

Understanding the Northern Perishable-Food Supply Chain: A Scoping Review of Challenges and Drivers of Change

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Table S1. Detailed keyword combinations for literature search.

Keywords	Keyword combinations
Food; fresh; perishable; fruit; vegetable; produce; item; product; country food; traditional food	(food OR fresh OR perishable OR fruit OR vegetable OR produce OR item OR product OR country food OR traditional food)
	AND
Remote communities; Arctic remote regions; remote locations; remote; remoteness; reserves; communit; Northern Canada; Canadian Arctic; Nunavut; Inuit; Indigenous; Alaska; Indigenous Peoples	(remote communities OR Arctic OR remote regions OR remote locations OR remote OR remoteness OR reserves OR communit OR northern Canada OR Canadian Arctic Or Nunavut OR Inuit OR Indigenous OR Alaska OR Indigenous Peoples)
Supply chain; value chain; food system; supply; procurement; air transport; transport; retail; distribution; transit; shipping; delivery; cold chain; last mile; shopping; consumption; demand; purchase; sales; logistics; operations; environment; infrastructure; food sector; supply chain management; cargo; airships; supply chain network; logistics network; outlets; store; market	(Supply chain OR value chain OR food system OR supply; procurement OR air transport OR transport OR retail; distribution OR transit OR shipping OR delivery OR cold chain OR last mile OR shopping OR consumption OR demand OR purchase OR sales OR logistics OR operations OR environment OR infrastructure OR food sector OR supply chain management OR cargo OR airships OR supply chain network OR logistics network OR outlets; store OR market)
	AND
Remote communities; Arctic remote regions; remote locations; remote; remoteness; reserves; communit; Northern Canada; Canadian Arctic; Nunavut; Inuit; Indigenous; Alaska; Indigenous Peoples	(remote communities OR Arctic OR remote regions OR remote locations OR remote OR remoteness OR reserves OR communit OR northern Canada OR Canadian Arctic Or Nunavut OR Inuit OR Indigenous OR Alaska OR Indigenous Peoples)
Food; fresh; perishable; fruit; vegetable; produce; item; product; country food; traditional food	(food OR fresh OR perishable OR fruit OR vegetable OR produce OR item OR product OR country food OR traditional food) AND (Supply chain OR value chain OR food system OR supply; procurement OR air transport OR transport OR retail; distribution OR transit OR shipping OR delivery OR cold chain OR last mile OR shopping OR consumption OR demand OR purchase OR sales OR logistics OR operations OR environment OR infrastructure OR food sector OR supply chain management OR cargo OR airships OR supply chain network OR logistics network OR outlets; store OR market)
Supply chain; value chain; food system; supply; procurement; air transport; transport; retail; distribution; transit; shipping; delivery; cold chain; last mile; shopping; consumption; demand; purchase; sales; logistics; operations; environment; infrastructure; food sector; supply chain management; cargo; airships; supply chain network; logistics network; outlets; store; market	
	AND
Remote communities; Arctic remote regions; remote locations; remote; remoteness; reserves; communit; Northern Canada; Canadian Arctic; Nunavut; Inuit; Indigenous; Alaska; Indigenous Peoples	(remote communities OR Arctic OR remote regions OR remote locations OR remote OR remoteness OR reserves OR communit OR northern Canada OR Canadian Arctic Or Nunavut OR Inuit OR Indigenous OR Alaska OR Indigenous Peoples)
Food; fresh; perishable; fruit; vegetable; produce; item; product; country food; traditional food	(food OR fresh OR perishable OR fruit OR vegetable OR produce OR item OR product OR country food OR traditional food) AND (adequacy OR affordability OR availability OR cost OR diet affordability OR access OR price OR quality OR food security OR food insecurity OR dietary practices OR dietary choices OR health OR nutrition OR safety OR wildlife OR harvesting)
Adequacy; affordability; availability; cost; diet affordability; access; price; quality; food security; food insecurity; dietary practices; dietary choices; health; nutrition; safety; wildlife; harvesting	
	AND
Remote communities; Arctic remote regions; remote locations; remote; remoteness; reserves; communit; Northern Canada; Canadian Arctic; Nunavut; Inuit; Indigenous; Alaska; Indigenous Peoples	(remote communities OR Arctic OR remote regions OR remote locations OR remote OR remoteness OR reserves OR communit OR northern Canada OR Canadian Arctic Or Nunavut OR Inuit OR Indigenous OR Alaska OR Indigenous Peoples)
Supply chain; value chain; food system; supply; procurement; air transport; transport; retail; distribution; transit; shipping; delivery; cold chain; last mile; shopping; consumption; demand; purchase; sales; logistics; operations; environment; infrastructure; food sector; supply chain management; cargo; airships; supply chain network; logistics network; outlets; store; market	(Supply chain OR value chain OR food system OR supply; procurement OR air transport OR transport OR retail; distribution OR transit OR shipping OR delivery OR cold chain OR last mile OR shopping OR consumption OR demand OR purchase OR sales OR logistics OR operations OR environment OR infrastructure OR food sector OR supply chain management OR cargo OR airships OR supply chain network OR logistics network OR outlets; store OR market)
	AND
Incentives; drivers; change; influencing factors; determinants; trade-off; challenges; barriers; drawbacks; limitation; effects; strategies; decision-making; opportunities; benefit	(incentives OR drivers OR influencing factors OR determinants OR trade-offs OR challenges OR barriers OR drawbacks OR limitation OR effects OR strategies OR decision-making OR opportunities OR benefit) AND (remote communities OR Arctic OR remote regions OR remote locations OR remote OR remoteness OR reserves OR communit OR northern Canada OR Canadian Arctic Or Nunavut OR Inuit OR Indigenous OR Alaska OR Indigenous Peoples)
Remote communities; Arctic remote regions; remote locations; remote; remoteness; reserves; communit; Northern Canada; Canadian Arctic; Nunavut; Inuit; Indigenous; Alaska; Indigenous Peoples	

TABLE S2. Summary of the main demand- and supply-side challenges.

Main challenges	Implications on supply	Key effects	Main references
<i>Demand-side challenges</i>			
Food insecurity	Short growing season, unemployment, poverty, and household vulnerability drive increased consumption of convenience foods	Reliance on imported goods Expensive store-bought food	Inability to cover food expenses Kuhnlein et al., 2006; Burton et al., 2015; Kuhnlein, 2018; Little et al., 2021
Substitution of nutritious traditional foods with low-quality store-bought alternatives	Higher consumption of convenience and confectionery foods, nutritional deficiencies	Balance the demand for harvested products	Burton et al., 2015; Mahmud, 2020; Bowers et al., 2022
Scarce food environment	Geographical remoteness and harsh climate make local agricultural production impractical	High food costs Fluctuating demand causing shortages or expired goods	Campbell et al., 2014; Natcher et al., 2016; Ingram et al., 2021
Consumer perceptions, preferences, and behaviour	Complaints about overripe pre-packaged items, unfamiliar foods	Diverse shopping patterns (e.g., outshopping practices) Higher end-consumer prices Lower produce quality Limited availability	Joseph et al., 2012; Burnett et al., 2015; Brown et al., 2019; Akande et al., 2021
<i>Supply-side challenges</i>			
Transportation challenges	Remote locations, heavy reliance on distant supplies, long travel distances, complex multi-modal supply chain, high aircraft operating costs, imbalance between service levels, demand, and airfares, and lack of competition	Greater vulnerability to disruptions Reduced supply reliability for perishables Increased complexity and interdependence Need for flexible, resilient supply chain strategies	Limited availability High price variability Decreased freshness and nutritional quality Higher end-consumer prices
Last-mile delivery challenges	Lack of roads and/or inadequate infrastructure in Northern areas	Complex, inefficient, and costly supply	Prentice and Adaman, 2017; Mercier et al., 2018
Product perishability and cold-chain management	Cold-chain requirements, freshness and nutritional decline, and challenges in food safety, integrity, and quality	Risks of spoilage during transit Higher operational costs Specialized logistics required (strict ambient conditions for transport/storage)	Nagurney et al., 2013; Kenny et al., 2020
Retail outlets challenges	Infrastructure limitations, economic challenges, and high staffing and operational expenses	High operational costs Extensive warehousing required	Higher end-consumer prices Limited product availability Ferguson et al., 2016; Mercier et al., 2018; Piltch et al., 2020; Natcher and Ingram, 2021
Lack of retail competition	Monopolies or oligopolies arising from sparse population and complex market entry barriers	Limited store access and food availability Higher end-consumer prices	Duhaime et al., 2004; Burnett et al., 2017; Akande et al., 2021