

REPORT

UN Food Systems Summit

Global Dialogue

**Integrating Indigenous Knowledge with Emerging Technologies
To Enhance Sustainability and Resilience of Food System**

Held on
May 31st, 2021

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1. Overview

We would like to thank the Secretariat of the United Nations Food Systems Summit for offering us an opportunity to organize this unique Global Dialogue “Integrating Indigenous Knowledge with emerging technologies to enhance sustainability & resilience of food system” as part of the Summit preparatory process, which was held on May 31st, 2021.

The issues addressed by this Global Dialogue, focused on challenges and barriers that currently exist related to food systems and how Indigenous Peoples can contribute solutions combined with emerging technologies that can be adapted and replicated.

Additionally, the dialogue leveraged the ongoing efforts of the Scientific Advisory Group of the Summit, offering an opportunity to reconcile the resilient ancestral Indigenous Peoples knowledge with evidence based scientific knowledge.

The outcome from the discussions from Panels covering all five Action Tracks reflected both the policy issues as well potential workable and replicable solutions, and new development model for improving the food security for Indigenous People.

Thus, this report offers the Secretariat of the United Nations Food Systems Summit focused feedback contributing to the planning of the Pre-Summit in July and the main Summit in September 2021.

Co-organized by CANEUS, FILAC, and UNOOSA, these efforts were a highly enriching and inspiring experiences bringing together complementary competences of Indigenous Peoples worldwide with those from the frontier technology communities who work with them.



The Dialogue was supported by 18 experts from 12 countries representing Americas, Asia, Africa, and Europe. Overall, the Dialogue achieved its intended goals, and we look forward to advancing these efforts through the Summit process.

2. Objectives:

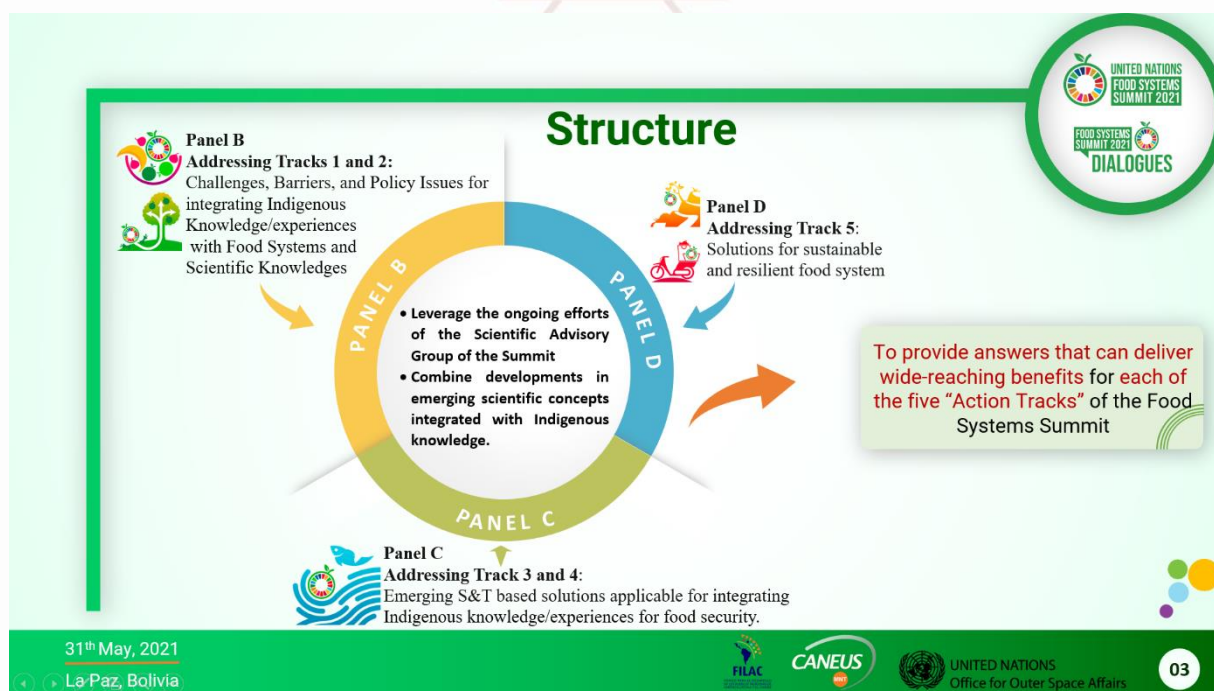
The goals of this “Global Dialogue” were:

1. To demonstrate that indigenous ancestral knowledge and aspects linked to Science and Technology can contribute to the achievement of the Food Systems Summit objective.
2. To promote a dialogue from the perspectives of Indigenous Peoples and aspects of science and technology that can demonstrate that these two aspects can synergize and contribute to more inclusive food systems.
3. To link the technical scientific aspects with the resilient ancestral knowledge of Indigenous Peoples.
4. To make the regional collaborative effort using lessons learned during the Covid-19 pandemic, as scalable and replicable worldwide, with the aim of addressing technological inequalities among Indigenous Peoples, techno-cultural complexities and the role of emerging tools and solutions based on Earth Observation and Artificial Intelligence that have great relevance to complement Indigenous knowledge for the economic, social, and environmental dimensions of sustainable development.



3. Structure:

The dialogue was structured to identify solutions that can deliver wide-reaching benefits for each of the five “Action Tracks” of the Summit:



- Action Track 1: Ensure access to healthy and nutritious food for all.
- Action Track 2: Adopt sustainable consumption patterns.
- Action Track 3: Promote nature-friendly production.
- Action Track 4: Promote equitable livelihoods.
- Action Track 5: Building resilience to vulnerabilities, shocks, and stresses.

4. Setting the Stage:

In her opening remarks, Ms. Simonetta Di Pippo, Director of United Nations Office for Outer Space Affairs (UNOOSA), highlighted the significance and importance of emerging technologies in the context of indigenous knowledge for food security.

Food security is a global challenge, and global challenges require global representation. We must strive to be more inclusive and embrace diversity in these global dialogues, fostering diverse viewpoints and solutions.

Here, we have indeed an opportunity to apply novel solutions thanks to science, technology, and innovation to address the challenges and burdens our food systems bear.

In this respect, space assets certainly deserve recognition. Space technologies are vital enablers for raising farm productivity and efficiency. For example, Geospatial information we receive from remote sensing satellites and the applications we derive from this data have transformed our agricultural practices.

Remote sensing satellites monitor snow cover, support rainfall assessments, inform farmers on harvest timings, and help predict a region anticipate and mitigate the effects of food shortages, to name but a few examples.

The combination of satellite navigation and Earth observation data helps farmers raise yields by more than 10%. Simultaneously, space solutions considerably cut input costs by up to 20%, including fertilizer, fuel, and pesticides – contributing to the climate action effort by preserving land and soil quality.

Space activities are, in a sense, game-changers and it is indeed great to see the list of the benefits they enable continually grow with the progress in the space sector. As more data and information translate to actionable services, applications, policies, and decisions, this empowers us to create the future we want.

However, there are still gaps we need to overcome. What hinders our collective progress is the lack of universal access to space assets and their associated benefits. We cannot leave indigenous people behind. We must embrace them, and we must ensure their voices are heard.

This is where UNOOSA steps in, as the only entity in the UN system dedicated to space affairs, bridging this space divide, enabling the establishment and growth of space activities in all UN Member States, but especially in emerging and developing contexts.

An integrated system approach, where we work collectively and leverage all available tools, to advance sustainable development has tremendous potential. By combining enduring knowledge from indigenous peoples with space assets, artificial intelligence, blockchain, citizen science, and other solutions, we maximize the prospects of delivering smart, more efficient, and sustainable agricultural practices for all.

Indeed, achieving this outcome can deliver wide-ranging benefits transcending across all five action tracks of the summit. The 2021 Food Systems Summit is an opportunity to merge new technologies and solutions with the knowledge of rural people from across the world.

5. Outcome and Recommendations from Panels Addressing Tracks 1 to 5

5.1 Addressing Tracks 1 and 2:

Challenges, Barriers, and Policy Issues for integrating Indigenous Knowledge/experiences with Food Systems and Scientific Knowledges

Moderator

Dr Ms. Patricia Palma de Fulladolsa, Director, PROGRESAN-SICA II

Panelist:

- Dr. Yon Fernández-de-Larrinoa, UN Food and Agriculture Organization (FAO), Leader of the FAO Indigenous Peoples Team
- Dr. Mattia Prayer Galletti, International Fund for Agricultural Development (IFAD)
- Dr. Philip Loring, University of Guelph, anthropologist and ecologist, Canada



Track 1



Track 2

Discussion Synthesis – Main Findings:

Panelists will provide insights on the challenges, barriers and policy options needed to integrate indigenous knowledge and scientific knowledge into food systems, including a new development model to improve food security for Indigenous Peoples. They reflected on the needs for sustainable food systems that are more inclusive and address population issues holistically.

Discussion Results-Recommendations:

- Technology innovation —driven by geotagging, agrotagging, Earth observation, machine learning, and ICT-enabled citizen science, mapping new consumerism —which provides essential entry points for integrating the local knowledge and indigenous intelligence for site-specific advisory, access to services/information that benefits the remote and smallholder farmers and consumers while safeguarding the environmental flows.
- Implementation of low-cost technology solutions may be shared with indigenous populations to improve data quantity and quality.
- Collaborative efforts focusing on resilience plans have the greatest benefits.
- The availability of space-based data may be used to substantially improve such plans when combined with information from indigenous populations.
- The frequency and availability of space-based data may aid indigenous populations in making better decisions about crop management/resilience.



5.2 Addressing Tracks 3 and 4:

Emerging S&T based solutions applicable for integrating Indigenous knowledge/experiences for food security.

Moderator:

Dr. Shirish Ravan, UNOOSA

Panelists:

- Dr. Chandrashekhara Biradar, ICARDA- A CGIAR Research Center
- Prof. Talbot Brooks, Delta State University
- Dr. Ms. Tania Eulalia Martinez-Cruz, University of Greenwich

Main topics covered:

- Indigenous community-based food security: A learning experience from Cree and Dene First nation Communities
- Indigenous methods of food preparation as a viable means of achieving food security and nutrition in rural poor communities.
- Development and implementation of programs that target food security using Indigenous knowledge and an intercultural perspective.
- No Action Track of the UNFSS can be achieved if the rights to lands and waters for indigenous peoples are not first guaranteed.
- Game changers were proposed using a white paper written by the Global Hub on Indigenous Peoples Food Systems and based on the experiences from more than 60 contributors around the world



Track 3



Track 4



Discussion Synthesis and Main Findings:

First of all, no action track will achieve its goals and objectives as far as the right to self-determination of Indigenous Peoples is not guaranteed as well their rights to their lands and waters. Many of the technologies and indigenous knowledge is preserved within Indigenous Peoples territories and with the daily use of their language and this is how they pass the knowledge from one generation to other. Thus, it becomes imperative to respect their right to self-determination, lands and waters.

The discussion helped to define a workable and replicable new development model for integrating emerging science and technology (S&T) based solutions with Indigenous knowledge. The panelists discussed ongoing efforts and new ideas based on their experience in using S&T, especially E Earth Observation (EO) and ICT based tools for food security and food system transformation.

It advocated the use of innovations to integrate indigenous knowledge and wisdom for better diet diversity, farming systems and planetary health, and use of Earth Observation and frontier technologies to investigate and integrate Indigenous knowledge for food and nutritional security.

Discussion Results:

Disasters are becoming more frequent with climate change and are a significant risk to food security – a risk that is only increasing due to global changes in climate. UN FAO recorded an increase in dollar-cost crop loss in Small Island Developing States (SIDS) from \$8.8 Bn for the 2000-2007 time to \$14 Bn for 2008-2015 (UN-FAO). Crop loss in Latin America and the Caribbean was estimated at \$22 Bn for 2005-2015 (UN-FAO).

While most of the present diets and farming practices prescribed by yield centric with few monocropping systems are far from the traditional knowledge and wisdom-later rely on the diversity of life, agrobiodiversity, nutrient-rich crops, and food sovereignty.

These risks need to be handled by understanding symbiotic relationship of 5 elements, the soil, water, air, flora, and fauna. Indigenous wisdom and rights on lands and waters are essential for future smart food and diet diversity, which is driven by indigenous knowledge in synch with emerging technologies. The Global Hub on Indigenous Peoples' Food Systems recommends:

1. Guaranteeing the right to self-determination of Indigenous Peoples, rights to their lands and waters through policies and reforms will ensure that Indigenous Peoples could advance to more equitable livelihoods. Supporting networks of Indigenous Peoples will also ensure they have a more active participation at policy level and to be included in the decision-making process.
2. Supporting increased biodiversity and implementing biocentric restoration centers. Resilience is strongly linked to biodiversity, so supporting indigenous communities to keep and restore their biodiversity is crucial not only for food security and nutrition but for life in general. One example of such initiatives is the Potato Park in Peru.

In natural systems, the production follows functions. There is an urgent need to leverage technology, diversity, and indigenous knowledge to restore the ecological sound food systems for healthy diets, sustainable living and planetary health. Technology is manured enough to make a difference which requires collective actions for system-level transformation- it must combine resilience, conservation, and restoration with co-benefits.

There are **two key drivers of technological innovations**, the recent advances in earth observation systems and the increased use of mobile phones –90% of the precision decision making data comes from these two technologies. The transformation requires an “Inclusive Agroecosystems” where use of science, technology help to rich the producers-farmers, connect them to consumers through an institutional framework that uses the digital technologies, enormous agricultural research with the ecological framework - diversification of agriculture with indigenous knowledge and wisdom of the right mixer of crops, varieties, multi-purpose trees, livestock, and people to preserve soil health and biodiversity. Scaling such transformational changes in the food systems requires digital augmentation for collective action to interlink various systems-level solutions for inclusive development.

50 years of Earth observation data coupled with local knowledge is a key to understand the impact of global climate change on food systems and indigenous people are the best stewards of climate balance. These efforts can benefit from space technologies, open data, and geo-intelligence linked with frontier technologies such as machine learning, 3-D printing, digital weather stations and the internet of things (IOTs).

Recommendations:

Panel provided recommendations that may be useful for harvesting indigenous knowledge, utilizing it, and promoting sustainable food production, distribution, and consumption.

- Ensure through policy making and institutional change that Indigenous Peoples rights to lands and waters is guaranteed. Respecting Indigenous Peoples' rights to self-determination is also crucial to advance to more equitable livelihoods and support their own processes to build and maintain more resilient communities.
- Technology innovation —driven by geotagging, agrotagging, Earth observation, machine learning, and ICT-enabled citizen science, mapping new consumerism —which provides essential entry points for integrating the local knowledge and indigenous knowledge (I am not comfortable with the world intelligence, could you explain what do you mean?) for site-specific advisory, access to services/information that benefits the remote and smallholder farmers and consumers while safeguarding the environmental flows.
- Involving and supporting Indigenous Peoples in the process of gathering data and evidence that supports the need to preserve their knowledge, lands, and waters. Those processes should also be led by Indigenous Peoples.
- Implementation of low-cost technology solutions may be shared with indigenous populations to improve data quantity and quality.
- Collaborative efforts focusing on resilience plans have the greatest benefits.
- The availability of space-based data may be used to substantially improve such plans when combined with information from indigenous populations.
- The frequency and availability of space-based data may aid indigenous populations in making better decisions about crop management/resilience.



5.3 Addressing Track 5: Solutions for Sustainable and Resilient Food System

Moderator:

Dr. Juan Carlos Méndez CATIE

Panelists:

5. **Prof. Ranjan Datta**, Canada Research Chair, Indigenous Studies, Department of Humanities, Mount Royal University
6. **Ms. Colleen Charles**, Woodland Cree from the Lac La Ronge Indian Band, La Ronge, Saskatchewan, Canada
7. **Ms. Francisca K.C Mwanda**, Zambia Agricultural Research Institute.
8. **Mr. Javier Aníbal León Guevara**, National Coordinator, Binational Adaptation Fund Project, World Food Program



Track 5

Main topics covered:

- Indigenous community-based food security: A learning experience from Cree and Dene First nation Communities
- Indigenous methods of food preparation as a viable means of achieving food security and nutrition in rural poor communities.
- Development and implementation of programs that target food security using Indigenous knowledge.

Discussion Synthesis and Main Findings:

This discussion section of the forum focused on Track 5: ***Building resilience to vulnerabilities, shocks, and stresses***, which had the objective of generating inputs and insights on challenges posed by climate change and extreme weather events that may impact the food systems, as well as discussing current efforts, mechanisms, and ideas based on using S&T tools for building resilient agriculture with focus on indigenous community, according to the concept note for this dialogue.

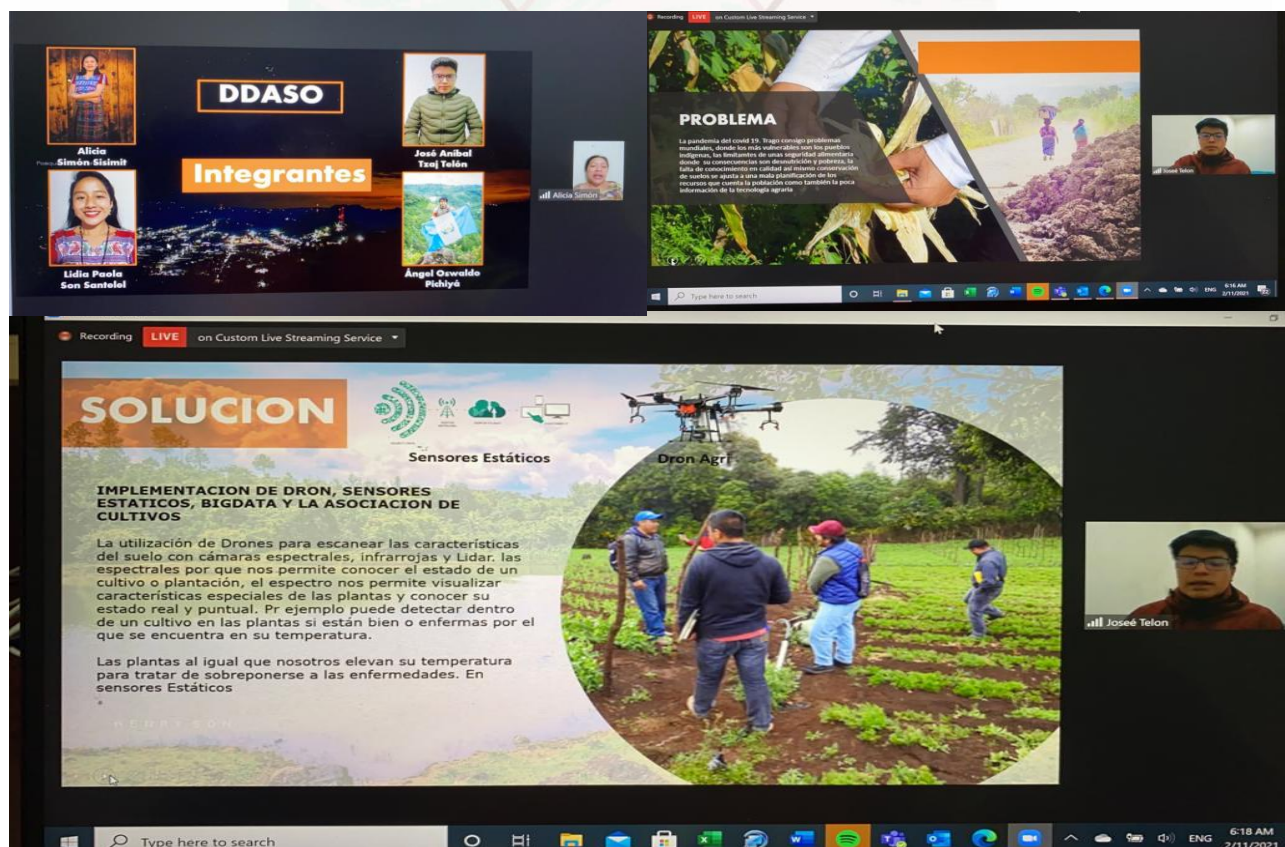
It is of crucial importance to open dialogues about the transmission of knowledge among young peoples of indigenous communities. There is a key role of carrying out the analysis work from their ancestral knowledge but at the same time under the lens of the recovery of this knowledge by the indigenous peoples themselves, especially from the oldest wise peoples to the youth, under their praxis and their own cosmovision.

The panelists highlighted the importance of positioning ancestral knowledge and technology under decolonial visions and debates, especially considering our approach to the terms of food security and the difference that exists between food security and food sovereignty. Looking at these concepts integrating the indigenous perceptions and not only from our western perspectives is a challenge that we need to take towards achieving a real participatory dialogue.

The challenges posed by climate change and its consequent extreme events in the sustainability of food systems of indigenous peoples require establishing bridges between research in science and technology and traditional/ancestral knowledge and practices. These knowledges for years were able to sustain the rich and healthy diet of the indigenous peoples. However, today we observe tendencies towards deterioration.

Through these spaces of dialogue, we aim to listen openly about what indigenous peoples have to say, which builds the necessary complementarity and synergy between technological innovations and traditional practices, to face the current situation that indigenous peoples experience due to the weakening of their food systems.

6. Next Steps:

DDASO

Integrantes

Alidia Simón Sismit
José Anibal Tzuj Tzuj
Lidia Paola San Santol
Ángel Oswaldo Pichiyá

PROBLEMA

La pandemia del covid 19, trajo consigo problemas mundiales, donde los más vulnerables son los pueblos indígenas, los habitantes de zonas marginales y los habitantes de zonas de conservación con alta biodiversidad. La falta de conectividad en zonas de alta biodiversidad y la falta de recursos que permitan a los productores acceder a la información de la tecnología agrícola.

SOLUCION

IMPLEMENTACION DE DRON, SENSORES ESTATICOS, BIGDATA Y LA ASOCIACION DE CULTIVOS

La utilización de Drones para escanear las características del suelo con cámaras espectrales, infrarrojas y Lidar. Las espectrales por que nos permite conocer el estado de un cultivo o plantación, el espectro nos permite visualizar características especiales de las plantas y conocer su estado real y puntual. Por ejemplo puede detectar dentro de un cultivo en las plantas si están bien o enfermas por el que se encuentra en su temperatura.

Las plantas al igual que nosotros elevan su temperatura para tratar de sobreponerse a las enfermedades. En sensores Estáticos

Sensores Estáticos

Dron Agri

6:18 AM
2/11/2021

Appendix: Program:

A. **Setting the Stage and *Raison d'être*:**

Moderator: Ms. Dali Angel, FILAC

- **Welcome and Overview:** Mr. Gabriel Muyuy, FILAC Technical Secretary
- **Prayers:** Ms. Sonia Astuhuamán, Prayers/ Coordinadora Andina de Organizaciones Indígenas CAOI
- **Objectives and Structure of the Dialogue:** Dr. Milind Pimprikar, Chairman, CANEUS
- "Space applications and solutions for food security": Ms. Simonetta Di Pippo, Director, UNOOSA
- "Food Systems Summit: An Opportunity", Dr Ms. Myrna Cunningham, President, FILAC

B. **Addressing Track 1 and 2: Challenges, Barriers, and Policy Issues for integrating Indigenous Knowledge/experiences with Food Systems and Scientific Knowledges**

Panel Input: The panelists will provide insight into challenges and barriers for Indigenous knowledge and necessary policies including new development model for improving the food security for Indigenous.

Moderator: Patricia Palma de Fulladolsa, directora, Programa de Sistemas de Información para la Resiliencia en Seguridad Alimentaria y Nutricional para la Región del SICA (PROGRESAN-SICA II)

Panelists:

- "Co-creating knowledge and evidence on Indigenous Peoples food systems: an approach", Mr. Yon Fernandez-de-Larrinoa, Agricultural Economist, FAO, Leader of the FAO Indigenous Peoples Team
- "New development model for improving the food security for Indigenous People." Mr. Mattia Prayer Galletti IFAD
- "Challenges and barriers" Prof. Dr. Philip Loring, respected anthropologist and ecologist, Professor, settler scholar living in Dish with One Spoon Territory, Guelph, Ontario, Canada.

C. **Addressing Track 3 and 4: Emerging S&T based solutions applicable for integrating Indigenous knowledge/experiences for food security.**

Panel Input: To help define and implement workable and replicable new development model for integrating emerging S&T based solutions with Indigenous knowledge. The panelists will discuss their current efforts and ideas based on their experience in using S&T, especially EO based tools for food security.

Moderator: Dr Shirish Ravan, UNOOSA, Vienna

Panelists:

- "Innovations to integrate indigenous wisdom for better diet diversity and planetary health", Dr. Chandrashekhar Biradar, International Center for Agricultural Research in the Dry Areas (ICARDA)
- Earth Observation and frontier technologies to investigate and integrate Indigenous knowledge for food security." Prof. Talbot Brooks, Delta State University, USA
- "Indigenous knowledge/experiences for food security." Dr. Tania Eulalia Martinez-Cruz University of Greenwich and a member of the Global Hub on Indigenous Peoples Food Systems

D. **Addressing Track 5: Solutions for sustainable and resilient food system**

Panel Input: The panelists will provide insight into challenges posed by climate change and extreme weather events that may impact the food systems and discuss current efforts, mechanisms and ideas based of using S&T tools for building resilient agriculture with focus on indigenous community.

Moderator: Dr. Juan Carlos Méndez CATIE

Panelists:

- Indigenous community-based food security: A learning experience from Cree and Dene First nation Communities, **Prof. Ranjan Datta**, Canada Research Chair, Indigenous Studies, Department of Humanities, Mount Royal University, and **Ms. Colleen Charles**, Woodland Cree from the Lac La Ronge Indian Band, La Ronge, Saskatchewan, Canada
- Indigenous methods of food preparation as a viable means of achieving food security and nutrition in rural poor communities, **Ms. Francisca K.C Mwanda**, Zambia Agricultural Research Institute.
- Development and implementation of programs that target food security using Indigenous knowledge, **Mr. Javier Aníbal León Guevara**, UN World Food Program, National Coordinator, Binational Adaptation Fund Project, Colombia and “**Dr Carla Mejia**, UN World Food Program’s Regional Nutrition Advisor Latin America and the Caribbean”.

E. **Outcome and Way forward:**

Summary from tracks 1 to 5 and contribution to the agenda and program of the Pre-Summit in July and the main Summit in September 2021

Moderator: Dr. Milind Pimprikar, CANEUS

Contributors: Moderators from Panels B, C and D above

- F. **Wrap up:** Closing Remarks
Mr. Gabriel Muyuy, FILAC Technical Secretary