



Original Research Article

Engaging youth in food preservation: Examining knowledge and practice on Canada's West Coast

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Abstract

Youth in remote communities of Canada, including those in the Clayoquot Sound UNESCO Biosphere Region (CSUBR), can benefit from building food preservation knowledge because of the additional challenges they experience accessing healthy food. Regrettably, youth in these areas are not adequately engaged in food practices within households that support knowledge building. Schools and community food programs that serve to fill such learning gaps lack food preservation content and are developed without input from youth. Consequently, youth in remote areas, including those in the CSUBR, lack food preservation learning opportunities. To address these gaps, we examine youth participation in food preservation in the CSUBR. We adopted a participatory approach to emphasize youth

perspectives. This paper is based on interviews, food preservation workshops, and workshop evaluations with youth. The interviews provided multiple perspectives, including current youth engagement in food preservation activities and factors that hinder or motivate youth participation in food preservation. In addition, we organized food preservation workshops to support youth learning goals. These workshops were evaluated to highlight participants' experiences, including their efficacy in supporting food preservation knowledge building. Findings show that youth are not adequately participating in food preservation compared to other food provisioning activities. Factors such as the lack of teachers hinder youth from participating in food preservation. The workshops supported youth in building various food preservation techniques and

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learning about the cultural importance of food – important skills and knowledge to support youth food security and their community's food sovereignty.

Résumé

Les jeunes des régions éloignées du Canada, incluant celle de la Réserve de biosphère de l'UNESCO Clayoquot Sound (CSUBR), auraient intérêt à développer leur savoir sur la conservation des aliments, étant donné la difficulté à accéder à de la nourriture saine là où ils vivent. Malheureusement, les jeunes de ces régions ne sont pas assez impliqués à la maison dans des pratiques alimentaires qui assureraient la construction de tels savoirs. Les écoles et les programmes communautaires liés à l'alimentation qui devraient corriger cette lacune n'abordent pas la préservation des aliments et sont conçus sans l'apport de la jeunesse. En conséquence, les jeunes des régions éloignées, y compris dans la CSUBR, n'ont pas l'occasion d'apprendre comment préserver les aliments. Pour y remédier, nous avons observé comment participent les jeunes à la conservation des aliments dans la CSUBR. Nous avons adopté une approche participative pour faire ressortir le point de vue des jeunes eux-mêmes. Cet article est basé sur des entretiens, des ateliers sur la conservation des aliments et l'évaluation des ateliers avec les jeunes. Les

entretiens ont révélé de multiples aspects, dont l'implication actuelle des jeunes dans les activités de conservation des aliments et les facteurs qui freinent ou qui motivent leur participation. Nous avons aussi organisé des ateliers de conservation des aliments pour soutenir les objectifs d'apprentissage des jeunes. Ces ateliers ont été évalués pour mettre en lumière l'expérience des participants et notamment pour vérifier s'ils favorisaient efficacement le développement de connaissances en matière de conservation des aliments. Les conclusions montrent que les jeunes ne sont pas assez impliqués dans la conservation des aliments par rapport aux autres activités d'approvisionnement alimentaire. Des facteurs tels que le manque de personnes susceptibles de leur enseigner constituent un frein à leur implication. Les ateliers ont permis aux jeunes de s'approprier diverses techniques de conservation et d'apprendre la valeur culturelle de l'alimentation – des compétences et des savoirs importants pour favoriser leur sécurité alimentaire et la souveraineté alimentaire de leur communauté.

Keywords: Youth; food preservation; food knowledge; Canada

Introduction

Youth¹ in Canada lack adequate food knowledge, and this gap is affecting their access to healthy food² and participation in localized food systems (Colatruglio & Slater, 2016; Korzun & Webb, 2014; Chan et al., 2006). Food knowledge is a multifaceted term that describes various dimensions of food literacy. It includes the knowledge and practice of food production, gathering, procurement, distribution, preservation, consumption, and disposal. It also includes nutrition and health, and the socio-cultural meaning and context in which food provisioning occurs (Kwik, 2008; Kimura, 2011; Gartaula et al., 2020). Possessing food knowledge can support people to make informed decisions about how to best access and utilize food that supports their food security and wellbeing (Begley et al., 2019; West et al., 2020). Food security—the stable access to nutritious food—is essential for maintaining physical health for all (Gunderson & Ziliak, 2015). However, within Indigenous communities, wellbeing—physical, emotional, social, and spiritual—is a more holistic way of understanding health (Martin & Amos, 2016). Access to traditional food supports Indigenous Peoples wellbeing because such food provides nutritional benefits and helps people connect with other important aspects of culture (Martin & Amos, 2016).

Indigenous groups in Canada, although culturally distinct, share a common connection to the lands and waters where traditional food comes from (Settee & Shukla, 2020). This connection manifests in the shared responsibility to care for the lands and waters as the health of such food sources is connected to the peoples' wellbeing who consume food (Martin & Amos, 2016). In addition, participation in the food system strengthens

other important aspects of wellbeing for Indigenous Peoples, such as sharing, community connection, and intergenerational knowledge transfer (Settee & Shukla, 2020). Similarly, some of these aspects of wellbeing for Indigenous Peoples, such as community connections and access to healthy food, are also as important within the general population (Centers for Disease Control [CDC], 2018). Therefore, possessing food knowledge can support youth to participate in localized food systems and enjoy various benefits to enhance their wellbeing (Chan et al., 2006; Amin et al., 2018).

The concept of food sovereignty offers a holistic framework for understanding how possessing food knowledge and accessing culturally preferred food contributes to wellbeing, including for Indigenous Peoples and youth (Morrison, 2011). Food sovereignty promotes the right of people to access food to meet their cultural preferences while also contributing to how their food is procured, preserved, or consumed (Martens et al., 2016). Indigenous food sovereignty has been coined to bring attention to the relationship that Indigenous Peoples have with their food system that is not fully captured in the broader food sovereignty discourse. Indigenous food sovereignty emphasizes the sacred, reciprocal, and respectful relationship that Indigenous Peoples have with the lands, waters, plants, animals, and medicine that make up their food systems and have nurtured them for generations (Coté, 2016; Martens et al., 2016). Based on this relationship, Indigenous food sovereignty is advanced together with Indigenous self-determination to emphasize Indigenous Peoples autonomy to be self-sufficient in ways that honour their relationships with the land (as opposed to dominating it)

¹ The term "youth" in this paper refers to Indigenous and non-Indigenous youth, unless otherwise differentiated.

² Foods that provide the body with needed nutrients for the maintenance of wellbeing (physical, emotional, social, spiritual, and mental health).

and to maintain their food preferences and traditional food practices (Coté, 2016). Understanding Indigenous food sovereignty within the self-determination framework is also a decolonizing strategy that, on the one hand, exposes the impacts of colonization on Indigenous Peoples capacity to nourish their communities and, on the other, shows Indigenous resistance to colonization by revitalizing their foodways, including through knowledge building (Coté, 2016). Thus, knowledge acquired from participating in localized food systems contributes to food sovereignty, which in turn promotes food security, both for Indigenous and non-Indigenous Peoples (Martin & Amos, 2016; Fulford & Thompson, 2013).

Anyone can benefit from having food knowledge. However, emerging trends in food insecurity and participation in food provisioning activities suggest that possessing such knowledge may be particularly critical for youth in Canada, especially those living in remote³ areas. More than 17 percent of youth (under eighteen years of age) in Canada experience food insecurity (Tarasuk & Mitchell, 2020). These numbers are higher among youth in remote communities. According to recent studies, more than 20 percent, 30 percent, and 79 percent of youth experienced food insecurity in remote communities of British Columbia, Northwest Territories, and Nunavut, respectively (Li et al., 2016; Tarasuk & Mitchell, 2020). The cost of healthy food is prohibitive in Canada's remote regions, constituting a significant barrier for youth in remote areas to access healthy food through grocery stores (Pal et al., 2013; Council of Canadian Academies [CCA], 2014).

In some remote communities, residents, including youth, may have the opportunity to access affordable seasonal food from within localized food systems that

draw from both Indigenous and local food systems (CCA, 2014; Clayoquot Biosphere Trust [CBT], 2018a). However, youth in particular can lack the knowledge to access and preserve seasonal food within localized food systems for year-round use (Fieldhouse & Thompson, 2012; CBT, 2018a). Food preservation—the process of preparing food to reduce spoilage—is an important activity within Indigenous and local food systems because food procurement within such systems is primarily seasonal (First Nations Health Authority, 2018).

Evidence suggests that youth in remote regions are not adequately engaged in food provisioning activities that support knowledge building (Fieldhouse & Thompson, 2012). As is the case across Canada, there has been a significant shift in food habits over the past half century that has seen home cooking with un/minimally processed food replaced by the consumption of low-nutrient ultra-processed food that requires little to no skills to prepare (Moubarac et al., 2014). Consequently, food skills are taught less in households, making it more challenging for youth to build up their food knowledge and competencies (Government of Canada, 2010; Moubarac, 2017). Further, among Indigenous youth, the lack of food knowledge and dietary change is linked to colonization and the generational impacts of policies such as the residential school system⁴ that removed children from their families and communities where traditional food skills and associated knowledge were taught (Gates et al., 2012). Today, Indigenous Peoples demonstrate resilience by continuing to practice and share their traditional foodways in the face of these disruptions. Participating in traditional food provisioning, including food preservation, is a form of cultural resurgence. Youth are

³ “The concept of remoteness is associated with the physical isolation of a community or region. It focusses on how distance restricts access to services and opportunities for interactions” (Alasia et al., 2017, p. 6).

⁴ “Government-sponsored religious schools that were established to assimilate Indigenous children into Euro-Canadian culture. Over 130 residential schools operated in Canada between 1831 and 1996” (Miller, 2021, p. 1).

revitalizing, with the help of their communities, various aspects of culture that colonization disrupted, including consumption of traditional food, intergenerational knowledge transfer, language acquisition, and food sharing practices (Coté, 2016).

To respond to food insecurity and the learning gap within households, schools and communities have developed initiatives for youth to build food knowledge and access nutritious food (Gillies et al., 2020). While such programs are helping to fill a void, they do suffer certain limitations. First, most school food and food knowledge initiatives are designed by adults, including school leadership and partners (e.g., donors, non-governmental organizations), with little input from youth as target beneficiaries (Amin et al., 2018). This approach has led to missed opportunities for programs to reflect youth perspectives on what matters to them regarding acquiring relevant food knowledge (Amin et al., 2018; Colatruglio & Slater, 2016). Second, school food programs are often heavily framed around nutrition and health (Parker & Koeppl, 2020)—a narrow focus that can neglect other important dimensions of food knowledge and food security, such as culture, the social meaning of food, and the contexts within which food knowledge is built (e.g., Indigenous, and local food systems) (Parker & Koeppl, 2020). These gaps are particularly significant for Indigenous youth because various aspects of culture are associated with food provisioning (Settee & Shukla, 2020). Third, food processing,⁵ and food preservation more specifically, has been neglected in Canada's food security research and policy (Moubarac, 2017). This gap persists despite the growing consumption of ultra-processed food in Canada and its negative effect on wellbeing and food knowledge building. Building food preservation knowledge is

especially important for youth in remote communities because they can benefit from having seasonal food year-round to complement what they can get from the store. Limited attention to food processing in research and policy has implications for what youth learn about through school and community food programs, with food preservation rarely a focus in such programming.

Given the absence of food preservation learning in school and community initiatives and the lack of youth voices in the design of food knowledge programs, the purpose of our research is to examine youth participation in food preservation in the Clayoquot Sound UNESCO Biosphere Region⁶ (CSUBR) in British Columbia, Canada. We adopted a participatory approach to emphasize youth perspectives. Our approach was framed by five main objectives: 1) determine the current level of youth engagement in food preservation activities; 2) investigate factors that hinder youth from starting to participate in food preservation; 3) identify factors that would motivate youth participation in food preservation; 4) describe reasons why youth may want to learn food preservation; and 5) provide the supports that youth might like to strengthen their food preservation engagement.

Our report is structured as follows: we review relevant Canadian food literacy studies on the building of food knowledge among youth to demonstrate the need for this research. We then provide details about the study region and research context, our participatory research approach, and the research methods we used. Next, we present our main results structured around the five research objectives, followed by a discussion. We end with a brief conclusion that highlights the paper's contribution.

⁵ Both food processing and preservation involve handling and preparing food to reduce spoilage. However, food processing also includes marketing and packaging, which are outside the scope of our research.

⁶ While UNESCO retains the term Reserve, Canadian Biosphere Reserves have universally and officially adopted the terminology of "region".

Initiatives building food knowledge among Canadian youth

A growing body of literature in Canada (Hanbazaza et al., 2015; Prelip et al., 2011; Gillies et al., 2020) highlights initiatives to support food knowledge-building among youth in various contexts, including schools and communities. Food production, nutrition, and cooking activities are ubiquitous in youth programs, particularly in schools and communities, and aim to encourage healthy eating⁷ (Huys et al., 2019; Price & Froese, 2019). Within Indigenous communities, food knowledge acquisition programs also support youth to maintain connections to traditional food systems, culture, and communities through the procurement, preservation, and consumption of traditional food (Price & Froese, 2019).

Food production and procurement knowledge

In Canada, youth acquire various knowledge from participating in food production and procurement activities, including food production skills, social and financial literacy, and traditional food procurement skills (Martin & Vold, 2018; Fulford & Thompson, 2013; Hirsch et al., 2016; Price & Froese, 2019). In a study that investigated how the *askty project* supports youth in Saskatoon to build their capacity to produce food in an urban context, Martin and Vold (2018) found that participants acquired knowledge associated with urban agriculture, including planting, and harvesting food, and learned to sell their harvest, build self-confidence, and positively changed their shopping habits. Fulford & Thompson (2013) reported similar outcomes among Winnipeg youth who participated in a community urban agriculture and gardening

initiative. Youth built vegetable production skills, aquaponics, beekeeping, leadership, and communication skills (Fulford & Thompson, 2013).

In remote areas of Canada, Indigenous communities are revitalizing traditional food procurement activities and supporting youth to build various food knowledge (Price & Froese, 2019; Hirsch et al., 2016). For example, the *Going off, Growing strong* (GOGS) program in northern Labrador supported youth to acquire hunting skills and traditional food sharing experience to support food security, mental, social, and community wellbeing (Hirsch et al., 2016). A similar community-based food program (*Ithinto Mechisowin*) in northern Manitoba supported youth to build hunting, fishing, and gardening skills, along with cultural principles of daily living (Kamal, et al., 2015). These community-led efforts empower Indigenous youth to continue engaging in traditional food procurement practices that are at risk of being lost due to the generational effects of various systemic policies put in place by Canada to disrupt such activities (Kamal et al., 2015). For example, in addition to the residential school system, Indigenous children were disproportionately apprehended from their families and communities in the 1960s and placed in non-Indigenous homes where Indigenous food procurement learning was absent. Hence, many Indigenous youth missed the opportunity to learn these skills and pass them on to their children (Settee & Shukla, 2020).

Although these initiatives play a vital role, studies have also found that participating in food production in and of itself within a program context may not necessarily translate into a significant shift in youth dietary habits (Hanbazaza et al., 2015; Prelip et al.,

⁷ Healthy eating is such that the body gets needed daily nutrient and calories from diverse food.

2011). Thus, a vital, additional skill for youth concerns their ability to transfer knowledge into actual practice to access and utilize nutritious food (Huys et al., 2019

Food utilization knowledge

In Canada, cooking and nutrition education appear to be favoured in programs that are aimed at supporting youth to build food utilization skills and knowledge. Studies show that food utilization programs have supported youth to build various skills to prepare nutritious food and make positive dietary changes (Colley et al., 2019). For example, an evaluation of the *Northern Fruit and Vegetable Pilot Program* that served twenty-six elementary schools in northern Ontario revealed that students who received a combination of nutrition education and healthy food increased their intake of fruits and vegetables (at school) compared to those who did not (He et al., 2009). Some food utilization initiatives include practical components like cooking to enable youth to apply theoretical learning of nutrition knowledge to practice. In Montreal, a school-based nutrition program *petits cuisiniers—parents en réseaux* involving seven schools included cooking and tasting workshops for students and their parents (Bisset et al., 2008). Those who participated in the program mentioned knowing more about cooking and nutrition, and reported a greater likelihood to try new food, than those who did not participate (Bisset et al., 2008). What is not clear is if these school-based programs promoted the cultural aspects of food utilization, such as teaching about the importance of consuming culturally preferred food as a vital aspect of wellbeing, in addition to nutritional intake. It is also not clear from the above cases if the building of nutrition and cooking skills translated into improved consumption of nutritious food for youth at home or if they learned about food preservation.

Food preservation learning

Food preservation knowledge enables users of localized food systems, including youth, to keep seasonal traditional and local food longer to support their food needs and maintain the consumption of food that meets their preferences (First Nations Health Authority, 2018). What is notable from our review is that food preservation learning hardly features in school food programs, as well as community food programs linked to schools. Examples include *Food Skills for Families* in British Columbia; *Kids in the Kitchen* in Manitoba; *Strive for Five at School* in Nova Scotia; and *Kids Kitchen* in Saskatchewan (Chenhall, 2010). Some exceptions include community-led programs taking place in some remote Indigenous communities. Initiatives in Délı̄nę, in the Northwest Territories, and in Tr'ondëk Hwëch'in, in the Yukon provide youth with opportunities to learn how to harvest and preserve fish (TV Ontario, 2020 Ryan & Steward, 2014).

Nevertheless, we can identify two particular gaps based on published work. First, food preservation learning is lacking in most school and community programs compared to other components like gardening and cooking. Perhaps food preservation is not a priority in the urban context, but in remote areas where the cost of nutritious food can be prohibitive, food preservation learning may be particularly important, including for youth. Also, as gardening, hunting, and fishing are seasonal activities, a lot can be gained by learning how to preserve those harvests to have them available for consumption year-round. Schools can also use food preservation learning as an entry point to educate students about the concept of food sovereignty, how possessing food preservation knowledge can help them have some control over the food they consume, and how practicing food preservation can help them learn about cultural food

traditions. This kind of knowledge remains to be developed in school food knowledge programs.

Second, it is not clear if or how the youth in the above-cited initiatives were involved in deciding the kind of food knowledge they were taught. Although all the programs reported achieving their objectives, a question mark remains around the likelihood that youth continue to practice what they have learnt (e.g., eating fruits and vegetables, cooking at home) beyond the school environment (He et al., 2009; Bisset et al., 2008). While many factors will determine whether youth continue using the skills they acquire from

school or community initiatives, allowing youth to decide what and how they want to learn might encourage them to sustain those practices.

The research that we report on in this paper looked to address these important gaps in our understanding of youth and food knowledge in a rural, remote Canadian context. As described below, we adopted a participatory approach to engage youth and learn more about their preferences, challenges, and how they would like to learn food knowledge, and food preservation skills in particular.

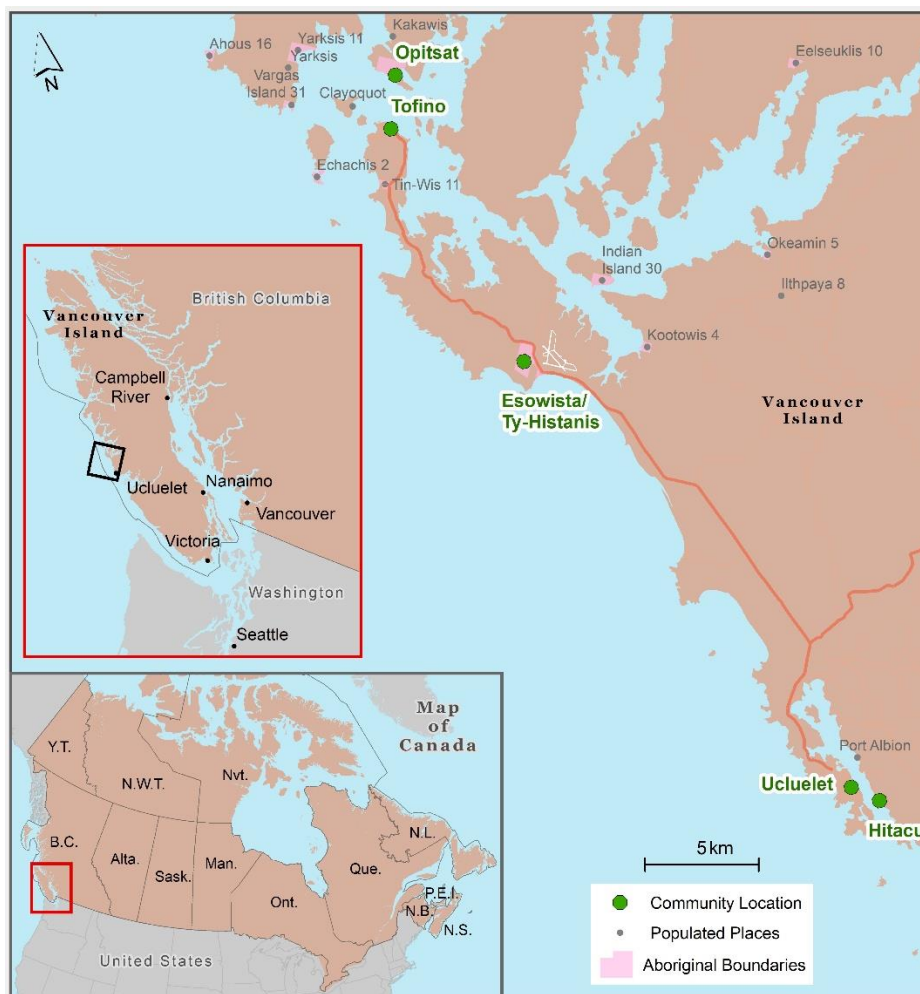
Methodology

Community and research context

Located on the west coast of Vancouver Island in British Columbia, the Clayoquot Sound UNESCO Biosphere Region (CSUBR) is the traditional territory of five nuučaan̓uł (Nuu-chah-nulth) Nations—hišqʷiʔath̓ (Hesquiaht First Nation), ʔaʔuukʷiʔath̓

(Tla-o-qui-aht First Nation), tukʷaaʔath̓ (Toquaht Nation), aaḥuusʔath̓ (Ahousaht), and yuuluʔiʔath̓ (Ucluelet First Nation). Thirty percent of its 6,462 residents are youth between ages fifteen and thirty-four years—a significant part of the region's population and future (CBT, 2018b). Figure 1 below shows the Clayoquot Sound region and participants' communities (Ucluelet, Hitacu, Esowista, Ty-histanis, Tofino, and Opitsaht).

Figure 1: Clayoquot Sound region showing locations of research communities.



The region's flourishing hospitality and tourism economy provides residents with employment alongside forestry and commercial fishing. The CSUBR is also endowed with a diverse range of ecosystems with rich biodiversity for food (Turner, 2014). Traditional food, such as Chinook Salmon (*Oncorhynchus tshawytscha*) and Salal Berry (*Gaultheria shallon*), that the nuučaan̓uł lived on and nurtured for centuries are today also enjoyed by locals (CBT, 2018b). Besides gathering and harvesting wild foods, people also grow food to complement what they purchase from the grocery store.

Nevertheless, despite these “endowments,” multiple barriers reduce food access, food security, and food knowledge among CSUBR residents, particularly youth (CBT, 2018a, 2018b). Causes include the prohibitive cost of healthy food, the lack of knowledgeable residents to teach youth food skills, and limited youth engagement in food provisioning activities, including food preservation (CBT, 2018a, 2018b). Healthy food items from grocery stores are 12 percent more expensive in the CSUBR than the next accessible town inland (CBT, 2018b). Only two (Tofino and Ucluelet) of eleven communities in the CSUBR have a grocery store. Residents living in poverty face additional difficulties

affording healthy food, one-fifth of youth (under eighteen years of age) were living in poverty in the CSUBR as of 2015 (CBT, 2018b). Additionally, there is no public transportation, further impacting access, especially for low-income residents. For example, a round trip to the nearest grocery store costs \$35 by taxi for residents of Esowista, and \$40 by boat for residents of Ahousaht (a boat-only accessible community) (CBT, 2018b). The prohibitive cost of healthy food, poverty, and unaffordable transportation affects people's food choices and drives food insecurity for residents, including youth (CBT, 2018a).

On the other hand, there are times when particular food becomes more affordable and accessible via localized food systems. For example, from spring to summer, residents have the opportunity to gather local berries, buy affordable local produce in bulk, and grow food. Since these are seasonal opportunities, it means that residents need to safely preserve such foods in order to have them available for most (if not all) of the year. Access to preserved food has also been identified as a key component of emergency preparedness, given that the CSUBR is located within a tsunami hazard zone (CBT, 2018a).

Regrettably, many residents, including youth, lack the knowledge and skills to preserve food safely. This was made clear during community consultations in 2017 led by the Clayoquot Biosphere Trust's *Eat West Coast* (EWC) initiative, designed to assess the need for a food knowledge education program in the CSUBR (CBT, 2018a). In response, EWC developed a program to train residents who will, in turn, teach others about safe food preservation. Since the program's inception in 2018, youth were not specifically targeted to share perspectives about food preservation or how associated training/learning might be structured. We collaborated with EWC to extend the food preservation initiative to

incorporate a youth focus, and to better understand how and what young people want to learn.

Our food preservation initiative involved youth from the Ucluelet secondary school (USS) and the *ł̓aʔuukʷiʔat̓h* warrior group from Ty-histanis and Esowista shown in Figure 1 above. USS is a grade eight to twelve school located on the traditional territory of the *yuuʔuʔiʔat̓h* Nation. The school serves students from six communities (Ucluelet, Hitacu, Esowista, Ty-histanis, Tofino, and Opitsaht). Programs such as outdoor education and the *nuučaanuʔ* language class offered in the school expose students to the local environment, culture, and food. We worked with grades eight, eleven, and twelve students (thirteen to eighteen years of age) from the outdoor education class and the *nuučaanuʔ* language class.

The *ł̓aʔuukʷiʔat̓h* warrior program started in 2018 and was informed by the *yuuʔuʔiʔat̓h* Nation warrior program that began in 2015. The warrior group is a young men's leadership program with the mantra to "provide, protect, and prepare." Warriors provide for their communities, their families, and themselves. Warriors protect the land, the territory, and the teachings that are at risk of being lost. Warriors prepare to respond when the community needs them and in times of emergency (Manmohan, 2020). The group's activities are typically land-based. They are involved in building cabins, setting snares, hunting, and harvesting seafood. They share this food with Elders.

Research design

We adopted a participatory research design (Bergold & Thomas, 2012) to encourage youth and their communities to engage in and inform our study. Participation is a "dynamic interactive process in which all stakeholders, even the most disadvantaged, have a voice and influence in decision making" (Agarwal,

2010, p. 100). When communities participate throughout the research process, it is more likely that such research will be designed to respond to their needs (Israel et al., 1998).

We encouraged the participation of youth and their communities at various stages, including the project design, the workshops delivery and the workshop assessment. We achieved this by following four steps. The first two are related to participatory research practices of consultation and co-design (Dickert & Sugarman, 2005; Goodyear-Smith et al., 2015), while the last two are connected to participatory research principles of respect and flexibility (Holkup et al., 2004; Buchanan et al., 2007).

We first approached the USS and the warrior group to explain our intentions and determine their level of interest in the proposed initiative. While our study grew from a regional program based on community consultation about food preservation in the CSUBR, youth were not part of that consultation. USS students and the warrior group said that involvement in outdoor land-based activities, which can include harvesting and preserving food for group trips or personal use, meant that the proposed applied research initiative was of interest, but that they would reflect on which elements were relevant to them and achievable given other commitments. Second, members from these two groups were subsequently invited to identify what kinds of food preservation would be most important to them (i.e., drying for school and fish canning for warriors). This preliminary information was used to guide the content and structure of the workshops we subsequently ran. For example, once we found that food flavour was a priority for youth, we included recipes in the workshops that catered to that aspect. Finally, both initial and subsequent interactions with youth were guided by principles of respect and flexibility. Participation among research stakeholders

cannot be encouraged without mutual respect for one another's knowledge, culture, belief, and aspirations. Without mutual respect, effective co-design can be challenging to achieve. Indigenous scholar, Shawn Wilson (2001), has written about the importance of researchers always staying accountable to their co-learners (participants, partners, community, etc.). Thus, we listened and followed their guidance. We also remained flexible as changes are expected in research. Scholars suggest that changes are a learning process and an opportunity for partners to reflect and, if need be, revise aspects of the study (McGregor et al., 2018). For example, we had reasons to re-design the food preservation initiative more than once because of multiple developments, including the availability of facilitators and potential class disruption. Such changes should be expected when research is co-designed and does not reflect (badly) on the academic or community researchers (Reed & Peters, 2004)

Research methods

We used semi-structured interviews, participatory workshops, and written evaluations to collect research data, facilitate food preservation learning, and assess participants' experiences with the workshops (Numa et al., 2008; William, 2015; Patton, 2001). After obtaining permission from Ucluelet secondary school and $\lambda a?uuk^w i?ath$ First Nation, we put out a call for participation through the school and the warrior group. The lead author met with each group to explain the research objectives, consent procedure, and research intentions. Those who were interested in participating registered their interests through their teachers and the warrior coordinator, respectively.

A total of nine youth—four females and five males—(seventeen to thirty years of age) were interviewed (six students and three warriors). We

conducted eight interviews in February 2020 and one in July 2020. All interviews were conducted in person in Ucluelet and Ty-histanis, except for the interview conducted in July by phone. The remote interview was a safe and effective way of staying connected, given the COVID-19 pandemic and safety concerns.

After the initial round of interviews with youth in February 2020, where we learnt about what and how youth wanted to learn, we ran three food preservation workshops later that same month. Details are provided in Table 1 below.

Table 1: Summary of food preservation workshops with youth

Learning Component	Participants
<p>Workshop 1: Drying fruits, vegetables, and meat</p> <ul style="list-style-type: none"> • science and nutritional implication of food drying • safe food handling and kitchen safety • teaching about types and operation of food dehydrators • learned various fruit drying recipes (e.g., cinnamon; lemon apple slices) • safety and methods of meat drying 	<p>six USS students (grades 11 and 12) involved in outdoor education</p>
<p>Workshop 2: Drying fruits and vegetables</p> <ul style="list-style-type: none"> • science and nutritional implication of food drying • safe food handling and kitchen safety • teaching about types and operation of food dehydrators • learned various fruit drying recipes (e.g., cinnamon; lemon apple slices) 	<p>14 USS grade eight students from nuučaanıł language class</p>
<p>Workshop 3: Fish (Salmon) canning workshop</p> <ul style="list-style-type: none"> • fish cutting • fish cleaning • learned fish parts • jarring fish for canning • cultural teachings about salmon, waste reduction by using all fish parts 	<p>15 łaʔuuk*ıʔatʰ warriors</p>

A total of thirty-five youth attended the three workshops. Two workshops were held with USS students; one with grade eleven and twelve students (from the outdoor education class), and the other with grade eight students from the nuučaan̓uł language class. Students learned how to dehydrate fruits, vegetables, and meat from an EWC community trainer. We ran one workshop with the warriors at Ty-histanis village. The warriors were interested in learning how to preserve fish, and fifteen of their members (from ten to twenty years of age) attended. A knowledgeable preserver from Ty-histanis showed youth how to cut, clean, and can salmon.

The leadership of the youth groups played an important, supportive role in making the interviews and workshops a success. Participation was constrained by

two main factors. First, students' participation relied on obtaining parental approval ahead of time. Similarly, our interactions with youth had to be scheduled during school time and warrior meeting times, which meant that some from both groups found it difficult to attend because of other classes or commitments.

NVIVO 12 software was used to code qualitative interview data, using a mainly deductive approach to identify themes and patterns based on our five research objectives. These were: youth participation in food provisioning and preservation; factors that hinder youth participation; factors that motivate youth participation; why youth participate in food preservation; and what youth need to build their food preservation knowledge.

Results

In this section, we summarize our main study findings, based on interview data and workshop evaluations. Table 2 below provides a summary of what the nine

youth interviewees told us in accordance with our five research objectives. We use alphanumeric labels, instead of participants’ real names for direct quotes

Table 2: summary of interview results

Themes	Results	Participants (n=9)
Youth Involvement in Food Provisioning and Preservation	<ul style="list-style-type: none"> involved in food provisioning 	6
	<ul style="list-style-type: none"> involved in food preservation (out of the 6 involved in food provisioning) 	2
	Not involved in food provisioning	3
Hindrances to Youth Participation in Food Preservation	Lack of food preservation knowledge and skills	6
	Lack of teachers and mentors	4
	Lack of interest	1
	Transportation difficulties	2
Motivators for Youth Participation in Food Preservation	Training offered in school	6
	Meal included as part of workshops	4
	Parental involvement	1
	Joint food procurement and preservation training	1
Why youth want to learn food preservation	Food security	4
	Knowledge building	4
	Cultural maintenance	4
	Emergency preparedness	2
	Connection to ILFSs	2
Support that youth would want to get to engage more in food preservation	Training	9

Youth involvement in food provisioning and preservation

More participants reported being involved in food production/procurement, including gardening, fishing, and berry picking, than food preservation. Only two of the six participants involved in food provisioning said they had done any food preservation; specifically, the drying of herbs and smoking of fish.

Participants mentioned opportunities they had to learn about food production through school gardens and traditional food gathering in the community. However, they did not report similar opportunities for learning about food preservation. As one participant mentioned, *"Our typical activities would involve hunting, harvesting crab, clam, and fishing. We know where to get these foods, but we don't know how to preserve them. It is not part of what we have been doing"* (W02, Feb 2020). Another participant said, *"I worked a bit in the school garden. I like being in the school garden. We picked snap peas and tomatoes. We were just eating the food when we picked it—we didn't preserve it"* (U06, Feb 2020).

Hindrances to youth participation in food preservation

There were several reasons why youth have not started participating in food preservation. Six participants cited inadequate food preservation knowledge and skills; four reported a shortage of teachers and mentors. One mentioned a lack of interest, while two participants cited difficulties getting to workshops because of lack of transportation.

Without adequate knowledge and skills, participants were wary of trying to preserve their food because of the health risks associated with consuming unsafe preserves. One youth said, *"My biggest challenge with food*

preservation is doing it properly, safer, and not contaminating it" (U03, Feb 2020). Another commented about lacking the proper skills, *"My only challenge is that I am scared to grab the jars from the hot pot"* (U04, Feb 2020).

Some youth attributed their lack of food preservation knowledge and skills to a shortage of teachers and mentors. As one participant noted, *"the problem is just finding someone to teach the youth. We have not had many people come to the group to teach us. As a group, we have an interest to learn"* (W01, Feb 2020). Another explained, *"my aunty does food preservation, but she never talks about it with me"* (U03, Feb 2020).

Limited interest in food preservation was evident for a small number of participants, with one acknowledging: *"I have never asked anyone to teach me about food preservation. It is not exciting. For me, I just never thought about learning food preservation"* (U05, Feb 2020). Others, though, were keen to learn more: *"I have never learned about food preservation before today, but I am curious about it. It sounds interesting"* (U06, Feb 2020).

A further hindrance for some youth was related to transportation challenges. There is no public transit within the CSUBR, and alternatives like land and water taxis are not always affordable for residents, especially youth. While community members sometimes offer to take youth to workshops and other events, youth can find it difficult to commit when they are not sure they can get a ride back. As one participant said, *"although we have people within our village that are willing to transport youth, maybe going outside of the community to attend training might be a challenge"* (W02, Feb 2020).

Motivators for youth participation in food preservation

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Despite such challenges, youth were eager to tell us about what would motivate them to engage in food preservation. Four things emerged: school-based workshops, meal offerings during workshops, parental involvement, and joint food procurement/preservation learning.

The call for school-based food preservation training can be linked to the transportation challenges mentioned earlier. Youth thought that food preservation training could be better incorporated into existing school programs. Such an arrangement would be convenient for both students and trainers since the school has an equipped kitchen, and students would not need to do any additional travel in order to receive training. Similarly, some youth welcomed the idea of learning food preservation at school because of the opportunity for co-learning and cross-cultural learning with their peers. As one youth explained *"It would be helpful because we get to learn from one another. It will be a new experience for me because it won't be from my culture"* (U04, Feb 2020).

Youth also mentioned the importance of being able to try foods during training. Providing nutritious food in gatherings is part of the research protocol of *łaaʔuukʷiʔaṭh*. With the USS youth worker's help, we provided food for the students who participated in our study. Similarly, a *łaaʔuukʷiʔaṭh* member helped prepare healthy food for the warrior participants. Providing nourishment for them was seen by youth as an opportunity to see how preserved food can be used and how it tastes.

Further, we learned from youth that combining food preservation training with food procurement activities like hunting and gardening would likely make the preservation training more interesting and engaging, since they would come to appreciate not only the

challenges but also the rewards of food production and harvesting. As one participant noted,

I think youth are interested in learning about the food on their territory but preserving food won't be the first thing they will think about. I think including youth through the whole process of harvesting the food before preserving might get them interested (W02, Feb 2020).

We also heard that involving parents in food preservation workshops would be beneficial: *"I think the parents need to be involved, and now with the movement and dialogue going on about food preservation in the communities and schools, it sounds like the kids will be encouraged if the parents are involved"* (W05, July 2020). The majority of the youth we worked with are dependent on their parents and guardians for food provisioning. Parents and guardians who have food preservation skills would most likely be supportive of their children learning about such activities. And it has been shown that children learn better with parental involvement (Epstein, 2009; Epstein et al., 2002)

Why youth are interested in food preservation

As shown in Table 2, participants said they want to learn about food preservation because it can support food security, build additional food skills, create opportunities to learn more about their culture and those of others, prepare for an emergency, and connect to localized food systems.

Youth were aware of the food security challenges in their communities. Some saw the need to preserve seasonal foods for year-round availability, while others understood how food preservation offered a means to reduce reliance on grocery stores. As one participant explained,

"Learning food preservation would be good for my family. We can buy fruits in bulk in the summer and preserve them for the winter. My mom always talks about how fresh fruits are expensive in the winter months: (U01, Feb 2020). Another noted how, "Here in Tofino, food is expensive, so just being able to grow my food and preserve it in order to have it all year long. This is what I am learning to do" (W05, July 2020).

Youth also mentioned that building food preservation knowledge will help them acquire other skills like safe food handling practices. Others thought that learning about food preservation can also help them know more about their culture and Indigenous food practices.

As mentioned, emergency food preparedness is a priority in the CSUBR. Besides being in a tsunami hazard zone, intense winter storms in the region sometimes leave residents without power supply for up to several days at a time. People are concerned about food shortages in such emergencies, with grocery stores in only two of eleven communities (CBT, 2018a). Thus, knowing how to preserve food beyond freezing is of interest, and this includes youth. The COVID-19 pandemic has complicated things further. Since most food consumed comes from the global food chain, some fear that disruptions associated with the pandemic will hit supply and affect food availability and affordability on the Island. In July 2020, a participant shared how experiences with COVID-19 had got people thinking about food:

If something were to happen, like we are on a fault line with all the issues around earthquake, tsunami that can occur at any time. If the pandemic were to hit us. COVID-19 has gotten a lot of people thinking about food preservation. People are beginning to realize that they don't have to rely on the world anymore to save them all the time (W05, July 2020).

Some participants recognize the potential of the region's Indigenous and local food systems to support access to seasonal food. These youth felt that knowing food preservation would enable them to access traditional and local food from their communities.

Support for youth: Focus on training

When asked how they would like to be supported to learn food preservation, all the participants asked for more training. The youth had different interests in terms of the specific training they would like to get. Seven participants mentioned that they would like to learn the basics of food preservation and safety practices. One youth would appreciate the opportunity to learn about Indigenous methods of food preservation, while another wanted to learn how to preserve fruits and vegetables. We organized three food preservation workshops in response to youth requests for training. We evaluated the workshops to know how effective such an initiative was in supporting youth to build food preservation skills.

Food preservation workshop evaluation

Workshop participants completed written evaluations before and after the workshops. The pre-workshop evaluation provided a baseline relating to youth skill level and concerns relating to food preservation. The post-workshop evaluation was a summative assessment of participants' overall experience with the training, what they learned, what they would like to learn in the future, and whether they enjoyed learning from community members. Additionally, the post-workshop evaluation was a way to compare changes to participants' baseline (pre-workshop) and post-workshop skill and knowledge levels to provide evidence of improvement in knowledgeability and

confidence following the workshops. A summary of evaluation outcomes is provided in Table 3 below.

Table 3: Summary of workshop evaluation

PRE-WORKSHOP		
Evaluation Component	Responses	Participants (n=12)
Do you think you have the right skills to preserve food safely	Yes	5
	No	7
Food preservation skill level*	Good	7
	Very good	2
	Fair	2
	Excellent	1
What are you most concerned about with food preservation	Flavour	5
	Food safety	4
	Nutrition	3
POST-WORKSHOP		
Workshop experience	Extremely satisfied	10
	Very satisfied	2
Do you feel like you know more about food preservation than you did before the workshop	Yes	12
Specific food knowledge acquired from the workshop	Cutting and preparing food for preservation; food dehydration; types and operating dehydrators; canning; food types; traditional food; cultural importance of consuming traditional food; the importance of intergenerational transmission of food knowledge	12
How likely are you to try food preservation after the workshop [^]	Extremely likely	10
	Likely	2

Table legend:

* Participants food preservation skill level: Excellent—I can safely preserve food on my own. Very good—I can safely preserve food, but I sometimes need to check with someone. Good—I can safely preserve food if someone works me through the process. Fair—I cannot preserve food safely, but I can help someone else doing it.

[^] Likelihood to try food preservation after the workshop: Extremely likely—I am positive that I will try food preservation on my own. Likely—I may try food preservation after this workshop with guidance.

From the pre-workshop evaluation, seven participants indicated that they do not have the right skills to preserve food safely, while five thought they did. When asked to provide more detail about their skill level, the numbers changed. Only one of twelve participants indicated that they could safely preserve food without help from others. Two felt confident that they could safely preserve food if they had someone to check with if needed. Seven participants felt that with help, they could preserve food. Two participants said that they could not preserve food safely but would be able to assist someone else who took the lead.

Additionally, there were four aspects of food preservation that youth said they were most concerned about: flavour (five), food safety (four), and nutrition (three). In terms of their overall workshop experience, ten of twelve participants reported being extremely satisfied, while two said they were very satisfied with the workshops. More specifically, participants said they learned how to prepare, dehydrate, or can food as well as cultural teachings about traditional food. As Table 3 shows, other youth mentioned how they learnt more about the food they were preserving, such as the various parts of the fish and how to use them. Based on the knowledge and skills they acquired from the workshops, all twelve participants reported that they

knew more about food preservation post-workshop than they did before.

Participants had various ideas for food knowledge programs. Those who did not attend the canning workshops indicated a desire to do so in the future. Others wanted to learn about Indigenous food preservation methods, to preserve fruits and vegetables other than those offered in their workshops, and generally add to their food preservation knowledge. One participant suggested being able to taste the food they had preserved at the workshop. Overall, all participants would like to see more community members who are equipped to teach them—by following the lead of the EWC graduate and *łá?uuk^{wi}?ath* members who led the workshops they attended.

Regarding the likelihood that participants would make use of the food preservation knowledge that they had acquired at the workshops, ten of twelve said that they would.

During workshops, participants seemed enthusiastic and engaged in learning—they were asking questions and celebrated various achievements like peeling or cutting food. Some of the more experienced participants supported others in cutting food and demonstrating how to handle utensils.

Discussion

From the interviews conducted and the workshop feedback received, participating youth have not been adequately engaged in activities that support the building of food preservation knowledge compared to other food provisioning activities like gardening or gathering. Our finding confirms the trend reported in other food knowledge programs in Canada, where food

preservation has rarely been part of learning for youth in schools and communities (He et al., 2009; Bisset et al., 2008; Fulford & Thompson, 2013; Hanbazaza et al., 2015). Similarly, our findings confirm what the EWC community consultation had found a gap in food preservation skills among residents, including youth, and the clear need for a regional food preservation

program (CBT, 2018a). The food knowledge gap evident in our study region mirrors similar gaps reported among youth in other remote areas, including northern Manitoba, Labrador, and Nunavut (Fieldhouse & Thompson, 2012; Hirsch et al., 2016; Chan et al., 2006). Our study addresses this gap by engaging youth in food preservation.

Our findings also support studies that point to the lack of teachers and mentors to guide youth through food provisioning activities, further limiting their food knowledge acquisition (Colatruglio & Slater, 2016; Muzaffar et al., 2018; Korzun & Webb, 2014). For example, a study that examined the challenges that youth face in acquiring and using food knowledge revealed that the absence of mentors at home and limited participation in food activities within households contributed to these knowledge gaps among youth (Colatruglio & Slater, 2016). In other cases, community and family members who wish to support youth lack the capacity to engage in food provisioning themselves. For example, in some remote Indigenous communities, experienced hunters are constrained by the expensive cost of harvesting equipment and supplies. As a result, they can neither maintain consistent participation in food provisioning nor teach youth in the process (Beaumier & Ford, 2010). Similarly, work schedules and extracurricular activities prevent families from participating in activities that encourage food knowledge acquisition for youth (Fulkerson et al., 2011). The lack of public transportation has also been found to contribute to food insecurity, especially for low-income residents of rural and urban communities (Baek, 2016; Gottlieb et al., 2002). Our study shows that youth can get support to build food preservation knowledge through community collaboration, such as that evident through the partnership that supported our research (i.e.,

school, youth group, teachers, community trainers, and researchers).

A growing body of literature has shown that practical learning in schools and communities supports food knowledge building for youth outside the home (Bisset et al., 2008; Hersch et al., 2014; Brooks & Begley, 2013; Thomas & Irwin, 2011). A systematic review of studies on youth participation in various cooking classes found that participants were able to build food preparation skills and cooking confidence (Hersch et al., 2014). This is in line with our own research findings, where youth reported having acquired food preservation knowledge and skills and confidence through attending the workshops. While participating in experiential food programs in an organized setting like schools is no guarantee that youth will continue to practice these skills they have learned at home, there is strong evidence that it can support further food knowledge building and dietary improvements in general (Hersch et al., 2014; Muzaffar et al., 2018; Gillies et al., 2020).

While youth indicated a strong likelihood to continue practicing food preservation post-workshop, we are unable to confirm that this has been the case at the time of writing this paper. Some participants have moved on to post-secondary schools, which makes it challenging to track them. For others, being more at home due to the ongoing COVID-19 pandemic restrictions may present opportunities for them to practice more or present challenges accessing equipment, support, and shared spaces like school and community kitchens.

Some school and community food knowledge initiatives aimed at youth also promote the involvement of parents in the learning process (BC Centre for Disease Control, 2020; Bisset et al., 2008). When parents are involved in building food knowledge with their children, they are more likely to encourage such

practice at home (Bisset et al., 2008). Also, youth learning food skills from knowledgeable adults within the context of their cultures can strengthen the intergenerational transfer of traditional food knowledge and community bonds (Kamal et al., 2015). Although parents did not join our workshops, youth indicated that getting parents involved would motivate them to engage in food preservation. Also, in line with what youth told us, studies have shown that offering youth the opportunity to learn multiple food provisioning activities is a more effective way of supporting knowledge building than a single activity (Huys et al., 2019; Steward, 2014). The rationale is that food provisioning activities are interconnected, and youth can benefit from better understanding those connections and how to access food from food systems, including localized food systems. For example, our study participants may be motivated to procure and

preserve seasonal local food—a move that could encourage them to participate in other stages of local food systems, connect with actors within those systems, and learn about their cultures.

Generally, people have different reasons for why they engage in food provisioning activities. Cooking, gardening, community hunting, and freezer programs have helped youth access and increase healthy food intake to support their food needs (Thomas & Irwin, 2011; Hanbazaza et al., 2015; Hirsch et al., 2016). However, in line with what our participants told us, studies also show that the benefit of participating in food provisioning extends beyond food security to include cultural, social, and economic benefits (Tsuji et al., 2020). Others have also suggested that participating in food provisioning within localized food systems helps youth and their communities to be self-reliant in support of food sovereignty (Kamal et al., 2015).

Conclusion

Our research examined how youth in the CSUBR are currently engaged in food preservation, and what hinders or motivates them to participate in such activities. Youth explained what they wanted to learn related to food preservation, and how they would like to build such knowledge. From our findings, youth in the CSUBR are not adequately engaged in food preservation activities compared to food production/procurement activities. A lack of teachers and mentors, limited food knowledge, limited transportation options, and a lack of interest in some cases were all found to hinder youth from engaging more in food preservation activities. Conversely, having access to training at school, having meals during

training, parental involvement, and combining food preservation with food production were all seen as ways to encourage participation. We are hoping that our study participants will see the food preservation skills they acquired as an opportunity to participate in other activities within the region's local food systems, access seasonal food to support their food needs, and engage with other actors within those food systems to strengthen cross-cultural food preservation learning.

Our work shows the potential for youth to build their food preservation knowledge through participating in school and community-level initiatives. Additionally, we demonstrated the benefit of prioritizing youth voices in the design of food

knowledge initiatives, a method that can support the development of programs that will better address their learning needs. Our study also shows that learning food preservation can support youth to know about other significant dimensions of food knowledge, such as the cultural importance of consuming traditional food. In summary, food preservation programs designed to meet youth preferences within localized food systems can provide multiple benefits for these youth. In turn, youth may come to value and strengthen community food sovereignty by participating in their community's food system over time. Our research found that

pathways for such contributions include: 1) preserving food from within localized food systems, 2) sharing food preservation knowledge with members of their community, 3) identifying and reporting hindrances to food preservation participation, 4) identifying motivators to maintain participation in food preservation, and 5) aligning food preservation practices with community's broader self-determination efforts. Such practices include getting out on the land to gather or grow food for preservation in a way that promotes reciprocity and respect.

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