1-1-2023

Nohwi Nadeesh Diyih: Honoring Indigenous Health Through Research, Evaluation, And Policy

Danya S. Carroll

NOHWI NADEESH DIYIH: HONORING INDIGENOUS HEALTH THROUGH RESEARCH, EVALUATION, AND POLICY

by

Danya Sancia Carroll
Bachelor of Science, University of Arizona, 2011
Master of Public Health, Colorado School of Public Health at the University of Northern Colorado, 2013

A Dissertation in Practice

Submitted to the Graduate Faculty

of the

University of North Dakota

in partial fulfilment of requirements

For the degree of

Doctor of Philosophy

Grand Forks, North Dakota

August
2023

Name: _____Danya S. Carroll_____

Degree: ___ Doctor of Philosophy_____

This document, submitted in partial fulfillment of the requirements for the degree from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

DocuSigned by:
7A490322C6E54B5...
Nicole Redvers, ND, MPH Chairperson

DocuSigned by:
A70919CE2D45458...
Donald Warne, MD, MPH Committee Member

DocuSigned by:
Virginia Clinton-Lisell
E9271ABE37B9454...
Virginia Clinton-Lisell, PhD Committee Member

DocuSigned by:
ACF9505DDF3A445...
A-dae Briones, JD, LLM Committee Member

_____

_____

This document is being submitted by the appointed advisory committee as having met all the requirements of the School of Graduate Studies at the University of North Dakota and is hereby approved.

DocuSigned by:
Chris Nelson
2E0AF088C733403...
Chris Nelson
Dean of the School of Graduate Studies

7/27/2023
Date

PERMISSION

Title	Nohwí Nádéésh Díyíh: Honoring Indigenous Health through Research, Evaluation, and Policy
Department	Indigenous Health
Degree	Doctor of Philosophy

In presenting this dissertation in partial fulfillment of the requirements for a graduate degree from the University of North Dakota, I agree that the library of this University shall make it freely available for inspection. I further agree that permission for extensive copying for scholarly purposes may be granted by the professor who supervised my dissertation work, or in her absence, by the Chairperson of the department or the dean of the School of Graduate Studies. It is understood that any copying or publication or other use of this dissertation or part thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of North Dakota in any scholarly use which may be made of any material in my dissertation.

Danya Carroll
July 26, 2023

TABLE OF CONTENTS

LIST OF TABLES

Product One:

Product Two:

Product Three:

LIST OF FIGURES

Product One:

Product Three:

ACKNOWLEDGMENTS

From an Indigenous lens it truly does take a village to raise a child, and in my case to be one that holds a doctorate. There are many that have been supportive throughout my journey as a doctoral student. First and foremost, *ahi'ye/ahéhee' nitsaago* (a big thank you) to my family including my parents, Orlando and Wilceta, for your support. There are no words that can express my gratitude for the love, care, and intention that you have invested in me as your oldest child and daughter. Thank you for teaching and instilling in me the important values and life skills that have helped me to achieve this dream. Thank you for providing a strong foundation for me including a deep respect for my roots. Thank you to my siblings, Corwin, and Kiana, for your continued support. To my nieces, Aiyana, Collence, and Kennedi, you motivated me to finish, and to also develop a dissertation that aims to promote a better life for all of you and other Native youth in the future. You will all do great things in the future. *Ahéhee' nitsaago shí masaní*, Laura (*Nił Bizhnł Baa*), for your incredible example, teachings, influence, and strength as our *Tó'ahaní* matriarch. Thank you to my Aunts, Uncles, Cousins, and extended relatives for always showing the importance of *k'é* (kinship). *Ahi'ye shí díkeh*, my godparents, John and Thana, for your encouragement and examples.

Thank you to my Committee members for your time, encouragement, expertise, and for getting through this process with me. I especially want to thank Dr. Nicole Redvers for your mentorship, inspiration, and thorough attention to detail throughout this journey. I also want to express much gratitude to the University of North Dakota Indigenous Health Department including fellow cohort mates, faculty, and staff. I am honored to have been in the inaugural cohort of the program. I also acknowledge Devon Olson, Research & Education Librarian from the University of North Dakota School of Medicine and Health Sciences for her expertise and guidance. Thank you to First Nations Development Institute for your support and the opportunity

to work with your organization. I acknowledge those that participated in the interviews and shared their time including the Chippewa Cree Tribe, FAST (Food Access and Sustainability Team) Blackfeet, Grinding Stone Collective, Ke Kula Nui O Waimanalo, Mesa Grande Business Development Corporation, STAR (Service to All Relations) School, Peace Keeper Society, Santa Fe Indigenous Center, and Walks on the Day.

Ahi'ye to the Apache Elders and teachers that shared special wisdom and input. I have been blessed with many incredible mentors over the years. Thank you to the many role models and mentors that have been instrumental in fostering my drive and tenacity to pursue the ladder of education. Thank you to all my wonderful friends and colleagues from across Turtle Island that have been supportive during this journey. *Dánowah nohwaa ahénsih*.

As Native Peoples we never forget where and who we come from. I know I stand on the shoulders of giants including all of those that have come before me who have left this earthly life. I am forever grateful for the teachings and prayers of my Elders including my late Grandmothers Veda, Alethea, Dollie, and Nina, and Grandfathers Willie and Murphy. They all taught our families many important lessons beyond the classroom. I also acknowledge my late Uncle Harris Burnette who was one our Apache spiritual leaders, Medicine Men, and knowledge keepers. He along with my late Uncle Glenn conducted many ceremonies for our people. *Ahi'ye ba'ahensih* to both of them for their teachings on the importance of walking in beauty (*Są'áh naaghai bik'eh gozhǫ́ǫ́*) and living a good life. There are so many individuals to thank for the support that you have gifted me throughout this journey. I am appreciative of all the words of encouragement and will always strive to contribute to the health and well-being of Indigenous Peoples including current and future generations.

I dedicate this Ph.D. to my parents, *shí masaní*, family, and relatives, to the Diné and White Mountain Apache Tribal Nations, and also to my ancestors whose strength and resilience ensured the existence of our Peoples, lands, cultures, and languages.

Abstract

American Indian and Alaska Native (AI/AN) communities in the United States (US) represent culturally rich food landscapes, traditions, and languages. Food access remains a public health issue in AI/AN communities that is influenced by a myriad of factors. Indigenous food cultures and Indigenous languages are also underappreciated factors in the health of AI/AN communities. This dissertation in practice is guided by both the Social Ecological Model (SEM) and Indigenous Evaluation Framework (IEF) Model with the intent of highlighting multilevel culturally aligned approaches to promoting AI/AN health through food access and Indigenous languages. Specifically, this dissertation in practice sought to platform Indigenous food cultures and Indigenous languages with the aim to provide a better understanding of the impact of strengths-based approaches to enhancing food access and Apache language revitalization.

For the first product, I conducted a scoping review to map the existing AI/AN food access literature in the US to the SEM to identify common impact levels that food access interventions are targeting. A systematic search strategy was developed, and I found that interventions targeted the 'institutional' and 'public policy' levels the least. My review highlighted the importance of including culturally aligned, multi-level programs, that include traditional foods in food access interventions. *For the second product*, I developed an evaluation report for the First Nations Development Institutes' (FNDI) Strengthening Native Programs & Feeding Families (SNPFF) grant program. This evaluation report summarizes key findings from the outcome evaluation carried out with the FNDI SNPFF grantees. Interviews done with participants highlighted important data on the strengths, challenges, and barriers that Native-led entities and nonprofits are working to address within the food access space. *For the third*

product, I developed a policy brief to promote Apache language revitalization and health among the White Mountain Apache Tribe (WMAT). Various policies impacting AI languages, wise practices, and model language programs are discussed in this policy brief. Based on input from community stakeholders, including Elders, as well as a scope of the literature, policy recommendations are presented. Together all three products promote a strengths-based approach to addressing key health issues impacting AI/AN communities.

Key words: food access; food insecurity; interventions; social ecological model; SEM; American Indian; Alaska Native; food sovereignty; Indigenous Peoples; scoping review; Indigenous languages; language revitalization; White Mountain Apache Tribe; Indigenous health; evaluation; Indigenous evaluation

Positionality Statement

My positionality as an Indigenous student and emerging scholar and researcher is shaped by my personal lived experiences from my Tribal communities. My name is Danya Carroll, and I am from two Tribes in the Southwest region of the United States including the White Mountain Apache Tribe, and the Diné (Navajo Nation). I have worked within Tribal communities for a decade, so my positionality has been influenced from my identity and the experiences of working directly within Tribal communities. Since time immemorial my Tribes, like many other Indigenous Peoples, have believed in harmony, balance, and relationality as ways of knowing. These Indigenous ways of knowing are key to living a healthy and productive life. Many of the stories and teachings in our Tribal Nations derive from Indigenous ways of knowing and existing.

My worldview aligns with the worldview of the Diné and White Mountain Apache Peoples specifically rooted in respect, reciprocity, and relationality. My approach towards contributing to improving Indigenous health outcomes is driven by relational accountability in what Shawn Wilson describes as "answering to all your relations."[1] My relations include those that have come before me, the land, water, plant, and animal relatives. Kinship is significant to the matrilineal systems that I come from. My clans are directly tied to culturally significant places for both of my peoples. I also resonate with the transformative worldview which has potential to address the continued need for more action-oriented research in Indigenous communities that aims to address power differences and policy change. The Indigenous and transformative worldviews both prioritize community-based strategies and engagement which was important for me and my Ph.D. work.

Both of these worldviews noted (i.e., Indigenous and transformative) are also aligned with that of Mi'kmaw Elder Albert Marshall's "Two-Eyed Seeing" approach.[2] He asserts that "Two-Eyed Seeing refers to learning to see from one eye with the strengths of Indigenous ways of knowing and from the other eye with the strengths of Western ways of knowing and to use both of these eyes together."[2] I acknowledge that I have been a part of the Western education system for most of my life (i.e., one eye). I have also been influenced by experiences among my Tribal Nations that have had a profound impact on me (i.e., the other eye). I recognize that engaging with Indigenous knowledges are a lifelong journey in which I continue to seek to learn my Indigenous languages, culture, stories, ceremonies, and ways of being. I reconcile that I can continue to seek to view the world through an Indigenous lens as well as through a Two-Eyed Seeing approach. There is value in both worldviews as they help me navigate both Indigenous and Western knowledge systems. Being able to walk in both worlds has been vital to my journey as a doctoral student as both are significant to my approach and motivations for my dissertation portfolio work.

Portfolio Product #1: Food Access Interventions in American Indian and Alaska Native Communities: A Scoping Review

Product Type: Scoping Review

Alignment with career and personal goals, as well as skill development

As an emerging Indigenous scholar and researcher, I aim to be able to carry out proficiently different types of reviews including scoping reviews throughout my career. Being an informed consumer of current and past research that has been effective in Indigenous communities has been important for me for my learning. Being able to contribute to the literature for American Indian health through the development of a manuscript was significant to my

progress as a scholar. Furthermore, I aimed to be able to further promote open access articles that not only those in the academic community can access on food access. It is imperative that those within Indigenous communities be able to access research and literature regardless of cost for products that involve them. Overall, I am motivated to be able to contribute to the research and literature of Indigenous health throughout my career.

This dissertation product aligned with my personal goals as I was able to produce publishable material that contributes to the Indigenous health literature. As a student and public health professional, I aimed to be able to increase my writing skills and to constantly improve the quality and quantity of my writing. I also aim to be able to produce research and material that is applicable and can make a difference for Indigenous communities, stakeholders, and researchers.

This product promoted skill development in producing a manuscript and more specifically a scoping review. I increased my skills and knowledge of the scoping review process including developing a review protocol. I developed skills throughout the collaboration process including working with other reviewers through editing and feedback. I also gained skills on how to use the Open Science Framework (OSF) protocol registration process, how to effectively search and collate information, and how to carry out appropriate analysis of the information found. Additionally, I increased my skills in using software including Covidence and NVivo.

Personal Responsibility Statement

I led this project with support from my advisor and a second reviewer who supported the double screening of searched articles. I created the scoping review protocol which was formally registered in OSF. I also developed the search strategy of the literature with support from the Medical & Research Librarian at UND. I carried out the data extraction and analysis, and

produced the draft of the scoping review while working with my advisor to refine the product until it was ready for journal submission.

Portfolio Project #2: Indigenizing Food Access for Our Communities: Strengthening Native Programs & Feeding Families Evaluation Report

Product Type: Evaluation Report

Alignment with career and personal goals, as well as skill development

The development of this second dissertation product aligned with my career goals as I aim to do program evaluation effectively within Tribal communities in the future. I have had some previous experience gathering data for the evaluation portion of programs that I have worked on; however, this product provided valuable learning opportunities to conduct all phases of the evaluation. There is a tremendous need for Indigenous program evaluators that can improve evaluation approaches to be more culturally aligned and respectful of local communities' knowledge and strengths. I aimed to contribute to furthering Indigenous evaluation strategies in Tribal communities so that they are more inclusive of the stories and community voices from the respective projects.

This product additionally aligned with my personal goals as I strive to serve Indigenous Peoples in the best ways possible to improve the health and wellbeing within Tribal communities. Food system structures impact myself, my family, and relatives as I have seen how diet and food access has affected our overall health and wellbeing as a community. I have several extended family members that are affected by chronic diseases that stem from diet-related factors. My topic therefore addressed in this evaluation project are both personal to me, in addition to being professionally orientated, as they impact various aspects of our Tribal community lives.

The process of developing the program evaluation report advanced various skills throughout the evaluation process. In the beginning, the skills I needed to complete the institutional review board (IRB) process were further developed. Throughout the project, my additional skill development included refining my understanding and practice of community engagement and participatory research processes. By the completion of the project, I developed a relationship with the partner organization while ensuring the evaluation was responsive to their needs. Furthermore, the evaluation report will be beneficial to the partner organization, as it will help them in refining their future funding strategies. The report will also be helpful to the evaluation participants and grantee programs to reflect on best practices and possible areas of improvement.

Personal Responsibility Statement

I led the evaluation project with support of my partner organization. I developed the University of North Dakota IRB protocol with the support of my advisor through to approval. I conducted all of the grantee interviews, carried out the full analysis to determine the evaluation findings, and developed the final evaluation report. I worked directly with the partner organization, whom the evaluation is for, including liaising with them as required for organizational information.

Portfolio Product 3: Nohwí Ndéé bí aan yu gohł dóh yu (For the Future of Our People): A Policy Approach to Promote Apache Language and Health

Product Type: Policy Brief

Alignment with career and personal goals, as well as skill development

As noted previously, I am an emerging Indigenous scholar committed to developing and promoting public health programming, policy, and research that protects cultural resources and

strengths in Tribal communities. Therefore, for the third dissertation product I aimed to advance policy dialogues that promote healthy language environments for Indigenous communities including youth. There is a significant need for more policies that promote health, culture, and protective factors for Indigenous youth. With this, I aimed to continue to build my policy knowledge for application within the community.

As an emerging Indigenous health scholar and researcher, I aim to platform and prioritize the strengths and assets that exist in Indigenous communities including cultural strengths such as language and identity. I also personally aim to be able to work with Indigenous communities to identify and leverage these existing strengths so that they may guide public health programs and interventions aimed at improving health outcomes. Furthermore, I have seen that there is a great need for more strengths-based and culturally grounded approaches to enhance individual and collective Indigenous health. The policy brief has therefore helped me further refine strengths-based approaches while being able to create a product to enhance support for Apache language revitalization that could have multidimensional health benefits for local communities. I am deeply concerned for the future longevity and existence of our Apache language, so this product aligns with my commitment to developing a tool that can provide guidance on actionable steps towards longer term language revitalization. My career goals include being able to synthesize and analyze policies that may hinder or promote health outcomes and/or determinants of health in Indigenous communities such as language. Connecting and producing culturally responsive policies is a skill I aim to continue to develop in the Indigenous health arena.

Lastly, this product further refined and promoted my skills in developing policy briefs. The process of developing this product included building a foundational awareness of the literature including what types of policies have been developed and been successful in similar

settings. Being able to use data to illustrate the need and the problem is an important skill I improved and further developed working on this product. I aimed to also further develop my skills of connecting policy with existing community strengths and resources. I also aimed to further develop my analytical skills of demonstrating the importance of policy in creating positive transformative change in Tribal settings.

Personal Responsibility Statement

I conducted a review of the policy and language literature for the topic while also actively engaging with community leaders, Elders, and language teachers about their views of local needs around language revitalization and programming. I developed the draft and final policy brief document with support from my advisor.

Overall Ph.D. Requirements

The table below provides an overview of the required elements that each of my portfolio projects addressed. Throughout the Indigenous Health Ph.D. coursework, I learned about many different aspects of Indigenous health research, policy, and engagement. The projects I chose to do for my portfolio projects fulfill the various required elements of the dissertation portfolio.

Table of Required Indigenous Health Ph.D. Dissertation Portfolio Elements

COMPONENT	PORTFOLIO 1: Manuscript (Scoping Review)	PORTFOLIO 2: Evaluation Report	PORTFOLIO 3; Policy Brief
Comprehensive definition of "community"	X	X	X
Community/participant demographics		X	X
Community participatory approach (need to clearly demonstrate)		X	
Indigenous research data considerations	X	X	X
Culturally grounded research approach	X	X	
Institutional Review Board (IRB) approval		X	
Ethical considerations (outside of IRB)		X	X
Community deliverables/benefit		X	X

Product One: Food Access Interventions in American Indian and Alaska Native communities: A Scoping Review

Target Journal: *Journal of Agriculture, Food Systems & Community Development*

Submission Date: In process

Danya Carroll, MPH, PhDc
School of Medicine and Health Sciences
University of North Dakota
danya.carroll@und.edu
July 17, 2023

Atten: Duncan Hilchey,
Editor in Chief- *Journal of Agriculture, Food Systems & Community Development*

Please find enclosed the manuscript titled "Food Access Interventions in American Indian and Alaska Native Communities: A Scoping Review", for consideration in the *Journal of Agriculture, Food Systems & Community Development (JAFSCD)* as an original manuscript.

This study provides a review of food access interventions in American Indian and Alaska Native (AI/AN) communities through the lens of the social ecological model (SEM) by an all-Indigenous research team. More specifically, a scoping review was conducted to map the existing AI/AN food access literature in the United States to the SEM to identify common impact levels that food access interventions are targeting as well reflecting on key gaps. The review highlights the importance of culturally aligned, multi-level food access intervention programs in AI/AN communities. We believe this review will highlight an often under-represented community food-related topic and demographic that will be of interest to your audiences.

I can confirm that neither the article nor any parts of its content are currently under consideration or published in another journal. Thank you for your consideration of this Indigenous-led article.

Sincerely,

Danya Carroll, MPH, PhDc
University of North Dakota School of Medicine & Health Sciences

Food Access Interventions in American Indian and Alaska Native communities: A Scoping Review

Danya S. Carroll, MPH, PhD (c)

University of North Dakota

Abstract

American Indian and Alaska Native (AI/AN) communities in the United States (US) represent culturally rich food landscapes and traditions. Yet, food access in AI/AN communities remains a public health issue. Food access is influenced by a myriad of factors that may interact at different levels of the Social Ecological Model (SEM). Using a scoping review methodology, I aimed to map the existing Indigenous community food access literature in the US to the SEM to identify common SEM impact levels that food access interventions are targeting. I further reflected on AI/AN community food access intervention gaps to inform future intervention targets. A systematic search strategy was developed and carried out in the following electronic databases with search dates from 1988 (to align with when the SEM was introduced) to 2023: PubMed, CINAHL, SocIndex, Academic Search Premier, ERIC, and Google Scholar. Fourteen articles met the inclusion criteria for my review. I then carried out deductive content analysis through the lens of the SEM using qualitative software. Intervention targets were identified based on what changes were highlighted in articles at each SEM level. Interventions targeted the 'intrapersonal' and 'community' SEM levels the most, while the 'institutional' and 'public policy' levels were the least targeted. Food access was promoted in various intervention formats including supporting community and/or school gardens; providing seeds; providing traditional foods at school, family, and community events; and providing meals to families. My review found that valuable research that has been conducted on AI/AN food access interventions with many interventions targeting multiple levels of the SEM. My review highlights the importance of leveraging strengths in AI/AN communities to enhance food access including through culturally aligned programs and traditional foods. Further collaboration between AI/AN communities and

researchers may lead to the development of more informed multilevel interventions that further integrates Indigenous methodological and culturally based approaches to improving food access.

Key words

food access; food insecurity; interventions; social ecological model; SEM; American Indian; Alaska Native; food sovereignty; Indigenous Peoples; scoping review

Introduction

American Indian and Alaska Native (AI/AN) communities in the United States (US) represent culturally rich food landscapes and traditions. Yet, food access in AI/AN communities remains a public health issue. Food insecurity is a social determinant of health,[3] with higher social determinant burden a known reality in AI/AN communities.[4] AI/AN households specifically are at a higher risk of food insecurity[3-5], with over seventy percent of American Indian (AI) individuals living more than a mile from a grocery store.[6] Food insecurity is associated with a plethora of chronic health conditions including diabetes, heart disease, cancer, and many other diseases.[3] Factors contributing to AI/AN food insecurity include water insecurity, land loss, forced relocation, and environmental pollution—with all these noted factors impacting traditional food practices in Tribal communities.[5]

Historical and current public policies stemming from colonization have influenced food access throughout AI/AN communities.[7] Colonization including the forced removal from traditional homelands, forced cultural assimilation, and urbanization have contributed to Indigenous health disparities and inequities[8] and the prevalence of historical trauma.[7] Diet-related diseases such as diabetes and hypertension that have a higher prevalence in AI/AN communities are also directly related to the ability to access healthy food.[7] AI/AN food access itself is further impacted by barriers including distance to food vendors and high cost[9]; however, food access does vary between rural and urban AI/AN populations. Tribal reservation areas, for example, often have much fewer healthy food vendors including grocery stores and produce markets.[9] Regardless, food insecurity affects AI/AN residing in both rural and urban areas. Seventy percent of AI/AN reside or live near urban areas[10], yet the food insecurity challenges facing urban AI/AN population are lacking in the literature.[5] Factors affecting food access for

urban AI/AN that have been identified include socioeconomic barriers, lack of transportation, and a need for more food access programs to improve the resources available for healthy food.[5]

Food access is influenced by a myriad of factors that may interact at different impact levels. Individual health behaviors, for example, are affected by the interdependence and interaction between multiple levels of influence across the social and physical environment.[5] Given this, understanding food access from a holistic perspective may give better insights into formulating more effective intervention points. It is currently unclear, however, whether or not interventions conducted across AI/AN communities targeting food access have been addressing one or more levels of influence. Ecological models such as the Social Ecological Model (SEM) recognize that identifying different types of social and environmental influences is key to developing appropriate interventions.[11] The SEM developed by McElroy et al[11] has become the standard for public health and health promotion as it employs a comprehensive approach to addressing health behavior.[11] The SEM includes intrapersonal factors, interpersonal processes and primary groups, institutional factors, community factors, and public policy.[11] Examining food access in AI/AN communities through the SEM may provide greater insights into current areas of impact.

There is evidence that some food interventions carried out to date in AI/AN communities are targeting different levels of the SEM.[12-14] For example, the CHILE (Child Health Initiative for Lifelong Eating and Exercise) randomized control trial intervention was carried out with AI and Hispanic children attending Head Starts in rural New Mexico.[12] The CHILE study specifically aimed to increase healthy food access and nutrition at the family, institutional, and community levels. In another community-based program, a multi-disciplinary team developed a community science approach to develop a collaborative research agenda with four Mid-western

AI Tribes.[13] The project aimed to promote community capacity to increase growing culturally important foods such as the Three Sisters through intercropping and soil health.[13] The Eat Fresh intervention was done on the Flathead Reservation in Montana to improve food access through weekly fruit and vegetable boxes and in-person education sessions with participants. [14] Individual and family level knowledge, attitudes, skills, and behaviors were targeted through meal preparation and education.[14]

The SEM may be one avenue to explore food access interventions in AI/AN communities as it opens up the ability to identify various levels of influence while being able to assess for intervention gaps present in current food access programs.[15] Identifying the most targeted levels within the SEM as it pertains to AI/AN food access interventions may be critical to better understand how communities are formulating impact. Progress has been made in working to address food access issues through programming, resources, and interventions in Tribal communities; however, gaps still exist. Therefore, there is a need to better understand the existing food access interventions in AI/AN communities to help inform future efforts. Although there are established food access programs anecdotally in many AI/AN communities, there is a lack of clarity on how such programs are implemented, what levels of impact they may be targeting, and the types of interventions that have been commonly employed for food access. Given this, a scoping review methodology was engaged to gain a better understanding of the food access landscape in AI/AN communities through the lens of the SEM. I specifically aimed:

1) to map the existing Indigenous community food access literature to the SEM to identify common SEM impact levels that food access interventions are targeting, and

2) to reflect on AI/AN community food access intervention gaps generally as well as mapped SEM impact gaps to inform future intervention targets.

Positionality

There is substantial need for more acknowledgement and recognition of Indigenous knowledge systems and methodologies within academic spaces. Indigenous methodologies platform and highlight the importance of the positionality of those writing by, with, for, or about Indigenous Peoples.[16,17] Therefore, the author of this review therefore positions herself as an Indigenous scholar committed to working to improve the health outcomes of Indigenous Peoples and communities. The author is from the White Mountain Apache Tribe and Navajo Nation in the US.

Methods

The framework outlined by Arksey and O'Malley[18] was engaged for this scoping review, and the scoping review protocol was registered on the Open Science Framework (OSF).[19] Additionally, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) reporting guidelines was followed for this review.[20]

Search and Sampling Strategy

A systematic search strategy was co-developed with a Research and Education Librarian from the University of North Dakota School of Medicine and Health Sciences. The following electronic databases were searched for relevant articles: PubMed, CINAHL, SocIndex, Academic Search Premier, and ERIC. Google Scholar was additionally searched through a review of two pages at a time until there were two pages with nothing of relevance found. Manual searches were conducted in the International Journal of Indigenous Health; the Journal of Agriculture, Food Systems, and Community Development; the Journal of Indigenous

Wellbeing: Te Mauri-Pimatisiwin; and the UNM Native Health Database (see *Table 1* for example search terms).

Table 1. Example PubMed search strategy.

Database	Search Terms
PubMed	Database: PubMed search terms ("Native American"[Title] OR "American Indian"[Title] OR "Alaska Native"[Title] OR "American Indian/Alaska Native"[Title] OR "Indians, North American"[Mesh]) AND (("access to food"[Title] OR "healthy food access*"[Title] OR "food bank"[Title] OR "food pantr*"[Title] OR "food assistance"[Title] OR "food security"[Title] OR "food shelf"[Title] OR "fruit and vegetable prescription*"[Title] OR "obesity prevention"[Title] OR "Healthy Food Availabilit*"[Title] OR "Availability of Healthy Food*"[Title] OR "Healthy Foods Availabilit*"[Title] OR "Access to Health Food"[Title] OR "Food Deserts"[MeSH] OR "Food Insecurity"[MeSH] OR "Food Security"[MeSH] OR "Food Assistance"[Mesh]) OR (("health promotion"[Title] OR intervention[Title] OR program*[Title] OR protocol*[Title] OR project*[Title] OR initiative*[Title] OR validation*[Title] OR evaluation*[Title] OR development*[Title] OR assessment*[Title] OR pilot[Title] OR strateg*[Title] OR "Health Services, Indigenous"[MeSH] OR "Health Promotion"[Mesh] OR "Program Development"[Mesh] OR "Program Evaluation"[Mesh] OR "Preventive Health Services"[Mesh]) AND ("food sovereignty" [Title] OR "traditional food*"[Title] OR foodway*[Title] OR "food security"[Title] OR "food system*"[Title] OR "cultural food"[Title] OR nutrition[Title] OR agriculture[Title] OR farm*[Title] OR garden*[Title] OR permaculture[Title] OR cook*[Title] OR vegetable*[Title] OR fruit*[Title] OR seed*[Title] OR forage*[Title] OR "food is medicine" OR "food as medicine" OR harvest*[Title] OR recipe*[Title] OR diet*[Title] OR "Diet, Healthy"[MeSH]))

All articles identified in the search strategy were exported into Covidence[21] review software to facilitate the article screening process. Reference lists of key articles were additionally reviewed for relevant articles of interest.

Inclusion Criteria and Article Selection Process

Articles were included in the review if they were peer-reviewed English language articles with a research intervention design (i.e., quantitative, qualitative, mixed methods) that described interventions where participants were >50% AI/AN. Since the SEM was introduced as a key model in 1988, we included articles published from 1988 onwards. We included articles with intervention studies that aimed to address food access within AI/AN communities, and that additionally provided participants with any type of food (e.g., cultural/traditional foods, fruits, vegetables, seeds) as a result of their participation in the intervention.

A two-stage process was implemented to determine article inclusion. First, the titles and abstracts of 100% of the articles identified through the search strategy were screened by two independent reviewers and any discrepancies were resolved by discussion with a third reviewer. One reviewer then screened 100% of the full text articles identified in the first stage of the article selection process, with a second reviewer screening 25% of the full-text articles to ensure consistency. A third reviewer was brought in to resolve any discrepancies by discussion.

Data Extraction and Analysis

One reviewer completed 100% of the data extraction from the included full text articles, with a second reviewer cross checking a random sample of 10% of the articles. Data charting was completed in Excel 365, and included the following elements: general article information (citation, year), level(s) of SEM targeted, evidence of SEM level(s) targeted, type of food access, rural or urban setting (if known), geographic location, specific AI/AN Tribe (if specified), total number of participants including number of AI/AN, type of intervention design, source of funding, intervention aims and outcomes, and whether the article was open access.

The overarching methodology outlined by Golden and Earp[22] guided the data analysis to identify intervention activities and their specific targets for change within the SEM. An a priori

coding system was developed that was intended to capture intervention activities and outcomes, targets for change, program settings, and any theoretical bases mentioned in the included articles.[22] Intervention targets were identified based on what changes were highlighted in articles at each SEM level (see *Table 3*). Two reviewers developed and pre-trialed the coding system to ensure consistency. I then carried out deductive content analysis through the method described by Kyngäs and Kaakinen[23], through the lens of the SEM. One reviewer coded 100% of the data within NVivo 14, with a second reviewer performing regular coding audits to ensure agreement within the data analysis process.

Results

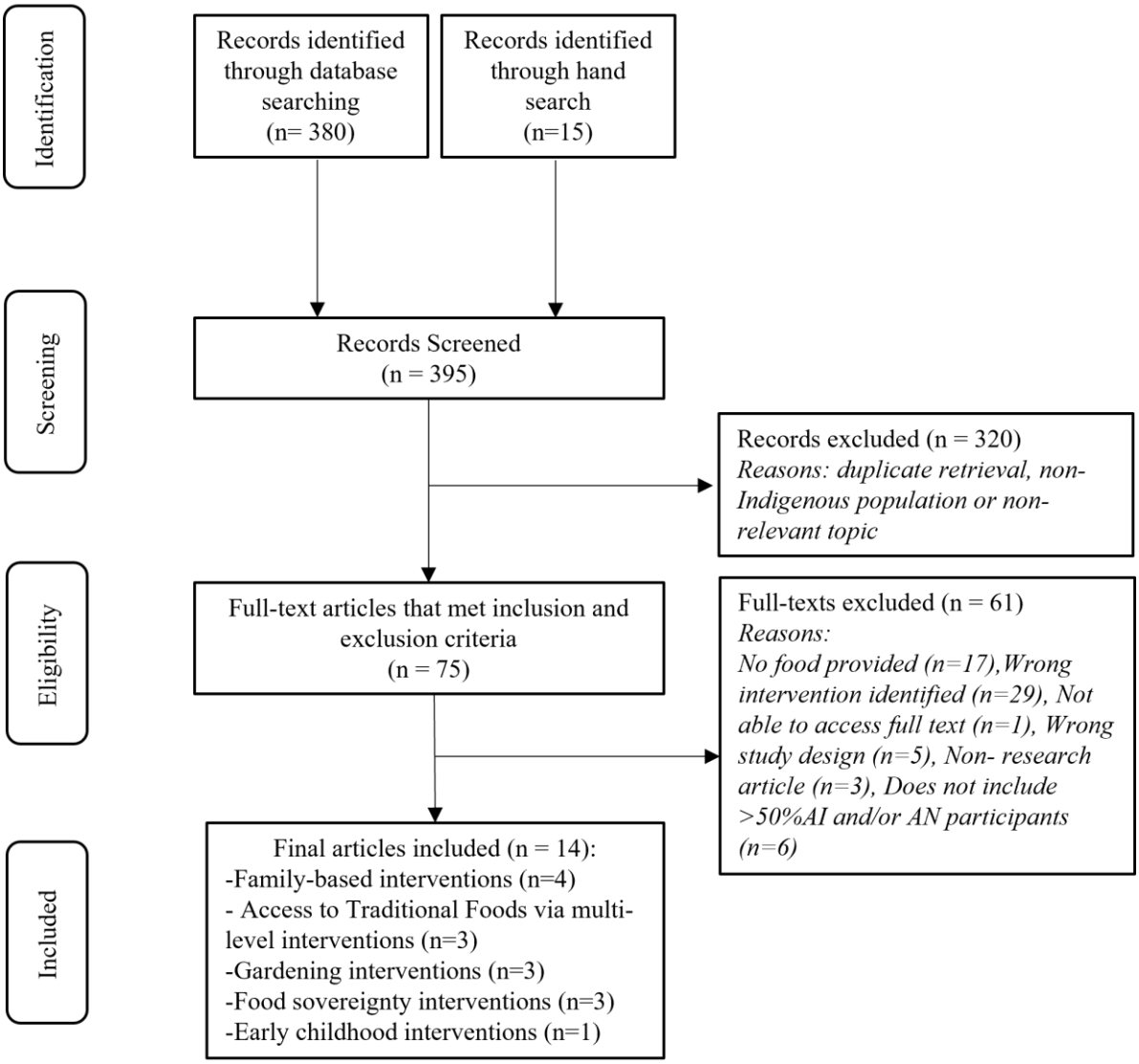

Figure 1. *Adapted PRISMA diagram.*

A total of 395 articles were screened for this scoping review with fourteen articles meeting the inclusion criteria for further analysis (see *Figure 1*). Twelve of the studies were published after 2016 with the exception of two studies indicating that most of the food access literature in AI/AN communities has emerged within the last seven years. Authorship overlap was noted in four of the studies[24-27], with additional noted overlap in funding sources between

studies with nine being federally funded. Many of the studies occurred in the Southwest region of the US (*n*=5), with studies also occurring in the Northern Plains region (*n*=3), Alaska *(n*=2), the Pacific Northwest (*n*=2), and in Oklahoma (*n*=2).

Five of the studies recruited from two or more Tribes including the Traditional Foods Program study[28] which was carried out with seventeen unique Tribal partners. All studies were carried out in rural areas, while two studies additionally included urban areas in addition to being rurally focused.[28,29] Six of the studies utilized a mixed methods design that included both quantitative and qualitative data collection processes; another six of the studies utilized quantitative methods; and the remaining two studies used a qualitative method design. The number of participants greatly varied among the studies with study sample sizes ranging from 12 in the Yéégo Gardening intervention[24] to 1,704 in the Pathways study[29]. Surveys and focus groups were the most used data collection methods across the fourteen studies. See *Table 2* for full data characterization of the included studies and the supplementary material for full data extraction tables.

Table 2. Descriptive characteristics of the included AI/AN food access interventions studies.

	Year	**Geographic Location**	**Intervention Design**	***n***	**Level of SEM Targeted**	**Type of Food Access**	**Key Findings**
Armstrong DL[30]	2000	Northwest American Indian Tribe	Quantitative	Undisclosed	Intrapersonal, community	Community garden produce	Workshops designed to be social, informational and involve community. Community garden established to improve access for participants & Elders to fresh produce and encourage exercise.
Bersamin et al[31]	2019	AK	Quantitative	76	Intrapersonal, institutional, community	Traditional foods at school, and family & community events	Participants in the intervention group consumed more servings of fish (traditional food). Results also indicated positive association between traditional way of life and beliefs regarding skills to harvest and store salmon.

Brown et al[32]	2020	Northern Plains American Indian Tribe	Mixed Methods	25	Intrapersonal, interpersonal, institutional, community, public policy	Vouchers for produce, garden produce, seeds	Community gardening and traditional ways of being were motivating factors for participants to grow food. The POMS* Inventory showed positive change for intervention participants in the group gardening group. Food access was promoted for participants at sessions.
Cueva et al[33]	2020	~US	Mixed Methods	43 (interviews), 350 youth per year	Intrapersonal, interpersonal, institutional, community, public policy	Gardens, traditional foods	Feast for Future has supported cultural connectedness, intergenerational learning, the revitalization of farming & gardening, increased access to healthy foods, and positive changes among involved individuals and communities.
Davis et al[29]	2003	AZ, SD	Mixed Methods	1,704 youth, 2,544 caregivers	Intrapersonal, interpersonal, community	Foods in classrooms, food at family/community events	Pathways curricula designed specifically for American Indians, deemed successful in introducing children and their families to healthful living, increasing their cultural identity, and promoting food access at family events.
DeBruyn et al[28]	2020	~US	Mixed Methods	17 Tribal partners	Interpersonal, community, public policy	Garden, farming, traditional foods	The Traditional Foods Project (TFP) addressed social support and healthy diet factors associated with individual and community health. Partners developed local programs promoting food access in their communities. Results indicated that gardening, availability of healthy foods, and new health practices occurred and supported food access.
Haslam et al[26]	2022	OK	Quantitative	94	Intrapersonal, interpersonal community	Meals at in-person sessions, food for parents	Primary outcome was an increase in vegetable and fruit intake among children. Researchers developed and implemented a hybrid curriculum. Modest participation in online component and more parent participation for in-person meetings where meals were provided. Food access was promoted at in-person sessions.
Mattingly & Andresen[34]	2016	SD	Quantitative	12 staff, 15 Head Start sites	Intrapersonal, interpersonal, institutional, public policy	Food incentives, food in classrooms	NAP SACC** program focused on environmental policies and best practices promoting healthy weight development through

							healthy food access for children. Program successfully implemented across 15 Head Start sites.
Mylant et al[35]	2021	~US	Mixed Methods	25	Intrapersonal, interpersonal, community	Family meals at sessions	Obesity rates among intervention groups remained the same while waitlist group increased by 20%. Focus groups revealed positive child behaviors to be strengths and adult disconnect to be a weakness. Food access promoted at sessions.
Nugent et al[36]	2022	AZ, NM, UT, AK	Quantitative	Undisclosed	Intrapersonal, interpersonal, community	Food prescription vouchers (produce/traditional foods)	Food access promoted through prescription vouchers. Vouchers supported the promotion of family and community-level food access. Produce options increased to meet redemption needs by participants and also the general community.
Ornelas et al[25]	2021	NM	Qualitative	28 (focus groups), 2 youth classrooms	Intrapersonal, interpersonal, community	Meals, school garden, traditional foods	Traditional food activities and teachings emerged as key components of intervention. Community garden intervention improved food access for participants and local residents.
Ornelas et al[24]	2017	NM	Qualitative	12	Intrapersonal, interpersonal, community	School/community gardens, traditional foods, workshops	Community input was essential throughout the intervention. Community garden intervention improved access to fruits & vegetables and traditional foods for participants.
Sowerwine et al[37]	2019	CA, OR	Mixed Methods	711 (surveys), 162 (interviews), 128 (focus groups)	Intrapersonal, interpersonal, community, public policy	Workshops, food camps	More than 1,300 educational events increased stakeholder knowledge and capacity to engage in transformative food system change. Native food workshops increased access to local foods. Pikyav Field Institute established to increase capacity to promote and sustain capacity for food access.
Taniguchi et al[27]	2022	OK	Quantitative	284	Intrapersonal, interpersonal, community	Family recipe kits	Changes noted in dietary intake, BMI, health status, systolic blood pressure, and food insecurity. Vegetable consumption significantly increased for intervention

	children. Access to local produce increased at ECE's***.

~United States (US) is used when the geographic location in the US is undisclosed or there are a group of geographic locations (see Supp material for detailed geographic location information).
*POMS=Profile of Mood States.
**NAP SACC=Nutrition and Physical Activity Self-Assessment for Child Care.
***ECE=Early Childhood Education programs.

Type of food access and key findings from the interventions

The type of food access interventions varied across the included studies. Food access was promoted in the studies through various means including supporting community and/or school gardens; providing seeds; providing traditional foods at school, family, and community events; and providing meals to families. Food was directly provided to children in schools, as well as to families through early childhood education programs in some studies.[27,29,34] Vouchers were also prescribed to participants to access fresh and frozen produce as well as traditional foods in the Produce Prescription programs.[36]

Key findings among study interventions included a variety of changes among the participants. Food access interventions were found to be affected through different modes including increases to traditional food intake, increased capacity for gardening and/or farming, and overall increased access to food.[24,28,30,31] Increased access to fresher and healthier foods through vouchers and educational sessions were also found to be important in some of the studies.[24,26,35,36] Food was brought into classrooms in studies targeting children[29,34], with cultural connectedness, intergenerational learning, and overall capacity building to improve local food systems also noted in some of the studies.[28,29,33,37]

The Social Ecological Model (SEM) levels targeted by interventions

When I examined the included articles through the SEM, I found that some explicitly stated which level(s) of impact they were targeting while others did not. We determined, however, that all articles described an intervention where multiple levels of SEM impact were

identified. Notably, two of the interventions targeted all the SEM levels.[32,33] Ninety-two percent of the included articles targeted the 'intrapersonal' and 'community' levels, the most targeted levels amongst all the interventions. Eighty-five percent of the articles targeted the 'interpersonal' level of the SEM. The 'institutional' and 'public policy' levels of the SEM were found to be the least targeted levels within the included articles. *Table 3* below depicts the SEM impact levels identified within the included articles which are further detailed below.

Table 3. SEM article distribution among AI/AN food access interventions.

SEM Level	**Relevant Articles***
Intrapersonal	Armstrong DL, Bersamin et al, Brown et al, Cueva et al, Davis et al, Haslam et al, Mattingly and Andresen, Mylant et al, Nugent et al, Ornelas et al (2017), Ornelas et al (2021), Sowerwine et al, Taniguchi et al
Interpersonal	Brown et al, Cueva et al, Davis et al, DeBruyn et al, Haslam et al, Mattingly and Andresen, Mylant et al, Nugent et al, Ornelas et al (2017), Ornelas et al (2021), Sowerwine et al, Taniguchi et al
Institutional	Bersamin et al, Brown et al, Cueva et al, Mattingly and Andresen
Community	Armstrong DL, Bersamin et al, Brown et al, Cueva et al, Davis et al, DeBruyn et al, Haslam et al, Nugent et al, Ornelas et al (2017), Ornelas et al (2021), Sowerwine et al, Taniguchi et al
Public Policy	Brown et al, Cueva et al, DeBruyn et al, Mattingly and Andresen, Sowerwine et al

*One article may have had more than one SEM level represented so the article may be located in multiple SEM level rows in the table.

Intrapersonal level factors include individual level knowledge, attitudes, behavior, skills, and self-efficacy.[11] Food access interventions targeting the intrapersonal level more specifically addressed eating behaviors, attitudes, and perceptions towards traditional foods and the consumption of traditional foods. The self-efficacy around eating fruits and vegetables and growing food were targeted as well as the knowledge of gardening, food preparation, and nutrition. *Interpersonal level* factors may include family and kinship structures which are important within AI/AN communities. Interpersonal processes and groups may include both formal and informal social networks and support systems.[11] Interpersonal level food access intervention targets included knowledge on food choices, cooking, and food preservation. Role

modeling and self-monitoring behaviors were also found to be important changes targeted at the interpersonal level.

Institutional level factors include social organizational characteristics and both formal and informal rules and regulations.[11] Institutional level food access intervention targets included fostering food access and positive organizational attitudes towards traditional foods. Enhancing organizational capacity to promote food access and/or gardening was also found to be targeted from within institutions such as schools and Tribal & early childhood education facilities.[31-34] *Community level* factors include organizational, institutional, and informal network relationships.[11] The community level food access intervention targets for change included enhancing social norms around gardening and traditional foods and increasing collective knowledge on food plants.[33,37] At the community level, some interventions additionally noted positive perceptions of community change and increased collective efficacy for gardening and/or farming.[33,37] As a result of the interventions that targeted the community level, community connectedness and increased community capacity to improve food access were noted for ten of the total interventions. Overall, the development of community-based interventions through gardens and traditional foods was noted to be critical for gaining further insight into the influential factors and common barriers that may hinder the growing of food.[28,32,33]

The *public policy level* targeted by the food access interventions included addressing policy barriers to food access and gardening at the Tribal and state levels. Public policy level approaches were specifically discussed in five of the included studies.[28,32-34,37] Two interventions developed and implemented wellness policies in schools and early childhood education facilities as part of the intervention.[33,34] Community level policies that aimed to improve overall food access and food systems were also developed in two of the larger studies.[28,37] In addition to

policy level interventions, increased community engagement and awareness on policy that supports community food access was also discussed in two of the interventions.[28,37] Support from Tribal leadership and policymakers was also noted as important for intervention success and impact on local food access.[26,27] SEM intervention categories and targeted areas for change are shown below in *Table 4*.

Table 4. SEM intervention categories and targets for change

	Intrapersonal	**Interpersonal**	**Institutional**	**Community**	**Public Policy**
What are the targets for change among AI/AN interventions across SEM levels?	-Eating behaviors -Traditional foods consumption -Attitudes towards traditional foods -Self-efficacy for eating fruits & vegetables and growing food -Knowledge on gardening, food preparation, and nutrition -Perceptions of traditional foods -Goal setting	-Knowledge on food choices, cooking, and preservation -Role modeling healthy food behaviors -Gardening capabilities -Increasing cultural identity -Self-monitoring behaviors	-Fostering food access and healthy meals -Promoting positive organizational attitudes towards traditional foods -Organizational capability to promote food access and/or gardening	-Enhancing social norms around gardening & traditional foods -Increasing knowledge on food plants -Positive perception of community change -Increased collective efficacy for gardening/farming	-Addressing barriers to gardening and food access -Increased community engagement & knowledge on policy -Tribal support for policy change that supports food access

Cultural Factors were distinguished in addition to the SEM level findings, it was noted more generally across the included articles that Indigenous culture was an important influence amongst the food access interventions. Notably, twelve of the interventions discussed culture as an important influence and component of their interventions. Cultural influences and factors in the respective interventions included: the inclusion of Indigenous languages; the inclusion of intergenerational teachings on growing and consuming food; the inclusion of traditional foods; the incorporation of traditional ecological knowledge (TEK); and platforming overall ways of connecting to food, family, and community as part of the intervention. Promoting access to

traditional foods in homes, schools, and communities was often discussed across the articles as being important to increasing food access and improving health.[24,25,31,33,36,37] Connecting to cultural knowledge and practices (e.g., planting culturally important foods, preparing and cooking cultural foods) were additionally highlighted as being important components for four of the interventions carried out.[29,31-33]

Another more general feature across the included articles was the dominance of *community-based interventions*. Ten of the interventions were denoted as being community-based interventions where direct community and stakeholder input was sought at the beginning of the development of the interventions. Community advisory boards and partnerships between researchers and the Tribal communities were formed before the interventions were developed and informed the foundation of the interventions. Stakeholders (e.g. Elders, farmers, educators, Tribal leadership) often informed community needs surrounding food access, health, and wellness. For example, Bersamin et al[31] ensured that local input and the Yup'ik worldview were integrated into intervention activities and evidence-based development strategies. The Food Resource Equity for Sustainable Health (FRESH) study by Taniguchi et al[27] additionally stated that commitment from the Osage Nation was integral to the study's development and success.

Discussion

My scoping review attempted to provide further insights into the existing literature surrounding food access interventions in AI/AN communities in the US. I specifically aimed to map the existing literature to the SEM to identify common SEM impact levels that AI/AN food access interventions are targeting. This scoping review additionally reflected on the existing gaps in the literature on food access interventions in AI/AN communities which we have reflected on further below.

All of the included interventions were conducted in rural areas with two of the interventions being conducted in both rural and urban locations.[28,29] The clear lack of interventions conducted in urban AI/AN communities surrounding food access is important as the majority of AI/AN populations live in urban areas (~70%).[10] There is limited research generally on food insecurity for urban AI/ANs, however, the limited evidence that does exists suggests that urban AI/AN individuals may experience higher food insecurity when compared to their rural counterparts.[38] Various factors may contribute to food insecurity for urban AI/AN individuals including high rates of poverty, and limited access to culturally appropriate food access services and resources.[38] Food insecurity may also contribute to other health outcomes. In a study carried out by Doug et al[38], they found that associations between food insecurity and cardiometabolic risks can impact urban AI/AN youth. Urban AI/ANs may also experience racial misclassification which may further compromise the accuracy and usefulness of AI/AN health assessments.[39] Much of the already limited health literature covers reservation dwelling AI/AN communities[39], which seems to also be the case for food access research given our review findings. Further research and support for food access programs involving urban AI/ANs are needed to better understand the potential similarities and differences across AI/AN populations to improve health outcomes.

Increasing access to Indigenous traditional foods as well as promoting gardening abilities were highlighted as important factors in many of the included studies. Traditional foods may promote food access for AI/AN communities and benefit overall health.[40] The Feast for the Future (FFF) program by Cueva et al[33] promoted traditional foods access in three Tribal communities through the intergenerational Traditional Foodways Education Program and community farming initiatives. Youth participants were taught by local Elders about seasonal

traditional cooking, gardening and farming, and key food practices such as harvesting.[33] More importantly, traditional foods were brought into schools and enhanced organizational support towards these foods.[33] Overall, stakeholders expressed that the FFF intervention fostered Indigenous approaches to supporting healthy living and cultural identity through traditional foods.[33] The Traditional Foods Project (TFP) also supported the notion that traditional foods are interwoven with land, identity, food sovereignty, and food security.[28] Traditional foodways are critical to improving healthy food access, individual and collective relationships with food, and overall health outcomes.[28,33,37] Multilevel traditional food interventions hold much promise in impacting AI/AN food systems and communities through culturally grounded and community driven approaches.

All the included studies targeted multiple levels of the SEM which points to research projects within Tribal communities potentially being attuned to the importance of being inclusive of multiple levels of the community experience regarding food access. This multi-level approach to addressing food access is notable as the targeting of many impact levels is known in other contexts to potentially influence individual and collective food access.[41] For example, rural multi-level food access interventions have been carried out in other communities in the US. Stluka et al[41] discuss a multi-state longitudinal multilevel intervention that aimed to improve food security through food policy councils (FPCs) and food pantries. The team found the community and strengths-based approach to be effective. There were also challenges, however, with the study including timelines, participant retention, and fidelity.[41]

Multi-level interventions, especially those in rural areas, have the potential to improve food access and foster positive changes in rural food systems. Prominent public health funding agencies (e.g., Centers for Disease Control and Prevention, USDA, and Food and Nutrition

Services) also recommend multi-level interventions that can foster a policies, systems, and environments (PSE) approach.[42] In a study by Randall et al[42] in the rural Southern US, qualitative findings indicated that community-based interventions and cultural influences were found to be key components to a PSE approach. Further research that assesses multi-level impacts in rural communities including with AI/AN communities may improve the understanding of multilevel approaches in varied contexts.

It became apparent throughout the review that interventions tended to target the institutional and public policy impact levels the least, whereas they targeted the intrapersonal (individual) and community SEM levels the most. Where policy levels were incorporated, they were mainly at the Tribal level with sparse interaction at state or federal policy levels. This despite, federal policy resulting in programs such as the Food Distribution Program on Indian Reservations (FDPIR) (which introduced processed foods to AI/AN communities) continuing to influence food choices for those that utilize their services.[36] Institutional and public policy levels targets have the potential to have profound impacts on food access in AI/AN communities.

Institutions that may exist in AI/AN communities include worksites, schools, universities and colleges, hospitals, parks and museums, and faith-based organizations.[43] The complexities of what food is allowed and available in these institutional settings in AI/AN communities may derive from many multi-level and interacting policies at local, state, Tribal and federal levels. Additionally, navigating the various policies impacting food access in Tribal communities can be unclear due to the potential for policy overlap. Local policy interventions at the Tribal level are of course needed. However, there is also need for more food access interventions that target policies that regulate state and federal programs directly within Tribal settings (i.e., federal

hospitals, public schools). There is also a need for further capacity building and infrastructure that enables Tribal stakeholders to be able to advocate at Tribal, state, and federal levels.

In considering some of the key gaps and knowledge mobilized on food access interventions within Tribal communities from this review, there are several considerations for developing, operationalizing, and amplifying food access programs. We have framed these considerations with a traditional food storage basket as depicted in *Figure 2* below. Baskets are significant to many AI/AN communities including the White Mountain Apache Tribe. The basket below is culturally important and is connected to food as it is used to carry food and plants in ceremonies and was used when traveling long distances. Food access considerations may include: 1) the historical and current policies impacting food access in Tribal communities; 2) the importance of the development and delivery of multi-level food access interventions; 3) the importance of leveraging existing strengths in AI/AN communities to enhance food access through community-based programs; and the 4) importance of traditional foods and culturally aligned programs and their role in food access. These four considerations are reviewed below.

Figure 2. *Traditional food storage basket with key considerations for AI/AN food access interventions.*

Historical and current policies continue to impact AI/AN communities' access to food. A better understanding of the policy-based approaches to increasing AI/AN food access is greatly needed. More specifically, there is a critical need for more research that assesses the viability and impact of policy interventions that aim to increase food access in AI/AN communities. Additionally, research that examines the long-term effects of policy approaches to increasing food access in AI/AN communities could further inform intervention development. Despite the food access interventions reviewed having some targets at the Tribal policy level, there is a paucity of research that assesses the impact of Tribally driven policies and their effectiveness in promoting food system change and increasing overall food access. In spite of this paucity of research, there is continued potential to improve the local Tribal policy environment surrounding food and agriculture through mechanisms such as Tribal Food Codes.[44] There is a need for more research that can provide examples of effectively improving local Tribal policy environments such as the American Indian Healthy Eating Project (AIHEP). AIHEP was carried out with seven North Carolina AI Tribes in which they used an ecological framework to improve access to healthy, affordable foods.[45] The AIHEP resulted in the Tools for Healthy Tribes toolkit and engagement with Tribal policymakers to increase access to healthy foods.[45]

Multi-level food access interventions typically intervene on two or more levels of the SEM[46] and may have the greatest impact in improving health.[47] However, multilevel interventions are rare in AI communities despite their potential to positively impact health.[8] With all the food access intervention studies included in this review being multi-level, further investigation could determine why the food access space is leading in multi-level interventions in AI communities compared to other research areas, and what lessons may be learned from those

approaches. Additionally, challenges to intervention science within AI communities often lacks the consideration of cultural and sociological contexts existing in these settings.[8] With this, better understanding of the culturally important measures and the role of environmental and social influences on food access is needed in the context of multilevel interventions.

Food access interventions within AI/AN settings requires a *community-based* approach that prioritizes local knowledge and input. The Sowerwine et al[37] intervention included in this review provided a detailed narrative of the process and partnerships needed to develop a multilevel intervention to enhance food access within the Klamath, Karuk, and Yurok Tribes. Through a community-based participatory research (CBPR) approach, the intervention promoted food security through teachings around accessing and preparing traditional foods, leveraged local community strengths, and created sustainable food system changes.[37] The project was effective in integrating cultural values through the partnership between Tribal partners and university-extension staff, while also fostering Tribally led research, education, and workforce development.[37] Through partnerships and a CBPR approach, the project exemplifies how local Indigenous community strengths and knowledge can transform food systems and enhance infrastructure to sustain longer-term project outcomes.[37]

Successful interventions conducted within AI/AN communities have been found to be grounded in culturally based approaches in which local values, worldviews, and ethics are integrated.[48] *Traditional foods and culturally aligned programs* have therefore been highlighted in many of the articles included in this review. Traditional foods themselves are culturally important foods that have provided nourishment and sustained for AI/AN Peoples for millennia. Many Indigenous Peoples including AI are reclaiming their food systems through Indigenous food sovereignty.[40] Food sovereignty initiatives support Indigenous communities' ability to

increase access to traditional and healthy foods while also reducing dependence on processed foods.[49] For example, traditional foods are vital to Alaska Native diets where they are an important nutrient source and contribute to overall food security.[50] Interventions that support AI/AN Peoples in rebuilding food sovereignty in their communities have potential to create sustainable changes and impacts.[40] Indigenous food sovereignty also supports access to traditional foods and can help foster collaboration between historically "siloed segments of communities (e.g., agriculture, land use, commerce, health departments)" to create more food equitable environments.[49] There is need for more research that better supports an understanding of how Indigenous food sovereignty can be used as an applied public health approach to improve traditional food access within AI/AN communities.

Limitations

Most of the included articles in this scoping review had a participant base that was AI with a clear lack of AN representation. Therefore, my findings may not be representative of the AN population due to the lack of AN representation in this review Additionally, food access interventions that are carried out in AI/AN communities may not always be published in peer-reviewed academic journals. As this review only included peer reviewed studies, relevant community-based food access work happening on the ground in AI/AN communities may therefore not be fully represented. Regardless, as policy and funding structures are often informed by academic orientated publications, I felt it was important to get an idea on the breadth of the literature on this topic area within the literature that may be used for informing food access dialogues and programmatic work. Future work should be directed towards examining non-academic sources of Tribal food access programs to create a more comprehensive understanding of targets for change to inform future food access intervention development.

Conclusion

This scoping review provides further evidence that food access is a tantamount public health issue and priority for AI/AN populations in varied settings. I reviewed the literature on interventions aiming to address food access in AI/AN communities. Included articles were mapped across the SEM which highlighted clear gaps at the institutional and public policy impact levels, with particular gaps at the state and federal policy level of intervention. Nonetheless, this review highlighted that there is valuable research that has been conducted on AI/AN food access interventions with many interventions targeting multiple levels of the SEM with a particular focus on intrapersonal and community levels. Further collaboration between AI/AN communities and researchers may lead to the development of more informed multilevel interventions that integrates Indigenous methodological approaches and culturally based approaches to improving food access. AI/AN food systems were once robust, diverse, and fully supported the health and well-being of AI/AN Peoples. By honoring the strengths, knowledge, and experiences of AI/AN communities it is possible to contribute to the rebuilding of AI/AN food systems while ensuring the right to food for current and future generations.

Indigenizing Food Access for Our Communities

Strengthening Native Programs & Feeding Families Program

Grant Evaluation Report for

First Nations Development Institute

By Danya S. Carroll, MPH, PhD (c)

University of North Dakota

EXECUTIVE SUMMARY

First Nations Development Institute (FNDI) is a Native-led 501(c)(3) nonprofit organization that supports American Indian people and their communities through its national grantmaking program. Since it began the grantmaking program, it has successfully managed more than $46 million dollars in funds to Tribal and Native-led community nonprofits across the United States. Through its Nourishing Native Foods and Health Program, FNDI supports Tribes and Native communities in building sustainable food systems that improve health, strengthen food security, and increase control over Native agriculture and food systems.

In 2021, FNDI recognized the elevated food insecurity in Tribal communities and the increased need for direct investment in food security. With the generous support of the American Express Foundation, twelve organizations were funded through the FNDI Strengthening Native Programs & Feeding Families Grant (SNPFF) Opportunity. Grants were awarded to Native-led entities and nonprofits that were focused on strengthening their existing infrastructure, capacity building, networking, increasing access to healthy traditional foods, and supporting logistics. The FNDI supported the implementation of an evaluation process to evaluate the SNPFF grant opportunity for the purpose of assessing the outcomes of the grant projects and to inform future grant opportunities. This evaluation report summarizes key findings from the outcome evaluation carried out with the FNDI grantees from the SNPFF program.

INTRODUCTION

Food is a vital resource that has a significant impact on the health and wellbeing of American Indian (AI) peoples and communities. Food accessibility and insecurity is a social determinant of health.[3] Yet, many AI communities lack access to healthy and fresh foods resulting in high rates of food insecurity, and consequent health inequities.[4] In a 2021 survey by the Native American Agriculture Fund, it was found that half of respondents reported experiencing very low food security.[51] Native Hawaiians have also been reported to experience high rates of food insecurity.[52]

During the COVID-19 pandemic, access to food further decreased in AI communities due to food supply chain disruptions and rising food prices.[51] Additionally, food prices on Tribal lands were exacerbated during the pandemic[51] which elevated the need for more supportive food infrastructure and programs that supply food to these communities.

Due to the increased need for food access support during the pandemic, many Native-led entities shifted their efforts to providing immediate relief through food purchases and donations to support those in their communities.[51] This evaluation report highlights several of these entities and their significant work and impact to support their communities through food distribution and increased access to food.

In 2021, the First Nations Development Institute released their request for proposals for the first grant cycle of the Strengthening Native Programs & Feeding Families (SNPFF) grant. Twelve organizations were funded a total of $10,000 each, for a total of $120,000 for all their food-related projects over the course of five months. The purpose of this evaluation was to therefore assess the impact and experiences of grantee projects within the varied communities

and Tribes that participated in the SNPFF grant. The successes, challenges, and overall experiences of grantees are highlighted in this report.

The grantees represented a diverse group of Native-led entities and Tribes. Grantees consisted of Tribal programs, schools, and nonprofit entities in addition to two Native Hawaiian-led organizations. All grantees from the first grant cycle were invited to participate in this evaluation for the SNPFF grant, and a total of nine grantees participated.

METHODS

The Indigenous Evaluation Framework (IEF) Model by LaFrance et al[53] guided this evaluation. The IEF Model emphasizes the importance of Indigenous knowledges, individual and communal experiences, place, and sovereignty.[53] Indigenous worldviews and the social structures existing within Indigenous communities including notions of place and time are also honored within the IEF Model.[53]

Balancing cultural considerations with evaluative rigor was significant in developing our effective evaluation with Indigenous partners.[54] Martinez et al[54] emphasize that evaluations must be responsive to local needs, Tribal culture, and experiences. Therefore, a culturally responsive evaluation was developed using the IEF Model[53] to ensure community voices were honored and highlighted. Using community-participatory approaches for this evaluation was essential to magnify the knowledge and experiences of those that were directly involved in designing and implementing food access programs in their communities. Therefore, it was crucial to interview grantees directly for this evaluation. Their expertise and understanding of their grants and programs were foundational to evaluating the SNPFF grant impact. The Ph.D. student worked with FNDI staff in 2022 to figure out the best approach to evaluate the SNPFF grant. After IRB approval in early 2023, grantee organizations were contacted from both FNDI staff and the Ph.D.

student to participate. The Ph.D. student aimed to foster an open environment where the interview participants each helped to guide where they wanted to take the interview and what they wanted to share about their organizations' journeys. Listening to and honoring the worldviews and stories of each participant was vital to the process of the evaluation.

Nine semi-structured interviews were carried out with participants based at SNPFF grant funded sites. The interviews lasted between 45 minutes to 90 minutes and were carried out by an Indigenous Health Ph.D. graduate student based at the University of North Dakota. All participants were 18 years old or older and represented key leadership and program implementation roles for their organizations. An Institutional Review Board (IRB) protocol (#IRB0005324) was submitted and approved by the University of North Dakota IRB for the Evaluation.

Purposive sampling was done to engage participants who would have the best knowledge of their programs.[55] Interviews were intended to highlight each participant's voice and firsthand experience with their program. Content analysis was carried out on the interview data and guided by the methods of Elo et al.[55] Content analysis included preparation, organization, and reporting of the results.[55] See *Table 1* below for examples of the questions that guided the interviews. After the interviews were conducted, open coding was done in NVivo 14, then code categories were created from the qualitative data. Codes were then organized and data from all grantee interviews were consolidated into each category. As interview data was analyzed, it was noted that a redundancy in the data emerged indicating that data saturation had been reached.[56]
The outcome evaluation was conducted once the SNPFF grant program had been completed. Through the outcome evaluation, the effectiveness of the program and what changes resulted from the program with grantee sites was investigated.

Table 1. Sample interview questions from the SNPFF grant evaluation.

- Can you tell me about your community's food system?
- Can you tell me about your project that was funded through the FNDI Strengthening Families Food Grant program?
- What do you think went well with your project?
- What areas do you think could have been improved?
- Do you have any stories to share on how your program was received by your community?
- Did the local cultural context affect the program? If so, how did it affect the program, or if not, why do you think that it didn't?
- What did you learn from your program that you will use in future programming?
- Did aspects of your program continue after the SNPFF grant?

GRANTEE SPOTLIGHT

Chippewa Cree Tribe

Chippewa Cree Indians of the Rocky Boy's Reservation, Montana

The Chippewa Cree Tribe developed a food pantry to further meet the needs of their community. The food pantry was supported by the SNPFF grant. The Tribe aimed to increase food access in their community and worked to collect data on food insecurity rates in their community. The Tribe provided food distribution to families throughout the pandemic including for those in quarantine.

FAST Blackfeet

Blackfeet Tribe of the Blackfeet Indian Reservation of Montana

The Food Access and Sustainability Team (FAST) is a nonprofit within the Blackfeet Tribe that is committed to improving food security, providing nutrition education, and reclaiming

& building food sovereignty. Through the SNPFF grant, FAST Blackfeet aimed to increase access to traditional foods in their food pantry for their community. Their project leveraged their ability to educate community members on healthy and traditional eating. By the end of the grant period, FAST Blackfeet had distributed 1,000 boxes of tea and over 56,000 lbs. of produce to local community members and families.

First Foods Program, Grinding Stone Collective
Inter-Tribal, Shinnecock, Lakota, Arapaho, Navajo, Ramapough, Apache, Taino, Mexica and more (Urban Setting in Colorado, New York, and Oregon Regions)

The Grinding Stone Collective is a grassroots nonprofit that is committed to building self-sustaining Indigenous communities in both rural and urban settings. They promote Inter-Tribal connections through events, workshops, classes, and databases. Through their SNPFF grant project, they aimed to create opportunities for urban Indigenous Peoples to access traditional foods through their Inter-Tribal Food Pantry & Co-op. They worked to develop connections to procure produce and meats including traditional foods for urban and rural communities.

Mesa Grande Business Development Corporation
Mesa Grande Band of Diegueno Mission Indians of the Mesa Grande Reservation, California

The Mesa Grande Business Development Corporation is committed to promoting economic self-sufficiency of the Mesa Grande Band of Mission Indians. Through their Golden Eagle Gardens and the SNPFF grant, they orchestrated food distribution for local community members. They are further developing their gardens and facilities for expansion. The SNPFF grant helped to promote their storage capacity to be able to store their produce longer for sales.

Ke Kula Nui O Waimanalo
Waimanalo, Hawaii

Ke Kula Nui O Waimānalo (KKNOW) is a grassroots community-based nonprofit that serves the Native Hawaiian community. KKNOW aims to build their local community to be self-sustainable and healthy. Through their SNPFF grant project, they aimed to increase food security through local foods and products including both traditional and medicinal items. In addition to food distribution, they also provided nutrition education classes for their community.

Painted Desert Demonstration Projects, The STAR School
Navajo Nation, Arizona, New Mexico, and Utah

The Service To All Relations (STAR) School is a charter elementary school located near the Navajo Nation. The STAR School aims to promote character, and self-reliance skills and attitudes for their students and staff including through food engagement. They developed a food box distribution program for their students and local communities which was further supported by this grant. The grant project aimed to increase healthy food access for Navajo families through the distribution of foods including locally grown foods. STAR School worked with local food banks and farmers to develop food boxes that were distributed through delivery and drive-thru distribution. They were able to distribute over 15,0000 lbs. of food during the SNPFF grant period. They continue their food box program to the present day.

Peacekeeper Society
Confederated Tribes and Bands of the Yakama Nation

The Peacekeeper Society is a female, Indigenous-led nonprofit that aims to promote culturally connected families and communities. Through their Traditional Foods Preservation Program, they provide education on processing and preserving traditional foods. Through their SNPFF grant project they aimed to increase their food distribution services and reach Tribal communities across the Pacific Northwest. Through their Emergency Response Program, they

aimed to provide food boxes through food distribution drive-thru and delivery to several communities.

Red Paint Creek Food Pantry
Fort Belknap Indian Community of the Fort Belknap Reservation of Montana

The Red Paint Creek Food Pantry is housed at a rural, local grocery store. They serve local youth and communities through food distribution. Through their SNPFF grant project they aimed to distribute food packages to local Elders through mobile distribution.

Santa Fe Indigenous Center
Inter-Tribal, Navajo (Diné), Apache, members of all the 19 Pueblos, and many others including Alaska Natives

The Santa Fe Indigenous Center provides many services for several Indigenous communities in New Mexico. Their food distributions included locally grown food that was distributed to the local Native communities. Through their SNPFF grant project they aimed to promote food security for Native families. They worked to procure food from local farmers including Native farms to provide culturally important foods through food distributions. They distributed over 22,000 lbs. of food during the SNPFF grant period. Their food distribution program continues to the present day.

Walks on the Day
Yankton Sioux Tribe of South Dakota

Walks on the Day is a nonprofit organization that serves the Yankton Sioux Tribe of South Dakota. The organization provides disaster relief and recovery services to local communities. Through the SNPFF grant they aimed to create a food pantry and increase food availability for local communities including children. They provided food distribution for local communities to promote healthier foods including locally grown foods.

World Indigenous Nations University - Hawaii Pasifika
Native Hawaiian

The World Indigenous Nations University is a nonprofit that promotes Western and Indigenous knowledge through their degree programs. Through their SNPFF grant project they aimed to increase availability of traditional fruits and vegetables for Native Hawaiian Elders in Maui. They aimed to distribute fruit and vegetable seeds to Elders to plant. They also sought to provide education and support on plant maintenance and care.

Yurok Tribe
Yurok Tribe of the Yurok Reservation, California

The Yurok Tribe operates several food distribution programs to local communities including to Elders and youth. Through partnership building and local food procurement the Tribe aimed to distribute food packages to local Elders. They also aimed to identify and prioritize local Indigenous food producers. By the end of the SNPFF grant period, the Yurok Tribe had distributed over 5,000 lbs. of food (at least half was fresh produce) to community members.

KEY FINDINGS FROM THE STRENGTHENING NATIVE PROGRAMS & FEEDING FAMILIES GRANTEES

Interviews with participants at the grantee sites revealed many strengths and assets in participants' communities in relation to food access, health, and community connectedness. Many of the organizations that the participants represented were recently established at the time they received the Strengthening Native Programs & Feeding Families (SNPFF) grant. However, it was evident throughout the interviews that grantee sites have already made significant impacts for the communities and Tribes they served.

Food Access, Availability, and Quality is Essential

Participants highlighted various barriers and concerns around food access, availability, and the quality of foods in their communities. All participants have observed these barriers and concerns firsthand in their programs.

Distance to Food

Distance to access food was brought up by many participants as a significant barrier for those in their communities. Many stated that transportation to get food was a major issue for those in rural areas. Grocery stores that supply fresh and healthy foods such as fruits and vegetables can be a luxury for those residing in remote, reservation settings. Participants expressed their concerns about how far their clients must travel to access food. One participant stated that,

> *"[p]eople have to commute up to 45 minutes away for the larger grocery stores."*

There was also discussion on how many people must travel to off reservation border towns for food. Spending money frequently at off reservation areas was identified as a concern. One participant emphasized,

> *"…[it] contributes to community leakage, when we spend money off rez… it is cheaper for groceries, but also causes economic drain."*

Food dollars that leave reservation economies can have larger impacts for the community such as the loss of business for local food producers. Participants emphasized the importance of increasing access to local foods to eliminate the barrier of distance to food.

Cost of Food

Cost was another important barrier to food access identified by the grantee participants. Many asserted that food was cheaper in larger grocery stores away from their communities. They

stated that while there was some access to healthy foods within their communities it was often expensive and overpriced. One participant stated,

"Food is very expensive, for example, a lime could cost five dollars."

Furthermore, in communities where most of the food is brought in by outside suppliers, cost can be a more substantial issue. Cost can affect food access for both rural and urban populations. One participant that works within urban areas stated,

"Food in cities is expensive… [due to] the inflation on prices of food, and the supply chain distribution."

Quality, Availability, and Supply Chain Issues

Participants provided valuable insights into the quality of foods available to their clients as well as supply chain issues that occur for those in rural areas. The foods most commonly available were described by participants as highly processed, some fresh, mostly nonperishable, and low quality. One participant stated,

"…people have a hard time securing fresh food."

Participants also described the efforts in their communities to increase access to better quality food through various initiatives including gardens, and local and/or Tribal farms. The foods available locally through these initiatives were described as higher quality, fresh, and more culturally significant foods.

Supply chain issues were stated to impact food access in many Tribal communities. Participants described supply chain issues as a major factor in limiting availability of fresher, healthier foods in their communities. During the pandemic, these issues were exacerbated as one participant stated,

"…there was no guarantee you would get anything at the store."

In areas such as Hawai'i, a participant described the supply chain as dire during the peak of the pandemic as the supplies coming into grocery stores was near to none. However, this provided more opportunities for local food producers to engage with local consumers and markets.

Role of Food Sourcing and Distribution in Food Access

Sourcing food was a prominent topic for grantee participants when they discussed their programs. Many discussed where they source their food for their programs. These sources included large company distributors that often require larger orders. Some participants pointed out, however, that they also order as much as they can from local producers including local Tribal cattle associations and farms. Finding products with longer shelf life was an additional concern for many of the grantee participants.

Local and Tribally Grown Food Sources

During the peak of the pandemic participants expressed how the food supply chain drastically changed in their communities. Through their programs and funding from the SNPFF Grant they were able to order more local foods that were familiar to their customers and clients. One participant stated,

> *"[w]e tried to support as much local food producers as possible…this also helped in keeping the produce more familiar with the community."*

Every grantee that participated in the interviews stated that they had ordered most of their foods directly from local sources including from Tribal producers. One participant stated,

> *"…the grant helped us to support local farms, including Native-owned…we started those relationships."*

Another participant provided further insight into how the grant opened up more opportunities of reaching out to local producers. The participant stated,

"*[t]hrough the grant we were able to work with over thirty different local producers including farmers, ranchers, fishermen…we could change up the diet and give families what they really want."*

A couple of participants expressed gratitude for the grant flexibility as they were able to buy almost all their foods from local and/or Tribal producers. Another participant stated that their organization purchased 600 pounds of produce from the local Tribal college farm. Many of the participants expressed that this grant provided them with the opportunity to positively contribute to the local food system.

Distribution of Food

Food distribution was a significant process that all the grantee participants discussed. Many shared that their organizations had to navigate the safest, most efficient strategies for distributing foods to their clients, customers, and families. Food box deliveries, door to door delivery, and drive-thru distributions were the most used modes of food distribution for grantees. Some participants stated that their organizations were directly involved in delivering to homes that were in quarantine. Locating those that were the most vulnerable during the pandemic was a high priority for grantees. Volunteers were also key to some of the organization's food distributions. One participant shared,

"…volunteers came back for every distribution, [they] knew how to run it."

Some grantee organizations have sustained their food distribution efforts even after their grant was complete to the present day. For several grantees, they have further refined their distribution model to be efficient and effective through the support of the SNPFF grant. One participant shared that their food distribution program has become their "most successful" program among all the services they provide. The continuance of effective food distribution

beyond the grant period for the grantees illustrates the significant need for food in rural and Tribal communities as well as the long-lasting impact the SNPFF grant had on enabling sustainable programming. Additionally, many of the participants shared that they do not have strict guidelines on who can receive food through their programs. Inclusivity and not turning anyone away even if they are not Native was shared by participants as an important facet of their support and mutual aid programs.

During the pandemic, grantee participants shared that it became apparent that they were serving many multigenerational families and households. Some family members and/or relatives did not have transportation so their relatives would get the food for them.

Lastly, participants shared how important the food distributions have been to increase their visibility and for developing relationships with their respective communities.

Role of Cultural and Traditional Foods in Food Access

Procurement of local, cultural, and traditional foods emerged as an important component of programming for all the grantee participants. Many shared that they were able to increase access to local and/or Indigenous traditional foods for those that they served as a result of the SNPFF grant. For example, two grantee participants shared that they were able to harvest bison with their communities as a result of the program. One participant shared:

> *"We went out and harvested the animals ourselves…we want to be traditional about how we procure food…we were able to get 600 pounds of buffalo."*

Procuring from local and culturally important traditional food sources were stated to positively impact the participants' communities by increasing community connectedness, intergenerational learning, and bringing foods familiar to clients including Elders. One participant shared a story of an encounter with an Elder:

"*There was an Elder that asked about the meat…I told him we only have buffalo today. He said only, oh I'm going to eat like my grandfather! He felt so good going home."*

The community connectedness with food was promoted by grantees through activities beyond distribution including cooking classes, harvesting, tanning, and food demonstrations. Grantee participants asserted the importance of indigenizing spaces where food is distributed including food pantries. Indigenous foods that grantees purchased and distributed included bison, blue corn meal, corn, chilies, atole, posole, and tepary beans, among many others.

Value-added products (i.e., food products that are raw or pre-processed commodities whose value has been increased)[57] were also purchased through the grantee programs including Indigenous teas and Hawaiian plant medicines. One participant shared that the organization did not have to travel very far to find local community members that they could buy food products from.

"*We could buy 100 mangos from an auntie down the road…and distribute that to community members."*

Community Outreach and Response to Grantee Projects

All the grantee interview participants shared that they had positive responses from their communities and clients from the food distribution activities and outreach that were being carried out. Grantees' expressed the importance of general supports being present as well as the provision of consistent and reliable service for their communities being available. Grantee participants shared how their programs had become a constant resource for the community during the pandemic. One participant stated that:

"[t]he response was positive from Tribal members, they love Tribally grown healthy produce, they love it as a way of reconnecting with the land."

Grantee participants shared that their clients shared a sense of gratitude for their services and the food being provided. One participant shared that the food distribution program provided more opportunities to build trust and relationships with their local communities.

> "*Native populations trust Native-based organizations, they know us and can come to us for resources."*

Grantee participants stated that community members would share appreciation of the foods they would receive and share their experiences of cooking and preparing new foods on social media. Distributing food also provided grantees with the opportunity to provide education on the local food system including why local foods were important for the community.

Emergency Response during Pandemic and Existing Food Access Gaps

Grantee participants expressed concern for what they felt was needed in their communities to promote food security including access to local and healthy foods. Many shared the need for more support of local producers and foods. It was emphasized that buying local foods can promote local economies and increase access to a larger variety of healthy and culturally important foods.

There was additional discussion from participants on the emergency response needed in their communities that they and other partners had to quickly address during the pandemic. Many stated, however, that there was still a significant need for food for families and community members beyond the pandemic time period.

Grantee participants also shared their ideas on what they thought were important solutions to improving local food access. One participant shared that there was a need to support local sustainable agriculture to move towards more self-reliance. Local food producers, for example, could supply food products to food assistance programs such as the Food Distribution

Program on Indian Reservations (FDPIR) and through farmers markets that could accept Supplemental Nutrition Assistance Program (formerly known as the food stamp program). Due to distance and transportation barriers, one participant brought up the potential for a mobile food pantry that could better reach those in need as another solution to improving food access to reach communities. Overall, participants shared that the pandemic had amplified food access and food insecurity challenges that were already existing in their communities. Improving emergency and food access infrastructure to meet the demand and need for food in Native communities continue to be a public health issue.

Grantee Capacity and Community Impact

Grantee participants shared stories about their organizations and the significant work and services they provide their communities daily. Grantee participants also shared that they often serve many roles beyond food distribution in their communities. Many participants expressed gratitude for the SNPFF grant as it has helped them increase their capacity and impact among the communities they serve.

Some grantees used their funding to support and improve infrastructure, train, and pay employees, and refine internal operational processes in their organizations. For example, one participant shared how their organization used funding to purchase a cooler that would be used for storing produce. The cooler was critical in storing produce that would be available to the community for a longer period of time and allowed them to expand their cold storage capacity. Many of the grantee participants also shared that the grant allowed them to not worry about the cost of ordering and purchasing higher quality produce. They shared how the grant has helped them evolve their food distribution into successful models and programs. Many of them have

been able to expand their procurement process (i.e., working with more vendors) while building more formalized networks with producers. One participated stated that,

> *"[t]his grant helped us make contact with other Indigenous food providers and farms and built that network of cultural food providers."*

Importantly, the impact that grantees have had on their communities' diet and food choices is evident.

> *"We had the luxury of picking and choosing what food is available [for those we serve, we could influence choices] by adding more fresh produce, and get locally grown foods into our communities' kitchens and dinner plates."*

Participants also expressed the need to continue their work including advocacy of local and Tribal foods. One participant shared,

> "*We were able to affect some kind of change regarding the Tribal food boxes [with the local food bank]…and make that connection for Tribal food like blue corn meal and tepary beans."*

Interviews with the SNPFF grantee participants provided valuable insights and stories on the impacts their programs have had on their communities.

Based on the findings from the interviews carried out with the SNPFF grantees, key recommendations below were developed for those (i.e., public health practitioners, researchers, funders) working with Native communities on food access programs and infrastructure. Stakeholders in Native communities themselves may also find these recommendations helpful.

Key Recommendations

- There is great interest and need for increased access to culturally important foods in Tribal settings.

- Engaging and linking local and Tribal producers to Native-led food pantries may help to alleviate barriers to fresh and healthy food for local consumers.
- Local food procurement may foster community connectedness, intergenerational learning, and supports community access to local and familiar foods for those who utilize food pantries and food assistance programs.
- Innovative distribution strategies such as pop-up food pantries are needed to address gaps and enhance food access in rural areas.
- Consistency, flexibility, and outreach are essential to building and maintaining trust and ongoing relationships with local Tribal communities.

CONCLUSION

This evaluation of the First Nations Development Institute's Strengthening Native Programs & Feeding Families grant program provided important data on the strengths, challenges, and barriers that Native-led entities and nonprofits are working to address within the food access space. The evaluation highlights the outstanding work that grantees have done through the SNPFF program. Historical and ongoing policies have changed the food landscape including precipitating food access issues and disturbing the important connections with traditional foods that many American Indian and Native Hawaiian Peoples have. However, this evaluation highlights the important work being done in American Indian and Native Hawaiian communities to address food access inequities.

Promoting healthy food access is tantamount to improving diet-related health outcomes in American Indian and Native Hawaiian communities. Reclaiming and revitalizing healthy connections and relationships with food is significant to improving food access and food systems in Tribal communities across the United States. Interviews with grantees demonstrated that they

continue to contribute to a movement towards more sustainable food sources and supply chains within their communities.

The grantee interviews supported the need for engaging with more local food sources and producers. Decreasing food miles and how far consumers need to travel are also critical to increasing access to healthy, fresh food for those living in rural areas and reservations. Strengthening the infrastructure and resources in these areas to develop more sustainable agriculture and food co-operatives and hubs is imperative to increasing the availability, diversity, and quality of food. Furthermore, increasing access to culturally significant foods, traditions, and knowledge is especially important for Tribal communities.

Interviews provided further insights into the processes and best practices of grantees to procure foods that were culturally significant to their communities. Inter-Tribal procurement emerged for grantees as they ordered foods from other Tribal producers and enhanced their local networks. Indigenizing food pantries and food banks to be more culturally aligned and responsive to Tribal communities was also discussed.

Historically, ensuring that everyone had food in a Native community was foundational to collective health and wellbeing. It is evident that grantees are doing tremendous work to ensure that they are reaching those most in need in their communities. Centering the Native voices and words of those that participated in this evaluation was important for developing a clearer picture of the great work being done in the food access space as a result of the SNPFF grant. As one grantee participant stated,

> *"…talking story with those that know their communities the best is critical to promoting change in the food system."*

Grantees in the SNPFF program accomplished a considerable amount during the grant cycle. The grantees interviewed were successful in aligning their goals and intent for their grants with the First Nations Development Institutes' overall goal of increasing food access. Many grantees expressed gratitude for the flexibility of the grant program that allowed them to address the unique food access and distribution challenges in their communities.

There are many food inequities that continue to affect American Indian and Native Hawaiian populations; however, there are many strengths that also exist in these communities. These strengths include the development of innovative approaches to systematic food access problems. The grantee participants that contributed to this evaluation are prime examples of community leaders and change makers. The grantees are challenging deficit-based systems and creating Native food sovereignty and security for their communities. The grantees represent communities that have been stewards of the land and water, including traditional foods and culture for millennia. The SNPFF grantee projects highlighted in this report are a small example of the larger continued need for programming and support that can enhance food access in Native communities. Furthermore, grantee projects illustrated the long-term impacts and changes that are needed to support overall food access in Native communities.

Nohwí Ndéé bí aan yu gohł dóh yu (For the Future of Our People): A Policy Approach to Promote Apache Language and Health

By Danya S. Carroll, MPH, PhD (c)

University of North Dakota

Executive Summary

Indigenous culture and Indigenous languages have been identified as key determinants of Indigenous health.[58,59] Due to colonization and ongoing colonial policy, many American Indian (AI) languages in the United States have been lost or are endangered. The White Mountain Apache Tribe (WMAT) in northeastern Arizona is one of several Apache Tribes in the Southwest. The WMAT continues to practice and retain their Indigenous culture with the Western Apache language still being spoken by many adults and Elders within WMAT. There is, however, growing concern locally within WMAT that the language is not being learned and spoken by many of the younger generation for numerous complex reasons. “First Things First”, a local and state early childhood organization, found that over half of the WMAT population speaks a language other than English at home, suggesting continued Apache language use to some extent.[60] Apache language use and proficiency at seemingly different ages likely stems from many factors including colonial policies. State and federal policies, for example, have sometimes negatively impacted AI languages. Some of the policies that have had negative impacts on AI languages include: the *Civilization Act, No Child Left Behind Act* and *Arizona Proposition 203.* There are also, however, some federal policies that have supported AI language revitalization including: the *Indian Education Act, Indian Self-Determination and Education Assistance Act, Native American Language Act, Esther Martinez Native American Languages Act,* and the *current Every Student Succeeds Act.*

Multiple studies support the benefits of language revitalization and immersion programs among AI children including an increased sense of identity, cognitive development, and higher academic outcomes.[61,62] Speaking an Indigenous language has also been found to protect individual and collective health and wellbeing amongst Indigenous Peoples.[63-65] Given the

important benefits of language revitalization for AI communities, there is increasing need for a policy approach that supports Apache language programs with a specific focus on those programs aiming to reach younger children and their families. This policy brief therefore focuses on a policy approach to support Apache language revitalization within the WMAT. Wise practices and model language programs are additionally discussed in this policy brief to help inform the development of a WMAT program that can effectively promote language revitalization. These model and exemplar programs may provide valuable tools and learning approaches that may support the WMAT to promote language immersion among younger generations. Relevant programs reviewed include: the Native Hawaiian Nāwahi School, the Tséhootsooí Diné Bi'ólta', the Cochiti Keres Language Revitalization Program, the Kahnawake Survival School, and the Cherokee Nation Language program.

Policy development with Tribal stakeholders around Apache language revitalization has the potential to create positive changes that are culturally responsive and based on the existing strengths in the community. Based on input from community stakeholders including Elders, language teachers, and educators, policy recommendations were developed based on their feedback and a review of the literature. Policy recommendations for Apache language revitalization include:

1) Key fluent speakers, Elders, and youth are supported to develop a stakeholder driven Apache Language Revitalization Coalition that supports the development of a strategic plan to address and enhance Apache language learning and speaking among children, youth, families, and communities;

2) The developed Apache Language Revitalization Coalition develops and presents an Apache Language Resolution to WMAT Tribal Council to increase support for and advance language

programming locally;

3) Leverage the *Esther Martinez Native American Languages Act* (EMNALA) to seek funding opportunities and support for Apache language revitalization and immersion programs;

4) Prioritize early childhood and education learning centers and spaces for Apache language immersion programming by developing a pilot program with children ages 0-5;

5) Invest in the training and certification of Apache language teachers through engagement with local stakeholders and local state colleges and universities.

6) Increase exposure to the Apache language at individual, family and community levels through language gatherings and varied technologies including radio and other media.

Key Concepts

- Rates of fluent American Indian language speakers including Western Apache language speakers are rapidly declining.
- Federal and state policies have had and continue to have significant impacts on American Indian language status and revitalization.
- Multiple research studies support the multi-faceted impact of American Indian language immersion programs including higher academic outcomes among immersion students as well as positive health outcomes.
- There are many examples of successful American Indian language revitalization programs including immersion programs in the United States to learn from.
- A proactive stakeholder driven approach to Apache language revitalization has tremendous potential to produce more fluent Western Apache speakers by building on existing community strengths and knowledge.

Description of the Issue

In 2022, the United Nations Decade of Indigenous Languages was declared.[66] This declaration promotes international efforts and opportunities to prioritize the preservation, revitalization, and promotion of Indigenous languages.[66] Indigenous cultures and Indigenous languages have also been identified as key determinants of Indigenous health.[58,59] The United Nations Economic & Social Council asserts that Indigenous knowledge is kept and transmitted through Indigenous language and ensures "that millenary health knowledge and Indigenous healing methodologies are preserved and enriched through time."[58] Language is therefore foundational to the culture and ways of knowing of Indigenous Peoples.

Many Indigenous languages are currently endangered with the number of fluent speakers continuing to rapidly diminish. One language is disappearing every two weeks worldwide.[67] With this pace of language loss, there is concern that up to 90% of languages in the world could disappear before the end of this century.[67] While the overarching data on Indigenous languages is alarming, it also provides evidence that robust language preservation and revitalization is needed for many AI communities including the White Mountain Apache Tribe (WMAT).

According to the latest Census data available,[68] 21.1% of American Indian and Alaska Native (AI/AN) households in the United States (US) spoke a language other than English. According to the American Community Survey[69], between 2009-2013 it was found that the Navajo language was the most spoken Indigenous language in the US by far (see *Figure 1* below). The Apache language was found to be the fourth most spoken Indigenous language in older US data with around 13,000 speakers as of 2013.[69] It is important to note that there are several different Apache Tribes (i.e., WMAT, San Carlos, Yavapai, Mescalero, Jicarilla, Kiowa,

Choctaw) that may have been included in this number; whereas this brief is focused on WMAT alone which does not have easily accessible language speaker data.

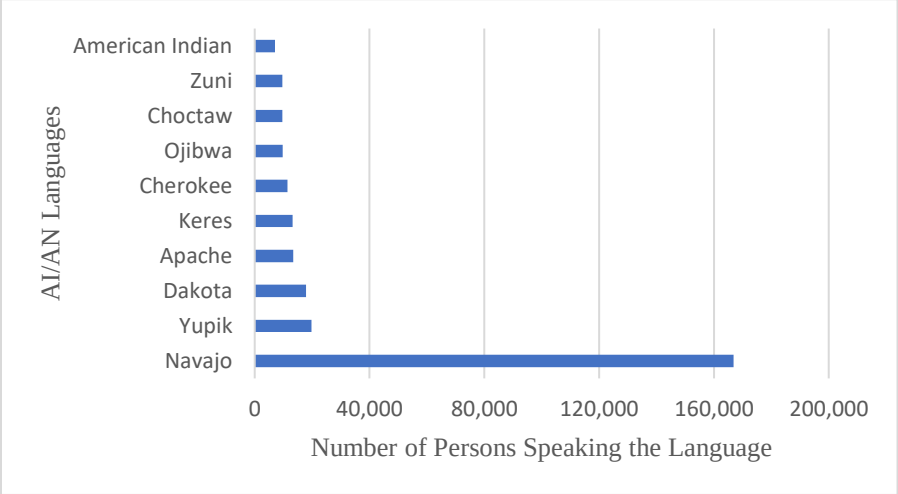

Figure 1. The Top 10 most spoken American Indian languages in the United States (American Community Survey, 2009-2013)

Community Background Information

The Fort Apache Indian Reservation in northeastern Arizona is home to the White Mountain Apache Tribe. According to the 2020 Census[70], there were over 14,000 residents on the reservation, with sixty percent of the total number of residents being under the age of thirty-five years old as of 2020. Significant health conditions impact the population including substance use, vehicle accidents, cardiovascular disease, and mental health conditions.[71] Leading causes of mortality among youth and adults include vehicle accidents, suicide, and alcoholic liver disease.[71] Much of the WMAT population utilizes the Indian Health Services (IHS) for health services.; however, there is a tremendous need for more primary care providers in the area as the population to provider ratio is 696:1.[71] The WMAT population continues many cultural practices, and the Apache language is still commonly used and heard. The land and water resources located on the reservation are significant with plentiful natural spaces for the WMAT

community to engage with for their family and community wellbeing.

The median household income within the WMAT as of 2020 was around $39,000 in the area.[70] Nearly three out of four children (ages 0-5) on the reservation receive Supplemental Nutritional Assistance Program (SNAP) benefits and almost all school children (>98%) are eligible for free or reduced-price lunch.[60] All of these socioeconomic factors influence the health and development of children in the area.

Current Apache Language Status

The most recent Census data show that 62.3% of households in the largest town within WMAT speak a language other than English at home indicating some level of Apache language use.[72] In a recent 2022 'Needs and Assets' report by "First Things First", a local early childhood organization, it was additionally mentioned that over half of the population speaks a language other than English at home.[60] *Figure 2* compares the other than English language use at local and state levels including other Arizona Tribes.[73] The WMAT data from *Figure 2* indicates more languages other than English are spoken at home when compared to other Arizona Tribes and the state.[73]

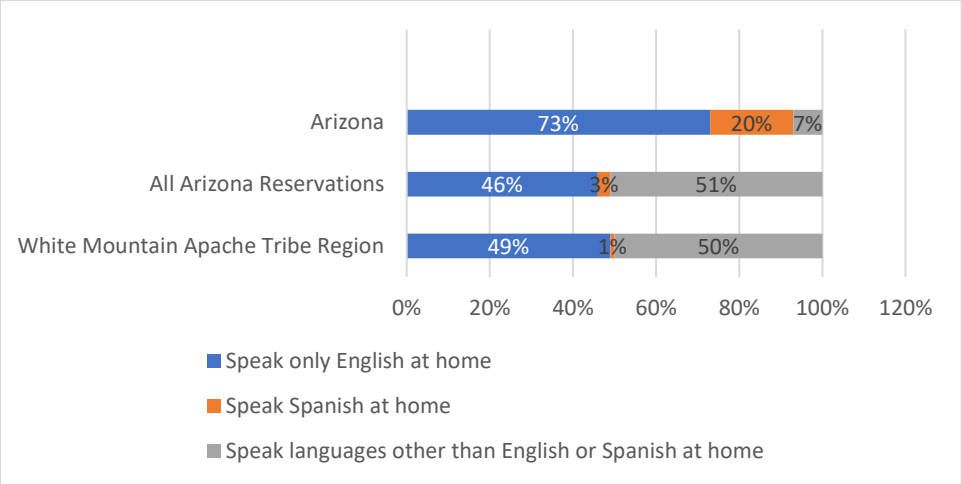

Figure 2. Language(s) spoken at home by persons ages 5 and older, 2019 ACS

Target Population for Apache Language Revitalization

For the purposes of this policy brief, the language policy focus will be centered on children aged 0 to 5 years old. The 0 to 5 age range is critical as the child development occurring at this stage has a long-lasting impact on children's ability to learn and succeed in school and in life.[60] Furthermore, this early age has been identified through informal input from local WMAT stakeholders as significant to language learning and retention in the community. Stakeholders such as Elders, educators, and community members have expressed the importance of beginning Apache language learning and speaking at much younger ages. Given this importance for early exposure and learning, policy aimed at promoting language learning and programming beginning at the time when children are "in the cradleboard" is tantamount (see *Figure 3*). Figure 3 shows a cradleboard figure alongside a grandmother figure that is talking to the child in the Apache language. The figure shows the significance of teaching children the language starting when they are very young; this mode of language transmission is ideal. Apache language learning and speaking is a lifelong journey (i.e., from infancy to Elderhood).

Mé tsaał bí yé bił ch'i got'ah

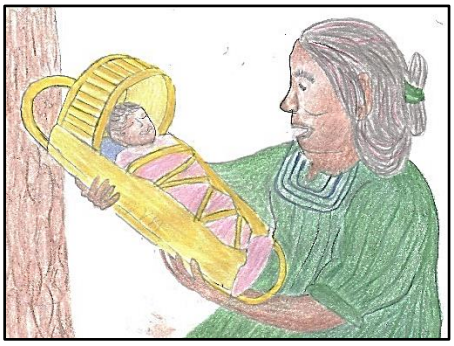

Figure 3: Mé tsaał bí yé bił ch'i got'ah (The baby is taught from the cradleboard.)

When considering the home environments of young children within the WMAT, 37% live with both parents while 33% live within their grandparents' household.[60] Furthermore,

around 500 grandparents in the region are responsible for one or more grandchildren in their homes.[60] Programs and resources that support parents and grandparents to more easily promote Apache language usage at home are significantly needed. Another setting that can potentially promote Apache language learning and speaking is within local early childhood care facilities and programs. Early childhood care serves many of the young WMAT population as around half of children (ages 0-5) live in households where all parents are in the workforce, indicating some form of childcare use.[60] Various childcare providers (e.g. daycares, preschool, Head Start program) can serve up to 500 children (ages 0-5).[60]

Data on current Apache language speaker rates for different age groups among the WMAT are unavailable. A 2020-21 WMAT 'Head Start Community Assessment', however, found that only 19% of parents and caregivers speak mainly Apache at home.[60] It is important to additionally note that the 'Head Start Community Assessment' received responses from only half as many respondents as in previous years due to the pandemic. Given this, Apache language speaker rates continues to be challenged by voids in available and up to date data. The local 'First Things First WMAT Regional Partnership Council' has noted that Apache language preservation is a top priority for them the next five years (began in 2020) through feedback from key informants.[60]

Current Resources and Apache Language Promotion

The Apache language is currently taught in local elementary schools, the local junior high schools, and in the two high schools on the reservation. Early childhood education programs also offer language instruction through vocabulary, singing, and dancing at two local preschools.[60] There have been adult Apache language classes that have been taught by local Elders at the local library and the WMAT local farm. These combined language program efforts are greatly needed;

however, stakeholders and key informants are concerned that the number of fluent speakers in local schools and communities continues to decline.[60]

Overview of Research

Language, Planetary Health, and Food Sovereignty

Indigenous languages and lands are inextricably linked for Indigenous Peoples worldwide. Indigenous languages are significant for translating Indigenous knowledge systems including traditional ecological knowledge (TEK). Redvers et al[74] affirms that there is an interconnectedness between biological diversity, planetary health, and Indigenous languages. Therefore, Indigenous Peoples' loss of land also impacts their ability to protect Mother Earth and increases the risk of losing their languages (i.e., the language comes from the land).[74] From a holistic perspective, separating individual, collective, and planetary health from Indigenous language revitalization is impossible.[74] Indigenous languages also represent a significant conduit between humans, the land, and sustainability.[75] This close relationship between language and land is also observed among the Apache. Basso[76] states:

> Named places have long been symbols of rich significance for the Apache people… [the Apache are] Inhabitants of their landscape, [and] the Western Apache are thus inhabited by it as well, and in the timeless depth of that abiding reciprocity, the people and their landscape are virtually as one.

Land stewardship and language revitalization cannot be separated from Indigenous health. The inseparability between land, language, and health must be prioritized by those seeking to engage with Indigenous communities. Indigenous languages are also woven into Indigenous food systems. Joseph and Turner[77] assert that it is no concurrence that food sovereignty and language revitalization are associated. Indigenous languages are vital to the narratives and ceremonies

surrounding Indigenous foods, with ancestral knowledge about culturally significant plants and foods being conveyed directly through Indigenous languages.[77]

Language and Health Outcomes

Language preservation is not only significant to Indigenous Peoples' identities and cultures, but also an important factor contributing to positive health outcomes. Whalen et al[64] conducted a realist review in which they reviewed 130 international studies that reported positive, neutral, or negative effects of language use and/or acquisition of health. They found that over 60% of studies reported positive effects on health including Indigenous language speakers reporting general improvement in health or the ability to achieve academic goals, decreased alcohol use, and higher mental health.[64] Language was also found to be a protective factor and associated with lower rates of arrest and victimization from crime.[64] Results from the study by Whalen et al[64] indicated that positive health effects can result from Indigenous language use regardless of proficiency level.

Indigenous language use has also been identified as a health protective factor while being associated with suicide reduction within some AI communities.[78] Language has also been found to be a protective factor for AI youth in preventing engagement in destructive behaviors while also promoting cultural values.[79] In Canadian First Nations communities, Indigenous language use has also been associated with lower suicide rates.[63] Additionally, Indigenous language use has been associated with lower rates of diabetes in Canadian First Nations communities. [80] Overall, current research supports the notion

Overall, current research supports the notion that promoting Indigenous language use not only promotes positive identity and supports culture in American Indian communities but also promotes positive health outcomes.

that promoting Indigenous language use not only promotes positive identity and supports culture in AI communities but also promotes positive health outcomes.

In the last decade, more research has been carried out that analyzes the potential health protective factors for Indigenous youth including at individual, family, and community levels. Henson et al[81] specifically found that interventions promoting protective factors at multiple levels may be beneficial for Indigenous youth and their communities.

Language, Cultural Identity, and Sovereignty

Maintaining cultural continuity is foundational to the linguistic health of AI communities.[62] Cultural continuity has been described as "the contemporary preservation of traditional culture."[80] Language is an important salient component of cultural continuity and is an integral part to ensuring the ability of Indigenous populations to maintain their cultures and identities.[61] It has been found that students with a strong sense of identity do better in school[82], and a loss of language can greatly impact a strong sense of cultural identity and wellbeing.[62] Language and identity are foundational to the social and cultural capital of a community.[61] Many cultural assets exist in AI communities including that of Indigenous languages. Therefore, it is imperative that research and policy experts recognize the importance of existing social and cultural capital in Tribal communities and the important role of fluent Indigenous language speakers' knowledge in the language revitalization process and cultural continuity.

Indigenous languages are also a significant component of Tribal educational sovereignty and the larger fight for cultural autonomy.[62] It is the right of Indigenous children to be able to achieve academic success through their Indigenous languages.[83] McCarty[62] states that the context and framing around language reclamation is,

> not merely or even a primarily linguistic one but is profoundly linked to issues of

educational equity, Indigenous self-determination, and the (re)construction of community well-being via culturally distinctive worldviews, identities, and life orientations.

Language reclamation ideally happens in homes through family-based language transmission[62]; however, that is not currently happening at the rates needed to produce more Indigenous language speakers than the rate of language speakers being lost. Therefore, Indigenous language schools are greatly needed to promote language revitalization as children spend much of their time at school.[62]

Language Programming and Wise Practices Models

There is increasing research that supports the effectiveness of prioritizing Indigenous languages and cultural integration in institutions such as schools.[61,62,84] In the 1970s following the *Indian Self-Determination and Education Assistance Act*, schools documented student achievement as it relates to bilingual education. The bilingual Rock Point school on the Navajo Nation found that students tested significantly higher in total reading than Navajo students attending monolingual English Bureau of Indian Affairs (BIA) schools.[61] The bilingual Rock Point school was effective in strengthening their overall curriculum through social capital (i.e., community input) which resulted in the integration of cultural values.[61] There are many other examples of outstanding Indigenous language immersion schools and programs in the United States and Canada that will be reviewed here.

In the late 1970s, Hawai'i officially recognized Native Hawaiian as a co-official state language.[62] The recognition of the Native Hawaiian language at a state level provided the support needed to prioritize Native Hawaiian language immersion programming. The Nāwahi Laboratory School is a full-immersion, early childhood through high school program that is affiliated with the University of Hawai'i. In 1999, the first students fully educated in the Native

Hawaiian language graduated from high school.[62] Nāwahi students have been found to surpass their non-immersion peers academically and have outperformed all ethnic groups in high school graduation, college attendance, and academic honors.[62] The Native Hawaiian language education case demonstrates that Indigenous language focused programming can produce exceptional academic results and also shows how proactive schools can be when language reclamation is stewarded by parents and the community.[62]

Although Navajo is the most commonly spoken AI language in the United States, there is still tremendous need to strengthen its daily use. In 1984, the Navajo Nation Council passed Title 10 (later amended to The Navajo Sovereignty in Education Act of 2005) which states that,

> [t]he Navajo language is an essential element of the life, culture, and identity of the Navajo people…Instruction in the Navajo language shall be made available for all grade levels in all schools serving the Navajo Nation.[85]

Since this educational act was passed, Navajo language and culture has become accessible to students in schools across the Navajo Nation. The Window Rock School District launched a voluntary Navajo language immersion program at Fort Defiance Elementary School in 1986.[62] Ironically, the school was in the very same place that the United States government used to assimilate Navajos including promoting English-only schooling. Similar to the Native Hawaiian case, after the first decade of operation, Navajo immersion students performed better on local tests including English assessments and mathematics.[62] Tséhootsooí Diné Bi'ólta' (TDB) remains one of the most long-lived and successful models of language immersion programming for AI students.[62]

A third example of successful language immersion programming is the Cochiti Keres Language Revitalization Program (CKLRP) in New Mexico. In the late 1990s, the Cochiti Tribal

Council responded to an educational survey that had indicated one-third of Cochiti Tribal members were fluent by moving forward and prioritizing Cochiti language revitalization and seeking funding.[86] The CKLRP began with the Cochiti Summer Youth Language Program in 1996.[86] There was overwhelming response from the community to the program resulting in a need for more fluent teachers. Similar to other master-apprentice approaches, fluent speakers were paired with semi-fluent speakers to address the teacher shortage.[86] The CKLRP has flourished since its establishment. The CKLRP also provides Cochiti employee language classes, adult classes, elementary and high school classes, and the Cochiti language nest.[86] The Cochiti language nest is an immersion program that focuses on entire immersion of children 3 to 6 years old.[87] Furthermore, The Keres Children's Learning Center (KCLC) is a Montessori school that provides immersive language instruction in reading, math, and cultural content.[87] The Montessori method at KCLC is built on the foundation of focusing on the "whole Pueblo child", a holistic approach that promotes development at various levels including linguistically.[87] The Cochiti example exemplifies how Indigenous languages can naturally foster a Tribal specific worldview and support the acquisition of knowledge as well as cultural and sociolinguistic practices.[86]

The final example comes from the Kahnawake Survival School (KSS) in Quebec, Canada. The KSS developed a curriculum that was intended to teach students not only how to simply translate words but also to teach Indigenous ways of thinking.[62] With university support, Indigenous language teacher preparation and training began in 1972. Like English-only state laws in the US, a French Language Charter was passed by the Partri Quebecois party making French the sole official language of Quebec and restricting language education in other languages.[62] The Kahnawake community, however, responded to the law by developing the KSS and a Culture Center. The program has seen impressive results including a language shift among

younger people.[62]

All of the described Indigenous language programs are strong examples of how institutions addressing language revitalization must foster school-community relationships for successful language approaches. These case examples demonstrate that language immersive schooling promotes overall growth and development of students. There is a plethora of research that strongly supports the abilities of Indigenous language immersion students to attain higher academic outcomes than their non-immersion peers.[61,62,84]

There is a plethora of research that strongly supports the abilities of Indigenous language immersion students to attain higher academic outcomes than their non-immersion peers.

Some Tribes have successfully integrated language development and immersion into their educational systems. However, more efforts to support language revitalization are needed, especially for smaller Tribes where the number of fluent Indigenous language speakers may be more limited. Seeking funding at the Tribal, state, and federal levels is critical to leveraging policy to promote language revitalization efforts for Tribal language programs. Effective resource allocation is important for developing and expanding Indigenous language immersion and educational opportunities for American Indian and Alaska Native children, families, and communities.

Challenges and Barriers for Indigenous Language Revitalization Programming

There are challenges and barriers that come with developing and sustaining Indigenous language revitalization programming. The Cherokee Nation is one of the largest American Indian Tribes (~600,000 citizens) yet it has a low percentage of Cherokee speakers with many current speakers advancing in age.[82] With a national teacher shortage, it may be even more

challenging to find teachers fluent in Indigenous languages.[82] AI teachers may also face obstacles in finding language specific textbooks, assessments, and other materials (if any). A local Apache fluent speaker and Elder that has taught language classes expressed this same sentiment in that he has had challenges finding resources and materials for Apache language classes.[88] Some states such as Washington are working to address the Indigenous teacher shortage through state-wide initiatives such as the Future Native Teachers Initiative that strives to promote Native students as future educators.[82]

With the advancement of technology, there are both pros and cons of technology usage in general including through cell phones, computers, and other modalities. The widespread use of technology is also observed in local Tribal communities, and especially within the younger generations. The amount of screen time per day that children and youth spend is estimated to be around 4-6 hours for children (ages 8-12) and up to 9 hours for teens.[89] Too much screen time among youth can lead to negative behaviors, and exposure to harmful content & misleading information.[89] More specifically for Indigenous youth, technology may be a distraction and/or barrier to connecting with the non-virtual culture around them.[82] On the other hand, technology may also promote creativity and connection with family and friends.[89]

Innovative Approaches to Language Programming

Indigenous languages may be supported by digital technologies through a myriad of ways.[90] Technology may be a powerful tool that can promote Indigenous language learning and resource sharing between speakers and learners from rural and urban settings.[90] It must be acknowledged, however, that there may be mixed views on using technology to promote Indigenous language learning. Regardless, studies have highlighted positive aspects of technology in Indigenous communities including support in preserving and revitalizing

Indigenous languages.[90] Digital technology may also appeal to youth, where they can interact with their Indigenous languages in different ways.

Technology has been used to support the ʻŌlelo Hawaiʻi language learning programs. The Hale Kuamoʻo Hawaiian Language Center developed the Leokī (an electronic bulletin board system meaning 'powerful voice'), which was used to teach the Native Hawaiian language in Hawaiian immersion schools and the broader community.[90] Digital technology has also increased the access to culturally relevant Hawaiian language materials including radio programming, audio books, movies, and podcasts.[90] It is additionally important to note that simply having access to technology itself as well as not having reliable internet connections may be barriers for some Indigenous communities to utilize language technology platforms.[90]

Another example of technology use is using artificial intelligence and immersive technology to revitalize the Kwak'wala language in northern Vancouver Island, British Columbia.[91] Researchers led by a Kwak'wala Ph.D. student are aiming to revitalize the language in a land-based setting through immersive technology.[91] Artificial intelligence is key to transcribing vast archives of the Kwak'wala language into usable resources at a faster speed than it would normally take.[91] There may be immense potential to leverage the Kwak'wala language project as a learning and implementation tool to promote Indigenous language revitalization in other communities once the technology is developed.[91] The TEK-nology (Traditional Ecological Knowledge and technology) project is another example of a technology-enabled language acquisition approach to support Anishinaabemowin language revitalization.[92] The pilot project was a bottom-up, community-based approach that included language planning which was conducted entirely online during the pandemic.[92] Throughout the project, participants emphasized the strengths between the language and the land, and the inclusion of TEK when

planning language revitalization programming in their communities.[92]

The Cherokee Nation (CN) has taken a proactive approach to promoting Cherokee language learning and fluent speakers at all levels. Most recently, they opened their Cherokee Nation Durbin Feeling Language Center in which the CN Tribal Council approved $16 million in funding for the facility.[93] The Center houses the CN Language Department, Cherokee Immersion Charter School, Language Master Program, and the Cherokee translation language technology, and community language departments.[93] The ultimate goal of the Cherokee language programs is to produce more Cherokee speakers. The Kituwah Preservation & Education Program (KPEP) includes their master apprentice program that pairs a learner (apprentice) with a Cherokee speaker (master).[94] Masters and apprentices aim to speak as much of the language as possible throughout their program.

The Cherokee Nation has various types of materials that promote the Cherokee language including their newspaper 'The Cherokee Phoenix' which is entirely in Cherokee.[95] Other materials include a Cherokee-English dictionary, online classes, computer fonts, and specialized keyboards.[95] The CN continues to explore other modes of promoting language learning including natural language processing (NLP) which can include building a community-based learning platform that community members can contribute to.[95] Machine translation also has the potential to automatically translate large amounts of text for languages such as Cherokee[95] which could potentially be applied to other languages such as Western Apache.

Pease-Pretty On Top[96] states that when Indigenous language loss is severe and knowledgeable fluent Elders are minimal, technology may be a primary resource for promoting learning and teaching. Tribes vary in the level of fluent speakers they may have and the variance within the respective age groups that are knowledgeable and still speaking their Native tongues.

The variance in fluent speakers is important when considering how to use technology to support language revitalization efforts. Regardless, there may be creative ways to leverage technological advances for producing materials to promote Indigenous language preservation within Tribal communities.

Current and Proposed Policies

Past and current policies at multiple levels of government have had both negative and positive impacts on language preservation and revitalization efforts throughout Tribal communities. These impacts are discussed below in further detail. When considering the current state of Indigenous languages in the United States, it is necessary to be cognizant of the many laws and policies that have played and continue to play pivotal roles in how language programs can be implemented. Below is a chronological overview of the most relevant policies and their effects on American Indian languages including the Western Apache language.

Historical Overview of Federal Policy

In 1819 with colonization running rampant, the US government passed the *Civilization Act* which provided funding for missionaries and others to introduce American Indians to "the habits and arts of civilization".[97] This Act also promoted a mandatory English language policy, and therefore initiated the boarding school system which operated from 1819 to 1969 in the United States.[98] By 1930, there were 136 on and off reservation boarding schools which served an estimated 32,316 Indigenous children.[97] The Federal Indian boarding school system included 408 Federal schools distributed across thirty-seven states including twenty-one Alaska schools and seven Hawaiian schools.[98] Between 1722 and 1869, around 374 Indian treaties were made with the British Crown and the US.[98] More than 150 Indian treaties between Tribes and the US included education-related provisions[98] such as the restriction of Tribes from establishing their

own educational programs.[61] For example, a major stipulation of the Navajo Treaty of 1868 was that Navajos would only be released back to their homelands from Fort Sumner if Navajo children entered the governmental educational system.[98] There were also harsh consequences for families that did not send their children to boarding schools such as their food rations being withheld.[98]

Boarding schools were designed based on "systematic militarized and identity-alteration methodologies" and were imposed on American Indian/Alaska Native (AI/AN) children by the US.[98] Boarding school conditions were often inhumane including a lack of sanitary facilities and hygiene practices for children.[98] In addition to the Western-based education being imposed on AI/AN children, they were also forced to do labor.[98] For example, boys at the Mescalero Boarding School in New Mexico "sawed over 70,000 feet of lumber and 40,0000 shingles and made upward of 120,000 brick."[98] Within boarding schools, AI/AN children were punished for speaking their Indigenous languages or engaging in cultural practices.[82,99] Boarding schools affected many if not all AI/AN families and communities across the US including Apache communities.

At the end of the Apache Wars in 1886, Chiracahua Apache leader Goyaałé (Geronimo) and his band surrendered to the US in Arizona and were sent to Florida.[98] Many Chiracahua Apache children from Geronimo's band were sent to Carlisle Indian School in Pennsylvania.[98] Some of these Apache children were returned back to their families, however, some were not, resulting in one-fourth of Carlisle gravesites being Apache children.[98] Back in Arizona, the Fort Apache post was turned into the Theodore Roosevelt Boarding School when the US Army left around 1920.[100] The boarding school became the center of a "psychological war of ethnic cleansing" through the removal of young Apaches from their families and lands.[100] The

connection between the assimilation policies of the US, the boarding school system, and the seizure of Indian lands and territories are intrinsically connected.[98] The *1887 Dawes Allotment Act* which significantly reduced Tribal lands to be held in trust by the US government[99] also supported the federal government's Indian education policy as proceeds from Indian land removal were used to absorb the costs of removing Indian children from their homes and taking them to federal boarding schools.[98]

Part of the foundation and aim of Westernized educational systems forced onto Tribal communities was to eradicate American Indian languages and destroy the connections children had with their Indigenous culture and knowledge systems. Historical policy was catastrophic for AI/AN Tribes to be able to promote their languages and cultures, particularly in schools. In a 1928 Merriam Report it concluded that the Federal Indian boarding school system has been the main disruption to Indian family and kinship structures.[98] Brave Heart et al[99] further emphasize that boarding schools have resulted in devastating consequences for AI families and communities including intergenerational trauma.

Elementary and Secondary Education Act of 1965

In the 1960s, there was a shift in the social and political climate of the US with a movement towards activism and civil liberties.[97] The *Elementary and Secondary Education Act* (ESEA) was passed in 1965 and promoted full educational opportunities for all students in the US.[101] ESEA offered more funding for low-income students including scholarships and provided federal grants to state educational agencies to improve elementary and secondary education.[101] Subsequent amendments to ESEA included Title VII, the Bilingual Education Act (1968), and Title IV of the Indian Education Act (1972).[97]

Indian Self-Determination Era

Indian Education Act of 1972

The 1970s had a significant impact on Indian education systems and sovereignty. In 1972, the *Indian Education Act* (IEA) was passed which provided opportunities for Indigenous languages to be taught in schools and increased Tribal control over schools for AI/AN students.[97] Federal funding was also allocated to AI/AN students at all grade levels, and parents were able to form advisory boards for federally operated boarding schools and public schools.[102] The *Indian Education Act* also established the Office of Indian Education and National Advisory Council on Indian Education (NACIE).[102]

Indian Self-Determination and Education Assistance Act of 1975

The *Indian Self-Determination and Education Assistance Act (ISDEA)* was passed in 1975 marking a new era of self-determination and local control of school systems for Tribes across the US. A critical component of this Act was that the right of AI/AN Peoples to be able to direct their own education was finally acknowledged.[97] Furthermore, bilingual education was now possible, and schools could foster environments that promoted local Indigenous languages. New methods of teaching and reviving Indigenous languages and promoting culturally responsive curriculums came into fruition through both the ISDEA and the IEA.[61] Both ISDEA and IEA were important precursors to "garnering the institutional support necessary for effective language revitalization."[61] Bilingual education flourished during this era and became a method to preserve AI/AN languages.[61] Bilingual education, however, was based on the notion that students were entering the school system already competent in their Indigenous languages.

Native American Languages Act (Title I of Public Law 101-477)

In the 1980s there was yet again a growing 'English-only' movement that catalyzed grassroots Indigenous educators, linguists, and leaders to develop a federal policy protecting

Indigenous languages.[103] The Native American Languages Issues Institute (NALI) and the American Indian Language Development Institute (AILDI) were key organizations that created a resolution that would eventually become the *Native American Languages Act* (NALA).[103] NALA represented a policy "that came directly from the people most involved and concerned with Native language education, retention, and revitalization."[103] Although it took two years for the resolution to be approved and signed into law by then President Bush, it was a monumental piece of legislation for Tribal sovereignty.

In 1990, President Bush signed the *Native American Languages Act* (Title I of Public Law 101-477) which supported Indian self-determination and language diversity in the United States.[103] NALA also increased funding opportunities and included appropriations for community language programs, training materials, and language documentation.[61] The Administration for Native Americans (ANA) administers federal funds for language revitalization programs within Tribal communities through their grant mechanisms.[61] Before NALA was signed, Indian schools still aimed to assimilate Indian children with their Tribes' culture and language being labeled and dismissed as inadequate.[104] Parents were rarely able to be involved in their child's education at this time due to government policy.[104] Cohen emphasizes that NALA is a prime example of how policy change and development for minority language communities can be possible.[61] In 1992, a substitute bill was signed into law "to help assist the survival and continuing vitality of Native American languages (US Congress, 1992, Section 2/Sec 803C [a2])", also known as the NALA of 1992.[90] NALA of 1992 also provided funding for various language revitalization programs, initiatives, and activities.[90] During the Clinton era, Indian education grew with funding support, Indian education research, and the rallying of American Indian organizations and Tribal governments around Indian education issues.[84]

No Child Left Behind Act of 2001

In 2001, the *No Child Left Behind Act* (NCLB) became a significant law that would affect students, including AI students, for years to come. NCLB paved the way for standards-based reforms (SBR) for schools across the US which required a common set of expectations for every student in the US including those in AI/AN communities.[105] NCLB would directly impact language revitalization progress in AI communities as it compromised Tribal language revitalization efforts in local schools and was a stark contrast to the progress made in the 1970s. Cohen and Allen[105] assert that NCLB was a standardization policy that did not promote Tribal sovereignty, liberty, and equity for AI/AN students and communities. Indian educational policy experts have articulated that NCLB was an overall barrier to promoting Indigenous language education programs with the intent of entirely eliminating Indigenous languages and cultures within schools.[84,97,105] The Office of Indian Education at the time attempted to pass deliberate policy that would ban the use of Indigenous languages and cultural instruction in Indian education programs.[84] Beaulieu[84] argues that the one-size-fits-all accountability approach of NCLB created a punitive system where students were blamed for school failure. Tribal governments and AI/AN parents'concerns were dismissed as it related to their children's education.

State Policy: Arizona Proposition 203

Despite having one of the largest populations of AI citizens, Arizona voters passed Proposition 203 in the year 2000 which severely limits bilingual education and requires a Structured English Immersion (SEI) program in schools.[106] Arizona state policy now places all designated English-language learners (ELL) in SEI classrooms.[106] In a study done by Combs et al[106], they found that in a metropolitan school where 70% of students were ELLs, the policy had

traumatic consequences for students in the school, exacerbated emotional problems, and resulted in frustrated teachers that were ill-prepared for newly mandated classrooms. Most students in K-3rd grade did not acquire enough English that would qualify them for dual-language classrooms.[106]

Proposition 203 could be argued to be an assimilationist policy as it states that "all children in Arizona schools shall be taught English as rapidly and effectively as possible."[107] Arizona Tribes strongly opposed Proposition 203 and Tribal leaders actively campaigned against the initiative.[107] In 2001, Arizona Attorney General Janet Napolitano then declared that Tribal and federally run reservation schools could still teach AI language and cultures in their schools.[107] Due to the symbolic nature of the Proposition, many AI parents became reluctant to enroll their children in bilingual programs. Proposition 203 did also become a catalyst for some Tribal schools to develop Indigenous language immersion classrooms such as the Window Rock School District on the Navajo Nation.[84] Yet many other school districts across the state eliminated or significantly reduced their bilingual programs entirely due to Proposition 203.[84]

Esther Martinez Native American Languages Act of 2006

In 2006, the 109th Congress approved the *Esther Martinez Native American Languages Preservation Act*.[108] The Act amended the *Native American Programs Act* of 1974 and authorized federal funding to support Tribal language grant programs including educational American Indian language nests (i.e., immersive language environments for children), language survival schools, and language restoration programs.[108] The law supports immersive language environments for AI children and communities.

Every Student Succeeds Act of 2015

President Obama signed the *Every Student Succeeds Act* (ESSA) in 2015, which was a

bipartisan measure that replaced the previous *No Child Left Behind Act* (NCLB). The bipartisan measure strives to promote equal opportunity for all students.[101] Due to NCLB's unworkable requirements for schools and educators, the Obama Administration recognized the need for a better law that would prepare all students for college and successful careers.[101] ESSA promotes equity by upholding critical protections for disadvantaged and high-need students in the United States.[101] ESSA also requires that students are taught high academic standards and that information is available for stakeholders through statewide assessments.[101] ESSA additionally expands investments to increase access to high-quality preschool.[101] Title VI of ESSA directly addresses AI/AN, and Native Hawaiian Education.[109] Part A of Title VI of ESSA specifies that:

> It is the policy of the United States to fulfill the Federal Government's unique and continuing trust relationship with and responsibility to the Indian people for the education of Indian children. The Federal Government will continue to work with local educational agencies, Indian tribes and organizations, postsecondary institutions, and other entities toward the goal of ensuring that programs that serve Indian children are of the highest quality and provide for not only the basic elementary and secondary educational needs, but also the unique educational and culturally related academic needs of these children.[109]

Furthermore, SEC. 6102 of Part A of Title VI of ESSA states that it is the

> purpose of the federal government, to support efforts of local educational agencies, Indian tribes and organizations, postsecondary institutions, and other entities…to ensure that Indian students gain knowledge and understanding of Native communities, languages, tribal histories, traditions, and cultures.[109]

ESSA requires that formula grants be streamlined to local educational agencies including those that can support American Indian language restoration programs which can be taught by

community leaders and knowledge holders.[109] ESSA is a significant policy that has and will continue to have considerable impacts on the revitalization of Indigenous languages in educational settings throughout Tribal communities in the United States.

White Mountain Apache Tribal (WMAT) Constitution

The WMAT Constitution was last amended in 1993. As it stands, the WMAT Constitution requires that any Tribal member running for a Tribal Council office must speak the Apache language.[110] There are no Tribal Codes, however, that promote language learning and speaking efforts including language revitalization at the individual, family, school, and community levels. The lack of Tribal Codes for promoting language learning and speaking efforts within WMAT illustrates a policy gap at the Tribal level for promoting language revitalization, maintenance, and preservation for an ever-evolving population that includes high amounts of young people.

Policy Recommendations

Based on local WMAT stakeholder input and the research, recommendations to strengthen Apache language revitalization efforts within the WMAT are proposed below.

Recommendation 1: Key fluent speakers, Elders, and youth are supported to develop a stakeholder driven Apache Language Revitalization Coalition that supports the development of a strategic plan to address and enhance Apache language learning and speaking among children, youth, families, and communities.

Research has shown that successful Indigenous language revitalization programs are "community-based, grassroots, and "bottom-up" quality."[103] Tribal Coalition development has been found to be effective in centering Indigenous ways of being and moving towards systems change.[111] For a movement towards effective Apache language revitalization to happen, it is

necessary to build a stakeholder driven approach that includes those that are speakers, Elders, teachers, parents, youth, Tribal educational professionals, and community leaders. Developing a WMAT stakeholder driven language revitalization coalition that can address concerns and develop a strategic plan towards language revitalization is essential. The Coalition could develop or support the development of a strategic plan that includes incremental goals (i.e., 1 year, 3 years, 5 years) towards robust Apache language revitalization. The strategic plan could include specific objectives and goals that the Coalition views may be feasible and manageable while working towards producing more Apache speakers—especially among younger generations. The strategic plan development process could also include the gathering of Tribally driven data collection for baseline levels of current language fluency in the WMAT community. Community roundtables with different age groups including youth, adults, and Elders could help to facilitate and inform the language revitalization plan and priorities.

Recommendation 2: The developed Apache Language Revitalization Coalition develops and presents an Apache Language Resolution to WMAT Tribal Council to increase support for and advance language programming locally.

Once a Tribally supported Apache Language Revitalization Coalition is established and has identified key goals and supported the development of a strategic plan, it will be important to increase awareness and garner support from Tribal policymakers. Currently, there are no WMAT Tribal Codes that explicitly support Apache language learning, speaking efforts, and programming. There is a tremendous need for Tribal policy that supports Apache language revitalization in various environments including in schools and the community. The Coalition could develop a resolution that could be presented to the WMAT Council that outlines the importance of the language as it relates to the vitality, longevity, and existence of the Tribe. The

Resolution could be supported by the evidence that language programs are promising in having widespread impacts (e.g., health outcomes, positive youth development) for a Tribal community beyond just speaking and learning the language.[64] Other strong examples of Tribal Nations who have language policy that could be looked to in the development of a WMAT resolution includes the Navajo Nation[85] (Navajo Nation Dine Language Act) and Cherokee Nation[112] (Cherokee Nation Language and Culture Preservation Act). A WMAT Language Code will provide more structured support to enable the vision and language objectives to be more easily met by the Coalition and the Tribe's citizens overall. A Tribal Resolution may also increase Tribal resources that can be allocated to language revitalization programming.

Recommendation 3: Leverage the Esther Martinez Native American Languages Act (EMNALA) to seek funding opportunities and support for Apache language revitalization and immersion programs.

The EMNALA has resulted in more funding being allocated to Indigenous language revitalization programming. Therefore, it is crucial for the WMAT to seek these EMNALA-related funding opportunities. There are funding opportunities at the federal level that supports Indigenous language revitalization and immersion programs including that of Tribal Early Childhood Programs. The Native American Language Grant is offered through the Office of Indian Education and supports schools that use AI/AN languages as the primary languages of instruction.[113]A top priority for this grant is developing and maintaining new Indigenous language programs including support for training teachers and staff.[113] The Administration for Native Americans also provides grants for Native American Language Preservation and Maintenance including immersion programs. Identifying a fiscal sponsor within the Tribe that can house and administer the grant is vital to WMAT program success. The Apache Language

Revitalization Coalition (i.e., Recommendation #1) could work with a department such as the Tribal Education Department to administer the grant(s) if funded. The Tribal Education Department has expressed interest in promoting Indigenous language revitalization in the community. There is also a need for Tribal leadership to lobby at the state and federal levels for additional resources that can further support Indigenous language revitalization efforts within WMAT.

Recommendation 4: Prioritize early childhood and education learning centers and spaces for Apache language immersion programming by developing a pilot program with children ages 0-5.

There are numerous examples of Tribal communities creating successful language immersion programs that have already been presented in this policy brief. All the presented examples, as well as the many others operating in the United States and abroad, could be valuable models to look to for wise practices within early childhood Indigenous language immersion programs. As with many other Tribes, the WMAT population demographic has shifted to be younger in age and continues to lose fluent speakers including Elders. Therefore, it is important that local Indigenous language revitalization efforts prioritize the learning and development of younger children and youth in programs. Children can grow to their fullest potential when they are in spaces where their language and culture is valued and integrated into their learning environments.[114] Early childhood programs that promote Apache language learning may have multiple benefits for children including a strong sense of identity and belonging, as well as positive health benefits.[64,105] There is also the potential for additional intergenerational learning by bringing in Elders frequently to teach and speak to children. Having the inclusion of parents and caregivers is also important for creating buy-in from these

stakeholders. As many local children live with their grandparents, early childhood language programming can also foster language continuity from school to home. By investing in children at much younger ages, there is greater potential to not only produce more Apache language speakers, but to also promote a generation of Apache children that are immersed in their culture—and therefore exposed to many strengths-based protective factors. Research by Henson et al[81] has recommended that interventions for AI/AN youth be rich in health protective factors that spread across the social ecological model (SEM) spectrum. These types of broad-spectrum interventions may foster strengths-based approaches and the promotion of protective factors such as language, culture, and identity among Indigenous youth. Potential early childhood and education settings that could host Apache language immersion programs include the local Head Starts and preschools within the WMAT.

Recommendation 5: Invest in the training and certification of Apache language teachers through engagement with local stakeholders and local state colleges/universities.

A strong Apache language revitalization program is not possible without committed and effective language teachers. Supporting current and aspiring Apache language teachers is tantamount to developing a culturally responsive Apache language revitalization program. Current Apache language teachers in local elementary, junior, and high schools are a valuable resource and represent the social capital of the communities they serve. Working with these teachers, Elders, and other speakers will be instrumental in creating a streamlined curriculum and training materials for future Apache language teachers. Support from local institutions such as the University of Arizona's American Indian Language Development Institute (AILDI) may also help in developing a solid Apache language teacher certification for the WMAT. The Coalition could reach out to AILDI for technical assistance in developing the certification and aspiring

teachers could also be supported to take AILDI courses. AILDI offers various courses including linguistics, conversational speech, natural language processing, and language revitalization support.[115] AILDI also supports participants through hands-on training and applying their knowledge in the classroom.[115] A train the trainer and/or master-apprentice program may be further developed within WMAT with more experienced Apache language teachers being the trainers to other novice teachers within the community to advance their technical level of language use.

Recommendation 6: Increase exposure to the Apache language at individual, family and community levels through language gatherings and varied technologies including radio and other media.

There is potential for increasing community-wide exposure to Apache languages through varied media. Developing and promoting a community language initiative that brings together Tribal citizens of all ages has the potential to increase collaboration through the exchange of ideas and skills, and to refine the use of different methods of technology that could be useful for the community.[90] Digital technology may be an efficient and effective strategy to create and share language materials with Tribal citizens both on and off reservation. There is also the potential to create digital materials for platforms and outputs such as radio programming, short stories, audio books, and online dictionaries. A digital based campaign may promote families and parents to talk Apache in their households. Additionally, bringing back the Apache language conference that occurred many years ago to WMAT, while hosting additional community events in similar conference formats could increase interest and momentum for Apache language revitalization in the community. Seeking out fluent language community champions and role models may promote more effective messaging and engagement with community members.

Conclusion

Previous generations of American Indians including White Mountain Apaches experienced tremendous hardships, challenges, and injustices resulting from colonial policies and a systematic effort to erase culture, language, and family and community structures. AI/AN children became the target for assimilation and integration into mainstream society. Federal policy has had mixed generational impacts on AI families and communities. Although the Federal government has begun reconciliation efforts to acknowledge the detrimental impact and role of the boarding school system in the US, much more action is needed including an increase in the support (i.e., funding) for language revitalization efforts. This policy brief has highlighted a small portion of the policy history that has affected AI and therefore WMAT experiences as it relates to culture, language, and education. Outstanding examples of successful language revitalization and immersion programs in various Indigenous communities were highlighted and may serve as examples and inspiration for a WMAT language revitalization and immersion program. More importantly, policies such as the *Native American Language Act* show that policy change is possible through a community-driven and coordinated effort. Policy recommendations have been provided for local WMAT stakeholders to use as a tool to address the current status of Apache language fluency. Many community strengths and knowledge exist in the WMAT that can support a robust effort to ensure younger generations of Apaches are learning and speaking their language. Ndee biyatí (Apache language) has existed since time immemorial and it is crucial that it will continue to be around for generations to come.

REFERENCES

1. Wilson S. What is indigenous research methodology? *Canadian Journal of Native Education*. 2001;25(2):175-179. https://ezproxy.library.und.edu/login?url=https://www.proquest.com/scholarly-journals/what-is-indigenous-research-methodology/docview/230307399/se-2
2. Bartlett C, Marshall M, Marshall A. Two-Eyed Seeing and other lessons learned within a co-learning journey of bringing together indigenous and mainstream knowledges and ways of knowing. *Journal of Environmental Studies and Sciences*. 2012;2(4):331-340. https://doi.org/10.1007/s13412-012-0086-8
3. Jernigan VBB, Huyser KR, Valdes J, Simonds VW. Food Insecurity among American Indians and Alaska Natives: A National Profile using the Current Population Survey-Food Security Supplement. *Journal of Hunger and Environmental Nutrition*. 2017;12(1):1-10. https://doi.org/10.1080/19320248.2016.1227750
4. Nikolaus CJ, Johnson S, Benally T, et al. Food Insecurity among American Indian and Alaska Native People: A Scoping Review to Inform Future Research and Policy Needs. *Advances in Nutrition*. 2022;13(5):1566-1583. https://doi.org/10.1093/advances/nmac008
5. Stotz SA, Hebert LE, Maddux A, Moore KR. Healthy Eating Determinants and Food Security Resource Opportunities: Urban-Dwelling American Indian and Alaska Native Older Adults Perspectives. *Journal of Nutrition Education and Behavior*. 2022;54(2):186-193. https://doi.org/10.1016/j.jneb.2021.09.015
6. Kaufman P, Dicken C, Williams R. *Measuring Access to Healthful, Affordable Food in American Indian and Alaska Native Tribal Areas*. 2014: EIB-131. Accessed May 10, 2023. https://www.ers.usda.gov/webdocs/publications/43905/49690_eib131_errata.pdf
7. Coté C. "Indigenizing" Food Sovereignty. Revitalizing Indigenous Food Practices and Ecological Knowledges in Canada and the United States. *Humanities*. 2016;5(3):57. https://doi.org/10.3390/h5030057
8. Blue Bird Jernigan V, D'Amico EJ, Duran B, Buchwald D. Multilevel and Community-Level Interventions with Native Americans: Challenges and Opportunities. *Prevention Science*. 2020; 21(Suppl 1):65-73. https://doi.org/10.1007/s11121-018-0916-3
9. Chodur GM, Shen Y, Kodish S, et al. Food Environments around American Indian Reservations: A Mixed Methods Study. *PLOS ONE*. 2016;11(8):e0161132. https://doi.org/10.1371/journal.pone.0161132
10. National Council on Urban Indian Health. Urban Indian Health Facts. Accessed May 22, 2022. https://ncuih.org/community-health/urban-indian-health-facts/
11. McLeroy KR, Bibeau D, Steckler A, Glanz K. An Ecological Perspective on Health Promotion Programs. *Health Education & Behavior*.1988;15(4):351-377. https://doi.org/10.1177/109019818801500401
12. Morshed A, Davis S, Keane P, Myers O, Mishra S. The Impact of the CHILE Intervention on the Food Served in Head Start Centers in Rural New Mexico. *Journal of School Health*. 2016; 86:414-423. https://doi.org/10.1111/josh.12393
13. Kapayou DG, Herrighty EM, Hill CG, et al. Reuniting the Three Sisters: collaborative science with Native growers to improve soil and community health. *Agriculture and Human Values*. 2023;40(1):65-82. https://doi.org/10.1007/s10460-022-10336-z

14. Ahmed S, Dupuis V, Tyron M, et al. Intended and Unintended Consequences of a Community-Based Fresh Fruit and Vegetable Dietary Intervention on the Flathead Reservation of the Confederated Salish and Kootenai Tribes. *Frontiers in Public Health*. 2020; 8:331-331. https://doi.org/10.3389/fpubh.2020.00331
15. Glanz K, Rimer BK,Viswanath K. *Health Behavior and Health Education: Theory, Research, and Practice.* 4 ed. Jossey-Bass; 2008.
16. Roach P, McMillan F. Reconciliation and Indigenous self-determination in health research: A call to action. *PLOS Global Public Health*. 2022;2(9):e0000999. https://doi.org/10.1371/journal.pgph.0000999
17. Lock MJ, McMillan F, Warne D, et al. ICIRAS: Research and reconciliation with indigenous peoples in rural health journals. *Australian Journal of Rural Health*. 2022;30(4):550-558. https://doi.org/10.1111/ajr.12905
18. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology*. 2005;8(1):19-32. https://doi.org/10.1080/1364557032000119616
19. Carroll D, Redvers N. 2023. Food Access Interventions in American Indian and Alaska Native communities: A Scoping Review. https://doi.org/10.17605/OSF.IO/Z7RYC
20. Tricco AC, Lillie E, Zarin W, O'Brien KK. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Annals of Internal Medicine*. 2018;169(7):467-473. https://doi.org/10.7326/m18-0850 %m 30178033
21. Software CSR. Covidence systematic review software.Veritas Health Innovation. www.covidence.org
22. Golden SD, Earp JAL. Social Ecological Approaches to Individuals and Their Contexts:Twenty Years of Health Education & Behavior Health Promotion Interventions. *Health Education & Behavior*. 2012;39(3):364-372. https://doi.org/10.1177/1090198111418634
23. Kyngäs HA, Kaakinen P. Deductive Content Analysis. *The Application of Content Analysis in Nursing Science Research*. Springer Cham; 2019. https://doi.org/10.1007/978-3-030-30199-6
24. Ornelas IJ, Deschenie D, Jim J, Bishop S, Lombard K, Beresford SA. Yéego Gardening! A Community Garden Intervention to Promote Health on the Navajo Nation. *Progress in Community Health Partnerships: Research, Education, and Action*. 2017;11(4):417-425. https://doi.org/10.1353/cpr.2017.0049
25. Ornelas I, Rudd K, Bishop S, et al. Engaging School and Family in Navajo Gardening for Health: Development of the Yéego Intervention to Promote Healthy Eating among Navajo Children. *Health Behavior and Policy Review*. 2021;8:212-222. https://doi.org/10.14485/HBPR.8.3.3
26. Haslam A, Love C, Taniguchi T, et al. Development and Implementation of a Hybrid Online and In-Person Food Sovereignty and Nutrition Education Curriculum for Native American Parents: The FRESH Study. *Health Education & Behavior*. 2023;50(3):430-440. https://doi.org/10.1177/10901981211067168
27. Taniguchi T, Haslam A, Sun W, Sisk M, Hayman J, Jernigan VBB. Impact of a Farm-to-School Nutrition and Gardening Intervention for Native American Families from the FRESH Study: A Randomized Wait-List Controlled Trial. *Nutrients*. 2022;14(13):2601. https://doi.org/10.3390/nu14132601

28. DeBruyn L, Fullerton L, Satterfield D, Frank M. Integrating Culture and History to Promote Health and Help Prevent Type 2 Diabetes in American Indian/Alaska Native Communities: Traditional Foods Have Become a Way to Talk About Health. *Preventing Chronic Disease*. 2020;17: E12. https://doi.org/10.5888/pcd17.190213
29. Davis SM, Clay T, Smyth M, et al. Pathways curriculum and family interventions to promote healthful eating and physical activity in American Indian schoolchildren. *Preventive Medicine*. 2003;37: S24-S34. https://doi.org/10.1016/j.ypmed.2003.08.011
30. Armstrong DL. A Community Diabetes Education and Gardening Project to Improve Diabetes Care in a Northwest American Indian Tribe. *The Diabetes Educator*. 2000;26(1):113-120. https://doi.org/10.1177/014572170002600112
31. Bersamin A, Izumi BT, Nu J, O'brien DM, Paschall M. Strengthening adolescents' connection to their traditional food system improves diet quality in remote Alaska Native communities: results from the Neqa Elicarvigmun Pilot Study. *Translational Behavioral Medicine*. 2019;9(5):952-961. https://doi.org/10.1093/tbm/ibz087
32. Brown B, Dybdal L, Noonan C, Pedersen MG, Parker M, Corcoran M. Group Gardening in a Native American Community: A Collaborative Approach. *Health Promotion Practice*. 2020;21(4):611-623. https://doi.org/10.1177/1524839919830930
33. Cueva K, Lovato V, Carroll D, et al. A Qualitative Evaluation of a Community Based, Culturally Relevant Intervention to Promote Healthy Food Access in American Indian Communities. *Journal of Community Health*. 2020;45(3):458-464. https://doi.org/10.1007/s10900-019-00760-4
34. Mattingly JA, Andresen PA. NAP SACC: Implementation of an Obesity Prevention Intervention in an American Indian Head Start Program. *Journal of Community Health Nursing*. 2016;33(3):145-153. https://doi.org/10.1080/07370016.2016.1191871
35. Mylant ML IM, Heil J. The Feasibility of the Strengthening Family and an Adapted American Indian Nutrition and Physical Activity Program: A Pilot Study. South Dakota Medicine; 2021;74(4):172-180. https://openprairie.sdstate.edu/con_pubs/99/
36. Budd Nugent N, Ridberg R, Fricke H, et al. Food sovereignty, health, and produce prescription programs: A case study in two rural tribal communities. *Journal of Agriculture, Food Systems, and Community Development*. 2022;11(3):177–196. https://doi.org/10.5304/jafscd.2022.113.014
37. Sowerwine J, Sarna-Wojcicki D, Mucioki M, Hillman L, Lake F, Friedman E. Enhancing Food Sovereignty: A Five-year Collaborative Tribal-University Research and Extension Project in California and Oregon. *Journal of Agriculture, Food Systems, and Community Development*. 2019;9(B):167-190. https://doi.org/10.5304/jafscd.2019.09B.013
38. Dong L, D'Amico EJ, Dickerson DL, et al. Food insecurity, sleep, and cardiometabolic risks in urban American Indian/Alaska Native youth. *Sleep Health*. 2023;9(1):4-10. https://doi.org/10.1016/j.sleh.2022.10.003
39. Yuan N, Bartgis J, Demers D. Promoting Ethical Research With American Indian and Alaska Native People Living in Urban Areas. *American Journal of Public Health*. 2014;104: e1-e7. https://doi.org/10.2105/AJPH.2014.302027
40. Gutierrez B, Kaloostian D, Redvers N. Elements of Successful Food Sovereignty Interventions within Indigenous Communities in the United States and Canada: A Systematic Review. *Current Developments in Nutrition*. 2023. https://doi.org/10.1016/j.cdnut.2023.101973

41. Stluka S, Moore L, Eicher-Miller HA, et al. Voices for food: methodologies for implementing a multi-state community-based intervention in rural, high poverty communities. *BMC Public Health*. 2018;18(1):1055. https://doi.org/10.1186/s12889-018-5957-9
42. Randall NL, Sanders CE, Lamm AJ, Berg AC. Qualitative Exploration of Cultural Influence on a Rural Health-Promotion Initiative. *Journal of Nutrition Education and Behavior*. 2023;55(4):255-265. https://doi.org/10.1016/j.jneb.2022.10.011
43. Harris D, Lott M, Lakins V, Bowden B, Kimmons J. Farm to Institution: Creating Access to Healthy Local and Regional Foods. *Advances in Nutrition*. 2012;3(3):343-349. https://doi.org/10.3945/an.111.001677
44. Indigenous Food and Agriculture Initiative. Model Tribal Food and Agriculture Code. 2023. Accessed May 5, 2023. https://indigenousfoodandag.com/resources/model-food-and-ag-code/
45. Fleischhacker S, Byrd RR, Ramachandran G, et al. Tools for healthy tribes: improving access to healthy foods in Indian country. *American Journal of Preventive Medicine*. 2012;43(3 Suppl 2): S123-S129. https://doi.org/10.1016/j.amepre.2012.05.015
46. Charns MP, Foster MK, Alligood EC, et al. Multilevel Interventions: Measurement and Measures. *Journal of the National Cancer Institute Monographs*. 2012(44):67-77. https://doi.org/10.1093/jncimonographs/lgs011
47. Trickett EJ. Multilevel Community-Based Culturally Situated Interventions and Community Impact: An Ecological Perspective. *American Journal of Community Psychology*. 2009;43(3-4):257-266. https://doi.org/10.1007/s10464-009-9227-y
48. Walters KL, Johnson-Jennings M, Stroud S, et al. Growing from Our Roots: Strategies for Developing Culturally Grounded Health Promotion Interventions in American Indian, Alaska Native, and Native Hawaiian Communities. *Prevention Science*. 2020;21(Suppl 1):54-64. https://doi.org/10.1007/s11121-018-0952-z
49. Blue Bird Jernigan V, Maudrie TL, Nikolaus CJ, et al. Food Sovereignty Indicators for Indigenous Community Capacity Building and Health. Mini Review. *Frontiers in Sustainable Food Systems*. 2021;5. https://doi.org/10.3389/fsufs.2021.704750
50. Walch A, Bersamin A, Loring P, Johnson R, Tholl M. A scoping review of traditional food security in Alaska. *International Journal of Circumpolar Health*. 2018;77(1):1419678. https://doi.org/10.1080/22423982.2017.1419678
51. Stanger-McLaughin T, Martini S, Henchy G, Jacobs K, Parker E, Segrest V. *Reimagining Hunger Responses in Times of Crisis: Insights from Case Examples and a Survey of Native Communities' Food Access During COVID-19*.1-71. Accessed on April 5, 2023. https://nativeamericanagriculturefund.org/wp-content/uploads/2018/04/Reimagining-Hunger-Responses-in-Times-of-Crisis.pdf
52. Long CR, Rowland B, McElfish PA, Ayers BL, Narcisse M-R. Food Security Status of Native Hawaiians and Pacific Islanders in the US: Analysis of a National Survey. *Journal of Nutrition Education and Behavior*. 2020;52(8):788-795. https://doi.org/10.1016/j.jneb.2020.01.009
53. LaFrance J, Nichols R, Kirkhart KE. Culture writes the script: On the centrality of context in indigenous evaluation. *New Directions for Evaluation*. 2012;(135):59-74. https://doi.org/10.1002/ev.20027

54. Martinez A, Running Wolf P, BigFoot DS, Randall C, Villegas M. The Process of Becoming: A Roadmap to Evaluation in Indian Country. *New Directions for Evaluation*. 2018;(159):33-45. https://doi.org/10.1002/ev.20333
55. Elo S, Kääriäinen M, Kanste O, Pölkki T, Utriainen K, Kyngäs H. Qualitative Content Analysis:A Focus on Trustworthiness. *SAGE Open*. 2014;4(1):2158244014522633. https://doi.org/10.1177/2158244014522633
56. Saunders B, Sim J, Kingstone T, et al. Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality & Quantity*. 2018;52(4):1893-1907. https://doi.org/10.1007/s11135-017-0574-8
57. Oregon State University. What is Value Added? Accessed May 29, 2023, https://foodsci.oregonstate.edu/value-added-food-product-development/what-value-added
58. United Nations Economic and Social Council. *Indigenous determinants of health in the 2030 Agenda for Sustainable Development*. 2023. Accessed on May 4, 2023. https://www.nihb.org/resources/IDH%20UNPFII%20Report%20-%202023.pdf
59. National Collaborating Centre for Indigenous Health. Understanding Indigenous Health Inequalities Through A Social Determinants Model. Accessed June 9, 2023, https://www.nccih.ca/Publications/Lists/Publications/Attachments/10373/Health_Inequalities_EN_Web_2022-04-26.pdf
60. First Things First. *2022 Need and Assets Report*. 2022. Accessed April 26, 2023. https://www.firstthingsfirst.org/wp-content/uploads/2022/10/2022-RNA-White-Mountain-Apache-Tribe.pdf
61. Cohen E, Allen A. Toward an Ideal Democracy:The Impact of Standardization Policies on the American Indian/Alaska Native Community and Language Revitalization Efforts. *Educational Policy*. 2013;27(5):743-769. https://doi.org/10.1177/0895904811429284
62. McCarty TL, Nicholas SE. Reclaiming Indigenous Languages:A Reconsideration of the Roles and Responsibilities of Schools. *Review of Research in Education*. 2014;38(1):106-136. https://doi.org/10.3102/0091732x13507894
63. Hallett D, Chandler M, Lalonde C. Aboriginal language knowledge and youth suicide. *Cognitive Development.* 2007; 22, 393-399. https://doi.org/10.1016/j.cogdev.2007.02.001
64. Whalen DH, Lewis ME, Gillson S, McBeath B, Alexander B, Nyhan K. Health effects of Indigenous language use and revitalization: a realist review. *International Journal for Equity in Health*. 2022;21(1):169. https://doi.org/10.1186/s12939-022-01782-6
65. McIvor O, Napoleon A, Dickie K. Language and Culture as Protective Factors for At-Risk Communities. *Journal of Aboriginal Health*. 2009; 5:6-25. https://doi.org/10.18357/ijih51200912327
66. United Nations. International Decade of Indigenous Languages 2022 – 2032. Accessed May 15, 2023, https://www.un.org/development/desa/indigenouspeoples/indigenous-languages.html
67. National Indian Council on Aging. 2019: International Year of Indigenous Languages. 2023. Accessed on May 15, 2023. https://www.nicoa.org/2019-international-year-of-indigenous-languages/
68. United States Census Bureau. ACS 5-Year Estimates American Indian and Alaska Native Data Profiles: Selected Social Characteristics in the United States. Accessed June 2, 2023.https://data.census.gov/table?d=ACS+5-

Year+Estimates+American+Indian+and+Alaska+Native+Data+Profiles&tid=ACSDP5YAIAN2021.DP02
69. United States Census Bureau. Table 1. Detailed Languages Spoken at Home and Ability to Speak English for the Population 5 Years and Over for United States: 2009-2013 American Community Survey. 2015. Accessed June 2, 2023. (http://factfinder.census.gov/bkmk/table/1.0/en/ACS/13_5YR/B16001/0100000US)
70. United States Census Bureau. 2017-2021 American Community Survey 5-Year Estimate: My Tribal Area. Accessed June 2, 2023. https://www.census.gov/tribal/?st=04&aianihh=1140
71. Arizona Department of Health. *White Mountain Apache Tribe Primary Care Area (PCA): 2021 Statistical Profile*. 2022. Accessed June 1, 2023. https://www.azdhs.gov/documents/prevention/health-systems-development/data-reports-maps/primary-care/navajo/16.pdf
72. United States Census Bureau. Language Spoken at Home: ACS 5-Year Estimates Data Profiles/Social Characteristics. Accessed June 9, 2023. https://www.census.gov/acs/www/about/why-we-ask-each-question/language/
73. United States Census Bureau. American Community Survey 5-Year Estimates, 2014-2019, Table B05009, B09001, B10002, B14003, B15002, B16001, B16002, B16005, B17001, B17002, APPENDIX 5: DATA SOURCES 213 B17006, B17022, B19126, B23008, B23025, B25002, B25106, B27001, B28005, B28008,B28010. https://data.census.gov/cedsci/
74. Redvers N, Menzel K, Ricker A, Lopez-Carmen VA, Blondin BS. Expanding the scope of planetary health education: the International Decade of Indigenous Languages. *The Lancet Planetary Health*. 2023;7(1):e4-e5. https://doi.org/10.1016/S2542-5196(22)00140-1
75. Ferguson J, Weaselboy M. Indigenous sustainable relations: considering land in language and language in land. *Current Opinion in Environmental Sustainability*. 2020; 43:1-7. https://doi.org/10.1016/j.cosust.2019.11.006
76. Basso KH. *Wisdom Sits in Places*. University of New Mexico Press; 1996:171.
77. Joseph L, Turner NJ. "The Old Foods Are the New Foods!": Erosion and Revitalization of Indigenous Food Systems in Northwestern North America. Systematic Review. *Frontiers in Sustainable Food Systems*. 2020;4. https://doi.org/10.3389/fsufs.2020.596237
78. May P, Serna P, Hurt L, DeBruyn L. Outcome Evaluation of a Public Health Approach to Suicide Prevention in an American Indian Tribal Nation. *American Journal of Public Health*. 2005; 95:1238-44. https://doi.org/10.2105/AJPH.2004.040410
79. Mmari KN, Blum RW, Teufel-Shone N. What Increases Risk and Protection for Delinquent Behaviors Among American Indian Youth?: Findings from Three Tribal Communities. *Youth & Society*. 2010;41(3):382-413. https://doi.org/10.1177/0044118X09333645
80. Oster RT, Grier A, Lightning R, Mayan MJ, Toth EL. Cultural continuity, traditional Indigenous language, and diabetes in Alberta First Nations: a mixed methods study. *International Journal for Equity in Health*. 2014;13(1):92. https://doi.org/10.1186/s12939-014-0092-4
81. Henson M, Sabo S, Trujillo A, Teufel-Shone N. Identifying Protective Factors to Promote Health in American Indian and Alaska Native Adolescents: A Literature

Review. *The Journal of Primary Prevention*. 2017;38. https://doi.org/10.1007/s10935-016-0455-2
82. Flannery ME. Educators Work to Preserve Native Languages. Accessed May 30, 2023. https://www.nea.org/advocating-for-change/new-from-nea/educators-work-preserve-native-languages
83. United Nations. *United Nations Declaration on the Rights of Indigenous Peoples*. 2007. Accessed June 20, 2023. https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf
84. Beaulieu D. Native American Education Research and Policy Development in an Era of No Child Left Behind: Native Language and Culture during the Administrations of Presidents Clinton and Bush. *Journal of American Indian Education*. 2008;47(1):10-45. http://www.jstor.org/stable/24398504.
85. Navajo Nation Dine Language Act, CJY – 52 – 01 Navajo Nation (2005). https://www.nnols.org/wp-content/uploads/2022/05/5A-12.pdf
86. Romero-Little E, Blum-Martinez R. In Retrospect, Revitalizing the Cochiti Language — A Proposal for Community Re-engagement in Collective Spirit and Mutual Respect. *Journal of American Indian Education*. 2012;51(3):95-103. https://www.jstor.org/stable/43608640
87. Kituwah Preservation & Education Program. Philosophy Statement. Accessed May 31, 2023. https://kclcmontessori.org/whole-pueblo-child/
88. Carroll O. Apache Language Resource Needs. Hondah, Arizona. 2023.
89. American Academy of Child & Adolescent Psychiatry. Screen Time and Children. Accessed May 30, 2023. https://www.aacap.org/AACAP/Families_and_Youth/Facts_for_Families/FFF-Guide/Children-And-Watching-TV-054.aspx
90. Galla C. Digital Realities of Indigenous Language Revitalization: A Look at Hawaiian Language Technology in the Modern World. *Language and Literacy*. 2018;20:100-120. https://doi.org/10.20360/langandlit29412
91. Marlow K. How AI and immersive technology are being used to revitalize Indigenous languages. *CBC/Radio Canada*. Accessed June 13, 2023. https://www.cbc.ca/news/canada/british-columbia/bc-indigenous-language-preservation-ai-1.6332285
92. Meighan PJ. "What is language for us?": Community-based Anishinaabemowin language planning using TEK-nology. *Language Policy*. 2023;22(2):223-253. https://doi.org/10.1007/s10993-023-09656-5
93. Bark L. CN celebrates opening of Durbin Feeling Language Center. Accessed May 31, 2023. https://www.cherokeephoenix.org/culture/language/cn-celebrates-opening-of-durbin-feeling-language-center/article_808df958-65d2-11ed-984d-73b44efd84e8.html
94. Kituwah Preservation & Education Program. Language revitalization and cultural education. Accessed May 31, 2023, https://ebcikpep.com/
95. Zhang S, Frey B, Bansal M. How can NLP help revitalize endangered languages? a case study and roadmap for the Cherokee language. *arXiv preprint arXiv:220411909*. 2022.
96. Pease-Pretty On Top J. *Native American Language Immersion: Innovative Native Education for Children & Families*. 2003. http://www.aihec.org/our-stories/docs/NativeLangugageImmersion.pdf

97. Warhol L. *Native American Language Policy in the United States*. 2011. *Heritage Briefs Collection*. Accessed May 29,2023. https://www.cal.org/heritage/pdfs/briefs/native-american-language-policy.pdf
98. Newland B. *Federal Indian Boarding School Initiative Investigative Report*. 2022. Accessed June 3, 2023. https://www.bia.gov/sites/default/files/dup/inline-files/bsi_investigative_report_may_2022_508.pdf
99. Brave Heart MY, DeBruyn LM. The American Indian holocaust: Healing historical unresolved grief. *American Indian and Alaska Native Mental Health Research*. 1998;8(2):56-78.
100. Welch JR, Riley R. Reclaiming Land and Spirit in the Western Apache Homeland. *American Indian Quarterly*. 2001;25(1):5-12. https://doi.org/10.1353/aiq.2001.0015
101. United States Department of Education. Every Student Succeeds Act (ESSA). 2023. https://www.ed.gov/essa?src=rn
102. National Institutes of Health. 1972: The Indian Education Act empowers parents; funds student programs. May 30, 2023. https://www.nlm.nih.gov/nativevoices/timeline/530.html
103. Warhol L. Creating official language policy from local practice: the example of the Native American Languages Act 1990/1992. *Language Policy*. 2012;11(3):235-252. https://doi.org/10.1007/s10993-012-9248-5
104. Rehyner J. American Indian Language Policy and School Success. *Journal of Educational Issues of Language Minority Students*. 1993;12(III):35-59.
105. Cohen E, Allen A. Toward an Ideal Democracy:The Impact of Standardization Policies on the American Indian/Alaska Native Community and Language Revitalization Efforts. *Educational Policy*. 2012;27(5):743-769. https://doi.org/10.1177/0895904811429284
106. Combs MC, Evans C, Fletcher T, Parra E, Jiménez A. Bilingualism for the Children: Implementing a Dual-Language Program in an English-Only State. *Educational Policy*. 2005;19(5):701-728. https://doi.org/10.1177/0895904805278063
107. Wright WE. The Political Spectacle of Arizona's Proposition 203. *Educational Policy*. 2005;19(5):662-700. https://doi.org/10.1177/0895904805278066
108. United States Congress. Summary: H.R.4766 — 109th Congress (2005-2006). Accessed May 30, 2023, https://www.congress.gov/bill/109th-congress/house-bill/4766
109. United States Department of Education. Title VI Indian, Native Hawaiian, and Alaska Native Education. Accessed May 28, 2023. https://oese.ed.gov/offices/office-of-formula-grants/school-support-and-accountability/essa-legislation-table-contents/title-vi-indian-native-hawaiian-and-alaska-native-education/#TITLE-VI-PART-A
110. White Mountain Apache Tribe. WMAT Constitution. Accessed May 31, 2023. http://www.wmat.us/Tribal_Constitution.html
111. Hilgendorf A, Anahkwet, Gauthier J, et al. Language, Culture, and Collectivism: Uniting Coalition Partners and Promoting Holistic Health in the Menominee Nation. *Health Education & Behavior*. 2019;46(1_suppl):81S-87S. https://doi.org/10.1177/1090198119859401
112. Cherokee Nation Language and Preservation Act, Cherokee Nation (2019). https://attorneygeneral.cherokee.org/media/5upcrg3j/word-searchable-full-code.pdf
113. United States Department of Education. Native American Language Grant. 2023. Accessed May 28, 2023. https://oese.ed.gov/offices/office-of-indian-education/native-american-language-program/

114. National Center for Rural Early Childhood Learning Initiatives. Proceedings of the Rural Early Childhood Forum on American Indian and Alaska Native Early Learning. Mississippi State University Early Childhood Institute; 2005:184. https://files.eric.ed.gov/fulltext/ED498834.pdf
115. American Indian Language Development Institute. Summer 2023 Courses. University of Arizona. Accessed June 1, 2023. https://aildi.arizona.edu/summer-session/courses-instructors