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Field Report

Fostering innovation in Arctic food industries

Lisa F. Clark[a], Andrey Mineev[b], and David Natcher[c*]

[a] University of Saskatchewan; ORCID: 0002-2098-2940
[b] Nord University; ORCID: 0009-0008-7902-5636
[c] University of Saskatchewan; ORCID: 0000-0002-4992-0575

Abstract

This Field Report describes the stages in the development of the Arctic Food Innovation Cluster (AFIC). Motivation for AFIC arose during research supported by the Arctic Council's Sustainable Development Working Group, which found the development of Arctic food industries was constrained by a general absence of innovation in primary and secondary product development. Through a series of iterative stages—scoping, consultations, design—a vision for AFIC emerged. This involved the establishment of a central AFIC hub that would promote strategic coordination, direction, and knowledge mobilization between stakeholders. The High North Centre (HNC) for Business and Governance at Nord University in Norway has assumed this central role and will guide the development of the AFIC initiative. The AFIC strategy assumes development of a network of regional pan-Arctic food hubs that will serve as aggregation points for knowledge sharing and strengthening the interconnectivity between local food producers and other value chain actors in the Arctic food system. Ultimately, the goal of AFIC and its associated regional hubs is to help instill a sense of pride, empowerment, health, and wellbeing in Arctic communities through the sustainable development of Arctic food industries.

Keywords: Arctic; cluster; food systems; Indigenous; innovation; policy; regional hubs; value chain

*Corresponding author: david.natcher@usask.ca

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Résumé

Ce rapport de terrain décrit les étapes du développement de l'Arctic Food Innovation Cluster (AFIC), un pôle d'innovation alimentaire pour l'Arctique. L'idée de créer l'AFIC est née lors d'une étude menée par le Groupe de travail sur le développement durable du Conseil de l'Arctique, qui a constaté que le développement des industries alimentaires de l'Arctique était limité par un manque général d'innovation dans la conception des produits primaires et secondaires. À travers une série d'étapes itératives (définition du champ d'application, consultations, conception), une vision pour l'AFIC a émergé. Il s'agissait de créer un centre AFIC qui favoriserait la coordination stratégique, l'orientation et la mobilisation des connaissances entre les parties prenantes. Le High North Center (HNC) pour les affaires et la gouvernance de l'Université Nord en Norvège a assumé ce rôle central et guidera le développement du projet AFIC. La stratégie de l'AFIC prévoit la création d'un réseau de centres alimentaires régionaux panarctiques qui serviront de points de convergence pour le partage des connaissances et le renforcement de l'interconnectivité entre les producteurs alimentaires locaux et les autres acteurs de la chaîne de valeur dans le système alimentaire arctique. En fin de compte, l'objectif de l'AFIC et de ses centres régionaux associés est de contribuer à instiller un sentiment de fierté, d'autonomie, de santé et de bien-être dans les communautés arctiques grâce au développement durable de leurs industries alimentaires.

Introduction

In 2016, the Arctic Council's Sustainable Development Working Group (SDWG) endorsed the Arctic as a Food Producing Region research program. Involving research teams from Canada, Norway, Finland, and Russia, the objective of the project was to assess the potential for increased production and added value of foods originating from the Arctic, with the overarching aim of improving food security, while enhancing the social and economic conditions of Arctic communities. The results of that research confirmed that there are considerable opportunities for commercial food production in the Arctic (Lorentzen et al., 2025). Food industries are producing large volumes of food commodities in the region that are culturally compatible with Indigenous and local food preferences and have high export value.

Although the Arctic was recognized as an important food-producing region, there was a shared sense that the Arctic was not meeting its full potential, either in terms of satisfying local food needs or for maximizing domestic or international export opportunities. The underperformance of Arctic food industries was attributed to a plethora of social, economic, climatic, and logistical constraints, including a lack of necessary infrastructure, fragmented supply chains, limited access to a skilled workforce, absence of innovation in product development, and tenuous access to, and knowledge of, domestic markets and consumer preferences (Natcher et al., 2021). While these challenges are experienced unevenly across the Arctic regions, Arctic food industries tend to be fragmented with poorly developed connections and communication streams. These conditions have in part led to a general overreliance on raw food exports and limited innovation in primary and secondary product development.

Based on these findings, the SDWG endorsed a follow-up study that would examine the opportunities for establishing an Arctic Foods Innovation Cluster (AFIC). The objective was to explore opportunities for AFIC to serve as an international hub that could connect northern entrepreneurs, southern-based investors, research centers, businesses, and bio-technology developers working in Arctic food industries. The intention for AFIC would be to pull together relevant actors in the Arctic foods value chain for a cluster-based approach to food production and regional economic development. While a range of definitions can be found (see Table 1), we adopted Engel and del-Palacio's (2009) definition of Innovation Cluster as inter-connected firms and institutions working in a common industry. They involve the creation of collaborative and dynamic relationships between various players around common goals, innovative ideas, knowledge sharing, public and private investment. Conceptualized in this way, AFIC could potentially foster a collaborative and multi-sectoral effort aimed at promoting synergistic value and innovation in the Arctic food system. To this end, we set out to engage Arctic food producers, governments, Indigenous communities, universities, research centers, vocational training providers and industry association, with an aim to improve the competitiveness of Arctic food industries through product and institutional innovations. Our objective was to explore the institutional requirements for food systems innovation that avoid redundancies and are complementary to other industry clusters, government programs, and research initiatives. In this Field Report, we describe the procedures that were followed in the development, design, and implementation of AFIC. This includes input from community members on the essential elements that an innovation cluster should have to ensure local relevance.

Table 1: Typology of Cluster Models

Types of cluster models	Definition
Modified	leveraging social catalysts (well-connected individuals who bridge unconnected parts of the network) to provide alternative funding mechanisms beyond conventional private financing
Orthodox	geographically concentrated economic activity in related sectors. Characterised by high incidences of traded and untraded economic interdependencies; workforce development, infrastructure investment plan, and better alignment of science, research and industry are required to achieve chosen outcomes
Social Enterprise	community-based businesses working to achieve a specific social, cultural and/or environmental purpose by selling goods and/or services, with profits being reinvested to maximize their social mission
Traditional	strictly based on market factors and private financing; dependent upon developed infrastructure, accessible labour markets and established markets for outputs

Sources: Laurence et al. 2019, pp:12, 25; Watts & Jones 2021, p. 51.

Methodology

The first stage of our research involved the completion of two independent assessments. Each assessment engaged Arctic residents, food industry leaders, government representatives, and others involved in the Arctic foods value chain. Insights were also sought from those with experience in innovation and the administration of industry clusters.

The first of these assessments was conducted by Fellows of the Action Canada program (Laurence et al., 2019). Action Canada is an independent, non-partisan and non-profit organization based in Ontario, Canada. The Action Canada Fellowship (ACF) program aims to enhance emerging leaders' understanding of public policy choices for the future. In this case, the ACF examined the constraints and opportunities associated with the development of the AFIC. Specifically, the ACF conducted interviews with thirty key informants from northern Canada—an area that includes Yukon, Northwest Territories, Nunavut, Nunavik, and Labrador—and explored how a cluster-based approach to food innovation could improve access to affordable, culturally compatible, and healthy foods. The interviews explored where innovations could or should be made to improve the commercial food sector. This includes new product development (e.g., seaweed), processing methods (e.g., full utilization of harvested fish), changes in existing value chains (e.g., north to north distribution), and the fostering roles of government and the private sector.

The second assessment was completed by the SEFARI Gateway Fellowship (SGF) program, based in Scotland. The SGF was set up to identify potential opportunities to engage actors in the food and drink sectors in the Arctic region. Their final report, entitled *Food and Drink Innovation and Clustering in Scotland's Highlands and Islands: Review of opportunities for engagement in the Arctic Region* (Watts & Jones, 2021), includes a review of the requirements for an AFIC, potential alignment with the Scottish Highlands and Islands food and drink sectors, and areas of research that can advance innovations in Scottish and Arctic food industries.

Guided by these assessments, interviews were then conducted with key industry and community informants. Industry experts and knowledge holders from northern Canada were invited to share their views and thoughts about the current state of the Arctic food system, and where innovations were needed for improvement. This includes their opinions on how a cluster-based approach to food innovation could be designed that accounts for the varying conditions of the Arctic, while advancing the values and priorities of Arctic communities. Interviews covered the economic, environmental, and sociocultural dimensions of food innovation. The economic theme investigated issues such as market access, certification, communication, logistical limitations, regulatory constraints, infrastructure, and the scalability of innovative technologies. This also included discussions on food-related entrepreneurship, local education, training, and employment, and opportunities for food tourism. The environmental theme focussed on understanding the biophysical and environmental constraints that can hamper food innovation, including strategies to reduce the carbon footprint of existing and new food industries (Oveisi et al., 2025). The sociocultural theme explored food culture and the potential tensions between commercial and traditional food production. The formative role of traditional ecological knowledge was discussed, particularly in relation to traditional systems of food production and storage. Several community members stressed that innovation does not

necessarily need to be something new but rather can be based on the food traditions that have long sustained Arctic peoples. Together, these insights were recorded to better understand how AFIC might advance the dual objective of local and regional economic development, while supporting the food security and sovereignty of Arctic peoples.

Results

The ACF assessment identified three principal factors that were constraining innovation in the Arctic's commercial food sector. The first was financing, as the accessibility of public and private financing has challenged the abilities of northern food industries to expand existing food chains and introduce innovations in product development. The lack of financing and associated capital investments have in effect undermined opportunities for added value to Arctic products, resulting in most food production being exported in raw form. The second was human capacity, as there are limited human resources available to facilitate industry expansion, particularly in small and remote communities where trained and skilled workforces may be lacking. The third factor was geographic, and includes infrastructure, transportation, and distribution capacity that is lacking in many Arctic regions. While the challenges are significant, the ACF assessment also noted several strengths, including the existence of strong community and social capital, specialized local knowledge and rich food culture, and the market potential for Arctic and Indigenous inspired food products (Laurence et al., 2019).

Based on their review, the ACF concluded that a traditional cluster, based strictly on market expansion may not be the most suitable model for the Arctic. Rather, ACF suggested that the AFIC should extend beyond the confines of the commercial food sector and incorporate other community enterprises that are constrained by many of the same challenges, such as those limiting tourism development and other local entrepreneurial opportunities. By broadening the scope of AFIC, it may be better positioned to leverage other funding opportunities to help overcome the financial limitations that constrain food innovation. This would also facilitate investments in local infrastructure that would have spillover benefits for the delivery of other community services. Serving in this broader capacity, AFIC could induce spillover benefits that generate wider social and economic benefits for communities. In this regard, ACF recommended that AFIC be modelled as a social enterprise, where economic, social, cultural, and environmental benefits are given equal consideration.

The SGF assessment reached many of the same conclusions, most notably that AFIC should avoid a singular focus on primary food production, which is often driven by volume at the expense of other socioeconomic benefits. Rather, the SGF assessment recommended a broader and more inclusive conceptualization of Arctic foods innovation, where multiple and synergistic benefits are gained (Watts & Jones, 2021). To best maximize its impact, it will be important for AFIC to broaden its focus from strictly economic innovations to include support for social and cultural development. This should be achieved, in part, through dialogue, partnership-building, and a commitment to advancing the multidimensional interests and values of Arctic peoples. Being sensitive and responsive to the many factors that hamper food

system innovations, be they socioeconomic, cultural, or environmental in nature, AFIC will be better placed to deliver a broader set of benefits to Arctic communities.

The results of both external assessments where consistent with the findings from our own key informant interviews, where the nexus between economic, cultural, and environmental benefits were emphasized. For example, in the case of commercial fisheries, the objective should not be to simply increase production per se but rather to develop alternative and more sustainable processing strategies. Full utilization methods that maximize value was identified as a strategy to reduce waste, create new revenue streams, and minimize the environmental impact of commercial fisheries.

Acknowledging that opportunities for food production will differ by region, as does the cultural understandings of food innovation, there was consensus that improvements in the Arctic food system could be made through collaboration and a networked approach to problem solving. Knowledge sharing and technology transfer were flagged as critical factors for innovation, with AFIC being a potential catalyst. As a bridging organization, AFIC could overcome connectivity constraints (transportation, telecommunications), thereby scaling out new products and processing methods, which could be fostered through a more integrated value chain. These recommendations are consistent with the findings of Natcher et al., (2021) who emphasize the need for innovation in Arctic food systems, particularly in facilitating communication and supporting business incubation opportunities.

In addition to knowledge transfer, it was suggested that AFIC could assist in the conduct of market research and might even support joint research activities, such as international flagship projects that facilitate scalable innovations. This could include opportunities for product branding that would be used to distinguish Arctic foods in national and global markets. Arctic branding was identified as a priority by several participants who suggested AFIC could potentially administer a "Made in the Arctic" labelling system that could help establish a greater market presence for Arctic foods. The potential value of an Arctic labeling system is supported by consumer preference studies (Yang et al., 2020b). For example, compared to other places of origin, consumers place higher value on the features of Arctic origin and would choose to purchase wild and locally produced foods over other southern-based alternatives (Yang et al., 2020b). Consumers also report feeling the consumption of Arctic foods allows them to experience Indigenous cultures and tradition, while supporting the economic development of Indigenous and Arctic communities. Demand is growing for niche food products that are sustainable, authentic, and that have their own stories. As such, opportunities exist to expand niche markets for Arctic foods by highlighting their distinctive characteristics, such as the natural environment, Indigenous cultural and historical associations, and the potential to improve local economic conditions in northern regions. The attitudinal analysis conducted by Yang et al. (2020b) confirms these factors are important to consumers.

To instill consumer confidence in a "Made in the Arctic" brand, several participants suggested the need for certification standards that designate place of origin and authenticity. This too was considered a potential marketing advantage for Arctic products. The Arctic is a unique food-producing region with the potential for location-specific price premiums among consumers (Yang et al., 2020a). Certification standards that highlight the uniqueness of Arctic products that ensure authenticity and traceability has traction in the consumer market. An example is the labeling and

trademark systems developed by the Intertribal Agriculture Council (IAC) that certifies components of Native American biocultural heritage. The IAC began the process to develop and create the trademark in 1991, shortly after the passing of the Indian Arts and Crafts Act (Acts) of 1990 (P.L. 101-644). The development of the IAC trademark was formally approved in 1993 and is now used on over 500 products sold in the U.S. and around the world to signal to consumers the authenticity of American Indian produced goods (IAC, nd). The Aleut Council in Alaska is a member of the IAC and uses trademark labeling to designate food products produced from Alaskan Native Villages. It was suggested that AFIC could potentially devise and administer a similar branding and certification program for Arctic foods. Through a certified "Made in the Arctic" brand, Arctic food industries could secure market advantage. Table 2 shows different approaches to an Arctic branding scheme that might be considered.

Table 2: Branding Schemes

Biocultural Heritage	Inter-linked traditional knowledge, biodiversity, landscapes, cultural and spiritual values and customary laws of Indigenous peoples and local communities.
Biocultural Heritage Indication	A graphical sign or label to indicate that a product or service is derived from biocultural heritage, guaranteeing its origins and authenticity.
Certification	Like labelling but entails third party attestation.
Geographical Indications (GIs)	Names link a product with a particular geographical area or territory and production process. Like trademarks, Geographical Indications are set up to protect intellectual property.
Intellectual Property Rights (IPRs)	Legal rights over inventions, artistic or literary works, distinctive marks, designs, place names and other practical expressions of mental outputs that have actual or potential commercial value.
Intellectual Property Rights-based Labelling Tool	Labelling schemes that seek to protect Intellectual Property Rights (e.g., Geographical Indications and Trademarks).
Labelling	Marks or logos offering guarantees to consumers but do not seek to protect Intellectual Property Rights, and do not necessarily entail third party attestation.
Trademarks	Similar in function to Geographical Indications, but link a product with a trade origin, which is likely to be a company rather than a place.

Source: Adapted from Swiderska et al., 2016, p. 141.

Design and implementation

With these findings, we set out to examine the requirements for designing and implementing AFIC. This included the development of strategies for knowledge transfer within and between Arctic food value chain stakeholders as well as opportunities to facilitate innovations within the Arctic food system. Various cluster models were assessed for appropriateness in the Arctic context, as well as the challenges and opportunities. Based on the finding of both assessments and our own key informant

interviews, the "social enterprise cluster model" was found to be the most appropriate given its equal commitment to the quadruple bottom line (economic, social, environmental and culture). The social enterprise approach to food innovation addresses several of the issues raised by participants, most notably the link between sustainable economic development and cultural well-being, where the goals and values of Indigenous peoples and Arctic communities are a foundational pillar. This necessarily includes opportunities for employment and developing workplace skills that can lead to new product development and processing strategies, while staying true to local culture and food traditions. Adopting a social enterprise approach was encouraged for AFIC to achieve local relevance, which will be necessary for sustainability over the long-term.

Concluding that the social enterprise approach to innovation was the most appropriate model to follow, a vision for AFIC and its implementation began to emerge. A critical requirement was to first establish a central hub that would promote strategic coordination, direction, and knowledge mobilization between stakeholders. To this end, the High North Center (HNC) at Nord University in Norway agreed to coordinate the first stage of AFIC implementation. The HNC for Business and Governance is an international center for research, education and communication, connected to societal and business development in the Arctic. Established in 2007, the HNC works closely with Arctic industries, government bodies, communities, and other stakeholders to develop knowledge, competence, and awareness about the potential for innovation and sustainable value creation in the Arctic. The HNC manages the Business Index North and is currently leading a new Thematic Network on Blue Economy and the Arctic. With this experience, the HNC has the institutional capacity to facilitate communication between communities, food industries, and governments, which will facilitate opportunities for collaborative problem solving.

While serving as AFIC's international hub, the HNC is setting out to connect northern entrepreneurs, southern-based investors, research centers, businesses, and biotechnology developers working in Arctic food industries. Building on existing networks, the HNC is planning to advance policy discussions and will offer a platform for Arctic food stakeholders to share experiences, lessons learned, and devise policy responses to food production challenges in Arctic communities. This includes identifying business models that will be required to ensure the continuation of the AFIC beyond its initial stage, including its future coordination with governmental and private sector initiatives. Ultimately, the AFIC will deepen the understanding of these dynamic conditions and build an evidence base for policy and development interventions that can support new innovations in Arctic food systems.

Once established (anticipated for winter 2025/2026), the identification of a regional food hubs will be initiated. Regional hubs will serve as aggregation points for knowledge sharing and strengthening the interconnectivity between local food producers and other value chain actors in their respective regions. This approach is not unlike the one used by the Icelandic Food and Biotech R&D (Matis), which has established food innovation centers at various locations in the country. Support from Matis regional innovation centers has been a successful strategy for small-scale product development, and in creating local and regional opportunities for market expansion. Like the objectives of Matis, AFIC hubs will be designed to support regional innovation in food sectors. For example, it was noted during several interviews with local and industry experts that access to financing is often the most

significant deterrent to innovation and business start-ups. With this need, regional hubs can assist entrepreneurs and small-scale enterprises in leveraging capital during their formative stages of development.

Other benefits of establishing regional hubs include the potential to support new distribution networks, for instance north-to-north distribution chains and regional food networks. This type of distribution model might rely on regional hubs that help provision other regional communities (spokes). Specific examples that were identified include Inuvik, Northwest Territories that could serve as a hub for the seven other communities in the Beaufort Delta Region or the community of Kuujjuaq that could service the other 13 communities in the Nunavik region in Canada. By regionalizing northern food networks, the distance between producers, retailers, and consumers would be significantly reduced, thereby lessoning reliance on long-distance value chains. This could also generate opportunities for local enterprises that would gain access to a large regional consumer base.

An important difference between AFIC and other innovation clusters will be the critical attention to social and cultural dimensions in Arctic community food systems. Several community participants noted that too often innovation is associated with new technologies that are introduced by external agencies, which may undermine local food culture. Residents of small and remote Arctic communities frequently engage in subsistence-based processing and sharing activities which may not represent their main source of income but have other equally important social and cultural benefits. Regional AFIC hubs will be better placed to support and not displace local traditions and institutions. This could be achieved, in part, by generating local employment opportunities and career pathways for young people. The involvement of young people in enterprise development will be a way to build employment opportunities via the creation of socially valued jobs in food-related sectors, which will offer viable alternatives for combating youth outmigration. Sustainable employment in food enterprises can provide a positive career option for young people who may otherwise move to urban areas seeking employment opportunities, where they may be exposed to social and welfare risks. In this way, regional hubs can offer important entrepreneurial and social support benefits to Arctic communities.

Conclusion

This brief field report shares preliminary findings stemming from research supported by the Arctic Council's Sustainable Development Working Group, who recognized the opportunities and challenges in developing a more sustainable Arctic food system. With their endorsement, we set out to assess how a cluster-based approach to innovation could be applied to Arctic food sectors. This involved our engagement with industry experts, government officials, community knowledge-holders, and those with experience with other innovation clusters. Through these discussions we concluded that a social enterprise approach to innovation is most applicable to the conditions of the Arctic, where food systems are uniquely integrated into the economies and cultures of Arctic peoples. To advance this agenda, the High North Centre (HNC) was identified as having the capacity to assume this central role and the ability to guide the development of

AFIC. Through the administration of the AFIC central hub, the HNC will play a critical role in promoting strategic coordination, direction, and knowledge mobilization between stakeholders. This includes the establishment of regional AFIC hubs. These regional hubs will serve as aggregation points for knowledge transfer that strengthen the connectivity between local food producers and other value chain actors. While guided by common objectives—to promote synergistic value and innovation in Arctic food systems—regional hubs will have the necessary understanding, familiarity, and flexibility to respond to unique local and regional conditions. This will enable greater responsiveness to the needs of regional industries while accounting for the social, cultural, and economic priorities of communities. This regional understanding will allow AFIC hubs to then leverage existing programs and government initiatives that best support those shared objectives. Ultimately, the goal of AFIC and its associated regional hubs is to help instill a sense of pride, empowerment, health, and wellbeing in Arctic communities through innovations in Arctic food systems that are sustainable and socially valued.

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Lisa F. Clark, University of Saskatchewan
Lisa is a Research Associate with the Department of Agricultural and Resource Economics, University of Saskatchewan. She holds a PhD in Political Science from Simon Fraser University, with a focus on public policy and international relations. Her research interests include innovative technologies in the agrifood system, food policy, food quality standards & labelling, food security, and climate change. Her most recent publication focuses on the regulation of gene editing in the food system (*International Regulation of Gene Editing Technologies in Crops* [co-authored with J. E. Hobbs]).

Andrey Mineev, Nord University Business School, Norway
Andrey Mineev holds a PhD in business economics from Nord University Business School and a master's degree in IT from the Baltic State Technical University in Saint-Petersburg (Russia). At present he works as a researcher at the High North Center for Business and Governance at Nord University Business School (Norway). His research interests include socio-economic development of the Arctic regions, strategic management control, scenario analysis. Since 2016 Andrey has coordinated the project Business Index North (www.businessindexnorth.com). In 2022 Andrey and colleagues issued an open access book on Arctic cooperation (*Global Development in the Arctic - International Cooperation for the Future* [co-edited with A.Bourmistrov and F.Mellemvik]).

David C. Natcher, University of Saskatchewan
David Natcher is a Professor in the Department of Agricultural and Resource Economics at the University of Saskatchewan, where he also holds a University of the Arctic Research Chair in Water, Energy, and Food Security in the Arctic. Trained as an applied cultural anthropologist, his research is focussed on the complex relationship between culture, economy, and the maintenance of Indigenous livelihoods. Recent publications include *Renewable Economies in the Arctic* (co-edited with Timo Koivurova).

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