

**2020 Arctic Observing Summit**  
**Food Security Working Group Final Report**  
*20 August 2020*

**KEY RECOMMENDATIONS & SUMMARY**

The Food Security Working Group (FSWG) puts forth key recommendations that emerged during the 2020 Arctic Observing Summit (AOS). We found these themes to be exceedingly important and critical to inform discussions beyond the 2020 AOS, and we provide an expanded table of actionable items (Table 1).

- View food security through an Indigenous lens;
- Weave human health and wellness into every aspect of the observation system;
- Support community-driven research and monitoring;
- Focus capacity building on Indigenous organizations, communities and researchers; and
- Moving forward under a new, equitable paradigm based on lessons learned from COVID-19 pandemic.

The FSWG encourages all individuals involved in any manner in the development and implementation of the Roadmap for Arctic Observing and Data Systems (ROADS) to support Indigenous capacity building, Indigenous-led observing and Indigenous-led research. Indigenous-led observing includes having Indigenous Peoples serve in leadership or other major and meaningful roles, with the support of agency, researchers, managers, practitioners, and others, in the entire process. The process begins with the generation of ideas; Indigenous Peoples should be developing the questions that need to be answered, identifying what gaps need to be filled, be actively involved in collaborations, and directing research and monitoring systems. Indigenous Peoples should also drive data collection and ownership to use in decision making at all levels. Until such a time that Indigenous Peoples have the support and encouragement from other stakeholders and decision makers to lead the efforts, observing systems will continue to lack equitable partnership of Indigenous Peoples. Second, ROADS should acknowledge and address the central concerns of health and safety of Indigenous resources. Health and wellbeing/wellness are important aspects of food security from an Indigenous world view and remains a critical gap in the broader Arctic observing community and should be prioritized by the larger community. Finally, youth and young adults are critical to include in observing efforts from inception to implementation. Oftentimes, youth are invited into the process but not provided adequate resources, space, nor guidance to feel comfortable contributing in a meaningful way.

**INTRODUCTION: DEFINING FOOD SECURITY FROM AN INDIGENOUS PEOPLES' PERSPECTIVE**

The AOS 2020 theme was “From Observations to Action.” Decisive action, however, is dependent on informed decision-making, which requires a full picture of Arctic systems. An Arctic observing system should, therefore, be equitably built from Indigenous Knowledge systems and not only science alone. Expert knowledge holders from these distinct worldviews should be meaningfully engaged from the onset. Importantly, this is dependent on the means and ability to actively participate throughout the entire process (e.g., design, implementation, decision-making; See Daniel et al. 2016: *Theme 6 AOS Synthesis*).

The Food Security Working Group (FSWG), in preparation for 2020 AOS, spent substantial time talking through two overarching themes: 1) how do Indigenous Peoples observe the environment, and 2) what do we mean by ‘food security.’ Having these initial in-depth discussions were important for several reasons. The white papers (Table 2) submitted to this theme by Indigenous organizations emphasized the importance of defining food security from an Indigenous world view (e.g., ICC, Indigenous Sentinels and SIKU). There is also an urgency for connected and meaningful observations that include Indigenous Peoples (e.g., Starkweather 2019\_049 and 2019\_050). Decision-making frameworks for where/how/when information is used is also an important consideration that has been a focus of FSWG discussions leading up to the 2020 summit and is reflected in the stories shared by FSWG members (Behe et al. 2019\_34; ICC-Alaska 2019\_26-28; 30-31; 2019\_37). In order to achieve these goals, approaches must include direct and abundant resources that build Indigenous capacity, uplift and include Indigenous Knowledge holders and leadership to inform critical observing needs as an integral part and prerequisite of all of the

stages (Jones et al. 2019\_14). To better connect these needs coming from both the roots up and top-down, the FSWG proposes a framework that links value systems and Indigenous ways of knowing. The first break-out session at 2020 AOS shared what we mean by important concepts, including Indigenous ways of knowing and a food security framework. The importance of ensuring that all participants and interested parties (e.g., researchers, agencies, academics, Indigenous Peoples) have a shared understanding cannot be understated because these are the foundation for meaningful observation systems.

### ***Ways of Knowing***

The Arctic has been Indigenous Peoples' homeland for thousands of years. Throughout this time Indigenous Peoples have accumulated an immense amount of knowledge shaped by an understanding that humans are part of the ecosystem. It is important to understand that Indigenous Knowledge applies a holistic view, one in which focus is placed on the interconnections between components (ICC-Alaska AOS FSWG 2020 presentation), instead of focusing on individual components themselves. With this understanding, we appreciate that Indigenous Knowledge is often asking different questions than those asked through a scientific lens (ICC-Alaska FSWG AOS 2020 presentation). We need the questions, observations, and knowledge of Indigenous Peoples in addition to science to understand the changes occurring.

Key components to understand Indigenous Knowledge are: that it is a systematic way of knowing; Indigenous Peoples have their own observational and monitoring approaches, and are often asking different questions than science; and this knowledge, this world view, includes the constant collection of observations and monitoring. With these considerations, we can begin to understand that observing through a food security lens, means understanding a holistic way of viewing the world. It also means understanding and respecting that Indigenous Peoples have applied these proven practices for thousands of years. As the ICC-Alaska workshop report shares,

*“Participants stressed that they have demonstrated the ability to protect and live with respect for all of life around them and hold an “...interconnected system view” (Focus Group Participant, 2019). Taking care of the environment - taking care of each other, of the water, land, animals, and plants, is with an understanding that there is a relationship between everything, that everything is interconnected.” (ICC-Alaska 2019\_27).*

While there are many ways of observing our environments, for Indigenous Peoples in the Arctic, observing occurs through Indigenous Knowledge, food sharing/supplementation programs, and western science in environmental decision-making. However, the most dominant forms of monitoring in Arctic observation programs collect quantitative or qualitative data that can be interpreted and evaluated from a western scientific perspective only. These forms of observing are widely and preferentially valued as more “rigorous” than other forms of observing, not taking into account that Indigenous forms of accountability and rigor in knowledge acquisition are well-established within Indigenous Knowledge contexts (ICC-Alaska 2015; ICC-Alaska 2019\_027, 028, 030, 031, 034). When considering how the ROADS process will shape an Arctic observation system, it is important to note that the ROADS framework is not currently designed to engage in non-western, non-academic world views, presenting a fundamental challenge to meaningfully engage diverse ways of knowing in long-term monitoring and research.

### ***Defining Food Security from Indigenous Peoples' perspectives***

#### ***Indigenous Rights to Food Security***

The Food and Agriculture Organization of the United Nations states that “food security exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO 2002)”. However, non-agriculturally derived foods and traditional foods are often ignored in food security discussions, particularly in northern contexts, ignoring the fundamentally interwoven nature of culture, Indigenous knowledges, governance, and stable environmental conditions that are necessary for sustainable Indigenous food systems (Anderson, 1990; FAO 2006; FAO, 2008; Heeringa et al. 2019). Indigenous rights to food have a particular cultural dimension that is critical to food choices, food preparation and the acquisition of food. Culturally appropriate foods, and the activities required to obtain them form an

essential part of cultural identity. As such, Indigenous Peoples' rights to food includes the right to culturally appropriate food produced through ecologically sound and sustainable methods, as well as the right of Indigenous Peoples to define their own culturally relevant local and national food systems (Nyéléni Forum on Food Sovereignty 2007). Importantly, Indigenous Peoples themselves are diverse, and so this right is something that must be further defined locally. However, also important is the right of all Indigenous Peoples to freely define their own food land-use policies. Indigenous Peoples' right to food is widely understood inseparable from their right to lands, resources, culture and self-determination (Kuhnlein et al. 2013). An integral rights-based approach to food security opens constructive dialogue on the policies, regulations, and activities required to ensure food security for all. International agreements establishing Indigenous Peoples' right to food go back to the International Covenant on Economic, Social and Cultural Rights (ICESCR), requiring States to implement the right to food domestically to ensure that Indigenous Peoples food security is part of their governance system (FAO 2008). The right to food is further affirmed by the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) (FAO 2008). Because Arctic observing is an important driver of environmental policy making, the governance obligations of UN member states under ICESCR and UNDRIP. Indigenous Peoples are highly pertinent to environmental observing frameworks. As such, it is critical that the observing systems ensure that monitoring activities meet Indigenous Peoples' expressed priorities and perspectives.

#### *Indigenous framings of food security*

Food security from the perspective of Indigenous Peoples is holistic and interconnected across different systems (e.g., social, biological, ecological, chemical, physical, cultural, spiritual, health and well-being). Food security and food sovereignty is so interwoven into the fabric of Indigenous ways of life, knowing that it cannot be isolated on its own from the environment and activities of Indigenous Peoples on the land and water (ICC-Alaska 2020\_26). The following Indigenous perspectives address salmon as a food resource:

*"We are compartmentalizing everything; putting lines where they don't belong. Lines don't belong in the natural world. They don't allow freedom of movement so that everything will survive." Another participant shared, "...It should be talked about as one environment. Salmon does not know who is regulating or what boundaries are" (ICC 2019\_30).*

Inuit Circumpolar Council (ICC)-Alaska offers this concise and clear definition of Inuit food security:

*"Alaskan Inuit food security is the natural right of all Inuit to be part of the ecosystem, to access food and to care-take, protect and respect all of life, land, water, and air. It allows for all Inuit to obtain, process, store and consume sufficient amounts of health and nutrition preferred foods—foods physically and spiritually craved and needed from the land, air and water, which provide for families and future generations through the practice of Inuit customs and spirituality, languages, knowledge, policies, management practices and self-governance. It includes the responsibility and ability to pass on knowledge to younger generations, the taste of traditional foods rooted in place and season, knowledge of how to safely obtain and prepare traditional foods for medicinal use, clothing, housing, nutrients and, overall, how to be within one's environment. It means understanding that food is a lifeline and a connection between the past and today's self and cultural identity. Inuit food security is characterized by environmental health and is made up of six interconnecting dimensions: 1) Availability, 2) Inuit Culture, 3) Decision Making Power and Management, 4) Health and Wellness, 5) Stability and 6) Accessibility. This definition holds the understanding that without food sovereignty, food security will not exist" (ICC-Alaska 2019\_26).*

#### *Threats to Indigenous food security*

Climatic changes are impacting Indigenous ways of life, challenging food security, and threatening sustenance and cultural preservation. Myriad examples exist showcasing the vulnerability of Indigenous Peoples and our Arctic communities to climate changes. However, these changes also provide opportunities for long-term food security if addressed in the right ways. Several Indigenous organizations have used Indigenous approaches and methodologies to identify drivers that threaten or reduce food security (ICC-Alaska 2015; Heeringa et al. 2019; ICC-Alaska 2020\_026-028; 030, 031). For example, the Inuit Circumpolar Council of Alaska (ICC-Alaska) identified what food security means from an Inuit perspective. They then advanced the approach by addressing the issue of governance (or co-management)

through the six dimensions of food security to identify solutions for co-management from an Inuit perspective (ICC-Alaska\_027, 028, 030, 031). Similar Indigenous approaches and methodologies should be applied to and inform the ROADS process. In practice, this also means taking different approaches in deciding how elemental decisions are made in decision-making and even how meetings are held.

Observing the environment from a food security lens or a holistic approach will be important given the complex challenges resulting from the impacts of climate change. For example, communities that are physically threatened by erosion and permafrost thaw and at the same time are experiencing changes in biota. Another example highlighting the complex and inter-related challenges in addressing climate change is a story submitted by Austin Ahmasuk (see *Indigenous Examples of Observing through a Food Security Lens* below) that illustrates multiple stresses on the Northern Bering Sea that include (not limited to) fish species extending their range followed by fishing industries. These fundamental changes in the Bering Sea ecosystem have significant impacts on social and cultural practices (Kawerak 2015, Bering Sea Elders 2011). These examples highlight the connected nature of impacts from climate change. To adequately inform how our communities will adapt and respond will require monitoring or observing multiple variables simultaneously.

Multiple threats from climate change offer an opportunity to systematically assess cumulative impacts. Indigenous communities experience the effects from cumulative impacts due to the connectivity of people to the environment and the recognition of people as part of the ecosystem in the Arctic. A food security lens offers an opportunity to observe and monitor multiple variables simultaneously as it focuses on the connectivity across systems in a food security lens (ICC-Alaska 2015). Observing through a food security lens will also promote a system that reflects the reality of the Arctic and the priorities of the Indigenous People who live there.

To bring light to a currently evolving threat to Indigenous food security, we can look at the ongoing coronavirus (COVID-19) worldwide pandemic. There has been a long history of diseases devastating Indigenous communities as they represent highly vulnerable populations due to lack of infrastructure for running water and sewer, remote locations, and lack of access to health services. The concerns of Indigenous communities are grounded in a long history of devastation from exposure and rapid spread of disease among Indigenous Peoples populations. Many villages were ravaged by tuberculosis and flu epidemics in the past. Elders are very integrated into daily life and many homes are multigenerational with no running water or sewer. Self-isolation is almost impossible. Villages lack any sort of advanced medical equipment or services. For example, in Alaska, routine healthcare is provided by telemedicine or requires patient travel to regional hubs or one of the 3 largest cities in Alaska for treatment: Anchorage, Fairbanks or Juneau.

## **INDIGENOUS PEOPLES' PERSPECTIVES ON THE ROADS FRAMEWORK**

Frameworks are shaped by the type of knowledge that is used to construct them, and by how the approaches to monitoring, evaluation and interpretation, and decision-making are developed, refined and informed. The Roadmap for Arctic Observing and Data System (ROADS) is a framework for Arctic observing currently being developed by the Sustaining Arctic Observing Networks (SAON, see Starkweather 2019\_049). The ROADS framework has been informed almost entirely by academic institutional approaches, which are dominated by a single focal species approach, quantitative and sensor-based data collection methodologies, as well as linear hypothesis-driven processes. Guidance should be sought early and consistently from Indigenous Peoples participating in the observing community strongly advised on the need for the equitable consideration of Indigenous Knowledge alongside western sciences, and for a focus on the specific issues identified as priorities by Arctic Indigenous Peoples themselves. Building equity into such a process in meaningful ways will require strong leadership by Indigenous Peoples, together with researchers and practitioners who are committed to a co-production of knowledge approach (CPK, Behe et al. 2019\_034). The CPK approach is a reflexive and iterative process, involving tools and methodologies that are revisited throughout the process, and not to be applied as a checklist. CPK methodologies include concepts surrounding the recognition of sovereignty, building trust and respect, nurturing relationships, empowerment of Indigenous Peoples, growing capacity, decolonization, and being ethical, deliberate, and intentional. Although CPK has gained momentum in the academic and agency research communities, many researchers still lack an understanding of how to apply CPK to their own projects.

A primary goal of the AOS 2020, was the development of a framework from a food security lens within which impactful Essential Arctic Variables (EAV) can be assessed jointly between different data users and observing network operators and prioritized. This framework is based on several critical elements identified by the FSWG for inclusion in the ROADS observing system so that the resulting framework operates through an Indigenous food security lens. We present this framework below, but share some of the discussions leading towards its development.

In previous AOS meetings, Indigenous Peoples participants' provided feedback and suggested action steps on how to assess and prioritize EAVs which remain relevant moving forward. For example, gaps identified in 2013 that remained in 2016 include the need for:

- Indigenous data management protocols (control of and access to data, representation of qualitative data and information in formats beyond western scientifically derived data, coordination of the varied and numerous data management initiatives, ethical use of Indigenous data and information);
- Indigenous data categorization and interpretation; and,
- Improved standards of inclusivity and equity in research and monitoring in terms of both funding and observing activities.

There are several approaches that the ROADS process may take in working towards implementing such a framework. One of the early steps is to look at those examples that are Indigenous-led and/or identified by Indigenous Peoples as having best-practices.

One approach to data management and stewardship is offered by SIKU (Heath 2019\_055), an IK platform that facilitates self-determination for Indigenous communities by leaving the interpretation and stewardship of Indigenous knowledge in the hands of Indigenous land-users themselves. SIKU provides a community-controlled social media platform for documenting Indigenous Knowledge by Indigenous land-users, who can then share their own georeferenced photos and other sources of data as they choose. At the same time, it is an archive for community-led research. The platform provides individual and community controls for data stewardship for use in community-driven monitoring programs, community-led research, environmental stewardship, and co-management planning. Importantly, the SIKU platform has been designed within the context of an extensive Indigenous knowledge network. This network meets regularly at roundtable meetings and has formed a Hudson Bay basin-wide consortium. It involves Inuit and Cree from each community, and its secretariat is the Arctic Eider Society, an organization based in Sanikiluaq, Nunavut. Thus, observing occurs within a network of accountability to Indigenous communities within the region at various scales.

*SciQ*, created by Indigenous scholars and youth with the Ikaarvik program in Nunavut, Canada, provides a strong example of best practices in observing programs that involve youth, including a step by step guide for implementation of working with youth in community-led monitoring and research, in which youth are active partners in a model co-leadership in research in community-driven research with academic collaborators (Ikaarvik 2019). Inuit youth act as active partners within community-driven research with academic collaborators. Working with youth in this way has led to more reliable results and provided reciprocal benefits to youth in terms of skills development, as well as to foster youth-elder relationships, which helps youth to acquire Indigenous Knowledge and elders to share their insights across the community (Carter et al. 2019).

Designing reciprocity in observing should not necessarily be limited to involving youth. Many middle-aged individuals have experienced negative impacts of government policies including colonial approaches to education, wildlife regulations, and loss of language. These negative impacts have prevented generations of Indigenous Peoples from acquiring Inuit Knowledge. In response, *Unuuq* in Inukjuak, Nunavik, focused on working with middle-aged men in building Inuit Knowledge (Villaseñor-Caron 2016). This work has expanded to involve men and women and boys and girls of all ages in food harvesting, preparation, and manufacturing of traditional tools and other items.

Because every community is unique, planning for observing needs to occur *with* each community (Henri et al. 2020). Indigenous communities should be active partners as demonstrated by the Arctic Corridors program in Nunavut (AC-NV). This approach to research hinges on a model of co-leadership of research between community members and southern, non-Indigenous researchers. The AC-NV co-leadership

model has: 1) led to more robust research results, 2) strengthened north-south relations, and 3) enhanced local capacity for community-led projects.

What has not received sufficient attention is the need for Indigenous-based approaches to the evaluation of observing programs. Projects led by non-Indigenous partners increasingly emphasize the need for co-design, reciprocity and community reporting. However, the success of such projects usually occurs away from communities in academic or policy contexts where Indigenous community members are absent. Wilson (2019) and the Ikaarvik program are currently developing an Inuit-specific approach to the evaluation of a community-driven monitoring program as part of a larger initiative to define specific approaches to meaningful self-determination in community-driven sea ice monitoring .

The FSWG also provided considerable discussion and guidance in 2013 and 2016 on the difference between Indigenous Knowledge and community-based monitoring, and brings forth the need for Indigenous Peoples and Indigenous organizations to achieve and maintain abundant capacity to meaningfully engage in the ROADS process ([Huntington 2013](#); [Daniel et al. 2016](#); see *Capacity Building* below). We have not seen adequate progress toward achieving true collaboration, equity, or progress toward filling the identified gaps. Thus, we again draw attention to the previously stated recommendations and strongly recommend that the larger IASC community works with the FSWG for developing and making forward progress on a specific plan of action in the next 12 months, and provides dedicated time for an update and evaluation of progress at the Arctic Science Summit Week and Arctic Observing Summit, Tromso, Norway in 2022.

## **KEY THEMES AND RECOMMENDATIONS FROM AOS 2020**

SAON's vision for a connected, collaborative, and comprehensive long-term pan-Arctic Observing System that addresses societal needs is a vision shared by the FSWG. During AOS 2020 the FSWG discussion/activity focused on developing actionable recommendations for building observing systems that equitably include Indigenous Peoples and Indigenous Knowledge. These recommendations should not only be applied in the ROADS process, but are applicable across research, observing and governance processes and projects.

### *Capacity Building*

The FSWG strongly recommends that abundant resources be dedicated to support capacity building for Indigenous Peoples and organizations to engage in this process equitably. Indigenous capacity building that is supported by agency and academia has been previously recommended [[Huntington 2013](#); [ICC-Alaska 2015](#); [Daniel et al. 2016](#); the CPK model) and still remains a serious limitation to fully realizing co-production of knowledge and Indigenous leadership in research today. Indigenous organizations need to receive support to build capacity (i.e., funding, training, equitable access to resources) in order to participate equitably in every step of the ROADS process. Until such a time that Indigenous Peoples have the support, encouragement and capacity-building assistance from other stakeholders and decision makers to lead the efforts, observing systems will continue to lack the holistic worldview necessary for a responsive, strong Arctic observing system. equitable partnership of Indigenous Peoples.

### *Indigenous-led observing and research*

All individuals involved in any manner in the development and implementation of the ROADS need to support Indigenous-led observing and research. "Indigenous-led" includes having Indigenous Peoples serve a major and meaningful role, with the support of agency, researchers, managers, practitioners, and others, in the entire process- from the generation of ideas (i.e., Indigenous Peoples should be developing the questions that need to be answered, identifying what gaps need to be filled, etc.) to data collection and ownership to use in decision making at all levels. This can most easily be remedied in amending the current trajectory of EAV identification, assessment and selection. Indigenous-led efforts require non-Indigenous recognition of the value of IK and use of a framework that adopts an IK perspective (e.g., ICC food security framework as presented in this synthesis versus current SAON ROADS Societal Benefit Areas framework). The ROADS process also needs to recognize that Indigenous Peoples may be interested in observations that come from an IK perspective, a science perspective, or through a co-

production knowledge approach equitably including multiple knowledge systems. Recognizing these different needs also means that Indigenous observations don't fit in a one-size-fits-all approach.

### *Health and safety of Arctic Indigenous Peoples*

The observing community (and the ROADS process) must acknowledge and address the central concerns of health and safety of Indigenous Peoples systems. Indigenous perspectives take a holistic approach about what ecosystem health means in relation to serious threats of pollution (e.g., contaminants, plastics), human and animal diseases, mental wellness, and degradation of the overall ecosystem. Current external management systems continue to have detrimental impacts on Indigenous health and wellness. Health, wellness and the safety of resources are connected to multiple systems and are integral to observing from a food security lens. These variables remain a critical gap in the Arctic observing community. By examining a food security framework could inform variables that are important to health and wellness. The Arctic Observing community and AOS specifically have not historically addressed these types of connected observations. We recommend that the next AOS meaningfully include this aspect in the next summit.

### *Moving forward under a new paradigm*

The ongoing coronavirus (COVID-19) worldwide pandemic presented unique challenges in AOS conference planning and organizing. It also posed additional challenges to the 2020 field season. For many if not all, it has also been viewed as an opportunity- a timely pause- and a place to look at what is working and not working and how we could do things differently moving forward. We encourage everyone to learn from these experiences and continue to advance this opportunity in building on our collective relationships, and particularly on relationships with Indigenous communities.

## **DEVELOPING A FOOD SECURITY OBSERVING SYSTEM FRAMEWORK**

We invited Indigenous Peoples to share stories illustrating how the dimensions of food security are linked with the importance of observations in their own words and experience (AOS 2020). The storytellers all participated in AOS 2020, that included many calls preparing for the online sessions. Moving forward and our next steps include working with each of the storytellers to apply an Indigenous framework (food security) into a common lens to illustrate the importance of observations that are connected and collected simultaneously.

The stories shared can be found in their entirety in the pre-summit synthesis (FSWG 2020). They include:

- Greenlandic experience of colonial structures and discussions of power and participation in policy making and management of total allowable catch. - Juno Berthelsen
- Money, power, and the co-production of knowledge in Arctic research - Kaare Sikuaq Erickson
- Practical application of Indigenous knowledge to state and federal agency decision-making - Eva Burk
- Climate-driven disruption in the Bering Sea: an ecosystem in peril - Austin Ahmasuk
- The role of community programs in food security: a case study of Iiisaqsivik Society in Clyde River, Nunavut - Shari Fox

These examples provide several cross-cutting themes. Each story highlighted the many different formats, parameters, and multiple dimensions that Indigenous Knowledge brings to a particular topic, problem, or question. Through each story there are three elements, the importance of: 1) being on and connected to the land; 2) having access to traditional foods; and, 3) wellness. The power of each element together forms a foundation through which to support human and ecosystem health. As has been mentioned in several different ways, the stories also show the often-detrimental impacts of dominant culture decision makers questioning the value of Indigenous Knowledge and as a result this important information is completely disregarded, ignored or given less weight or value to quantitative data. Existing decision-making structures have a long history of, and continue to, minimizing and disregarding Indigenous voices and data, information and Indigenous Knowledge. Indigenous Peoples seek equitable power in management and governance of natural resources as an integral component of holistic wellbeing of the ecosystem, including for our communities.

Conceptualizing food systems with Indigenous Knowledge holders has provided an approach to more effectively framing and understanding the cumulative impacts of environmental (natural and anthropogenic) change - something that has been challenging for the general scientific community to do comprehensively in ways that address priorities and concerns of Indigenous Peoples (Arragutainaq 2014; Sheremata et al. 2019). It is our goal in moving forward to advance this model by sharing and building cases of best practices (from an Indigenous perspective) as well as building on the food security framework for which to base observations that take a more holistic view of variables that are meaningful to Indigenous Peoples.



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Table 1. Key themes and recommendations from the Food Security Working Group from AOS 2020

Key Theme	Description	Recommended Actions
<p><b>View food security through an Indigenous lens</b></p>	<p>An Indigenous worldview as a lens to understanding food security includes observations from a variety of ecosystem components from physical to biological to cultural and health and wellness. Indigenous Peoples have different perspectives of what an ‘ecosystem approach’ is than what is being typically applied. Inclusive of diverse perspectives in a community in order to get a whole picture, for example often researchers seek out expert Indigenous or Traditional Knowledge holders or active hunters; but exclude other expertise and groups (e.g., youth, those processing foods). An understanding of the Indigenous governance landscape and flow of information (formal or informal) is needed and can be achieved by viewing food security through an Indigenous lens.</p>	<ul style="list-style-type: none"> <li>● Adopt the “Six Dimensions of Food Security Framework” (ICC-Alaska 2015; ICC-Alaska white paper submissions to AOS).</li> <li>● Facilitate Indigenous participation in the ROADS process.</li> <li>● Ask Indigenous participants to set focal observation variables.</li> <li>● Co-design a system that is flexible and adaptable and incorporate a variety of programs/ methodologies/approaches.</li> <li>● Address issue of access to the system by both Indigenous Peoples and researchers.</li> </ul>
<p><b>Weave human health &amp; wellness into every aspect of the observation system</b></p>	<p>There is a fundamental need to fully understand what Indigenous Peoples mean by health and wellness, particularly in regards to our relationships that are taught through a belief and value system that we are not separate from. Indigenous perspectives take a holistic approach about what ecosystem health means in relation to serious threats of pollution (e.g., contaminants, plastics), human and animal diseases, mental wellness, and degradation of the overall ecosystem. Current external management systems continue to have detrimental impacts on Indigenous health and wellness.</p>	<ul style="list-style-type: none"> <li>● Facilitate Indigenous leadership through capacity-building (see Key Theme).</li> <li>● Include an ‘Impacts on Human Health and Wellness’ session/track at the next AOS and invite Indigenous scholars to lead the conversation.</li> <li>● Provide co-produced training and resources for researchers to gain a better understanding of the Indigenous health and wellness implications of their research.</li> <li>● Encourage regular and meaningful communication with regional efforts (e.g., One Health, ArcticNet, etc.).</li> </ul>

<p><b>Support community-driven research and monitoring</b></p>	<p>Indigenous Peoples prefer community-driven monitoring over 'community based monitoring (CBM)'. Community-driven efforts are limited because funding does not support long-term data collection efforts. There is an immediate need to support ongoing and expanded community-driven efforts across the Arctic which facilitate individuals to observe and monitor on the ground, year-round, as opposed to work only by seasonal external researchers. Abundant financial resources are needed for building collaborative approaches on a large scale.</p>	<ul style="list-style-type: none"> <li>● Rename the <i>Community-Based Monitoring Atlas</i> to <i>Community-Driven Monitoring Atlas</i> and update project list.</li> <li>● Increase funding to existing and new or expanded community-driven programs.</li> <li>● Fund Indigenous organizations to develop community-defined protocols for what community-driven research is and how to be a good partner to Indigenous communities.</li> </ul>
<p><b>Adopt a food sovereignty approach to governance</b></p>	<p>There are limited to non-existent co-management frameworks in some Arctic countries; we need to advance co-management structures where they are non-existent and facilitate equitable co-management across the Arctic. Indigenous Peoples across the Arctic need facilitated convening opportunities to learn and share with one another. Regularly applying the food security conceptual framework in decision-making; systematically identifying impacts of regulations and policies on Indigenous ways of life and health of the ecosystem; identify examples of bringing together Indigenous and Traditional Knowledge and science for decision making; Indigenous communities are facing common challenges but under different dominant governments resulting in different impacts.</p>	<ul style="list-style-type: none"> <li>● Implement recommendations from the ICC-Alaska Food Security and Food Sovereignty workshop (submitted white papers &amp; available online) and in the forthcoming Food Security Working Group Synthesis.</li> <li>● Include multiple Indigenous Peoples (expert knowledge holders, scholars, organizations) in every expert panel.</li> <li>● In the SAON ROADS framework, include transparent and consistent pathways to show how and where observation data are used in decision-making.</li> </ul>
<p><b>Appropriately acknowledge &amp; value Indigenous Peoples' Knowledge*</b></p>	<p>Indigenous Peoples' knowledge is not taken seriously nor weighed equally with other types of scientific data and information. Western institutions, as a whole, must make abundant resources available to meet and engage with Indigenous Peoples' knowledge. Most western research, including proposal development, continues to move forward without Indigenous Peoples' knowledge as the status quo. Indigenous Peoples' knowledge is not only 'data', but also the framework for how to look at, understand, and think about our world. Researchers, agencies, and institutions must shift the way they do their work to embrace and prioritize Indigenous Peoples' knowledge. This includes</p>	<ul style="list-style-type: none"> <li>● Co-produce guidance that supports relationship-building between researchers and remote Arctic communities as critical to facilitating better working relationships.</li> <li>● Encourage funding institutions to reframe how proposals are ranked in a way that prioritizes projects with ample budget for time spent in communities and/or funding for Indigenous partners.</li> </ul>

	leaving titles and egos at the door; trusting and respecting Indigenous Peoples' knowledge as valid, and recognizing them as equitable to western science.	<ul style="list-style-type: none"> <li>● Adopt guidance from Indigenous communities to define what kind of funds are 'adequate' and what is needed for Indigenous involvement in successful research and monitoring.</li> </ul>
<b>Appropriately acknowledge &amp; value Indigenous languages</b>	Language holds knowledge. Researchers must learn to respect and work among Indigenous languages. Dominant scientific languages reinforce linear thinking; Indigenous languages encompass holistic, interconnected worldviews. Researchers must be encouraged and funded to develop a deeper understanding of the cultures they work in and with. This is best achieved through long-term relationship building and time spent in and with communities. Research questions, research design and research activities must be designed to capture these nuances in language and understanding, and must be structured to allow the time and space for such understandings to come to light and be expressed.	<ul style="list-style-type: none"> <li>● Provide funding under exploratory work for researchers interested in learning an Indigenous language</li> <li>● Offer regional opportunities for researchers and Indigenous Peoples to come together in workshops to develop shared understandings and explore areas of similar interest.</li> </ul>
<b>Use a common language &amp; understanding in the ROADS process</b>	People from different perspectives, backgrounds and training hold various understanding of concepts and terms commonly used when discussing observing systems. Several examples include "community," "ecosystem," "ecosystem-based," and "community-based." We need to collectively think about using a common terminology and language moving forward.	<ul style="list-style-type: none"> <li>● Co-produce a common terminology and language guide for the ROADS process.</li> </ul>
<b>Increase support for capacity building for researchers</b>	Capacity building is needed for researchers at all career stages and at all types of institutions (academia, governmental and non-governmental agencies). Some examples include the need for a thorough and comprehensive understanding of Indigenous languages, cultures, and values, as well as Indigenous governance systems, communication, and education. It is okay to make mistakes and to ask for advice (while recognizing the burdens this may place on Indigenous people and organizations).	<ul style="list-style-type: none"> <li>● Provide training and resources to researchers to gain a better understanding of Indigenous languages, cultures, values, governance systems, communication, and education.</li> </ul>

<p><b>Increase support for capacity building for Indigenous Peoples &amp; communities</b></p>	<p>Empower and include Indigenous leadership and Indigenous and Traditional Knowledge holders to inform critical observing needs as an integral part and prerequisite of all of the stages of ROADS; capacity building is not just about funding capacity; serious issue that limits engagement and true partnership with Indigenous peoples; still remains a serious limitation to fully realizing co-production of knowledge and Indigenous leadership in research today</p>	<ul style="list-style-type: none"> <li>● Provide funding directly to Indigenous organizations and communities to: <ul style="list-style-type: none"> <li>○ develop their own protocols</li> <li>○ develop their own critical observing needs</li> <li>○ engage in co-production of knowledge and develop Indigenous leadership in research and monitoring</li> <li>○ involve youth in observing and research projects.</li> <li>○ train and engage youth for long-term participation in observing and research.</li> </ul> </li> </ul>
<p><b>Appropriately acknowledge the contributions of Indigenous Peoples &amp; organizations</b></p>	<p>There is a need to appropriately acknowledge contributions of Indigenous peoples and organizations. This includes when these sources are used in published work, oral and poster presentations, visuals (e.g., ICC-Alaska 6 Dimensions of Food Security Framework) - all should be properly cited in the same manner as western peer-reviewed data and publications. Current funding processes should incorporate aspects in a true co-production of knowledge approach (white paper).</p>	<ul style="list-style-type: none"> <li>● Provide funding directly to Indigenous organizations and communities to develop their own protocols and ethics guidelines.</li> <li>● Provide Indigenous-led co-production of knowledge approach training for researchers that is developed by Indigenous perspectives and values.</li> </ul>
<p><b>Document &amp; share good examples of research practices from Indigenous experiences</b></p>	<p>Indigenous Peoples have been observing our environments under a food security lens for millennia. This knowledge is shown in practice, by observation programs and research projects led by Indigenous Peoples and organizations, and not necessarily accessible to academics. There is a need to document and share these examples and to use this information to help connect people both research and Indigenous communities to foster partnerships across the circumpolar Arctic. Some resources identified at AOS2020 include SciQ; Indigenous Sentinels Network; and stories in the FSWG Synthesis that highlight the many interconnected dimensions of food security and a co-production of knowledge approach.</p>	<ul style="list-style-type: none"> <li>● IASC should support cross-pollination networking opportunities that include Indigenous Peoples and researchers in meaningful ways across the Arctic.</li> <li>● IASC should support the continued work of the Food Security Working Group.</li> <li>● Food Security Working Group should be charged with regularly communicating (in person, email list serve, etc.) with the Indigenous observing community to identify and share best practices with the broader Arctic observing community.</li> </ul>





Table 2 – List of Alphabetized Submitted White Papers and Short Statements Submitted to 2020 AOS

Author(s)	Title	Type	PDF	ID#
Behe, C., Daniel, R.G. and Raymond-Yakoubian, J.	Observing frameworks need to reflect a co-production of knowledge approach to equitably include Indigenous Knowledge systems	White Paper	<a href="#">link</a>	2019_034
Divine, L.M. and Robson, B.	The Indigenous Sentinel Network: The use of community-based monitoring to enhance food security in northern coastal communities	White Paper	<a href="#">link</a>	2019_024
Enghoff, M., Vronski, N., Shadrin, V., Sulyandziga, R. and Danielsen, F.	Community-based observing for action in Yakutia, Russia	Short Statement	<a href="#">link</a>	2019_044
Heath, J.P.	THE ARCTIC EIDER SOCIETY: SIKU and the Hudson Bay Consortium - Indigenous-driven solutions for thriving communities.	Short Statement	<a href="#">link</a>	2019_055
Inuit Circumpolar Council Alaska (ICC-AK)	Alaska Inuit Food Security Definition	White Paper	<a href="#">link</a>	2019_026
Inuit Circumpolar Council Alaska (ICC-AK)	Savoonga Marine Mammal Advisory Committee Focus Group: Food Sovereignty and Self Governance	White Paper	<a href="#">link</a>	2019_027
Inuit Circumpolar Council Alaska (ICC-AK)	Food Sovereignty and Self Governance Collective Meeting Summary Report - Eskimo Walrus Commission Focus Group	White Paper	<a href="#">link</a>	2019_028
Inuit Circumpolar Council Alaska (ICC-AK)	Yup'ik and Cup'ik Past and Current Managers of Salmon Focus Group: Food Sovereignty and Self Governance	White Paper	<a href="#">link</a>	2019_030
Inuit Circumpolar Council Alaska (ICC-AK)	Inuit Past and Current Managers of Marine Resources Focus Group: Food Sovereignty and Self Governance	White Paper	<a href="#">link</a>	2019_031
Inuit Circumpolar Council Alaska (ICC-AK)	Food Sovereignty and Self Governance - Inuit Role in Managing Arctic Marine Resources - Collective Meeting Summary Report	White Paper	<a href="#">link</a>	2019_037
Jones, T., Behe, C., McLennan, D., Arvnes, M., Wesseberg, S., Sergienko, L., Harris, C.,	A Co-production of Knowledge Approach to Monitor Change in the Biodiversity of Circum-Arctic Coastal	White Paper	<a href="#">link</a>	2019_014

Harcharek, Q., Fletcher, S., Nichols, S., Christensen, T. and Larusson, K.F.	Ecosystems			
Kaplin, N.	Urgent Measures to stop Siberian Forest Fires	Short Statement	<a href="#">link</a>	2019_005
Kourantidou, M. and Bailey, M.	Monitoring food insecurity among Inuit: The Forgotten Pillar of Fisheries Management	White Paper	<a href="#">link</a>	2019_025
Starkweather, S., Cananico, G., McCammon, M., Smith, G., Lee, C., Fuglestad, J.L.	Advancing an Arctic Regional Component of the Global Ocean Observing System under SAON, the GOOS Regional Alliance and the UN Decade for Ocean Science	Short Statement	<a href="#">link</a>	2019_050
Starkweather., S., Larsen, J.R., Kruemmel, E., Eicken, H., Arthurs, D., Biebow, N., Christensen, T., Delgado, R., Gambardella, A., Kallhok, S., Johannson, M., Jóhannsson, H., Kodama, Y and Sandven, S.	Sustaining Arctic Observing Networks (SAON) Roadmap for Arctic Observing and Data Systems (ROADS)	White Paper	<a href="#">link</a>	2019_049