the Development of Indigenous Peoples of Latin America and the Caribbean (FILAC)
- Mr Carlos FULLER, International and Regional Liaison Officer, Caribbean Community Climate Change Centre (CCCCC)
- Ms Arlene LAING, Coordinating Director of the Caribbean Meteorological Organization (CMO)

CLOSING

- Ms Peggy OTI-BOATENG, Director, Division of Science Policy and Capacity Building, UNESCO
- Ms Khalissa IKHLEF, Small Islands and Indigenous Knowledge Section, UNESCO
- Ms Veronica GONZALEZ GONZALEZ, LINKS programme, Small Islands and Indigenous Knowledge Section, UNESCO



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