

“Our past is preserved and explained through the telling of stories and the passing of information from one generation to the next through what is called the oral tradition. Inuit recognize the importance of maintaining the oral tradition as a part of our culture and way of learning.”

Inuit Tapiriit Kanatami

Abstract

The ongoing nutrition transition in the Canadian Arctic is resulting in an epidemiologic transition towards the emergence of obesity and obesity-related chronic diseases. In response, the community of Pangnirtung in the Baffin Region of Nunavut, Canada, in partnership with the Centre for Indigenous Peoples' Nutrition and Environment, developed a community health promotion project in two phases. The first phase involved collecting health behaviour data from adults (2005) and youth (2006), and recording and transcribing elders' stories on the value of traditional food, including plants and remedies (2006 to 2007). In the second phase, the health behaviour survey data and storytelling were used to help develop an innovative pilot intervention in the community (2008 onwards). The intervention aimed to increase knowledge about traditional food and nutrition and improve nutritional health behaviours through the age-old Inuit tradition of storytelling. It targeted youth and young adults because of community members' concerns that youth were consuming more high-sugar drinks and "junk food" and less traditional food than older adults in the community.

The youth survey found that youth had consumed an average of 1.4 litres of sweet drinks a day, including two cans of pop, over the previous month. It also found that only five traditional food species had been consumed by more than 80 percent of the youth over the previous year, and that youth had a strong preference for caribou meat, with 98.7 percent of them consuming caribou in the past year, at an average of 87.2 g per day among consumers. No other traditional food was consumed to the same degree.

Elders' stories were incorporated into a DVD promoting knowledge and appreciation of a wide range of traditional foods. The stories were also incorporated with modern

nutritional health advice for youth radio drama programmes aimed at reducing the high consumption of pop in the community. The DVD and radio programmes have already been pilot tested for effectiveness, cultural relevance and acceptability, and a broader community-wide evaluation of the community radio's nutritional health promotion is currently taking place.

In addition, elders' storytelling revealed elders' perceptions of climate change and its impacts on local flora and fauna, and their resulting concerns for the sustainability of subsistence food species. With climate change now outpacing projections, and potentially threatening favoured subsistence species, elders' storytelling can be a means of building youth's awareness and appreciation of the full range of traditional food available and increasing the diversity of traditional foods consumed. Elders' storytelling also provides opportunities for understanding changes in a historical context and, when combined with modern-day nutrition issues and modern media, may be a means of reaching youth, building social cohesion and promoting Inuit resiliency in a time of rapid climate change and uncertain food security.

Introduction

A nutrition transition has been documented in the Canadian Arctic, with increased consumption of processed market foods that are high in sodium, saturated and trans-fat and added sugars, and with reduced consumption of traditional food (TF) leading to

consequences such as the emergence of obesity and chronic diseases (Johnson-Down and Egeland, 2010; Kuhnlein and Receveur, 1996; Kuhnlein *et al.*, 2004; Jørgensen *et al.*, 2002; Young and Bjerregaard, 2008). TF represents more than a superior source of nutrients and a contributor to dietary adequacy (Fediuk *et al.*, 2002; Egeland *et al.*, 2004; Kuhnlein *et al.*, 2002; 2006); it also symbolizes cultural identity, self-reliance, self-determination and connectedness to the land, and provides social cohesion through shared activities, all of which can contribute to health and well-being (King, Smith and Gracey, 2009; Egeland *et al.*, 2009). Thus, the promotion of Inuit TF is a central feature of the Inuit component of the Indigenous Peoples' Food Systems for Health Program of the Centre for Indigenous Peoples' Nutrition and Environment (CINE). The purpose of the case study described in this chapter was "to utilize traditional knowledge, Inuit storytelling, and country food to promote the health and well-being of community members" in Pangnirtung in the Baffin Region of Nunavut (Figure 9.1) (Egeland *et al.*, 2009).

Community steering committee members envisioned two phases of work. The first phase involved collecting health behaviour data on adults and youth (2005 to 2006) and recording and transcribing elders' stories on the value of TF, including plants and medicinal remedies (2006 to 2007). Community members wanted the elders' stories to be used to help promote TF as part of an effort to combat a dietary transition in their community, as adults and, to a greater extent, youth were thought to be eating more "junk" food and less TF. The health surveys were designed to quantify eating behaviours, to help guide interventions and provide a baseline for future evaluations of trends.

The second phase of the elders' storytelling project was developed to incorporate elders' stories into community health promotion activities targeting primarily youth and young adults. Storytelling is a strong Inuit tradition. The umbrella organization for Inuit in Canada, Inuit Tapiriit Kanatami ("Inuit we are united"), eloquently stated:

Our past is preserved and explained through the telling of stories and the passing of information

from one generation to the next through what is called the oral tradition. Inuit recognize the importance of maintaining the oral tradition as a part of our culture and way of learning.¹

Inuit *Qaujimaqatunqangit* (traditional knowledge) is highly valued, and its incorporation into nutritional health promotion ensures cultural relevancy and acceptability.

This chapter provides details regarding the youth health survey and its findings, and the elders' storytelling interventions, which have been pilot tested and are currently undergoing a broader community-wide evaluation. During the elders' storytelling project, elders' observations of climate change and its impacts on local flora and fauna were captured, along with their concerns about the sustainability of TF species and food security. The chapter therefore draws on information on climate change, and the available literature related to climate change's potential impacts on subsistence food species and food security.

Youth health survey, Pangnirtung

Objectives and methods

As part of community and CINE collaboration, a youth health survey was conducted to document current dietary consumption patterns and body mass index (BMI) among youth aged 11 to 17 years. This information was to guide health promotion activities targeting youth in the community (Yohannes, 2009).

Ethics approval was granted by the McGill Faculty of Medicine Institutional Review Board; a research licence was issued by Nunavummi Qaujisaqtulirijikkut (the Nunavut Research Institute); and the Hamlet of Pangnirtung approved the research work. The age range of 11 to 17 years was selected for the convenience of conducting the survey at the local secondary school.

The youth survey took place over ten weekdays in May 2006, with all the youth attending school invited to participate. Community research assistants were hired and trained and conducted the interviews with

¹ www.itk.ca/publications/5000yearheritage.pdf

CINE staff members. Food model kits were used in the 24-hour dietary recalls to facilitate recollection and the reporting of portion sizes.

Parents were contacted through the school, and their informed consent and assent were obtained. The total of 75 students participating in the survey represented nearly all those attending school in May and approximately 50 percent of all the youth in their age range in the community, according to information from school administrators.

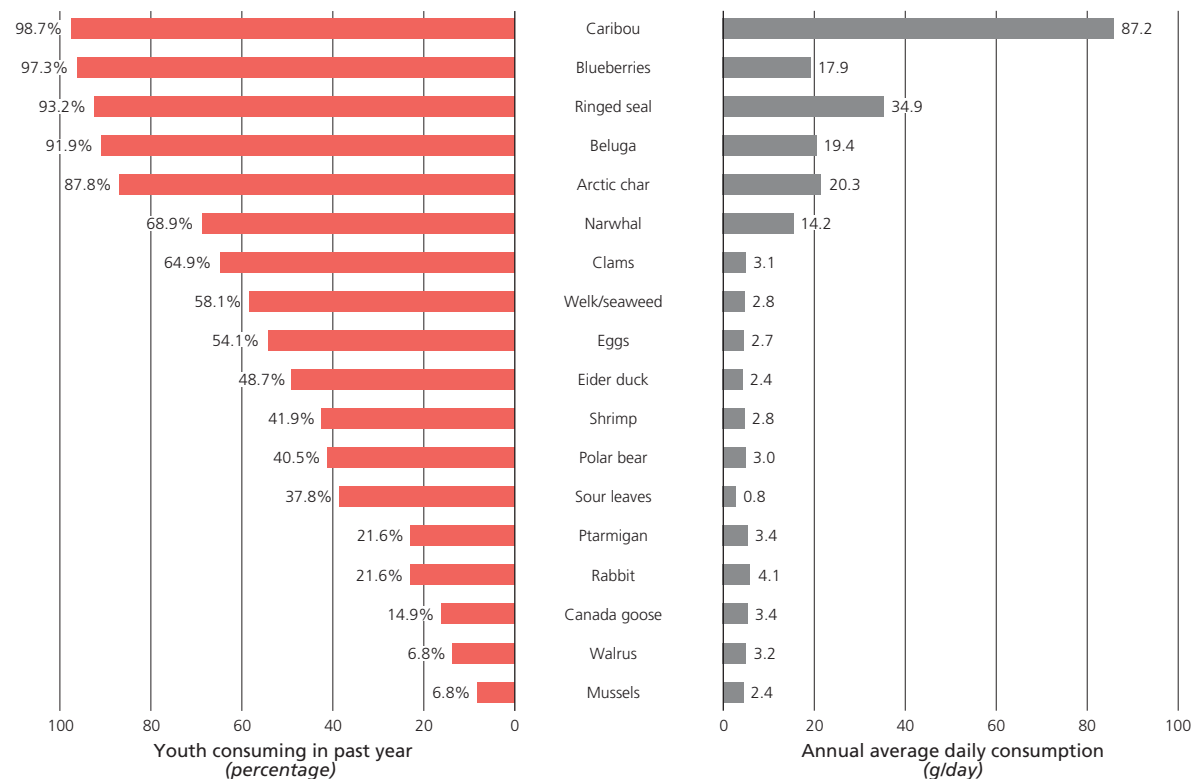
Each youth completed two 24-hour recalls on non-consecutive days, a semi-quantitative 38-item past-year traditional food frequency questionnaire (FFQ; Annex 9.1) and a five-item past-month market FFQ. The traditional FFQ was developed by CINE with guidance from hunters, trappers and other key informants. The market FFQ was designed to capture usual consumption of beverages and chips, based on community consultations indicating that chips would

be a good indicator of the consumption of high-energy, low-nutrient-dense snack foods.

Harvest calendars collected through key informant interviews in the community were used to define the in- and out-of-season periods associated with each TF species, to estimate average TF consumption over the entire past year. Because of extremely high reports of TF consumption in the traditional FFQ, extreme intakes were truncated to the 90th percentile (i.e., all those reporting amounts higher than the 90th percentile were reassigned the 90th percentile value).

A database was developed in Microsoft Excel 2003. The dietary recalls were entered into CANDAT software (Godin, London, Ontario, Canada, version 2007), and nutrient intakes were estimated using the Canadian Nutrient File (Health Canada, 2007) and a file developed at McGill University with 2 000 additional foods, derived from food labels and standardized recipes. SAS version 9.1 (SAS Institute, Cary, North Carolina, United

Figure 9.2 Top 18 traditional food items consumed in the past year, 2006



States of America) was used in all analyses. Macro- and micronutrient intakes were adjusted to reflect usual intakes, using procedures outlined by the Institute of Medicine (2000). When within-person variability was larger than between-person variability, calculation of usual intakes was not possible, and the unadjusted means of two days of dietary intake were reported.

Results

Traditional food frequency

Of the 75 youth participating in the survey, 39 were boys and 36 girls. Only five TF species had been consumed by 80 percent or more of the youth in the previous year: caribou (*Rangifer tarandus*), blueberries (*Vaccinium myrtillus*), ringed seal (*Phoca hispida*), beluga (*Delphinapterus leucas*) and Arctic char (*Salvelinus alpinus*) (Figure 9.2). Among these five items, caribou meat was by far the most popular and heavily consumed TF, with 98.7 percent of the youth consuming it in the previous year, at an annual average daily consumption of 87.2 g per consumer, based on the truncated traditional FFQ data. No other TF was consumed to the same degree among youth. Although Arctic char was consumed by 87.8 percent, the annual average daily consumption was only 20.3 g among consumers. Narwhal (*Monodon monoceros*) was the sixth most popular TF species, consumed by 68.9 percent of youth in the previous year, with a daily average consumption of 14.2 g over the year. Much

lower percentages of youth reported consuming the other TF items, each with an annual average daily consumption of less than 3.5 g among consumers.

Market food frequency

Based on the market FFQ, youth reported consuming a median intake of 28 g of chips per day, equivalent to more than half a 44-g bag (Table 9.1). They also reported a high degree of daily sweet drink consumption, with median consumptions for fruit juice of 344 ml, powdered sugar drinks of 344 ml, and carbonated beverages of 710 ml (equivalent to two cans of pop per day). In contrast to the high soft drink consumption, at 149 ml/day, the youth reported a median milk consumption that was less than a third of the intake recommended by Canada's Food Guide for First Nations, Inuit and Métis (Health Canada, 2007).

24-hour dietary recalls and micronutrient intakes

Forty-four youth (58.7 percent) reported consuming TF in one or both of the 24-hour recalls, with TF contributing 11.8 percent (± 10.8) of total energy intake among consumers. Adjusted mean micronutrient intakes were evaluated for those consuming and those not consuming TF in one or both of the past 24-hour dietary recalls (Table 9.2). Iron, vitamin A, phosphorous, zinc, selenium and vitamin D were not significantly higher in boys who consumed TF than in those who did not. Girls who consumed TF had

Table 9.1 Median (interquartile range) past-month daily consumption of selected market foods by Inuit youth aged 11 to 17 years, by consumers and non-consumers of TF, Pangnirtung, Nunavut, 2006^a

	Traditional food		
	TF consumed ^a (n = 43) ^b Median (25th–75th percentile)	TF not consumed (n = 31) Median (25th–75th percentile)	Total (n = 74) Median (25th–75th percentile)
Chips (g)	28.0 (12.3–80.0)	35.0 (8.00–56.0)	28.0 (12.0–56.0)
Fruit juice (ml)	344 (188–1 032)	258 (172–688)	344 (188–688)
Milk (ml)	158 (22.6–344)	125 (0–500)	149 (22.6–376)
Powdered drinks (ml)	344 (49.1–1 000)	376 (71.4–600)	344 (71.4–710)
Soft drinks (ml)	710 (355–1 376)	1065 (355–1 775)*	710 (355–1420)

* $p \leq 0.05$, Wilcoxon test.

^a Consumed at least one TF item in one or both 24-hour recalls versus consumed no TF in either.

^b One youth missing food frequency data; reported in one or both 24-hour recalls.

Source: Adapted from Yohannes, 2009.

significantly higher iron ($p \leq 0.01$) and vitamin A ($p \leq 0.01$) intakes. Both boys and girls who consumed TF had significantly higher protein intakes ($p \leq 0.05$) than those who did not. TF consumers reported greater protein intake as percentage of energy on the previous day than did non-consumers: among those consuming TF, 19.8 percent (± 7.3) and 17.3 percent (± 6.8) of energy was in the form of protein for boys and girls, respectively; whereas among those not consuming TF in the previous two days the equivalent figures were 14.0 percent (± 4.8) for boys and 11.7 percent (± 3.5) for girls (t-tests, $p \leq 0.05$). No differences in percentages of energy as carbohydrate or fat were observed between TF consumers and non-consumers (Table 9.3). However, boys who consumed TF derived significantly less energy from saturated fat ($p \leq 0.01$).

Based on the two 24-hour recalls, 92 percent of the youth reported consuming soft drinks on one or both

days, with an average consumption of 2.5 cans (875 ml) per day among consumers. Those who consumed TF in either of the two 24-hour recalls reported significantly lower median intakes of carbonated beverages over the previous month (710.0 ml/day) than those who did not consume TF (1 065.0 ml/day) (Wilcoxon $p \leq 0.05$) (Table 9.1).

Discussion

Although the proportion of youth consuming any TF in either or both of the 24-hour recalls approached 60 percent, and the vast majority of youth had consumed some kind of TF in the previous year, there was a general lack of diversity in the species being consumed regularly, as indicated by the traditional FFQ. By far the strongest preference was for caribou meat, as indicated by the high average daily consumption over the previous

Table 9.2 Usual mean micronutrient intakes among Inuit boys and girls aged 11 to 17 years, by consumers and non-consumers of TF, in two 24-hour dietary recalls on non-consecutive days, Pangnirtung, Nunavut, 2006^a

	Boys' mean intake		Girls' mean intake	
	TF consumed (n = 14) Mean (SD)	TF not consumed (n = 25) Mean (SD)	TF consumed (n = 17) Mean (SD)	TF not consumed (n = 19) Mean (SD)
Iron (mg)	18.7 (10.0)	14.3 (5.2)	19.8 (9.2)	13.1 (4.2)*
Vitamin C (mg)	107.7 (88.2)	128.6 (86.9)	160.6 (95.6)	156.5 (82.6)
Vitamin A (µg)	307.0 (101.0)	257.2 (59.9)	362.0 (144.2)	253.6 (79.9)*
Phosphorous (mg)	1 209.8 (419.2)	1 019.4 (317.3)	1 235.3 (222.7)	1 155.0 (279.8)
Selenium (µg)	65.9 (37.4)	63.0 (30.9)	75.0 (27.5)	66.6 (27.4)
Zn (mg)	10.5 (4.0)	8.8 (3.6)	9.3 (1.9)	8.1 (2.0)
B ⁶ (mg) ^b	1.4 (0.6)	1.3 (0.6)	1.5 (0.7)	1.6 (0.7)
Niacin (mg) ^b	35.6 (19.0)	29.1 (11.0)	38.4 (14.8)	4.0 (16.3)
Thiamin (mg)	1.6 (0.4)	1.6 (0.5)	1.5 (0.3)	1.4 (0.4)
Riboflavin (mg) ^b	1.5 (0.3)	1.6 (0.3)	1.7 (0.6)	2.1 (0.9)
Calcium (mg)	572.5 (126.0)	570.6 (116.2)	553.2 (179.2)	587.2 (167.8)
Vitamin D (µg) ^b	2.2 (1.3)	2.7 (1.7)	2.8 (1.5)	3.4 (2.0)
Folate (µg) ^c	372.1 (187.4)	295.2 (135.7)	322.0 (105.2)	364.3 (82.3)
Total fibre (g)	8.7 (2.1)	9.5 (4.2)	10.3 (4.2)	11.0 (4.7)

* $p \leq 0.01$, Student's t-test.

^a Adjusted usual mean (SD) intake unless otherwise noted.

^b Designates when within-person variability among girls was larger than between-person variability; therefore, the unadjusted mean of two days' intake is presented rather than the adjusted mean.

^c Designates when within-person variability among boys was larger than between-person variability; therefore, the unadjusted mean of two days' intake is presented rather than the adjusted mean.

Source: Adapted from Yohannes, 2009.

Table 9.3 Total energy and percentages of energy from macronutrients among Inuit girls and boys, by consumers and non-consumers of TF, in two 24-hour dietary recalls on non-consecutive days, Pangnirtung, Nunavut, 2006^a

	Boys (n = 36)		Girls (n = 39)	
	TF consumed ^c (n = 25) Mean (SD)	TF not consumed ^c (n = 14) Mean (SD)	TF consumed ^b (n = 19) Mean (SD)	TF not consumed ^b (n = 17) Mean (SD)
Total energy				
(kcal)	2 128 (745)	1 922 (762)	2 213 (515)	2 416 (817)
(kJ)	8 910 (3 119)	8 047 (3 190)	9 265 (2 156)	10 115 (3 420)
% protein	19.8 (7.3)	14.0 (4.8)*	17.3 (6.8)	11.7 (3.5)§
% carbohydrate	57.8 (8.4)	60.4 (9.9)	58.5 (11.3)	63.8 (8.5)
% fat ^c	22.8 (3.9)	26.6 (6.0)	24.5 (3.4)	25.5 (5.9)
% saturated fat	7.0 (1.5)	8.5 (1.9)§	7.8 (1.9)	7.8 (2.2)
% MUFA ^c	8.7 (1.9)	10.1 (2.3)	9.9 (1.7)	9.5 (2.9)
% PUFA ^{b, c}	4.4 (1.3)	4.1 (2.2)	4.7 (1.6)	4.8 (1.7)

* $p \leq 0.05$.

§ $p \leq 0.01$, Student's t-test.

MUFA = monounsaturated fatty acid.

PUFA = polyunsaturated fatty acid.

^a Adjusted usual mean (SD) intake unless otherwise noted.

^b For girls, designates when within-person variability was larger than between-person variability; therefore, the unadjusted mean of two days' intake is presented rather than the adjusted mean.

^c For boys, designates when within-person variability was larger than between-person variability; therefore, the unadjusted mean of two days' intake is presented rather than the adjusted mean.

Source: Adapted from Yohannes, 2009.

year. A preference for caribou was also identified among Inuit preschoolers in 16 Nunavut communities, where caribou consumption by 84.3 percent of the preschoolers far exceeded that of any other TF species in the previous month (Johnson-Down and Egeland, 2010). In CINE's previous dietary surveys across the Arctic too, caribou was a prominent component of the TF system (Kuhnlein and Receveur, 2007; Kuhnlein and Soueida, 1992). The results indicate that a broad variety of TFs could be promoted for consumption by youth.

The high consumption of sugar-sweetened beverages reported in the market FFQ was also observed in the 24-hour recalls. The consumption of soft drinks has been associated with obesity, and reduction in soft drink consumption has been related to weight loss (Chen *et al.*, 2009; Giammattei *et al.*, 2003; Sanigorski, Bell and Swinburn, 2007), although not all studies show consistent associations between soft drink consumption and weight gain or obesity (Gibson, 2008).

In the 24-hour recalls, the lower consumption of soft drinks among youth who consumed TF than

among those who did not was an unexpected finding. Although the mechanisms are still not clear, protein aids in satiety (Tome, 2004). Thus, greater protein intake among youth who habitually consume TF may, in part, explain the lower amount of pop consumed among TF consumers, as those consuming more protein may not have the same degree of cravings for sugar-sweetened beverages. Conversely, those who consume TF may be more traditional and may therefore avoid sugared beverage consumption. While additional research is needed on this topic, the current findings highlight the unexpected ways in which even small amounts of nutrient-dense TF may promote or be associated with a healthy diet in the contemporary context.

Food frequency data can both over- and underreport food items, and can vary by demographics such as age and sex (Marks, Hughes and van der Pols, 2006). Food items that are well liked by youth could be overreported because of the social desirability of reporting culturally valued foods. Therefore, the amounts recalled should be interpreted with caution. However, a strength



of the research was that extreme reports of TF were truncated to the 90th percentile, which would limit the extent of overreporting in the data. Another strength of the study was that two approaches were used to assess dietary behaviours, the two 24-hour recalls and the FFQ, which provided opportunities to evaluate consistencies in the data.

In summary, the survey highlighted the low diversity of TF in youth's diet and the high intake of sugared beverages and high-fat snacks. In an effort to enhance youth's knowledge of TF, a storytelling project with elders was initiated.

Storytelling and health promotion research

Background

During storytelling interviews, community members asked elders about their experiences and knowledge of TF, including hunting and harvesting activities, what parts of animals were eaten by men and women, medicinal remedies, how TF differs from market food, and the elders' observations related to climate change. In 2006 and 2007, a total of 21 elders were interviewed in Inuktitut (by author Jonah Kilabuk), and their interviews were transcribed into English (by Looee Okalik). Interviews ranged in length from 20 to 45 minutes. The storytellers' informed consent was obtained for the use of their stories in publications and media.

Two pilot interventions were developed based on the stories: elders' storytelling in a DVD format; and youth radio drama incorporating elders' stories, to build appreciation of TF and encourage healthy food choices among youth.

Elders' stories in DVD format

Objectives and methods

The objective of this pilot intervention was to determine whether the use of elders' stories in a DVD would be an effective means of transferring traditional knowledge from Pangnirtung elders to youth (Yohannes, 2009). The elders were identified by community steering

committee members and through the community Elder Centre. The DVD was developed by CINE (Sennait Yohannes) and steering committee members; Inuktitut with English subtitles was used throughout. Five of the 21 interviews with elders were used, as they provided in-depth information on three themes, each of which corresponded to a segment of the DVD: TFs and how they differ from market foods; what parts of the animal were eaten by men and women; and TFs that serve as medicinal remedies. The three themes were chosen by the steering committee and CINE, based on a review of the contents of the elders' stories.

Informed consent was obtained from the youth (students) participating in the pre- and post-DVD viewing assessments. CINE and the community health promotion steering committee developed a series of 28 true/false questions, based on the content of the five elders' interviews captured in the DVD (Yohannes, 2009). Four of the 28 questions had to be dropped from the assessments, as youth had problems understanding them. An increase in the number of correct responses to the true/false questions was considered an indication that viewing the draft DVD had improved knowledge of TF among the youth. The pilot intervention took place in May 2008.

During the first week, students completed the pre-DVD questionnaire and then viewed the first of two segments of the DVD; the second segment was played the following week, and the students then completed the post-viewing questionnaire. However, because of community events, not all students were present on both the pre- and post-DVD viewing occasions.

Results

The pilot intervention found that the mean knowledge score based on the true/false questionnaire among the 24 youth who took the post-viewing assessment was significantly higher than that among the 19 youth who took the pre-viewing assessment (post-viewing 15.8 ± 2.9 , versus pre-viewing 13.8 ± 3.0 ; independent sample t-test $p \leq 0.05$). Similar results were obtained in the analyses of ten youth who took both the pre- and post-viewing assessments (post-viewing 15.5 ± 2.5 , versus pre-viewing 13.3 ± 2.5 ; paired t-test, $p \leq$

Box 9.1

Example of radio drama narrative

Maryann: When it comes to our health it is important to understand *pilujjaiqsimaniq* [Inuktitut for “moderation”]. Some foods and drinks are okay for us to have, but only in small amounts. We have to be very careful how much we eat or drink. Pop is an example of one of these foods. Too much pop can lead to serious health problems, including weight gain, cavities in our teeth, problems sleeping and concentrating at school or work. Let’s listen to a story told by Josephee Keenainak who talks about country food and how it affects his life.

Taped elder: This excerpt from *Josephee’s story* explains the traditions of country food, the importance of country food in our culture, and eating certain foods in *pilujjaiqsimaniq*.

“Our parents kept us informed and taught us. With *mattaaq* (whale skin) being very delicious, we were told not to overindulge eating *mattaaq* if we hadn’t eaten any meat prior, we were also told not to eat whale meat if its oil had yellowed, for it had affected the meat. Those were always told and there weren’t many to be cautious of. I had heard that one individual had overindulged on *mattaaq* upon having craved it. That is why we were reminded to eat a good amount.

As I was raised decades back and was informed of food scarcity that we could confront during life. We tend to eat meat wisely, give thanks upon gain [i.e., obtaining it] and give some meat to other people for their fulfilment. God appreciates it when we share our foods with others. My fellow Inuit and younger generations need to care for food well and on healthy eating. When there is country food at hand, take pleasure in enjoying it. Our bodies will be healthier. It was said that Inuit had healthier blood at the time of traditional food consumption. Cut down on the intake of junk foods. I was always told that my blood was healthy for I have minimal consumption of food with sweets. Let us be conscious, although we do our best, to live healthily for our bodies to be healthy.”

Maryann: In his story, Josephee Keenainak talks about eating certain country foods only in *pilujjaiqsimaniq*, the example that he uses is *mattaaq*. We can use this knowledge that Josephee teaches us to be careful about how much pop we drink. A little bit once in a while is not bad, but if we drink too much pop too often, it can make us unhealthy, just like eating too much *mattaaq*. We hope that you have enjoyed our message today and thank you for listening.

0.01). Qualitative comments from the youth indicated a positive reaction to the elders’ stories and a desire to learn more about TF and traditional ways. The assessment indicated that elders’ storytelling in DVD format was a successful approach for transferring knowledge from elders to youth participating in the pilot assessment. The qualitative feedback was helpful in revising the DVD for future use and evaluation (Yohannes, 2009).

Youth radio drama

Objectives and methods

Radio drama with community youth was developed to help improve youth’s nutrition and health knowledge and to enable them to make healthier food choices. Messages were designed to increase appreciation of TF and to target selected high-risk behaviours, such as the high consumption of carbonated beverages, which includes an average of 1 litre of pop per day. The messages were designed to link the themes of the elders’ stories to modern nutritional advice involving healthy food choices, including market food choices.

The specific messages were developed by CINE (Cassandra Racicot), with advice from the community steering committee and youth. Before airing the dramas on local radio, youth were recruited for focus group tests of their messages, to ensure cultural relevance and acceptability. Box 9.1 gives an example of a radio drama that utilizes Inuit traditional knowledge through the elders’ stories, youth dialogue and modern nutritional advice, with actors recruited from among community youth.

The radio drama pilot tests used key informant interviews and focus group discussions to ensure relevancy and acceptability. The results of a broader community-wide evaluation of the radio programmes, which were aired several times a week, were not yet available at time of writing. However, the approach holds promise for capturing youth’s attention and engaging youth in building on the knowledge that already exists in the community, strengthening ties between youth and elders, and ensuring health promotion that is culturally relevant.

Box 9.2

Elder Pauloosie Veevee reports on climate change in the Arctic

From my knowledge, climate change is most evident, with the ice conditions being affected most from how it used to be.

When digging for a seal hole on ice or to set nets, the ice is much softer today, whereas yesteryear, it used to make sounds when chiselled, when the ice was harder. Then, the ice used to be slightly softer than the lake ice. Today the sea ice is much softer. Even with the extreme cold temperatures, the ice conditions don't freeze up as hard; the ice is softer, like shortening. This has been occurring more recently.

If I can recall the year, I would be able to name it. As I am not too cognizant of time, the year is recent as of when the sea ice has softened.

Post-2000, that is when the sea ice conditions have changed. That is when that has occurred. The scattered water that used to be visible atop some ice doesn't occur as much now. In the spring, there used to be scattered water atop some ice. Today, water will overflow over the whole ice with minimal scattered water atop some ice. A lot of water overflows over the sea ice now, allowing for the sea ice to soften more quickly.

Before, the scattered water atop ice would have dust build-up along the edges, now that doesn't even occur. The sea ice doesn't pack as thick any longer. It will thicken but not in consistency. Before, the snow ice used to pack thick and build on to the land, and it would remain for longer periods of time. It occurs today but for a shorter time. Changes are very pertinent to the sea ice.

It is June, nearing the end of the month. We would be hunting for the infant seals with blizzards occurring at times. That is how it was back then by June. Although, it wasn't always like that. By June, the ice would break on the southerly winds.

The ice never broke off on its own. Now, the ice breaks up without any wind or with minimal wind. There was a word used to describe the southerly wind breaking off the ice, *nunningiarasuttuq*.

In *Paurngaturlik* (camp), that is how it used to be.

At times, the wind would break the ice in chunks and leave a channel of water. It was a perfect time to catch seals. The sea ice would ground into the sea bed at times in the Panniqtuuq Fiord. We would anchor where there were most seals at high tide. By high tide, we would take the dog-team while the sea ice seemed connected. Today, these don't occur anymore. The sea ice melts so rapidly. We used to wait for ships in the fall for they were our source of food rations. We had to paddle to return to our camps from trading. October was a hasty month to travel in, for the ice was forming and we had to return to our camps. At one time, we got caught when the ice formed by October, so we had to winter in Usualuk. Boating was impossible. October and November were the times the ice formed for the winter.

Today, the ice doesn't form until the Christmas month.

The sea ice totally solidifies by January. At times, Christmas arrives when there is still water visible.

I haven't observed any drastic changes with the snow. The snow doesn't compact itself as hard as it used to. On the southerly wind, snow would form atop the snow, called *naannuat*, not snow-drifts. This type of snow shudders the skidoo as it's going. When the wind comes from the west, snow forms into *naannuat* now too. That is evidence of the snow formation change.

It is different today. I didn't construct many iglus [igloos] but I had to build them when hunting by dog-team, as that was the practice then. It is different today to build an iglu, for we have to search harder to find the appropriate snow. Even with the wind blowing, the snow doesn't harden as much today.

We hear of climate change occurring today. I have a slightly different perspective on climate change effects on the ice. My view is that the weather is not totally warmer, I think the change is evident through the seawater.

The seawater doesn't get as cold anymore, although it isn't changing by warmth as much either. It gets extremely cold outside still at times. I can see the changes, for we lived a nomadic lifestyle with dog-teams. Living harmoniously, we used whips with our dog-teams. In the spring, we would dunk our whips into the water as deep as we could and when we'd pull it out, the tip of the whip would freeze up. This is not common any longer.

I know very well that the wind has a more cyclone pattern today. I have noticed the changes in the wind over the past two years. In the summer of 2005, it was most evident. It was windy with barely any calm days. On the calming of wind, it would pick up from the other direction.

In our youthful days, when we were paddling, the days were calm for long. Now, we don't see that kind of days. The wind is more frequent now, with fewer calm days, and I don't know why that is so. The westerly wind always calms down by evening, always has and still does. At sunset, the day is calm but as the day picks up the wind begins to hustle.

We have a word that describes this, as we have dialectal differences, the word *saqijaal-latuinnaqtuq* is the term we use for when the wind begins to pick up from the other direction. This is very new, the wind picking up from the opposite direction, it never was like that before.

Times have changed. Then, the weather seemed to be cold for one whole season. The cold today is as sharp as a blade with an intensity to it. It'll be cold but it won't freeze up or thicken the ice as it used to. When we had cold seasons, the weather would freeze up the ice fully. Today, it is a sharp cold. The changes in the cold weather are evident.

I don't go hunting as frequently anymore, but I keep informed. We all have perspectives on things. As the ice break-up is earlier now, seals' fur is browner now. They don't have as much time to bask in the sun. When you are used to seeing the full colour of seal fur, it is regrettable to see them brown. The ice they bask on is no longer accessible, so they have less ice and sun time. Polar bears will have no more feed left with seals being speedier and



they get to places faster than the bears. I have thought of things I shouldn't even consider, that if ice doesn't form any more, our traditional food system might disappear. With the warming of the sea, we may have no more seals.

There have been some slight changes to the seal fur. It is evident if there is no more sea ice, as seals with the change of their fur colour go through a phase of dandruff release. Seals like to bask in the sun as they go through a colour change. But if there is no longer any ice left, seals will remain brown in the future.

I haven't noticed any effect on the meat. Seals rely on their food chain. I don't know when they have eaten something, their meat isn't as tender as it used to be. In the olden days, we used to leave the seal out for a day or two before butchering and then it would be so tender with the blood clotting a bit, they were so good. My thoughts are – as we have time to reflect on things when alone, although not all the time – in the year 2006, the seals were almost left with no time for birthing with the ice breakage being much earlier. Seals have birthing seasons in March and April. I feel if there is no natural habitat for the seals and their pups, the pups will die off. They will die off from cold. This almost occurred recently, barely stretching the luck. The seals always birth their pups within the snow.

There is so much noise pollution today, with boats roaming back and forth. Back in the day, there was barely any noise to disrupt the game. There is quite an abundance of seals still, they are just not as close to our homeland. As the game prefer solace, I feel they are keeping a distance.

There has been an abundance of change! Back then, the melted ice foliage remained. It would melt only when its time arrived. It would turn into water. Today, it melts even before its season arrives. I have no idea why that is. It is worrisome now for young hunters too, as ice breakage can appear to be melting ice when it is not.

I haven't noticed much change in the water currents. We have always sought for clams at low tide during full moon. I am not sure if this is a recent trend or whether it is common or not, the high tide will draw in high but the low tide doesn't extend as far as it used to. When full moon is drawing near, we always delightfully say, "umm, it'll be clam season soon". The water current is noticeable in that sense.

I haven't seen any changes in the waves. It's likely that others have observed them but I haven't seen any changes in the waves.

I noticed immense changes in the years 2005 and 2006, especially in 2006. It is as if the earth is in a rush. The plants have been turning green a lot earlier in the spring, even

before their season has arrived for growth: our rare, earth's rare plants in the Arctic. I haven't noticed any foreign plants to date. But I have noticed that the plants green a lot sooner than they used to. The weather contributes to the growth of the plants. They wouldn't grow by themselves, the weather controls their growth.

There is an old saying among Inuit that if the snow melts earlier, the birds will nest their eggs earlier as well. On the other side of Cumberland Sound there is an abundance of birds that nest eggs. It is said the egg laying birds go with the cycle of summer. If the snow takes longer to melt, the birds will take longer to lay eggs. There hasn't been much change with this. It is more than likely that with snow melting sooner, the birds will lay eggs a lot sooner.

What is evident is the *sirmiit* [Inuktitut for "blue glaciers with melting ice"] that have running water throughout the winter are no longer here. There used to be *sirmiit*, and they would remain cold. They remained frozen. They melt now. Atop the mountains are glaciers. The ones that are not at the mountain top and have running water we call *sirmiit*.

I am not totally certain of how climate change has affected Inuit. But how I observe it is that Inuit easily get colds. It wasn't like that back then. People are more susceptible to colds now. I think with the varying physical demands, that may be a contributor. Or it's likely that the community is more populated and that could be the main contributor to the colds. Or the weather may be the factor to all the colds.

Safety is the top of the list today with being aware of the environment. We have always had to be cautious, but caution is required more today. Before, we always had to check the ice conditions with our hunting tools to avoid danger or accidents. Today, tools will be a necessity to check the ice conditions. We utilize the harpoons/tools to check the ice conditions. That was a requirement in our days. It'll be more of a prerequisite today, as climate change has big effects on the ice.

The last thing I'd like to say is, I am not praising myself, I am a seasoned elder having lived the times of dog-teaming. I am not getting any wiser. I have listened to many storytellings. I don't contribute to the storytellings. Although in interviews, I can provide some historical knowledge, I don't like to give second-hand knowledge. There isn't enough evidence in second-hand stories, so I prefer listening to first-hand stories. That is all I have to say. *Qujannamiik*.

Elder Pauloosie Veevee in an interview with Jonah Kilabuk, Pangnirtung, 24 June 2006

one year alone, the Baffin community of Clyde River earned CAD 212 000 from polar bear hunting tourism and most of this money went directly to Inuit households, which in turn purchased equipment to facilitate their own subsistence hunting as well as future hunting tourism (Nuttall *et al.*, 2010). Thus, although polar bear meat

itself is not a major contributor to the diet (Kuhnlein and Soueida, 1992), threats to polar bear populations could have a profound effect on food security in the Arctic through reduced economic opportunities in tourism. Political lobbying regarding the banning of the sale of seal furs has already had devastating effects on the

economy of Inuit communities, as seal furs represented a significant source of revenue (Carino, 2009). Thus, changes in the availability of subsistence species and in market-place policies can have profound economic effects on isolated communities with limited options for income generation, and serve as examples of the diverse ways in which decreased availability or utilization of TF species can threaten food security.

The food chain involves exposure to a variety of threats, including viruses, bacteria, biotoxins and parasitic pathogens found in subsistence species and other foods (Parkinson and Evengård, 2009; Hotez, 2010; Van Dolah, 2000); lead-shot micro-fragments and dissolved lead in game meats, particularly fowl (AMAP, 2009; Dewailly *et al.*, 2000); and trace metals and persistent organic pollutants, which are atmospherically transported to the Arctic and biomagnified in the food chain (AMAP, 2009). Surveillance and targeted interventions that support the consumption of TF while reducing exposure to harmful agents include community education to eliminate the use of modern air-tight containers and bags when fermenting and storing TF, to prevent botulism (McLaughlin *et al.*, 2004); the banning of lead-shot in Quebec, which has resulted in blood lead levels decreasing by a half (Dewailly *et al.*, 2007a; 2001); and *Trichinella larvae* testing of meat prior to community consumption (Proulx *et al.*, 2002). Biomonitoring indicates that exposure to methylmercury and persistent organic pollutants has declined, owing in part to reductions in environmental levels and in consumption of TF (AMAP, 2009). However, because the effects of contaminant levels observed in the Arctic are subtle and there are many competing benefits to eating TF (Egeland and Middaugh, 1997; Dewailly *et al.*, 2002; 2007b; Jacobson *et al.*, 2008; Kuhnlein *et al.*, 2002; Mozaffarian and Rimm, 2006), a review of the full scope of evidence led the Arctic Monitoring and Assessment Program (AMAP) to advocate for continuing the consumption of TF in the Arctic (AMAP, 2009).

However, there is evidence that climate change and related impacts can alter food safety in the Arctic. Water warming increases biotoxins, such as *Saxitoxin*, and the presence of pathogenic bacteria, such as *Vibrio parahaemolyticus*, with respective

consequences for paralytic shellfish poisoning (Van Dolah, 2000) and increased risk of bacterial-related food-borne illness (McLaughlin *et al.*, 2005). Floods, erosion and the thawing of permafrost can threaten community sanitation infrastructure, resulting in release of pathogens into the environment, and floods and erosion can increase distant agricultural pesticide runoff into streams and tributaries that ultimately reach the Arctic. Higher global temperatures would increase the volatilization of contaminants, resulting in increased transport and deposition of contaminants in the Arctic (Kraemer, Berner and Furgal, 2005). Floods and erosion would increase inorganic mercury in water, and water warming would increase the methylation of inorganic mercury and, over time, the methylmercury burdens in subsistence species (Booth and Zeller, 2005). These are only a few of the numerous pathways by which climate change may alter food safety in the Arctic (Parkinson and Evengård, 2009; Kraemer, Berner and Furgal, 2005). Inuit also mention that the heavy use of tranquilizers for research in the Arctic has made polar bear meat inedible. Whereas Elder Jamesie Mike reported that frozen polar bear meat was edible 60 years ago, today polar bear meat must be cooked for hours to rid it of toxins (KP Studios, 2009).

In addition to potential impacts on food chain safety, climate change is having effects on Arctic ecosystems, with implications – which are not yet fully understood – for access to and availability of subsistence species that are important for food security. Climate change can alter access to TF species, as travel to hunting areas requires navigation, often of considerable distances over rough terrain, streams and inlets, and is safer when the landscape is frozen. Extreme weather conditions also represent threats to navigation and safety, with further implications for hunters' access to subsistence species (Krupnik and Jolly, 2002; Furgal, Martin and Gosselin, 2002; Ford, 2009; Ford and Berrang-Ford, 2009; Ford and Pearce, 2010; Guyot *et al.*, 2006).

Climate changes thus affect TF species; the Arctic has already witnessed the encroachment of non-Arctic flora and fauna species due to these changes (Simmonds and Isaac, 2007; Meier, Döscher and Halkka, 2004; Ferguson, Stirling and McLoughlin, 2005; Humphries,



Umbanhowar and McCann, 2004; Vors and Boyce, 2009). Although there have always been fluctuations in caribou populations over time, the decline now being noted (Vors and Boyce, 2009) is particularly important given the heavy reliance on caribou meat in the Canadian Arctic (Johnson-Down and Egeland, 2010; Kuhnlein and Receveur, 2007; Kuhnlein and Soueida, 1992). In addition to the scientific literature, communities too have reported that caribou have been scarce in the last couple of years, with migration routes considered to be off the usual ones taken. Given the historical fluctuations in herds and migration routes, elders state that the caribou will return to their usual migration path in time (L. Okalik, personal communication, 2010).

There is also evidence that early ice melt and reduced snow fall and snow thickness have an impact on populations of ringed seal (*Phoca hispida*) pups in Western Hudson Bay, and are projected to continue to diminish the species (Ferguson, Stirling and McLoughlin, 2005). The lack of ice floes in eastern Canada resulted in the deaths of thousands of harp seal (*Phoca groenlandica*) pups in 2007, and a similar occurrence was reported in 2002, when the Department of Fisheries and Oceans estimated that 75 percent of seal pups in the Gulf of Lawrence died coincident with a year of very little ice (MacKenzie, 2007). With the ongoing shrinkage of pack ice in the Arctic, seal populations will likely be greatly threatened. In addition, although current data are contradictory regarding whether polar bear (*Ursus maritimus*) populations are diminishing or in abundance (Aars, Lunn and Derocher, 2006; Dowsley and Wenzel, 2008), polar bears rely heavily on seals for their sustenance, raising concerns for the bears' propagation and survival if seal populations diminish. As caribou, seal and polar bear are a central component of the TF system and economy, the changes are potentially important for Inuit food security.

Inuit have historically been highly adaptive to changes in their environment, but current constraints in adaptive capacity have been noted (Nuttall *et al.*, 2010; Ford, Smit and Wandel, 2006; Ford and Pearce, 2010). Given that Canada's Action Plan for Food Security (Agriculture and Agri-Food Canada, 1998) listed TF acquisition as one of its ten priorities for dealing

with food insecurity, understanding the impact that continued climate change will have on food insecurity should be a high-priority research area.

As traditional knowledge and strong social support networks have been listed as factors contributing to the adaptive capacity of Inuit communities (Ford *et al.*, 2006), elders' storytelling may be one of many strategies communities can utilize to help meet the challenges of climate change. Elders' storytelling regarding their knowledge of a full range of TF species and parts of species may be a means of enhancing youth's skills in and knowledge and acceptance of hunting and harvesting a wide range of subsistence species and utilizing diverse parts of species, and could be one of the much-needed strategies for building resiliency in a time of uncertainty and rapid climate change.

Summary

With caribou, seal and polar bear populations potentially in peril (three mainstays of the Inuit TF system and economy), the promotion of a wide range of TF is needed to build adaptive capacity in Inuit communities.

This case study reports on the development of innovative nutritional health promotion in Pangnirtung, where health promotion messages built on existing knowledge and cultural conceptualizations of health and well-being through Inuit elders' traditional knowledge combined with two culturally relevant modes of communication: community radio and storytelling. The intervention engaged youth by involving them in developing and testing messages prior to airing on community radio, and in conducting the radio programmes. The health promotion programme was developed in partnership with the community, and its main elements came directly from community steering committee members. Health promotion programmes developed locally are likely to be more acceptable, relevant and, ultimately, successful than programmes that are imported from non-Inuit communities. At time of writing, the results of a post-survey community-wide evaluation of youth and young adults were not yet known, but the community-CINE model developed in Pangnirtung holds promise

for helping to prevent the negative consequences of acculturation and nutrition transition, and could be adapted to other indigenous communities in Canada and globally.

Storytelling also revealed elders' observations of climate change and its impacts on local flora and fauna, and the elders' resulting concerns for food security. As food security is a fundamental component of a population's health, this chapter has highlighted the economic and ecological context of food insecurity in Inuit communities. While the true impact of climate change is not yet known, enough information exists to suggest that research in this area should be a high priority. Given that climate changes are outpacing projections, health promotion programmes need to take into account the broader and likely future realities that will challenge Arctic communities.

Conclusion

The pace of change “has been breath-taking and has few parallels in the developed world” (Inuit Tapiriit Kanatami President, Mary Simon) (Simon, 2009).

Clearly, changes in the Arctic ecosystem are happening rapidly, and current changes follow the recent 60-year history of a rapid transition from nomadic life to the establishment of settlements throughout the Canadian Arctic, and the ensuing ratification of four land claim agreements (Egeland *et al.*, 2009). The ongoing changes will not stop with the loss of pack ice, as this will usher in an era of Arctic exploration and development projects to extract the vast wealth the Arctic holds (Yalowitz, Collins and Virginia, 2008). As the Northwest Passage becomes commonly used for international shipping and transportation, the effects on water and noise pollution will further disrupt game and their migratory paths.

It is worth pausing to consider the implications of the coming changes for Inuit communities, which are already strained by an unprecedented pace of change and unresolved social justice issues of poverty, household crowding, low educational attainment, lack of opportunities, and disparities in health and longevity (Egeland, Faraj and Osborne, 2010; Veugelers, Yip and

Mq, 2001; Wilkins *et al.*, 2008; Standing Committee on Aboriginal Affairs and Northern Development, 2007). For Indigenous Peoples, cultural and environmental dispossession are among the top determinants of poor health (Richmond and Ross, 2009).

Efforts are needed on multiple fronts to promote Inuit health and resiliency and Arctic ecosystem sustainability. In the context of rapid changes, storytelling with elders is important in building knowledge of the past that may otherwise be lost to future generations. Firm roots in this knowledge and in elders' wisdom will help strengthen social cohesion and support, which is recognized as having beneficial associations with health and well-being (Richmond, Ross and Egeland, 2007). Strengthening the ties between elders and youth may also have other benefits in a time of rapid changes that are affecting all dimensions of life in the Arctic. Elders' storytelling that links to modern-day nutritional issues and uses modern media may be a means of reaching youth, building social cohesion, and promoting Inuit resiliency and adaptive capacity in a time of great uncertainty and rapid changes.

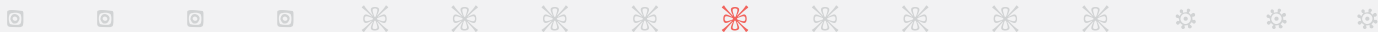
As Inuit Tapiriit Kanatami President Mary Simon stated, “with focused and responsible efforts we can harness the enormous potential of our youth and direct it towards a positive outcome” (Simon, 2009) ✨

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Annex 9.1 Traditional foods included in the traditional FFQ, Pangnirtung, Baffin Region, Nunavut, 2006

Marine mammals

- Beluga meat (fresh, cooked, frozen)
- Beluga meat (dried)
- Beluga *mattaaq* with blubber (raw or boiled)
- Beluga *mattaaq* without blubber
- Beluga blubber (raw or cooked)
- Beluga oil
- Narwhal blubber (raw or cooked)
- Narwhal *mattaaq* with blubber (raw or boiled)
- Narwhal *mattaaq* without blubber (raw or boiled)
- Ringed seal blubber (raw or boiled)
- Ringed seal liver (raw or cooked)
- Ringed seal meat (raw, cooked or frozen)
- Walrus blubber
- Walrus meat

Fish and seafood

- Arctic char
- Halibut
- Turbot
- Mussels
- Clams
- Shrimp

Land mammals

- Caribou meat (raw, frozen, baked, cooked and aged)
- Caribou meat (dried)
- Caribou liver
- Caribou heart (raw, boiled)
- Caribou kidney
- Caribou tongue (raw, cooked)
- Caribou stomach (walls and content)
- Polar bear meat (raw, boiled)
- Rabbit meat

Game birds

- Ptarmigan
- Canada goose
- Eider duck
- Eggs of goose or duck

Plants and berries

- Blueberries, crowberries, cranberries, other picked berries
- Sour leaves
- Welk (seaweed)
- Other flowers and plants (please specify)
- Other (specify)



Chapter 10

Culture-based nutrition and health promotion in a **Karen** community

☞ SOLOT SIRISAI¹ ☞ SINEE CHOTIBORIBOON² ☞ PRAIWAN TANTIVATANASATHIEN²

☞ SUAIJEEMONG SANGKHAWIMOL³ ☞ SUTTLAK SMITASIRI²

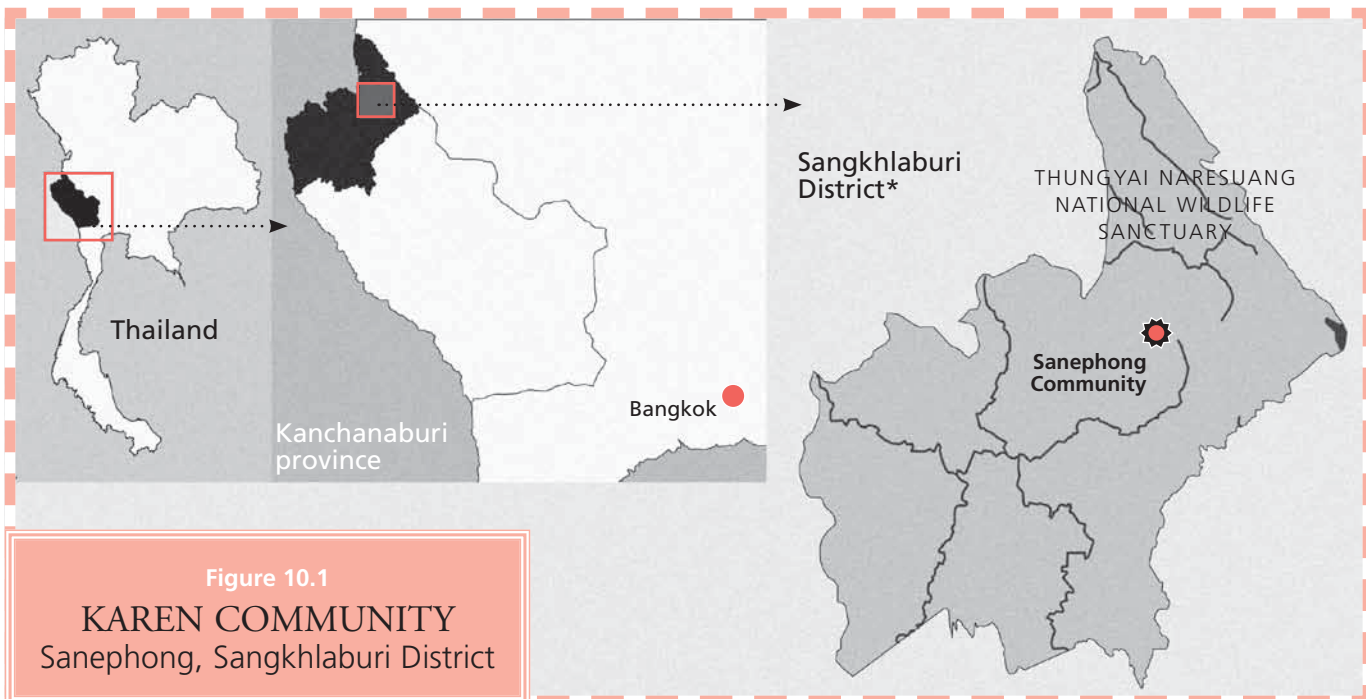


Figure 10.1
KAREN COMMUNITY
 Sanephong, Sangkhlaburi District

Data from ESRI Global GIS, 2006.
 Walter Hitschfield
 Geographic Information Centre,
 McGill University Library.
 *Digitized from
www.kanchanaburi-info.com

1
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Key words > Indigenous Peoples,
 traditional foods, Karen, nutrition education,
 health promotion, culture-based approach, food and
 nutrition security

Photographic section >> XIX



“We work together.
We understand each other;
much more than when
we started the work.”

Suaijeemong Sangkhawimol (Sanephong traditional healer)

Abstract

Sanephong, a Karen community in western Thailand with a population of fewer than 700 people, benefits from the availability of traditional food, but the food system is deteriorating rapidly. The overall objective of this participatory intervention research project (2005 to 2009) was to use expert and community knowledge of the traditional food system and culture as a platform for working to improve community nutrition and health by: i) increasing awareness of the importance of traditional food sources; ii) promoting traditional food production and consumption, with a focus on children; and iii) increasing local people's capacities, knowledge and skills for enhancing children's food and nutrition security.

A culture-based approach, metaphors and social dialogue were used to develop four main intervention inputs: i) increased production of traditional foods at home; ii) motivation and nutrition education for schoolchildren; iii) women's empowerment; and iv) capacity strengthening for community leaders, local researchers and youth.

Results indicate that the project raised awareness and increased the availability and consumption of traditional foods, especially among children. Nutrition outcomes were also noted. Local change agents' capacity for continuing nutrition and food development was enhanced. The community became more aware of the importance of traditional foods and nutrition. High availability and use of local food sources confirmed that traditional food consumption remains common in the community. Researchers learned that successful nutrition and health promotion in an indigenous community relies heavily on processes that build trust and commitment among multiple stakeholders.

The design of intervention activities should be based on the community's own priorities, with academic researchers playing the roles of project catalysts and coordinators. Outside assistance is likely to be crucial in enabling indigenous communities such as Sanephong to achieve their development goals within a rapidly changing environment.

Introduction

Work in Sanephong, a Karen village in Thailand, began with a study to explore the indigenous food system, nutrition and health status.

Results indicated that this community's food system has both strengths and weaknesses. Although plenty of nutritious traditional foods are available, the local food system is deteriorating rapidly, owing to economic and external market influences. The presence of 14 underweight and 20 stunted children indicated both acute and chronic undernutrition, and most children were consuming low levels of iron. Perhaps even more important, the traditional culture was being challenged. These results suggested that culturally appropriate nutrition and health improvement was essential for the community, especially for children (Chotiboriboon *et al.*, 2009).

On 21 January 2005, the Mahidol University Committee on Human Rights Related to Human Experiment granted ethical approval to the intervention research project. The signing of an official contract between external academic researchers and local community researchers and leaders is not common in Thai indigenous cultures. Through an anthropological approach, good communications and an open relationship helped to establish good rapport with the community (Langness and Frank, 1981). When good relations and trust had been built, community leaders and representatives were invited to join a seminar at Mahidol University, Salaya in August 2005. At this

meeting, participants were encouraged to use the strengths and opportunities within their community to improve nutrition and health using traditional food sources. They affirmed their commitment to enhancing community food and nutrition security, especially for children, in collaboration with the academic research team and under the following principles:

- Indigenous culture, local food systems, traditional knowledge and the community's goals and expected outcomes are the foundation for the work.
- Intervention activities are jointly designed, are contingent on the results of the project's first phase (Chotiboriboon *et al.*, 2009) and build on the community's strengths and opportunities for development.
- Researchers' knowledge and other relevant information are used to raise the community's awareness and support its decisions.
- Social dialogue is used to encourage communication and learning among the community, other stakeholders and research partners.
- Use of vernacular language and metaphor is encouraged to provide a communication tool for wider sharing of the project's vision and successes.
- Relationships among the community, other stakeholders and research partners are on equal terms and based on Karen tradition.

Context

Sanephong village is located in a mountainous tropical forest region of the Thungyai Naresuan National Wildlife Sanctuary, 336 km northwest of Bangkok, adjacent to the Myanmar border, at latitude 14° 55 and 15° 45 and longitude 98° 25 and 99° 05 east (Figure 10.1). Lying about 12 km east of Sangkhlaburi Municipality, the community can be reached only by four-wheel drive vehicle or on foot. A 2005 census reports the population of Sanephong at 661, with 345 males and 316 females (52 and 48 percent, respectively) living in 126 households. There is no electricity, but

solar panels provide an energy source for charging batteries that are used in homes for television¹ and lighting. Social organization is based on kinship. Vernacular Karen is the everyday language, but Thai is also spoken, particularly among community leaders and the younger generation. Although community people identify themselves as Buddhists, indigenous animistic rituals are common. People worship Mother Earth and the Rice Mother to empower their indigenous spirits and ensure food security and well-being.

Most people live in extended families, with three or four generations in the same household. Men clear the forest for traditional farming, while women take charge of the household (e.g., gathering and cooking food and caring for children). Complementary activities are also carried out, and during periods of peak labour demand, whole families work on their farms, weeding and harvesting. At the household level, children are taught life skills by older siblings, and are brought to the Buddhist temple to observe community rituals from an early age. Food sharing, labour exchange and food *dhana*² for monks contribute to more equitable access to food. Socialization in the community occurs through day-to-day interaction at homes, local shops and the temple. Watching soap operas on television is the most popular leisure activity. From 2005 to 2008, the proportions of households with television sets increased from 18 to 39 percent of the total, with motorcycles from 15 to 21 percent, and with mobile telephones from 12 to 26 percent.

The food system

Sanephong people benefit greatly from the availability of local food. Domesticated local rice varieties, maize, taro roots and potatoes are the main sources of carbohydrates, while animals, particularly fish, are the main sources of protein, fat and oil. Vitamins and minerals come from traditional foods such as wild seasonal vegetables, fruits, cereals and animal

¹ Televisions are more common in affluent households. They are bought with income from selling crops (e.g., chilli, coffee), while some are gifts from family members who work in town or city centres.

² *Dhana*, meaning to give, provides merit in the Buddhist tradition, through gifts of living things such as food to monks.



sources. Rice is the staple food, supplemented by food items from traditional farming and seasonal natural resources. Most people still value traditional foods as medicines that make them strong and healthy. Local food species are grouped into four categories: i) cereals and roots (14 percent); ii) animal proteins – aquatic animals, insects and small mammals (17 percent); iii) vegetables and mushrooms (53 percent); and iv) fruits (16 percent). Although animal food sources are plentiful, people tend to prefer fishing, as hunting is strictly prohibited in and around the community. Vegetables and mushrooms from outside sources are now available in small local shops, as are chickens from industrial farming, pork, fish and canned fish, string beans, eggplant, cabbage and snacks of low nutritional quality.

Traditional farming techniques suit the local topography. Slash-and-burn for field rice cultivation is used on higher levels where irrigation is not possible. Paddy rice farming is practised on the alluvial floodplain. Harvested rice is stored for household consumption, sharing, offerings and occasional sales to neighbouring households. Food items such as cucumbers, gourds, sesame, taro roots and vegetables are grown on the same plots as the rice. Seeds are preserved for the next growing season. These traditional farming practices are also found in other Karen communities in northern Thailand (Ganjanaphan *et al.*, 2004). It should be noted that although most households grow rice for their own consumption, rice yields are low in Sanephong. Fewer than 30 percent of households produce sufficient rice for their yearly consumption.

Project objectives

The overall objectives of this intervention project (which is ongoing) are similar to those of other projects described in this book: to use expert and community knowledge of the traditional food system and culture as a platform for working with the community to improve its nutrition and health. Specific objectives are to: i) increase awareness about the importance of traditional food sources among community people; ii) promote traditional food production and consumption, especially

among children; and iii) increase community capacities, knowledge and skills to take action on children's food and nutrition security.

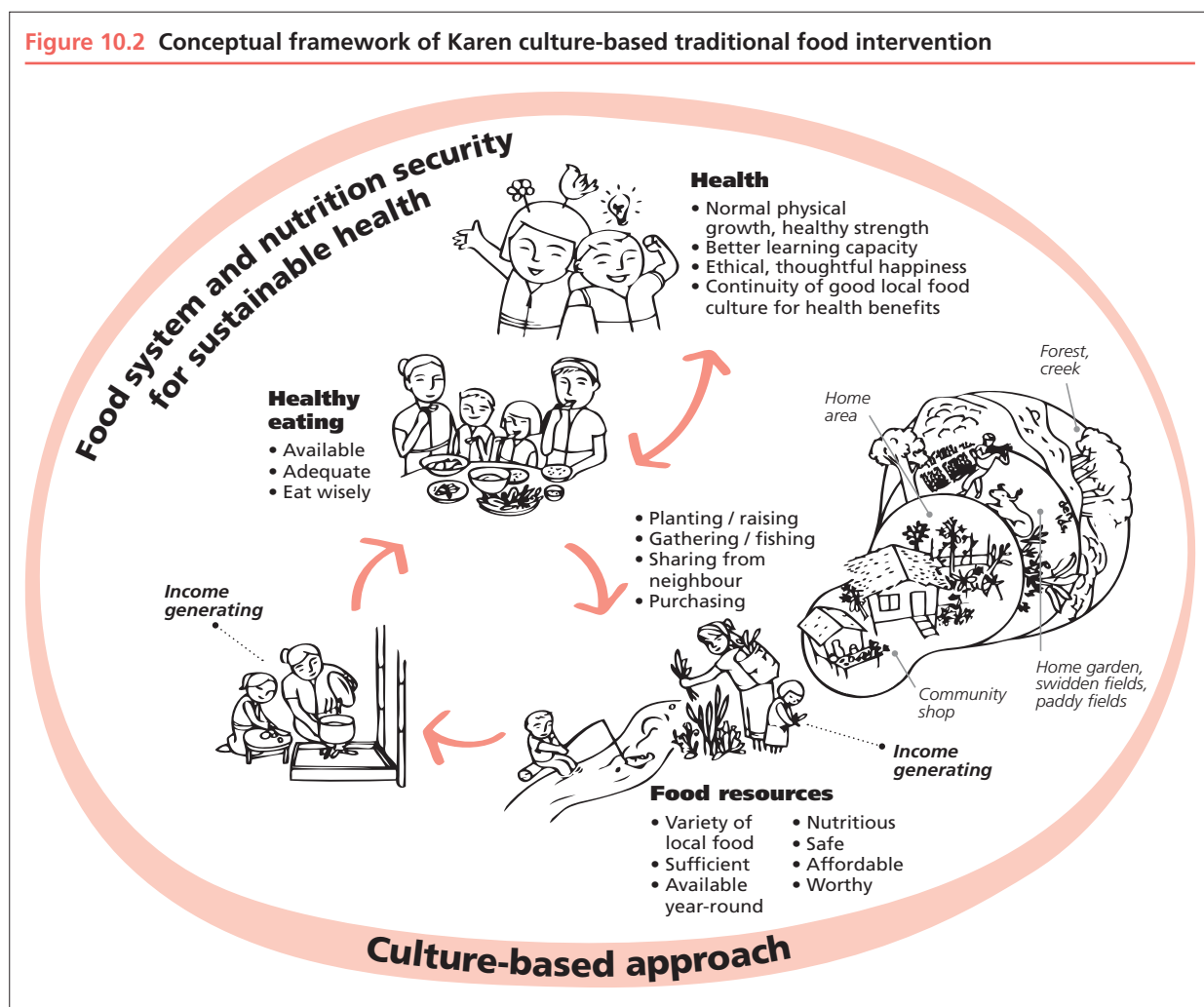
Intervention concepts and methods

Figure 10.2 illustrates the project in a form that helps the community, researchers and other stakeholders develop a common understanding of the project vision. This communication method was found especially helpful for working with community people whose way of thinking is more concrete than abstract.

The project encourages villagers to grow more traditional foods in household and school backyards. Villagers also gather foods from natural sources (the forest, rice fields, ponds, canals, etc.) or buy them from small shops in the village. Both men and women are encouraged to increase the range and year-round availability of local foods, based on economic and nutrition considerations. Mothers and daughters are encouraged to use fresh food and a variety of foods, and to practise clean and safe food preparation and cooking that is both economical and nutritious. Families are encouraged to ensure that all family members, particularly children, have enough food and eat wisely (for food and nutrition security). All villagers are encouraged to take action to improve nutrition and health. In this way, the people of Sanephong can become healthy, strong and intelligent through improved nutrition and food security. For sustainability, traditional Karen culture and values are promoted among the local people, especially children and youth.

The project adopted Prawase Wasi's (2009) culture-based development approach. He compares this people-centred approach to building a pagoda, which normally starts from the ground, not from the top. He holds that it is wrong to initiate a community development programme from the "ivory tower" of expert knowledge while ignoring local knowledge. Wasi urges all those involved in community development to build a deep understanding of the local people, to learn from them, and to use their local knowledge as a driving force for development. Demonstrating respect for local people right from the start makes it easier for project workers

Figure 10.2 Conceptual framework of Karen culture-based traditional food intervention



to win trust. Diverse stakeholders (community people and outsiders) should think together, and local resources and knowledge – or “cultural capital” – should be combined with adaptive knowledge, building on the community’s strengths to improve the quality of life of its members (Wasi, 2009).

Using this culture-based approach, the participatory project integrates indigenous knowledge and researchers’ knowledge, to promote food and nutrition security by using local foods and to carry out interdisciplinary research based on community collaboration. The project is implemented within the context of the community’s culture, through dialogue among community people, local authorities and academic partners. All are key players throughout project processes (equitable

involvement): the project is guided by the community and its cultural preferences; and project implementation uses resources and strengths available in the community (Israel *et al.*, 1998).

For outside researchers, a culture-based approach is challenging because it requires them to build trust, find culturally appropriate ways of communicating with indigenous people, and ensure that intervention activities are in tune with cultural preferences (Grenier, 1998). The project uses social dialogue as a communication strategy because it allows participants to listen to one another and express themselves and their wishes freely. Indigenous partners are not seen as underprivileged or victimized, because all share equally in the dialogue and all views are recognized. Trust usually develops easily



in such a context (Yankelovich, 1999; Isaacs, 1999; Wheatley, 2002).

Bohmian dialogue (BD) (Bohm, 1996) is used for team learning and decision-making. This method has been found to be particularly effective in situations where wide diversity among actors leads to a tendency for certain academic disciplines to dominate, thereby creating a strong social hierarchy. BD can briefly be described as an attempt to tackle fragmented and diverse thoughts and ideas. Innovative interventions and community empowerment are hard to achieve because individuals usually try to impose their own mental models of reality on others. If not properly handled, advocating and arguing tend to block the tacit development of thoughts and consensus. In groups or organizations – including rural communities – this generally results in forced acceptance, which leads to silent resistance. BD’s effectiveness relies on having a natural and peaceful setting that allows equal opportunities for each individual to reflect on her/his experiences and generates collective thinking about the group’s future. Mutual respect and trust are important elements. With appropriate facilitation, BD can lead to collective innovation and a sense of community. Project meetings are therefore conducted in peaceful, open and – when possible – culturally symbolic settings, such as Buddhist temples, mosques or mountain tops. To maximize the potential for a creative surge of insight and innovation, rituals and images such as prayers or sacrifices are also included when appropriate.

The project design is therefore based on a clear vision of collective action and shared expectations, a culture-based approach with multi-stakeholder participation, and good communication platforms. To facilitate collective action in an indigenous cultural context, metaphor has been found to be a simple and effective tool. For example, when working with an indigenous group in Latin America, Friulian lexicalized plant species by assigning them animal attributes that brought out their properties and colours (Pellegrini, 2006). A similar practice occurs in corporate organization culture, where people with different backgrounds often use metaphor as a tool in knowledge management and the generation of

common goals and thinking, using imagination and intuition to develop a shared vision (Nonaka, 1998). Metaphor helps people to understand complex realities by using the common intuition they have developed from day-to-day experience and encapsulated in their vernacular language (Lakoff and Johnson, 1980). The community and research team developed “SWA” as a metaphor for communicating the project’s shared vision among stakeholders (Figure 10.3).

“SWA” is a Karen vernacular term denoting a fish sanctuary in a running stream. The fish in a SWA are safe from predators and can resist the current of the flowing stream. In the metaphor, the SWA is the community, while the community members are the fish. Living in a SWA gives Sanephong people a safe space for their own culturally appropriate lifestyles, but it must also allow them to develop resistance so they can face rapid changes outside their community. Living in a SWA does not mean that people are trapped in their community for safety. Those who want to leave the SWA need to prepare themselves physically, mentally and spiritually to survive well outside. The SWA metaphor thus conceptualizes the “how” of the project. Working in Sanephong, for Sanephong people, intervention efforts should assist the community in

Figure 10.3 SWA – a visual model used to communicate shared vision among project stakeholders



building a strong *SWA* (i.e., in preserving an ecological niche and creating a living space that is suitable for them and future generations).

Intervention activities to date

Based on these concepts and methods, the community, other stakeholders and the academic research team planned and implemented four main intervention inputs: i) increased production of traditional foods at home; ii) motivation and nutrition education for schoolchildren; iii) women's empowerment; and iv) capacity strengthening for community leaders, local researchers and youth.

Increased production of traditional foods at home

A home garden is analogical to having a *SWA* at home, and this activity was designed to put the *SWA* concept into practice. First, 50 participating children were asked to list the traditional vegetables and fruits they found in a demonstration garden, and then to draw them, to create a visual model (Figure 10.4). Next, they explored the traditional vegetables and fruits in their own home gardens. Rare and endangered traditional plants were cultivated in a nursery and transplanted to home gardens. To stimulate the children's learning and action, they also visited other home gardens and recorded and drew pictures of what they found there. To endorse these activities, community adults advised the children on how to select good traditional food varieties and grow them. This was followed by a competition in which the children grew varieties of traditional vegetables and fruits in their home gardens. Three important criteria for selecting competition winners were easy access to traditional plant foods, self-reliance and diversity of plants. Agriculture experts were brought in to advise on the value of traditional agricultural techniques, such as growing several varieties of food in the same plot, storing seeds for the following season, and respecting nature, which sustains the environment and home food security. As water shortage can be an important

constraint during the dry season, the research team also assisted the community with writing a proposal for the building of a small community dam, to present to the local administration.

Motivation and nutrition education for schoolchildren

To increase schoolchildren's confidence in their culture and traditional foods, four motivation and education camps were organized (Henderson, Bialeschki and James, 2007; Bialeschki, Henderson and James, 2007; Goldstein *et al.*, 2004) for a total of 350 children aged eight to 15 years. The children were conceptually seen as small fish in a *SWA*. Topics at the camps included: i) re-establishment of traditional food crops at the household level; ii) environment and natural resource conservation; iii) nutritious cooking of traditional foods; iv) basic health care; and v) nutrition. The process emphasized holistic learning development (language, music, arts and life skills), and included an introduction to traditional food sources from forests, waterways and households; food and nutrition songs; drawing; lectures; brainstorming; presentations for friends and community members; and "edutainment" (educational entertainment) activities, which included traditional indigenous ways of learning by doing. The children were encouraged to cook local dishes. Based on traditional knowledge, they were also encouraged to plant more local vegetables in upstream areas, to safeguard community water resources.

Information about the importance of traditional foods, and nutrition education were later integrated into primary school curricula. This involves parents, elders, community leaders and school teachers, to ensure continuation in schools. Education tools emphasizing the importance of food diversity include games and poems promoting traditional foods. Elders are also involved in educating children in school. Community women volunteered to share their cooking knowledge and skills, emphasizing the concept of "fresh, clean, nutritious and safe" food preparation with the schoolchildren. During these sessions, children were taught to be careful about money, especially regarding their habit of buying sweets

Figure 10.4 Household traditional food plant diversity in Sanephong



and snack foods from community shops. Nutritious local sweets were promoted as alternatives. After each session, schoolchildren were encouraged to share what they had learned with their families. Interpersonal communications and home visits were used to encourage the community to endorse the children’s activities and to promote healthy traditional food sources. Scientific information about local food and nutrition helped stimulate discussions on local foods and enhanced the community’s knowledge, attitudes and participation.

Women’s empowerment

Fifty women volunteers were trained in techniques of “fresh, clean, nutritious and safe” cooking. This resulted in the creation of nutritious traditional food snacks, such as glutinous rice mashed with sesame, which the volunteers then prepared for the monthly community

meetings where project activities are discussed. Two local shop owners were invited to join the women’s group activities and to help organize a competition for local nutritious recipes, such as traditional vegetables in noodle soup and other common local dishes. Through the competition, the women’s group gathered 20 nutritious local recipes and one modified healthy local snack, which they promoted in the community. The women volunteers were also trained in monitoring the nutrition status of their children and themselves, including education on achievable daily nutrition intakes from local foods, to ensure good nutrition and health for their families.

Capacity strengthening for community leaders, local researchers and youth

To strengthen the confidence and communication capacities of community leaders and local researchers,

the academic research team provided opportunities for them to share their knowledge and experiences on issues such as subsistence practices, health and the community's future with non-governmental organization (NGO) officers working in the area, border patrol police, local district administrators and others. Study visits were also organized for the local leaders and researchers to learn more about organic farming, ecotourism and ecomarketing. Five local researchers were trained in financial management and traditional food recipe development. In addition, 100 community youth were trained in conserving traditional knowledge and culture, and good communication skills. Nine community leaders and the local researchers participated in a national seminar at Princess Sirindhorn Botanical Museum, Bangkok. Five community leaders and researchers joined international workshops in Italy, Japan and Canada, to exchange ideas and worldviews with international indigenous leaders, academics from universities and activists from NGOs.

Indirect project contributions

These four main intervention activities were not the project's only inputs for food and nutrition security in Sanephong. Following the capacity strengthening activities, community and local leaders, youth, women and children can now help bring about changes that will contribute to the continuing achievement of project objectives. For instance, community leaders – supported by the local administration – are now mobilizing the community and managing the budget for a community garden project, to provide vegetables for consumption and income generation. Project activities were designed not only to effect direct changes but also to generate additional changes through training and capacity building of community researchers and other agents.

Intervention results

This participatory research in a Thai Karen community was conducted through collaboration among the community, other stakeholders and the academic research team. These groups therefore represented

both the research network and the tools of the research. To collect the necessary data, both qualitative and quantitative research methodologies were applied in Sanephong community between 2005 and 2009. The process for studying indigenous food systems described by Kuhnlein *et al.* (2006a) provided guidelines for this. In-depth interviews, focus group discussions, participatory observations, community walks and surveys, and nutrition and health assessments were used. The following subsections summarize the evaluation results.

Trust and commitment

One important indicator of successful work with an indigenous community is the building of trust between collaborators in and outside the community. Throughout the project, the external research team generated community participation and involvement. Results of a community survey³ indicated that people in the community recognized the project's contributions to providing knowledge (65 percent, n = 44), changing attitudes (15 percent, n = 10) and changing behaviours (20 percent, n = 14). Opinions from community people and leaders, recorded from interviews and group discussions, suggest that the community trusted the research team:

Many community people participated in the project activities ... more than half.

(Villager)

This group does not deceive us ... they are good and diligent ... they talked to us nicely ... and they explained rather well.

(Deputy Village Headman)

I talked with them [community people] before but they were not interested ... no action. It's heartbreaking for me again and again ... When the research team came in and worked with us, things became clearer ... I felt such relief.

(Sub-district Headman)

The research team and the community are like husband and wife now, we have good relationship.

(Villager)

³ Survey respondents were the mothers of 68 primary school children in Sanephong.



Another important aspect for sustainable food and nutrition development in an indigenous community is that local commitments were strengthened. At least 20 community people volunteered to continue promoting traditional foods after the intervention. A group of these volunteers started to rehabilitate community waterways, to make them more environmentally favourable for aquatic animals such as fish, snails, crabs, frogs and shrimps.⁴ They also established community rules prohibiting dive-harpooning to catch fish. Another group volunteered to cook for children at the school and the day care centre. These activities indicate that community people might carry the project achievements forward. Although community members have various levels of awareness of the importance of traditional foods, there is a core group of people who are willing to take action to improve the situation.

Traditional food awareness and availability

It was clear that the research team had created awareness about the importance of traditional foods in Sanephong. Results of a community survey⁵ indicated that the research team contributed to increased awareness of traditional foods' role in making people strong and healthy (97.3 percent, n = 73). Only 14.5 percent reported that their families had cooked purchased vegetables over the previous year. Many (73.7 percent, n = 56) reported that over the previous four years, community people had collected vegetables from the surrounding forest to grow around their households, but when asked whether their own families had grown traditional vegetables over the previous four years, more than half (59.2 percent, n = 45) reported that they had not, and only 36.8 percent (n = 28) that they had (Figure 10.5).

Nevertheless, it was found that the number of vegetable and fruit varieties in community households had increased from 81 to 137 after the intervention,

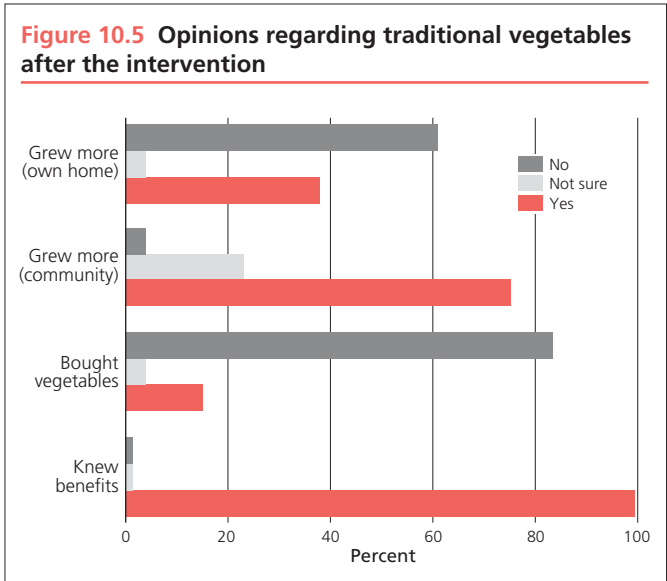


Table 10.1 Numbers of vegetables and fruits grown by households, before and after intervention

Type of vegetable and fruit	Before	After	Change
Traditional	75	119	+ 44
Others	6	18	+ 12
Total	81	137	+ 56

with 119 of these 137 items identified as traditional. However, the number of non-traditional vegetables and fruits had also increased, from six to 18 (Table 10.1). The vegetables *Pak Man Moo* (*Gnetum nemon* L. var. *tenerum* Markr.) and *Pak Kood* (*Diplazium esculentum* [Retz.] Sw.) have high nutritive values, and their use in households increased. However, after the intervention, only about 10 to 14 percent of the households were growing them; this slow uptake was due to traditional beliefs and lack of water. It seems likely that the project built awareness of nutrition, particularly from vegetables and fruits, and of the importance of traditional vegetables and fruits.⁶ This view is supported by the community's continuing frequent use of traditional foods.

⁴ The community survey revealed that 68.4 percent of families (n = 52) cooked fish from community waterways and did not have to buy it.

⁵ Survey respondents were the mothers of 75 primary school children in Sanephong.

⁶ The Karen in this area do not usually raise traditional animal food sources, but they started raising aquatic food sources following a government initiation.

Figure 10.6 Children’s activities in the traditional plant activity programme, as reported by parents

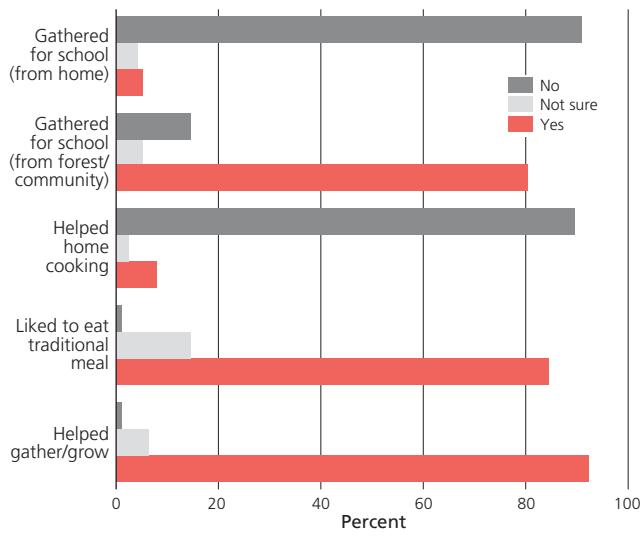


Table 10.2 Reported food preferences for families, children and community festivals

Dish	% preferring item (n = 77)		
	For family	For children	For festivals
Chilli paste and vegetables	61.5	1.3	17.9
Vegetable soup	12.8	14.1	–
Fish and vegetable soup	14.1	28.2	–
Chicken/pork and vegetable soup	1.3	15.4	2.6
Fried foods (stir- or deep-fried)	5.1	34.6	1.3
Curries (e.g., pumpkin with chicken, pork in coconut milk)	5.1	–	66.7
Dessert	–	–	3.8
Others (e.g., <i>Kanom Jeen</i> /Thai vermicelli)	–	6.4	6.4

Children as change agents⁷

Children are the future. To preserve Karen culture and traditions, community leaders gave priority to children’s education. Figure 10.6 shows that community people were aware of the many activities

⁷ A change agent is an individual with capacities for influencing changes in the community. By empowering the children through active participation in project interventions, the project team helped them become valuable project advocates and important players in future development.

for teaching children about traditional vegetables and fruits. According to the survey, children had become more involved in growing or gathering traditional vegetables over the previous year (92 percent, n = 69). They also gathered traditional vegetables from the forest and waterways to cook for school lunches, although traditional vegetables and fruits grown in household gardens did not contribute to school lunches.⁸ Most respondents (89.5 percent, n = 68) mentioned that children helped with home cooking, and 84.2 percent (n = 64) agreed that “community children like to eat traditional meals very much”.

Traditional food uses

Food preferences in the community indicate that people in Sanephong still have a rather simple lifestyle. Table 10.2 shows that there are only five categories of dish eaten by families and children and at festivals: chilli paste with vegetables, soups, fried foods, curries, and desserts. Those interviewed (n = 77) reported that chilli paste with vegetables⁹ was the most popular food for the family (61.5 percent, n = 48) and was also used at festivals (17.9 percent, n = 14), but not for young children. Soups were the most popular dish among children, who also liked fried foods (34.6 percent, n = 27). Curries such as pumpkin with chicken or pork in coconut milk were the most popular festival foods. Based on these food preferences, it can be seen that family diets could rely on traditional food sources (i.e., traditional vegetables and fish), but children’s preferences for chicken/pork soups and fried foods indicate a need for families to purchase some foods (chicken, pork and cooking oils). If this trend continues, family expenses on food can be expected to increase in the community.

Respondents often mentioned health and safety (32.1 percent, n = 25) as their reason for maintaining traditional diets: “eating our food makes us strong and healthy”. Some (29.5 percent, n = 23) simply liked

⁸ This indicated that there were still plenty of traditional vegetables in the area around the community, and that households probably grow traditional vegetables in small amounts for their own consumption.

⁹ Chilli paste is prepared by pounding red chillies and garlic together with salt or shrimp paste. Karen chilli paste is generally very strong, so it is usually eaten together with raw or boiled vegetables.



traditional foods: “eating chilli paste and vegetables makes me happy”. Self-sufficiency (23.1 percent, n = 18) was another reason: “eating food grown by ourselves is marvellous”. Some (14.1 percent, n = 11) felt at home and proud: “I am proud to eat our local foods like my grandparents”. Thus, increased exposure to mainstream communication and food marketing had not changed community dietary patterns, and positive attitudes towards traditional diets remained intact at the end of intervention.

Although the project promoted the use of traditional foods in general, it focused on the food items identified in the phase 1 study as being of high nutritional value and available in the community. For example, *Pak Man Moo* is a good source of vitamin A and folate, and an excellent source of vitamin C; *Pak Kood* is a good source of iron and an excellent source of vitamin C; and the shellfish *Khlu-mi* is a good source of calcium and an excellent source of iron (Chotiboriboon *et al.*, 2009). Mothers (82.4 percent, n = 61) mentioned that they cooked more of these foods (some up to two or three times per week) during the intervention.

Change agents as examples for others

Local researchers reported that persuading Sanephong people to take action to improve their food and nutrition security by using traditional foods takes both time and effort. After the nutritive values of traditional foods (the phase 1 results) were presented to the community, one of the local researchers decided that she would act as an example. Similar to many others in the community, her family included three adults (her husband, herself and a grandmother) and four children aged two to 12 years (three boys and one girl). Her husband played a major role in traditional farming while she took care of the household by gathering and cooking food and looking after the children. Her husband occasionally earned some extra cash from daily wages.

By January 2008, she was growing 58 different traditional vegetables and fruits in an area of about 0.2 acres (0.08 ha) around her house. From this home

garden, she was able to pick 15 traditional vegetables in about 15 minutes, to cook a good meal for her family. This meal included stir-fried roselle with canned fish, a mung bean noodle soup with ivy gourd omelettes, pumpkin and canned fish curry and chilli paste. In terms of dietary reference intakes (DRIs) (Banjong *et al.*, 2003; Changbumrung, 2003) these four dishes with steamed rice were found to provide adequate energy and macronutrients (carbohydrate, protein, fat), at more than 40 percent of the DRIs. The dishes also provided 30 percent of the DRIs for iron and vitamin C, 28 percent for vitamin A, 78 percent for vitamin B₁, 26 percent for vitamin B₂, 18 percent for calcium, and 13 percent for niacin. The calculations of vitamin A content did not include the vegetables eaten with chilli paste, which is a rich source of carotene, so the family’s vitamin A intake may have been more than 30 percent of the DRI. These percentages of DRIs represent good dietary contributions, especially of macronutrients, iron and vitamins C, A and B₁. However, intakes of other nutrients, especially calcium, vitamin B₂ and niacin, were inadequate. This meal required the purchase of canned fish, eggs and vegetable oil, and was estimated to cost about baht (THB) 6 or USD 0.16 per person.

This demonstrated that growing a variety of traditional vegetables and fruits is not only feasible but could also lead to increased dietary variety at minimum cost to the family. This local researcher was able to share her home-grown vegetables with neighbours, which is a highly regarded practice in the community. Even more important, her children’s nutrition and health improved significantly. For instance, her eldest son’s weight-for-age increased from 89 to 95 percent of the Thai standard, his height-for-age from 94 to 96 percent, and his weight-for-height from 105 to 107 percent. His haemoglobin level also improved, from 9.8 to 12.7 g/dl. As is the case for many women in developing countries, these positive changes were possible because of the local researcher’s contributions to food production, food access and nutrition security (Quisumbing *et al.*, 1995). Based on this success, she has become an effective promoter of traditional foods in Sanephong.

Figure 10.7 Nutrition status of children up to 12 years of age, before and after intervention

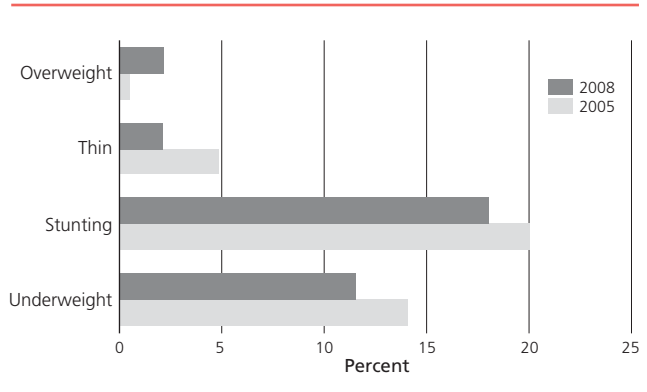
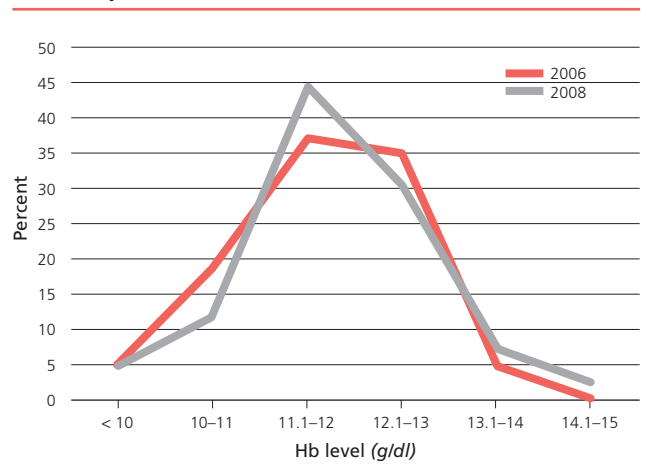


Figure 10.8 Distribution of haemoglobin values among children aged eight to 12 years at initiation (2006) and follow-up (2008)



Local capacity strengthening

The community and the research team made capacity strengthening their highest priority as a way of helping to maintain and sustain the changes long after the project ended. Throughout the project, change agents – including community leaders and local researchers – were observed to become more confident in their communications on food and nutrition security within their community, at the national and international levels. In January 2009, Her Royal Highness Crown Princess Sirindhorn visited Sanephong and the project’s change agents gave a

good presentation. The Crown Princess encouraged them to continue their efforts to protect traditional food sources and to eat traditional foods with their families. The efforts of Sanephong change agents and the community at large are now widely recognized, and a Web site¹⁰ reports on progress to the outside world. In addition, community leaders have allocated THB 200 000 (about USD 6 000) to developing homestead gardening activities, and a local youth group has organized its own learning camps, with support from elders and local officers.

Nutrition outcomes

The project focused on increasing awareness about the importance of traditional food sources, and strengthening local capacities, knowledge and skills to take action on children’s food and nutrition security, but it did not have resources to influence directly the quality or quantity of diets. Changes in nutrition status thus rely on the community’s abilities to adjust within their own means. It was observed that nutrition among children aged 0 to 12 years improved during the intervention. Figure 10.7 shows that the overall incidences of underweight among children decreased from 14.1 percent (n = 26) to 11.6 percent (n = 22), of stunting from 20 percent (n = 37) to 18 percent (n = 34), and of thinness from 4.9 percent (n = 9) to 2.1 percent (n = 4). The proportion of overweight children increased from 0.5 to 2.1 percent, reflecting the global nutrition trend (Khor, 2008).

Iron nutrition status among children aged eight to 12 years (n = 43), as measured by haemoglobin, indicated average levels of 11.7 mg/dl (SD = 0.9) before and 11.9 mg/dl (SD = 0.9) after the intervention, and a tendency for improved distribution of haemoglobin concentrations was also noted (Figure 10.8). According to World Health Organization (WHO) criteria (Gleason and Scrimshaw, 2007), the proportions of children with normal concentrations increased from 65.1 to 69.8 percent, those with mild shortages decreased from 30.2 to 25.6 percent, and those

¹⁰ www.rdpb.go.th/rdpb/front/news/rdpbnewsdetail.aspx?rid=123&catid=1



with moderate shortages remained at 4.1 percent. Tackling iron nutrition with traditional food sources in Sanephong remains a challenge because most local iron-rich foods (i.e., *Khlu-mi*, shellfish) are available for only a few months a year (March to May). Similar to experiences elsewhere, the shortage of iron-rich foods underlines the importance of ensuring that traditional foods are diverse and evenly distributed through the seasons (Arimond and Ruel, 2004). This issue needs further work in the community. Raising community awareness of and participation in traditional food rehabilitation can improve nutrition and health indirectly (Kuhnlein and Receveur, 1996; Damman, Eide and Kuhnlein, 2008; Khor, 2008), but more direct interventions are necessary if immediate results are expected, especially for iron nutrition improvement.

Conclusion

Living in a tropical forested area in harmony with nature, Sanephong people benefit greatly from the availability of local foods such as cereals and roots, animal foods, vegetables, mushrooms and fruits. However, the food system is deteriorating rapidly owing to environmental degradation and external socio-economic influences. This participatory intervention research project aimed to capitalize on indigenous culture and food sources as the basis for improving nutrition and health in the community, particularly among children under 12 years of age. The project was implemented with a culture-based approach, in close collaboration with stakeholders of diverse backgrounds (community people, primary school teachers, local health officers and academic researchers from different disciplines). Metaphor and social dialogue were used as communication tools for promoting equitable participation. Based on these concepts, four main intervention activities were initiated.

Increasing families' production of traditional foods at home was designed to promote easy access to traditional food sources, self-reliance and greater diversity of local foods. Children were key actors in this, with support from adults. Motivation and

nutrition education for schoolchildren increased their confidence in their culture and traditional foods. The process emphasized holistic learning through "edutainment", consolidating language, music, arts and life skills into actions. Women's empowerment activities helped increase women's capacity to take care of their families through the use of fresh, clean, nutritious and safe food, as demonstrated by a woman volunteer change agent. Capacity strengthening for community leaders, local researchers and youth was designed to bring indirect improvements to nutrition and health through the use of local foods. This intervention focused on creating awareness and enhancing traditional knowledge, communication skills and management capacities, so that community people can handle nutrition and health issues themselves.

The project successfully raised awareness and availability of traditional food sources in Sanephong. Community people recognized the project as a partnership to provide the knowledge needed for attitude and behavioural changes. Working together, community-led changes occurred in all age groups. Children and youth cultivated and gathered more traditional vegetables, and helped with home cooking and the care of younger siblings. Community women developed and promoted local dishes using nutritious traditional food sources. Creative menus were used at the community child care centre, for school lunches, in home cooking and at community events such as learning activities, community meetings, hospitality and annual festivals. Community men set up new rules for protecting the *SWAs* that provide habitats for aquatic resources. All project activities were approved and supported by community leaders. Strong awareness and community efforts to increase traditional food sources indicated the important role that traditional food use continues to have in Sanephong. During the project, community people gathered more traditional vegetables from the surrounding forest and their home gardens. The project change agents explained the value of traditional foods and exchanged ideas and world-views on food and nutrition security at the local, national and international levels.

Lessons learned

While nutrition and health problems related to environmental change and the deterioration of local food systems are emerging in indigenous communities all over the world, enhancing traditional food systems can serve as a strategy for coping with malnutrition and sustaining development (Kuhnlein and Receveur, 1996). The participatory project in Sanephong demonstrates this (Chotiboriboon *et al.*, 2009). The project team set out to work with and for the people of Sanephong community, by combining team members' knowledge of community food systems with local knowledge and wisdom about Sanephong's traditional food system, to improve nutrition and health, especially of children. Although a culture-based approach was used, academic partners were crucial at the start of the project in ensuring that the process adopted allowed all community members to participate and identify their own priorities (Kuhnlein *et al.*, 2006b). As outsiders working with the consensus of community people from the outset, the academic researchers were catalysts and project coordinators. Multi-stakeholder partnership was key to project success. To work well in this context, members of the participatory research team needed trust, openness and deep respect for each another. Outsiders had to accept that changes would come only at the community's own pace.

Similar to experiences of the global network (Kuhnlein *et al.*, 2006b), the project team learned that using local foods to improve the nutrition and health of children requires more than technical knowledge. Project success relied heavily on human processes and factors, such as establishing long-term relationships, building mutual trust and developing effective communication among multiple partners. Individuals tend to see things from their own perspectives, which are derived from fragmented thoughts and personal experience. People's actions are driven by their own perspectives, and occasionally conflicts emerge. The project team learned that the different ways of thinking of the indigenous people and the urban-based researchers could be connected through socializing activities. Partnerships

were created through exchanging ideas and sharing experiences from working together. Once mutual trust had emerged, appropriate implementation could follow. This process took both time and effort for all stakeholders. It is therefore recommended that future work to improve food and nutrition security in an indigenous community such as Sanephong should consider applying a culture-based, free-formed and organic approach rather than a mechanical and controlled approach with expected outcomes that are set by others without the community's participation.

Although the project turned out to be positive for both the Sanephong community and the academic research team, the road to better nutrition and health using traditional foods in this community is long. Similar to many other indigenous communities around the world, Sanephong is no longer isolated. It is connected to the global community through socio-economic and cultural aspects, together with the newly introduced market economy, media and transportation. Sanephong people should still be able to choose how they wish to live; the community has made great efforts and has expressed a strong interest in maintaining its own culture and traditions, which may include preserving traditional food diversity and traditional farming. Community people still firmly believe that retaining biocultural heritage nourishes the spirit of the Karen people. Nevertheless, the community needs outside assistance to help its members achieve their goals. Interested outsiders should act like fish from other *SWAs*, coming in to help people in the Sanephong *SWA* prepare their younger generation for a brighter future, so they can live proudly in their own *SWA* within the running stream of the rapidly changing social and global environment ✨

Participatory research team

A team of community and academic partners made this work possible. Major contributors from Sanephong community were Anon Setapan, Mailong-ong Sangkhachalatarn, Nutcharee Setapan, Sompop Sangkhachalatarn, Benchamas Chumvaratayee, Sanu, Jongkol Pongern, Plubplueng



Kamolpimankul and Suwatchai Saisangkachawarit. The academic team included Charana Sapsuwan, Sopa Tamachotipong, Prapa Kongpunya, Pasamai Eg-kantrong, Saifon Phonsa-ard, Waragon Khotchakrai, Suwarin Yunaitum, Prangtong Doungnosaen, Kamontip Srihaset and Tharaporn Graigate of the Institute of Nutrition, Mahidol University; Winai Somprasong, Pramote Triboun and Bordintorn Sonsupab from the Division of Plant Varieties Protection, Ministry of Agriculture and Cooperatives; Rattanawat Chairat of the Faculty of Environment and Resource Studies; and Ariya Thanomsakyuth of the Faculty of Medicine, Ramathibodi Hospital, Mahidol University.

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Chapter 11

The Nuxalk Food and Nutrition Program for Health revisited

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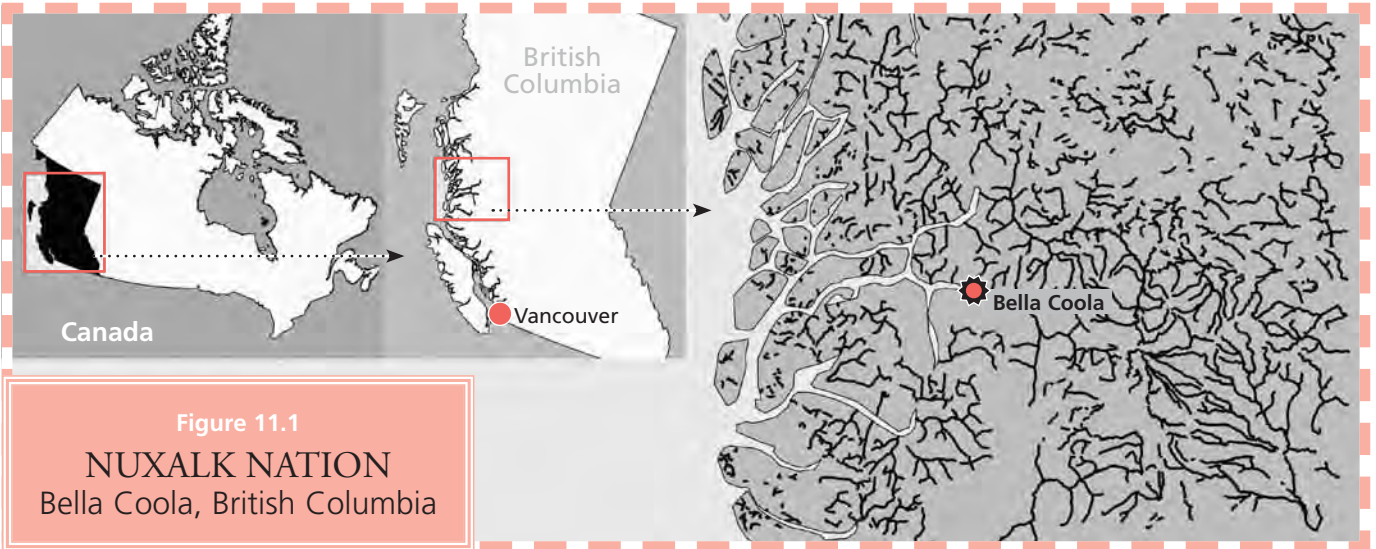


Figure 11.1
NUXALK NATION
 Bella Coola, British Columbia

Data from ESRI Global GIS, 2006.
 Walter Hitschfield
 Geographic Information Centre,
 McGill University Library.

1
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Key words > Indigenous Peoples, food systems,
 traditional food, Nuxalk Nation, British Columbia,
 intervention

Photographic section >> XXII



“They came out in droves!”

Rose Hans, in recollection of the feasts for youth that were part of the Nuxalk Food and Nutrition Program, as remembered in 2006

Abstract

The original diet of the Nuxalk Nation incorporated a range of nutritious fish and seafood, game and various plant foods, including greens, berries and root vegetables. However, early research underlying the Nuxalk Food and Nutrition Program demonstrated a dramatic shift in diet during the twentieth century, with less use of traditional food and greater reliance on processed and less healthy food, combined with a more sedentary lifestyle. Documentation of the Nuxalk Nation's food system underlined the imperative of using community resources and local cultural foods as the platform for health education and promotion to improve food use and nutrition status.

The Nuxalk Food and Nutrition Program was conducted in the mid-1980s, with changes in food use and nutrition status determined through measurements taken before and after the interventions. This was the first programme of its kind in First Nations communities, and led to many similar initiatives in Canada. More than 350 activities were developed with input from community elders and leaders, and attracted thousands of individual participations from the population of about 500 on-reserve Nuxalk. Popular activities were feasts, food excursions and two widely distributed books on traditional food systems and recipes. Evaluation activities included interviews on food use and diet, and measurement of anthropometry and physiologic indicators of key micronutrients (vitamin A as carotene and retinol, folate and iron), dental health, and process indicators of programme success and participation.

Improved use of traditional food resources was shown, with increasing numbers of families using these foods, particularly fish, and increased amounts of food used per family. Dietary status improved with the increased use of fruit and vegetables and better intakes of vitamin A, folate and iron. Nutrition status regarding carotene, retinol and folate improved in all age and gender categories, and iron status improved among youth. Dental health, measured through examination of children's tooth decay, improved dramatically.

A follow-up consultation in 2006 examined long-term programme impacts, changes in traditional food availability due to environmental shifts, and concerns about increasing obesity and chronic disease within the Nuxalk Nation.

Introduction

The Nuxalk Food and Nutrition Program was conceived in the early 1980s and began officially in 1983. It was a collaborative research project involving the Nuxalk¹ Nation (including the community health centre, Band Council and regional leaders, elders and youth) and academic research partners. It represented one of the first comprehensive community-based projects to document Canada's Indigenous Peoples' traditional food systems and how these relate to health. Funded through grants from Health Canada, the project received ethics review and approval from the University of British Columbia, the main participating academic institution when the project began, and later from McGill University. The details of how the research was established, an inventory and nutrient analyses of traditional Nuxalk foods, and specific initiatives embraced within the overall programme are provided elsewhere (Kuhnlein, 1986; 1989; 1992; Lepofsky, Turner and Kuhnlein, 1985; Kuhnlein and Moody, 1989; Kuhnlein and Burgess, 1997; Turner *et al.*, 2009).

This programme represented best practices in community-based nutrition research, and has served as a model for many other initiatives in Canada and other parts of the world. In all aspects of the programme, community researchers and health promotion staff were primary participants and collaborators, undertaking interviews, assessments and promotion activities. Throughout the course of the programme, the researchers followed agreed research protocols, seeking informed consent for interviews and photographs, maintaining the confidentiality and anonymity of interview respondents, and ensuring that results from the project were first shared with and reviewed by Nuxalk Nation participants.

¹ Pronounced "Noo-halk".

Context

The Nuxalk (formerly known as the Bella Coola) are a community of Indigenous People of the central coast of British Columbia, whose home territory is set within a network of deepwater inlets, channels, islands, river estuaries, floodplains and valleys, and rugged mountainous terrain. The Nuxalk language is classed in the Salishan language family. At the time of European contact in the late eighteenth century, the Nuxalk Nation included approximately 30 permanent villages extending along the Bella Coola River Valley and along the coasts of North and South Bentinck Arms, Dean Channel and Kwatna Inlet (Figure 11.1). By the early twentieth century, the numbers of Nuxalk people had dwindled significantly from their original (estimated) population of more than 2 000, largely owing to epidemic diseases brought by the European newcomers (Boyd, 1990). Those who remained came together at a village on the north side of the Bella Coola River, then moved to their present location at Bella Coola in 1936, after a major flood forced them to abandon their earlier village. In the 1980s, a new housing subdivision was established about 8 km east of Bella Coola, and many Nuxalk people now live there. At the time of the research reported here, reserve residents numbered approximately 800 people in 150 homes.

The Nuxalk territory is bounded by the territories of Indigenous Peoples from other language families: Wakashan peoples (Haisla and Hanaksiala, Heiltsuk and Kwakwaka'wakw) surrounding the Nuxalk lands and waters along the coast; and Athapaskan people (Ulkatcho Dakelh, or Carrier) on the inland side (Boyd, 1990). The Nuxalk are culturally similar to their Heiltsuk neighbours, having a complex social organization with hereditary leadership, strong ceremonial traditions and an oral history that reflects a deep relationship with and knowledge of the marine environment, rivers and associated habitats in which the Nuxalk people have dwelled since time immemorial (McIlwraith, 1948; Kennedy and Bouchard, 1990). Today, the Bella Coola Valley is also home to many non-native settlers.

The climate of the Nuxalk territory is typical of coastal British Columbia: high precipitation and relatively mild winters and summers, at least in the lowlands. The vegetation reflects this regime, as part of the coastal temperate rain forest. At lower elevations, the forests are dominated by western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), amabilis fir (*Abies amabilis*) and Sitka spruce (*Picea sitchensis*), all coniferous species. Some lodgepole pine (*Pinus contorta*) and Douglas fir (*Pseudotsuga menziesii*) occur in drier places. Black cottonwood (*Populus balsamifera* spp. *trichocarpa*) forms immense stands along the river valleys, and red alder (*Alnus rubra*) and Pacific crab apple (*Malus fusca*) are other common deciduous species. Higher-elevation forests, which receive more of their precipitation in the form of snow, include mountain hemlock (*Tsuga mertensiana*), yellow cedar (*Chamaecyparis nootkatensis*) and subalpine fir (*Abies lasiocarpa*). Industrial logging has removed much of the original old-growth forests, but there are still remnants of the giant trees that once covered the valleys and lower mountain slopes. The Bella Coola River and adjacent river valleys were formed through tremendous scouring of the original rock by glaciers; the geological history of the region is reflected in the steep-sided mountains, many of which are bare rock supporting little vegetation, with ice-capped peaks, waterfalls and streams tumbling down into the valleys. The diversity of the landscape leads to biological diversity; there is a wide range of different habitat types – coastal salt marshes and tidal flats, rocky shorelines, bogs, marshes, river estuaries, small prairies, gravel outwashes, rocky scree slopes, and deep-soiled forest habitats. Together with the rivers, lakes and ocean, these support the diversity of plants and game animals that have nurtured the people of the Nuxalk Nation, providing them with food, clothing, tools, shelter and medicines, generation after generation (Lepofsky, Turner and Kuhnlein, 1985). In particular, the Bella Coola and other rivers in Nuxalk territory have provided spawning and rearing habitats for all five species of anadromous Pacific salmon, a nutritious and staple food, while outer sea channels provide other fish and shellfish.

Food system and health change

Similar to other Northwest coast peoples, the Nuxalk used to reside in permanent villages only over the winter, spending most of the year following a seasonal harvesting cycle, procuring springtime foods along the coast, estuaries and valley bottoms; travelling further up the valley and out towards the open ocean during the summer months, to harvest berries and hunt game; and harvesting root vegetables, game, fish and shellfish in the autumn. For each type of food, specialized processing – drying, smoking or other preservation – was required to prepare for winter storage. There was a general division of labour, with men hunting and fishing while women undertook the cutting and processing of meat and fish, and the harvesting and preparation of various plant foods – greens, berries and roots – which were an important part of the diet. All of these activities required special skills and knowledge that children and youth learned through participation, observation and instruction by working with adults, including elders.

In the first two years of this research with the Nuxalk in the early 1980s, 102 Nuxalk families (82 on-reserve and 20 off-reserve in urban centres such as Vancouver) were interviewed to identify traditional foods and the cultural patterns of food use (Kuhnlein, 1984). Another key undertaking was a series of elders' meetings organized by the research team to consult the elders about which traditional foods they considered important, which were still being used, and how these foods were traditionally harvested, processed and prepared for consumption. Changes in food use frequency were identified through another interview study (1982/1983), conducted with the grandmothers, mothers and daughters of families living on the Nuxalk reserve. In 1982, a food availability assessment was undertaken, and from 1980 to 1986 the nutritional values of traditional foods and diets were assessed, using standard practices for sample collection and nutrient analysis (Kuhnlein, 1986). Health status assessments were undertaken in 1983. This research set the stage for the food-based intervention activities conducted by the Nuxalk Food and Nutrition Program, which are summarized in this chapter, and the programme evaluation, which was conducted in 1986.

Details of the food system and the health and nutrition status of the Nuxalk, as reported in baseline assessments for the Nuxalk Food and Nutrition Program, are summarized in Turner *et al.* (2009). There was ample evidence that families and individuals were using different foods and living different lifestyles from those of even a few generations previously (Kuhnlein, 1992). The study documented that 13 species of fish, eight species of shellfish, seal and seal lion were still being used. One of these fish was the ooligan (eulachon – *Thaleichthys pacificus*), a type of smelt used by the Nuxalk for countless generations, especially for the nutritious fat (grease) rendered from it through a sophisticated traditional process and used widely as a condiment (Kuhnlein *et al.*, 1982; Kuhnlein *et al.*, 1996).

The grandmother-mother-daughter interviews documented marked declines in Nuxalk traditional food use over the three generations (Kuhnlein, 1992; 1989). Not only was there a distinct drop in the diversity of traditional foods used, but a general decline in the frequency of use was also noted. Significantly, declining food use was linked to food availability and taste appreciation; when a food's frequency of use declined, taste appreciation also declined. Providing younger generations with opportunities to sample traditional foods and develop taste appreciation was therefore one of the strategies embodied in the programme.

In the 1980s, the Nuxalk were using only about 20 species of plant and animal foods from their traditional diet – a huge decline from the 70 or so traditional food species used earlier in the twentieth century. The continuing importance of salmon and ooligan was a main finding of earlier studies, which revealed that the Nuxalk were still eating significant amounts of salmon, ooligan grease and seafood – as much as they were able to get. They were also still hunting deer and some other animal foods at the time of the study. However, it has recently been noted (B. Tallio, personal communication, 2008) that the mule deer hunted in the 1950s and 1960s, along with the black-tailed deer, had declined to very low numbers by the 1980s; today, only black-tailed

deer are available. In addition, mountain goats, which were formerly very important for not only their meat and fat, but also their wool, skins, horns and bones, are no longer seen in the Bella Coola area. In the 1980s, some people were continuing to harvest traditional wild berries (29 original species were documented), especially huckleberries, blueberries, soapberries and salmonberries. However, many traditional plant foods – root vegetables such as springbank clover, Pacific silverweed, northern riceroor and woodfern (seven species documented) (Kuhnlein, Turner and Kluckner, 1982); greens such as cow parsnip and fireweed (12 species); and the inner bark of black cottonwood and other trees (three species) – were largely unused by the latter part of the twentieth century. Significantly, these healthy vegetable foods were being displaced by less healthy purchased, processed food in contemporary diets.

Investigating the reasons for this dramatic shift away from many local traditional foods was among the

aims of the Nuxalk programme. The causal factors are very complex and relate to, among many other factors, an array of regulations; time constraints due to wage jobs, school requirements and other obligations; loss of ability to pass on knowledge about foods from older to younger generations; prevalence and easier availability of marketed foods; concerns about pollution, declining populations and productivity; and loss of easy access to traditional food (Kuhnlein, 1984; 1989; 1992; Nuxalk Food and Nutrition Program Staff, 1984; Turner and Turner, 2008).

In British Columbia, aboriginal people have lower health status than the general population. Recent provincial data show life expectancy of 7.5 years less for aboriginal people, with higher rates and younger ages for all causes of death, although there has been steady improvement over the years. Between 1980 and 2002, life expectancy rose, for men from 58 to 68 years, and for women from 66 to 76 years. There

Table 11.1 Health promotion activities undertaken by the Nuxalk Food and Nutrition Program, 1983 to 1986

Activity	Numbers of events/participants	Notes
Food events involving elders, adults and youth	47/391	Included fishing, fish cutting and preserving, berry picking, greens and root gathering, bark gathering, ooligan grease preparation, children's food summer camps
Feasts and other meals featuring healthy traditional foods with advice and direction of elders	19/1 456	Included salmon barbecues, wild berries, greens and roots, ooligan grease. Often directed to specific populations groups (e.g., feasts for youth were very popular)
Public awareness and adult education	21/370 Not counted: many attending public events; weekly flyers to all homes	Included Mom's Time Out, adult nutrition classes, displays at fairs, weekly flyers. Included use and preparation of both traditional and available market food of good quality
School class presentations promoting traditional foods, good nutrition, dental health and hygiene, healthy lifestyle habits	94/2 716	Delivered in the Nuxalk Nation nursery school, 2 elementary schools and the high school
Fitness classes (regular and light aerobics) and fun runs	190/1 708 Not counted: fun run participants	Conducted by programme staff and David Bogoch of Bogie's Fitness, Vancouver. Included sessions at schools and sessions for overweight adults, adults with arthritis, and the general public
Designing and installing a Nuxalk food demonstration garden in the health centre yard	Visitors were not counted	Included a range of traditional food plants, from salmonberries and highbush cranberries and soapberries, to riceroor and <i>puuy'aas</i> (Labrador tea), so that people could see what these plants look like
Publication of a Nuxalk food system handbook and a recipe book prepared by programme staff	Distributed to all homes on reserve, and to many school classes	Included an overview of traditional Nuxalk and healthy market foods, safe preparation methods, and recipes contributed by community residents. These popular books were reprinted several times

Sources: Adapted from Nuxalk Food and Nutrition Program Staff, 1984; and Kuhnlein and Moody, 1989.



has also been reduction in infant mortality, which in 2001 was 4.0 per 1 000 live births, compared with 3.7 in the general population (Kendall, 2002). At the time of programme activities, unemployment was more than 30 percent, and formal education rarely exceeded ninth grade; fishing and logging industries provided seasonal employment for men (Census of Canada, 1981). In 2005, the situation was similar, with 30 percent of aboriginal peoples (versus 12 percent of the overall provincial population) having no formal education certificate, diploma or degree. Moreover, 30 percent of aboriginal peoples were unemployed compared with 20 percent of the general population (BC Stats, 2006).

A health-related quality of life survey conducted in 2001/2002 recognized lower scores for quality of life for Bella Coola Valley aboriginal people than for non-aboriginal people. The most prominent diseases were hypertension, depression, hyperlipidaemia, diabetes, chronic back/neck pain and osteoarthritis, with many co-morbidities. In particular, there was more diabetes among aboriginal valley residents, and they reported the worst scores for quality of life (Thommasen and Zhang, 2006).

Background objectives

The overall objectives of the Nuxalk Food and Nutrition Program were to understand and document the Nuxalk traditional food system, and to use this information as a platform for stimulating community activities to improve nutrition and health. From the project's initial stages, workshops and interviews to gather information about food and nutrition served as a culturally appropriate means of raising the profile of traditional food, and provided opportunities for elders to teach younger community members about the tastes and ways of preparing traditional foods. Explicit food, nutrition and health promotion activities were built into the programme. Assessments before and after the three-year intervention were conducted in 1983 and 1986, to assess shifts in household food use and health status. Follow-up after 20 years was conducted through consultations on the reserve in 2006.

Intervention methods and activities

The programme's health promotion activities are summarized in Table 11.1. Two project assistants were based at the on-reserve Nuxalk health clinic to facilitate the programme, with supervision from the community health nurse, the community health representative and other health staff. Activities were broad-based, emphasizing traditional food and lifestyles and contrasting these with current diet and physical activity practices. Process indicators were maintained to track participation and impressions of success for each activity (Kuhnlein and Moody, 1989).

More than 350 activities were conducted during the programme period, with thousands of individual participations. Many individuals and families participated in many events, and the programme was regarded as highly successful, with requests from other coastal British Columbia communities to provide advice and guidance for initiating similar programmes in their areas. Feasts, either as pot-luck or prepared by programme staff, were very popular events. The *Nuxalk Food and Nutrition Handbook* and the Nuxalk recipe book (*Kanusiam A Sncnik* "Real good food") described techniques for handling and preparing traditional and market foods. These were distributed to all families, and reprinted several times for use in school classes; they are still used today. Although approximately 25 percent of Nuxalk residents did not choose to participate – in particular, older men were rarely seen at events other than feasts – most people were aware of the programme and participated in several activities. Activities with the highest community participation were feasts, nutrition and dental education in schools, fitness activities, and activities based on the nutrition and health evaluation assessments (Kuhnlein and Moody, 1989).

During the course of the programme, the community's inventory of traditional food processing equipment increased, including through the building of ooligan grease bins and fish smokehouses, and collective purchases (at reduced prices) of food dryers, pressure and water-bath canners, and jars and tins for canning food. Teaching resources added to the health centre included a barbeque pavilion, an equipped fitness room and a

Table 11.2 Changes in Nuxalk family food use before and during the health promotion intervention programme

Food type	1981		1985		Difference 1981 to 1985 ^a
	% families (n = 73)	Average/family/year ^a	% families (n = 98)	Average/family/year ^a	
Steelhead	49	56.9 lb	77	156.3 lb	+ 99.4 lb*
Spring salmon	64	85.4 lb	90	349.2 lb	+263.8 lb*
Sockeye salmon	79	61.1 lb	90	195.8 lb	+134.7 lb*
Pink salmon	23	4.1 lb	25	58.8 lb	+54.7 lb*
Chum salmon	22	76.4 lb	48	143.3 lb	+66.9 lb*
Coho salmon	37	138.1 lb	76	187.0 lb	+48.9 lb*
Ooligans	75	122.4 lb	78	38.9 lb	-83.5 lb*
Cod	4	11.7 lb	47	23.0 lb	+11.3 lb*
Other fish/shellfish	11	15.1 lb	64	26.5 lb	+11.4 lb*
All fish roe	7	27.2 lb	76	72.5 lb	+45.3 lb*
Ooligan grease	46	62.5 qt	61	8.2 qt	-54.3 qt*
Game	30	76.3 lb	73	196.2 lb	+119.9 lb*
Wild berries	56	41.5 qt	87	49.1 qt	+7.6 qt
Wild greens	14	1.0 lb	64	17.3 lb	+16.3 lb*
Garden vegetables	38	533.9 lb	61	288.6 lb	-245.3 lb**
Garden fruits	7	132.9 lb	82	167.0 lb	+34.1 lb

1 lb = about 0.45 kg.
 1 qt = just under 1 litre.
 a Quantities only for families using the food.
 * $p \leq 0.001$.
 ** $p \leq 0.01$.
 Source: Adapted from Kuhnlein and Moody, 1989.

traditional plant food demonstration garden (Kuhnlein and Moody, 1989). Project staff also supported health clinic programmes for diabetes education, prenatal nutrition and fitness, and general healthy lifestyles.

Intervention measurements

In addition to the process indicators, which tracked activities and the participation they attracted, interviews were conducted in 1981 and 1985 to assess households' traditional food use and grocery store expenditures. These interviews were conducted by trained reserve-resident interviewers and completed by 65 to 70 percent of on-reserve families, with the woman in charge of the family's food usually being interviewed. At the time of these interviews, the prices for Agriculture Canada's "nutritious food basket", comprising 78 standard food items, were compiled for the one grocery market in

the village. In an attempt to assess bias, participants were selected on the basis of their representativeness of food use in the entire Nuxalk community, as judged by Band Council members.

Quantitative measurements were collected from nutrition status assessments conducted in 1983 and 1986. These assessments included anthropometry measurements, dental health examinations, dietary evaluations by 24-hour recall, and blood tests for evaluating retinol, carotene, haemoglobin/ferritin and red cell folate levels. As a service to the community, vision and hearing evaluations were also completed during the assessment period, and referrals were made for eyeglasses and hearing aids when needed. The assessments were completed among males and females in three age groups: 13 to 19 years, 20 to 40 years, and more than 40 years. The entire community was invited to attend the assessments; 370 individuals participated in 1983, and



Table 11.3 Improvements in Nuxalk physiological status for retinol, carotene, folate and iron before and after the health promotion intervention programme, ages 13 to more than 60 years

Nutrient	no.	Test 1 (before)	Test 2 (after)	Test 2-Test 1	p*
Beta carotene (µg/dl)	102	38.1 ± 1.4	60.0 ± 1.7	21.9 ± 1.5	≤ 0.05
Retinol (µg/dl)	101	23.9 ± 0.6	41.2 ± 1.8	17.3 ± 1.8	≤ 0.05
Ferritin (ng/ml)	104	41.0 ± 3.3	46.4 ± 3.9	5.5 ± 3.5	NS
Red cell folate (ng/ml)	92	221.2 ± 11.5	267.8 ± 11.7	46.6 ± 13.2	≤ 0.05
Haemoglobin (g/dl)	104	13.7 ± 0.2	13.8 ± 0.2	0.1 ± 0.1	NS

* Paired t-test.
Source: Adapted from Kuhnlein and Burgess, 1997.

477 in 1986 (Kuhnlein and Moody, 1989). Throughout the programme, interviews were conducted by local Nuxalk staff; university research assistants contributed to the health assessments in 1981 and 1986.

Intervention results and discussion

A key finding was the change in Nuxalk family food use from 1981 to 1985, which was assessed through interviews to record the numbers of families using each food and the quantities used by each family (Table 11.2). While the grandmother-mother-daughter interview study clearly demonstrated that fish was a mainstay in Nuxalk diets during the twentieth century, use of plant foods had declined (Kuhnlein, 1989; 1992). One important finding was that the percentages of families using each food increased, often doubling, which demonstrated the programme’s effectiveness in enhancing participation in traditional food harvesting and preparation. The significant increases in use of several species of fish and game were seen as improved use of these mainstay resources. The numbers of families using wild berries and greens, and garden fruit also increased. A notable exception was family use of the ooligan (*Thaleichthys pacificus*) and ooligan grease, which declined because of poor spawning conditions for the fish in 1985, although many families still had access to these resources during the period. More families produced garden vegetables in 1985 than in 1982, but the average weights produced declined significantly, primarily because potatoes were being grown by more people but on smaller plots (Kuhnlein and Moody, 1989).

The interviews also demonstrated that families were reducing their expenditures at the grocery store, from an average of CAD 104 a week to CAD 83 over the project period, while the cost of the nutritious food basket for a four-person family increased from CAD 105 to 125. Interview reports noted that the reduction in expenditures was directly due to increased use of home-harvested and -preserved food, as well as new knowledge of economical shopping practices (Kuhnlein and Moody, 1989).

The programme was evaluated before and after intervention activities, using nutrition assessments and venous blood tests for three micronutrients: vitamin A, folate and iron (Kuhnlein and Burgess, 1997). Table 11.3 summarizes the findings from these assessments. Adults of both genders had increased levels of carotene, retinol and folate in their blood. From paired comparisons (among those participating in both assessments), significant improvements were shown for carotene, retinol and folate in the community at large. Youth were at risk of iron (ferritin), carotene and folate shortages, but improved their status for these nutrients during the programme.

Dietary change was assessed from 24-hour recalls among women aged 20 to 40 years, conducted in 1981 and 1986. Table 11.4 shows changes in intakes of fruit, vegetables and selected nutrients. Significant increases are shown for the amounts of all fruits and vegetables and for the nutrient intakes of vitamin A, iron and folate. During this period, the percentages of women achieving less than 50 percent of the recommended intakes (for that time) of vitamin A, iron and folate

Table 11.4 Improvements in dietary intake for Nuxalk women aged 20 to 40 years before and after the health promotion intervention programme

Nutrient	1981 mean ± SD (n = 31)	1986 mean ± SD (n = 62)	p
Vitamin A (IU)	2 267 ± 1 810	5 599 ± 9 198	0.008
Iron (mg)	7.66 ± 4.01	10.36 ± 3.81	0.002
Vitamin E (µg)	2.35 ± 1.75	4.57 ± 3.09	0.000
Folate (µg)	78.03 ± 53.3	132.92 ± 101.64	0.001
Fruit (g)	123 ± 145	289 ± 324	0.001
Vegetables (g)	93 ± 110	143 ± 116	0.050

Source: Adapted from Kuhnlein, 1987.

declined. Improvements in intakes of several other nutrients were also noted (Kuhnlein, 1987).

Dental health education was conducted by project assistants at prenatal classes and on-reserve schools; dental evaluations and referrals for dental treatment were made by the same Health Canada dental team in the pre- and post-test periods (1983 and 1986). Table 11.5 shows that all age groups of children, except two-year-olds, had fewer teeth recorded as “decayed, extracted, missing or filled”. Improvements were also noted in the numbers of Nuxalk children and young adults aged 20 to 29 years who were free of periodontal disease (assessed as oral health category 1) during the course of the programme (not shown) (Kuhnlein, 1987).

Anthropometric assessments of both adults and children did not change significantly between 1983 and 1986. The same proportions of overweight and obesity existed, in both children and adults, and there was negligible underweight in all categories. The extents of chronic diseases were not assessed in either survey. Although there was modest concern about diabetes at the time, the programme did not emphasize weight loss or diabetes control, except by encouraging more physical activity.

In summary, impressive changes were made in the food use and health status of Nuxalk from 1981 to 1986. These were reflected in increased numbers of families using Nuxalk traditional foods, and larger amounts of most of these foods being used by each family. Dietary intakes of young Nuxalk women showed

increased fruit and vegetable use, and better nutritional intakes of vitamin A, folate and iron. As expected from this better diet, all members of the community registered improved health status for vitamin A, folate and iron, which have numerous health benefits. Dental examinations revealed substantial improvements in dental health and hygiene.

Although the Nuxalk Food and Nutrition Program was prominent in the community during this period, it is not clear which activities from it and which from other health initiatives were responsible for these specific benefits. However, as the community health nurse and staff noted, the Nuxalk Food and Nutrition Program was the only one providing broad-based food or nutrition education or dental health activities in the community at the time. The community’s positive response to programme activities, and the improvements documented over the period encouraged community leaders to maintain their commitment to enhancing the use of Nuxalk cultural food resources and traditional health activities while embracing other healthy foods and modern health programmes and services.

Revisiting the Nuxalk Food and Nutrition Program, 2006

The successes documented over the course of the original Nuxalk Food and Nutrition Program were impressive, and led to interest in knowing the longer-term effects that the programme had had on the community. Therefore, in July 2006 – 20 years after the original final assessment – the community’s perspective on the programme’s impact was investigated as part of the Centre for Indigenous Peoples’ Nutrition and Environment (CINE) Global Health Program. Many of the original Nuxalk programme participants were visited, and qualitative open-ended interviews and discussions with community leaders were conducted. Many interviews were included in a film (KP Studios, 2008) examining the longer-term outcomes of the project. In 2006, many of the children, youth and young adults who had participated in the original programme had become parents or grandparents, and many of the elders had passed away.

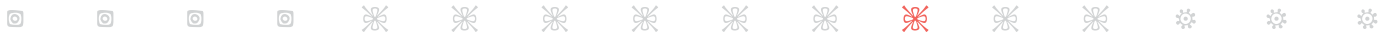


Table 11.5 Improvements in dental health of Nuxalk children before and after the health promotion intervention programme

Age (years)	1983			1986			Difference
	<i>n</i>	<i>DEF</i>	<i>DMF</i>	<i>n</i>	<i>DEF</i>	<i>DMF</i>	<i>DEF + DMF</i>
2	7	1.4	–	7	3.7	–	+2.3
3	6	7.8	–	11	6.7	–	–1.1
4	10	7.6	–	14	5.9	–	–1.7
5	20	9.2	0.2	21	7.4	–	–2.0
6	10	9.5	0.9	13	6.7	1.2	–2.5
7	15	6.3	2.1	22	5.1	1.6	–1.7
8	21	7.7	4.2	15	4.7	1.9	–5.3
9	14	3.1	4.3	14	4.9	2.4	–0.1
10	20	3.1	5.2	17	2.5	4.2	–1.6
11	9	2.9	6.3	20	2.2	6.3	–0.7
12	14	0.2	10.3	15	0.1	5.6	–4.5
13	10	–	11.0	18	0.3	8.9	–1.8
14	11	–	13.4	8	–	13.1	–0.3
15	7	–	13.6	11	–	14.8	+1.2
16	5	–	18.6	5	–	11.6	–7.0
17	11	–	17.4	7	–	14.4	–3.0
18	5	–	15.0	7	–	17.7	+2.7
19	5	–	14.0	3	–	18.6	+4.6
Total	200			228			

DEF = average number of decayed, extracted or filled deciduous teeth.
 DMF = average number of decayed, missing or filled permanent teeth.
 Source: Adapted from Kuhnlein, 1987.

Those taking part in the 2006 survey were consulted about their views of the programme and the future for health and nutrition in general. Intervention activities were well remembered, and participants had fond recollections of the feasts that were held, especially for youth, to promote healthy traditional food. People also remembered the spring picnic, when a cottonwood tree was cut down so that elders and youth could harvest the succulent inner bark; many of the elders had not tasted this food for many years. The Moms-and-Tots sessions of instruction and training on traditional food, led by elders, were also remembered with pleasure, and many of the women highlighted the opportunities for learning from elders. Almost everyone still had and used the two handbooks that were published as part of the project (Nuxalk Food and Nutrition Program Staff, 1984;

1985), and plans were under way to republish these in an updated format. One handbook had been repeatedly reprinted over the years for use in local schools.

Most programme activities were remembered and continued to feature in people’s lives through their activities and appreciation of traditional foods and the local environment. One indication of this interest was people’s participation in a community plant identification and cultural awareness hike along Thorsen Creek, facilitated by traditional Healer Sam Moody and Community Health Representative Thelma Harvey. Participants wanted to know the names of plants, in both English and Nuxalk, and their cultural significance and potential applications as food or medicine. The importance of clean environments and fresh drinking-water was also reinforced, as the

group walked alongside the rushing waters of Thorsen Creek and witnessed some of the impacts of industrial logging in the Bella Coola Valley. Frustration and concern were expressed about the declining salmon stocks and disappearance of ooligan from the Bella Coola River (Moody, 2008).

Lessons learned and considerations for the future

The Nuxalk community retains an impressively strong interest in healthy food, including the harvesting and processing of traditional local foods, resulting from its whole-hearted response to the Nuxalk Food and Nutrition Program. Shortages and lack of access to some of these foods make it likely that fewer are now being used regularly, but the youth and young adults of 2006 showed great interest in them. Some of the foods known to elders in the 1980s, such as the inner bark of trees and traditional root vegetables, were virtually unknown to younger people in 2006, but most of the traditional foods documented in the original study were still familiar to many people. Foods that were still being used by the younger generations in Bella Coola included all five species of salmon, steelhead, trout, herring, ooligan, cod species, salmon eggs, crabs, clams, some berries (e.g., blackcaps, wild raspberries, salmonberries, soapberries), thimbleberry shoots, seaweed, Labrador tea, cow parsnip, deer, moose, duck and grouse. People have adapted these foods for modern recipes, such as sushi from Bella Coola fish and special sauces and preparations for marinating and barbecuing fish. In some cases, freezers have replaced smoking and canning for preserving fish and other traditional foods. The 2006 survey made it clear that there was much discussion of food, health and the cultural values of food – reflecting, at least in part, the original Nuxalk Food and Nutrition Program’s support and promotion of traditional food.

Local community members and health staff designed and organized a number of activities that – although not directly related to the original project – can be considered as spin-off projects. These include building a community garden, which was planned in conjunction with the day care centre in the older part of the village and set up

in the newer Four-Mile housing development. Fresh produce from this garden – peas, carrots, potatoes, beets, spinach and other vegetables – was used by participating organizations and families, and shared with elders and families in need. Another very productive on-reserve garden, set up as part of the current Prenatal Nutrition Program, included traditional medicinal plants. Other activities included food safety classes, the development of a community kitchen, outdoor education tours focusing on traditional foods and medicines, and grocery tours to help people assess the value of different foods in terms of nutrition and cost.

Fitness events and classes were organized, many of them inspired and led by elders. One woman in her late seventies started climbing up and down the 116 steps to the community water reservoir for exercise. Others soon joined her, until as many as 50 or 60 people a day were following her example. Some elders started to use pedometers to measure the distance they walked, and friendly competitions sprang up, with younger people following the elders’ lead. A Nuxalk leader remarked that he regularly (almost daily) walked the 4 miles (6.4 km) from his home to the Band Council offices on the reserve: “It saves my life to do this exercise” (A. Pootlass, personal communication, 2008). This is a result of his learning the benefits of fitness in the Nuxalk programme.

Encouragement in the form of contests and prizes made the efforts even more fun. A community fitness centre with weights and exercise equipment became very popular with diabetic individuals and the community at large, and was also used for nutrition education events. In 2006, 23 people from Bella Coola, including two elders in their seventies, took part in the Sun Run, a 10-km run or walk in Vancouver, with more than 59 000 participants.

Nutrition and lifestyle education programmes directed at children and youth were particularly valuable. These community-based programmes stressed not only good nutrition and exercise, but also the mental, emotional and spiritual aspects of health and fitness. A comprehensive wellness plan incorporating all the components of healthy living was being planned in community-led health and nutrition initiatives.



Awareness of the importance of Indigenous Peoples' food for healthy living was recognized and acknowledged by virtually everyone interviewed in 2006 in the Nuxalk community.

Unfortunately, some of the intervention activities that had had initial success in increasing the awareness and use of traditional foods by Nuxalk community members were later eclipsed by negative environmental impacts on some of the traditional food species. Since the end of the original programme in 1986, salmon stocks throughout the west coast have dwindled notably; sockeye and spring salmon in particular are less plentiful than they were 20 years ago. The ooligan, which is of immense cultural importance to the Nuxalk and was a focus of the original project, has declined drastically over the past decade, as its coastal communities and springtime spawning runs on the Bella Coola River have disappeared. The decline of the ooligan has been alarming for the Nuxalk, and for other coastal Indigenous Peoples who relied on grease as an important part of their diets and nutrition. In June 2007, the Nuxalk hosted a mourning feast at which indigenous communities and fishery biologists on the British Columbia coast commemorated the lost ooligan runs (Senkowsky, 2007). Feasting is a long-standing cultural tradition for the Nuxalk and other First Nations in the region, and is used to recognize important occurrences, including memorials of those who have passed away. A feast was therefore a fitting way to mark the passing of the ooligan, and to discuss how it might be restored in the future. Abalone is another traditional food that is no longer available; commercial overharvesting of this valuable shellfish in the 1970s and 1980s resulted in a general collapse of populations, which have still not recovered, despite an ongoing moratorium against abalone harvesting by the Department of Fisheries and Oceans (IUCN, 2008).

The continuing decline of local food traditions also reflects a general, global trend among local and Indigenous Peoples, as more and more people around the world are consuming food that is produced, processed and marketed at a global scale (Nabhan, 2006; Turner and Turner, 2008). As do many other remote food stores, those of Bella Coola now provide a wide range of products from other parts of the world

– such as mangoes and packaged cashews – and it is not surprising that people seek out and enjoy these.

In the 1980s interviews, diabetes was emerging as a health problem, but its immensity was not recognized at the time. Now, in the twenty-first century, the incidence of diabetes has grown to almost epidemic proportions among First Nations people, including the Nuxalk. An overall healthy lifestyle promotion programme focusing on children and youth will likely be the most successful strategy for addressing and reversing this situation.

Opportunities for promoting traditional food systems for Indigenous Peoples

Chapter 3 in this volume (Turner, Plotkin and Kuhnlein, 2013) draws attention to the complex environmental concerns that affect the traditional food systems and cultures of Indigenous Peoples around the globe. The Nuxalk and other communities of western Canada are certainly facing severe environmental challenges, including declining populations of some of their key traditional food resources: sockeye salmon, ooligan and abalone. Added to these challenges are concerns about pollution from local sewage outfalls at the Bella Coola River estuary; deforestation and loss of old growth from Nuxalk lands; and the introduction of invasive plant species that might out-compete indigenous species. Degradation of camping sites, impacts from widening roads and increasing traffic, and declines in productivity of berries are other environmental problems that people have noted.

An over-riding concern is global climate change, which is facing Indigenous Peoples and environments everywhere. People on the west coast of Canada have noted many changes in species distributions, seasonal rainfall and snowfall, and local weather patterns in general (Turner and Clifton, 2009). There are indications that the declines in salmon and ooligan may be related, at least in part, to climate regimes. In general, warmer water temperatures reduce the fitness, survival and reproductive success of salmon, facilitating potential long-term population declines (Ministry of Environment, 2002).

There are other challenges to the promotion and use of traditional food for the Nuxalk and other coastal First Nations. The rising costs of fuel and of operating boats and vehicles reduce the opportunities to travel for food procurement and other purposes. Many traditional Nuxalk territories have been privatized and are no longer easily accessible for food harvesting. There are also difficulties in linking children and youth to elders and knowledge holders and in providing appropriate opportunities for passing on important traditional knowledge about food and survival (Turner *et al.*, 2009).

Nuxalk and other First Nations recognize that these obstacles have to be faced and overcome, if they are to maintain their cultural integrity and the health and well-being of their communities (Kuhnlein, 1995; 2001a; 2001b; Parrish, Turner and Solberg, 2007; Senos *et al.*, 2006). There are many ideas for strengthening and supporting healthy traditional food systems (Chapter 14 – Kuhnlein, 2013). However, it is important to remember that a multiplicity of cumulative factors has caused the erosion of traditional food systems, so problems cannot be addressed by only one or two measures; instead, an array of different intervention strategies is needed, for use at different scales and with different audiences. It is important to continue the educational and intervention strategies that showed success in the original Nuxalk Food and Nutrition Program, especially those involving children and youth and hands-on experiential learning, such as harvesting expeditions, science camps and school projects.

The changing of lifestyles and healing of environments take patience and time, and must be evaluated carefully to demonstrate effectiveness and provide guidance to continuing efforts. It is crucially important that successes such as those from the Nuxalk Food and Nutrition Program be recognized and celebrated, to encourage further community development and action. It is only through patience, vigilance and positive, directed action that the transformations necessary for the continued well-being of the Nuxalk community can be realized (Thompson, 2004; Turner and Thompson, 2006; Turner *et al.*, 2009) ✨

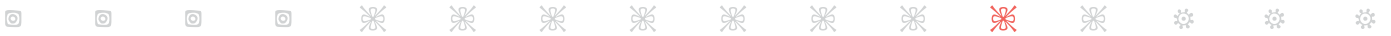
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Chapter 12

Let's Go Local!

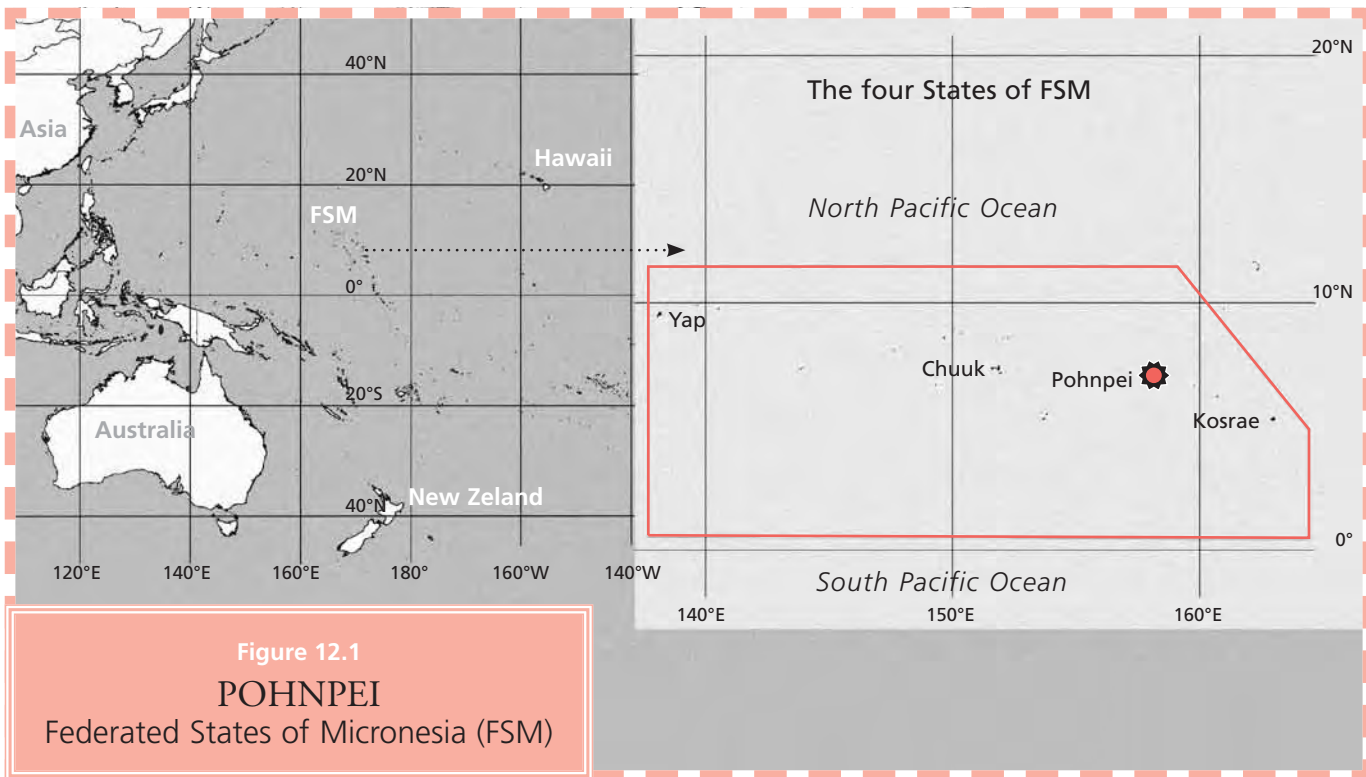
Pohnpei promotes local food production and nutrition for health

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Data from ESRI Global GIS, 2006.
Walter Hitschfield
Geographic Information Centre,
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Key words > Pohnpei, Micronesia, traditional food, provitamin A, carotenoids, energy, obesity, diabetes, vitamin A, community, participatory, inter-agency approach, Indigenous Peoples, food security

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“Let’s Go Local! Grow and eat local foods for their ‘CHEEF’ benefits: culture, health, environment, economics and food security.”

Island Food Community of Pohnpei

Abstract

The Pohnpei community intervention programme took place in Mand community, Pohnpei, Federated States of Micronesia (FSM) from September 2005 to June 2007. The programme aimed at increasing the production and consumption of locally grown foods and improving health. A community-based, participatory, inter-agency, multiple-methodology approach was used, with all age groups in the community participating in programme activities. The programme had two phases: phase 1 involved documenting the traditional food system and imported foods, and assessing health status, using the Centre for Indigenous Peoples’ Nutrition and Environment methodology; phase 2 involved two sub-phases. In phase 2a, promotion and intervention activities focused on building awareness through workshops, competitions (weight loss, planting and cooking), mass media, posters, billboards, postage stamps, postcards and other materials; the conservation of rare crop varieties; and small-scale food processing. In phase 2b, the impact of promotion and intervention activities carried out in phase 2a was evaluated. Activities for expanding the programme continue.

Phase 1 revealed neglect of the traditional food system, reliance on rice and other imported processed foods, and high incidence and prevalence of overweight, obesity and diabetes among adults, and of stunting, vitamin A deficiency and dental decay among children. Detailed studies initiated in 1998 revealed that local staples, including yellow- and orange-fleshed banana, giant swamp taro, breadfruit and pandanus varieties, are rich in nutrients. They contain substantial levels of provitamin A and other carotenoids, which are important in alleviating vitamin A deficiency and other chronic diseases such as diabetes, heart disease and cancer. Promotional activities based on the campaign slogans – “Let’s Go Local” and “Going Yellow” – were adopted widely throughout FSM to promote local foods and yellow- and orange-fleshed staple crop varieties.

The project impact evaluation revealed a significant decrease in rice consumption; an increase in the consumption frequency of local banana varieties, giant swamp taro and

vegetables (including green leaves); an increase in the intake of local food diversity and provitamin A carotenoid; and a positive change in attitude towards local food. The Pohnpei Go Local campaign also created interest nationally and regionally.

Background: context of the research site

The Federated States of Micronesia (FSM) is an independent island country located in the western Pacific Ocean. It comprises 607 islands and has a population of 107 434 people (July 2009 estimate) (FSM Department of Economic Affairs, 2002; CIA, 2010). The country is divided into four states: Pohnpei, Chuuk, Yap and Kosrae.

Pohnpei, a mountainous island about 40 km in diameter and 355 km² in area, is the location of the FSM national government. It is situated 6° 55 north latitude and 158° 15 east longitude (Figure 12.1) (CIA, 2010). Pohnpei State (population about 34 500) includes the main island of Pohnpei divided into five municipalities – Nett, U, Madolenihmw, Sokehs and Kitti – and five main outlying low atoll islands with distinct languages and cultures: Sapwuaifik, Nukuoro, Kapingamarangi, Mwoakilloa and Pingelap.

Pohnpei Island has rich agricultural resources, while the atolls have hot dry climates and poor sandy soils that make it difficult to grow crops.

Demographic and cultural characteristics of the study site

The intervention study site is Mand community, Madolenihmw Municipality in Pohnpei State. It is a rural community, about a 40-minute drive on a paved road from the town centre of Kolonia. The average annual temperature is about 27 °C, with heavy rainfall and verdant tropical vegetation. Agricultural resources are abundant all year round.

Context of the food system

FSM's economy is based on subsistence farming and fishing. Sources of cash income include formal employment, agriculture, remittances or pensions, and fishing (Drew, 2008). More than 25 percent of the population is considered to be living below the poverty line (Abbott, 2004; CIA, 2010). Because of the availability and convenience of imported processed foods, traditional methods of local food preservation have been greatly neglected, and there has been little uptake of modern methods for the small-scale processing of local foods (Englberger, 2003; Englberger, Marks and Fitzgerald, 2003b).

The main crops of the Pohnpei traditional food system include many varieties of banana, breadfruit, taro and yam, which are consumed with coconut, fish and seafood; foods eaten as snacks include fruits and sugar cane (Merlin *et al.*, 1992; Raynor, 1991). Vegetables (other than the traditional starchy staple foods) have only recently been introduced. Pohnpei society apparently had good nutrition status up to the 1950s, when people consumed mainly traditional staple food crops and had traditional lifestyles with ample physical activity (Murai, Pen and Miller, 1958).

The neglect of Pohnpei's traditional food system and the shift towards processed, less healthy imported foods accelerated in the 1970s. The causal factors for this change include the availability of convenience food; the high status and low cost of imported white rice, flour, sugar, fatty meats and other refined processed foods; changing lifestyles and family structures; the shift from subsistence farming to a market economy and

cash employment; inconsistent external and internal government policies and food aid programmes; the large sums of money made available through the Compact of Free Association with the United States of America; and modernization and globalization.

The shift to imported foods in Pohnpei and other parts of Micronesia has been more drastic than in many other parts of the Pacific (Schoeffel, 1992). From 1885 until the end of the Second World War in 1945, Pohnpei was colonized by three colonial powers: Spain, Germany and Japan. In 1945, it and the other islands in what is now FSM became part of the United Nations (UN) Trust Territories of the Pacific Islands under United States of America administration. In 1961, the UN criticized the United States of America for neglecting the islands, and development activities greatly increased soon after.

One set of controversial programmes that greatly influenced FSM food habits were the United States Department of Agriculture (USDA) supplementary feeding programmes. These started in the 1960s, increased in the 1970s and continued into the 1990s. USDA surplus commodities (including rice and tinned foods) provided food for school lunches, needy families, the elderly, and disaster relief in Pohnpei (Schoeffel, 1992; Englberger, Marks and Fitzgerald, 2003b). The 30-year United States School Lunch Program and other food aid programmes introduced rice and processed foods to many children and adults in Pohnpei, establishing new food habits, attitudes and food tastes that persist today.

In 1986, FSM became independent but kept close ties to the United States of America through the Compact of Free Association (CIA, 2010). Large sums of money were provided to FSM communities, giving opportunities for jobs and cash for purchasing store foods that are mainly low in nutrients. The first Compact ended in 2001, but a second Compact renegotiated in 2003 provides large amounts of development funding annually up to 2023.

Overall health and nutrition status

A large health study conducted in Pohnpei in the late 1940s identified no diabetes (Richard, 1957; Hezel, 2004). However, by the late 1980s, the prevalence rates



of overweight, obesity and diabetes, along with those of other non-communicable diseases such as heart disease and cancer, were rapidly increasing, and these conditions were becoming problems of epidemic proportion (Coyne, 2000; Elymore *et al.*, 1989; Englberger, Marks and Fitzgerald, 2003b). For example, the STEPS survey¹ of Pohnpei showed that more than 70 percent of the adult population aged 25 to 64 years (both sexes) was either overweight or obese (more than 80 percent of women were classified as overweight) and 32.8 percent of adult participants (both sexes) were diabetic (WHO, 2008).

A global report indicated that FSM had the second highest national prevalence of obesity in the world, ranking below only Nauru, another Micronesian island country (Streib, 2007). Of the ten countries in the world listed as having the highest obesity rates, eight were Pacific Island countries. Although the data considered in this 2007 report vary by sampling procedures, age groupings and year(s) of data collection, making it difficult to interpret country rankings, the situation in Pohnpei and other parts of the Pacific has undeniably become serious. Many families are suffering, and the problem has escalated, as reflected in the STEPS survey (2008). One projection indicates that if behaviour changes in diet and activity are not introduced, by the next quarter century more than half of Pohnpei adults will be diabetic (CDC, 2000).

Pohnpei also has a serious micronutrient deficiency problem. In 1993, more than half of its children under five years of age had vitamin A deficiency (Yamamura *et al.*, 2004). To alleviate this deficiency, a vitamin A supplementation programme was established for all children aged one to 12 years. However, there have been logistical and organizational difficulties with distributing the supplements.

Rationale and objectives

Similar to the situation in other indigenous communities globally, FSM's indigenous foods that are rich in carotenoids and other phytochemicals

have been neglected owing to the transformation of food habits. The change in food habits from fresh traditional foods to processed imported foods has been accompanied by high prevalence of overweight, obesity, diabetes, heart disease and cancer among the adult population, while micronutrient deficiencies, such as of vitamin A, are prevalent among children. Responding to growing concern about the emergence of nutrition and health-related epidemics related to change in diets, this project sought to revive the use of neglected traditional foods among the traditional community of Mand in Pohnpei.

The objectives were to:

- improve awareness of the high nutritional values of local foods;
- increase the production and consumption of local Pohnpei foods and varieties, especially those rich in carotenoids and other nutrients;
- evaluate the project using health status measures and awareness indicators, locally, nationally and internationally.

Methodology

A research agreement was established in March 2005, jointly signed by the Mand community leader, the Island Food Community of Pohnpei (IFCP) and CINE (Englberger *et al.*, 2005; 2009b; 2010b).

The Pohnpei case study consisted of two phases, which took place over a period of five years (May 2005 to March 2010):

- phase 1: documentation of baseline data on the contemporary food system (May to August 2005);
- phase 2: intervention activities and evaluation: phase 2a (August 2005 to August 2007) involved intervention and administrative activities, many of which were island-wide, and collection of qualitative data and process indicators (August 2005 to May 2007); and phase 2b was an evaluation of the programme (June to August 2007).

In June 2009 a further assessment of the diet was conducted, following a two-year absence of intervention activities in the target village of Mand.

¹ STEPS is a World Health Organization (WHO) research process tool for non-communicable disease risk factor surveillance: www.who.int/chp/steps/manual/en/index.html

Study site

Mand community was chosen because it fulfilled the overall study criteria. These included being a rural indigenous community comprising about 500 people, being accessible for transport, and being willing to participate. A group of settlers from the Pohnpei atoll of Pingelap occupied the village in 1954, and Pingelapese people are still its original inhabitants. An additional selection criterion was the availability of staff from collaborating agencies that had strong linkages with Mand community and could assist the project.

Participatory research

The study adopted a community-based, participatory, inter-agency, multiple-methodology approach, including social marketing. Ethnography (Fitzgerald, 1997)² was used for continual assessment of the situation in the community and for considering the intervention approaches that might be most effective. With coordination by IFCP, activities were facilitated by government and non-governmental agencies, including the Pohnpei State Departments of Health, Education, and Land and Natural Resources; the Offices of Economic Affairs, and Social Affairs; the College of Micronesia (COM)-FSM Cooperative Extension Services (CES); USDA's Natural Resources Conservation Service; the Conservation Society of Pohnpei; and Peace Corps Micronesia. Other partners included V6AF Radio, Island Cable Television, Kaselehlie Press, FSM Telecom, Micronesia Seminar and local businesses.³

Mand community members in all age groups were well informed about the projects and were encouraged to participate. Some project facilitators were selected because of their close relationship to the community and their commitment to the project. All meetings

and intervention activities were announced on the community hall notice board and at church and other community events. Community leaders and members were trained and fully informed about the project prior to their full engagement in the planning and implementation of appropriate activities. Individual consent for participation in both phases of the study was obtained. This included getting permission for the use of photographs in newspaper articles and film interviews.

As staff from many agencies assisted in this project, an inter-agency approach was also used to prepare this chapter. Many individuals assisted voluntarily, because they were passionate about the project and its importance. Activities were carried out throughout the island of Pohnpei, but the intervention's effects were documented in the community of Mand.

Phase 1: documentation phase

This phase involved documenting the traditional food system through focus group discussions, in-depth interviews of key informants, literature review, photography and observation. These took place during community meetings, home visits and visits to organized meetings in both Mand community and Kolonia, where some community members work and live.

Key informants

These were selected on the basis of their expertise on specific topics, for example individuals (mostly elderly men) with long experience of identifying fish were selected as key informants on fish.

Analysis of neglected local foods

This involved a series of studies, which were published in several papers (Englberger *et al.*, 2003a; 2003b; 2003c; 2006a; 2008; 2009a; Thakorlal, 2009). Sampling and analysis methodologies are described in detail in specific papers.

Cross-section baseline survey

This included the gathering of baseline data from a random sample of households in Mand, using dietary assessment via seven-day food frequency questionnaires

² Ethnography includes such methods as informal focus group discussions, in-depth interviews of key informants, literature review, photography and observation.

³ V6AF radio broadcast many project items; Island Cable Television provided multiple airings of IFCP-supported videos; and Kaselehlie Press published project items in its biweekly newspaper issues. FSM Telecom issued a telephone card promoting the state banana of *Karat*, and published a two-page insert on IFCP's work in its annual telephone directories from 2008 to 2010, including a photograph of this case study. Micronesian Seminar assisted in producing promotional films, and local businesses displayed and distributed IFCP promotional materials in their shops.



(FFQs) and two 24-hour recalls on non-consecutive days; health status assessment by anthropometry, fasting blood glucose (FBG) and blood pressure measurements; and agroforestry and socio-economic questionnaires.

Phase 2: promotion and intervention phase

Activities were promoted and implemented at three major levels: community, state/national, and regional/international. Qualitative assessments, including observation, key informant interviews, focus group discussions, field notes, process indicators, photographs and a Mand log of activities, were used to supplement other data collection methods in both phases and in planning.

Throughout this phase, the focus was on facilitating effective behaviour change, such as by identifying the factors to be considered when designing food-based interventions for Micronesia (Englberger, Marks and Fitzgerald, 2003a); the predisposing, enabling and reinforcing factors of specific issues and problems (Green and Kreuter, 1991); and factors relevant to dietary change and the promotion of traditional food systems (Kuhnlein and Pelto, 1997; Barker, 1996; Pollock, 1992; Shintani *et al.*, 1991).

Activities at the community level

General community meetings. The main purposes of these were to document the contemporary food system and discuss and plan activities appropriate for the intervention phase. Two larger meetings were organized: one in Mand, to allow community participation; and the other in Kolonia, to bring together relevant government and non-governmental agencies and Mand community. Children were encouraged to attend meetings, where they usually viewed films and tasted local food dishes. At these meetings, two major themes were agreed as the focus for all community activities:

- awareness of local foods' value and importance for health;
- training on how to grow and utilize local foods better, including new recipes and appropriate

technology, and involving adults and youth of different ages.

Campaign slogans. The three slogans communicated project concepts in a simple, powerful way, which helped people remember and talk about the project, thereby assisting the process towards behaviour change:

- The project revived the “Let’s Go Local” slogan, which was coined in the 1980s by a local leader who encouraged retaining traditional values and customs, including growing and consuming local food. This slogan was used on billboards (see Photographic section, pp. XXV to XXVIII), in songs and videos, on t-shirts, as a title for newspaper articles and a topic for radio programmes, and in face-to-face interactions.
- “Going Yellow” conveyed the “Yellow Varieties Message”, emphasizing that yellow-fleshed varieties of fruits and vegetables are rich sources of nutrients that have health benefits. This slogan restored interest in local food varieties that were commonly consumed in the past, but have been neglected in recent years. It was used in local Pohnpei food posters, songs and videos, on t-shirts and in face-to-face discussions.
- “Practise What You Preach” refers to putting into practice the “Let’s Go Local” slogan. It encouraged people to prepare and serve local foods and drinks at community functions and meetings.

Mand Community Working Group meetings. General community meetings were followed up by meetings of the Mand Community Working Group, whose members are local leaders interested in participating in the project. The main purposes of these meetings were to plan, decide and implement appropriate approaches and activities for promoting local foods, raising awareness and conducting intervention activities in the Mand community. A total of 500 community members took part in 78 meetings between September 2005 and June 2007, with about 20 to 30 adults attending each. Meetings were usually held in the community hall in the evenings, when people were

more likely to be able to attend. Activities included the following:

- *Group interviews*: People were interviewed on the foods they had eaten that day (starchy staples, rice, fruits, vegetables) and there were occasional quizzes on topics related to the theme of the week.
- *Meeting bags* (for new members): The bags contained information materials for the project, including illustrated newspaper articles, colour photographs of members, local food promotion leaflets and a list of project activities. These were given to new members of the Mand Community Working Group, to welcome them and familiarize them with the project.
- *Planning of upcoming activities*: Promotion and intervention activities were planned and endorsed; individual members were consulted and their consensus was sought.
- *Awareness activities*: These included talks, films, weight and waist measurements, field trips and photography.

Invited guests gave brief talks on healthy lifestyles, understanding diabetes, the Yellow Varieties Message, container gardening, weight loss and management, dental care, and breastfeeding. The talks included the use and introduction of teaching materials, such as the Pohnpei local food posters, the Pohnpei bananas booklet, and the Pacific indigenous foods poster.⁴ The talks aimed to improve community members' understanding of the relationships among diet, lifestyles and health.

Films shown included *Going Yellow*, to reinforce project messages and provide enjoyment. Local foods and community members were regularly filmed and photographed. Film documentaries were prepared for promoting local food, and one was put online.⁵ Others were shown on local television or distributed as videos and DVDs for use at family gatherings. Photographs of Mand community members and their families were used as gifts and souvenirs of project activities, which also reinforced local food promotion messages and generated positive feelings about the

project. Photographs were taken for newspaper articles, other publications and presentations at local, national or international meetings; for a recipe collection (Levendusky, 2006); and for local promotion materials, such as three FSM national postage stamps.

Guidelines were given on the use of healthy local refreshments at meetings and in the home. Families were told that all the refreshments they brought to meetings had to use local foods and be prepared hygienically using healthy ingredients (low in salt, fat and sugar). Serving plates and baskets had to be of local biodegradable materials (leaves or woven baskets). Families were told that this saved a lot of money and was also good for the environment. Families providing refreshments for meetings received small payments, as an income-generating activity (this was rotated to give all families an opportunity).

Planting materials, including banana, soursop and citrus seedlings, were distributed to farmers and other interested people. Some varieties of banana (e.g., *Karat* and *Utin Iap*) and coconut (e.g., *Adohl*, which has a sweet husk that can be consumed) are quite rare, and few families had lemon grass, which grows easily and can be made into a tasty hot or cold drink. Provision of these planting materials was important in helping families to start growing these crops.

Demonstrations of ways of minimizing fat, salt and sugar consumption focused on baking, boiling or grilling (versus frying) and the use of natural sweeteners, such as ripe banana, coconut juice or fresh sugar cane. Families were told that excessive sugar and fat contribute to overweight and obesity and lead to specific illnesses, and that sugar contributes to dental decay and salt to high blood pressure, serious health problems and death. Families were encouraged to eat more unprocessed, fresh foods that are low in fat, salt and sugar, and are important for healthy and happy living.

Although recipes were not prepared at the meetings, ways of preparing dishes, with ripe local fruit and nuts for desserts and snacks, were described, so families learned new recipes.

Efforts were made to convey simple health messages, including the following:

- People's health is affected by what they eat.

⁴ www.islandfood.org
⁵ www.indigenousnutrition.org



- Local food items are rich in essential nutrients, while many processed foods lack nutrients or contain low amounts, and may contain too much fat, salt or sugar.
- Yellow- and orange-fleshed banana, giant swamp taro, breadfruit and pandanus are rich in β-carotene and other carotenoids, providing health benefits⁶ (the Yellow Varieties Message).
- People should avoid eating large amounts and should generally eat less than they desire.
- People need sufficient physical activity to stay healthy.

Cooking, serving and documenting traditional dishes.

During a 14-day Expanded Food and Nutrition Education Program course conducted by COM-FSM's CES, community members were trained about the nutritional and health importance of local foods and how to cook foods that are easily available but neglected or underutilized, such as green leafy vegetables, banana blossom and green papaya, as well as introduced vegetables⁷ that families can grow easily.

Planting and weight loss competitions. Mand Community Working Group members were selected and trained to monitor planting and plant management activities, and to visit competitors' plantations. The purpose of this activity was to stimulate community members' interest in and commitment to growing and consuming healthy local foods. As part of the weight loss competition, weight, height and waist measurements were recorded. Counselling services were provided to people who required them, especially those found to be overweight, obese and/or suffering from nutrition-related disease. Participants also learned about healthy weights.

Container gardening (vegetables) training and nursery project. This joint project with USDA's Natural Resources Conservation Service (NRCS) was based on 14 demonstration plots and two nurseries,

and included seedlings of a rare coconut variety. Demonstrations included the use of composted animal waste as an on-site source for soil improvement, application of mulch for erosion control and moisture retention, and minimal or zero tillage for subsistence agroforestry. The garden produce was served at working group meetings. This activity was linked to the planting and weight loss competitions and was very important in helping participants to grow their own vegetables.

Counselling through home visits. Families were visited in their homes and counselled on the results of their vitamin A and FBG tests. The visits were documented to provide insight for further activities.

Charcoal oven development. Through a week-long workshop, 34 energy-efficient, smokeless charcoal ovens were built and distributed. These were fuelled with charcoal made from coconut shells and readily available fuelwood. The ovens provided an economical, environmentally friendly alternative to kerosene, and a healthier more convenient way of cooking (baking) than traditional earth ovens. Following the workshop, a cooking competition using the charcoal ovens was held. A local carpenter was contacted to build the ovens commercially. He helped improve the design and built an oven for his own use, which he promoted through workshop demonstrations at his own expense. Since January 2009, improved charcoal ovens have been available for purchase from this business.

Youth involvement. The Mand Drama Club involved teenagers and younger children to make them more aware of the values of local food and encourage them to share these messages with others. A COM-FSM drama expert led the children's discussions on local foods and their values, and guided their writing of short pieces to act. Several performances were given, notably one for Easter 2006, which was filmed and raised much interest, demonstrating the value of this activity.

Youth were also involved in activities held with class 4 at Mand elementary school as part of the Youth to Youth project, in collaboration with the Conservation Society

⁶ In-depth talks explained that provitamin A carotenoids protect against vitamin A deficiency disorders and anaemia. Carotenoid-rich foods protect against cancer, heart disease and diabetes.

⁷ Vegetables included eggplant, bell pepper and Chinese cabbage.

of Pohnpei. Children learned about the importance of rare Pohnpei banana varieties, such as Karat, and how to plant and conserve them and use them in recipes. At the end of the school year, the children performed in the state-wide school fair, where students of other schools performed on other conservation topics.

Pilot farm genebank. This nursery and collection of banana, giant swamp taro and pandanus varieties was established near Mand in 2003 and improved by the project, to provide planting materials for its activities. The genebank was looked after by the Mand youth group, which used it to generate income and educational materials. Working group members made a field trip to the genebank, to obtain and learn about banana and other planting materials.

Mand Breastfeeding Club. About 20 young mothers gathered to talk about breastfeeding, photograph and weigh their babies and themselves, and take part in recreational talks, quizzes and yoga exercises. The focus was on the advantages of breastfeeding and how to produce more milk by stimulating the breast. A strongly held Pohnpei belief is that mothers should wake up to eat during the night, to produce enough milk, and this has often resulted in overeating and overweight. Mothers described “stuffing themselves” even when they were not hungry, as they wanted to help their babies. They expressed relief when they learned that they could stop this practice. A finale was a club picnic held at a small beach park and featuring a talk by the Pohnpei State Breastfeeding Coordinator.

Go Local billboards were installed to share the project message with as many people as possible. The attractive design showed a family planting and preparing foods, and several striking drawings of local foods, including *Karat*. One billboard was placed in Mand and two in Kolonia town, one at the hospital and one near the airport, both strategic and well-frequented sites.

Activities at the state/national level

These aimed to bring the project messages to a broader public. This not only fostered interest among groups

outside the community, but also encouraged the community itself to work hard, as the state and the nation were watching to see the outcome. These activities were therefore of great importance.

Meetings, workshops and gatherings. Table 12.1 presents a summary of selected IFCP activities at state/national events, contributing to the overall Go Local campaign:

- *Annual Farmers' Fair/World Food Day:* This usually takes place in October with about 500 participants. Its main events are food crop competitions, school essay/art competitions, a healthy cooking competition and health screenings. The purpose is to promote crops, including rare yellow-fleshed varieties; healthy cooking of local foods; and art and writing skills and awareness of local food among youth. To help relay the Yellow Varieties Message, banana varieties are categorized, with larger prizes awarded for yellow-fleshed, carotenoid-rich varieties. The healthy cooking competition also has different categories for recipes using *Karat* and other yellow-fleshed varieties, and criteria include low use of fat, salt and sugar; taste; appearance; and cleanliness.
- *Local food pot luck dinner held by the Ambassador of the United States of America:* The Ambassador supported the Go Local movement and hosted a local food pot luck dinner in 2006 at her residence. Mand community members participated and sang a local food song, and the Let's Go Local High School Club performed a skit using the Pohnpei food posters.
- *Field trips to the outer atoll of Pingelap:* The purposes of these were to document traditional food crops from Pingelap, as Mand community was established by a group of Pingelapese people, and to share the Let's Go Local messages about the benefits of local foods. Two visits were made, focusing on documenting varieties of giant swamp taro and collecting planting material for the genebank.



Table 12.1 Selected Go Local activities and IFCP involvement in state/national events, 2006 to 2008

<i>Event</i>	<i>Date(s)</i>	<i>IFCP involvement</i>	<i>No. participants</i>
Mortlocks taro workshop, Mortlocks, Chuuk	15–18 Mar. 2006	Documenting taro varieties and collecting samples/plantlets	35
Pingelap workshop, Pohnpei	5–8 Jan. 2007	Daily workshops, training on local foods	75
FSM President’s Inauguration, Pohnpei	16 July 2007	Display of materials and foods	350
Let’s Go Local Club, Ohmine and Kolonia schools, class 6, Pohnpei	21 Sept. 2007	High school students teaching elementary students – Go Local	100
YINEC workshop, Colonia, Yap	26–28 Sept. 2007	Local food/nutrition training	20
FSM consultation on plant genetic resources, Pohnpei	4–6 Feb. 2008	25-minute presentation with Pohnpei students and “Banana Varieties” song	55
IFCP Training Center opening, Kolonia, Pohnpei	21 May 2008	Centre opened by Pohnpei Governor Ehsa	44
COM-FSM Annual Health Fair, Palikir, Pohnpei	30 Apr. 2008	Keynote presentation	50
Upward Bound student workshop, Palikir, Pohnpei	27 June and 11 July 2008	Two 3-hour workshops	80
Camp girls leading our world, Nihco Park, Pohnpei	11 June 2008	60-minute presentation	50
Health values for fish seminar, IFCP Training Center, Kolonia, Pohnpei	2 Sept. 2008	1.5 hour presentation with Japanese team	25
Nukuoro softball teams, IFCP Training Center, Kolonia, Pohnpei	5 and 19 Sept. 2008	40-minute presentation to players. Go Local and poster talk	38
Let’s Go Local Club, Nett School class 4, Pohnpei	16 Sept. 2008	1-hour presentation, taught by high school club members	40
Pingelap Green Day, Kolonia, Pohnpei	20 Sept. 2008	Keynote presentation	100

Radio press releases, newspaper articles and e-mail releases were prepared for each activity. The IFCP standard “Go Local” talk was presented at each event, along with promotional materials and, often, fresh samples of rare banana varieties for display and tasting. YINEC = Yap Interagency Nutrition Education Council.

- *Kolonia fun runs*: From 2007 to 2010, IFCP participated in six fun runs per year, coordinated by the FSM National Olympic Committee (NOC). IFCP gave short and inspiring pre- and post-run health talks, shared local food messages, and provided drinking coconuts and ripe bananas, including rare varieties, as healthy alternatives to imported soft drinks and snacks. In 2010, with help from FSM NOC, IFCP held its first Let’s Go Local fun run, which had a record number of participants, with more than 300 youth and adults, and offered prizes relevant to local food production and consumption, such as machetes and shovels for planting, and local food items as raffle prizes.
- *IFCP-coordinated meetings and workshops*: These included strategic planning meetings,

charcoal oven and food processing workshops, and meetings where rare banana varieties and other local foods were promoted. In 2009, with support from funding agencies, the Go Local project was expanded to additional communities in Pohnpei and one community in each of the other three FSM states: Kosrae, Chuuk and Yap.

Campaign slogans. The “Let’s Go Local”, “Going Yellow” and “Practise What You Preach”⁸ slogans were used at the state and national levels, through e-mail, newspaper, radio, television and video communications. In 2007, IFCP coined an acronym summarizing the reasons for going local – the CHEEF⁹ benefits of local

⁸ Some referred to this as “Walk the Talk”.

⁹ This acronym is of particular relevance in communities where chiefs are prominent in the social organization.

foods are culture, health, environment, economics and food security.

Mass media: The mass media were used to share the promotional messages on local food, health and nutrition with a wider audience than could be reached through face-to-face encounters:

- *Radio* broadcasts reach the entire island and no costs are involved. Press releases were sent to the government radio station, which broadcast them several times in Pohnpeian and English, during news bulletins.
- *Television:* Pohnpei's local television station has a limited broadcasting range to only a few kilometres beyond Kolonia town and does not reach Mand community. Nevertheless, videos provided by the project were frequently broadcast.
- *Video/DVD:* These allow messages to be shared with Pohnpei families and communities that cannot be reached by television, and can be shown at meetings or in homes. Most of the project's eight videos and DVDs are in English, but a Pohnpei version of the main theme video *Going Yellow* was prepared in 2010 and continues to be popular among all ages.
- *Newspapers* are mainly in English with photographs. Although only about 1 100 copies are printed, many people share each copy, and electronic versions are available on national Web sites. More than 160 articles and recipes with photographs were written and published in a column for Kaselehlie Press, Pohnpei's biweekly newspaper, from June 2005 to July 2010. Printed articles were photocopied and distributed to selected locations and people.
- *Go Local e-mail network:* By 2010, the network had more than 700 participants, and sends messages (in English only) to academics, donor and development agencies and family members in all four states of FSM and in many other countries in the Pacific Islands and beyond. The network started in 2005, with updates on nutrition, local foods and activities issued

to a small number of participants in Pohnpei. Comments from more than 200 participants were then gathered and disseminated in a discussion forum. E-mails are also distributed to the Regional Pacific Island Medical Distribution List (with more than 170 members) and PAPGREN News and Biodiversity for Nutrition. Individual and organizational recipients share the messages in their own professional and social networks.¹⁰

- *Web site and Facebook:* The IFCP Web site¹¹ was established in late 2005 and provides a wealth of information (mainly in English) on local food, health and the Mand project, providing access to a wider community – locally, nationally and internationally. It shares scientific papers, photos, promotional presentations and IFCP newspaper articles. In 2010, IFCP also established a page on Facebook.
- *“Let's Go Local” song:* This is used at meetings and workshops, and in video, radio and electronic media, including as the background theme to the *Going Yellow* video.¹² In 2009, a second song on the CHEEF benefits of local foods was composed for inclusion in IFCP presentations. The words for both songs were published in an international magazine (Englberger *et al.*, 2010a).

Print and other promotional materials.

- *IFCP local food posters:* These present the Yellow Varieties Message, with photos of varieties, nutrient contents (β-carotene) and health messages. The posters required off-island printing¹³ and became the main teaching tools for the Go Local campaign, through wide distribution (see IFCP Web site). Posters included “Pacific Indigenous Foods”, produced by FAO/CINE in 2006,¹⁴ and “No End to the

¹⁰ One e-mail network participant commented: “I forward these bits of knowledge to my practicum teachers, each adds to the health lessons they are supposed to teach.”

¹¹ www.islandfood.org

¹² The words are: “Let's go local, let's grow local, let's eat local, let's stay local; Vitamin A, good for eyesight, no heart problems, diabetes; Yellow varieties come from local, Karat banana and many others more.”

¹³ The posters involved food analysis at off-island laboratories and photography of rare varieties. The first poster required seven years to complete. Poster printing is now available on the island.

Table 12.2 Selected Go Local activities and IFCP involvement in regional/international events, 2006 to 2008

Event	Date	IFCP involvement	No. participants
30th National Nutrient Databank Conference, Honolulu, Hawaii, USA	19–20 Sept. 2006	Oral presentation on provitamin A carotenoid in bananas and other Micronesian foods	100
1st International Breadfruit Symposium, Suva, Fiji	16–19 Apr. 2007	2 oral presentations	30
Eden Project, Cornwall, UK	16 Aug. 2007	Oral presentation, Go Local initiative, Pohnpei bananas and other local foods	16
Banana and sweet potato study and workshops, Makira, Solomon Islands	2–16 Oct. 2007	Oral presentations at workshops/ACIAR/HarvestPlus, SPC and Solomon Islands activity	700
Pacific Banana Strategy and PAPGREN Meeting, Suva, Fiji	9–16 Nov. 2007	Oral presentation on Pohnpei bananas and Go Local	35
2nd Conference on Health and Biodiversity, Galway, Ireland	25–28 Feb. 2008	Oral presentation on Go Local	200
International Symposium on Underutilized Plants, Arusha, United Republic of Tanzania	3–7 Mar. 2008	Oral presentation on Let's Go Local initiative in Pohnpei	250
CINE Case Studies Meeting, Bellagio, Italy	3–9 May 2008	Oral presentation on Pohnpei case study intervention chapter	30
Banana characterization training, South Johnstone, Australia	28–30 July 2008	Oral presentation on Pohnpei banana promotional materials	35
First Pacific Summit on Diabetes, Saipan, CNMI	8–12 Sept. 2008	Oral presentation on Go Local initiative for diabetes control, and display of promotional materials	150
Sweet potato and banana workshops, North Malaita, Solomon Islands and Lae, Papua New Guinea	2–19 Oct. 2008	Oral presentations at 10 workshops/ACIAR/HarvestPlus and Solomon Islands activity	680

These activities were reported in the *Kaselehlie Press*, on local V6AH radio and in the Island Food Go Local e-mail network. The IFCP standard Go Local talk was presented at each event, along with promotional materials. CNMI = Commonwealth of the Northern Mariana Islands.

Youth involvement. In 2006, the Upward Bound administration asked IFCP to hold a six-week intensive health and nutrition course (an hour and a half a day, on four days per week) for 25 high school students who were selected based on their school performance and leadership qualities. The course improved the students' understanding of how their health is affected by what they eat, and the importance of local foods. The Upward Bound students went on to form the Let's Go Local High School Club of more than 50 students who are enthusiastic about promoting local foods. In 2007 and 2008 the club gave presentations on the values of local food to the community and in Pohnpei's three elementary schools and a women's technical school.

Assessment of local foods' nutrient contents. The resistant starch content of green banana varieties was

analysed in collaboration with the University of Auckland, New Zealand (Thakorlal *et al.*, 2010). Recent studies indicate that resistant starch provides fibre and may help protect against diabetes.

Small-scale processing of local foods. Overseas consultants helped to develop skills and capacity for the drying and blending of local fruits to make fruit nectars. Workshops were held in Kolonia and Mand community, and experiments with solar and charcoal dryers were carried out. Market research was carried out in July 2007 to assess the attitudes and perceptions of market owners, consumers and local food advocates, and to list the product ranges of four food markets and six take-out restaurants. This assisted IFCP and partners in their local food promotion efforts.



Membership drive. In 2009, IFCP established membership rules and annual fees, and recruited more than 150 new members to help promote local foods. Each member receives a membership card and a subscription to the IFCP newsletter. In 2010, they also received IFCP t-shirts. Student, regular, institution and lifetime memberships are available.

Activities at the regional/international level
These led to additional funding support for project activities and encouraged participants by stimulating international recognition of the campaign's importance. Table 12.2 outlines IFCP's involvement in regional/international events, which contributed to the Go Local campaign.

Papers, articles, releases, displays/exhibitions and workshops. These disseminated a wealth of information to diverse audiences. Scientific papers and other materials provided a strong basis for the project's approach and credibility for its activities. Specific activities included:

- the Go Local e-mail network providing short updates on scientific findings and a forum for discussion and experience exchange among members;
- displays on Pohnpei bananas and IFCP's Go Local campaign – held in Cornwall, United Kingdom, and at Bioversity International's No End to the Banana exhibition¹⁸ – which stimulated international interest in valuable FSM local foods, adding to the international prestige;
- scientific papers on findings about the nutrient contents of local foods;
- Pohnpei banana and taro chapters for a Pohnpei ethnobotany book;
- an overview of Pohnpei yam for a regional project;
- articles and releases for development journals and global Web sites;

- Go Local workshops in other Pacific Island countries, reaching more than 1 500 people in remote communities in the Solomon Islands and Papua New Guinea, and led by the Australian Centre for International Agricultural Research (ACIAR), HarvestPlus, and the Secretariat of the Pacific Community Centre for Pacific Crops and Trees;
- presentations at regional and international meetings, including the first Pacific Summit on Diabetes, from 8 to 12 September 2008 at Saipan World Resort, in the Commonwealth of the Northern Mariana Islands, which led to many further requests.

Collaborative research projects. The project collaborated with post-graduate and other university students to investigate the production and consumption of local foods and ways of promoting local foods in Micronesia. Topics included dietary assessment (Corsi, 2004), an assessment of agroforestry relating to diet and health (Shaeffer, 2006), banana marketing (Parvanta, 2006), marketed processed local food (Naik, 2008), Mand project evaluation (Kaufer, 2008; Bittenbender, 2010), challenges to local food availability (Clayton, 2009), youth attitudes and perceptions relating to local food (Greene-Cramer, 2009), resistant starch in Pohnpei banana cultivars (Thakorlal, 2009), diet in times of transition in a remote area of Pohnpei (Emerson, 2009), and food security issues (Del Guercio, 2010; Sears, 2010). Collaborating universities were Emory University, the University of Arizona and the University of Hawaii, all in the United States of America; the University of Auckland in New Zealand; and McGill University in Canada.

Community-level evaluation survey

To evaluate the effect of the promotional and intervention activities discussed in the previous subsections, two cross-sectional surveys were conducted: a baseline survey in June and July 2005; and a major evaluation survey in June and July 2007, after the intervention. A further evaluation focusing on diet was

¹⁸ Presented at the Central Library of Leuven in Belgium; the Royal Botanic Garden, Edinburgh, and the Eden Project in the United Kingdom; the National Botanic Gardens of Ireland; the World Bank lobby in Washington, DC; and the Fairchild Tropical Botanic Garden in Florida, United States of America.

conducted in 2009, two years after the interventions had been completed, to determine whether the initial improvements documented in the earlier evaluation had persisted. A standardized protocol and trained interviewers were used.¹⁹ The evaluations assessed changes in the dietary intakes, consumption patterns and health of people in Mand community. Health assessments and dietary interviews took place in Mand Community Hall during Mand Community Working Group meetings. Interviews were primarily in Pohnpeian or Pingelapese, and were transcribed in English. Participants were selected randomly as one adult woman per household. One criterion for inclusion in the 2009 analysis was that households had to have completed the dietary records in both 2005 (baseline) and 2007 (evaluation). The SAS statistical program (SAS Institute Inc., United States of America) was used for statistical analysis. A *p* value of ≤ 0.05 was considered significant.²⁰

Dietary intake was assessed through two non-consecutive 24-hour recalls in 26 out of 44 households. Two individuals from 2005 and five from 2007 were excluded because of underreported data (Goldberg *et al.*, 1991), and 11 lactating women were excluded from nutrient analysis owing to their extreme nutrient requirements. The data were analysed using modified Pacific Island food composition software.²¹

Food frequency was assessed with a seven-day FFQ of 33 food items and 200 sub-items.²² Data from a total of 40 households were analysed. Each participant was asked to give the number of days in the last seven that a main item had been consumed, and whether sub-items had been consumed at any point during the seven days.

The diversity of foods consumed was assessed systematically. Three scores of dietary diversity were defined and computed: food group diversity (the

numbers of total, local and imported food groups consumed); species diversity (the numbers of individual total, local and imported species consumed); and food variety (the numbers of individual total, local and imported varieties consumed).

Anthropometry (weight, height and waist circumference), FGB and blood pressure were measured to assess health status, using standard methods (WHO, 1997).

Additional assessments were carried out to test participants' knowledge, awareness and behaviour patterns regarding project activities. Questions included how and where the participant had heard about the project, who in the family participated, and what lessons had been learned.

The 2009 diet assessment utilized similar methodology as in 2005 and 2007: a seven-day FFQ and two days of 24-hour recalls, collected via door-to-door surveys of the same households as previously studied. Because of migration, changes in household composition and deaths, the number of households surveyed was reduced from 40 to 36.

Results of promotion and intervention activities

Among the many challenges to implementing this project in FSM were the convenience, low cost and high status of imported foods in relation to local foods, and the important role that imported foods and drinks have assumed in people's diets, which makes it difficult to change course. Also important were the lack of awareness that many people have regarding the relationships among diet, lifestyles and health, and the difficulty in storing, transporting and marketing local foods compared with imported processed foods. A dearth of awareness-raising and educational materials relevant to local Pacific Island foods and local varieties led to the use of less relevant and appropriate materials.

FSM faces major challenges owing to its remote location, geographic dispersion, multiple cultures and languages, and the threats of climate change. FSM comprises a small land mass surrounded by a million square miles (about 2.6 million km²) of ocean, so

¹⁹ The 2007 research team included 12 officers from eight agencies, nine of whom were in the 2005 team (of four interviewers, two nurses and three research assistants). Three of the four interviewers took part in both 2005 and 2007.

²⁰ Proc MIXED was used to examine change in dependent variables as continuous quantitative data with a normal distribution. Normality was tested with Proc Univariate, using a Shapiro-Wilk statistic (*p* value > 0.01 indicated normality). If normality was not met, power transformations were used (in the order of logarithm, square root, cube root, fourth root).

²¹ FoodWorks Professional Edition (version 4.0, Xyris Software, Australia).

²² The FFQ was modified from those previously developed for FSM (Englberger, 2003; Corsi *et al.*, 2008).



national meetings with representatives from all four states are costly, as great distances have to be travelled. English is the government language in all states, but the use of eight official local languages and additional dialects, and cultural differences are challenging for the development of state and national programmes and policies.

Documentation phase

Very little was known about specific varieties of Pohnpei's local foods prior to 1998, when efforts were made to identify local foods that could alleviate the emerging vitamin A deficiency problem. Key informants mentioned *Karat*, an unusual banana variety with deep yellow/orange flesh, which indicates the presence of provitamin A carotenoids. Samples were taken and analysed for provitamin A carotenoids and other nutrients at off-island laboratories, as there are no laboratories in FSM.

These analyses confirmed that *Karat* is rich in β -carotene, the most important of the provitamin A carotenoids, and other essential nutrients.²³ Other yellow- and orange-fleshed varieties/cultivars of banana, giant swamp taro, breadfruit and pandanus were analysed and identified as containing substantial concentrations of carotenoids, essential minerals and other nutrients (Englberger *et al.*, 2003a; 2003b; 2006a; 2008; 2009a).

There are more than 50 varieties of banana in Pohnpei, with flesh coloration varying from white and cream, to yellow, yellow/orange and orange. In general, the deeper the colour of a variety's flesh the greater the carotenoid content. Similarly, giant swamp taro, breadfruit and pandanus varieties vary by intensity of flesh coloration and associated carotenoid content. Foods rich in β -carotene and other provitamin A carotenoids protect against vitamin A deficiency disorders (infection and night blindness), anaemia (weak blood) and cancer, heart disease and diabetes (McLaren and Frigg, 2001). The Yellow Varieties Message was developed to relay the concept that consuming these

varieties offers important nutrients and health benefits (Englberger *et al.*, 2006b).

As well as documenting carotenoid-rich foods, the project also documented the vast diversity of traditional foods available on Pohnpei (Englberger *et al.*, 2009b).

Results of community-level activities

Meetings in Mand were important for raising awareness about the positive values of local foods and were effective in promoting local foods. Responses indicated that people enjoyed consuming traditional dishes, some of which they had not tasted for a long time.²⁴

Attitude towards local foods. The promotion of local foods had a great impact in the community, despite occasional difficulties in mobilizing family members to join activities. There was a clear change in people's attitude towards local foods, as evident from the following comments made by community members:

People are now talking more about local food at informal gatherings and there is more local food at church feasts, such as Easter.

There is more local food at cultural events. During the Easter 2008 event, very little rice was brought. In the past it was the major food item. Also people ate more of the local food, leaving the rice. Coconuts were served and there were hardly any soft drinks. Hot dog was not seen. The main protein foods were fish and chicken, whereas previously fatty spare ribs were a main item.

Since the project I cannot get the coconuts from my Adohl tree. People are always taking them now! I tell you it is a very effective programme, when we have our special gatherings we now have local food dishes, and we say "Go Local". The way they cook the food now is different, and we talk about how local food is good for the body.

People are starting to say "Where is the local food?" at community events serving food (previously they were happy with rice and other imported foods).

²³ Analyses also found that *Karat* is rich in riboflavin (vitamin B₂) (Englberger *et al.*, 2006a).

²⁴ "I feel good eating *apior* [edible coconut husk from the *Adohl* variety, tied with pieces of mature coconut]. My grandmother gave me this when I was sick. It is such a long time since I had it." Mand woman.

It is important to teach children the importance and value of their traditional foods.

When we were children, we used to eat kaikes seeds. They tasted good. We need to teach our children today to eat them.

Project leaders indicated other community benefits from the project, such as the carving of three new canoes for fishing, learning the names of more fish, and the provision of training opportunities in areas of interest. Prior to the project, there were no canoes in Mand, and people knew the names of only a few fish. The project documentation phase helped young people to learn the names of many rare fish, while training and awareness-raising opportunities for adults included the container gardening training, the United

States Ambassador's local food pot luck dinner, and a half-day planning workshop involving academic and community leaders from CINE's Indigenous Peoples' Food Systems for Health Program, Professor Kuhnlein and Chief Erasmus from Canada.

Dietary intervention

Tables 12.3 to 12.8 summarize the results from the dietary evaluation, which are presented in full by Kaufer (2008) and Kaufer *et al.* (2010). Significant dietary changes were observed in the Mand community. There were a significant reduction in the consumption of rice (Tables 12.3 and 12.5), a significant increase in the intake of provitamin A carotenoid (Table 12.4), increases in the frequencies of consumption of banana,

Table 12.3 Top foods consumed by Mand community, Pohnpei, 2005 and 2007

2005			2007		
Source	Food item	Average adult consumption (g/day)	Source	Food item	Average adult consumption (g/day)
Imported	Rice	846.9	Imported	Rice	544.1*
Local	Banana, all	131.0	Local	Banana, all	170.2
Local	(Fresh) fish	127.8	Imported	Chicken	149.8
Imported	Chicken	111.0	Local	Coconut products	94.2
Local	Breadfruit	80.8	Local	Taro, giant swamp	92.3
Imported	Sugar products	71.8	Local	Breadfruit	88.8
Local	Coconut products	41.5	Local	(Fresh) fish	87.9
Imported	(Canned) fish	39.5	Imported	Sugar products	62.1
Imported	Ramen noodles	35.6	Imported	(Canned) fish	52.9
Local	Taro, giant swamp	30.8	Imported	Ramen noodles	29.6
Local	Local fruit	21.4	Local	Local fruit	22.7
Imported	Canned meat	20.1	Imported	Imported fruit	20.7
Local	Pork	14.4	Imported	Donut	20.1
Imported	Bread	14.2	Imported	Bread	18.1
Imported	Donut	13.4	Local	Pork	16.5
Quantity of local food consumed		471.3	Quantity of local food consumed		618.3
Quantity of imported food consumed		1 201.2	Quantity of imported food consumed		951.3

Data calculated from two 24-hour recalls on non-consecutive days, from non-lactating women; reported as average daily consumption (26 households per year, one woman per household); collected in same time period both years (June, July), but breadfruit season may vary from year to year.

* Significant decrease from 2005 ($p = 0.0002$).

Canned fish = canned mackerel, tuna and sardines.

Coconut products = cream, flesh, juice and germinating.

Fresh fish = all local fish (tuna, mackerel and reef fish).

Local fruit = excluding banana; including pineapple, pawpaw, pandanus and malay apple.

Sugar products = granulated sugar added to food, and drinks containing sugar.

Source: Kaufer, 2008.

Table 12.4 Average daily energy and nutrient intakes of Mand community, Pohnpei, 2005 and 2007

	2005		2007		p value
	LS mean*	% energy	LS mean*	% energy	
Total					
Energy (kJ)	9 879.3		8 833.4		0.04^a
Carbohydrate (g)	354.6	59.8	303.7	56.5	0.03
Protein (g)	100.7	17.0	92.7	17.3	0.39 ^a
Fat (g)	61.3	23.3	62.6	26.2	0.82
Vitamin C (mg)	43.2		61.8		0.08 ^a
Vitamin A (µg)	176.5		193.2		0.59 ^a
Retinol (µg)	176.0		148.1		0.30
β-carotene equivalents (µg)	226.6		475.7		0.02^a
		% total[§]		% total[§]	
Local food					
Energy (kJ)	2 286.2	23.2	2 127.6	24.3	0.71 ^{be}
Carbohydrate (g)	51.1	14.8	70.3	24.6	0.24 ^b
Protein (g)	31.9	33.9	20.1	23.5	0.06 ^{ce}
Fat (g)	18.6	33.3	11.3	20.1	0.04^b
Vitamin C (mg)	42.0	97.6	55.0	97.0	0.21 ^b
Vitamin A (µg)	92.3	52.8	80.4	46.1	0.59 ^b
Retinol (µg)	53.4	43.1	19.0	18.1	0.02^b
β-carotene equivalents (µg)	202.1	68.6	511.6	79.7	0.02^b
Imported food					
Energy (kJ)	7 587.7	76.8	6 624.5	75.7	0.09
Carbohydrate (g)	294.5	85.2	216.1	75.4	0.0007
Protein (g)	62.2	66.1	65.2	76.5	0.68 ^a
Fat (g)	37.1	66.7	45.0	79.9	0.10 ^a
Vitamin C (mg)	1.0	2.4	1.7	3.0	0.54 ^{de}
Vitamin A (µg)	82.3	47.2	94.1	53.9	0.55 ^a
Retinol (µg)	70.6	56.9	85.8	81.9	0.42 ^a
β-carotene equivalents (µg)	92.3	31.4	130.0	20.3	0.64 ^e

Data calculated from two 24-hour recalls on non-consecutive days, from non-lactating women; reported as average daily consumption (26 households per year, one woman per household); collected in same time period both years (June, July), but breadfruit season may vary from year to year. Bold denotes significant difference.

* Least square mean estimate; standard errors (SEs) of least square mean estimates cannot be obtained for transformed variables, thus SEs are not presented. Variance parameters are provided in the complete evaluation (Kaufer, 2008).

§ Because total, local and imported intakes were analysed separately, the LS means for local and imported do not exactly equal the LS mean for total. For comparison, percentage of total was calculated from the sum of the LS means for local and imported.

^a Log transformation.

^b Square root transformation.

^c Cube root transformation.

^d Fourth root transformation.

^e Unable to find power transformation producing normality; used the closest to normality.

Source: Adapted from Kaufer, 2008.

Table 12.5 Frequencies of consumption of selected foods in Mand community, Pohnpei, 2005 and 2007

Food item	Weekly consumption			Food item	Weekly consumption		
	LS means ^a		p value		LS means ^a		p value
	2005	2007		2005	2007		
Local				Imported			
Banana, all	2.6	3.9	0.0001	Dairy ^d	0.6	0.8	0.25
Banana, white-fleshed	2.9	2.9	0.86	Drink, imported, with sugar ^e	2.0	3.6	≤ 0.0001
Banana, yellow-fleshed	0.5	0.7	0.13	Egg	1.1	1.6	0.03
Breadfruit	4.0	3.8	0.41	Fish, imported	2.4	2.7	0.46
Coconut fat	1.7	1.3	0.15	Flour products	4.1	5.0	0.008
Drink, local	2.4	3.2	0.01	Fruit, imported	0.8	0.2	0.0004
Fish, local	3.9	4.2	0.42	Meat, imported	1.7	2.6	0.003
Fruit, local ^b	3.5	4.0	0.10	Rice	6.8	6.1	≤ 0.001
Meat, local	1.5	1.1	0.06	Snack, imported	0.3	0.4	0.4
Nuts, local	0.2	0.6	0.01	Sugar, imported products or added to local food ^f	3.2	1.9	0.0002
Pandanus	0.0	0.0	1	Turkey tail	0.2	0.2	0.65
Snack, local	0.3	0.7	0.01	Vegetable, imported	0.5	0.6	0.32
Starch, other ^c	0.1	0.3	0.07	Imported and local			
Taro, giant swamp	0.2	0.9	≤ 0.0001	Fat, imported/animal	2.1	2.4	0.46
Vegetable, local	1.4	3.3	≤ 0.0001	Fried food	2.1	2.3	0.45
				Fruit, all	3.0	4.5	≤ 0.0001
				Liver	0.1	0.5	0.001
				Vegetable, all	1.5	3.4	≤ 0.0001

Data calculated from a seven-day FFQ, from 40 households per year, from one woman per household. Bold denotes significant difference.

Source: Kaufer, 2008.

^a Least square mean estimate; standard error (SEs) of least square mean estimates cannot be obtained for transformed variables, thus SEs are not presented.

^b Includes ripe banana, excludes pandanus.

^c Includes dryland taro, yam, cassava, sweet potato.

^d Includes butter, margarine, cheese, milk.

^e Includes soft drinks, coffee, tea, Kool-Aid.

^f Includes donuts and sugar added to local food and/or local drink.

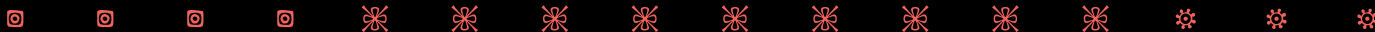
giant swamp taro and vegetables (including green leafy vegetables) (Table 12.5), and an increase in the diversity of local foods (Table 12.6).

Increased dietary diversity was a major achievement, with the total food (local and imported combined) and local food diversity scores increasing in all aspects: by food group, species diversity, and food variety scores (Table 12.6). The mean diversity score for local foods increased between 2005 and 2007, in all three diversity measures.²⁵

²⁵ When the difference in local food diversity scores between 2005 and 2007 was tested with Proc GLIMMIX binomial distribution, all three diversity score groups increased significantly by $p \leq 0.0001$.

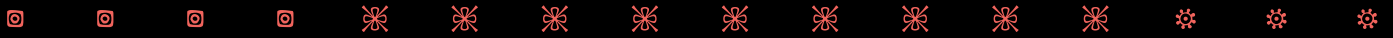
Another major achievement was the decrease in rice consumption. The average daily consumption of rice in 2005 was 846 g per person, compared with 544 g in 2007. This reduction was significant ($p < 0.0002$) (Table 12.3). Similarly, the frequency of rice consumption decreased from 6.8 days per week in 2005 to 6.1 days in 2007 ($p < 0.001$) (Table 12.5).

Although the data revealed decreased reliance on imported rice as a food source, there was no significant increase in overall energy intake from local food sources between 2005 and 2007. In 2007, 24.2 percent of energy was from local foods (and 75.7 percent from



Photographic section

		Inuit	xvi
Awajún	iv	Karen	xix
Dalit	vii	Nuxalk	xxii
Gwich'in	x	Pohnpei	xxv
Inga	xiii	Ainu	xxviii



Our book is dedicated to all children in communities of Indigenous People who will continue to face the challenges to protect their traditional knowledge and use of their local foods for physical, social and environmental health. We know our work gives you power and strength.



Awajún

“Before I didn’t eat well;
now I can get fish from my fish pond
until the river is full of fish again and
I can eat the food that I have
in my farm.”

Awajún mother



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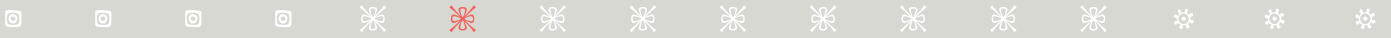


▲
Awajún children
(kp-studios.com)



▲
Sra. Agchuin, Awajún Elder
Palm heart – lju
Irma (Chinita) Tuesta
Fermin Apikai, Awajún leader
Francisco Quiaco, Awajún
community leader
(kp-studios.com)

▲
Awajún girls
(kp-studios.com)
▶
Sr. Kinin, Awajún Elder
(kp-studios.com)



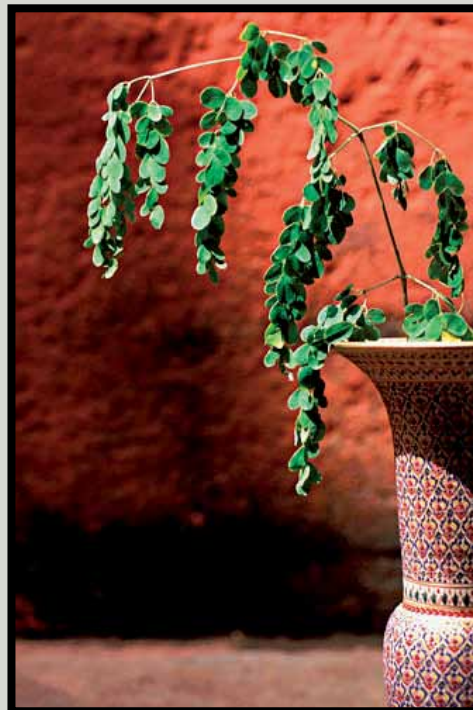
“Today, if I look back, I can sense a sea-change in my life, and what is so exhilarating about it is the feeling of control that we are experiencing...”

Susheelamma, Raipally village

Dalit

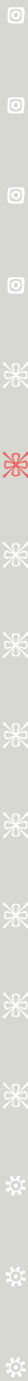


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▲ Dalit boys and girls from Humnapur village, Nyalkal mandal, Medak district, Zaheerabad, India (kp-studios.com)

◀ Drumstick leaf – *Moringa oleifera* (kp-studios.com)



▲
Sorghum in a mixed farm –
Sorghum vulgare
(kp-studios.com)
Dalit child (kp-studios.com)
Dalit women farmers
weeding and collecting
greens, near Zaheerabad,
India (H.V. Kuhnlein)



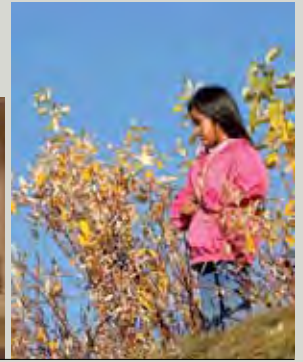
▲
Bachali – *Basella* sp., a popular leafy
green vegetable (kp-studios.com)
◀
Shakunthamma, Dalit assistant,
in mixed crop field (kp-studios.com)

Gwich'in

“Through harvesting traditional foods you practice your culture and live your heritage.”
Gwich'in community member

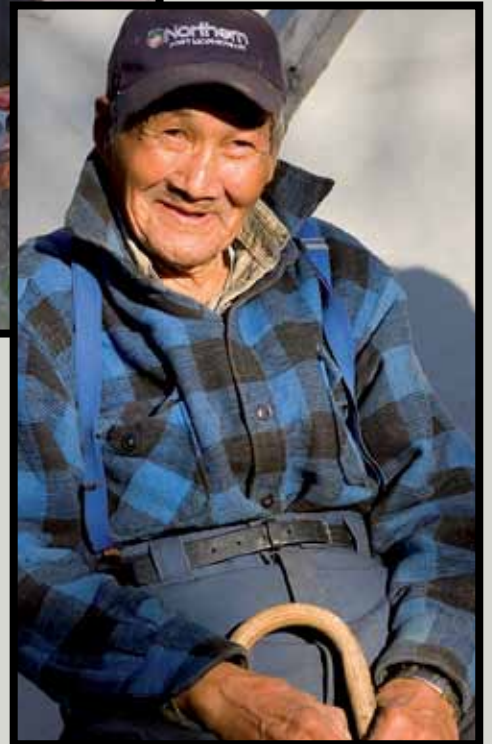
Chapter 7 >> 101



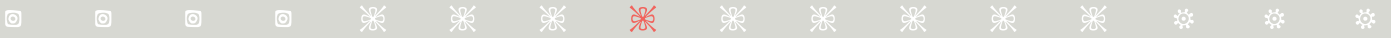


▲ Mary Snowshoe, Gwich'in Elder (kp-studios.com)
 Caribou meat as "stirfry" with vegetables (H.V. Kuhnlein)
 Home freezer with fish and meat (H.V. Kuhnlein)
 Gwich'in girl (kp-studios.com)

▼ Andrew Neyando, Gwich'in Elder (kp-studios.com)



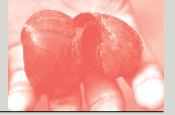
▲ Alice Andre, Gwich'in Elder, cutting fish (H.V. Kuhnlein)
 ▲ Shawn Vittrekwa, Gwich'in hunter (kp-studios.com)



“I [...] promote traditional foods and crops so that families are able to recover traditional foods, recipes and drinks, seeking to make them less dependent on markets when it comes to health and food.”

Libia Diaz, Inga local promoter, San Miguel Indigenous Reserve

Inga



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▲
 Antonia Mutumbajoy, Inga leader (kp-studios.com)
 Eva Yela, Inga leader (kp-studios.com)
 Ana Maria Chaparro, Amazon Conservation Team, Bogota (kp-studios.com)
 Inga girl (Inga Research Team)

Sonia Caicedo, Amazon Conservation Team, Bogota (kp-studios.com)

◀◀
 Previous page, Children squashing chontaduro, a palm tree fruit (*Bactris gasipaes* Kunth) for making *chichi* (Inga Research Team)

▲
 Food plant identification session (Inga Research Team)

▶
 Smoked river sardines (Inga Research Team)

Inuit

“Our past is preserved and explained through the telling of stories and the passing of information from one generation to the next...”

Inuit Tapiriit Kanatami



Chapter 9 >> 141





▲ Mahtanah Alivaktuk, Inuit grandfather and granddaughter Briana Alivaktuk (kp-studios.com)

▶ Jaco Ishulutak, Inuit carver (kp-studios.com)

▲ Joanasie Veevee, Inuit youth (kp-studios.com)



▲ Johnny Kuluguqtuq, Regional Community Health Development Coordinator
Fish soup with market vegetables
Looe Okalik, Inuit Tapiriit Kanatami, Ottawa, Ontario (kp-studios.com)



“We work together.
We understand each other;
much more than when
we started the work.”

Suaijeemong Sangkhawimol (Sanephong traditional healer)

Karen



Chapter 10 >> 159





▲
Sinee Chotiboriboon and
Mailong-ong Sangkhachalatarn
(kp-studios.com)

Karen family (H.V. Kuhnlein)
Karen traditional dishes
(Mahidol team)

Harriet V. Kuhnlein and Solot
Sirisai (kp-studios.com)

◀◀
Previous page, Karen vegetables
(Mahidol team)

▲
Sompop Sangkhachalatarn,
Karen community,
Kanchanaburi, Thailand
(H.V. Kuhnlein)

▶
Mainia Sangkhathiti, Karen
community (H.V. Kuhnlein)





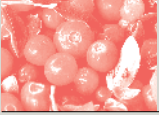
▲ Suttalak Smitasiri, Mahidol University, Salaya, Thailand (kp-studios.com)
 Prapasri Puwastien, Mahidol University, Salaya Thailand (Prangtong Doungnosaen)
 ▲ Nipaporn Sangkhawimol and her child (H.V. Kuhnlein)
 ▲▲ Karen traditional dishes (Mahidol team)
 Suaijeemong Sangkhawimol, Karen leader (M. Roche)
 Anon Setaphan, Karen leader, Sanephong Village, (kp-studios.com)

Nuxalk

“They came out
in droves!”

Rose Hans

Chapter 11 >> 177





▲ Salmon roe (kp-studios.com)

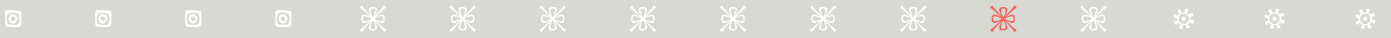
Drying salmon *sluq* (kp-studios.com)

Cow parsnip (*Heracleum lanatum*), a Nuxalk spring vegetable (H.V. Kuhnlein)

Filleting spring salmon (kp-studios.com)

▲ A bountiful catch of Nuxalk salmon (kp-studios.com)

▲ Lorraine Tallio cutting spring salmon (kp-studios.com)



“Let’s Go Local!
Grow and eat local foods for
their ‘CHEEF’ benefits:
culture, health, environment,
economics and food security.”

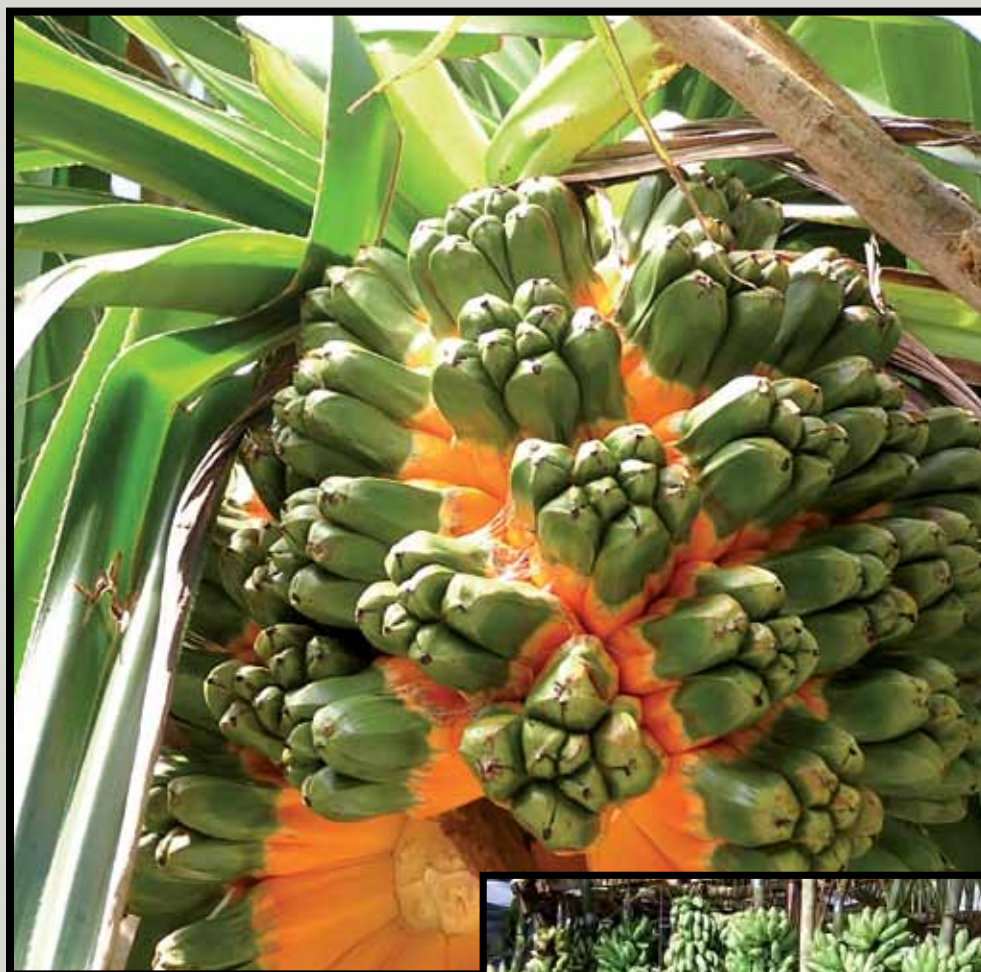
Island Food Community of Pohnpei

Pohnpei



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▲
 The late Dr Lois Englberger (kp-studios.com)
 Kiped Albert (kp-studios.com)
 Adelino Lorens (HV Kuhnlain)
 Billboard – The “Let’s Go Local” campaign slogan was painted on billboards to portray different Pohnpei foods and varieties, including Karat banana (left top), an important fruit to Pohnpei families. (IFCP)

Next page

▶
 The late Selihna Johnson (kp-studios.com)
 ▶▶
 Pohnpei child (kp-studios.com)



▲
 Pandanus, *Pandanus tectorius*, a rich source of many nutrients (IFCP)

▶
 Banana market in Pohnpei (IFCP)

◀◀
 Previous page, Pohnpei child (kp-studios.com)

Ainu

“...When the local people accept Ainu food as a part of local food, there will be no social discrimination against Ainu people.”

Miwako Kaizawa



Chapter 13 >> 221

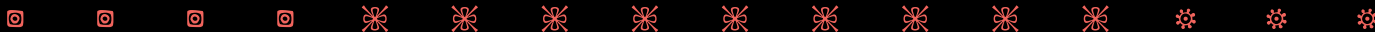




▲ Pukusa, *Allium victorialis* (2 varieties), dried (kp-studios.com)

▲ Ainu infant (kp-studios.com)

▲ Taichi Kaizawa
Pukusakina leaves
Yuk (deer) soup
Teaching about the Ainu traditional food (kp-studios.com)
▲ Masahiro Nomoto, Ainu leader (H.V. Kuhnlein)



- 1. Gail Harrison (Ch. 2, Ch. 7)
- 2. P.V. Satheesh (Ch. 6) and Salomeyesudas (Dalit, Ch. 6)
- 3. Martina Schmid (Ch. 6)
- 4. Jonah Kilabuk (Inuit, Ch.9) and Grace Egeland (Ch. 2, Ch. 6, Ch. 9)
- 5. Mark Plotkin (Ch. 3)
- 6. Liliana Madrigal (Ch. 8)
- 7. Thelma Harvey (Nuxalk, Ch. 11)

- 8. Marion Roche (Ch. 4)
- 9. Margaret McDonald (Gwich'in, Ch. 7)
- 10. Andy Siwallace (Nuxalk, Ch. 11)
- 11. Group photo in Bangkok, 2009 (all chapters)
- 12. Nancy Turner (Ch. 3, Ch. 11) and Bill Tallio (Nuxalk, Ch. 11)
- 13. Arjan Sakorn (Ch. 10); Bill Erasmus; Harriet

- V. Kuhnlein and Suttalak Smitasiri (Ch. 10)
- 14. Siri Damman (Ch. 15) and Inga Partners (Ch. 8)
- 15. Hillary Creed-Kanashiro (Ch. 4, Ch. 5) and Irma Tuesta (Awajún, Ch. 5)
- 16 Peter Siwallace (Nuxalk, Ch. 11)
- 17, 18. Pohnpei assistants (Pohnpei, Ch. 12)





"The walrus head [in the sculpture] represents the universe, and we all live on the earth with the sea connected. It's telling the story of climate change occurring in the North. How it's affecting the animals, the environment and ourselves... This may only look like a carving, but it depicts a lot of our lifestyles and environment and animals which are united. We have to manage the animals well today because the next generation will have to have their own meals as well."

Jaco Ishulutak,
Inuit master carver, hunter and cultural specialist,
Pangnirtung, Nunavut, speaking about
his sculpture depicting climate change.

*(kp-studios.com, from the DVD film,
The Inuit and their Indigenous Foods, 2008)*

Table 12.6 Dietary diversity in Mand community, Pohnpei, 2005 and 2007

	2005		2007		p value ^b	p value ^c
	LS means ^a	Range	LS means ^a	Range		
Food group score						
Total (n = 14)	10.1	6–13	10.9	6–14	0.04	0.04
Local (n = 6)	4.8	2–6	5.5	4–6	0.001	≤ 0.0001^d
Imported (n = 8)	5.3	2–7	5.4	2–8	0.74	0.74 ^d
Species diversity score						
Total (n = 72)	12.4	7–18	18.1	9–29	≤ 0.0001	≤ 0.0001
Local (n = 51)	12.3	3–11	17.3	5–23	≤ 0.0001	≤ 0.0001
Imported (n = 21)	5.2	2–8	6.0	3–11	0.14	0.06
Food variety score						
Total (n = 166)	21.3	11–31	32.5	14–66	≤ 0.0001	≤ 0.0001^d
Local (n = 100)	11.8	4–19	19.5	8–43	≤ 0.0001	≤ 0.0001^d
Imported (n = 66)	9.4	3–16	12.8	5–24	≤ 0.0001	0.0003

Data calculated from a seven-day FFQ, from 40 households, from one woman per household. Bold denotes significant difference.

^a Least square mean estimate: standard errors (SEs) of least square mean estimates cannot be obtained for transformed variables, thus SEs are not presented.

^b Year effect tested with Proc GLIMMIX, binomial distribution.

^c Year effect tested with Proc MIXED with arcsine transformation.

^d Non-normal distribution.

Food group score = number of different food groups consumed by the individual over the reference period.

Local food groups (n = 6) = starchy staples, meat and nuts (including fish), fruit, vegetables, fat, and snacks.

Imported food groups (n = 8) = starchy staples, meat and nuts (including fish), fruit, vegetables, fat, snacks, dairy, and sweets.

Species diversity score = number of unique individual species, excluding cultivars, consumed over the reference period.

Food variety score = number of all food items and sub-items, including cultivars, consumed over the reference period.

Source: Kaufer, 2008.

imported), while in 2005 it was 23.2 percent (Table 12.4). Imported chicken, other imported protein foods, sugar and flour products were major food items in both 2005 and 2007 (Tables 12.3 and 12.5).

Three local foods registered significant increases in their frequencies of consumption: banana increased from 2.6 days/week in 2005 to 3.9 days in 2007; giant swamp taro from 0.2 to 0.9 days/week; and local vegetables, such as chilli leaves, *chaya*, *pele* and Brazilian spinach, from 1.4 to 3.3 days/week ($p \leq 0.0001$) (Table 12.5).

Consumption of β -carotene equivalents also registered a significant increase, from 202.1 μg in 2005 to 511.6 μg in 2007 ($p \leq 0.02$) (Table 12.4). This included β -carotene and other provitamin A carotenoids that contribute to vitamin A status.

The evaluation revealed some inconsistencies in the results reported: there was a significant increase in the frequency of consuming some unhealthy food items,

including white flour products and sweet drinks, but a significant decrease in the frequency of items with sugar (Table 12.5), indicating possible underreporting of these items.

The 2007 dietary intake evaluation found that rice was the highest overall contributor of energy (30.4 percent), imported chicken contributed the most protein and fat (39.0 and 34.8 percent, respectively), banana the most vitamin C (29.1 percent), fish the most vitamin A (27.9 percent), and green leafy vegetables the most β -carotene (55.7 percent) (results not shown in table).

Tables 12.7 and 12.8 show the frequencies of consumption of imported and local foods for 2005 and 2007. Results reveal that the consumption of local foods increased while that of imported foods remained constant. A total of 14 different banana cultivars were consumed and eight green leafy vegetables, while the intake of lemon grass increased between 2005 and

Table 12.7 Dietary diversity in Mand community, Pohnpei, 2005 and 2007

Food group/Imported food	Description	7-day FFQ counts/week		24-hour recalls counts/2 days	
		2005	2007	2005	2007
Starch					
Rice	White	40	38	39	39
Wheat	Ramen, bread, flour	35	40	30	34
Meat					
Chicken	Meat, egg	20	34	27	30
Beef products	Canned meat, hamburger	23	19	13	6
Turkey	Turkey tail	5	7	0	2
Fish					
Mackerel	Canned	22	28	12	13
Sardines	Canned	1	5	0	1
Tuna	Canned	18	21	13	9
Nut					
Peanuts	Whole, butter	0	3	3	4
Dairy					
Dairy products	Milk, ice cream, cheese	10	16	3	3
Vegetable					
Broccoli		n/a	n/a	2	1
Cabbage	European	2	3	3	2
Carrot		1	6	3	2
Chilli		n/a	n/a	1	0
Maize		0	1	4	0
Cucumber		3	0	0	0
Garlic		n/a	n/a	0	4
Lettuce		1	0	0	0
Onion		n/a	n/a	2	7
Potato	Fresh, canned	0	3	3	2
Tomato	Fresh, canned	1	2	1	2
Fruit					
Apple		2	2	0	1
Grapes		1	0	0	0
Guava	Juice	n/a	n/a	0	1
Orange	Whole, juice	1	0	2	1
Pineapple	Canned	8	3	0	2

Data calculated from a seven-day FFQ and two 24-hour recalls, from 40 households per year, from one woman per household; presented as counts per week and counts per two days.

n/a = food did not appear on the FFQ.

Source: Kaufer, 2008.

Table 12.8 Dietary diversity in Mand community, Pohnpei, 2005 and 2007

Common name	Cultivar, description or local names: Pohnpeian (Pingelapese)	Scientific name*	7-day FFQ counts/week		24-hour recalls counts/2 days	
			2005	2007	2005	2007
Starchy staple						
Breadfruit	<i>Mahi (mei)</i>	<i>Artocarpus altilis/mariannensis</i>	38	33	22	22
	Ripe unseeded		16	13	n/c	n/c
	Green unseeded		15	22	n/c	n/c
	Green seeded		0	2	n/c	n/c
	Ripe seeded		0	3	n/c	n/c
Taro, dryland	<i>Sawa (sewa)</i>	<i>Colocasia esculenta</i>	5	4	1	5
Taro, giant swamp	<i>Mwahng (mweiang)</i>	<i>Cyrtosperma merkusii</i>	9	17	6	9
	Yellow-fleshed <i>Pwiliet (Pwilies)</i>		2	5	n/c	n/c
	Yellow-fleshed <i>Simihden</i>		0	2	n/c	n/c
	Yellow-fleshed <i>Sounpwong Weneu</i>		0	1	n/c	n/c
	Yellow-fleshed <i>Tekatek (Sekasek)</i>		0	3	n/c	n/c
Yam	<i>Kehp</i>	<i>Dioscorea</i> spp.	0	6	1	0
Tapioca	<i>Kehp tuhke (dapiohka)</i>	<i>Manihot esculenta</i>	0	2	0	1
Sweet potato	<i>Pidehde</i>	<i>Ipomea batatas</i>	0	3	0	1
Banana	<i>Uht (wis)</i>	<i>Musa</i> spp.	33	36	23	24
	White-fleshed <i>Inahsio (Aroh wis)</i>		2	5	0	2
	White-fleshed <i>Kaimana (Lokoei)</i>		14	15	3	8
	White-fleshed <i>Utin Menihle</i>		7	14	0	1
	White-fleshed <i>Pihsi/Fiji</i>		8	13	1	5
	White-fleshed <i>Utin Ruk (Wis in Ruk)</i>		8	13	19	11
	White-fleshed <i>Utin Wai (Wis in Wai)</i>		n/a	n/a	0	1
	Yellow-fleshed <i>Akadahn (Lakadahn)</i>		2	1	0	1
	Yellow-fleshed <i>Karat (Wis Karat)</i>		0	3	0	0
	Yellow-fleshed <i>Daiwang</i>		6	7	5	2
	Yellow-fleshed <i>Utimwas</i>		0	2	0	0
	Yellow-fleshed <i>Utin lap (Wis in lap)</i>		0	1	0	0
	Yellow-fleshed <i>Utin Kerenis</i>		0	1	0	0
	Yellow-fleshed <i>Utin Rais/Kudud (Sendohki)</i>		2	1	0	1
Nuts						
Chestnut	<i>Mworopw (mwerepw)</i>	<i>Inocarpus fagifer</i>	8	14	1	0
Fish						
Tuna, skipjack, yellowfin	<i>Lesapwil; pweipwei</i>	<i>Katsuwonus pelamis; Thunnus albacares</i>	13	20	17	19
Reef fish	Fresh, dried	More than 100 different fish	28	33	14	20
Mackerel	Double-lined mackerel (<i>pweir</i>)	<i>Grammatorcynus bilineatus</i>	n/a	n/a	6	2

(Continued)

Table 12.8 (Continued) Dietary diversity in Mand community, Pohnpei, 2005 and 2007

Common name	Cultivar, description or local names: Pohnpeian (Pingelapese)	Scientific name*	7-day FFQ counts/week		24-hour recalls counts/2 days	
			2005	2007	2005	2007
Other seafood						
Crab, mangrove	<i>Elimoang</i>	<i>Scylla sirreda</i>	0	1	1	0
Lobster	<i>Urehna</i>	<i>Panilurus</i> spp.	0	2	0	0
Shrimp	<i>Likedepw</i>	<i>Palaemon serrifer</i>	1	3	0	0
Meat						
Chicken	<i>Malek</i>	<i>Gallus domesticus</i>	5	7	0	1
Dog	<i>Kidi</i>	<i>Canis familiaris</i>	1	0	0	0
Duck	<i>Deki</i>	<i>Aythya fuligula</i>	0	1	0	0
Pork	<i>Pwihk (koaso/pwihk)</i>	<i>Sus scrofa</i>	17	18	14	11
Green leafy vegetables						
Pumpkin	<i>Pwengkin</i>	<i>Cucurbita moschata</i>	0	1	0	2
Chilli	<i>Sele</i>	<i>Capsicum annuum</i>	2	4	0	2
Kangkong, swamp cabbage	<i>Kangkong</i>	<i>Ipomoea aquatica</i>	4	6	0	2
<i>Pele</i>	<i>Bele</i>	<i>Hibiscus manihot</i>	2	8	0	0
Brazilian/Okinawan spinach	<i>Spinis</i>	<i>Alternanthera sissoo; Gynura crepidioides</i>	0	13	3	6
Chinese cabbage	Cabbage	<i>Brassica chinensis</i>	2	14	2	5
<i>Chaya</i>	<i>Chaya</i>	<i>Cnidoscolus chayamansa</i>	3	15	1	3
Drumstick	<i>Moringay (drumstick)</i>	<i>Moringa oleifera</i>	n/a	n/a	0	1
Other vegetables						
Beans	<i>(Pihns)</i>	<i>Vigna sesquipedalis</i>	0	4	0	0
Bell pepper	Bell pepper	<i>Capsicum annuum</i>	1	11	0	1
Cucumber	<i>Kiuhri</i>	<i>Cucumis sativus</i>	7	13	6	3
Eggplant	<i>Nasupi (eggplant)</i>	<i>Solanum melongena</i>	0	7	0	1
Ginger	<i>Sinter (sinsar)</i>	<i>Zingiber officinale</i>	n/a	n/a	1	0
Leek	<i>Nira (lihk)</i>	<i>Allium schoenoprasum</i>	0	4	0	0
Onion, green	<i>Nengi</i>	<i>Allium cepa</i>	1	8	0	1
Tomato	<i>Domado</i>	<i>Lycopersicon esculentum</i>	0	4	0	2
Fruit						
Rose apple, bell apple	<i>Apeltik (apolsikisik)</i>	<i>Eugenia jambos</i>	1	6	0	0
Citrus	<i>Karer, karertik (karersik)</i>	<i>Citrus aurantifolia</i>	0	13	9	11
Guava	<i>Kuahpa</i>	<i>Psidium guajava</i>	3	9	2	0
Mango	<i>Kehngid</i>	<i>Mangifera indica</i>	5	2	0	0
Mountain apple	<i>Apel en pohnpei</i>	<i>Syzygium malaccensis</i>	0	20	1	2
Pandanus	<i>Kipar</i>	<i>Pandanus tectorius</i>	2	2	2	0
	<i>Swaijwehpwe</i>		0	1	n/c	n/c
	<i>Aspwihrek</i>		1	0	n/c	n/c

(Continued)

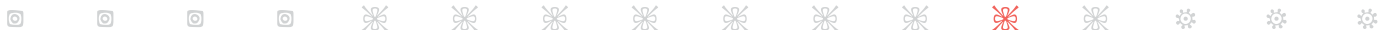


Table 12.8 (Continued) Dietary diversity in Mand community, Pohnpei, 2005 and 2007

Common name	Cultivar, description or local names: Pohnpeian (Pingelapese)	Scientific name*	7-day FFQ counts/week		24-hour recalls counts/2 days	
			2005	2007	2005	2007
Fruit (cont.)						
Papaya	<i>Memiap (keiniap)</i>	<i>Carica papaya</i>	4	15	1	2
Pineapple	<i>Pweinaper (pweiniaper)</i>	<i>Ananas comosus</i>	10	17	8	5
Soursop	<i>(Sei)</i>	<i>Annona muricata</i>	1	1	0	1
Starfruit	<i>(Ansu)</i>	<i>Averrhoa carambola</i>	n/a	n/a	1	0
Watermelon	<i>Sihka (wedamelen)</i>	<i>Citrullus vulgaris</i>	0	6	0	1
Drinks/spices						
Cinnamon	<i>(Madeu)</i>	<i>Cinnamomum carolinense</i>	3	8	1	0
Lemongrass	Lemon grass	<i>Cymbopogon citratus</i>	0	11	1	2
Sugar cane	<i>Sehu (seu)</i>	<i>Saccharum officinarum</i>	8	14	0	1
Coconut						
Mature coconut, embryo	<i>Ering, pahr</i>	<i>Cocos nucifera</i>	45	36	30	24

Data calculated from a seven-day FFQ and two 24-hour recalls, from 40 households per year, from one woman per household; presented as counts per week and counts per two days.
n/a = food did not appear on FFQ.
n/c = not captured in 24-hour recall.
Sources: Kaufer, 2008; * species names from Englberger *et al.*, 2009b, verified from The International Plant Names Index and FAO databases.

2007. The change in reliance on imported versus local food was not significant in terms of contribution to daily energy. In 2005, about 23 percent of energy came from local food sources and about 77 percent from imported foods, whereas in 2007, the equivalent figures were about 24 and 76 percent.

Assessment of the diet in 2009 showed that the increase in giant swamp taro consumption, from about zero days a week in 2005 to 1.4 in 2007, had been maintained in the 36 households participating in the survey. Another sign of sustained change in attitudes to local and imported foods and improved understanding of the relationship between food and health, was the ban on soft drinks at community events that the Mand community imposed in 2010.

Health status

Table 12.9 shows results of the health assessments for 2005 and 2007. Overall, there were no significant changes in health indicators. Overweight and abnormal FBG levels are still serious problems in FSM:

- *Body mass index (BMI)*: Only 13 percent of the population had normal BMI in 2005, rising to 19 percent in 2007; there was no underweight, but there was a high prevalence of obesity. Detailed observation revealed that the young adult age group (18 to 29 years) had a mean BMI of 30, indicating high health risk. The mean BMI among women (34) was significantly higher than that among men (29).
- *Waist measurement*: There was no significant difference in average waist circumference between 2005 and 2007. More than 70 percent of the sample population had waist circumferences exceeding 88 cm (the cut-off for women) or 102 cm (the cut-off for men), indicating high risk for obesity-related illnesses (based on sex-specific cut-offs).
- *FBG*: There were no significant differences in FBG concentrations or classification categories (normal, abnormal) between 2005 and 2007, or between genders. However, FBG significantly

Table 12.9 Results from health assessments in Mand community, Pohnpei, 2005 and 2007

Outcome	No. individuals/year	Descriptive statistics			Statistical analysis	
			2005	2007	Least square mean ^a	p value ^a
BMI (kg/m ²) 68 Normal: 18–24.9 Overweight: 25–29.9 Obese: 30–39.9 Very obese: ≥ 40		Median	30.6	31	c Year: 2005 = 31.4; 2007 = 31.4. Gender: male = 29.24; female = 33.55 Age: ^b A = 30.8; B = 31.6; C = 30.9; D = 30.9; E = 32.9	Year (p = 0.78) Age (p = 0.46) Gender (p = 0.005)
		Range	18.3–50	20–51.9		
		BMI	n (%)	n (%)		
		Normal	9 (13)	13 (19)		
		Overweight	21 (31)	16 (24)		
		Obese	31 (46)	32 (47)		
		Very obese	7 (10)	7 (10)		
Waist circumference (cm) 42 Increased risk: Female: > 88 Male > 102		Median	98	100.5	c Year: 2005 = 98.12; 2007 = 98.21. Gender: male = 95.43; female = 100.9 Age: ^b A = 90.11; B = 99.95; C = 101.35; D = 99.58; E = 99.84	Year (p = 0.94) Age (p = 0.05) Gender (p = 0.16)
		Range	71.2 – 131.4	71.2 – 129.5		
		Waist circumference	n (%)	n (%)		
		Increased risk	32 (76)	30 (71)		
FBG (mg/dl) 108 Normal: < 126 Abnormal: ≥ 126		Median	111	114	d Year: 2005 = 128.2; 2007 = 129.1. Gender: male = 124.7; female = 132.8. Age: ^b A = 110.49; B = 110.2; C = 142.0; D = 140.8; E = 151.4	Year (p = 0.74) Age (p ≤ 0.0001) Gender (p = 0.17)
		Range	79–436	85–496		
		FBG	n (%)	n (%)		
		Normal	71 (66)	67 (62)		
Blood pressure (mmHg) 112 Optimal/normal: <130/85 High normal: 130–139/85–89 mild/borderline hypertension: 140–159/90–99 Hypertension: ≥160/100		Systolic blood pressure			Systolic ^c Year: 2005 = 114.8; 2007 = 115.1. Gender: male ≤ 116.6; female ≤ 113.3 Age: ^b A = 101.4; B = 107.8; C = 114.9; D = 122.2; E = 128.4	Year (p = 0.85) Age (p = 0.28) Gender (p = 0.0001)
		Median	110	110		
		Range	90–195	90–180		
		Diastolic blood pressure			Diastolic ^c Year: 2005 = 72.6; 2007 = 73.1. Gender: male = 74.1; female = 71.6 Age: ^b A = 66.1; B = 68.1; C = 74.3; D = 75.7; E = 80.0	Year (p = 0.64) Age (p = 0.16) Gender (p ≤ 0.0001)
		Median	70	70		
		Range	40–120	50–98		
		Blood pressure	n (%)	n (%)		
		Optimal/ normal	93 (83)	89 (80)		
		High normal	8 (7)	9 (8)		
		Mild/ borderline Hypertension	7 (6)	8 (7)		
	Hypertension	4 (4)	6 (5)			

^a Proc MIXED (outcomes as continuous variables). Standard errors (SEs) of least square mean estimates cannot be obtained for transformed variables, hence SEs are not presented.

^b Age categories: A = 18–29 years; B = 30–39 years; C = 40–49 years; D = 50–59; E 60 years and more.

^c No transformation.

^d Reciprocal transformation.

Source: Kaufer, 2008.



Table 12.10 Process indicators for intervention activities for Mand community, Pohnpei, 2005 to 2007

Activity	% awareness ^a (n = 42)	% exposure ^b (n = 42)	Duration	Frequency	No. meetings/visits	No. participants	No. regular participants
Community Working Group	93	60	2 years	Weekly/ bimonthly	78	126	11
Youth school education	76	33	8 months	Varied	13	42	n/a
Youth Drama Club	88	29	6 months	Monthly	6 meetings in 2006; 3 performances	20 in first; 10 in second	n/a
Breastfeeding Club	83	33	7 months	Bimonthly	12	43	34
Planting material distribution	86	50	8 months	Throughout	n/a	34	n/a
Home gardening	76	48	12 months	Varied	5	20 at first workshop	n/a
Cooking training	83	50	10 days	Once	10	25	n/a
Charcoal oven	90	50	4 weeks	4 weeks for construction and distribution	8	34	n/a
USA Ambassador's dinner	57	21	Once	Once	1	90 (15 from Mand)	n/a
Planting and weight loss competitions	71	50	2 years	2 planting competitions, 1 weight loss competition	n/a	First planting competition: 23	n/a

Data obtained from sources including IFCP intervention log, newspaper articles and questionnaires.

increased with age, especially for those aged 40 years and more. The prevalence of diabetes (FBG \geq 126mg/dl) was 34 percent in 2005 and 38 percent in 2007.

- *Blood pressure:* More than 80 percent of the sample population had blood pressure measurements in the optimal range, and only 4 to 6 percent were definite cases of hypertension. There was no significant difference in blood pressure measurements between genders, but systolic and diastolic blood pressure (BP) both increased significantly with age ($p < 0.0001$). It is a remarkable “good news paradox” that although the Mand population is seriously obese and prone to diabetes, it has low levels of hypertension.

Awareness of and exposure to project activities and materials

The evaluation showed that there was high awareness of and exposure²⁶ to project activities and materials (Table 12.10). Of those interviewed, 93 percent knew about the Mand Community Working Group meetings, and 60 percent were directly involved in activities.

²⁶ Exposure was defined as involvement in a project activity.

Similarly, 90 percent were aware of the charcoal oven project, and 50 percent were directly involved. More than 70 percent of respondents indicated that they were aware of the youth work, the home gardening and cooking training, the distribution of planting materials, the planting/weight loss competitions, and the Breastfeeding Club. More than 50 percent knew about the pot luck dinner at the United States Ambassador's residence, although this single evening event involved only 15 Mand community members.

Of the awareness-raising materials used in the intervention, the Go Local billboard on the main road to Kolonia and the Pohnpei bananas poster displayed in the community meeting hall were the most well-known, by 96 and 95 percent, respectively. The indigenous foods poster was the least known, as it was introduced late in the intervention.

Results of state- and national-level activities

Similar to the project's impact at the community level, there were many indications of changes in attitude towards local foods at the state and national levels.

Availability of *Karat* and *Daiwang* bananas in markets. Observations indicated that the market availability of *Karat* has been steadily improving since 2006. *Daiwang*, a low-status but tasty banana, was previously described as “the banana that was fed only to pigs” and was not marketed. When analysis showed that it is rich in carotenoids, it started to be promoted as a food for humans, and in 2006 it was sold at four of 14 local markets.

Increase in stalls selling local staple food take-outs. A remarkable increase in local staple food take-outs started in 2005, and has continued. Naik (2008) reports that in July 2007, more than 3 550 kg of cooked local staple foods were sold by a sample of Kolonia markets and shops. These included 1 752 kg of banana, 893 kg of breadfruit and the remainder as taro, yam and cassava. New take-out stands continued to appear. Many people, including market owners, indicated that the Pohnpei local food promotion campaign has contributed much to this increase in the marketing of local foods.

Charcoal oven development. The local carpenter engaged to produce charcoal ovens enthusiastically reported that people were purchasing his ovens: “I sold one oven to a man from Chuuk, where there is a problem with electricity outages. He was so happy and took it with him on the plane. A lady from the Marshall Islands also bought one. I built one for my family. I can bake anything in it, just like a normal electric or gas oven. We save money with it. We don’t have to buy fuel.”

Interest from other communities. Groups from Madolenihmw, Kitti and FSM’s other states asked to replicate the project in their communities. In November 2009, the Go Local Agroforestry and Health Improvements project was initiated in six additional communities in Pohnpei and in communities in other states. Baseline surveys have been conducted and intervention activities started, including encouraging the establishment of local food policies.

Other communities that have initiated noteworthy Go Local activities include the following:

- Saladak and Rohi communities of U Municipality

and Sapwohn community of Sokehs Municipality held meetings on local food promotion and hosted several large gatherings that served only local foods.

- Salapwuk community of Kitti Municipality held a workshop on building energy-efficient charcoal ovens and improving local food production skills.
- In Madolenihmw Municipality, through the leadership of Chief Lepen Madau en Metipw, the Metipw community promoted local foods at funerals and traditional gatherings. This included providing food take-outs for up to 1 000 people, using local materials such as banana leaves for wrapping and woven coconut leaves for serving foods, and avoiding plastic containers, which cause environmental problems. This community’s activities to increase the use of local resources encouraged neighbouring communities to do the same.

Among the many agencies and events to use the “Go Local” slogan as a theme are Annual Library Week in 2006, COM-FSM’s graduation ceremony in May 2006,²⁷ COM-FSM’s 2008 Annual Health Fair²⁸ and the Pingelap People Organization’s Pingelap Green Day in 2008. A youth club in Madolehnihmw Municipality took the name “Go Local”, and two local softball teams wore Let’s Go Local t-shirts as part of their uniform. The slogan was also used at workshops in Yap, Kosrae and Chuuk States.

Following Mand community’s banning of soft drinks from all community functions in 2010, other community organizations, such as Pingelap Peoples’ Organization, Inc., have done the same, as publicized in the local newspaper, on the radio and in the Go Local e-mail network.

Many people from all four FSM states have shown great interest in the e-mail network (Englberger *et al.*, 2010c). Comments from members include the following:

I look forward to those e-mails ... I print them out and share them with others too.

²⁷ Instead of the usual hamburgers and soft drinks, the refreshments served were fish sandwiches and drinking coconuts.

²⁸ A speaker at this event, speaking about the Mand case study, stated “We are all proud of this project.”



Because of this campaign, I stopped eating rice and now after about two years my son joined me. I have stopped eating rice and I also discourage my two teenage daughters from eating rice and encourage more local foods. Now my two daughters are complaining of no local foods at home.

When my patients have diabetes, I tell them “go local”... I don’t really know nutrition that much so I like this way of talking about taro and local food.

Newspapers have published individuals’ comments indicating their appreciation of the Mand project and their interest in the promotion of local foods. The local radio broadcaster reported that following the project’s press release, more than ten people had called for more information about local foods.

Results of regional- and international-level activities

The “Go Local” slogan was adopted in the title of an SPC Plant Genetic Resources documentary, and a keynote speaker at one international meeting stated that the Pohnpei Let’s Go Local project should be considered a model for promoting local foods (SPC, 2007).

Women’s groups in Papua New Guinea have adopted the “Let’s Go Local” slogan and song (Anzu, 2008), and the International Centre for Underutilized Crops (ICUC) included a description of the Mand project in its annual symposium report for 2006. In 2008, *Kemelis* – a Pngelapese recipe documented in the Mand project – was selected as the April Recipe of the Month on the ICUC Web site.

In 2009, FAO asked IFCP to assist in developing a booklet on how to carry out a Let’s Go Local campaign, and in April 2010, supported by WHO, Ms Englberger was invited to be one of only a few speakers at the Pacific Food Summit in Port Vila, Vanuatu, presenting on Go Local to enhance food security. Other publications include articles on the Pohnpei banana stamp series (Ormerod, 2006) and two chapters on local island food in a Pohnpei ethnobotany book (Balick, 2009).

Lessons learned

An overall lesson learned was that reviving memories and restoring confidence in local foods is important, and touches people’s hearts and minds. Participants became more interested in health messages when they learned about their own health problems. The slogans and songs helped greatly in passing on messages, and repetition of the same message in different activities and materials was effective. The project team found that elderly people often had set habits that were hard to change, so it was important to work with youth. A realistic approach was needed, encouraging gradual changes and “practising what you preach” rather than banning imported foods. Project facilitators found that they needed to use humour in their presentations and to make activities fun. Writing and communicating about the project regionally and internationally helped spread the message and resulted in increased local interest.

Two comments from Pohnpei market owners, reported by Naik (2008), provide insight: “Today I think that the education about local food is working ... The older generation is going back to eating local and this is influencing the younger people”; and “I have been selling more local food, especially breadfruit, taro and yam, but it is still not common for the Pohnpeians to eat them everyday – they eat rice all the time everyday”. Nevertheless, the impressive number of new local food take-outs is promising.

Another factor relevant to the Go Local campaign in Pohnpei is the rise in global food prices. In 2008, this became a major topic throughout the Pacific Islands (Singh, 2008), and the price of rice in Pohnpei has doubled. This could provide a stimulus for growing and consuming more local traditional food. Some have suggested producing rice on Pohnpei, which has been shown to be possible, but past attempts to do this have failed owing to the intensive nature of rice growing, which contrasts with traditional Pohnpei agroforestry. Other barriers have been the need for imported fertilizer and pesticides, and the crop’s vulnerability to heavy rains and winds. In addition, processed white rice is known to be nutritionally poor, and high consumption of rice presents health risks.

The inclusion of Pohnpei as a case study in this global project provided a rewarding experience for the project team and participants as they progress towards the goal they share with the other 11 communities in the CINE Food Systems for Health Program.

Conclusions

The health situation in FSM continues to be considered a “state of health emergency”, as more and more individuals become ill with non-communicable diseases, including diabetes, heart disease, stroke and cancer (FSM Information Services, 2010). Project activities have been popular and have succeeded in increasing people’s awareness of this health crisis, and improving their use of better food, their food diversity and their nutrition. With time, this dietary change seems likely to improve the health of all the people in Pohnpei.

The project found many activities that contribute to healthy diets, and an approach that works. In the past, diets and lifestyles changed towards the use of imported food, but they can also shift back to more local foods, and are already doing so.

The way forward

New goals for the projects are:

- advocacy with Pohnpei leaders (traditional, government, church, and private sector) to promote local food and relevant policies;
- expansion of the project to other communities in Pohnpei and other FSM states;
- expansion to more local, regional and international partners, focusing on local foods and their CHEEF benefits;
- continued development of awareness materials and methods for increasing the production and consumption of local foods and varieties;
- a continuous watch for signs of improved health status that can be attributed to the project.

As one team member pointed out: “Remember that this is a long-term process, we may not see the full

change in our lifetime, but it is happening.” Another team member pointed out: “It is hard to change but let’s hang in there, don’t give up!” ✨

Acknowledgements

Thanks are warmly extended to all the members of Mand community, including their leaders, who enthusiastically took part in this challenging project. Their willingness to participate has led to insights that may guide work in improving diets and health in additional communities in Micronesia and possibly other Pacific nations and around the world. The authors acknowledge all partners, funding and support agencies, particularly CINE, kp-studios.com, CINE partners and case studies; Pohnpei State and FSM national government departments, including the Pohnpei Office of Economic Affairs, the Department of Education, the Department of Health Services and the Department of Land and Natural Resources; COM-FSM CES; USDA NRCS; Peace Corps Micronesia; Conservation Society of Pohnpei; FSM National Olympic Committee; Global Environment Facility Small Grant Programme; *Sight and Life*; the embassies of Germany, Australia, New Zealand and Japan; PATS Foundation; Papa Ola Lokahi, Global Greengrants Fund; SPC Land Resources Division, SPC Development of Sustainable Agriculture in the Pacific, SPC Forests and Trees Program, SPC Healthy Pacific Lifestyle Section; WHO; FAO; Emory University, McGill University, University of Hawaii and University of Auckland; ACIAR/HarvestPlus; Forum Secretariat; ICUC; Technical Centre for Agriculture and Rural Cooperation (CTA); Xyris; and Bioversity International.

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Chapter 13

Tasty *tonoto* and not-so-tasty *tonoto*: fostering traditional food culture among the **Ainu** people in the Saru River region, Japan

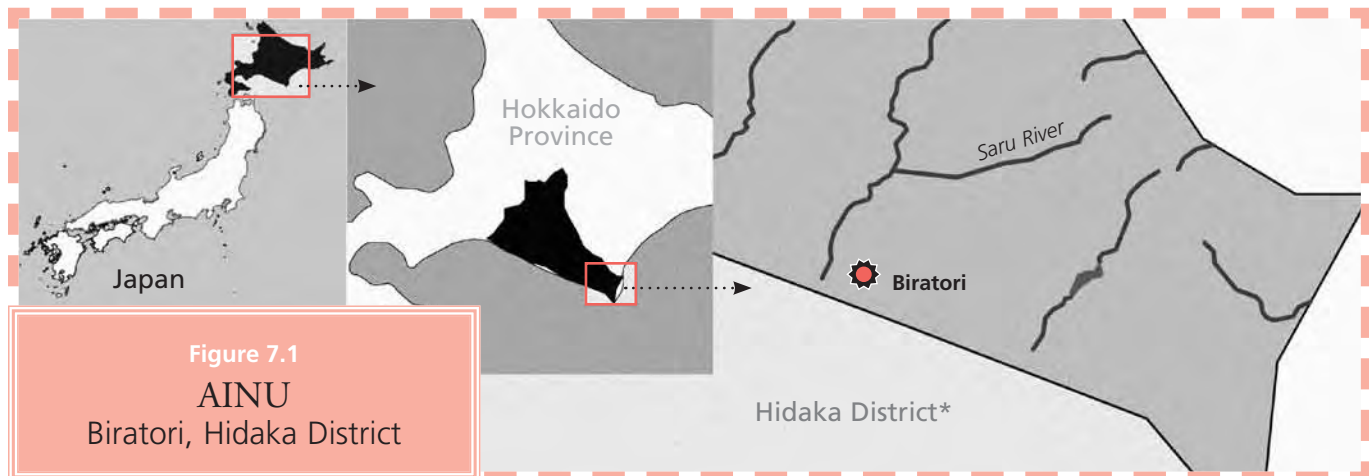


Figure 7.1
AINU
 Biratori, Hidaka District

Data from ESRI Global GIS, 2006.
 Walter Hitschfield
 Geographic Information Centre,
 McGill University Library.
 *Hidaka outline digitized from
 web-japan.org

1
 Faculty of Humanities,
 Hokkai-Gakuen University,
 Sapporo, Japan

Key words > Ainu, Indigenous Peoples,
 food systems, traditional food

Photographic section >> XXVIII



“I would like to see Ainu dishes served as school lunch at the local schools. When the local people accept Ainu food as a part of local food, there will be no social discrimination against Ainu people.”

Miwako Kaizawa

“Restoring natural environment is the key issue for preserving Ainu food culture. People should be able to go out the door and pick wild vegetables in their backyard, as they did in old days.”

Koichi Kaizawa

Abstract

The Ainu community in the Saru River region of Hokkaido has the highest concentration of Ainu population in Japan. In 2004, an Ainu research group led by community leader, Mr Koichi Kaizawa, started the project described in this chapter as part of the international comparative research of the Indigenous Peoples’ Food Systems for Health Program coordinated by the Centre for Indigenous Peoples’ Nutrition and Environment. The ultimate goal of the project’s research and intervention activities was to improve the social and cultural health of Ainu people in the community, by promoting Ainu food culture. The research group conducted four kinds of intervention activities: i) publishing a local community newsletter; ii) holding Ainu cooking lessons; iii) preparing Ainu dishes for ceremonial occasions; and iv) conducting an Ainu cooking project with university students. Over the years since the research began, the research group has observed changes in the community’s perception and use of Ainu food. The intervention activities continue, and the researchers anticipate that the Ainu people will integrate their local food culture further into daily life.

¹ The original members of the research group are Koichi Kaizawa (community leader), Miwako Kaizawa (community researcher), Masami Iwasaki-Goodman (anthropologist), Taichi Kaizawa (ethnologist), Satomi Ishii (nutritionist), Hidetomo Iwano (microbiologist) and Hiroki Inoue (microbiologist).

Introduction

At the invitation of Dr Harriet Kuhnlein, Founding Director of the Centre for Indigenous Peoples’ Nutrition and Environment (CINE), an Ainu research group¹ led by community leader Mr Koichi Kaizawa joined CINE’s Indigenous Peoples’ Food Systems for Health Program in the spring of 2004. The CINE-Ainu research group spent the first three years interviewing elders to gather information on traditional food uses, and conducting composition analyses of those food items that the elders identified as being important in their food culture. A summary and the results of this research were published (Iwasaki-Goodman, Ishii and Kaizawa, 2009). During the research period, the group also undertook various intervention activities to promote uses of Ainu food within and outside the community. This chapter summarizes these intervention activities and provides an analysis of their social and cultural implications in the Ainu community of Saru River region.

Improving socio-cultural health among the Ainu in the Saru River region

The research in the Ainu community was expected to generate results on which to base clear project goals. However, during the planning phase in 2004, the research group identified problems with and limitations to conducting this kind of research in the Ainu community. The group identified elements that make this community different from other communities of Indigenous Peoples included in the CINE joint research programme.

First, the Ainu community in Saru River region has consisted of a mixture of Ainu and non-Ainu people since the late nineteenth century, when Japanese people settled in the area and established a township under the Japanese Government (Iwasaki-Goodman, Ishii and Kaizawa, 2009) (Figure 13.1). Following a strong assimilation policy, under which the Government issued numerous laws that affected the Ainu way of life, most Ainu people eventually gave up their traditional hunter-gatherer lifestyle and took up farming. Poverty and racial discrimination seriously affected the Ainu, pushing them to the margins of a society that treated them as second-class members. Facing serious social discrimination, many Ainu people suppressed their ethnic identity and adopted the mainstream Japanese way of life. It is only recently that improved social conditions have given Ainu people the confidence to disclose their ethnic identity, but not all of them have done so. Following this history of distress, the project community in Saru River region is a multi-ethnic community with complex issues of racial discrimination and stigmatized ethnic identity.

The second difference between the Ainu community and the other indigenous communities in CINE's programme is that Ainu people resent academic research, especially when it involves physical and medical examinations. This is mainly because earlier research was conducted unethically (see Lewallen, 2007 for details), and many Ainu people remember their experience of invasive examinations and the accompanying sense of humiliation.

Given that local people had not identified the improvement of physical and medical conditions as a

pressing need, and to avoid subjecting them to medical examinations, the research group decided that the CINE global research aim of improving the health of Indigenous Peoples could best be met by focusing on improving Ainu people's social and cultural conditions, rather than their physical and medical ones.

Efforts to improve the Ainu's social and cultural health in Saru River region aimed eventually to resolve social prejudices against Ainu people. The researchers believed that reintroducing traditional Ainu foods and recognizing their nutritional value would promote positive attitudes towards Ainu foods, people and culture, inside and outside the community. This in turn would help create a community in which Ainu people could freely express their ethnic identity with pride. The ultimate aim was for Ainu people to live with dignity as an ethnically distinct group, while maintaining the same social status as non-Ainu members of the community.

A third issue that the research group took into consideration when planning the research is that different age groups of Ainu people hold different levels of cultural knowledge (Iwasaki-Goodman, Ishii and Kaizawa, 2009). Social discrimination following the intensive assimilation policy created negative attitudes towards Ainu ethnicity, including among Ainu people themselves. As a result, many decided not to teach the Ainu language and culture to their children, encouraging them instead to live as their mainstream Japanese neighbours did, speaking Japanese and following Japanese customs. This period of cultural discontinuity created a group of Ainu people with limited understanding of their language and cultural traditions. Starting in the 1980s, however, cultural revitalization among the Ainu led to increasing efforts to reintroduce cultural elements such as language, dance, song and rituals. In the Saru River community, Ainu language classes were held, giving young Ainu an opportunity to learn their language. Rituals that had not been held since before the assimilation period were resumed, as were the prayers, dances, songs and cooking preparations associated with these rituals. Young Ainu people growing up during this period were exposed to various aspects of their own culture. As a result of these



developments, the Saru River Ainu community now includes three main age groups of Ainu people: i) a few elders whose first language is Ainu and who have had first-hand experience of Ainu culture; ii) middle-aged people and elders who have had minimum exposure to Ainu culture and who were taught to follow Japanese ways by their parents; and iii) young people who grew up during the cultural revitalization and have learned some aspects of Ainu culture.

A significant difference between the diet changes imposed on Ainu people during the Meiji-Taisho Era (late nineteenth to early twentieth centuries) and those imposed on other Indigenous Peoples, such as in Canada, is that the adoption of Japanese food culture did not result in drastic drops in the nutritional value of the Ainu diet, so there was no major deterioration in health.² During the contact period (before the Second World War), the daily diet of Japanese people was almost as simple as the Ainu diet (Ishige, 1979; Iwasaki-Goodman *et al.*, 2005) and contained mainly vegetables with modest amounts of white rice and animal meat. Therefore, the diet shift from Ainu food – salmon, deer and wild vegetables with grains – to Japanese food, such as white rice, pork, chicken and vegetables, did not cause serious negative effects on the health of Ainu people.

However, although the diet change had an insignificant impact on the health and nutrition of Ainu people, it had a serious cultural impact in the minds of both Ainu and non-Ainu people in Saru River region. Mainstream Japanese culture dominated the community, affecting local people's views regarding every aspect of life. Needless to say, the dominant culture was seen as superior, while Ainu culture was regarded as inferior and therefore undesirable. The Government of Japan's powerful assimilation policy added force to social discrimination, pushing Ainu people and their culture to the margins of society.

Many Ainu food items became symbols of the inferiority of Ainu culture. For example, the strong taste

and smell of wild onion/garlic (*pukusa* or *kitopiro*)³ became a target of discrimination; when the rest of the community renamed the onion Ainu *negi* (Ainu onion), Ainu people started to avoid use of both the onion and its new derogatory name, and eventually it became a taboo food. Other traditional food items were classified as undesirable, mainly because of their associations with Ainu people and culture. At the same time, other Ainu food items were gradually integrated into Japanese food because they were not identifiable as distinct Ainu food items. Many Ainu people use Ainu traditional food items without knowing them as such.

This oppression is not unique to the Ainu community of Saru River region and is a feature of the histories of many Indigenous Peoples throughout the world. However, the research group felt that focusing on the historical and current situation of the Ainu community would help identify the social and cultural aspects to consider when revitalizing Ainu food culture. This approach was also adopted by earlier research (Iwasaki-Goodman, Ishii and Kaizawa, 2009).

Interventions

With strong leadership from the community leader, the research group discussed diverse ways of providing people in the community with information and experience of Ainu traditional food, thus reintroducing the food into the local food culture. Intervention activities had four components: i) a community newsletter providing information about traditional food items; ii) a series of cooking lessons; iii) preparation of Ainu dishes for ceremonial occasions; and iv) other activities conducted outside the community.

Ianpero:⁴ the local community newsletter

Most Ainu people were unaware of their own use of traditional foods, mainly because these foods had been integrated into mainstream Japanese cuisine. At the start of the research, local people told the research group

² However, there are records of health problems among Ainu people during the Meiji Era. For example, a United Kingdom doctor living in Saru region reported that Ainu people were becoming ill because they no longer ate wild game (Biratori Town, 1974).

³ *Pukusa* is often referred to as *kitopiro* (*kito* is another Ainu word for *pukusa*).

⁴ "Let us eat" in the Ainu language.

Box 13.1

Pukusakina

(*Anemone flaccida*, *anemone*)

Pukusakina is not well known, but it is an important wild vegetable that Ainu people have been eating for a long time. They dry it and cook it in a soup, called *ohau* or *ruru*, all year round. Because of its frequent use in soup, it is also called *ohau kina* meaning “leaves in soup”. When magnolia is in bloom, mothers take their children into the mountains to pick enough *pukusakina* to fill an *icha saranip* (a bag made from the bark of the *shinano-ki*, a Japanese lime), which mothers carry on their backs when harvesting wild vegetables.

Pukusakina has a mild taste and goes well with other ingredients. It is therefore used in many dishes. Its nutritional value is high, and it contains more potassium and phosphorus than *pukusa* (wild garlic). *Pukusakina* is best in *yuku ohau* (deer soup), but is also good in pork soup as deer meat is difficult to get. Fortunately, *pukusakina* is found in many places. It is so abundant that even elders and children can find it easily. Although there are concerns about resource depletion resulting from the booming interest in harvesting wild vegetables, *pukusakina* is abundant and will become popular in the future.

that they no longer ate Ainu food because they had adopted the Japanese way of life. However, it did not take long to discover that they were using traditional Ainu food items in their daily diets, without realizing it. Looking closer at what they eat every day, Ainu people noticed that there are important differences between their food culture and that of non-Ainu people. The most noticeable of these differences is the Ainu's extensive use of various wild vegetables, continuing their ancestral tradition of using wild plants. When planning the intervention activities, the research group decided to focus on creating awareness of traditional food use among Ainu people, and providing information to non-Ainu members of the community. To this end, the group contributed an article on Ainu food use to the community's *Saru unkr newsletter*, for people living in Saru River region.

This monthly newsletter is issued by the Biratori regional branch of the Hokkaido Association of Ainu, and is distributed to all 2 500 households in Biratori. Ms Miwako Kaizawa, a local researcher in the CINE-

Ainu research group, was responsible for writing articles on traditional Ainu foods and their uses, based on information gathered by the research group. Her contributions, each of 700 to 800 words with two or three illustrations, began in April 2005, providing an introduction to the food items and information on harvesting, processing, preservation and cooking methods (Annex 13.1 gives a list of her articles). She took particular care to write in a way that is easy for readers to understand, so that they could harvest the food items and cook the dishes themselves. Box 13.1 gives an example of an article introducing the wild vegetable, *pukusakina*.

The articles also introduced many dishes unique to Ainu food culture. Box 13.2 gives the example of *tonoto*, which is a sacred fermented beverage offered to kamuy (spirits) during rituals.

Although the newsletter reaches every household every month, it is difficult to know how many people read the articles. The research group has to rely on local people's comments as feedback on the intervention. Ms Kaizawa (who writes the articles) has heard that local people enjoy reading them. Some readers have told her that they would like to learn about a greater variety of dishes using Ainu food items, and she has been working on the modification of traditional dishes to meet the tastes of today's local people.

In the first four years of publishing articles in the community newsletter *Ianper*, about 50 articles were written, reaching 2 500 households a month. Ms Kaizawa feels that there have been clear changes in local people's perception of Ainu food. Recently, local non-Ainu women expressed an interest in learning more about Ainu food and culture, and asked her for Ainu cooking lessons. This shows a clearly positive change in attitudes towards Ainu people and their culture.

Cooking lessons

Ainu cooking lessons have been very effective in promoting local people's understanding of Ainu food culture. Since 1996, the local elementary school has regularly held a programme, *Hararaki Time*, to teach children various aspects of Ainu culture (Iwasaki-

Box 13.3

Two *sito* dishes

Traditional *sito*

Ingredients: Rice flour, egg millet flour, water.

- Mix the rice and egg millet flours with water and knead until the dough is as soft as an earlobe.
- Take a portion of this well-mixed, soft dough and roll it into a pancake shape. (The size of the pancake depends on the use of the *sito*. For example, large *sito* [20 cm in diameter] are for offerings, and smaller ones are eaten with other things by the participants of gatherings.)
- Boil the water, and put the dough into the boiling water. Cook until the dough rises to the surface of the boiling water, and wait for another five minutes. Make sure that the *sito* is cooked through in the middle and remove it from the boiling water.
- At the final stage, rinse the *sito* in cold water to get rid of excess flour.

Sito with minced deer meat

Ingredients: Rice flour, egg millet flour, water, deer meat, soy sauce, sugar.

- Chop the deer meat finely, cook it with sugar and soy sauce and set it aside.
- Make the *sito* dough following the *sito* recipe.
- Mix the cooked deer meat into the *sito* dough and spread the dough on to a flat surface.
- Take a deer-shaped cookie cutter and cut out the *sito* in the shape of deer.
- Put the deer-shaped *sito* into boiling water until they are cooked.
- Take them out of the water to cool.
- Brown both sides of the *sito* in a frying pan, and eat with salt and pepper.

Preservation Group, started the initiative of serving Ainu traditional dishes at ceremonial occasions. In August 2006, *Chipsanke*, the boat launching ceremony, was celebrated with *tonoto* prepared by the group, and gradually the group started to receive requests to prepare Ainu dishes for other local gatherings and ceremonies, and for gatherings in other towns. The group also held cooking lessons for Biratori residents and visitors. As a result, group members have become knowledgeable about Ainu foods and recipes, and are developing an understanding of the cultural aspects of food preparation. For example, preparation of *tonoto* requires an understanding of the role of kamuy (spirits), as guardians of the *tonoto* fermentation process. When

tonoto has fermented, women are responsible for straining it, and praying to the kamuy to thank them for protecting the *tonoto* during the fermentation is an indispensable part of the straining process. Members of the team making *tonoto* take turns to strain it and learn the prayer, which gives them an important introduction to the spiritual side of *tonoto* making.

Through the Ainu Food Culture Preservation Group's efforts, various Ainu rituals held in Saru River region now include the serving of *tonoto* and other Ainu dishes. Ainu foods have therefore become an indispensable part of local rituals.

Interventions outside the community

Ms Masami Iwasaki-Goodman, the author of this chapter, conducted an Ainu cooking project after she and her students worked as volunteers at the International Forum for Indigenous People in 2005, when they tasted Ainu dishes for the first time. The students found *sito* in its original form too filling and too high in calories compared with the snack dishes they are used to eating. They wanted to eat *sito* in smaller portions and with flavours that they like. Since then, the students have developed various *sito* dishes, including with minced deer meat, cheese filling, tomato sauce and various sweet sauces. Box 13.3 gives the original *sito* recipe and the students' recipe for deer *sito*.

Every autumn, during the university festival, the students set up a booth to promote their versions of *sito*, which they cook themselves and sell to friends and festival visitors. Over the three days of the festival, about 300 people buy *sito*. For most of these people, this is their first experience of Ainu food and culture.

The students' *sito* booth provided them with their first experience of introducing an Ainu food. They promote the *sito* enthusiastically, calling it "a tasty dish that you will like at the first bite". The students' positive attitude to making and selling *sito* generates positive feelings about Ainu culture and people; many students have become interested in learning more about Ainu culture, and some have chosen this as the topic for their graduation theses. The students' vociferous promotion of Ainu food at the university festival often



provokes unexpected reactions from visitors, who express negative feelings towards Ainu people and their culture. This gives the students direct experience of the social prejudices confronting Ainu people, and an opportunity to think about ethnic issues in their society.

The CINE-Ainu research group is continuing with its interventions in and outside the Ainu community. Group members hope that many more people will learn about the food culture their Ainu ancestors fostered, thus changing attitudes towards Ainu people and their culture.

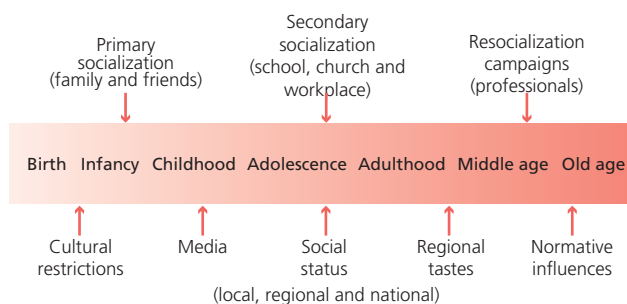
Cultural implications of intervention activities

Knowledge concerning food is a significant part of culture, similar to language and religion, which people need for their daily lives. People grow up learning the kinds of food and ways of processing them that are culturally acceptable in their community. Intervention activities therefore seek to change the cultural knowledge of people in the community. For the Ainu community in Saru River region the processes of change are complex and difficult to identify because of the multi-cultural nature of the community. However, it is necessary to try to understand these processes, to evaluate the effectiveness of the intervention activities. As cultural changes cannot be examined quantitatively, anthropological analysis is used to examine the change process and current situation in the Ainu community.

Intervention activities as resocialization

Children learn to eat what their family members eat, and gain understanding of various factors surrounding their food, including taste, value and preference, along with the historical and societal relationships of food within the community. Food habits are cultural, in that people eat according to rules that are shared by other members of their group. To understand the implications of the intervention activities that the CINE-Ainu research group conducted, it is necessary to examine the dynamics involved in the acquisition of food habits.

Figure 13.2 Socialization and the acquisition of food habits



Source: Adapted from Fieldhouse, 1996.

First, people gain knowledge of their food culture through socialization. Figure 13.2 illustrates the process of socialization and acquisition of food habits, based on work by Fieldhouse (1996).

From birth, children learn appropriate food habits through socializing with family and friends. They are fed with locally acceptable foods prepared in ways that are appropriate in the community. Along with food habits, children also learn the attitudes and values associated with food items and their preparation through interactions with family members and friends. Fieldhouse (1996) states that primary socialization is more influential than socialization at later stages in life, because the food habits that people acquire when they are young tend to persist throughout their lives. Individual food habits are established during childhood.

The food habits learned in early childhood undergo changes under the influence of the people who are met in later stages in life. Fieldhouse (1996) calls this secondary socialization, and states that individuals alter their food habits by learning from the people they meet in school and the workplace. Through secondary socialization, people are exposed to different ways of fulfilling their food needs; in some cases, they expand their repertoire of food habits and/or make drastic changes in the food they eat.

Resocialization can occur at any time of life, and is often the result of an organized effort to encourage people to adopt new food habits (Fieldhouse, 1996). Resocialization efforts usually take the form of

educational campaigns and interventions, introducing various kinds of information concerning food habits, such as the nutritional values of food, and healthy eating habits.

Other important factors that influence people's food habits are cultural restrictions, the media, social status and regional tastes (Figure 13.2). These factors reflect the normative influences in a specific region; food habits are greatly determined by the social, cultural and historical repertoire of the regional food culture.

The processes of socialization and resocialization described by Fieldhouse refer to normal conditions where no drastic social change is occurring. People live their lives in fairly stable social conditions over generations, and normative influences usually arise at the local, regional and national levels. However, this is often not the case for indigenous communities. For example, for the Ainu, the assimilation policy of the Meiji Era (1868 to 1912) created social conditions in which Ainu food habits were viewed as being less desirable, and in some cases were rejected. To avoid being subject to social prejudice, Ainu adopted Japanese food habits. Although some households appreciated and maintained Ainu food habits, negative social influences generally drove these habits underground and integrated them into Japanese food habits. For example, the many kinds of wild vegetable that continued to be eaten in Ainu households were called by their Japanese names, and were no longer recognized as Ainu food. Some foods were replaced with others; for example deer meat was replaced with pork in many dishes, as the government restricted deer hunting, and pig farming became a common means of livelihood for Ainu people when hunting and fishing were no longer possible. Popular Ainu dishes prepared with deer meat were therefore no longer distinct from pork-based Japanese dishes.

A particularly complicated situation can be observed among middle-aged Ainu people in Saru River region, as described previously. During their primary socialization, these people acquired complex food habits, which were primarily Japanese with some Ainu food incorporated. One of the complexities of these food habits is that they make no reference to the cultural knowledge associated with Ainu food traditions. Ainu people in

this generation pick and eat wild vegetables for their daily meals, but are not familiar with the vegetables' Ainu names. In addition, they have not acquired cultural knowledge regarding the important prayers to and attitudes towards the spiritual beings involved in harvesting and processing certain foods. The normative influences during the adolescence of these people prevented Ainu food habits from being reinforced through secondary socialization. Instead, negative social conditions influenced attitudes to Ainu food habits, making people more willing to shift towards the Japanese way of life.

The younger generation of Ainu also underwent primary socialization without acquiring Ainu food habits. However, in the 1980s, one Ainu elder, Mr Shigeru Kayano, started to teach the Ainu language to small children from both Ainu and non-Ainu families in the community. He took the children into the forest to share his knowledge about trees, plants and aspects of Ainu culture, including the preparation of wild vegetables and other Ainu dishes. Unlike the previous generation, the young Ainu who attended Mr Kayano's classes were exposed to Ainu food habits and resocialized with these (Anderson and Iwasaki-Goodman, 2001). This is consistent with Fieldhouse's explanation that resocialization can occur at any time of life, although he himself focuses on resocialization in middle and old age (Fieldhouse, 1996). Mr Kayano's efforts were especially effective and helped to trigger the revitalization of Ainu culture throughout Hokkaido.

The CINE-Ainu research group results (Iwasaki-Goodman, Ishii and Kaizawa, 2009), together with the intervention activities described in this chapter demonstrate that effective intervention activities in the Ainu community of Saru River region need to be based on resocialization that creates not only changes in individual households, schools and workplaces, but also normative influences at the local, regional and national levels. It is clear that such changes involve people outside the Ainu community even more than people within it. By reintroducing Ainu food culture, the intervention therefore aims to re-establish Ainu people and culture in Japanese society, creating changes at multiple levels, such as households, schools, communities and the nation.

the difference between tasty *tonoto* and not-so-tasty *tonoto*. When the *tonoto* is successfully made and tastes good, everyone wants to take home the leftovers from the ceremony. But if it is not so good, no-one wants to take it home”. Local people have acquired a taste for *tonoto* and have developed a communally shared way of evaluating its flavour.

Conclusion

The CINE-Ainu research group decided that the project’s goal was to improve the socio-cultural health of Ainu people in Saru River region, to create a community where Ainu people are proud of their ethnic background. Four kinds of intervention activity were planned and carried out. The intended cultural changes are a slow and complex process, but positive changes are occurring in the community. The local researcher, Ms Miwako Kaizawa, often says that the ultimate goal is to have Ainu dishes served for lunch in local schools, indicating that Ainu food culture has been integrated into the local food culture. This would demonstrate that the intervention has been effective in creating normative changes. The CINE-Ainu research group is confident that the day is near when this will be the case ✨

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Annex 13.1 Articles in *Ianpero*, the community newsletter (April 2005 to May 2008)

Apr. 2005	<i>Pukusa</i> , <i>Allium victorialis</i> var. <i>platyphyllum</i> (wild onion/garlic)
May 2005	<i>Pukusakina</i> , <i>Anemone flaccida</i> (anemone)
June 2005	<i>Cimakina</i> , <i>Aralia cordata</i> (<i>udo</i> , spikenard)
July 2005	<i>Turep</i> , <i>Lilium cordatum</i> var. <i>glehnii</i> (perennial lily)
Aug. 2005	Traditional dishes of Indigenous Peoples around the world (Report of the Nibutani Forum, 2005)
Sept. 2005	<i>Amam</i> (grains)
Oct. 2005	<i>Aha</i> , <i>Amphicarpa bracteata</i> Edgeworthii var. <i>japonica</i> (aha bean)
Nov. 2005	<i>Kosayo</i> (porridge with beans)
Dec. 2005	<i>Citatap</i> (chopped pork brain with wild onion)
Jan. 2006	<i>Sito</i> (dumplings)
Feb. 2006	<i>Yuk ohaw</i> (deer soup)
Mar. 2006	<i>Peneemo</i> (potato pancakes using frozen potatoes)
Apr. 2006	<i>Makayo</i> (a butterbur scape)
May 2006	<i>Sorma</i> , <i>Matteuccia struthiopteris</i> (ostrich fern, fiddle head fern)
June 2006	<i>Korkoni</i> , <i>Petasites japonicus</i> (Japanese butterbur, coltsfoot)
July 2006	<i>Nupe</i> (<i>veratrum</i>)
Aug. 2006	Summer fruits: <i>emaui</i> , <i>turepni</i> (wild berries)
Sept. 2006	<i>Chitatau</i> (chopped salmon milt with wild onion)
Oct. 2006	Autumn fruits: <i>matatanpu</i> (<i>Actinidia polygama</i>) and others
Nov. 2006	<i>Kikuimo</i>
Dec. 2006	<i>Ciporusi emo</i> (potato mixed with salmon roe)
Jan. 2007	<i>Tonoto</i> (beverage)
Feb. 2007	<i>Ento</i> , <i>Elsholtzia ciliata</i>
Mar. 2007	<i>Haykina</i> , <i>Urtica platyphylla</i>
Apr. 2007	<i>Sito</i> (adapted <i>sito</i> dishes)
May 2007	<i>Pukusa</i> , Part 2
June 2007	<i>Turep</i> , Part 2
July 2007	<i>Noya</i> (mugwort)
Aug. 2007	<i>Kene</i> (alder)
Sept. 2007	<i>Yukkarus</i> (maitake)
Oct. 2007	<i>Atane</i> (turnip)
Nov. 2007	<i>Sakkabocya</i> (dried pumpkin), <i>ratashikepu</i> (cooked pumpkin)
Dec. 2007	<i>Huipe</i> (raw food, liver)
Jan. 2008	<i>Kankan</i> (intestines)
Feb. 2008	<i>Cepohaw</i> (fish soup)
Mar. 2008	<i>Nitope</i> (tree sap)
Apr. 2008	Pickled <i>pukusa</i> (pickled wild onion)
May 2008	<i>Pukusakina</i> mixed with sesame, vinegared <i>sorma</i>



Future directions





Chapter 14

What food system **intervention strategies** and evaluation indicators are successful with Indigenous Peoples?



1

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Key words > Indigenous Peoples, food systems, nutrition intervention, intervention indicators, intervention evaluation

Background and rationale

It is well recognized that today's globalization of food affects economies and people at all socio-economic levels, in all countries. The forces that drive food globalization are industrialized production and trade of agricultural crops, foreign investment in food processing and retailing, and global advertising (Hawkes, 2006). Globalization leads to the erosion of the food cultures of all people and the simultaneous reduction of food biodiversity, which results from the food industry's demand for standardized and uniform products being passed on to consumers, especially in supermarkets and fast-food chains. Combined with changing lifestyles, loss of livelihoods at all stages in the food production sector, and increasing urbanization and poverty, sedentary lifestyles and new dietary patterns are driving increases in obesity and non-communicable diseases, including micronutrient deficiencies. With unresolved food and nutrition insecurity issues and high incidence of non-communicable diseases, this nutrition transition and the resulting "double burden of malnutrition" are reaching all corners of the globe (Kennedy, Nantel and Shetty, 2004; 2006).

In developed countries, disparities in obesity prevalence are related to the availability and quality of retail food environments, with more overweight and obesity occurring in socio-economically disadvantaged areas, often where there are particular ethnicities. These areas often have poor access to healthy foods and low-quality retail food environments (Ford and Dziewaltowski, 2008). In developing countries and in many areas where Indigenous Peoples live, the retail foods available and purchased have low nutrient densities and lead to poor-quality diets (Kuhnlein *et al.*, 2006a; Chapter 1 in this volume – Kuhnlein and Burlingame, 2013). Many nutrient-rich local indigenous foods still produced at the subsistence level may not be marketed or may be marketed at higher prices than processed imported foods. Direct access to these foods from local ecosystems is often hampered by the environmental damage caused by industrial interests and urbanization (Chapter 3 – Turner, Plotkin and Kuhnlein, 2013).

Broadly speaking, to improve the quality of food available in poor communities, including those of Indigenous Peoples and in both developed and developing countries, it makes sense to: i) improve access to traditional local foods; ii) reduce the prices of healthy foods, with government enforcement; iii) increase education in and demand for "good" food, and understanding of the impact of poor diet on health; and iv) increase the prices of "junk food" (nutrient-poor, high-energy, sweet or fatty foods and drinks), perhaps through increased taxes. Points i), ii) and iv) are usually difficult to implement and require government involvement, whereas point iii) can be supported through community nutrition networks. All four measures will speed up success in food systems predominated by industrialized food markets. Indigenous communities' attention to their food systems may be increased if interventions are based on communities' own knowledge bases, especially if there is limited use of market food and ensured access to traditional food.

Nutrition transition

The contemporary global food security crisis – which includes simultaneous and paradoxical obesity and undernutrition from poor-quality diets – is a public health crisis driven by inequitable access to food through international systems of governance (Traill, 2006; Yngve *et al.*, 2009). This calls for consideration of Indigenous Peoples' food systems, attention to the poor quality of Westernized¹ diets, and action to promote sustainable food systems within the unique local cultures and ecosystems in which Indigenous Peoples live.

Recent moves to disaggregate national health data by ethnicity are uncovering aspects of the nutrition transition that are specific to Indigenous Peoples. For example, research on a large cohort of Inuit children in Nuuk, Greenland, demonstrates that more children are reaching overweight status and at younger ages than in earlier cohorts (1970s versus 1990s) (Schnohr, Petersen and Niclasen, 2008). In a very different part of the world, the socio-economic

¹ Derived from or relating to the countries of Europe and North America.



status and obesity levels (measured as percentage of the population obese and as mean body mass index [BMI]) of Surui Indians in Brazil were found to have increased between the 1980s and 2008 – this rapid nutrition transition occurred in the midst of poverty (despite increased income), food insecurity, indicators of poor growth (stunting) and precarious living conditions (Lourenço *et al.*, 2008).

Disparities

Indigenous Peoples face widespread disparities with the larger societies in which they live, in all countries where threats to land, culture and linguistic heritage destabilize identity and self-determination. These circumstances generate health challenges that are specific to Indigenous Peoples (King, Smith and Gracey, 2009; Gracey and King, 2009). In Canada, Indigenous Peoples experience higher rates than the overall national averages for diabetes, heart disease, HIV/AIDS, tuberculosis and many other diseases. Infant mortality rates are higher and life expectancy is lower than in the general population. Suicide rates are two to three times higher overall, and five to six times higher among youth (Reading, 2009; Egeland and Harrison, 2013). Similar and worse circumstances driven by poor access to traditional resources and culture exist in other countries (UNPFII, 2009).

Social practice is recognized as a driving force in dietary strategies (Delormier, Frohlich and Potvin, 2009), so there is need for new, innovative and transformative intervention strategies and policies that use traditional food systems to make long-term improvements in the health of Indigenous Peoples. This is especially so for Indigenous Peoples who recognize that health encompasses physical, mental, social and spiritual dimensions and regard food as affecting all of these dimensions. To address these multiple dimensions, health promotion strategies must therefore be carefully incorporated into the five stages of behaviour change – pre-contemplation, contemplation, preparation, action, and maintenance (Medical College of Georgia, 2005).

Nutrition interventions that stress obesity control and healthy body weight cannot be separated from

interventions that support increased physical activity. A study of the physical activity patterns of a large cohort of American Indian and Alaskan Native Peoples concluded that many activities are undertaken within communities, including traditional food harvesting. However half of the respondents (49 percent) reported no vigorous activity at all, and only 23 percent reported up to 30 minutes of moderate to vigorous activity a day. Women had lower activity levels than men; those with vigorous activity had better clinical health characteristics (BMI, blood lipids, etc.) (Redwood *et al.*, 2009). Successful physical activity interventions with American Indians and Alaskan Natives in the United States of America showed significant changes in health knowledge or behaviour, with sustainability being related to capacity building involving locally trained personnel, culturally acceptable programmes, local leadership and stable funding (Teufel-Shone *et al.*, 2009).

There is considerable literature on how to use schools to deliver nutrition education information and improve physical activity. Strategies can be sought from focus groups of teachers, parents and students (Schetzina *et al.*, 2009) examining how to improve school lunch and physical activities. The Pathways Program for American Indian schoolchildren was well constructed for addressing obesity prevention, dietary improvement and the sharing of health messages with families (Caballero *et al.*, 2003; Teufel *et al.*, 1999), and the Native Diabetes Wellness Program of the United States Centers for Disease Control and Prevention (CDC) published the Eagle books for diabetes prevention (CDC, 2009). Obesity prevention in Canadian schoolchildren was researched through an intervention implementation and evaluation programme in Kahnawake, Quebec (Cargo *et al.*, 2003; Jimenez *et al.*, 2003).

Food and nutrition interventions

For decades, national and international health agencies have been promoting food and diet-based approaches to solving nutrition problems, along with nutrient supplementation and food fortification. The food-based approach to alleviating micronutrient deficiencies has received special attention as a relatively easy-to-deliver

and cost-effective strategy. However, in the absence of adequate food (energy), supplying micronutrients to improve nutrition status is obviously futile. It has also long been known that nutrition education cannot compensate for poor access to food, and activities for improving access must be integrated into other elements of programmes (Kennedy and Pinstруп-Andersen, 1983). Local food-based strategies are therefore important in contributing food with all the needed nutrients, and they can also provide livelihoods and income (FAO and International Life Sciences Institute, 1997). Community-level production of small animals, poultry and fish can provide necessary animal foods with absorbable micronutrients, as complementary foods for infants and young children. Sustainable food programmes use a combination of approaches directed at increasing the production of animal and plant micronutrient-rich foods, promoting nutrition education and guiding food selection, to increase diet quality through reduced consumption of less nutritious carbohydrates and fats. This helps to prevent both undernutrition, and overweight and obesity (Allen and Gillespie, 2001; Allen, 2008).

Community-based food and nutrition programmes that promote healthy diets have been analysed and summarized in detail to identify the factors that drive success (Gillespie, Mason and Martorell, 1996; FAO, 2003a; 2003b). It is recognized that there is no single way for programmes to succeed, because of cultural diversity and complexity and multiple perceptions of “the good life” and of what constitutes desirable cultural change (Messer, 1999). Review of the contextual factors that are important for programme success suggests that the most important factor is the existence of a nutrition-friendly policy environment at all levels of society in the country (Gillespie, Mason and Martorell, 1996). Infrastructure that supports community nutrition interventions includes charismatic leadership with decision-making skills, particularly among women, and the existence of poverty reduction programmes. The presence of community organizations, non-governmental organizations (NGOs) and infrastructure for basic services is also important, as is a culture that recognizes the need to support child development. Given

the many complexities and local and global contextual factors that affect the food systems of Indigenous Peoples – such as lack of political commitment at the national level, pollution of lands and waters, climate change, and discrimination against women – it is not surprising that there is no single template for improving food security for Indigenous Peoples by ensuring that food resources are available, accessible, acceptable and sustainable. In the context of these pillars of food security, successful programmes for improving health also depend on the application of key components of individual and/or community behaviour change: changing of knowledge, action, attitudes/values and behaviour (Boyle and Holben, 2006).

Climate change, with impacts on many traditional food systems of Indigenous Peoples, is an interfering external contextual factor (Nilsson, 2008). Within the United Nations, considerable attention is paid to global actions for reducing the pollution emissions that drive climate change, with consideration of Indigenous Peoples’ issues playing a key role (Damman, 2010). Recently, reports of climate change affecting traditional food have been made for Arctic Peoples (Nuttal, 2008), African pastoralists (Simel, 2008) and small island states in the Pacific (Smallacombe, 2008). The need for resiliency to changes in ecosystems resulting from climate instability or other ecosystem threats focuses Indigenous Peoples’ attention squarely on their own management of biodiverse resources to maintain community health.

When nutrition interventions have positive results, their scaling up to other communities and regions is an additional mark of success. Methods for understanding and measuring scale-up can be: i) quantitative, through increasing numbers of participating people/places; ii) functional, through increasing numbers/types of activities within a community; iii) political, with activities moving beyond service delivery to include empowerment and increasing relations with others in the state or region; or iv) organizational, through enhancing an organization’s strength to increase the intervention’s effectiveness, efficiency and sustainability, such as by improving its finances and income, or introducing appropriate legislation (Uvin, 1999). Scaling up can



also be measured with qualitative data that demonstrate improving programme effectiveness in empowering communities to collect data and decide what to do themselves – showing that the programme is “scaling down the top-down management” and using resources generated locally (Messer, 1999).

While the whole world needs improved nutrition with appropriate interventions, Indigenous Peoples are routinely at the bottom of the poverty ladder and especially vulnerable to malnutrition. In many regions there is an overriding assault on “indigeneity” and demands from multinational industries to profit from Indigenous Peoples’ land and water resources (oil, gas, minerals, lumber, etc.), ignoring the unique relationships and interlinkages Indigenous Peoples have with their ecosystems, cultures and health, as well as their priorities for the protection and sustainable use of resources. The United Nations actively promotes the human rights to food security and food sovereignty for Indigenous Peoples (FAO, 2009a; 2009b; 2009c). However, successful interventions that provide the necessary resources, promote Indigenous Peoples’ priorities, create the social conditions for self-determination and well-being, and develop capacity to build better nutrition and health within communities have still to be identified. The CINE programme is a contribution to this effort.

This chapter revisits the food, nutrition and health interventions described in other chapters. These were conducted by communities of Indigenous Peoples in nine case studies included in the CINE programme. The authors of each chapter share stories, lessons and commonalities that may help identify successful strategies and policies for initiation in other regions.

Basic concepts for creating interventions with communities of Indigenous Peoples

It has long been known that nutrition interventions can be efficacious, but the crucial issue is whether or not they are effective and sustainable in the long run (Gillespie, Mason and Martorell, 1996). Interventions involving education and medical health tend to have

the lowest costs, while those that involve feeding or providing food resources to populations can be very expensive (ACC/SCN, 1991). Over the years much has been written about recommended procedures for producing and sustaining food and nutrition programmes (e.g., Caribbean Food and Nutrition Institute and Ministry of Health, 1985; FAO, 1997; 2003a). In the context of Indigenous Peoples, the CINE research team found that it makes a great deal of sense to build community infrastructure so as to make the best use of local food resources, and to protect ecosystems so they can provide sustainably for communities within the local cultural context.

Even in the most favourable conditions, community-based health promotion interventions are not easy to implement and complete successfully. Garnering resources, developing local community members’ capacity to conduct intervention activities for behaviour change, evaluating these activities and sustaining them pose immense challenges. Creating food-based community interventions to improve nutrition and health adds another layer of complexity at each of these steps, because getting the desired nutritious food into the community, and creating the formative events that ensure people have access to it and can enjoy and use it effectively and sustainably to improve health with measurable outcomes stretches the research agenda to almost impossible levels. The health promotion effort becomes even more challenging when it depends on creating a successful food-based intervention for Indigenous Peoples living in areas with difficult access, in circumstances of poverty and disadvantage and with multiple nutrition and health issues.

Begin at the beginning – know the resources

The CINE programme research partners recognized that the rural areas where the case study communities are located have the potential for making better use of local food resources to improve food and nutrition security. The partners began by realizing that many people did not know about their local resources, or at least not all of the resources known to the most knowledgeable community residents – the elders. For case study

projects that are grounded in knowledge and use of local food it was therefore necessary to ensure community-based knowledge sharing and documentation of local food systems in their full diversity. It was important to understand what people could harvest and purchase locally, what made foods acceptable to different age and gender groups in the community, and what health-giving potential there was for each of these foods. The first step in the overall CINE programme was to document scientific terminology and laboratory-based food compositions, under expert guidance. The methodology used to create this knowledge base is presented by Kuhnlein *et al.* (2006a).

Earlier work with partners demonstrated that a wide variety of intervention approaches are feasible in indigenous communities, and that many indicators can be used to measure the effectiveness of each (Kuhnlein *et al.*, 2006b). However, each community and culture has its own knowledge of benefits for physical, mental, emotional and spiritual health. Each has its own symbolic values for food, its own ways of using these to create identity and culture, and its own holistic approach to well-being (including physical activity, sharing, and community spirit in joint harvesting activities and celebrations). Tapping this knowledge for a health promotion effort requires building a knowledge-sharing consortium in the community. The research team had the benefit of strong community leadership to guide this component in each of the case studies. Applying and disseminating this knowledge in the community, and developing and evaluating health promotion activities depended on building trust and commitment among the community residents, their leaders and the research partners. This required substantial time, and was implemented in unique ways in each of the cultures, with their vastly different ecosystems, local social settings and priorities.

For example, in the Karen case study (Chapter 10 – Sirisai *et al.*, 2013)² involving a community of 600 people in western Thai land, the programme

explored and documented knowledge of more than 380 different food species/varieties in the rain forest jungle area. The priority was to develop better community experience of how children's health can be fostered using the Karen's own gardening and forestry techniques. Through school and community programmes, children were taught how to grow and cook healthy foods. One outstanding result was that within three years, the community had increased its production of local vegetables and fruits from 81 to 137 different food species, thereby increasing the diversity and variety of family meals, resulting in improved nutrition status (stature) for children.

Common themes for interventions

Programmes must reflect communities' own world views, allowing them to accomplish goals that are within their own priorities and to recognize the values within their own environments. The CINE researchers found that interventions based on local cultural knowledge and focusing on children's health, and food for women and children have universal appeal. Communities welcome scientific knowledge about the physical benefits of good nutrition and health when it is presented sensitively and with meaningful examples, while communities' own understanding and knowledge of food environments offer unique perspectives and indicators for recognizing progress and change in health.

In all of the case studies, it became clear that Indigenous Peoples were keen to document their food systems for the benefit of future generations. However, there was an overarching sense that assessing these food systems was not enough; more had to be done with the information before it could help lead to better lives. The project had to provide not only a research environment and research subjects, but also opportunities for participants and leaders in the community to make decisions and use the information wisely for the community's benefit. Creating research agreements and/or mutual understandings with all those involved helped build the trust that this work required. Capacity building developed the concept of being empowered to express indigenous ways of knowing and indigenous community

² For the case studies with Indigenous Peoples described in this volume, chapter numbers and authors' names are given only on the first mention. The section on pp. 249 to 255 presents the case studies in alphabetical order of the Indigenous Peoples concerned, and repeats the chapter number and author name(s) for reference.



priorities. As documented with Indigenous Peoples in the United States of America, it was important to create community self-determination that worked from the ground up and was not imposed from the top down (Chino and DeBruyn, 2006).

Partnerships and capacity building are crucial

Canada's ground-breaking public policy of creating guidelines for health research involving aboriginal peoples (Canadian Institutes of Health Research, 2007) and a research partnership methodology involving collective and individual consent were the foundations for community discussions about the projects described in this book. Discussions were held on benefit sharing, protection of cultural knowledge, and joint decisions on the collection, use, storage and secondary use of data and biological samples (when available) (Reading, 2009; Canadian Institutes of Health Research, 2010). Returning results to the community in an understandable format is the key to ensuring communication and trust between outside researchers and the community, while sharing results with the broader research community and the public is important in "translating" the knowledge generated from work carried out in case study communities. CINE's research partners continue to be energized by their work's promotion at the United Nations level, in discussions of the importance and benefits of Indigenous Peoples' food systems, and in publications where results are shared with the world at large (CINE, 2010).

The CINE researchers were constantly aware of the profound disparities that affect indigenous women in particular, and understood that the impact of these disparities must not be underestimated. Indigenous women often face high levels of discrimination, both within their own communities and in external rural and urban areas. Gender disparities may exist in literacy and education levels, access to family planning and other health services, and birth weights, as well as through maternal mortality. Microcredit may be more frequently denied to women than to men. All of these factors can affect capabilities for improving nutrition (Gillespie, Mason and Martorell, 1996). As food and

nutrition programmes invariably involve women's participation, the project researchers intended to include and empower women as much as possible, and to provide tools through which women could be the knowledge bearers in social marketing within communities and with community leaders.

Evaluations and sharing of intervention results

There is a huge diversity of ways of measuring and evaluating the success of intervention programmes in indigenous communities (Kuhnlein *et al.*, 2006b). Measurements of knowledge, attitudes and behaviour can be used to identify change in food and diet, and there is compelling logic for measuring food use to evaluate food-based interventions. However, it is also important to assess changes in context, to evaluate processes, and to recognize the potential for measuring change through biological indicators. The many possible confounding, extraneous and interfering effects must be considered. Evaluations must look at the strengths/diversity of the advocacy efforts managed within the programme. Most important, evaluations must recognize how Indigenous Peoples themselves view improvements through their own lens of understanding and experience, and how this makes self-determination and community development possible. Consideration must be given to the inclusion of at least some of the cultural indicators for food security developed with the United Nations Permanent Forum on Indigenous Issues (UNPFII) and the Convention on Biological (CBD) Diversity Working Group on Article 8(j) (Stankovitch, 2008; FAO, 2008). These include percentages of traditional food or food-related items used in ceremonies, and percentages of households using traditional/subsistence foods regularly.

At the international level, it is widely recognized that evaluations of health promotion programmes can be formative or summative. There can be: i) context evaluation; ii) input evaluation, such as of the adequacy and appropriateness of resources; iii) process evaluation; and/or iv) outcome or impact evaluation. As experienced in the interventions described in this book, it is difficult to distinguish gross outcomes (all the changes taking place

in the community during the period) from net changes (only those changes resulting from education or other community intervention activities). In any community, net effects can be influenced or masked by extraneous confounding effects and secular trends, such as increasing income from new employment opportunities in the community. There can be interfering events (climate change, food prices, natural disasters, etc.), design effects and stochastic effects (chance fluctuations). Attention needs to be given to the reliability of measurements, the bias or lack of internal validity that may result from selection bias, information bias, or even the placebo effect of simply having a new activity in the community (Oshaug, 1997).

In evaluations of health programmes in communities of Indigenous Peoples, it is not always possible to survey and analyse populations that are large enough to provide valid findings from statistical methods using quantifiable indicators of health, welfare or environmental improvements. This often limits the researcher to using only descriptive statistics (LaFrance, 2004) and creates the need to use qualitative methodologies that offer alternative ways of determining success, which may be more efficacious. Qualitative methodologies are appropriate for efforts to capture indicators of participatory methodologies, empowerment, community solidarity, and use of culture and traditional foods (Tauli-Corpuz and Tapang, 2006).

Despite the daunting challenges in evaluating interventions, research partners were convinced that their projects in reasonably small community settings were successful, and that evaluations provided meaningful demonstrations of impact measured in many different ways.

Successful strategies and particular challenges

Inter-project communications

Communication among the different case study research partners, community leaders and academic leaders was very important to the successes experienced. It provided rich discussion and cross-fertilization of ideas among interventions, and strategies for implementing

and evaluating activities. Annual meetings of research partners created new friendships and helped maintain the interventions' vitality. The CINE research team constantly learned the need for patience and careful listening. By keeping intervention leaders abreast of developments, ensuring opportunities for them to discuss their successes and challenges with colleagues, and providing incentives for revising and bolstering interventions where needed, these meetings were an important part of empowering communities and their leaders to see interventions through. The communities involved were proud that their leaders had been invited to these international meetings.

Understand the basics

It was very important for the food system projects to begin with basic knowledge about the food resources: the species/varieties, their scientific properties and identification, and their use patterns within communities. Interdisciplinary experts such as nutritionists, food scientists, anthropologists, ethnobiologists and public health professionals contributed as needed. This grassroots knowledge made it easy to discuss food resources and ways of maximizing their availability. For example, the Pohnpei State Department of Agriculture of the Office of Economic Affairs, Department of Land and Natural Resources and the College of Micronesia-FSM/ Cooperative Extension Service collaborated to provide seeds and seedlings of important traditional species and cultivars, for planting in home areas (Chapter 12 – Englberger *et al.*, 2013; 2010). Karen case study leaders worked with community elders and knowledgeable leaders to teach schoolchildren how to grow many of the species in their food system.

Building pride in the cultural food system and the project

Pride in the local food and culture created enthusiasm and momentum for community leaders and assistants to continue activities. Sharing success stories and showcasing special events and foods within the community and at meetings also provided impetus. Stories were routinely shared with local media, through newsletters, e-mail networks, radio and television, promotional



films, and school class and parent discussions, as available. The Ainu case study issued a weekly newsletter for sharing recipes and stories based on traditional foods (Chapter 13 – Iwasaki-Goodman, 2013); the project succeeded in giving Ainu people pride in and recognition of the particular flavours in their unique traditional preparations. The Nuxalk case study describes the development of user-friendly community food system handbooks presenting photos, names in the local language, identifications, harvest areas and strategies, and recipes (Chapter 11 – Turner *et al.*, 2013). Locally produced books can be expanded and revised periodically, reprinted and shared as a resource for adults and children. The book created for the Awajún case study was deposited in the national library of Peru (Chapter 5 – Creed-Kanashiro *et al.*, 2013). Several case study teams made posters of their foods for display in local community halls and schools.

Focus on children and youth

All the case studies included interventions for children and youth, who represent the future of food system knowledge as it is passed to following generations. The case studies include many examples of food use in child care, and of teaching children to be self-sufficient in food, often using knowledge from elders. For example, elders in the Gwich'in area demonstrated the preparation of dried caribou meat to groups of youth in school. The youth then prepared several boxes of meat for distribution to home-bound elders (Chapter 7 – Kuhnlein *et al.*, 2013). In the Pangnirtung example, elders' stories were recorded on video for sharing with youth in school classes, to stimulate discussions about food, health and the impact of climate change on the availability of local foods (Chapter 9 – Egeland *et al.*, 2013).

Commitment, capacity building and empowerment

Project leaders' commitment and capacity are essential for the success of interventions in communities of Indigenous Peoples. How and by whom activities are organized and carried out are of crucial importance, and there must be genuine community ownership,

for example, involving women's organizations and leaders. People are not just the beneficiaries of programmes; they make programmes happen. Community ownership is developed through the involvement of community partners in programme planning, initiation, organization and implementation. Community leaders recognize what seems reasonable and is operationally realistic for the community. Community nutrition programmes in developing areas are more likely to succeed when intervention activities result from the persistence and persuasiveness of project advocates rather than precisely documented needs (Berg and Muscat, 1971; Gillespie, Mason and Martorell, 1996). Each of the chapters in this book gives evidence of local leadership mobilization and commitment and community empowerment, especially the case studies with the Nuxalk, Awajún and Dalit (Chapter 6 – Salomeyesudas *et al.*, 2013).

Multidisciplinary stakeholders

In all of the case studies, once the basic documentation had been completed and shared with the community, the project team took time to gather and discuss new ideas and strategies from the community. Successful projects have long lists of stakeholders, including intersectoral and multidisciplinary partners, NGOs and government sectors (for capacity building), local research assistants and community volunteer networks. For example, the Inga case study team worked with local schools and health promoters, had immeasurable support from the NGO, Amazon Conservation Team, and built government support for the protection of lands for indigenous food and medicines in Colombia (Chapter 8 – Caicedo and Chaparro, 2013). The Pohnpei project drew on strong support from state, national and other agencies, including those for education, land and natural resources, health and agriculture – particularly the extension service provided through the College of Micronesia-FSM and the United States Department of Agriculture (USDA) Natural Resources Conservation Services Program. All the case studies worked with local professionals to enhance small-scale homestead and community farming of crops and livestock, emphasizing methods that were culturally appropriate and suitable for the local ecosystem.

Rather than basing intervention design on evaluation results, all the case studies adopted multifaceted approaches, which some call the “bottomless pit” of using anything that comes to mind to create awareness and behavioural change to improve food system use. This often brings unexpected rewards, with new ideas and resources coming from unanticipated sources. For example, the extensive communication networks built by the Island Food Community of Pohnpei led to requests for similar initiatives in the rest of the Federated States of Micronesia and on other Pacific islands. The Island Food Community of Pohnpei also worked with the Federated States of Micronesia Philatelic Bureau to develop two series of postage stamps depicting local foods.

Intra-project communications and dialogue to build confidence and trust

Effective project management within communities must meet time-bound goals. In the CINE programme, community leaders played major roles in management, as academic leaders were often distant from the community region (Awajún, Gwich’in, Inuit, Inga). Frequent meetings between academic and community leaders stimulated mutual trust and effective management (Dalit, Nuxalk, Karen, Pohnpei, Ainu). Community steering committees played supportive roles, boosting the confidence of community leaders and assistants, and providing advice and direction for new activities. Community members themselves are the most effective in delivering new information and integrating it to reinforce community knowledge.

Scaling up beyond the initial project communities

Requests for the scaling up of intervention activities can be considered the gold standard of success. The initial Nuxalk programme led to similar programmes in British Columbia and, eventually, the creation of CINE and its Global Health Food Systems Program. The Awajún health promoters are now working in many other communities in the Cenepa River region of Peru. The Ainu education programmes on traditional foods are spreading through universities in Hokkaido. There have been several requests for the Karen programme to be

replicated in other Southeast Asian tribal communities. The Deccan Development Society, an Indian NGO in Andhra Pradesh, has an impressive record of engaging Dalit communities in celebrating their traditional food knowledge through extensive media and community awareness campaigns.

Contextual strengths and weaknesses

Contextual factors have a very strong influence on interventions, as they result in both enabling strengths and disabling weaknesses. For example, the Awajún in Peru faced a serious setback when government policies supported the use of their lands for mining and resource development (*Asociación Interétnica de Desarrollo de la Selva Peruana* Web site).³ A national socio-economic plan promoting a sufficiency economy and active participation in community development enabled the Karen in Thailand, by procuring support and attention from various development partners at the national and community levels. The Pohnpei case study (Englberger *et al.*, 2010) benefited greatly from a supportive government that ensured attention through the attendance of the President and Governor at programme activities and the creation of national postage stamps, noted earlier. Climate change is a massive contextual factor, with impacts on the availability of traditional food species in all global regions, which are especially noted by Gwich’in and Inuit of Baffin Island. Escalating food prices during project periods, and various local environmental and economic changes were other important contextual features in case studies. All the case studies recognized that evaluations would likely have recorded better intervention results if they had not been carried out so soon after activities were implemented. Despite these caveats, all the case studies were enthusiastic about their projects and the results documented.

Funding constraints

Funding constraints are always a problem when programmes have multifaceted and multisectoral activities. Each of the interventions mentioned in this book was conducted with minimal external budget while

³ www.aidesep.org.pe/



stimulating local empowerment and local sustainability. Stimulus funding through CINE was provided by Canada and FAO for all phase 1 activities (developing methods for documenting each of the 12 food systems) and some phase 2 (intervention and evaluation) ones. All of the case studies faced challenges with finding their own resources for phase 2 activities. This sometimes made it difficult to continue an intervention, such as with the Maasai (Oiye *et al.*, 2009), Bhil (Bhattacharjee *et al.*, 2009) and Igbo (Okeke *et al.*, 2009). However, all the other interventions obtained funding through NGOs and a wide variety of local volunteers. Finding this support depends on having committed, energetic and charismatic leaders, networks and a positive attitude to project success. All of the interventions have continued since the evaluations that were carried out in preparation for the chapters in this book.

Evaluation constraints

The constraints to evaluation design considered in these case studies result from activities taking place in small community populations, activities being multifaceted, and appropriate control groups not being available. Another constraint is the use of pre- and post-assessments, which may result in data collection bias and lack of internal validity. As anticipated from the literature, these two- to three-year intervention programmes did not result in anthropometrical changes, reflected as improvements in stunting or obesity control. The exception was growth improvement among Karen children. The CINE programme team used community assistants in the field to collect evaluation data, which increased the burden on communities by requiring them to provide skilled assistants or people who were easily trained. However, communities appreciated this opportunity for capacity building in collecting their own data. Qualitative assessments of communities' knowledge of the changes taking place recorded successes, with notable examples being the Ainu, Pohnpei (Englberger *et al.*, 2010) and Karen case studies.

Resistance to the collection of biological samples (blood, faeces, urine), due to fear of discomfort or superstition, was offset by acceptance of food use and dietary indicators as ways of tracking change

resulting from food-based strategies. Dietary indicators were challenged by missing values in the nutrient composition data set for all the species used, and wide data variations within small populations.

Working with government

In some cases, it was possible to work successfully with government agencies as partners, which contributed to intervention success. Although all the case studies had networks within some form of government service or policy setting, governments were not always supportive of efforts to increase Indigenous Peoples' access to local traditional foods. In Pohnpei (Englberger *et al.*, 2010) and for the Karen, both the community and the government felt ownership of the projects and their successes. However, different political priorities led governments or government sectors to avoid direct involvement with the food access strategies of the Awajún, Dalit, Gwich'in or Ainu.

The case studies⁴

Table 14.1 provides a summary of the intervention strategies used by the case studies described in this volume, and Table 14.2 summarizes the evaluation indicators used. The reader is encouraged to read the specific chapters. The following subsections present brief descriptions of the case studies (in alphabetical order), intervention activities, evaluation methods and important contextual features.

Ainu

(Chapter 13 – Iwasaki-Goodman, 2013)

The Ainu are considered Japan's indigenous population, but serious discrimination and assimilation practices have contributed to poor cultural morale among Ainu people. The intervention is being conducted on Hokkaido Island through various projects to promote enjoyment of Ainu traditional food. A monthly newsletter describing harvesting, processing and cooking techniques for Ainu foods is distributed

⁴ The present tense is used in this section because the interventions described are ongoing.

Table 14.1 Summary of intervention strategies used

<i>Intervention activity</i>	<i>Case studies conducting the activity</i>
Community partner consultation and/or research agreement	Ainu, Awajún, Dalit, Gwich'in, Inga, Inuit, Karen, Nuxalk, Pohnpei
Community steering committee	Gwich'in, Inuit, Nuxalk, Pohnpei
Empowerment in training	Ainu, Awajún, Dalit, Gwich'in, Inga, Inuit, Karen, Nuxalk, Pohnpei
Local resources and traditions	Ainu, Awajún, Dalit, Gwich'in, Inga, Inuit, Karen, Nuxalk, Pohnpei
Employment of community assistants	Ainu, Awajún, Dalit, Gwich'in, Inga, Inuit, Karen, Nuxalk, Pohnpei
Activities in and for schools	Ainu, Awajún, Dalit, Gwich'in, Inga, Inuit, Karen, Nuxalk, Pohnpei
Activities engaging elders	Ainu, Gwich'in, Inga, Inuit, Karen, Nuxalk
Activities for children/youth	Awajún, Gwich'in, Inga, Inuit, Karen, Nuxalk, Pohnpei
Activities for women	Ainu, Awajún, Dalit, Gwich'in, Inga, Karen, Nuxalk, Pohnpei
Presentations of local/traditional food in community settings	Ainu, Awajún, Dalit, Gwich'in, Inga, Karen, Nuxalk, Pohnpei
Reaching diverse segments of communities	Ainu, Awajún, Dalit, Gwich'in, Inga, Inuit, Karen, Nuxalk, Pohnpei
Internal and external communications	Ainu, Awajún, Dalit, Gwich'in, Inga, Inuit, Karen, Nuxalk, Pohnpei
Media activities	Ainu, Dalit, Gwich'in, Inuit, Karen, Nuxalk, Pohnpei
Involvement of the business sector	Karen, Nuxalk, Pohnpei
Engaging partners from government	Dalit, Inga, Inuit, Karen, Pohnpei

to every household in the main community, Biratori, which has a population of 2 500. Two books for local residents have been prepared from interviews with elders, describing different Ainu traditional foods and medicinal plants. Community gatherings now serve Ainu dishes, and traditional prayers and offerings to the gods have been revived. More Ainu rituals have been conducted recently, with elders' participation, and traditional foods are indispensable parts of these occasions. Both Ainu and non-Ainu people living outside Biratori are interested in learning about Ainu foods and dishes, and cooking classes for students are held at Sapporo universities, including Rakuno Gakuen and Hokkai Gakuen. In partnership with elders in Biratori, students have developed a project highlighting new kinds of *shito* (a dumpling made from millet and rice powder). An Ainu graduate student helped to open a *shito* stall for university festivals. Restaurants in the Sapporo Grand Hotel have organized special dinners featuring an Ainu theme, and the Shiraoi Museum has adopted Ainu dishes for its cultural days.

The community and academic leaders view intervention activities as having improved socio-cultural health among Ainu people in Saru River region. The

reintroduction of cultural elements associated with food, such as knowledge regarding the harvesting, preservation and cooking of certain foods, and rituals featuring food, has led to cultural revitalization. Ainu people are now proud of their ethnic background and their food culture's integration into local food culture. This is helping to resolve the serious social prejudices faced by Ainu people.

Awajún (Chapter 5 – Creed-Kanashiro *et al.*, 2013)

The local diet of the Awajún on the River Cenepa in the Amazon region of Peru is almost entirely made up of more than 200 traditional food species, but intakes of micronutrients are low, particularly among children. The intervention aims to increase the accessibility and use of high-quality traditional foods. Through participatory workshops, health promoters have been trained to emphasize traditional food topics and hygiene in food preparation. Use of traditional foods prepared with traditional utensils is promoted through print media, drama, songs and the sharing of recipes for young children's food. Small animal production,



Table 14.2 Summary of evaluation indicators used

<i>Evaluation indicator</i>	<i>Case studies using the indicator</i>
Interdisciplinary partners	Ainu, Awajún, Inga, Karen, Pohnpei
Qualitative methods	Ainu, Awajún, Dalit, Gwich'in, Inga, Inuit, Karen, Nuxalk, Pohnpei
Quantitative methods	Awajún, Dalit, Gwich'in, Inga, Inuit, Karen, Nuxalk, Pohnpei
Dietary indicators	Awajún, Dalit, Gwich'in, Inga, Inuit, Karen, Nuxalk, Pohnpei
Biological indicators	Nuxalk, Pohnpei
Clinical indicators	Awajún, Dalit, Gwich'in, Inga, Karen, Nuxalk
Anthropometry	Awajún, Dalit, Gwich'in, Inga, Inuit, Karen, Nuxalk, Pohnpei
Process indicators	Awajún, Gwich'in, Inga, Karen, Nuxalk, Pohnpei
Employment of community assistants	Awajún, Dalit, Gwich'in, Inga, Karen, Nuxalk, Pohnpei
Training and empowerment for local residents	Ainu, Awajún, Dalit, Gwich'in, Inga, Karen, Nuxalk, Pohnpei
Feedback from community	Ainu, Awajún, Gwich'in, Karen, Pohnpei
Locating local resources for sustainability	Ainu, Awajún, Dalit, Gwich'in, Inga, Inuit, Karen, Nuxalk, Pohnpei
Participation of volunteers	Awajún, Gwich'in, Inga, Karen, Nuxalk, Pohnpei
National awareness of project	Ainu, Awajún, Dalit, Gwich'in, Karen, Nuxalk, Pohnpei
International awareness of project	Ainu, Awajún, Dalit, Gwich'in, Inga, Inuit, Karen, Nuxalk, Pohnpei
Serious contextual constraints	Ainu, Awajún, Gwich'in, Inga, Inuit, Karen, Nuxalk
Policy impact	Ainu, Awajún, Dalit, Pohnpei
Scaling up	Ainu, Awajún, Dalit, Inga, Karen, Nuxalk, Pohnpei

fish farms, fruit tree production, food plant nurseries and medicinal plants have increased. Primary school children are trained in plant nurseries, and school lunches have been improved. Several cultural festivals are held annually. A traditional food reference book with photos, descriptions and nutrient data has been prepared, distributed in the communities and deposited in the national library.

Local health promoters keep records of food and health promotion activities. Surveys have recorded food intakes, mothers' physical activity levels, family food security, infant feeding practices and anthropometry of children. After two years of the intervention, traditional food diversity in the diets of women and children under five years had increased, and young children were consuming more animal-source foods (meat and fish).

External constraints experienced include changes in the local political structure, and a violent land rights conflict with the federal government, which interfered with activities of the local Awajún promoters. In

addition, imported food from donation programmes and cash from coca production is beginning to decrease the quality of the local diet.

Dalit (Chapter 6 – Salomeyesudas *et al.*, 2013)

Although the Dalit are not considered a tribal people,⁵ Dalit women are recognized as the most disadvantaged of Indian adults. The local Dalit food system in the Zaheerabad region of Andhra Pradesh contains more than 300 species and has evolved over the thousands of years that these people have lived in the region, working in agriculture. Case study partners have been using participatory methods to promote these foods since the mid-1980s, focusing on locally grown sorghum, millet, legumes, vegetables, fruit and uncultivated green leafy vegetables. A broad spectrum of activities benefit the health of women and children: reclaiming land and using revitalized agricultural methods for food

⁵ The Indigenous Peoples officially noted by the Indian Government.

production by Dalit women farmers; capacity building for women as farmers, advocates, and film and media producers; food preparation for day-care centres; food festivals in communities and educational and industrial settings; film; school curricula; advocacy through radio and television; and work with a policy action group to influence national and state policies. Major impacts noted by the community and partners include enhanced soil fertility and conservation, increased food availability, greater self-reliance, reduced seasonal migration, more animal fodder and livestock, and more children attending school.

The CINE programme has contributed a dietary and nutrition assessment and a socio-cultural evaluation based on interviews. Intervention activities have been conducted through participating women's *sanghams*, and data from participating villages have been compared with data from villages that did not participate in the programme. Women in participating communities have better intakes of sorghum, legumes, vegetables and animal-source foods, and better dietary status; however children's nutrition levels are similar in both intervention and non-intervention villages. The traditional foods protect against chronic energy deficiency and night blindness (Schmid *et al.*, 2006). The evaluation was probably affected by the extensive media exposure of intervention activities in all villages.

Gwich'in (Chapter 7 – Kuhnlein *et al.*, 2013)

The Gwich'in community of Tetlit Zheh in the Northwest Territories of Arctic Canada have expressed concern that their traditional wildlife foods, particularly caribou, birds and fish, are becoming scarcer and that children are affected by poor-quality diets composed mainly of market food. Local personnel have implemented intervention activities for two years, to improve the use of traditional food and better-quality market food. Activities have included regular radio announcements, school activities with youth, food teaching events involving elders, physical activity events, the creation of a DVD about local food, and production of a Gwich'in food and health book. The

baseline assessment of young women and youth found extensive overweight and obesity and poor diets, with high consumption of sweet, salty and fatty market foods and beverages. Those consuming wildlife foods have better nutrition status, although intakes of some nutrients are still below recommended levels. More than half of households are categorized as food-insecure, and households with less access to traditional foods have lower food security.

Serious external contextual events include climate change impacts on wildlife, and escalating fuel and food prices (market food) driven by external global markets. The local project personnel declined CINE's follow-up assessment with interviews and dietary and health assessment. However, the food and health book has been found to be highly appreciated by the community.

Inga (Chapter 8 – Caicedo and Chaparro, 2013)

The Inga community members involved in this project are located on several reserves in the Caqueta region of Colombia. Community leaders and leaders of the Tandachiridu Inganokuna Association provide participatory development approaches and planning, in cooperation with the Amazon Conservation Team, an NGO. More than 5 000 Inga from 800 farm areas (covering 94 ha) have participated in the programme to ensure community health, which focuses on traditional food and medicine availability, cultural promotion and primary health care. An Inga traditional food handbook and an agro-ecology calendar have been developed. All the programme materials developed use words and imagery that are common to the Inga and consistent with their official *Plan de Vida*. Traditional foods and medicines have been promoted through family visits, workshops and courses, traditional food seed exchanges, the establishment of community and school gardens for food and medicinal plants, culinary festivals and recipe exchanges, radio programmes and health brigades, which include shamans and women healers.

Quantitative evaluation was based on dietary, anthropometric and clinical nutrition assessments, and qualitative evaluations on individual and family



interviews. The proportions of dietary energy, protein, iron and vitamin A in the diet increased over the two-year evaluation period, but there have been no changes in anthropometric indicators. Fewer participating families express insecurity regarding the availability of locally grown food and medicines. Species diversity in farms has increased by 54 percent.

Specific challenges relate to advancing colonization on traditional Inga territory, for logging and seismic exploration for petroleum extraction, and the presence of armed militias and paramilitary groups. These create economic, environmental and social instability, leading to violence against citizens. Coca production and peripheral relations with the narcotics industry have contributed to ecosystem instability.

Inuit

(Chapter 9 – Egeland *et al.*, 2013)

The community of Pangnirtung in the Baffin region of Nunavut in Arctic Canada participate in this project, with community leadership through Inuit Tapiriit Kanatami. Primary traditional food species are caribou, blueberries, seal, Arctic char, clams and local shrimp, and intervention activities focus on elders' traditional food stories, delivered on DVD and through youth radio drama programmes that provide modern-day nutrition and health advice. These build beneficial associations with health and well-being. Inuit traditional knowledge on plants, medicines and foods, and observations on climate change are discussed in these media.

Health surveys of adults and youth for the baseline evaluation found that dietary quality improves with increased intakes of traditional food. More sugared beverages and chips are eaten when traditional food is not, and this contributes greatly to high energy, sugar and saturated fat intakes and resulting overweight. Those consuming even only one serving of traditional food per day have significantly more dietary energy from protein, less carbohydrate and more total fat. Girls, but not boys, who consume traditional food were found to have higher dietary intakes of iron, vitamins A, B and D. Clearly, increasing the proportion of traditional food in food energy would improve nutrition.

As a result of climate change, disturbances in the Arctic ecosystem are happening rapidly, and are likely to continue. Changes in ice formation threaten Inuit traditional food species and food security, and undercut the promotion of greater use of traditional food.

Karen

(Chapter 10 – Sirisai *et al.*, 2013)

The Sanephong Karen community is in a remote village in western Thailand, close to the Myanmar border. The community and academic partners recognize that traditional food availability is deteriorating rapidly, partly because traditional lands have been designated as a national park, thus restricting the Karen's access to wildlife. The intervention has the objective of using traditional food knowledge about more than 300 food species/varieties as a platform for working with the community to improve nutrition and health. Focusing on empowerment and building trust and commitment, partners have worked together to increase awareness of food and water sources; promote production and consumption of these resources in village areas, especially by children; and increase local capacity, knowledge and skills for taking action in children's food and nutrition security. Using a culture-based approach with metaphor and social dialogue, project personnel are growing more food at home, encouraging better food education for schoolchildren, empowering community women, and strengthening community leaders, with input from elders and many stakeholders, including local Buddhist monks and store owners. Interdisciplinary academic participants from Mahidol University include personnel from the Institute of Nutrition, the Faculty of Environment and Resource Studies, the Institute of Language and Culture for Rural Development and the Faculty of Medicine. Staff from the Ministries of Agriculture and Cooperatives and of Health are also involved. A unique aspect of the intervention is its strong empowerment of both the Karen community and local government officials. Local people are encouraged to report on the progress of their community development at all levels, including to Her Royal Highness Crown Princess Mahachakri

Sirindhorn who has visited the community. Many different materials have been created and distributed in the community, including posters and a book highlighting local foods and stressing that “food is part of happiness” and local pride.

Evaluation demonstrated substantial change in the number of household-grown vegetables and fruit species in the community (with more than 50 additional species compared with pre-project numbers); change in opinion, with more household members recognizing the benefits of using traditional vegetables; and schoolchildren’s increased capacity for growing, harvesting, cooking and enjoying local traditional plants. The anthropometric status of children under 12 years of age has also improved.

Nuxalk (Chapter 11 – Turner *et al.*, 2013)

More than 20 years ago, the Nuxalk Nation, an indigenous community on the west coast of British Columbia, Canada, conducted a highly successful intervention stressing traditional food use and well-being. The intervention was based on participatory cooperation with the Nuxalk Nation Council and the local nursing station, with researchers from the University of British Columbia, and stressed the use of traditional food knowledge as a platform for health promotion. Intervention strategies included research and the sharing of results to define the food system, the nutrient composition of key foods and how food use knowledge had changed over three generations of Nuxalk women. Personnel living on the reserve and working in its health centre promoted the use of traditional food and quality market foods. Food teaching events led by elders included the creation of a traditional food and medicine garden, regular information flyers distributed to family mailboxes, fitness events, and school classes on nutrition, dental health and food preparation. A traditional food handbook and a recipe book were distributed to all homes on the reserve and have been reprinted several times (Kuhnlein and Moody, 1989).

Before-and-after evaluation demonstrated increased quantities of traditional food being harvested and used,

and more families participating in these activities after the intervention. Biological evaluations from blood samples showed increased red blood cell folate, serum retinol and carotene in adults and youth, with youth also experiencing better iron status. Process measures documented community participation and tracked successful activities (Kuhnlein and Burgess, 1997).

Key to programme success was regular participation of the Nuxalk Nation Council and community health personnel in traditional food promotion events. A fitness “guru” from Vancouver spent several days in the community, encouraging youth to participate in fitness activities. When the project was revisited 20 years later, the original participants and their families still indicated substantial awareness of the importance of traditional food and an interest in growing garden produce and processing fish and other local foods for their families; they attributed at least part of this interest to the original programme.

Pohnpei (Chapter 12 – Englberger *et al.*, 2013)

The Mand community of Pohnpei State, one of four states in the Federated States of Micronesia, is the focus of traditional food documentation and food and health promotion activities, which were evaluated two years after they commenced. Activity design and implementation were led by the Island Food Community of Pohnpei and its many collaborators. Documentation of the traditional food system uncovered knowledge and use of 381 species and their varieties/cultivars, and many valuable nutritional properties of these foods. Intervention activities that were community-based are now continuing with interdisciplinary and multisectoral inter-agency support at the state and national government levels and through other NGOs: departments of education, economic affairs, health, lands and natural resources; the College of Micronesia-FSM Cooperative Extension Services; and USDA’s Natural Resources Conservation Services. Activities include youth drama clubs, recipe presentations, training in container gardening, cooking classes, newspaper articles, radio, film and television presentations, school and curriculum development,



slogans and songs, games, weight loss competitions, and many promotional incentives.

Baseline and two-year evaluations have been successfully conducted with randomly selected households. Significant data differences between the two show that the consumption of refined imported white rice has decreased – this is a major improvement, as white rice has been replacing healthy local foods that are abundant in this rural area. In addition, the consumption of locally grown giant swamp taro and vegetables has increased, as has that of different banana varieties. Dietary diversity and attitudes to local food have improved (Kaufer *et al.*, 2010).

The success of this programme results from several factors, including outstanding and extremely supportive leadership at the local, state, national and NGO levels; the small island situation, creating close proximity among these different levels; extensive communications across sectors and disciplines, including the participation of graduate students from several universities; and the development of imaginative activities that appeal to community leadership. Community and academic leaders are satisfied that the package of project activities has had substantial impact, based on social marketing, education and agricultural provisioning to the community.

What have we learned? Where do we go from here?

Participants and researchers in all case studies have learned immeasurably about their unique settings, and continue to promote the increasing availability of local food, ensuring that it is accessible and acceptable for all members of the community, and developing programmes with good promise of internal sustainability. These local success stories demonstrate opportunities for scaling up to adjacent communities and wider regions.

Intervention strategies that work intensively at the grassroots level with small communities of Indigenous Peoples and have limited budgets present overwhelming challenges. It is notoriously difficult to use food-based strategies to effect rapid change that can be reflected

in quantitative evaluation using statistical methods. There are many justifications for poor returns on public health promotion efforts, such as formidable contextual factors affecting access to land, water and local cultural food resources; the extensive debilities and disparities resulting from neglect and repressive discrimination of indigenous communities, especially women; and the need for time and commitment for capacity building within cultures and communities.

Nevertheless, the research partners described in this book have achieved successes in their work with indigenous communities, and have learned how to create and evaluate effective intervention programmes grounded in the rich diversity and nutrition provisioning available in the local food systems of Indigenous Peoples. Capacity building, participatory decision-making, learning by doing, the use of local cultural and ecosystem knowledge and resources, and networking are key factors for success. These findings contribute to understanding of how governments and advocates can help to create programmes for improving well-being throughout the indigenous world. Building confidence in local food systems and links to cultural and ecosystem integrity develops the commitment to using and protecting these vital resources with community-specific knowledge and methods. Giving credence to these methods in local, national and international communications helps to reduce the disparities in health and well-being experienced by Indigenous Peoples.

The CINE researchers have learned to listen to what people have to say about what is important to them. Definitions of wealth, well-being and happiness are connected to important principles of culture and the food that people enjoy within their local environment. Many indigenous people do not consider themselves poor, even though they are living at the bottom levels of the definitions of poverty accepted by most development agencies. Information exchange has been at the heart of CINE's work, and all partners recognize that development, including food and nutrition security, is more sustainable when they listen and understand each other and work together to build the best strategies for change that is meaningful to the people directly involved.

Despite obvious obstacles, the imperative for United Nations agencies and forward-thinking governments is to recognize the scientific benefits of and the human right to Indigenous Peoples' local food systems, using activities such as those created and described in this book. Programmes that find success with any disadvantaged population do not necessarily work for Indigenous Peoples; additional efforts are needed to address the issues of discrimination, rural inaccessibility, and respect and protection of the culture and ecosystems from which Indigenous Peoples draw their well-being. On the other hand, successful health promotion using local food systems with communities of Indigenous Peoples are very likely to provide important lessons for public health practitioners working with any other community, regardless of whether it is disadvantaged, indigenous or not. ❁

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