



Virtual Workshop

09, 13, 14, & 15 October 2020

Workshop Report

Indigenous Food Systems, Biocultural Heritage and the SDGs

Challenges, interdisciplinary research gaps and empowering methodologies



Author information

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About the event

The workshop was part of the “Indigenous food systems, biocultural heritage and agricultural resilience” project funded by UK Research and Innovation via the Arts and Humanities Research Council (AHRC) and the Global Challenges Research Fund (GCRF). The project is implemented with Kenya Forestry Research Institute (Kenya), Lok Chetna Manch (India) and the Farmers’ Seed Network (China). We are grateful to the FAO Indigenous Peoples’ Unit and Asociación ANDES (Peru) for their guidance and important contributions to the workshop.

For more information about this report, or the Indigenous food systems, biocultural heritage and agricultural resilience project, visit www.iied.org/indigenous-food-systems-biocultural-heritage-agricultural-resilience, or contact Krystyna Swiderska at: krystyna.swiderska@iied.org.

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The Royal Botanic Gardens, Kew is a non-profit public body whose mission is “To understand and protect plants and fungi for the well-being of people and the future of all life on Earth”.

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Abbreviations and acronyms

AHRC	Arts and Humanities Research Council
ANDES	Association for Nature and Sustainable Development
ATREE	Ashoka Trust for Research in Ecology and the Environment
CINE	Centre for Indigenous Nutrition and Environment
CIP	International Potato Centre
COP	Conference of the Parties (UNFCCC)
FAO	Food & Agriculture Organization of the UN
FPIC	free, prior, and informed consent
GCRF	Global Challenges Research Fund
GIS	geographic information system
GM	genetically modified
GPS	global positioning system
ha	hectare
IFS	Indigenous food systems
IIED	International Institute for Environment and Development
INFOODS	FAO International Network of Food Data Systems
IPBES	Intergovernmental Panel on Biodiversity and Ecosystem Services
KEFRI	Kenya Forestry Research Institute
NGO	non-governmental organisation
PAR	participatory action research
RBG Kew	Royal Botanic Gardens, Kew
SDG	Sustainable Development Goal
UCL	University College London
UK	United Kingdom
UKRI	UK Research and Innovation
UN	United Nations
UNDRIP	UN Declaration on the Rights of Indigenous Peoples
UNESCO	UN Educational, Scientific and Cultural Organization
UNFCCC	UN Framework Convention on Climate Change

Introduction and Objectives

Indigenous Peoples' food systems have a critical role to play in addressing the 2030 Sustainable Development Goals (SDGs) but face many challenges and have so far received little attention from researchers and policymakers. This virtual workshop brought together several Indigenous representatives, academics, NGOs (non-governmental organisations) and UN agencies to:

1. Explore the role of Indigenous Peoples' food systems in achieving the SDGs
2. Explore Indigenous Peoples' research priorities, interdisciplinary research gaps, and interdisciplinary and decolonising research methods
3. Build new interdisciplinary and multi-actor research networks and partnerships, and
4. Promote an equitable and inclusive inter-cultural dialogue on Indigenous Peoples' food systems.

Participants at the workshop included:

- United Kingdom academics from different disciplines and interdisciplinary areas — humanities, botany, and ethnobotany
- Action-researchers and NGOs working with Indigenous people and sustainable agri-food systems, and
- Indigenous representatives from the Arctic, the Saami Council, Brazil, Peru, Kenya, Botswana, Chad, India, China and the Philippines.

The workshop focused on whole food systems from farm to plate — not only crops and farming systems, but also storage, processing, preparation and cooking methods that form an essential part of Indigenous Peoples' food systems. It was organised as part of an IIED (International Institute for Environment & Development) project with Royal Botanic Gardens (RBG) Kew and partners in Kenya, India and China, titled “Indigenous Food Systems, Biocultural Heritage and Agricultural Resilience”, funded by the UKRI (UK Research and Innovation) Arts and Humanities Research Council (AHRC) and the Global Challenges Research Fund (GCRF).

The workshop consisted of four linked webinars:

- 09 October: Opening and keynotes; livestreamed interaction with the Potato Park (Peru)
- 13 October: Indigenous food systems in China, India and Kenya (case studies in the AHRC-GCRF project)
- 14 October: Co-creating research agendas: Indigenous research priorities and interdisciplinary gaps
- 15 October: Exploring research methods: Interdisciplinary and decolonising methods.

The results of the workshop will be used to inform the design of new research on Indigenous food systems (IFS), and to inform key policy processes in 2021, including the Biodiversity Convention COP15 and post-2020 biodiversity targets; the UN Food Systems Summit; and the Climate Change COP26.

Introducing the workshop theme: Krystyna Swiderska, IIED

There are about 476 million Indigenous Peoples in 90 countries, speaking more than 4000 languages. Indigenous Peoples are custodians of about 80% of the world's biodiversity. However, this rich biocultural diversity is facing unprecedented threats. The UN recently announced that none of the 2020 Aichi Biodiversity targets will be met. And UNESCO has estimated that over 20 Indigenous languages are lost each year. With the loss of Indigenous cultures and the passing of elders, we are also losing unique ecological knowledge, values and worldviews for biodiversity conservation and sustainable development.

Many Indigenous Peoples have suffered violent colonisation and continue to be colonised today in more subtle ways by dominant Euro-Western cultures. They continue to suffer widespread racial

discrimination and marginalisation, and growing violence against environmental defenders. For decades Indigenous Peoples have been calling for their rights to land and self-determination to be respected — these rights are now enshrined in the UN Declaration on the Rights of Indigenous Peoples (UNDRIP), but are still widely threatened and many Indigenous Peoples are still struggling to be recognised as Indigenous Peoples.

COVID-19 has been devastating for some Indigenous Peoples, but has also demonstrated the resilience of localised IFS, which have provided a vital safety net during the crisis. IFS are very diverse, entailing farming, pastoralism, hunting, gathering and fishing in different environments, but also have a number of common features:

- They sustain high levels of biodiversity, including many of the world's underutilised species and varieties, through agroecological practices, adaptive resource management and protection of sacred sites. They promote efficient natural resource use — for example, circular farming, and soil and water conservation. They use far less water than modern chemical intensive farming and emit less carbon.
- They sustain vital ecosystem services and are often more resilient to climate change than monocultures and high-tech crops. Indigenous crops and landraces have also been shown to be more nutritious than modern equivalents.
- They are rooted in Indigenous Peoples' cultures, identity, spirituality, and solidarity.

Across the world, many IFS are already achieving **Zero Hunger** (SDG 2) — but the transition to modern foods is leading to growing health problems (for example, obesity and diabetes). In climate-constrained areas such as the Sahel, the loss of traditional knowledge has been linked to hunger and food insecurity by the World Food Programme.¹

Indigenous Peoples' food systems are also critical for achieving other SDGs, including SDG 15 on protecting ecosystems and biodiversity; SDG 13 on climate action; SDGs 1 and 10 on ending poverty and inequality; and SDG 3 on health and wellbeing. But they are often seen as 'backward' or unproductive, and are undermined by policies promoting industrial agri-food systems, resource extraction and protected areas.

Indigenous Peoples have created biodiversity-rich landscapes and a huge diversity of domesticated crops and livestock over generations. This biodiversity is part of their cultural heritage. When native potato varieties were repatriated to Andean communities in the Potato Park (Peru), the Indigenous knowledge, culture and rituals embedded in these varieties were also revived. Indigenous women play a key role in IFS, from nurturing seeds to cuisine.

The '**biocultural heritage**' concept is derived from Indigenous Peoples' holistic worldviews where Indigenous knowledge, biodiversity, landscapes and cultural and spiritual values — ie tangible and intangible heritage — are inextricably linked and cannot be separated. The concept emerged from work with Quechua communities in the Potato Park, supported by Asociación ANDES (Association for Nature and Sustainable Development, Peru), and was validated by research by IIED and partners with 11 Indigenous groups in five countries. It bridges sectoral siloes and knowledge systems, and reaffirms the rights and responsibilities of Indigenous Peoples over their ancestral biodiversity and landscapes as Indigenous cultural heritage.²

¹ Swiderska, K., & Seddon, N. (2020) The World Food Programme's contribution to nature-based solutions. Discussion paper (Forthcoming)

² Swiderska, K., Argumedo, A., & Pimbert, M. (2020) Biocultural heritage territories: key to halting biodiversity loss. IIED briefing. IIED, London. <https://pubs.iied.org/17760iied>

Welcome and opening remarks: Andrew Norton, IIED Director

Indigenous Peoples and their food systems is a topic at the heart of IIED's environment and development agenda. One conclusion of the IPBES (Intergovernmental Panel on Biodiversity and Ecosystem Services) Global Biodiversity Assessment (May 2019)³ is that biodiversity is better conserved on land managed by Indigenous Peoples than other lands. This is likely to stem from their long-term stewardship relationship with the land. If local Indigenous Peoples are better stewards then there is a need to protect their rights as an urgent agenda, and critical is the right to self-determination. How can we learn from Indigenous Peoples to improve biodiversity stewardship on a global scale? How do we protect and scale up Indigenous stewardship?

Opening remarks: Philippa Ryan, RBG Kew

Research into IFS and crops tends to crosscut many academic disciplines and organisations. There can be very different aims and methods; research can remain largely disconnected, and often focuses on elements within food systems. Holistic approaches would reflect the interconnectedness between crop diversity, environments, and agricultural practices, between crop choices and foods, and between traditional agricultural and food knowledge and heritage. One aim of this workshop is to bring together academics and researchers spanning disciplines and methods to create ideas for interdisciplinary approaches, which are set within the framework of locally-led priorities, cultural contexts, and broad-ranging aims. For example, exploring the potential of ethnobotany as an approach that helps connect botanical sciences with humanities, and that can link studies across the different components of food systems from crops to cuisine. And, to consider the value of historical approaches, such as documenting farmers' memories about changes in local food crops. Or drawing on archival and archaeological sources to find out about long-term crop histories.

While people often think of Kew as a taxonomic institute, food security and ethnobotany are growing subjects here; these studies are grounded in taxonomy as plant identification and understanding of evolutionary relationships underpins research into underutilised and threatened crops as well as conservation. Kew has been a leader in the practical application of the Convention on Biological Diversity including prior informed consent and benefit-sharing, and its projects are grounded in a participatory approach. Kew is an old institution, and a new initiative 'Decolonising Kew' is currently re-examining both Kew's history and how science is done and communicated.

³ See: IPBES (2019) Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. <https://ipbes.net/global-assessment>

Webinar 1: 09 October. Opening & Keynotes

Summary and key messages

Indigenous food systems are critical for achieving Zero Hunger and other SDGs

Sustainability: Indigenous Peoples' food systems are vital for food security because they sustain the natural resource base rather than depleting it. As Yon Fernandez de Larrinoa from FAO said: "Food systems will not be able to feed humanity in a sustainable way unless they are re-designed with much stronger environmental considerations". Modern farming systems focusing on a narrow set of crops have eroded genetic diversity and Indigenous knowledge, and without these we are unlikely to achieve sustainable food systems. Indigenous Peoples sustain crop wild relatives that are used to enrich domesticated populations in home gardens in the Philippines and in the Potato Park biocultural heritage territory in Peru.

Resilience: IFS are part of the solution in the fight against climate change — this is a key message from the FAO Expert Seminar in 2018.⁴ And native varieties have proved vital for confronting climate change impacts in the Andean Potato Park (Peru). IFS are also providing a critical safety net during the COVID-19 crisis — not only for Indigenous farmers but also for people in urban areas. Simon Mitambo (Tharaka tribe in Kenya) explained how Indigenous seeds have helped to lessen the impacts of COVID-19 because they bring people together through ceremonies (social cohesion), and how COVID-19 has led to a revival of traditional foods in Kenya.

Nutrition & health: Harriet Kuhnlein (Centre for Indigenous Nutrition and Environment; CINE) explained how Indigenous foods can provide more nutritious diets, and the importance of considering their contribution to spiritual, social and mental health, not only physical health. Women in the Potato Park explained that the food they prepare is also for medicine — women play a key role in IFS and in transmitting the cultural values that underpin IFS. More research is needed on the nutritional quality of Indigenous foods, and metrics on nutritional quality.

Cultural heritage: Simon Mitambo explained that in Indigenous seeds there is sacredness — Indigenous seeds and food systems are very important for identity, spirituality and social cohesion since most work on IFS is collective. In Peru, Quechua Potato Park experts explained that their food security/sovereignty and rich biodiversity is sustained through ancestral values of Solidarity, Reciprocity and Balance — and the Ayllu concept where the human, the wild/natural and the sacred worlds have to be in balance to achieve wellbeing. Their culturally rooted food system provides a genetic reserve for the global community and for future generations (it sustains over 1000 native potato varieties).

Challenges facing IFS: Joji Carino (Indigenous Representative from the Philippines) explained that in Asia, mainstream economic development and modern agriculture have overtaken traditional farming in many Indigenous communities, and there have been rapid changes in food, diets and nutrition. In Thailand, Indigenous farmers can be imprisoned for rotational or swidden farming because there has been a misconception that it causes deforestation (according to forest science) and forest laws do not recognise the rights of Indigenous Peoples living in protected areas. Special Cultural Zones in Thailand have revived local economies and biocultural heritage; but promoting markets for heritage rice has undermined agrobiodiversity in the Philippines.

In Africa the big push for hybrids and chemicals are undermining soils and water, and there is a lot of arm-twisting between government and agribusiness corporations, which blocks laws that support IFS. There are huge power imbalances in food systems. Colonial laws promoting seed patenting undermine collective seed systems. In the Potato Park, communities are worried that the government is promoting GM crops, and are organising action to confront this threat. The Potato Park biocultural heritage territory has enabled communities to respond to multiple crises — biodiversity, climate change, food security, COVID-19, and systemic racism.

Research: Philippa Ryan (RBG Kew) explained how research on IFS often has different aims, and how more holistic approaches are needed that combine different disciplines to better understand and protect IFS. Participants stressed the need for participatory research with Indigenous Peoples and linking

⁴ For more information, see: <http://www.fao.org/indigenous-peoples/food-systems/en/>

Indigenous knowledge and science; and that research should not only focus on IFS but also on the broader challenges that Indigenous Peoples face. As the Potato Park Quechua experts explained, research in the Potato Park is defined by them and addresses their needs.

Session 1: Keynote presentations

FAO and Indigenous Peoples' Food Systems: From the High-Level Expert Seminar to the Global-Hub: Yon Fernandez-de-Larrinoa, Chief FAO Indigenous Peoples Unit; Anne Brunel — Focal point Indigenous Peoples Food Systems, FAO Indigenous Peoples Unit

Our food systems as currently conceived will not be able to feed humanity in a sustainable way unless they are reinvented with much stronger environmental considerations. Indigenous Peoples are key allies in achieving the SDGs. “Without [Indigenous Peoples] we cannot achieve the Zero Hunger Goal and we will not achieve sustainable development” (FAO Director General, 2018)⁵. Today academics and scientists are more open to other forms of knowledge, including Indigenous scientific knowledge, partly due to unanswered questions raised by COVID-19. We need to start by decolonising our own minds, as that’s where most of the difficulties start.

There is an ongoing global debate on how to make food systems more sustainable and resilient in the face of climate change. The debate started in the framework of the UN Decade of Action on Nutrition, which served as an umbrella for the Voluntary Guidelines on Nutrition currently being discussed in the Committee on World Food Security. The UN Food Systems Summit in 2021 will put forward policies and a conceptual framework for food systems for the next 20 years. This provides a great opportunity for Indigenous Peoples and their tremendous knowledge accumulated for centuries to be put on the table and show how they can feed populations and maintain 80% of the remaining biodiversity — a lot of biodiversity we have annihilated through other forms of food production. Indigenous leaders recommended to FAO to include a dedicated programme on IFS. FAO started working on IFS in 2009 from a nutrition and sustainability perspective. FAO developed a methodology for profiling IFS, especially on the sustainability aspects and also resilience, and is conducting 12 profiles of IFS — some have been published in two FAO books and eight are expected to be published by end of 2020. The profiles include the Quechua IFS in Peru (the Potato Park), the Baka (Cameroon), Dao in Vietnam, and the Khasi, Bhotia, Anwal and Kumaon in India, China, Iran.

FAO hosted a High-Level Expert Seminar on IFS at FAO, 7-9 November 2018. The seminar brought together 200 participants: 70 speakers from 40 countries; more than 22 Indigenous communities; more than 23 governments; and 20 universities and research centres. It included a focus on climate change and resilience, diets and nutrition, and the need to identify policies that undermine IFS. The main outcome was a commitment from different actors to strengthen the understanding, promotion and preservation of IFS to achieve Zero Hunger and the 2030 Agenda.

Key messages from the FAO Expert Seminar in 2018:

1. IFS are efficient food systems which feed local people in a nutritious way and at the same time keep balance with fragile environments.
2. Indigenous cultures and ecosystems’ survival depend on the preservation and transmission of traditional knowledge.
3. Innovations and commercialisation of indigenous foods need to involve Indigenous Peoples to be sustainable.
4. IFS are big part of the solution against climate change.
5. Natural resource management decisions need to involve Indigenous Peoples.
6. Research on food composition can improve food security and nutrition of Indigenous communities.

⁵ FAO Director General (08 August 2018) Listen to FAO Director General message on International Day of Indigenous Peoples. <http://www.fao.org/indigenous-peoples/news-article/en/c/1148548/>

7. Indigenous governance practices should be recognised and strengthened at all levels, and
8. Shifting cultivation is a sustainable lifestyle and practice.

Indigenous food systems in Asia: Resilience, nutrition, sustainability, and wellbeing; challenges and responses needed: Joji Carino, Forest Peoples' Programme

- In Asia, similar to other regions of the world, mainstream economic development and modern agriculture, focused on commercial crops and plantations, have been overtaking traditional farming by many Indigenous communities, leading to the devaluation and erosion of Indigenous and local knowledge. IFS have been in decline, eg rice terraces under disrepair, areas under swidden farming are shrinking, and there has been rapid change in food, diets and nutrition.
- Only recently have the full impacts of industrial agriculture become better understood as a systemic driver of biodiversity loss, climate change and gross social inequality. The current pandemic highlights the vulnerability of global food chains, pointing to transitions from carbon-intensive globalised food production and consumption patterns towards more resilient and sustainable local food systems.
- We are at an historic transition in food and agricultural policy — linked to transitions in knowledge and technologies — visions, planning and action on the revitalisation of Indigenous and local food systems. Historical traditional agro-ecological systems are now being revitalised under contemporary conditions.
- Looking at my own home region in central Cordillera mountains, northern Philippines with its IFS based on agro-forestry — shifting cultivation, rice terrace agriculture and home gardens — I see many features common to many Indigenous Peoples in Asia.

Living examples: rotation agriculture/swidden farming. In northern Thailand, from the beginning of highland development interventions by the government, there has been a misconception of rotational farming as the cause of deforestation. The policy has been to replace rotational farming with sedentary farming emphasising commercial crop production. Moreover, existing forestry laws do not recognise Indigenous and local communities living in the protected areas, including their residential and farmlands. Cash crop expansion has been promoted and is supported by government projects and private business. This model of development has had serious impacts on the traditional way of agriculture, particularly the rotational farming system. This modern agricultural approach has destroyed the forests, and caused soil erosion and pollution by chemical pesticides and herbicides. Modern education has impelled young people to migrate to urban areas for study and work, cut off from their cultural roots and losing their identity.

However, traditional rotational farming in Thailand still exists in around 50% of *Pgakenyaw* Karen communities. A cabinet resolution on recovering Karen livelihoods recognises the traditional and dynamic practice of agriculture and its co-existence within the natural ecosystem. The resolution promulgates Special Cultural Zones for the revival and maintenance of cultural identity, in harmony with nature. This revitalisation in rotational agriculture has strengthened the local economy, and some young people have returned to their communities in a dynamic and innovative process to reclaim their cultural identity and alternative livelihoods. These innovations in rotational farming, combined with social enterprise provide a new solution for young people, and their numbers have been increasing in the last few years.

Features of terraced rice agriculture: The central Cordillera region and its terraced rice agriculture, also practised in many mountain areas in Asia. In Ifugao, UNESCO has recognised this as a “living cultural heritage”. These rice terraces when understood as a “whole” food system comprise an Indigenous technological system of rice fields supported by a sophisticated irrigation and water management system with its associated spiritual and cultural values and social institutions.

Key features of the terraces:

- Combine forest, water, and land management
- Use sophisticated Indigenous technology and institutions, and
- Multiple biodiversity, cultural and economic values within the landscape: a) Tourism; b) Heritage; c) Ecosystem; d) Water and carbon management; e) Subsistence and Food values; f) Traditional occupations — woodcarving, weaving, basketry.

The “green revolution” has introduced changes in use of hybrid rice seeds, and today the best varieties of “heritage rice” are marketed to urban centres and niche markets, and local people eat cheaper outside varieties.

Urban transitions: Of the estimated global Indigenous Peoples population of 476 million, 70% live in Asia with approximately 72% still living in rural areas. This is not the same as Latin America and North America, where a majority of Indigenous Peoples are living in urban areas. For Indigenous Peoples living in urban areas, the revitalisation of home gardens — called **Baeng** among the Ibaloi — is a viable initiative. Through Indigenous gardens among the Ibaloi and other Indigenous Peoples living in Baguio City, opportunities for intergenerational learning among elders and youth take place. Indigenous knowledge will be a key enabler to finding solutions to 21st century crises of social inequality and imbalanced relationships with nature.

Revitalisation of IFS: The Strategic Plan for Biodiversity (2011-2020) envisions a world of humanity living in harmony with nature by 2050. Fulfilling such a vision requires deep transformations in social institutions and human-nature relationships at multiple scales, as well as changes in personal values, lifestyles and actions. This holds true for all societies, including Indigenous Peoples and communities.

During this transition, Indigenous Peoples will play vital roles, both in the renewal of their own societies and contributing to this global vision, as well as being living exemplars of collective values, knowledge, innovations and practices which are addressing contemporary problems. Community-based solutions towards food sovereignty, sustainable livelihoods, conservation and sustainable use of biodiversity, culturally relevant education, and responsible social enterprises are gaining strength in many countries. These inter-generational collective actions by Indigenous elders, women, youth and children are vital contributions to 21st century transformation.

Revitalising Indigenous gardens and farms, and nurturing Indigenous Peoples’ heritage values in northern Philippines and northern Thailand:

1. Baeng home gardens and rotational farms are established and flourishing
2. Intergenerational learning is alive and practised in communities and schools
3. Community institutions and learning networks are strengthened, and
4. Network of Centers of Distinction on Indigenous and Local Knowledge is strengthened through collaborative activities.

Small and medium farms make up 80% of Asian agriculture, the vast majority being family farmers. There is a need to focus not just on large or small, but also on the systemic characteristics of farming — particularly of the IFS that have emerged in Asia through the long period of co-evolution with natural ecosystems.

Indigenous food systems in Africa: Resilience, nutrition, sustainability and wellbeing; challenges and responses needed: Simon Mitambo (African Biodiversity Network)

I am a leader from the Tharaka tribe in Kenya. In seed there is sacredness. Seed is very important for our cultural identity and spirituality. The food you eat makes you feel you are a Tharaka — you know you are in Tharaka, not somewhere else, so that seed gives you identity. We need seeds for cultural ceremonies and for many other purposes — in most ceremonies, we will not use a ‘foreign’ seed; if we don’t recognise the seed, we won’t use it. When preparing to plant, certain rituals have to be performed in order to receive the gift of nature which is rain. Most of the work on IFS and seeds is collective and

brings cohesion to our community. Thus, during COVID-19, indigenous seeds helped us to support one another – this is a feature of our collective food system. Seed is shared, not sold.

Trends: In Africa, there has been a big loss of IFS due to colonial laws — some laws undermine seeds for example, by promoting patenting of seeds (individual ownership), when seeds are meant to be collective. There has been a big push to promote hybrid seeds and chemicals, which undermine soils and water. In Africa, there is corruption — a lot of arm-twisting between government institutions and multi-national corporations, so it is not possible to promote laws that support IFS. COVID-19 has led to an unprecedented revival of IFS and increased demand for traditional foods. In rural Africa, there is emerging leadership of women because women lead on seeds, they can read the climate and ecosystems. We are engaging communities and working on community research.

Indigenous Food Systems, Health and Nutrition: Harriet Kuhnlein, CINE

I am a founding Director of CINE, and have conducted 15 years of Arctic work on food and nutrition and Inuit communities, in close collaboration with Indigenous leaders in Canada, and I have worked with the FAO Nutrition unit; and with several cultures over 25 years. I'm currently working in Anacortes-Coast Salish. When researching Indigenous Peoples' health and nutrition, it is important to pay attention to four aspects: physical, spiritual, social, mental/intellectual health. There is a need for a sustained research focus on diversity in food systems and nutrient composition, to build health promotion conversation.

CINE's research with FAO on promoting Indigenous Peoples' food systems for health and wellbeing explored the dichotomy of traditional and commercial foods. It collected dietary data for days with/without traditional foods and for diversity in terms of species and nutrients. In the Arctic for example — 45 Inuit communities found more protein and nutrients were consumed on days with traditional foods; and more energy, fat and sugar on days without. We also found nutrient surprises, such as Vitamin C and A in traditional foods. We conducted 12 diverse case studies of IFS (FAO and CINE publications relating to these can be found online), three in North America, two in South America, two in Africa, one in the Pacific, and four in Asia. I am involved with many interdisciplinary partners both at CINE and in-country. I have documented foods, cultural attributes, environmental risks, as well as health and nutrition aspects and health promotion strategies to improve food use and nutrition.

Session 2: Indigenous Food Systems in the Andes: Livestreamed session with the Potato Park, Cusco, Peru

The Potato Park is a biocultural heritage territory of about 9,600 hectares in a centre of potato diversity and domestication. It was established in 2000 with support of the NGO ANDES. The Potato Park is a thriving IFS where Quechua values and beliefs are still very strong, which provides solutions to address many of today's crises — biodiversity loss, food security, climate change, COVID-19 and racism. Repatriation of native potatoes through an agreement with the International Potato Centre (CIP) has revived traditional knowledge and culture and led to equitable research between Indigenous researchers and scientists, blending Indigenous knowledge and science.

The Potato Park experts explained: “Our food system is embodied in our Sumaq Causay principle of *Buen Vivir* which connects the environment and different forms of life and humans — we divide everything into three worlds, the human, spiritual and wild”. They performed a ceremony to the mountain gods, an offering called Quintuchi which involves men and women “so we can see there is harmony — the sacred always involves women and men; through coca leaves and wind we can connect with the mountains and ask for their blessing”. Different mountains were asked for their blessing: a lady mountain who protects the land; her husband Apus; an Apus who protects wildlife and medicinal plants; an Apu who is ‘the law of the community of Paru’; an Apu ‘who is in charge of all the water in this land’; and a Apus who is the oldest, wisest mountain who protects the knowledge, please give us your blessing’.

Mariano Sutta (Potato Park expert, cultural and spiritual values): I will explain how in the Potato Park our food system is connected to our values, and the environment, and how these values underpin our food system. I would like to say how the principles that we have seen in the ceremony are important for our knowledge about food, agriculture and how our women play an important role in passing that knowledge on. For us, having our food system built on these principles is very important. Our main authorities in this land are these two mountains. They are the highest authority in the Potato Park, not humans. The principles of Solidarity, Reciprocity and Balance (between humans, nature and the sacred worlds or '*Ayllus*') define how we do agriculture in the Potato Park. These principles are key to ensure we have diversity of food — this diversity of food could not exist without the women and without these principles. The way we do reciprocity with the land is linked to principles by which we connect the natural community with the human community and the sacred community. We work in a collective manner and we are only reflecting the solidarity and reciprocity that we see in how nature relates to humans, and the indicators that we learn from the land — this is important if we are to have plenty of food and diversity of food. In these landscapes you will see women are leaders, but we work with men like the mountain gods, we do reciprocity because women transmit the knowledge to children. These principles define our food systems. In each one of the Potato Park communities, we have the human, the wild and the sacred, and all work together.

Lino Mamani (Potato Park expert, community seed bank): In the Salka Ayllu (the community of the wild), what types of wildlife and wild relatives of potato do we have? We have a good number of wild relatives in the Potato Park. It is important how we combine them with domesticated potatoes so they can 'converse'. We have indicators from wildlife so we can do forecasting of when we can do planting; so we do seed selection when wildlife tells us or when the sky tells us — this is very important for seed selection, eg we follow the fox (we are in planting season today). We have experts that read the signs and farmers have their own knowledge. When we are planting, neighbours help each other, so it is collective.

Nasario: In this Potato Park conservation area, that was recognised by the government as an Agrobiodiversity Zone, we are now conserving 1347 different native potato varieties. Our local collection has 700+ varieties of potato that we keep, including 410 varieties repatriated from CIP and others, and we are also keeping those potatoes for other communities in Peru. We have unique varieties that are threatened by extinction because we are a centre of origin for potatoes, and we also have the world's highest diversity of potatoes. We don't conserve all this just for ourselves but for future and other communities, to share, and for food sovereignty, which is connected to our values. The fact that we have wild relatives has given us the opportunity to see how they produce their own 'tribe' — some wild relatives produce potatoes good for drying, others for other uses — *Pachamama* (Mother Earth) likes diversity — and we must combine potatoes with other crops. Keeping all this diversity ensures we have plenty of food.

Ricardina: We have organised ourselves using different tools, like the Inter-Community Agreement for the Potato Park, and the Potato Park Association guides the activities of the Park. We have economic collectives where women are the leaders of economic activities, and a gastronomy group that advances culinary knowledge and our tourism group. In each community we elect leaders and the leaders come together in the Potato Park Association and the 'tecnicos' (Potato Park experts) provide technical support. Each economic collective has to provide 10% of their revenues to a communal Potato Park fund, and this is divided amongst all the park communities at the end of the year — so the benefits of our work also reach the most needy. And the principles of Reciprocity, Solidarity and Balance are applied in the way we share our benefits (amongst communities); but part of the benefits also go into our conservation activities so that the wildlife can benefit — we receive benefits from them and we also reciprocate to them.

We have also been involved in policy engagement activities because we know we have pressures from outside, and we have to defend our land from threats such as mining and privatisation of seeds — all these continue without any kind of free, prior and informed consent (FPIC) from us, so we need to respond in a way that solidarity etc can be maintained. So, we have been in Cusco and Lima fighting against transgenics and other threats to our Buen Vivir/Wellbeing. The Potato Park is now involved in action against the law on transgenics that allows these to come back (they had been blocked by a regional ban) — we have to protect our lands from genetic contamination. The Potato Park is an example of how communities can come together to defend their land. Why do we conserve such a high diversity of crops? We as women are organised according to our expertise, and these days in the

Potato Park we are in the planting season. We see that climate change has become a big issue; we don't have rain these days as would be expected. We as women have our own knowledge of cooking and feeding our kids and about medicinal plants, so we use that knowledge for the Potato Park's traditional restaurant and provide medicine to our kids through our food.

Aniceto: I want to stress how when we work with the three Ayllus, we have harmony and plenty of food. So a food system in the Potato Park would not exist without this. We have been doing agriculture in these lands for 10,000 years with the same values and we continue to work with nature and the Apus and Pachamama. If we want to have Buen Vivir, our institutions and organisations have to be based on these principles. Despite COVID-19, we have plenty of food — the Park has donated a lot of potatoes to people in need in Cusco.

Questions & Answers:

How do you store potato seeds? When we harvest, we put some potatoes in the Potato Park's Community Seed Bank. We store seeds using a type of selection which reflects our taxonomy.

What are your expectations for the research you are conducting? We are currently researching climate change impacts — pests and potatoes are moving up to higher altitudes; and how to use potatoes in gastronomy. Our research is defined by us and addresses our needs. Our research has allowed us to build an infrastructure for conservation that is used by our economic collectives.

Do you plant improved varieties? In our Potato Park, modern varieties don't produce well but our local varieties are better because we know them and use them for ceremonies and rituals and our gastronomy group/restaurant. We only focus on traditional varieties and don't see the need for modern varieties.

Do your ceremonies help to reduce fears about the impacts of COVID-19? The pandemic has affected the community in different ways — because we have focused on strengthening our food system, we don't depend on external markets. So when the pandemic came, we were not affected as we have plenty of different foods and different medicines, so this shows that if you have diversity you are resilient.

How to deal with potato blight/Rancha? We've been dealing with phytophthora for thousands of years; this is a disease that does not need any kind of external solutions. We manage it by doing a good selection of seeds first; we rotate crops to avoid the plot with the disease and do seed selection [to select the most tolerant seeds]. That allows us to respond. Having high diversity is another strategy because the disease usually only affects one or two varieties so we have others that don't get it. Though phytophthora is moving up with climate change and our crops are moving up and this is concerning because our traditional methods of dealing with it [are not working so well].

How is sacred knowledge protected? There are three ways to protect knowledge: The first type of knowledge is not shared as it is sacred; the second type is shared with care so we have to take measures to protect it; and the third type we have to share with others because our food and livelihoods and organisation depend on it. Most knowledge is this third type. It includes knowledge about values and principles and about being in harmony between men and women, and this has to be shared and transmitted to future generations.

Are you working on climate change? Yes, this is a key problem, we maintain a high diversity of crops to help with climate change adaptation, and build on lessons from five years of research with the CIP — even though we have high diversity overall, we need to increase diversity that each farmer grows. Climate change has been an issue for a few years; we've been collaborating with universities and others — collaboration is important. Climate change is going to affect the diversity of potatoes we have, as the varieties are moving up [in altitude], so collaboration with scientists will help us to respond. In the Potato Park, all crops are moving up so we are losing varieties in the upper part.

Are the potatoes commercially grown? It depends; we first prioritise our own food needs — the repatriation agreement with CIP was done to bring back potatoes that were collected from the Park but had been lost. We don't plant them commercially but for food purposes.

Webinar 2: 13 October. Indigenous Food Systems in China, India and Kenya

Summary

The IFS of the Naxi in north west Yunnan, China, the Lepcha and Limbu in the eastern Himalayas of India, and the Mijikenda in coastal Kenya sustain very rich crop diversity and wild relatives. Food is a way of life and seed is life — not just a commodity. IFS are ritualistic and spiritual beliefs are fundamental for their continuity. But these IFS are changing and face many threats — some crops have been lost, culture is becoming weaker, and the youth are less interested.

The **Naxi Dongba** (spiritual leader) explained that their mountain indigenous food system is becoming more and more uniform and the diversity of crops and ways of preparing them is disappearing, which threatens the whole food system — this is because food is increasingly produced for markets rather than subsistence and nutrition and because of the influx of modern foods. So, a key question is how to accept outside food without destroying our IFS. The Farmer Seed Network in China supports participatory action research (PAR) to let the voice of Indigenous farmers come out directly.

The **Lepcha and Limbu IFS** in north east India are threatened by forest conservation policy that places a lot of restrictions on the use of forest resources even though it is Lepcha ancestral land. This is affecting their rituals and their traditional food system cannot sustain them fully, so people are growing less traditional crops and increasingly growing cash crops. And they are losing their traditional knowledge for sustainable use of the forest. Traditional rice cultivation is decreasing because of the Green Revolution — they have lost dryland paddy, wild millet, foxtail millet. Their IFS is also affected by aggressive food marketing and inappropriate government schemes. Opportunities to address these challenges include the growing demand for traditional foods; the fact that spiritual beliefs and seed exchange systems are still maintained — but government policy needs to consider Indigenous culture — that is key to prevent the continued erosion of Indigenous culture and food systems.

The **Mijikenda food system and sacred Kaya forests in Rabai** community, Kenya, conserves wild cowpeas and many indigenous vegetables and wild fruits — which supplement farming and are important for nutrition and resilience to climate change. The traditional Kaya forest governance system and spiritual beliefs and taboos ensure forest conservation, and traditionally conserved agrobiodiversity on farmland. But government policy on food security has promoted modern hybrids through heavy sensitisation — they have lost sorghum, millet, yams and loss of traditional varieties threatens nutrition. Other challenges include limited land, and modernisation due to proximity to Mombasa — so traditional farming and cultural practices are diminishing very fast. Ceremonies have been undermined by modern education, leading to loss of traditional foods. Marketing of indigenous foods (eg cowpeas) is key for sustaining cultivation; and there is a need to strengthen the traditional governance structure (Kaya elders). Research is needed on how modernity is affecting Indigenous culture and Indigenous knowledge transmission, and on the links between loss of culture and loss of indigenous crops, the role of women and girls in IFS, household consumption of indigenous foods; traditional ways of preserving food as this information is being lost; and on how to propagate indigenous foods.

Naxi Indigenous Food Systems: Stone Village Biocultural Network, Yunnan, South West China

Haimei Liang and Yiching Song, Farmer Seed Network; Jixian He (Naxi Dongba), Wumu Village

The Farmer Seed Network is working with four Naxi villages — a community network in north west Yunnan, which includes the Stone Village, Wumu, Youmi and Labo villages, along the Yangtse river. The inhabitants of the four villages belong to the Naxi people (an ethnic group in China) and share a common biocultural system with a common Dongba religion and values. Youmi is the furthest away from Lijiang (towards Tibet); it has nine Dongba (spiritual leaders), who are spiritually governing the daily life and livelihoods of 83 households in the village. Labo has eight Daba (spiritual leader, similar to Dongba). The traditional irrigation system underpins livelihoods in the four villages. Wumu village

retains more than 20 traditional granaries, and Dongba rituals to worship gods. The four villages can enlighten us on different aspects of IFS.

Jixian He: The Naxi IFS has four main components:

1. Cultural and spiritual
2. Local biodiversity and physical components
3. Community networking, because the four villages are complementary towards one another, and
4. Community interactions with the outside world.

The IFS is evolving, not fixed. Food is the everyday life of the people; it is the basis of Naxi culture. Because of the accumulation of food, their culture became more and more food centred. Previously, they were hunter-gatherers. Worship in Wumu village is around maize, rice and other food crops and medicinal plants. Storage — pork hanging — lasts all year and they have a festival at harvest time.

Yiching Song: Intercropping with maize occurs in mountain areas, and mountain foods are produced such as: moon cake, traditional/local maize, wild walnut oil, root crops; they make sugar, dry a potato product on roofs, chili for exchange with city people, buckwheat traditional crop; and they dry vegetables. Turnip is a traditional crop in the mountains. Food from outside is coming into the community. Beans are very adapted to the mountain community. The Farmer Seed Network is trying to support Indigenous Peoples; our approach is to let their voice come out directly. Seed is life, it is very important for communities — seed is not only about money, technology or research, but is everyday life and links to other aspects of the communities' sustainability and links to city people. We consider seed and Indigenous communities as root and basis for a sustainable food system and follow “from seed to table” approach to support Indigenous communities and their food systems.

Question & Answers:

Are traditional foods helping to alleviate diabetes? Do people who eat them get less diabetes?

Mr He: Yes, not only because the foods are healthier but also because the way of life entails more exercise.

How is the IFS changing? What are the threats and what is your vision for the future?

Mr He: The Naxi IFS is based on experience with farming — it has changed from hunter-gatherer and gradually diversified, but in recent decades the food system has become more and more uniform, and diversity is disappearing in food crops and ways of preparing them. This threatens the whole IFS and worries me. Previously, food was for livelihoods and nutrition, and now it is for money so that's why diversity is declining, and more and more external food comes in. How can we accept outside food without destroying our IFS?

Are there other organisations in China researching IFS?

Research on IFS is not mainstream but many research institutes have been conducting research on IFS in the last 1-2 decades, eg Kunming Institute of Botany, Centre for Chinese Agricultural Policy and China Agricultural University.

Lepcha and Limbu IFS: Lingsey and Linseykha, Kalimpong District, West Bengal, North East India

Nawraj Gurung, Lok Chetna Manch, India

I will talk about the food system of the Lepcha and Limbu mountain tribes in the Kanchendzonga landscape of Eastern Himalayan region of India, in the Lingsey and Lingseykha Gram Panachayats, which have 1,000 households with six major mountain tribes, situated at temperate to sub-tropical range of southern watershed border to Neora Valley National Forest Conservation Park. The region also borders with Bhutan in the north and Sikkim in the west. The Lepchas' history of creation, culture, rituals and livelihood revolves around the Mount Kanchendzonga landscape. For them, this mountain is the most sacred and it was not necessary for them to move out of this landscape because of its abundance of biodiversity, high altitude lakes and sacred places. Lepchas "Rong" and Limbu "Tsong" along with Bhutia entered into an agreement called "Lo-Men-Tsong-Sum" in 1642 and they considered themselves as the blood brothers for the formation of Kingdom of Sikkim.

Settlements of Lepcha and Limbu tribes are often found adjacent to each other in Sikkim, West Bengal, western Bhutan and eastern Nepal in the Eastern Himalayan range. Since the Lepchas changed their way of life from hunters, gatherers and shifting cultivators to a settled farming system, they have been living in the Lingsey-Lingseykha watershed area. The Limbus migrated there from the western Kanchendzonga range during the 1830s. These tribes possess tremendous knowledge about the plants and animals of this region. They have knowledge about 38 herbal plants and 36 wild edibles. They grow 28 species of cereals and vegetables, 3 major cash crops and around 20-30 different varieties of beans and pulses. Major traditional cereals grown are maize, paddy, millet, buckwheat, naked wheat, and proso millet. Traditional crops lost during last over 40-50 years are dryland paddy, wild millet (Kaguni), and foxtail millet (Pangdure). The forest they were living and worshipping was declared as a National Conservation Park in 1993. Since then their relationship with the forest is restricted.

Based on the recent sample survey 37% of the total Lepcha and Limbu population is within the age group of 18 to 39 years, 44% of the households cultivate in three quarters of the land under their possession, and 79% of household income comes from agriculture and allied activities. The Green Revolution in India enabled a strong public distribution system and access to cheaper rice in the market, resulting in a decline in traditional rice cultivation. These days, rice is grown to sustain the family's tradition, status and elders' interest and tasting. Maize is considered the 'king of the cereals' and everybody grows it. Finger millet is grown especially for making the common local brew 'Chi, Thi, Chyang, Tongbha, Janr, Dungro'. This drink is an integral part of all the rituals, ceremonies, festivals and has significant influences in social system and wellbeing of the village.

Besides following 'ritual-based agriculture practices' they also follow behavioural signals of animals and birds for weather forecast and agriculture operations. Major agricultural operations are done collectively through a system called "Perma" or "Hurrey". This system combines working in the group with fun/pleasure. Most of the individual households have a back garden, which is considered as sacred and only family members are allowed to enter. Mostly herbs, spices, seasonal vegetables and new species are planted there. The area is normally fenced off, serves as a kind of germplasm collections garden and contributes to the conservation of biodiversity. Important agricultural operations are celebrated as rituals and culture, and connected with rituals, festivals and ceremonies like Siri-panchami, Asar ko pandhra, Nuwangi, Dhan Nach, Kodo Nach, Magay Sankrati etc. In the day of "Sri Panchami", for example, which falls sometime during February, they invariably start sowing of maize. "Ubauli" which means, migration of birds and animals to higher hills, signifies rising of temperature and time for sowing of seeds for summer crops. Similarly, they also celebrate "Udhauli" which means migration of birds and animals to lower altitude signifying falling temperatures and time for harvesting of crops. On these occasions, they offer grains, fruits, vegetables, fermented millet, eggs etc to their deities. Some also release finger lings (fish) in the river. These ceremonies are performed at the riverbeds from where birds and animal pass while migrating. These offerings not only provide food to tired migrating birds and animals, but these birds and animals also then spread seeds to different altitudes.

They celebrate "Asar ko pandra" for planting paddy in peak rainy season. At this time of year, they have to do hard field work and do not have time for cooking; as a ritual they eat stamped rice and curd on this day. The main idea behind this ritual is to reduce the workload of women as all women also go to the field. Similarly, they celebrate "Nuwangi" which means taste/sample harvest before final harvest of the

crop. It's a kind of sample harvesting. This practice not only determines the maturity time of the crop but also prohibits unmonitored harvesting. The practice of selecting seeds of cereal crops from the standing crop is called Baliaunu. Mothers or elderly experienced women select the best of the inflorescence with healthy grains from the standing crop and store them separately for seed. The activity of separating grains from the plant after harvest of paddy and millet is done collectively (especially by Limbu) and is celebrated as a ceremonial dance (Dhan Nach and Kodo Nach) by youths where young girls and boys get an opportunity to come closer and begin their matrimonial relationship.

Mountain farmers, especially Lepcha and Limbu, possess huge knowledge about behaviour of birds and animals relevant to weather conditions and their significance to agricultural operations in the field. Based on the visit of different birds they presume weather conditions and prepare themselves for forthcoming agricultural activities. They have knowledge about 28 species of birds that visit their field and villages. Except cash crops and some excess vegetables, other farm products are consumed in the households. Livestock like cattle, pig and poultry are popular which contribute 8% of household income. Meat is an important part of their food. They enjoy occasional hunting and fishing in the wild.

Lost aspects of the IFS:

- Over the period of the last 40-50 years, traditional cereals like Dryland paddy, Wild millet (Kaguni), Foxtail millet (Pangdure) have been lost from the area.
- Agricultural social events like Dhan nach and Kodo nach related to post-harvest operations are discontinued in the field due to decline in its cultivation; however, at different festivals and occasions these dances are performed as cultural events.
- Some of the traditional cuisines made out of millet, maize and other produces have also lost their prominence due to influence of town and city food.
- Traditional knowledge attached to the forest is also being lost and attitudes of sustainable use of forest products are also declining due to reduced interface with the forest and less of a sense of ownership.
- Knowledge about bird and animal behaviours relevant to agricultural practices are also rarely passed on to younger generations.
- Rituals and cultural events have become expensive affairs and shamanistic priests are rare and difficult to find.

Role of IFS and crops in climate resilience, nutrition and sustainability/biodiversity conservation

Resilient practices: The community continues to grow a few local landraces like paddy, two landraces of maize, two landraces of millet, buckwheat and naked wheat. They also grow proso millet "Junelo" in small quantity. These landraces do not have any problems with crop failure; however, there are declines in yield rate. Some farmers have adapted their cultivation practices to overcome some of the threats posed by climate change, like changing the planting time of millet, early harvesting of maize to vacate the land for paddy, following crop rotation and changing the habitat, etc. They still continue to collect wild vegetables, fruits, herbal plants and root crops from the forest. Traditional practices of seed exchange within and between the households, community and villages are still practised. There is also an intrinsic habit of trying out and conserving new species in their backyard garden as traditional germplasm collection. Some of the traditional foods are still common in all the households and some traditional cuisines are prepared during specific seasons, ceremonies and rituals. Even during the COVID-19 pandemic, there was not much shortage of food in villages; in fact, they were growing more and eating more healthy food.

When there are difficulties in any households because of natural or unnatural incidents, there is a practice of contribution by all the members of the society in terms of cash, kind and service which is called "Sarau". This social activity operates through village society, community organisations or self-help groups. The community operates in a coordinated manner while utilising the natural and human resources in agricultural activities.

Nutrition and sustainability: More than 80% of their diet consists of locally grown crops and livestock they maintain. Elders especially love to eat traditional cuisine. There are also rituals and festivals of eating specific cuisines based on particular weather conditions, agricultural activities, social-cultural occasions and sickness; for example, they celebrate “Maghay Sankrati” as a ritual and eat different varieties of root crop including wild, and on 15th January in mid-winter they eat mixed pulses and beans to keep warm. They also collect wild seasonal edibles which have high nutritional and medicinal values. However, there is a continuous influence of modern food culture and cheaper food grains in the market. Breast feeding babies is common practice. The government-aided schools are also provided with balanced midday meals, which operates as a government nutrition programme. Brewed millet drink is an integral part of rituals, ceremonies, festivals and collective field work, which gives immediate energy and satisfies their thirst. It is also popular in social gatherings and gives happiness and pleasure. There is also a traditional practice of preserving surplus vegetables and soya beans, which are important during the lean season and some of them are used for overcoming tiredness, body ache and stomach upsets. Since 100% households are farming, a major share of the food requirements comes from their farms. However, there is an increasing trend of obtaining food from the market because of increasing cultivation of cash crops and off-farm income.

Challenges for IFS:

- Influences of urban lifestyle and food
- Decrease in yield rate of traditional crops
- Younger generations taking more interest in city life and off-farm income activities
- Deteriorating social capital
- Younger generation showing less interest in rituals as they are disconnected with elders because of the more mobile culture
- Inappropriate development schemes of the government
- Aggressive marketing by packed food companies
- Influence of social media, and
- Influence of urban migration for higher education and better livelihood options.

Responses needed:

- Efforts of Community organisations and Cultural and Tribal Development Boards
- Consciousness of health and strengthening immune system (especially with COVID-19)
- Environmental consciousness among social organisations
- Appreciation of local traditional food by the people coming back to villages from cities and towns
- Demand for local traditional cuisines in the tourism (homestay) sector
- Elders sustaining traditional food culture, and
- Rituals and ceremonies sustaining traditional food.

Most research on IFS is done in specific and isolated conditions. There is a need for a platform for integrated research approach of nature and humanities at local level, connected to national and international levels.

Mijikenda Indigenous Food System, Rabai sub-tribe, Kilifi County, Coastal Kenya

Chemuku Wekesa, Kenya Forestry Research Institute (KEFRI)

Key features:

- The Rabai community is one of the nine Mijikenda communities found in coastal Kenya. The population of the Rabai community is 120,813 people covering an area of 207.8 square kilometres, with a population density of 581 persons per km². The number of households is 24,809 with the average number of persons per household being 4.9. About 71% of people in Rabai live below the poverty line.
- The current average farm size per household is 0.84 hectares or 2.1 acres, down from 0.95 ha or 2.4 acres in 2010 — indicating a decline in size of farmlands owned per household.
- The Rabai community occupies a hilly area that has moderate rainfall of 1,300mm per annum, and thus they practise mixed farming, ie both livestock keeping and crop farming.
- Tapping of coconut wine is the main source of income in Rabai mainly due to the large population of coconut trees grown in the area.
- The main traditional crops grown include: coconut, maize, cassava, bananas, sweet potatoes, wheat, pumpkins, green gram and the African domesticates cowpea, finger millet and sorghum. Improved crop varieties grown as cash crops include: cashew nut, beans, vegetables such as kales and tomatoes and grafted fruit varieties such as mangoes, oranges, and avocados.
- The community is endowed with four sacred Kaya forests. These forests harbour over **24 diverse species** of wild food and medicinal plants that the community depends on to supplement what is cultivated and domesticated in farmlands. The species include: *Vibohoya*, *Magwagwe*, *Shomoni*, *Jomoko*, *Pera*, *Majaje tsikitsi*, *Tundukula*, *Koma*, *Mzambarau*, *Fudu*, *Tula*, *Nyenze*, *Mezugarisa*, *Dzala*, *Bokwe*, *Tseketse*, *Hohe*, *Kone*, *Mabuyu*, *Kwaju*, *Kungu*, *Kunazi*, *Fenesi* and *Nanazi*.
- Some of the food plants from the Kaya forests are now cultivated in farmlands and include: *Mkungu*, *Mzambarau*, *Mnyaze*, *Nanazi*, *Mkwaju*, *Mtomoko* and *Mpera*.
- 20 indigenous wild vegetables grow naturally in farmlands and communities. These include: *Thalakushe*, *Mnavu*, *Mtsunga*, *Chitsambare*, *Mrenda*, *Phombo*, *Chikoshu*, *Mwambalu*, *Mwangani*, *Logatsi*, *Chimwaga*, *Mazia*, *Chisonya*, *Chifuga*, *Tsafe mbale* (wild cowpeas), *Mchemche*, *Demu*, *Hoho*, *Tindihoho* and *Madonge*. These vegetable species are wild.
- Pulses (cowpeas, green grams and beans) are also grown. Three main varieties of cowpea are cultivated: *Mbomu*, *Mtite* and *Matso ga paka*.
- Cassava and sweet potatoes are other important food crops grown by the community. The main varieties of cassava grown are *Chibandameno*, *Kaleso* and *Chikokote* while for sweet potatoes, *Mjivi*, *Mkaroti* and *Mweruphe* are the main varieties grown by the community.
- There is a high level of food diversity in the landscape, with over 60 varieties: indigenous vegetables (21), wild fruits (25), in addition to a mix of traditional and indigenous crops — cereals (5 varieties - maize with 3 varieties *Mwangogo*, *Kanjerenjere* and *Mdzihana*, and millet and sorghum with 1 variety each), sweet potatoes (3 varieties), cassava (3 varieties), cowpeas (3 varieties), and green grams (1 variety).
- The main livestock kept in the Rabai community include: poultry, goats, sheep and cattle (both local and hybrid varieties). Others include: ducks, guinea fowl, rabbits, and pigeons.
- A number of hybrids have been introduced such as PH1, PH4, DH1 and DH4 for maize and *Chibandameno* and *Chilesa* for cassava by Kenya Agricultural and Livestock Research Organization (KALRO), and hence threatens IFS.
- Traditional knowledge pertaining to processing and preparation of indigenous foods has been lost mainly due to lack of effective knowledge transfer from older generation to youth — leading to less consumption of indigenous foods.

Role of the IFS and crops in climate resilience, nutrition, and sustainability/biodiversity conservation/health & wellbeing

- The community's adaptation capacity to climate change is supported by the rich agro-biodiversity. Rich agro-biodiversity provides opportunities for improvements in crop cultivars and varieties by harnessing genes from wild species and known varieties, such as domesticated cowpeas (*Mbomu* variety), a high-yielding, pest- and diseases-resistant, and drought-tolerant variety which has been developed by farmers by crossing wild and domesticated cowpeas. Unique genetic characteristics of wild food plants such as resistance to pests and diseases and tolerance to drought have ensured there are high yields even when the weather conditions are not favourable and has ensured that the Rabai community is food-secure.
- Indigenous vegetables are perceived to have high nutritional value and have medicinal value and therefore preferred by local communities because of the multiple benefits and their ability to thrive under diverse climatic conditions.

Challenges facing IFS

- Pressure on land resources — infrastructural development taking place within the vicinity of the landscape is reducing land under crop farming as well as negatively impacting on agrobiodiversity conservation.
- Urbanisation, modernity, Christianity and social transformations are contributing to the erosion of cultural practices and beliefs associated with IFS. The proximity of the community to Mombasa city threatens IFS due to the influence of modernity and migration of the youth and middle aged to Mombasa in search of employment opportunities at the expense of farming.
- Traditional and cultural practices are fast diminishing, posing great danger to the social fabric and cohesiveness of the community who venerate and celebrate them as their identity and symbol of continuity.

Responses needed:

- Community sensitisation and awareness on the multiple benefits of IFS (agrobiodiversity conservation, enhanced capacity of the community to adapt to climate change, improved income, preservation of cultural heritage, improved health, and food and nutrition security), particularly targeting the youth.
- Traditional governance structures (Kaya elders council) which are skewed towards conservation of Kaya forests and whose representation is not all-inclusive should be reformed and strengthened to include women, youth and village elders to ensure that decision-making process takes into consideration the diverse views. The Kaya elders council's mandate could be expanded to include conservation of the entire landscape.
- Pro-IFS policies that promote IFS from farm to markets and plate.
- Land use planning should take into consideration the preservation of unique cultural landscapes to avert the negative effects of industrial development and infrastructural development.

Research to date and priorities for future research

Research undertaken: Documented the traditional crop varieties that are grown by the community and their unique characteristics, traditional crops that have been lost, food diversity of the community both in farmlands and in the wild, innovations that promote preservation of traditional knowledge and cultural practices, traditional governance system, cultural values and domesticated crops.

Priorities for future research:

- Research should focus more on indigenous vegetables including cowpeas whose nutritional value and market potential are very high.
- How is modernity/erosion of culture affecting biodiversity conservation and IFS including agrobiodiversity conservation both on-farm and in kaya forests?
- Link between indigenous food crops and cultural practices, rituals and beliefs.

- How can traditional governance systems be strengthened for enhanced food systems? What other governance frameworks can be put in place to complement kaya elders to sustain IFS, eg involvement of women who determine household food consumption and youth for sustainability.
- Assess the consumption patterns of indigenous foods at household level, restaurants and other eateries. Which indigenous foods are popular? Identify existing markets for different indigenous foods (since market is key for sustaining cultivation); and conduct value chain analysis of various indigenous foods to determine market value.
- Document value addition including preservation of indigenous foods. Focus on preservation methods which do not alter nutritional value, and how long each food type can be preserved.
- What should be done to market and popularise traditional foods/cuisines? Which marketing platforms are effective? Eg use of traditional restaurants and documenting traditional cooking methods for sharing with restaurant owners as a means of promoting and popularising indigenous foods.
- Conduct inventory of traditional food and medicinal plants currently grown on farms and found in kayas.
- Identification of traditional food plants, domestication, cultivation, collection and propagation methods/multiplication and preservation including viability, focusing on traditional preservation methods (community seed bank, and gene bank).
- Identify factors hindering Indigenous knowledge transfer on traditional food systems. Look at the link between weakening cultural practices and beliefs and loss of knowledge on preparation of traditional foods.
- Assess the roles of girls and women in sustaining IFS.

Indigenous food system past, present and future: Rabai Community representative/elder

1. We had approximately 60 types of food crops in the past but now they have reduced to 25-30 types because of modernised food.
2. There was enough land in the past because the population was scarce compared to the present time; that population has grown big and many investments have been brought to the interior land.
3. Rabai cultural practices, and their integrity were safeguarded by a council of elders who employed a system of taboos and traditional rules to protect traditional food crops and forests that acted as a seed bank in the past. But today, there is weak enforcement of laws by kaya elders during planting season and conservation of forests coupled with a loss of cultural values that have traditionally been used to conserve both the traditional food crops and forests.
4. The rapid population growth and erosion of cultural values by local communities have caused extensive loss of these IFS.

Key challenges/threats facing our IFS:

1. Erosion of traditional knowledge has resulted in loss of germplasm for traditional crop varieties further threatening food and nutrition security.
2. Inadequate awareness of modern farmers on the value of traditional food crops has further resulted in their neglect.
3. Important cultural rituals conducted by Kaya elders before planting season and during harvesting of the food crops have been lost due to modern education, religions and weakening of Kaya elder's council.
4. Weak enforcement of protection laws and the erosion of cultural values and beliefs used to protect the traditional food crops inside our forests which are increasingly being degraded mainly as a result of population growth, and overdependence on natural resources by local communities.
5. Industrialisation
6. Changing of weather patterns, experiencing of long dry season.

Responses needed:

1. Documenting of the traditional food crops available
2. Plant those available in our forests to our homestead farms
3. Construction of a modern seed bank.

Webinar 3: 14 October. Co-creating research agendas: Indigenous priorities and interdisciplinary research gaps

This webinar explored Indigenous Peoples' priorities for research — both in terms of the issues that need further research and the methods and approaches that should be used to conduct research. For example, should we be going beyond participatory approaches to support the use of Indigenous Peoples' own theories, concepts, and methods for research? What should be the role of academic researchers? The webinar also explored ideas for interdisciplinary research, that draws on more than one discipline. IFS cut across many disciplines — botany, environment, agriculture, nutrition, socio-ecological systems, humanities, governance, markets. We need to draw on different disciplines to fully understand them and address the challenges they face.

Summary

IFS and biocultural heritage are fundamental for Indigenous Peoples' food sovereignty, identity, spirituality, health and wellbeing. They also have a significant role to play in the transition to sustainable food systems, and can make an important contribution to national economies (eg pastoralism in Chad). IFS face many threats and traditional knowledge is disappearing very fast. Research must focus on these threats and challenges and not only on IFS themselves. Threats include policies restricting resource use (forests), promoting modern agriculture, modernisation, inappropriate economic development and education.

There is a critical need for research on Indigenous Peoples' Land Rights, an area which is under-researched:

- As Hindou Ibrahim explained, in Chad most land belongs to governments and land that is vital for pastoralists is being sold off to sedentary people.
- In the Arctic region of Russia, the introduction of industrial development has almost destroyed a traditional way of life; traditional food culture of hunting and fishing is very close to nature and the traditional diet is essential for survival in the harsh climate. In response to climate change, Arctic people must return to IFS and for this they must preserve their land.
- Hunter-gathers are mobile, egalitarian, culturally diverse, but are very threatened by economic expansion and protected areas.

Indigenous Peoples don't use the term 'food security' but rather 'food sovereignty' — the latter is also a priority for research, as it is essential to sustain Indigenous knowledge systems, as is maintaining 7-generation thinking of Indigenous Peoples (eg in Chad and in China). Traditional knowledge must be respected on the same level as science — it contains ancestral wisdom (science is often just information).

Phrang Roy stressed the need to gather evidence of how destructive industrial agriculture is to Indigenous Peoples (eg in Asia); the need for researchers to respect the value of IFS and Indigenous knowledge (rather than viewing them as backward); and the need to mainstream Indigenous perspectives and knowledge in research, to respect Indigenous Peoples' rights / UNDRIPs; and support Indigenous methods of knowledge transmission, eg story-telling. He stressed the need for a multicultural research approach that blends Indigenous knowledge and science. The Multiple Evidence Based approach allows you to combine Indigenous knowledge and science.

Indigenous Peoples would like academics to recognise them as equally expert. Academics can play a useful role in helping to show that Indigenous Peoples are experts; and should support Indigenous-led research. Conventional research that is externally led is not useful to Indigenous Peoples and can never fully understand them. But there is much scope for collaboration when there is mutual respect. Indigenous Peoples don't have separate fields of study, everything is interlinked — so community-led research can provide the framework for interdisciplinary research. It is crucial to empower communities, support community networking, understand governance and engage at policy level. More research is also needed on gender and women's health issues.

The new Global Hub on IFS coordinated by FAO brings together universities, the UN, and Indigenous Peoples, and seeks to inform policy processes, eg the Food Systems Summit in 2021. Yon Fernandez-Larrinoa from FAO confirmed that UK universities can become members of the Global Hub — emphasis is placed on institutions and research centres that do hands-on research with Indigenous Peoples and respect the principle of FPIC.

Panel on Indigenous Peoples' research priorities

Hindou Ibrahim, Mbororo community, Chad, activist on Indigenous Peoples' rights, climate change and women's rights

Milk is the main basis of the traditional food system. We are transboundary people, across Cameroon, Nigeria etc. Cattle contributes about 40% of GDP. As Indigenous Peoples we don't call it food security, we call it food sovereignty. Every two days we sell cattle. We have millions of cattle, also have sheep, goats, chickens. It's a sustainable land use system because not all land can have cattle, and it ensures our food sovereignty. The main challenge relates to land — most land belongs to the government in the Constitution. The community is on the move for 6-9 months, and previously they came back to find fertile land, but those lands are being sold by sedentary people, and there are transboundary issues impacting our food system and food sovereignty.

We used to milk more during the dry season, now only two days, because we don't have enough, and it is our economy. We didn't learn this system from academia. Researchers need to understand and respect our community decision-making processes, and can never understand us/our food systems unless they fully engage us in the research process. A big problem is that people use milk powder in cities and that destroys our economy and replaces our food system. Research must focus on:

1. Land rights first — this is essential for our food sovereignty for our people and for others who are benefiting from it for food security.
2. A focus on food sovereignty is essential to sustain our knowledge system and we also need to build networks, and maintain our 7-generation thinking.
3. Getting traditional knowledge respected on the same level as science — who are you (as western researchers) to 'validate' our knowledge? Recognising the validity of traditional knowledge is very important to confirm our knowledge which is ancestral.

Research and academia can help and support us to develop these ideas. Lastly, there is no access to finance in Chad and 35% hunger — need to direct funding to Indigenous Peoples to protect their own food systems, because they are resilient to drought.

Phrang Roy, Indigenous Partnership for Agrobiodiversity and Food Sovereignty (TIP)

IFS is an area that many of us know very little about. In the last two webinars of this virtual workshop, Indigenous speakers gave vivid accounts of the connectedness of their Indigenous food and knowledge systems to nature, place and community-based learnings, evolving cultures and rituals. Joji Carino, using the example of the Cordillera Region of The Philippines gave a vivid account how the full impact of industrial agriculture at the local level is not fully appreciated by national policy makers who are eager to simply monetise agriculture. She spoke about how biodiversity-rich home gardens, shifting cultivation and culture-based livelihood practices have in the process been marginalised and made dysfunctional.

The problem with traditional research on IFS is the historical perception that there is something backward, underdeveloped and problematic with IFS. UN publications have highlighted the concrete contributions that IFS have made towards sustainability, but this is not enough. Today, more than ever, we must gather evidence at the local level to demonstrate to our local and national policymakers how destructive industrial agriculture is towards the wellbeing of all. Our local data must inform their strategies.

The other research priority must be to mainstream Indigenous perspectives and knowledge that are often overlooked in conventional mainstream research. Culture, rituals and local knowledge systems, as

we heard in the last two webinars, have contributed to the wellbeing of various Indigenous communities. Our research work must also contribute to the body of knowledge of Indigenous Peoples — for their own needs as a people rather than as an object of investigation. As Indigenous Peoples we expect that the research approach must be an appreciative enquiry which is respectful, culturally appropriate, ethical and reciprocal. It must be consistent with the main principles enshrined in the UNDRIP.

Research priorities, within Indigenous communities, are constructed through everyday experiences and relations between communities and the landscapes around them. They learn by observing, by listening and by contributing where women, children and elders all play an equal part. Our research methods must include these aspects of Indigenous knowledge generation. Storytelling, for example, could become an important instrument to capture these processes in our research work.

Our research priorities must also identify practical infrastructure challenges. In 2012, our North East India Project presented over 100 species and varieties of wild edibles and fruits to Slow Food's Ark of Taste inventory. FAO found that most were not listed in FAO's INFOODS's (International Network of Food Data Systems) inventory. However, no nutritional analysis could be undertaken for want of an appropriate laboratory nearby.

Finally, in co-creation, research work must move beyond multidisciplinary into a multicultural approach. Indigenous communities and Indigenous organisations such as TIP and its partners must play a leading role in Indigenous territories with FAO, IIED and others as supporting organisations. By empowering Indigenous communities, we will co-create a meaningful research agenda. As an Indigenous organisation, we extend our hand of collaboration and support along this less travelled destination.

Hunter-Gatherers, Edmond Dounias, IRD (Research Institute for Sustainable Development)

Present-day hunter-gatherers are Indigenous Peoples whose ways of life are essentially based on the collection of non-domesticated resources. Many of them are now referred to as 'post-foragers', given that these peoples are increasingly forced to renounce their hunter-gatherer lifestyle. Heavy dependence on wild resources exposes them, more than any other Indigenous Peoples, to the dramatic degradation of their natural ecosystems.

Present-day hunter-gatherers are estimated up to 10 million individuals. They represent less than 2% of the "Indigenous Peoples" group and 0.12% of the world's population. But this tiny portion of humankind is the custodian of 6% of the languages still spoken in the world today. So, they are small in numbers, but highly diverse and highly threatened. There is a striking parallel with a broad part of the biological diversity, composed of countless species that are small in number, extremely localised and which may have disappeared before we know that they ever existed.

Present-day hunter-gatherers are mobile and move around over vast territories regardless of state borders; this often impairs the recognition of their right to citizenship. Present-day hunter-gatherers are egalitarian peoples; the absence of leadership raises problems of representativeness in the political arenas and impacts on how field surveys are conducted as it implies working with the entire community. Present-day hunter-gatherers are doubly penalised: they are ostracised, stigmatised, marginalised as Indigenous Peoples; but they are also often treated all the same by other Indigenous Peoples. Therefore, they are systematically excluded from political arenas where other Indigenous Peoples have representatives.

Present-day hunter-gatherers still arouse our western collective imagination; unfortunately, fantasy and elucubrations get the upper hand over the objective reality of their life conditions. An anachronistic image of the primitive noble savage persists among the general public, the media and decision makers who see these people as a reminiscence of our pre-agricultural past. Two diametrically opposed but equally harmful attitudes result from this: Either one wants to lock hunter-gatherers up in eco-museums as one would do with a mammoth bone; or force them to give up a way of life that most authorities consider as non-decent: in either case, we ignore that they are our contemporaries, and they are deprived of their right to self-determination. Present-day hunter-gatherers are often caught between a rock and a hard place because they are just as much victims of the destruction of their environment by economic expansion as they are by conservation policies.

Last but not least, hunter-gatherer children are all too often forgotten interlocutors; in contrast to our Western system of thought, hunter-gatherers do not consider their children as just "adults-to-be". Children are full-fledged actors within households, they have their own culture, forged on a perception of the environment that is not that of adults. They are holders of a substantial part of the knowledge of their society and they transmit it horizontally to each other, without the intervention of adults. They also hold their own self-determination, which is not controlled by any parental authority. Taking an interest in hunter-gatherer ecological knowledge requires working also with children and obtaining their direct informed consent, but this may expose the researcher to ethical barriers vis-à-vis an international child-right legislation that does not take into account the particularities of these peoples. To conclude, we need to dedicate specific efforts, resources and methodological thinking towards hunter-gatherer societies, despite the fact that they represent only a minor fraction of the Indigenous Peoples.

The traditional food system of Indigenous Peoples of Yakutia, the Arctic, Vyacheslav Shadrin

The Evenki, Evens, Dolgans, Yukaghirs and Chukchi are Indigenous Peoples in Yakutia. The traditional food system of these peoples of the north of Yakutia is determined by the habitat. The extreme climate and living conditions influenced the diet of Indigenous Peoples. The modern food culture of the peoples of the North has undergone significant changes with the loss of traditions. The cause of many diseases is poor nutrition, lack of vitamins and minerals. The specific genetics of our peoples does not allow the use of modern food products and drinks. The way out of the situation of extinction of the northern peoples is to return us to our former economic structure and traditional food culture, which is closely related to traditional nature management.

The traditional culture of the peoples of the North is based on hunting, reindeer husbandry and fishing. At the same time, each of the nationalities has its own cooking skills and special culinary recipes, but the main food system is the same. A characteristic feature of this food culture is the consumption of raw foods, without heat treatment. Those who eat raw meat and fish do not get scurvy and do not suffer from vitamin deficiency.

We distinguish three types of raw meat consumed. The first type: fresh steamed meat of deer, walrus, seal. Fat and blood of the animal is eaten, cut off in pieces. Such meat is distinguished by its tenderness, softness, and special taste. In a mixture of blood and milk, the drink is considered healing. The second type of consumption of raw meat is steam, seized by frost. It has not yet lost its value. Stroganina is made from such meat or fish, cut into thin long shavings, flavored with hot spices, herbs, frozen berries and others. The third type of meat consumption is dried in the cold and wind. There are various ways of cooking fish: it can be eaten both raw and frozen, salted, sauerkraut, baked in ash, boiled, while it is not fried. The favorite hot dish of all northern peoples is tea with milk. Eggs and partridge meat are also cooked using local herbs.

Thus, the traditional food culture of our peoples corresponds to the genetic characteristics of our peoples, the northern climate, and our way of life. The desire of every nation to return to its roots, origins, and traditions has not been lost. It is necessary to help people in creating conditions for economic management and revival of the culture of the northern peoples. It is necessary to restore the connection of the organism of the northerners with the external environment, with the ecological conditions of life. The Indigenous Peoples of the North eat non-traditional food products for other peoples, which allow the body to fully develop in harsh climatic conditions.

A common feature of modern changes among the Indigenous Peoples of Russia was the reduction of the used territories due to the introduction of various types of industrial development. All this almost destroyed the traditional way of life and types of economy and led to severe environmental consequences. And the main challenge facing us is the loss of our lands.

Break-out groups on Indigenous Peoples' research priorities and interdisciplinary research gaps

Introduction on the need for interdisciplinary research: Philippa Ryan, Kew and Krystyna Swiderska, IIED

Different elements within food systems are mostly studied separately, but many of the talks have highlighted the connectedness between crop diversity, local environments, agricultural practices, and foods, and also the cultural and spiritual importance of seeds and related rituals. Additionally, several talks have highlighted how farming systems are changing, with crop and food diversity being lost, and further threatened by climate change and because of increasingly endangered traditional knowledge. It is clear therefore that developing interdisciplinary and multidisciplinary approaches is important for studying Indigenous Peoples' food systems from a holistic perspective, for documenting knowledge, to understand drivers of change, and to understand the relationship between biodiversity and cultural heritage.

Interdisciplinary research is needed to provide a more complete understanding of IFS as a whole, from farm to plate, including issues at the interface between disciplines, such as the relationship between biodiversity and culture. And to ensure that research in different sectors supports Indigenous Peoples' priorities and rights and does not undermine them (eg we heard how forest science has influenced policy and undermined IFS in Thailand). We can draw on different disciplines to strengthen evidence — for example, agricultural research can show present day resilience of indigenous crops and complementing that with archaeobotany can show long-term historical resilience in particular local contexts. Research involving Indigenous knowledge and science is also interdisciplinary and crosses epistemologies, and can provide a richer understanding of IFS and help to address complex challenges.

The break-out group objectives are:

1. To further explore the research priorities of Indigenous Peoples (issues, approaches, methods)
2. To share ideas for interdisciplinary research, eg how can different disciplines be combined to fully understand IFS, and better address the challenges they face?

Group 1:

- The Multiple Evidence Based approach values all knowledge equally; objectives are decided by Indigenous Peoples and scientists together; it gives a richer picture, to discover new things that wouldn't be discovered otherwise. Each knowledge system creates its own evidence, which is validated within their own knowledge system, and both types of evidence are valued equally. Objectives can really clash — for scientists having their name visible is important; for Indigenous Peoples the wellbeing of their group is important.
- Scientists can never fully understand Indigenous Peoples without actively engaging them in research — first scientists must understand that they are not bigger experts than Indigenous Peoples. Academics can help Indigenous Peoples by showing that Indigenous Peoples are experts. Researchers need to understand Indigenous Peoples' governance systems before visiting communities, and respect them.
- Indigenous Peoples don't have separate fields; everything is combined and interlinked, eg in meteorology western scientists have three seasons, but we have six seasons for food production — a different classification.
- Academics mix concepts — information and knowledge. A lot of academic knowledge has very little wisdom, and a lot of science provides information, not knowledge. However, Indigenous Peoples' knowledge is ancestral and full of wisdom.
- Academics can expect Indigenous Peoples to do their own research, based on Indigenous knowledge to stem its loss, eg our children are losing names for plants. Also, academics can do analyses of nutritional value, and help to track how Indigenous Peoples are improving their soils. There is a lot of scope for collaboration, provided scientists and Indigenous Peoples respect each other.

- There has not been a better time to give research back to Indigenous Peoples as it is now possible to develop Android Apps on ethnobotany. Academic systems and journal reviewers discourage interdisciplinary research.
- Indigenous Peoples in China also have 7-generation thinking and 24 farming seasons, and continual interaction with nature, so we really need to promote community voices and enable communities to play a key role and respect their knowledge as wisdom. We have different sectors but Indigenous Peoples consider different sectors all together, so interdisciplinary research can be promoted by supporting community-led research. We need to work at policy level to empower communities (like in the Potato Park, you can see the communities' pride).
- All the issues we have discussed are structural; research doesn't focus enough on land rights.

Group 2:

- We need to look for long-term solutions – what is a sustainable solution?
- Interdisciplinary research raises the question of how to measure impacts of research – it can use a mix of qualitative and quantitative approaches, but the timeframe for impacts to materialise may be beyond the funding cycles of donors. We can use citizen science.
- We need to work with community institutions. It is important to talk to different actors in communities as they have different knowledge.
- We need to look at how IFS are working in the context of other cultures around them.

Group 3:

- It is not so useful to discuss combinations of disciplines, but rather we need concepts that bring them together. Livelihoods underpin everything. Rituals are very important.
- Governance of IFS is a crucial aspect — it is important to empower communities and women; and more research is needed on gender and women's health.

Global-Hub on Indigenous Food Systems, a knowledge platform generating evidence for policy on sustainable food systems

Yon Fernandez-de-Larrinoa and Anne Brunel, FAO

The Global Hub on IFS is a platform that brings together universities, UN agencies and Indigenous Peoples to enhance learning, preservation and promotion of IFS in the face of various pressures (eg from extractive industries). IFS can play a significant role in informing the transition to sustainable food systems — very important to inform the UN Food Systems Summit. Traditional knowledge is disappearing very fast — education systems and out-migration are affecting inter-generational transmission; there is a need for inter-cultural education. The Global Hub aims to bring evidence on the importance of IFS to policy processes, such as the UN Food Systems Summit. It places Indigenous and scientific knowledge on an equal level, and draws on academic publications as well as facilitating direct participation of Indigenous Peoples. The Global Hub's Work Programme comprises four key elements, shown in the image below.



Webinar 4: 15 October. Exploring research methods: Interdisciplinary and Decolonising Methods for Research on IFS

The webinar consisted of two sessions:

- Session 1: Short talks on different Interdisciplinary Research Methods that can be used to better understand IFS, enhance evidence of their importance, and address the challenges they face.
- Session 2: An Indigenous Panel on Decolonising and Indigenous Research Methods that seek to empower Indigenous Peoples and help address key challenges through the research process, eg by promoting transmission of Indigenous knowledge, enhancing capacity to protect rights and biodiversity.

Panel 1: Interdisciplinary methods for research on Indigenous and traditional crops, whole food systems and temporal changes (Chair: Philippa Ryan)

Combining ethnobotany, local agricultural histories and archaeobotany: Philippa Ryan RBG, Kew

Ethnobotanical approaches to studying Indigenous Peoples' food systems can include documenting crop diversity and uses, and the relationships between crops and land use, and between crops and foods. All these elements are connected, and subject to dynamic change. There are multitudes of reasons for growing particular crop varieties including for different uses such as food or fodder, for their cooking properties, for their resilient traits or yield, and for their suitability to seasonal cycles or types of land. For example:

- **Documenting crop diversity and uses within the agroecological context**, could include recording which crops are grown in different microenvironments, created for example by differences in soils and altitude, or through land-use systems such as terracing and home gardens, and why they are grown there. This would mean recording crops grown, and how they are grown together, in different categories of land/land use.
- **Studying crops from cultivation to cooking practices** can include all the practical steps — from harvesting, through to storage, and food preparation, and how they connect with material culture, technologies, and cultural practices.
- **Documenting farmers' memories can provide valuable information about past crop uses, about the advantages of different crops, about growing methods, and reasons for any changes.** Many crops considered minor today have been more important in the recent and ancient past, and historical approaches can provide insights into changes to crop use. Many changes have happened in the last 50 years — and farmers can report on these changes. Historical documents and archaeological data can then additionally provide important information on crop long-term histories, eg when they were first grown in the region – and this provides insights into their local environmental suitability.

Project example — Past and present agriculture and food systems in Sudan, with Mohamed Saad (NCAM Sudan): The project is based in the hyper-arid north in Nubian villages. Agriculture is centred on family farms and dependent on the River Nile. Farmers were interviewed about the crops they grow today, where they are grown, and about cultivation and crop processing methods (focusing on cereals and pulses), as well as associated foods. In oral history interviews with elderly farmers we learnt about crops, cultivation, land use and foods in the mid-twentieth century before the irrigation system changed and many new crops were introduced. Interviews were semi-structured and open ended, with individual households and groups. Crops grown (today and the past) were listed to enable temporal comparison and to see differences between farmers' practices between households within a village or between villages. We noted when/why crop uses have changed. It was noted where and when crops are grown to understand the seasonal patterns, and why crops are grown in certain areas,

eg due to soil types, or their uses. Farmers were asked which crops are regarded as the most important and in which seasons (and why, eg commercial/resilient/cultural). These topics were discussed in the present-day and oral history interviews.

Today, there is a mix of new and old practices, crops and food traditions and these are changing rapidly. Several previously staple crops are now minor food crops, and there are many reasons for such changes, including shifts in food preferences and processing methods. Many of these crops (and old landraces/varieties) are now just grown for home use in small patches, especially along the riverbanks (almost like home gardens). Today broad beans are the dominant commercial and food pulse crop, though previously, a wide diversity of pulses were eaten more frequently, especially lablab and cowpea. Baked wheat bread has also become an increasingly dominant food, partly replacing flatbreads. Flatbreads are also now made from fewer types cereal and pulse flours.

Changes in crops and foods are also reflected by material culture changes such as the gradual disappearance of many traditional kitchens and storage rooms. Most of the dominant hybrid crops in use today can only be grown in the winter and are dependent on intensive irrigation. In contrast, the crops dominant in the past are low-input, stress tolerant, and can be grown throughout the year (these are mostly African cereals and pulses, and also hulled barley which is from the Near East but was an important crop in the Nile valley for thousands of years) The previously important crops have a long history of use in the archaeological and historical record of the region, which helps to highlight their environmental suitability.

Botanical plant identifications and linking these with local names is always a key element. Recording the names of crops and foods in Nubian, as well as Arabic, was also important. Nubian can sometimes be more specific for crop/food names, and this knowledge is endangered as it is now mostly held within the memories of older generations and is little recorded. Nubian languages are also endangered. To help preserve local agricultural histories, the findings were summarised in a booklet that was shared with local communities. Its content and design involved the local community and teachers. This included many photographs and also some illustrations, and a glossary of agricultural words in local language.

Mohamed Saad then discussed our research in Sudan further via video — he especially talked about farming in the time of the *saqia*, which is the culturally iconic waterwheel that was replaced by diesel pumps by the 1970s, how the seeds and land use have changed since then, and how some of the old seeds are very resilient and suited to the difficult climate.

Ethnobotany, Participatory Action-Research and agrobiodiversity: Rajindra Puri, University of Kent

Ethnobotany studies the relationship of people to plants; and we think of that relationship as mutual, an interdependency caused by co-evolution that results in what we call biocultural diversity. Our food plants and other cultivated crops are some of the clearest examples of this ongoing co-evolutionary process; we have manipulated and domesticated these plants and produced agrobiodiversity, but they have domesticated us too, and produced the knowledges needed to grow, protect, harvest, process, cook, store, and use those plants; and those uses derive ultimately from the material, symbolic and spiritual needs, beliefs, practices and values that underpin the cultural lives of peoples around the world. So, when we speak of agrobiodiversity that is only half the story, for what are plant varieties, seeds and other plant parts without the cultural contexts and shared knowledges that enliven them and give them meaning? Losing one aspect here necessarily leads to losses in the other. Maintaining crop diversity requires maintaining the recipes for dishes, the celebratory feasts and rituals that require these special varieties. Conserving biocultural diversity is therefore a multidisciplinary task, requiring integrated research on this co-evolutionary relationship, on this biocultural diversity, on its resilience and threats to it, from globalisation and climatic change to name a couple, and on its changing nature/culture as it transforms in the face of both internal and external forces of change.

There are many manuals and many examples of research of this kind being conducted around the world, but today I wanted to focus on PAR, participatory action research, using tested and tried ethnobotanical methods to solve problems, but being conducted by residents of communities who are trying to resolve problems and develop new directions for their lives and livelihoods. Our role in this is as consultants (ie advisors) and trainers, gathering together people to help them think through issues, providing training, and funds, to collect and analyse data for themselves about themselves, helping them to protect, store, and disseminate their knowledge as they see fit. One fact we have learned is that no one knows everything about the plants people know and use, and what people do know often differs: there are knowledges of men and women, of children and elders, of farmers and gardeners, etc.

One important role of an ethnobotanist in PAR is to find ways to get people to share their own knowledges with each other (eg Mark Plotkin's Sorcerer's apprentice; Basketry among the Dusun in Sabah — elders set up workshops to teach their children). We do this through interviewing in focus groups of say only older women or only young men, so they can teach and learn from each other; through community mapping exercises, inventorying gardens or along plant trails, all done by community members. They may collect specimens and seeds for a community herbarium, garden or seed bank, or sit down and write a plant manual in local language for their kids. Or they may choose to record it all on video, using what we call participatory video, developed by people at Insightshare.

I have been associated with several of these projects over the years, and our students at Kent have been leading the way through their projects and engagements with communities to produce gardens, manuals and video. I'd also point out the work done by the Global Diversity Foundation, who emphasise long-term commitment to communities, to foster research capacity so that communities can document their own knowledges and protect their own biocultural diversity. In India, where I have been working, ATREE (Ashoka Trust for Research in Ecology and the Environment) researchers have helped communities deal with impacts of invasive *Lantana camera* on forest undergrowth by setting up nurseries to grow some of their important wild food and medicinal plants in their home gardens. In Sabah, GDF led a PAR project with Dusun communities and NGOs to use participatory resource inventory methods to document knowledge and use of plants for the purposes of designing community use zones in the Crocker Range Park. All that research and training and their GIS maps became vital when a proposal to damn and flood their valley was dramatically announced. Fortunately, they were successful in killing off the project.

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Using ethnobotany, botanical linguistics and anthropology to understand Indigenous food systems – the urgent need for documentation: Roger Blench, Cambridge University

Why we need basic documentation. The documentation of basic ethnobiological systems remains in a very poor state and has perhaps deteriorated in the last 40 years. Activism is crucial but without underlying documentation has a weak evidential base. Much existing documentation is in obscure sources or languages not easily available. A key task for the future would seem to be to make it accessible. Similarly, the web is littered with unmaintained databases, which contain valuable but unused material. This is because it is usually prepared on time-limited grants and the creator moves on.

Interdisciplinarity: Institutions speak with forked tongues. It may be that one section has an interest in useful plants and their promotion, but other sections (where the money is) push for 'hard science'. There is much talk of interdisciplinarity, but this is extremely hard to implement in practice. Funders often support advances in individual disciplines which makes plant scientists turn away from economic botany. Hence journal reviewers similarly typically reject this type of work (as journals are often discipline specific).

Documentation: Some examples — I work in Nigeria and north east India, where 502 and circa. 250 languages are spoken respectively. Satisfactory ethnobotanical and ethnozoological documentation exist for about four languages in Nigeria and none(!) in north east India. So, we therefore have an uphill task. One reason is a lack of field guides. There are no usable field guides for many areas of Nigeria, with adequate photos and durable presentation, so it is hard even for a willing researcher to achieve the goal. In north east India, the only field guides are for mammals and reptiles. No types of plants are documented and there is not even a basic flora.

Botanical science for conserving orphan crops and Indigenous knowledge: Paul Wilkin, RBG Kew

These comments also cover exploited plants across the spectrum of plant domestication. In terms of botanical science methods, it boils down to four key questions:

1. What is it? Inventories — species, landraces, and varieties. And also looking at traits and variation, and in current research approaches we would also want to look at genetics and genomics as ways of describing understanding diversity, and we would want to see participatory, restored and shared knowledge.
2. Where is it? We would want to geolocate the material we are looking at, and that brings into play a lot of spatial research methods that there is not time to discuss today.

After these first two steps, we start to think about:

3. Conservation? a. looking at cultivation, in situ, or close to in situ; and b. ex situ — seed banking or cryopreservation.
4. What do we do with preserved material? How do we regenerate — It is important to look at things such as seed germination.

Seed crops like cereals are easier to bank. Vegetative crops are harder to conserve ex situ. Eg cryopreservation is one possibility for yams (freezing).

Using plant diversity and ethnobotany to support community livelihoods: A participatory multidisciplinary approach: Tiziana Ulian, RBG Kew

This is a quick overview of the Useful Plants Project (Botswana, Kenya, Mali, South Africa, and Mexico) to highlight the research methods which we use, go to the following link:

<https://www.kew.org/science/our-science/projects/project-mgu-useful-plants-project>

The aim was to enhance the ex situ conservation of indigenous useful plants (important for food, medicine, construction, etc) to support community livelihoods by building the local capacity to

successfully conserve and use these species sustainably. The main components of the project included:

- Targeting and prioritising useful plants with local communities
- Ex situ conservation of useful plants through seed banking
- Propagation and conservation of useful plants in local communities through the establishment of community gardens and by supporting agriculture and forestry activities, and
- Sustainable use and income generation from useful plants.

We applied a participatory approach by working with local communities and collaborators and reaching out to stakeholders, for example, we involved the forestry sector in Kenya. Our approach was multidisciplinary as we carried out research to enable the conservation and sustainable use of these plants which involved ethnobotanical methods, research on seed biology and ecology of the species, and the development of propagation protocols and establishment of agriculture and forestry plots (exotic vs. indigenous species) where we assessed plant survival and growth rate. We decolonised our science through participatory training workshops and the provision of technical and scientific advice as well as by supporting the enhancement of conservation and propagation facilities in the communities (eg plants nurseries and tools).

One of our main outputs was a technical book published in 2019: *Wild Plants for a Sustainable Future: 110 multipurpose species* where we compiled all the information gathered during the project for the most important plants used by the local communities. A link can be found here:

<https://kew.iro.bl.uk/work/sc/e5f06281-47b4-4ab1-9b5e-7220abc066a8>.

- Each species profile includes a description, information on taxonomy and nomenclature, fruits and seeds, distribution, habitat, uses, known hazards and safety, conservation status, seed conservation, propagation, and trade. Illustrated throughout with images of the plants in the wild, associated habitats, seed morphology, and use in cultivation.
- This is a book aimed at practitioners in governmental institutions and NGOs working in Africa and Latin America, to promote the conservation and sustainable use of wild multipurpose indigenous plants in conservation, agriculture and forestry projects and to help addressing the UN SDGs 'to end poverty, protect the planet and ensure prosperity for all'.

Identifying archaeobotanical evidence of plant processing techniques: Julian Garay-Vazquez, University College London (UCL)

Julian's research focuses on the study of Indigenous human-plant dynamics of the Antillean Caribbean through the analysis of carbonised plant remains. Additionally, he works on revitalising indigenous foodways using a combination of experimental archaeology, ethnographical information, modern recipes, and archaeobotanical information. This presentation discusses how archaeobotanical analyses look at human plant dynamics. We can identify lots of different plants in the archaeological record, but often we understand less about how to process them. Some of the information about how to process plants can be found and recovered in the archaeological record. We can use archaeobotanical methods to help bring back some methods that have been lost. Two slides presented show methods for (a) linking crops with processing methods and cooking — research is focused on yuca, Manihot, and cassava — and we see images of different stages of processing (including steps to do with detoxifying and turning Manihot into flour). This helps to understand the processing steps and what this looks like. (b) The second slide discusses methods for identifying meals from carbonised archaeological remains found at historical sites, to look at food histories. These crop histories can help to contextualise food habits for Antillean Caribbean. And he discussed working with communities and wider aims of reviving Indigenous food practices.

A long-term view on lost and orphaned crops: Dorian Fuller, archaeobotanist, UCL

Archaeobotany is the study of preserved plants from ancient human sites. It can tell us about long-term changes in the crop repertoire of certain regions, eg which crops have come in and out of use over time, and about the changing diversification of crops; about how crops grown have changed since the Columbian exchange, eg we have heard about how maize is an important crop in many countries in Asia and Africa today, and this is comparatively recent. Archaeology can also tell us about crops that have disappeared.

Orphaned crops: These today have a minor presence geographically and statistically and the modern populations are unlikely to represent the past genetic and ecological diversity. An example is brown-top millet (*Brachiaria ramosa*). This is only grown on a small scale today in India. For example, an ethnographic study has documented two villages that still grow it today, mainly as ritual foods — ‘*relict cultivation and food stuffs*’.⁶ In contrast to the use of this millet today, evidence from excavated archaeological sites tells us brown-top millet was a major crop in south India. From 4500-1500 years ago it was a staple crop. What is left today is just a small example of its past use.

Lost crops: This means crop taxa that are not grown today but were present in pre-history, eg there are several examples from north east America such as iva oilseed. There are also lost types of wheats in Europe that are only now found at archaeological sites.

Documenting traditional crops, agri-systems, and temporal changes in Kenya: Matthew Davies, UCL

This talk is about a long-term multiple partnered project in Elgeyo-Marakwet County in Kenya on food systems (includes East African Herbarium, BIAA, the University of Eldoret and more). The region is well known for its pre-colonial irrigation systems. Part of the research has been to create a detailed history of the rural economy and landscape and connections to food production. The citizen science team and the community has helped define the research. Diverse research methods have been used including:

- Physically mapping the landscape with groups, has included mapping contemporary and historic features connected to food production and settlement patterns, field boundaries and irrigation, erosion, buildings.
- Participatory mapping of individual fields and farms including boundaries, pathways, and what is grown where and when. They have done repeat mapping of some fields over the last eight years to see changes.
- Ethnobotany — 10 varieties of sorghum and 12 varieties of finger millet have been identified.
- Various types of ethnographic and ethnohistoric interviews with farmers and field surveys.
- Smartphone use has also recently developed as a data collection tool. Farmers record their cropping practices, and document all the ways crops are grown together in different combinations, and the problems they are facing.

The aims include helping to show diverse small farmer practices, rethinking the distinctions between traditional and modern practice, and placing small farmers as central to innovations (not just the recipients of).

Oral history as a method for studying the meanings of foodways amongst women smallholders in Karnataka, India: Sandip Hazareesingh, Open University

This talk is based on recorded and filmed oral history interviews with women smallholders in Karnataka, India, in the context of a recent AHRC-funded project, ‘*Changing Farming Lives in South India, Past and Present*’. Foodways refers to the study of the meanings of food production and consumption and is essentially about how food intersects with culture and history.

⁶ See: Kimata M, Ashok EG, Seetharam A (2000) Domestication, cultivation and utilization of two small millet, *Brachiaria ramosa* and *Setaria glauca* (Poaceae), in South India. *Economic Botany* 54:217–227

In the context of food systems and heritage, oral history provides a particularly amenable entry point for research. This is because oral history is about memory and remembering lived experience. It can therefore document and communicate food traditions and heritage, and the meanings and feelings involved in a particularly vivid manner. Secondly, food tends to resonate particularly well with memory, in terms of its sensorial ability to trigger rich memories and emotions of food pleasures within home, family, and community. This process is known as 'edible memory'. Thirdly, this method offers the capability of generating insights into meanings of food cultures over a significant historical duration, usually the lifetime of the interviewee; and it is also conducive to reclaiming the voices and life experiences of Indigenous and subaltern groups such as women peasants and farmers, who are either not heard or marginalised in written documents.

Oral history involves a process of co-creation between interviewer and narrator in a way that both highlights narrator agency and invites listeners or viewers into her lived experience. Too often in development writings, the voices of subaltern groups tend to be subsumed by the researchers' interpretation which is what ultimately becomes authoritative. In our *Changing Farming Lives* project, although we began by asking questions that were primarily of interest to us as researchers, participants were encouraged to shape their narratives as much as they wished by talking about activities, subjects, and life episodes that they themselves regarded as significant and meaningful. In the process, we discovered that it was foods and diets that the women smallholders were particularly passionate about, especially the beliefs, rituals, and knowledges associated with *ragi* or finger millet-based foodways that they were seeking to revive. Rituals involved deities, earth, seeds, animals, birds, and other more-than-human entities which have the power to affect food and farming outcomes. In contrast, they were less interested in the economic specificities of crops and livelihoods.

To conclude, oral history offers the capacities to understand and change the present in the light of the past, to identify patterns of local social and climatic change, to give voice to hidden and alternative narratives, and to recall cultural memories as a repository of knowledge and resilience for on-going innovations.

Participatory methods for exploring IFS, health and wellbeing: Harriet Kuhnlein, CINE

I have experience through CINE at McGill University, as founding director of CINE. I began with a start-up project in 1985-92 with Indigenous Peoples in Canada's Arctic region. I have explored consumption of indigenous foods. Indigenous leaders guided community consultations — Chief Bill E. The study led to a World Health Organization publication in 2003 in English and Spanish.

Indigenous Peoples and Participatory Health Research — planning, management, preparing research agreements. The key lessons were: there is no single way to build collaboration — every community is different; it is key to know how to listen to community concerns, and to maintain respect for the people, the food system and the environment. We need to work to build mutual respect and ensure mutual benefit. Mutual trust is key. Work 'with' not 'on' communities and food systems. FPIC is also key⁷ — there is a need for collective as well as individual FPIC in the research process to fully explain the proposed research and allow the community to place conditions or say no. Major issues include publications co-authorship with Indigenous Peoples; and transparent and fair distribution of funds.

⁷ See: FAO 2016 FPIC Manual:

<https://www.un.org/development/desa/indigenouspeoples/publications/2016/10/free-prior-and-informed-consent-an-indigenous-peoples-right-and-a-good-practice-for-local-communities-fao/>

Discussion

- Documentation of basic ethnobiological systems is important to provide the basis for advocacy and activism — for this, documentation needs to be made accessible.
- However, publications and public databases are the primary route by which Indigenous knowledge is misappropriated for commercial use, without consent or benefit-sharing with communities, leading to 'biopiracy'. Once documented, it is very difficult for communities to control access to their traditional knowledge. The Nagoya Protocol has not worked as it has created impenetrable red tape in many countries. Access and benefit-sharing laws need to be more user-friendly for all stakeholders, but drafting is guided by patent lawyers etc.
- Secrecy also carries a cost in terms of human adaptability, innovation and resilience.
- It is important to ensure that Indigenous knowledge is only documented and published following a collective FPIC process with Indigenous Peoples, as FAO and CINE have emphasised. The FPIC process must fully explain how the knowledge will be used and the risks of misappropriation and allow communities to deny consent to document their knowledge. Another option is to build a knowledge base within communities, and support communities to collect the knowledge themselves and enter it into a community database which they can control access to.
- The Ethno-Ornithology World Atlas (EWA) at Oxford University has developed an innovative way to store knowledge in a digital archive that gives control over access to the depositors.
<http://egi.zoo.ox.ac.uk/research-at-the-egi/ethno-ornithology-world-archive-ewa>
- Oral histories are a very important tool as IFS are changing, and some aspects only exist in elders' memories; they can also give voice (eg to women farmers in India). Archaeobotany can also be useful to build a picture of the food system (eg cuisine) in the recent past. Both tools are useful for reviving lost or threatened biocultural heritage and establishing biocultural heritage territories.
- Tribal food restaurants are very important for sustaining Indigenous Peoples' food systems (eg in Indonesia), but there is very little research on these. Conserving recipes leads to conservation of species as well.
- In the United States, people are reconnecting with indigenous foods; these are broken Indigenous traditions, but there is growing fascination with Native American cuisine.
- The Smithsonian Institute wrote a book about Indigenous cookery in the US. But Indigenous people don't want to read a colonial narrative.
- The pattern of farmers selling production to the detriment of nutrition is quite widespread as many nutritious foods have high value in markets (eg in India).
- In north east India, TIP found that women maintain some areas free of fertiliser and government seeds and use them for their own nutrition and taste. However, they use a good part of their lands for commercial crops.

Indigenous Panel: Decolonising & Indigenous Research Methods (Chair: Krystyna Swiderska)

I am honoured to be chairing this Indigenous Panel, on a topic which I think is extremely important. As a researcher I have come to believe that the best way to help Indigenous Peoples is to ensure research is strongly community-led, that it empowers Indigenous Peoples and addresses their needs and priorities — this type of research can have a lot more impact than externally-led research which can easily become 'extractive' since Indigenous Peoples are asked to contribute to a process which provides little in return. In my view that is unethical.

Methods for research on Indigenous agri-food systems in the Philippines: Florence Daguitan, Tebtebba

My involvement in the search for appropriate research methodologies emanates from being part of social movements — first as advocate for the promotion of organic/ecological sustainable agriculture and then as advocate for the recognition, respect and fulfilment of Indigenous Peoples' rights.

We were taught that our people create/produce knowledge from their day-to-day life as they relate with nature and the land. They monitor changes, events, places; they closely observe what is in their surroundings, and discover new ways of doing things. Whatever they discover, they share to whoever is interested, like a better way of storing seeds, the part of the forests where such trees can be found. This knowledge is shared in various ways, in different venues, and is stored in stories, epics, songs, chants, in the memories of the peoples.

Yet, when we invite groups in the communities to embark on a research project with us and if we mention the word 'research', what automatically comes to their mind is that research is the work of the schooled, of people who went to college and universities. Therefore, the first challenge is to debunk the notion that creation of knowledge or collection of information are not only done by the schooled. That people do research in their daily activities. I would like to share some of the effective Indigenous research methods related to agri-food systems:

1. Mapping/walking through the territory — their sense of place and identity. Some of the many things that they can show in their maps are:
 - The diversity of food crops; the different kinds of food crops and animals each with their different varieties, breeds in the cultivated land
 - Locations of the naturally occurring/wild plants and animals that are part of peoples' diet, and
 - How the whole of the territory contributes to their diet.

We did some upgrading in the mapping process and built communities' capacities to use GPS, to construct their 3-dimensional map and also introduced some "modern ways" of biodiversity inventory.

2. Use of the traditional calendar — this shows:
 - The availability of different foods at different times of the year
 - The time to plant what crops
 - The time not to disturb the wild animals in the forest, the fishes in the rice lands and the fishes in the rivers to give them time to mate and reproduce, and
 - Indicators in changes in seasons.
3. Storytelling can show:
 - How certain food is valued and why
 - Changes in food production and consumption system, and
 - How the wilds are protected, how seeds are conserved.

4. Compare and contrast — can show:
 - How community elders/leaders were more proactive in the past in looking into community issues and concerns and addressing these for the promotion of common good
 - Abundance or scarcity of certain food, and
 - Health of the environment — then and now.
5. Learning by doing, eg:
 - Production of organic farm inputs: scientists are invited to conduct soil tests using laboratories; traditional indicators are also tested/used
 - Innovations in rice farming system — process documentation — what and when to record.

Results/outcomes: Collective analysis is one of the most essential processes which may lead to community policy formulation, eg to ban junk food from entering the community; plan of action, eg backyard gardens in every home; land restoration/reclamation like re-cultivate the rice-lands.

Recommendations:

1. Full and effective participation of concerned Indigenous communities in the research and documentation must be ensured at all times. Research should be an educational process that facilitates a community/collective analysis of the matter being researched and the community should be the first to benefit from the knowledge produced.
2. Provide support to Indigenous research and documentation, innovations and curriculum development, among others.
3. Build collaborative partnerships between Indigenous Peoples' communities and concerned stakeholders for the development of culturally appropriate research methodologies.

Indigenous Research Methods in Africa: Bagele Chilisa, University of Botswana

Indigenous research methods are about the rights of those voices that are silenced by western knowledge. Indigenous Peoples have rich knowledge about food, including names, oral traditions and songs. Scientists can provide science. Indigenous research methods are about Indigenous Peoples' right to know and about their right to place Indigenous ways and values on an equal footing with other knowledge systems; and about bringing Indigenous foods and recipes to global markets. Mixed methods research is not only about combining qualitative and quantitative data but also about combining Indigenous methods and other western methods. Indigenous research methods are about the right of Indigenous Peoples to prioritise the research issues and what is relevant; and about challenging stereotypes — not just relating to food but also spirituality etc. They are not about replacing western knowledge systems, but about a coalition of knowledge systems. They are about decolonising the minds of Indigenous Peoples, who have been brainwashed to think that their foods are inferior to western foods; and about research framed by Indigenous worldviews and values, including community research and showing spiritual aspects — our spiritual beliefs are real. Indigenous research appreciates the value of food not only as food but recognises spirituality and links to land.

Therefore, it is important to follow the '8 Rs', including: Relationality — long lasting research; Respecting the values of people; Reciprocity, eg what is being given back to communities who are hungry; Relevance — is the research only for curiosity; whose worldviews is it using? There is an urgent need for research that address Indigenous Peoples' problems; reflexivity of the researchers; and decolonisation of research, allowing others to speak from their own perspective.

Decolonising Action-Research methods and tools in the Andes: Alejandro Argumedo, ANDES, Peru

Machu Picchu is an expression of research, the product of Indigenous scholars; it embodies the concept of Buen Vivir. Ontological and epistemic principles are passed on by Andean elders and should guide research:

1. Relationalities: accountability with the rest of Indigenous Peoples' relations (not just humans).
2. Reciprocity: relationship with all living beings. This is important because of the colonial worldview that research is neutral; FPIC is needed but the relationship is not between humans only.
3. Balance and how we seek to create a relationship between the natural and human worlds — so we have three Ayllus (communities) and our goal is Buen Vivir.

Methods: Any action has to be developed in line with the Quechua learning principles of Yachay — knowledge learned through reflection, discussion and analysis; Llankay — practical learning; and Munay — learning with the heart.

Decolonisation means leadership by elders, and participation of youth is key. According to tradition, oral methods are used, but metrics are also traditionally used to create and store data — the Inca Khipus (knots tied on string), which has been used in the Potato Park to represent chromosomes in potatoes. And Yupana, a matrix tool of the Incas for ranking which can give a numerical value to different plants (eg after walking through the landscape/transects). This decolonising action-research approach has enabled us to maintain a very large collection of native potatoes in the Potato Park. We have used an Indigenous mixed methods strategy that combines qualitative and quantitative approaches, responds to Indigenous wellbeing objectives (Sumaq Causay), and is guided by principles from the Incas. These principles are reflected in an Inca drawing from the 1500s which shows the southern cross and the three Ayllus — the human, the wild and the sacred (the middle star).

The decolonising action-research methods used by the Potato Park and Maize Park promote Indigenous knowledge transmission from elders to youth. We have developed visual ways to collect data, and have developed an App that can use photo, video or voice recordings which are tools for traditional knowledge transmission. We use these tools and put the information in a biocultural database, and then elders get together in knowledge circles and do Yupana ranking using maize grains. Then, elders and youth use the information to solve problems such as pests and disease in a crop. The matrix tool of the Incas allows us to undertake this kind of process. Then the community assembly sanctions the research and it becomes part of a Life Plan.

Discussion

- How has climate change affected agricultural calendars in the Philippines? Natural indicators are not so useful anymore, so we rely increasingly on dreams, our elders are grappling with the changes, and are triangulating their dreams and what they observe.
- Elders have a very long timeline to build their experiences on: they have observed and interacted with their landscape for such a long time. This can never be compensated for by other methods from western science, which at best may factor in a long time series, but often just represents a 'snapshot'.
- Decolonisation must also happen in research institutions — they should employ Indigenous researchers who understand Indigenous worldviews and Indigenous research methods that are consistent with Indigenous knowledge generation, and work with Indigenous researchers from communities. They should also give back the genetic material they have taken from communities, and stop them being patented.
- In the Cordillera (the Philippines), all history is colonial. A historian used all the historical archives to understand what was happening in the past on the ground, and Indigenous Peoples used that to interpret it in their own way and revive their heritage — see "Cracks through the Parchment Curtain" by William Henry Scott.

- Mr He Jixian, the Naxi elder from China, also said that culture is at the core of the Indigenous food system, as Alejandro said. Therefore, in decolonising research, we first need to learn from the communities.
- Indigenous Peoples' values and principles, concepts and ways of knowing are at the heart of decolonising research- that's what sets it apart from ethnobotany and PAR.

Conclusions and next steps

Indigenous Peoples' food systems have a critical role to play in achieving SDG2 and feeding humanity in a sustainable way, in the longer term; in a resilient way (climate change and COVID-19); and in a compassionate way (solidarity). Under the current food system, we are seeing growing food insecurity and hunger — IFS provide critical lessons for transitions to more sustainable and equitable food systems. Research must address Indigenous Peoples' priorities and the many challenges facing IFS. This is urgent as we are losing traditional knowledge, crops and culture very fast. Research must also address unequal power relations and empower Indigenous Peoples and given them a voice and recognition as experts whose ancestral wisdom offers valuable pathways towards sustainable and equitable development.

Next Steps

- A workshop report and communications will be produced (blogs, media releases) to disseminate key messages ahead of key events — eg CBD (Convention on Biological Diversity) meetings, UN Food Systems Summit.
- This workshop will inform the design of future research on IFS by IIED, Kew and partners in Kenya, India and China, and will inform a journal article.
- Networking — a virtual workshop is not ideal for this, but I hope some of you have made some connections and can follow up; we could circulate emails with the workshop report. We need to continue working together to address the urgent challenges facing Indigenous Peoples and their unique food systems that are vital at this critical point in time when food systems are highly unsustainable and highly inequitable and we are losing precious biocultural heritage.

Annex A: Biographies of Presenters

Alejandro Argumedo

Alejandro Argumedo is Director of Programs and Andean Amazon Lead of Swift Foundation. He is a recognised Indigenous Quechua leader and current member of the Board of Directors of Asociación ANDES of Cusco, Peru and SeedChange of Ottawa, Canada. He is also Advisor to the Potato Park, of Cusco, Peru, current International Coordinator of the International Network of Mountain Indigenous Peoples and “Champion” of the global initiative “Food for Ever”. Alejandro is an agronomist by training and has served on various expert panels for the UN and other relevant bodies and has consulted for national and international organisations.

Anne Brunel

Anne Brunel is the focal point on IFS in the FAO Indigenous Peoples Unit. She is co-coordinating the Global-Hub on Indigenous Peoples’ Food Systems and co-directing the third FAO publication on IFS involving scientific and Indigenous collaborators, such as IRD, Bioversity, and the Indigenous Partnership. Anne holds a Master of Engineering in agronomy from AgroParisTech, and a Master of Research in political science of the European Union from Institute of Political Sciences of Grenoble.

Bagele Chilisa

Bagele Chilisa is a Professor of the Post Graduate Research and Evaluation Program at the University of Botswana. Her work has focused on culturally and contextually responsive research and evaluation. The second edition of her publication: *Indigenous Research Methodologies* includes chapters on decolonising evaluation and mixed methods in Indigenous research.

Chemuku Wekesa

Dr Chemuku Wekesa has a PhD in Natural Resources Management, and works as a Landscape Ecologist with the Kenya Forestry Research Institute. He has over 8 years’ experience of working with Indigenous Mijikenda communities in Coastal Kenya in exploring the role of traditional knowledge, cultural practices and beliefs in conserving agrobiodiversity and enhancing communities’ resilience to climate change. He has coordinated several projects on traditional knowledge that include SIFOR, Satoyama and British Academy. He is Co-Investigator on the AHRC-GCRF-funded project on IFS, biocultural heritage and agricultural resilience.

Dorian Fuller

Dorian Fuller is Professor of Archaeobotany at the Institute of Archaeology, UCL. His first degree is from Yale University (1995), and his PhD is from Cambridge (2000) on the Origins of Agriculture in South India. He has worked on archaeological projects in South Asia, Southeast Asia, China, Near Eastern countries and African countries (Sudan, Ethiopia) and through archaeobotanical studies works on hunter-gatherer plant use, plant domestication, and the reconstruction of agricultural systems across Asia and Africa and parts of Europe from their beginnings through the ancient historical times.

Edmond Dounias

Edmond Dounias is the representative for Indonesia of the French National Research Institute for Sustainable Development (IRD). He explores the resilience to global change of Indigenous livelihoods and food systems in the tropical rainforests. He has a long fieldwork experience among hunter-gatherer societies in Congo Basin, Sumatra and Borneo.

Florence Mayocycoc-Daguitan

Florence Mayocycoc-Daguitan belongs to the Kankanaey's, one of the seven ethnolinguistic groups collectively known as the *Igorots* of the Cordillera Administrative Region in the northern Philippines. She currently works with Tebtebba as a Coordinator of the Indigenous Peoples' and Biodiversity Program.

Harriet Kuhnlein

Professor Emerita Harriet Kuhnlein is a nutritionist and Founding Director of CINE at McGill University in Montreal, Canada. She is a member of several nutrition societies, and recipient of awards for distinguished service in nutrition. Harriet has conducted participatory research on food and nutrition with many cultures of Indigenous Peoples in different parts of the world demonstrating that Indigenous Peoples' biodiverse food systems foster food security and good health.

Hindou Ibrahim

Hindou Oumarou Ibrahim is an environmental activist and member of Chad's pastoralist Mbororo community, a UN SDG Advocate and Conservation International Senior Fellow. Hindou began advocating for Indigenous rights and environmental protection at age 16, founding the Association for Indigenous Women and Peoples of Chad (AFPAT) to introduce new income revenue activities for women and collaborative tools such as 3D participatory mapping to build sustainable ecosystems management and reduction of nature-based resource conflicts. Her vision is to grow support for both traditional knowledge and science to improve resilience to climate change especially for rural communities.

Joji Carino

Joji Carino - Ibaloi - Igorot is from the Cordillera, Philippines. She is a Senior Policy Advisor at Forest Peoples Programme, and is a lead writer, together with Maurizio Farhan Ferrari of Local Biodiversity Outlooks, a complementary publication to Global Biodiversity Outlook. Joji has been an active campaigner and advocate, over the past 35 years on Indigenous Peoples' rights at community, national and international levels. She strongly supports community-based research and monitoring, also coordinating a network of Centres of Distinction on Indigenous and Local Knowledge.

José Julián Garay-Vázquez

José Julián Garay-Vázquez is from the island of Borikén (Puerto Rico). His research focuses on the study of Indigenous human-plant dynamics of the Antillean Caribbean through the analysis of carbonised plant remains. Additionally, he works on revitalising Indigenous foodways using a combination of experimental archaeology, ethnographical information, modern recipes, and archaeobotanical information.

Krystyna Swiderska

Krystyna Swiderska is a Principal Researcher in IIED's Natural Resources Group. She has conducted PAR with Indigenous Peoples, particularly in Peru, India, China and Kenya for the last 20 years. Her work has focused on biocultural heritage and protection of traditional knowledge; the role of traditional crops and innovations in resilience to climate change and livelihoods; biocultural heritage territories and the Potato Park. She is Principal Investigator on the British Academy project on "Indigenous Biocultural Heritage for Sustainable Development" and the AHRC-GCRF project on IFS, biocultural heritage and agricultural resilience.

Matthew Davies

Matthew Davies' research explores issues around prosperity, society and the environment. He is especially interested in the management of landscapes, ecological diversity, climate and questions of sustainability, resilience and regeneration. Most of his work has focused on agricultural systems in Eastern Africa and has examined community practice and knowledge both historically and anthropologically, often employing a perspective known as historical ecology. This has involved analyses of the spatial, material and temporal dynamics of farming systems, including understandings of soils, crops, irrigation, exchange networks and forests/vegetation. He currently leads the Taught Teaching programmes at IGP and is the Programme Lead for the MSc in Global Prosperity. At IGP, he also heads a growing portfolio of research under the framework of Prosperity Co-Lab Kenya and as part of the wider IGP community.

Nawraj Gurung

Nawraj Gurung studied agriculture and natural resources management. He started his career as a government servant and later became engaged in bilateral projects and international NGO projects as facilitator to conduct participatory technology development process and as a researcher conducted participatory social and gender analysis and bio-cultural heritage and sustainable development. He has also served as a National UN Volunteer (Research) under the UNDP programme "Human Development Research and Coordination" for four years. He currently works for Lok Chetna Manch, Eastern Himalaya, India.

Dr Paul Wilkin

Paul Wilkin's research is primarily on the tuberous crop plants yams (*Dioscorea*), and Enset (*Ensete*). Yams provide both dietary starch for millions and secondary compounds of considerable economic importance. Enset is a key starch staple for 20 million people in southern Ethiopia, as well as providing a broad range of further ecosystem services and having the potential to be a climate-smart crop with a major role in the future of Africa. Approaches encompass taxonomy, systematics, conservation science and -omics, especially phylogenomics and population genetics to investigate crop, crop wild relative and edible/wild yam diversity to enhance food security, nutrition, livelihoods and economic innovation. He leads Kew's Natural Capital & Plant Health Department, part of the Science Directorate. The Department undertakes research on plants and fungi that provide ecosystem services, from which societal benefit is derived, using Kew's exceptional collections.

Philippa Ryan

Philippa Ryan is a Research Fellow at Royal Botanic Gardens, Kew where she specialises in the ethnobotany of traditional agrisystems. Her research aims to document orphan crops from cultivation through to cuisine, and to situate their present-day use within their local agroecological, historical and cultural contexts. She is also an archaeologist and interested in comparing recent and ancient agricultural change. She is Co-Investigator on the AHRC-GCRF-funded project on IFS, biocultural heritage and agricultural resilience.

Phrang Roy

Phrang Roy belongs to the Khasi Matriarchal Indigenous community of Meghalaya in north east India. He worked with the UN for 25 years and served as an Assistant President of IFAD (the International Fund for Agricultural Development), Rome. He played a major role in establishing the special focus of IFAD on promoting a greater focus on the sustainable approaches of Indigenous communities. Phrang Roy also worked for The Christensen Fund, California, USA on biocultural issues and is currently leading the global Indigenous Partnership for Agrobiodiversity and Food Sovereignty, Rome. He is also the Chairman of North East Slow Food and Agrobiodiversity Society (NEFAS), Shillong which works on local IFS.

Prasert Trakansuphakon

Prasert Trakansuphakon is a specialist of Indigenous Study in Thailand. Of Karen origin, he is a Doctor in Sociology and he has developed an expertise that he put to good use both in the academic world and as a senior Indigenous NGO activist. He is currently Director of Pgakenyaw (Karen) for Sustainable Development (PASD), Chairperson of Inter Mountain Peoples Education and Culture in Thailand (IMPECT) and Advisor Board Committee of Asia Indigenous People Pact Foundation (AIPP).

Dr Rajindra K Puri

Dr Rajindra K. Puri is a Senior Lecturer in Environmental Anthropology and the Director of the Centre for Biocultural Diversity, School of Anthropology and Conservation, University of Kent in Canterbury, UK. He also convenes Kent's Ethnobotany MSc programme with the Royal Botanical Gardens at Kew. Over the past 30 years he has been conducting interdisciplinary research on local knowledge systems, the dynamics of human-environment relations, and the application of anthropology to conservation social science and climate change adaptation, in Indonesia, Malaysia, Vietnam, and recently, India. Most of his research has been conducted with local researchers. He has extensive experience in multidisciplinary teams, co-creating research design, and teaching anthropology to natural scientists. For instance, he worked closely with forest ecologists and economists to design a ground-breaking CIFOR project, Multidisciplinary Landscape Assessment. He has recently started working with ATREE forest ecologists on local adaptation to invasive *Lantana camara* in protected forests in southern India, using local knowledge to influence the contentious debates surrounding community-based forest management and rights to collect non-timber forest products.

Roger Blench

Roger Blench is an anthropologist with interests in ethnoscience, linguistics and archaeology. He has worked as a consultant for many years in sub-Saharan Africa and Southeast Asia. He is the Chief Research Officer of the Kay Williamson Educational Foundation and a visiting fellow at the MacDonald Institute for Archaeological Research, University of Cambridge.

Sandip Hazareesingh

Sandip Hazareesingh is a historian at the Open University, UK, with current research interests in food, environment, climate and development in the contexts of both colonial and contemporary India. He uses arts and humanities methods and approaches, particularly oral history, to investigate these issues.

Simon Mitambo

Simon Ndonco Mitambo is an initiated African leader of Tharaka, Kenya origin. He works with African Biodiversity Network as Regional Programs Coordinator. He is an Earth Jurisprudence Practitioner who has great passion and experience of accompanying communities across Africa. Simon uses resilience methodologies such as community dialogues, nature experiential learning among others to de-school society and decolonise mindsets from the dominant industrial system to be able to develop strategies for alternative civilisation.

Tiziana Ulian

Tiziana Ulian works as a Senior Research Leader at the Royal Botanic Gardens, Kew. She leads a research team studying plant and fungal diversity and developing nature-based approaches to improve people's livelihoods and well-being worldwide. She has a general expertise in plant ecology and conservation biology and specific interest in linking social and biophysical research to address the global challenges of sustainable development. She holds a PhD in Conservation Biology from the Natural Resources Institute (NRI) of the University of Greenwich.

Yiching Song

Dr Yiching Song obtained her PhD in rural sociology and rural development at Wageningen University in the Netherlands in 1998. Since 2000, she has been a senior researcher and programme leader in the Centre for Chinese Agricultural Policy (CCAP), Chinese Academy of Science (CAS). She is founder of Farmer Seed Network in China and is leading a young team working with 36 farming communities for farmers' seed and IFS across China. She is Co-Investigator on the AHRC-GCRF-funded project on IFS, biocultural heritage and agricultural resilience.

Yon Fernandez-de-Larrinoa

Yon Fernandez-de-Larrinoa is head of the FAO Indigenous Peoples Unit. He is an Agricultural Economist with an MABD-DEA on entitlements and food security who coordinated emergency operations in the field before joining the Partnerships and UN Relations Division. Until 2014, he led the FAO Civil Society team, co-authoring the strategy to engage with civil society and ensuring the participation of civil society in the World Committee of Food Security. He co-founded the Pastoralists knowledge hub in FAO and started the FAO Indigenous Peoples Unit. The Unit works on FPIC; collective rights; indigenous youth and in 2018 launched a Global Campaign on Indigenous Women, and in 2019 the group of Friends of Indigenous Peoples in Rome. At the Committee of Agriculture in October 2020, the FAO Indigenous Peoples Unit officially launched the Global-Hub on Indigenous Peoples' Food Systems now including 16 academic, research, UN and indigenous organisations.

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Indigenous Peoples' food systems have a critical role to play in addressing the 2030 Sustainable Development Goals (SDGs) but face many challenges and have so far received little attention from researchers and policymakers. This virtual workshop, consisting of four webinars held in October 2020, brought together several Indigenous representatives, academics, NGOs and UN agencies to explore the issue further and promote new dialogue on Indigenous food systems.



Event Materials

Food and Agriculture, Natural Resource Management

Keywords:

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