



DOCUMENTING TRADITIONAL FOOD SYSTEMS OF INDIGENOUS PEOPLES: INTERNATIONAL CASE STUDIES

GUIDELINES FOR PROCEDURES

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FIVE STEPS TO TAKE

1. Step 1: Prepare the Team
2. Step 2: Gather Foodlist Data
3. Step 3: Scientific Parameters of Food
4. Step 4: Understanding Food Use and Health
5. Step 5: Plan Intervention

Yukon workshop; Karen community food list workshop; Bangladesh laboratory; Karen focus group; Nuxalk interview.

STEP 1.
PREPARE THE INTERDISCIPLINARY RESEARCH TEAM, GATHER BACKGROUND DATA AND DEVELOP GOOD PARTICIPATORY TECHNIQUE WITH COMMUNITIES OF INDIGENOUS PEOPLES

The interdisciplinary research management team

The team leader or co-leader for this method development should have background in nutrition. In addition, there are 4 key interdisciplinary specialists with expertise required in this procedure:

1. Indigenous People's local leadership: for development of good participatory research technique
2. Food culture anthropologist/specialist: for providing background on community history, and local food and cultural understanding
3. Food analysis specialist with laboratory: for nutrient composition studies
4. Food and dietary database specialist: for computer definition of dietary intake

Additional data may be required from these specialists:

- Herbarium scientist and, where needed, a link to a taxonomic zoologist: for identification of species of food plants and animals
- Local Indigenous People's environment protection specialist: for providing background on environment issues related to traditional food systems

Team members should be brought into the project early on with meetings and workshops to discuss the research questions, and research plan.

Gather background data

A background of the group under study is needed at the beginning of each project to set the stage for the work to be undertaken. The basic background description is to address: a) evidence of need to focus on these particular communities; b) sufficiency of food as energy and protein sources; and c) evidence of concern for micronutrient status. The following information should be sought from a variety of sources to understand the Indigenous People of the area, their food system, and their nutrition and health situation. It may not be possible to get all of this information from existing documents; however, it is also important to know when data do not exist.

1. National micronutrient nutrition situation reports; local data if possible
2. Geography and climate of the specific community area
3. Brief history of the Indigenous People in the study, including

migration patterns if applicable

4. Current situation of the people
    a. Village structure in context of the region
    b. Transportation; communication channels and patterns
    c. Census/information for the area; general population structure
    d. Family structure and way of life; recreation; general family resources
    e. Material culture; housing, clothing, etc.
    f. Persistence of traditional lifestyle
    g. Agriculture/livelihood/income, including general cropping patterns
    h. Hunting, fishing, and gathering wild/uncultivated foods
    i. Typical education pattern
    j. Water, sanitation, hygiene
    k. Political/administrative structure
    l. NGO's aid programs in the area
    m. Environmental concerns and protection issues to date
5. Food availability
    a. Major crops, and proportion of these sold or retained for home use
    b. Food items from gathering, hunting, fishing
    c. Livestock
    d. Distance to market areas
    e. Availability of foods fortified with micronutrients
    f. Storage facilities in village, regular preservation practices
6. Health care
    a. Customs, including child care practices in the community
    b. Closest nurses, doctors, hospitals
    c. Immunizations: local campaigns and frequency
    d. Distribution of nutrient supplements
    e. Nutrition programs in the area: when, where, degree of success
    f. Agency programs implemented in the area that promote child health.

GOOD PARTICIPATORY TECHNIQUE FOR WORKING WITH INDIGENOUS PEOPLE

Successful work with Indigenous Peoples requires effort in building trust and co-operation. For this special relationship between health professional/researcher and the community to develop, it is important that the following principles be considered:

- Deal with community concerns and involvement. To be successful, this work should be a priority for the community.
- Request clear community guidance in the process to develop the research goals and techniques employed.
- Involve local community residents to assist the research process, employ them whenever possible, and train them in the research methods.
- For individual interviews request a signed informed consent statement. If signatures are not possible, request local leaders to advise you on how the elements of informed consent are guaranteed to respondents.
- Contribute to the community in other ways with expertise of the researchers—for example, offer to assist at the health center or to give special class to the school.
- Be sure to return something relevant to the community, in consultation with them - for example, desired medicines or food supplies, or documents on the food system that can be used in local schools.
- A document on participatory health research with Indigenous Peoples has been published by the World Health Organization, and is available at www.cine.mcgill.ca.
- Give timely progress reports of the results back to the community leaders; ask for their advice if a procedure needs to be changed.
- Return all results to the community, and request input on your interpretation of the results.
- Consider a firm research agreement. If written agreements are not possible in the area, have a witnessed verbal understanding with the village leader. Be sure to discuss the disposition of the resulting data, and the benefits that will accrue to the community.

Research agreements are regularly incorporated into procedures for work with Indigenous Peoples in North America. An example of a community research agreement is given in Appendix 1, and of an Indigenous Peoples' collective research agreement is given in Appendix 2.

Informed consent is the principle by which a potential participant agrees to assist your work. Elements of informed consent that the participant should be aware of are:

- description of the project (what is to be learned and why it is important to them)
- what is to happen in the research process
- are there any risks to the participant
- the participant's personal information will never be publicly

Karen home; CINE Governing Board Meeting; WHO/CINE Participatory Research Guide; interviewing Karen participant.

attached to their name

- the participant will not be coerced into participating, and can stop the procedure at any time
- that the results of the overall work will be reported back to the community
- what benefits will come back to the community as a result of this work
- the names of the leaders of the research, and the individual who is the community liaison to the project.

An example of a consent form is found in Appendix 3. If signed consent forms are not used in your area, be sure that a verbal description of the above elements is noted to each participant, and before each focus group or workshop.

STEP 2. GATHER TRADITIONAL FOOD LIST DATA

Gathering data on the traditional food system is the first and most important foundation for the duration of the project. A combination of key informant interviews and focus group or workshops can be successfully used for this purpose. It is an activity that most Indigenous People enjoy, because it helps them identify the bounty and benefit of their culture and environment. Notes on working with key informants and for conducting focus groups/workshops are found in the data gathering tools section of this manual.

Most traditional food systems of Indigenous Peoples contain 70-100, or more, species of traditional food. In addition, some species have several distinct varieties that are known and used to advantage. The best way to create this list of traditional food species is to guide key informants or focus groups to think about independent species (and varieties) of food animals or plants. Leave consideration of recipe items for a later time. Characterizing the species, and perhaps collecting them for scientific identification by a specialist is the first step in understanding the entire **traditional food system** which is defined as:

" all food from a particular culture available from local resources and culturally accepted. It includes sociocultural meanings, acquisition/processing techniques, use, composition, and nutritional consequences for people using the food."

Traditional Food List

When working with key informants, field notes capture the names of each individual plant or animal, and perhaps other information. Be sure to ask if there are different types (varieties) of the species that the individual recognizes as important. The Free List Record Form for Community Food Names Given by Individual Key Informants (Form 2.1) is an example of how these data are listed. The form can be copied to provide ample space for listing all the foods in the traditional food system. Information from 3 or 4 key informants is sufficient to set the stage for a focus group or workshop where a group of 6-10 people jointly decide upon items for the complete list.

The focus group or workshop can set the food items into food groups, as noted on the Traditional Food Complete List from Focus Group or Workshop (Form 2.2). It is helpful to have the group list the food species, and possibly the varieties, one by one by common food groups (fruit, vegetable, grain, meat, fish, etc.) before going on to other ways that food may be classified into groups (hot/cold, also used for medicinal purposes, etc.). This exercise will take a focus group or workshop of 6-10 people approximately 2 hours. Be sure to get the common names of the food items, particularly if they are unique varieties—this may be the only unique name for the food there is. The names on the final form should be written in English letters for sharing with the other case studies.

Karen workshop; Dalit community workshop; Inuit workshop; Bhil community meeting; Karen men's focus group; Karen food list workshop.

Traditional Food Seasonality and Popularity with Children and Women

The next exercise uses this food and food group list to place each food item in the months it is harvested, as noted in Form 2.3. A single check is placed in the month box when the food is available, and two checks are placed in the month box for the peak season. The focus group or workshop can then easily note whether each food is liked by children or mothers, or perhaps both. In the comments section, note can be made of the rough quantity harvested by the community in a year, in order to estimate the relative quantitative importance of each food

For literate groups, writing the food names in the food groups on flip-chart paper, and taping it onto the wall helps the group place each food in the appropriate seasonal grid with checks. As well, identifying the children/mother likes and recording comments with overall harvest quantity can be done in a similar fashion. In the Dalit case study, this was done on the floor with chalk.

Form 2.3 can be copied so that the complete food list can be recorded by food group for seasonality and child and mother preferences. An example of a traditional food list by season for one community in the Dene Nation, Northwest Territories, Canada, is given in Appendix 3.

Community Traditional Food System Data Tables

With a complete traditional food list, the researchers can then construct the resources known as the Community Traditional Food System Data Tables. For this, each food species is given a table as seen in Form 2.4. An appendix to this form should be made for each species that has several varieties. For example, in many parts of Asia, several varieties of eggplant, sweet potato, and mango are known and frequently used. As well, many other important foods (eg. rice, potato) that are less likely sources of micronutrients have several varieties. By using this form, and searching through existing information about food availability and food composition, the extent of unknown information about each species (variety) can be determined. National food composition tables and tables from neighboring countries should be reviewed for existing information.

You may need consultation with a food composition specialist to complete the nutrient data in the tables. Information from other countries that have a similar climatic zone may contain relevant data; however the scientific names must be known for these comparisons to be made. Information specific to varieties will be limited. For example, the food composition tables for China, India and Thailand contain some of the same foods; they have different common names, but the same botanical/zoological name (but perhaps no varietal names). There may be different parts and different preparation styles, but the nutrient data may be similar, and should be noted in the Food System Data Table. This information will guide your selection of foods to target for sampling and analysis in Step 3.

Miao preserved duck; Miao greens without identification or nutrient data; Miao rice cakes; Dalit kitchen; Dalit chilis; Bhil chapatti and curry; Dalit bagging pulses; horseradish tree leaves.

These tables will be completed throughout the research process, as information becomes available. It will be this resource that guides decision-making on what traditional food may hold promise for food-based strategies to alleviate micronutrient malnutrition. An example of a completed community food system table is given in Appendix 4.

Little-used or currently unused traditional food known by elders

Special effort is needed to uncover foods to add to the traditional food list that may currently be little-used or unused. Key informant interviews or focus groups with elders can uncover this information. What is needed is a list of foods not already on the traditional food list and information about why they are not there. You are looking for the following information:

- The food name (and food category). This may be available only in the local name. If there are several varieties, each one should be discussed separately.
- Season available (be sure to ask if there are foods that are only consumed during periods of drought, and if they exist in the local area)
- Place available (this may require a map of the local area)
- A brief description of the food harvest and preparation
- Why the food is used infrequently, or no longer used
- Could this food be shown to you? If not, why not? If so, take a photograph
- and possibly a herbarium sample (see Step 3)

You may want to start the interview or focus group by saying, "People in this area eat quite a lot of different foods. We want to know if there are other foods you know about here that people are not using and why not. We are also interested in the different kinds of the same foods (varieties) that may grow and be harvested here. We are interested in local foods that grow here (not imported ones bought in the market), and especially those that were eaten by most family members".

For each general food (animal food, starch/staple food, fruit, etc.) category ask the elders if there are other foods to add to the traditional food list you already have for the area, and request the information noted above.

Examples of reasons that a particular food resource may little used today are:

i. The food is now considered "old fashioned" by the current generation of inhabitants; perhaps due to the influence of European and American cultural contacts (including administrators and missionaries).
ii. The food may have been collected in connection with other activities (e.g., weeding of fields or collection of firewood) which are no longer done. Hence this relatively secondary source of

Bhil elder man; Bhil community leaders; Bhil toddler; Bhil elder woman; Dalit elder woman; Dalit village chicken.

food is now neglected, in part because of inconvenience.

iii. In some cases the food may have been contaminated or damaged by activities such as the spraying of pesticides, closeness to garbage dump, etc., and people are not sure of its quality or safety.

iv. As people have become accustomed to the purchasing of foods from stores and markets, use of less-popular traditional foods (whether taken as wild food, or grown in gardens) has dwindled to insignificance.

v. Various other factors may also be involved in the low utilization of certain foods. For example, former cropland may now be used for cash crops, thus displacing the ecological niche for a particular traditional food rich in micronutrients, such as leafy green plants.

Key informants and focus groups should be probed for lists of foods that might be used only during special times, such as lean seasons, or lean years. Some of the so-called "famine foods", or "lean-year foods" may be important sources of micronutrients at certain times of the year. Some individuals and families may be particularly good sources of information about "famine foods" and other no-longer-utilised foods. Some families that live in marginal circumstances, or perhaps in the distant outskirts of the community, or in other special ecological locations, may have information about wild foods or unusual cultigens that the rest of the population has forgotten.

If, in the memory of the elders, the community had been relocated into this area, make a note of it on the form. Knowledge of locally-available foods is often limited when people migrate into a new area. Sometimes peoples of different ethnic groups use different foods from the same environment.

This list of foods no longer used should be scrutinized for what may be potentially good sources of micronutrients. If the food is still available, it should be added to the list of foods in the Community Food System Data Tables for identification, possible nutrient analysis, and for the structured interviews.

Complete Form 2.5 to record these newly listed foods, and to identify those with good potential for providing micronutrients. The foods can be scored on a scale of 0-5 for their availability (and potential for promotion). Adjust the criteria for the area you are working in, and describe the criteria in your report. For example: 0 = no potential, 5 = high potential. Criteria could include: a) easy to grow or gather; b) plenty is in the area; c) it is available for several months of the year; d) about ¼-1/2 cup is consumed each time by adult.

Bhil fish trap; Dalit grains; Karen focus group; Dalit bachali.

Selecting a short list of potential micronutrient-rich food for more detailed study

Form 2.6 can be prepared after reviewing information in the Food System Data Tables. You are looking for foods that have good *potential* to be micronutrient sources in the community, but for which complete information is not already known. You are also looking for foods that are available in the community during more than one month, and that are liked by children and mothers. Twenty-five to 30 foods are a reasonable number to work with, but you may wish to select more than this, depending on your findings.

Generally speaking, you are looking for foods with potential to provide good sources of iron, zinc, vitamin A (retinol or carotene), vitamin C and folic acid. Therefore, Form 2.6 should contain primarily animal foods, leafy vegetables, orange or deep yellow vegetables and fruit. Be sure to note whether or not there are several varieties of the same food that should be looked into. Some may have little recorded food composition data.

At this point you should note the parts and general preparation style (raw, steaming, roasting) of the animal or plant that are regularly consumed, and likely targeted for sampling and analysis. This information is recorded in the tables of Form 2.4.

Patterns of traditional food harvest, storage and preparation

The Community Food System Data Tables will contain a large number of food species, perhaps up to 100 different species, and several varieties for some. It is useful to look for common practices of harvest, storage and preparation within the community, and prepare a summary statement of the foods which are harvested in each of the major seasons, which seasons may be lean seasons for total food as well as micronutrient resources, how foods are stored (if they are stored), and general methods of food preparation.

Using Form 2.6 as a guide, complete Form 2.7 about the harvest, processing and storage techniques of important foods to guide your sampling of these foods for Step 3.

Market survey for purchased food

Forms 2.8 and 2.9 A, B, and C are to guide your exploration of local market food potentially micronutrient rich. Your objective is to determine the price of each food by season, and whether there are affordable and acceptable foods in the market that are consumed by children.

From your key informant interviews and focus groups, you can determine what food items are regularly purchased that are consumed by children. List these foods in Table 2.8, and determine where purchased

Nayakrishi food use interview; Karen squash; Karen rosselle; Canada goose; Bhil portion; Miao green.

(market or store), the price range, seasons available, and serving size. Be sure to list the part of the food species that is being purchased (for example goat *liver*, or sweet potato *leaves* or *tubers*).

In Table 2.9, select the foods from Table 2.8 for their contents of Vitamin A (2.9A), iron (2.9B), and vitamin C (2.9C). You can then determine the price per unit of each nutrient. In the Community Food System Data Tables, you will want to record the price range, if it varies over different seasons.

While in the market you will also want to determine whether or not **iodized salt** is available and purchased, as well as the purchase price, so this important micronutrient (iodine) can be included in your final report.

Village market; Philippine market; market grains; Karen market prices.

FORM 2.1

FREE LIST RECORD FORM FOR COMMUNITY TRADITIONAL FOOD NAMES GIVEN BY INDIVIDUAL KEY-INFORMANTS

NAME: _____AGE: _____ PROFESSION: _____

	TRADITIONAL FOOD ITEM	LOCAL NAME/NATIONAL LANGUAGE NAME (ENGLISH COMMON NAME)	COMMENTS: CHARACTERISTICS AND FREQUENCY OF USE
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
- - -			
100			

FORM 2.2

TRADITIONAL FOOD—COMPLETE LIST FROM FOCUS GROUP / WORKSHOP

VILLAGE: _____ **DATE:** _____

FOOD GROUP:	
TRADITIONAL FOOD NAME / ITEM	**COMMENTS**

FOOD GROUP:	
TRADITIONAL FOOD NAME / ITEM	**COMMENTS**

FOOD GROUP:	
TRADITIONAL FOOD NAME / ITEM	**COMMENTS**

COMPLETE TRADITIONAL FOOD HARVEST CALENDAR AND KEY DATA

FORM 2.3

VILLAGE: _____ **DATE:** _____

TRADITIONAL FOOD LIST	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	CHILDREN LIKE Rank 1-3 (3=most liked)	MOHERS LIKE Rank 1-3 (3=most liked)	COMMENTS: Kg/yr by community
FOOD GROUP:															
FOOD GROUP:															

... continue until complete

FORM 2.4

COMMUNITY FOOD SYSTEM DATA TABLES

Food group/category (animal, fish, bird, insect, vegetable, fruit): _____
Local name & other common names: _____
Scientific identification: _____
Part(s) used: _____
Preparation: _____

Nutrient	Nutrient Composition/100g (Edible Portion by Part)*		
	Part:	Part:	Part:
Energy, kcal, kJ			
Protein, g			
Fat, g			
Fiber, g			
Retinol, mg			
Beta carotene, mg			
Total carotene, mg			
Folic acid, ug			
Ascorbate, mg			
Zinc, mg			
Iron, mg			
Calcium, mg			
Other:			

*Highlight New Lab Data

Notes: Animal (Wild, Domestic, Hunted?), Plant (Wild, Gathered, or Cultivated?):
_____
_____

Home Harvested or Purchased: _____
_____

Seasonality of Use: _____
_____

Cost of Production, if Known: _____
_____

...Continued to page 2

COMMUNITY FOOD SYSTEM DATA TABLES : FOOD DATA SHEET (continued)

Record the **relative importance for frequency of use or quantity of consumption by the community** by month in the following table. This information should be take from the focus group or workshop data. Notes can be used to indicate the season when prices are high or low, if the food is purchased. Also in the notes section, the rough total quantity harvested by the community (determined in the focus group or workshop) can be recorded. This information will establish when (if) a food sample should be scientifically studied (step 3).

Use / price

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High												
Medium												
Low												
None												

NOTES:

Importance Value to the Community by Age / Gender

_____

_____

_____

Notes on quantities harvested annually by the community

_____

Notes on Samples Needed for Analysis

_____

_____

_____

_____

_____

Reference to Sample Collection Sheets

_____

_____

FORM 2.5

LIST OF LITTLE-USED OR UNUSED EXPECTED MICRONUTRIENT RICH FOOD

Focus Group participants: _____ No: _____

Date: _____ Place: _____

	TraditionalFood Name/ Item	Food category/part and preparation	Season	Habitat (woods, dry field, etc.)	Why Not Used More often	Score* 0-5
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						

* Availability Score 0 = no potential, 5= good potential

FORM 2.6

SHORT LIST OF EXPECTED KEY MICRONUTRIENT-RICH TRADITIONAL FOOD FOR CHILDREN AND ADULTS

(Notes on cultural values and potential, and anticipated micronutrient contents)

Key Traditional Food list	Children - notes	Adults - notes
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
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29.		
30.		

FORM 2.7

SHORT LIST OF KEY EXPECTED MICRONUTRIENT RICH FOOD WITH NOTES: HARVEST, PROCESS, STORAGE TECHNIQUES

Traditional Food Name	Harvest (time, place)	Process (preservation, cooking)	Storage Procedures
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
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21.			
22.			
23.			
24.			
25.			

FORM 2.8

MARKET SURVEY TABLE FOR CHILDREN'S FOOD

Date: _____ Place: _____

Can you buy iodized salt? ( ) Yes ( ) No

Food Items	Food Quantity	Commercial Food Source (Identify location)				Months Available	Price Range	Price per Serving (Range)	Serving Size
		Market	Store	Vendor	Other				
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									
19.									
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21.									
22.									
23.									
24.									
25.									
26.									
27.									
28.									

FORM 2.9A

RANK ORDER OF FOOD PRICES FOR MICRONUTRIENT RICH MARKET FOOD

VITAMIN A

Vitamin A Food Item	Price or Price Range /Serving	Price or Price Range /1000 RE
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
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22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

FORM 2.9B

RANK ORDER OF FOOD PRICES FOR MICRONUTRIENT RICH MARKET FOOD

IRON

Iron Food Item	Price or Price Range /Serving	Price or Price Range /100 mg Fe
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
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26.		
27.		
28.		
29.		
30.		

FORM 2.9C

RANK ORDER OF FOOD PRICES FOR MICRONUTRIENT RICH MARKET FOOD

VITAMIN C

Vitamin C Food Item	Price or Price Range /Serving	Price or Price Range /60 mg
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
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STEP 3. SCIENTIFIC PARAMETERS OF TRADITIONAL FOOD

In this step of the procedure, you will use the traditional food list and basic data on food likes with children and women (Form 2.3), as well as the Food System Data Tables (Form 2.4) to determine which food items need taxonomic identifications and nutrient analyses. It is important to recognize the costly nature of these procedures, in both time and funds; therefore it is necessary to carefully review existing data for the most promising items before proceeding. This is true for the field sampling for herbarium specimens, as well as for nutrient analysis. It is important to work closely with a community research assistant to assure accurate identification of the particular food recognized as fit for consumption, as well as the most efficient way of harvesting and preparing the food sample. It is also important to work closely with the food analyst to ensure that good quality samples are received and treated in the laboratory.

Taxonomic identifications

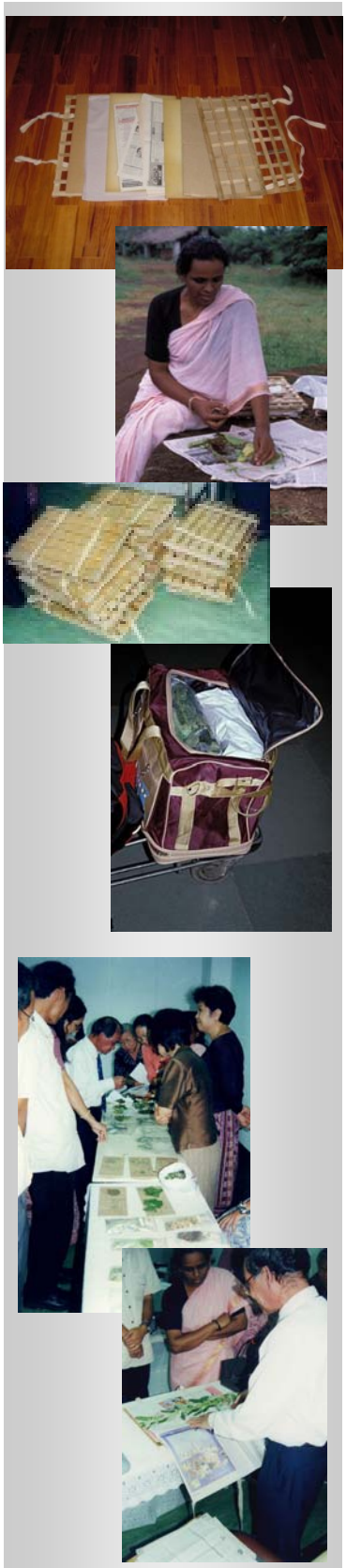
To begin the investigation of the traditional food list for identifications, have an early meeting with your collaborating herbarium and zoologist specialists to review the common names of items on the food list. Pay particular attention if the specialists recognize availability of several varieties of a species. If there are items he or she does not recognize by common name, the next step is to collect a small raw sample of the food in its natural state together with a photograph of the food in its local environment. If the herbarium specialist still does not recognize the item, and cannot provide genus, species and family, a full herbarium sample needs to be collected as described further.

Plant samples

Taking plant specimens for a herbarium from the field setting requires careful methods. First of all, the collector should take the following equipment: pruning shears, pocket knife, trowel for digging underground parts, hatchet, handsaw, tag-labels and field labels, altimeter, notebook, large plastic bags, camera, and a portable plant press. An example of the tag-label and field label is shown in Form 3.1.

When taking a sample, it is important to consult with the community field assistant, and to record the locality carefully, as well as the local name of the plant food -- and variety (if any), date and time of collection, altitude, growing habitat (full sun, shade, type of soil, general climate), and notes about the color of the leaves, fruit, etc. Then take as complete a sample as possible into a large bag, with enough foliage to prepare 4 herbarium specimens.

When back from the field, press and dry the specimens as quickly



Plant press; preparing sample for identification; stack of plant presses; satchel for transporting fresh samples; plant identification workshop; workshop on identifying plant foods in Mahidol University, Thailand.

as possible, to prevent development of mold. Place the specimens between newspaper, absorbent paper and place in a drying press that can be closed with webbing straps as seen in Figure XX.. The paper should be changed frequently and the press placed in full sun (or near an electric heater) for as much time as possible until the specimens are completely dry. In this form, the drying samples can be transported to the herbarium.

The botanist will make the taxonomic classification, usually with the aid of a microscope, and retain the herbarium specimen if it is a unique and new identification for the area. The classification will be given as Class, Family, Genus, Species, and potentially the Variety. With this information you will be able to screen existing food composition tables for food items with the same genus and species, and part of the plant used as food. If you do not find any information on this particular food item, you will certainly have a good candidate

Animal food samples

Animal samples are less problematical than plant samples for scientific identifications. Firstly, there are usually fewer of them, and they are well known by common name. Exceptions may be insects, small birds, ducks, and fish, because there are many different kinds. Since animal samples are not easily prepared for the specialists in the same way that plants are for herbarium samples, the best course of action is photography of the intact animal *before it is prepared for consumption*, and distinguishing outer markings (feathers, fins, etc.) removed. Use a good camera with a macro lens and a size marker (such as a small ruler or pocket knife) to get a quality color photograph. You can then use the photographs for consultation with a zoologist on taxonomic identifications. For the food systems data tables (Form 2.4), you will want to know how the food is prepared for consumption. It is important to get the taxonomic identification before proceeding with sampling for the laboratory, for reasons noted above.

Using a camera

Pictures are valuable for your documentation.

Plant foods: Take 35mm color photos with a macro lens, if at all possible. If the setting is shady, use as high an ASA number in film that you can find. Digital cameras can also be used, but take photos at as high a resolution as practical. Take more than one picture, and take pictures of the food before it is picked, when it is picked, and after it is prepared. We will want to have photos of all the foods in the traditional food system, if possible, but especially those that are newly identified species, and unique species.

Animal foods: As noted earlier, you will want photos of the animal, insect, fish, bird, etc. before it is cleaned of external identifying features. Again, take close-up photos of the creature before it is cut or cleaned, and

Taking fresh leaf samples in Bangladesh; collecting samples in Bangladesh; Miao plant samples; collecting Bhil tree fruit samples.

again after preparation. Use a size marker as noted above.

If you have a digital camera, this is even better; but take care that they are of high resolution, and will transmit well on email with your scientific collaborator.

Selecting and prioritizing food with missing nutrient data

In this section, food proximate composition and micronutrient composition is emphasized due to the common problems of micronutrient deficiencies in developing countries and communities of Indigenous Peoples in general.

When selecting food for nutrient analysis sampling, you need to carefully review the following:

- Traditional Food System List (Forms 2.1, 2.2, 2.3- including seasonality and likes by children and mothers – check for those with a score of 1-3)
- Food System Data Tables (Forms 2.4 and 2.5) – check for food items that have missing nutrient data for the key nutrients of this project.
- Identifications by a botanist/zoologist – if possible considering field travel, do not take a sample for analysis which has not been scientifically identified. First take the initial sample to show the botanist, or a herbarium sample for identification.
- If no identification, there is a good chance that there is not nutrient information. For field efficiency during a short availability season, you might want to take the herbarium sample and food sample at the same time.

With this information at hand, complete Table 3.2. You will need the opinion of a nutritionist with some knowledge on food composition to complete the first column. Since you will not yet know the nutrient values, you will still have to decide whether or not to sample the food. As noted earlier, green leafy vegetables, orange or yellow vegetables, and animal foods are good candidates for the nutrients under study.

You may find that the Food System Data Tables contain only partial information for the nutrients under study, or that the existing information is contradictory. This would mean that the food can be reasonably sampled for new analysis.

Preparing food sample for photograph; photograph of wild plant sample; photographing a food sample; Dalit children getting a lesson in photography; photo of unidentified fish in Bangladesh.

Identifying good laboratory procedures and cost

Since taking food samples in the field and laboratory analyses for nutrients are costly in terms of funding and time, it is important to have confidence that the procedures are conducted precisely. When searching for a good laboratory for sample analysis, you are searching for an organization that can demonstrate ***precision*** (getting the same results with repeat analysis), ***accuracy*** (getting the right results), and ***reliability*** (getting the same results that are correct). This can be demonstrated when the laboratory uses in-house quality control procedures, reference materials from an external source, and participates in laboratory performance tests.

Within the laboratory, you should check that standard analytical methods or in-house validated methods are used and that the procedures used with samples are documented on a daily basis (see the lab notebooks). Using clean glassware and calibrated instruments should be routine, and staff should be well trained. In-house quality control procedures include use of an internal standard, and sample results that are regularly recalculated and rechecked.

In the 2001 workshop held in Thailand, it was determined that at two national food composition laboratories in Asia one sample analyzed for proximate composition (protein, moisture, fat, ash), dietary fibre, retinol, carotene, folic acid, vitamin C, iron and zinc would be accomplished at a cost of approximately $190 USD. Costs are determined by the equipment and instruments used, the cost of chemicals, and laboratory staff salary costs. Approximately 60 days are required to do the complete set of analyses for duplicates of 30 original samples (60 independent samples).

Food sampling, packaging and transport to the laboratory

Firstly, it is important to approach the community with a list of food samples you are clearly interested in collecting. This will result from your traditional food list, and prioritizing of samples after reviewing earlier data. Prepare Form 3.3 to identify the food items you are interested in collecting.

When collecting samples in the field setting, it is important to be certain that the food item is indeed fit for consumption. Ask your field assistant if this food is suitable to prepare for a family, so that you avoid inadvertently taking samples that are perhaps unripe, spoiled, or otherwise unfit to eat.

The second important principle in these initial stages is to ensure that there is sufficient sample. You will need from 100-500 g of sample, so be cautious that your field assistant or others do not take a large portion of what you collect together for the household kitchen or the next feast! You want a food sample that is representative of what is actually eaten.

When you are sure you can obtain sufficient sample, be prepared to package, label and store the sample to prevent spoilage. Form 3.4 should

Laboratory in Bangladesh; Bhil samples; Nayakrishi plant samples; Dalit plant samples.

be copied and completed for each food sample taken in the field. It identifies the place, date, person collecting, and the size of the sample take. It also requires a sample number that you should use consistently for identifying this sample, and the sample number should be placed on or inside the sample container so that it will not be easily dislodged. When returning samples to the laboratory, include copies of Form 3.4. Additional information can be recorded in your field notebook.

The equipment you will need for taking food samples for the nutrients included in this procedure are: large and clean plastic bags, ties or bands to hold the bags closed, a stainless steel knife and Teflon cutting board, plenty of paper towels, labels and a pen, and a cooler filled with ice. If the samples are fresh and fragile (intact fruits and vegetables and whole animals are less fragile), they must be transported with ice, or spoilage will set in).

The sample should be taken into the ***labeled bags*** when it is clean and free of obvious external moisture. Therefore, if soil clings to the roots of a plant sample, and the roots are not consumed, remove them, wash the plant, and dry it carefully with toweling or sun-drying only to the point of removing excess moisture (not desiccation or drying of the sample). However, for vitamin analysis, it is especially important not to desiccate the food sample before packaging. Removing excess water is critical, for this will interfere with the moisture data of the intact edible portion of the plant. Bags in which samples are placed should have excess air removed, to prevent oxidation as much as possible. New (previously unused) zip-lock plastic bags are recommended

Place the sample in the cooler, and transport to the place for initial processing and freezing. This may be a home kitchen or a laboratory. For shipping long distances, use dry ice for keeping samples frozen for 1-3 days. Wet ice will not usually last more than 10 hours in a well-insulated cooler. It is important that samples arrive in the laboratory chilled, if not solidly frozen.

Be sure that a food sample data sheet (Form 3.4) is completed for each sample taken, and that the label number on the package matches that on the food sample data sheet. You will want to copy this several times, so there is one for each food sample collected in the field. Plan the food code numbers in advance with the laboratory analyst.

Initial food processing in the field

As noted above, the samples should be fit for consumption, cleaned and packaged for shipment to the laboratory. Animals should be cleaned, eviscerated and skinned, and samples packaged according to tissue (muscle and organ meats, for example, should be packaged separately). Plants should be cleaned of major inedible portions, but skins and shells left intact, if they enhance shipment. Leaf foods should have soil removed, and be free of excess moisture. When possible, include portions from several plants when taking a field sample. This will help ensure

representativeness of the sample which is ultimately analyzed. Notes on the food sample data sheet will alert the food analyst if skins, etc. are to be removed.

Preparing foods with heat and sealing them is one way to enhance food preservation for transport to the laboratory. This is especially relevant if the final product is always eaten cooked. If the intent is to sample cooked foods in the field, it is critical to prepare the food without added ingredients, except water (for example, simple steaming, simmering or roasting). Added ingredients will contribute additional nutrients to your sample. Record the weight of the food before and after preparation. If water is added, it should be measured, so that a known (and recorded) amount of water is added to a known (and recorded) amount of food sample. The final cooked volume should also be recorded. This is important to calculate the moisture contents of the original raw sample, and to calculate nutrients per gram of raw or cooked sample. Keeping careful notes of these details is critical to good food sampling. These notes should be made on the food sample data sheet.

Nutrient analysis

Initial food processing in the laboratory

The first steps in the laboratory are to first gently thaw the sample, and to process it into a homogeneous sample, using any number of methods depending on the sample (chopping, blending, mixing, sieving, etc.). Ensuring a representative sample is key to precision, accuracy and reliability of analyses. If sample portions are not randomly selected, or if the sample is not representatively portioned, replicate samples may have widely divergent results, an uncertainty which will lead to unnecessarily taking more samples in the field.

Samples should be analyzed as quickly as possible after they are received from the field. For nutrients under consideration in this procedure, portioning from the homogenous sample should be into 4 portions, each of which must be carefully labeled with the sample number and name.

Portion 1 is made for proximate composition, dietary fiber, and minerals (at least 150 g);
Portion 2 for retinol and carotene (at least 40 g);
Portion 3 for folate and an extra reserved sample (at least 40 g)
Portion 4 for vitamin C placed in 3% metaphosphoric acid (at least 20 g).

Portion 2 should be carefully sealed under nitrogen and protected from light (use brown plastic or glass vials, or cover the vials with metal foil) and heat, and frozen quickly, ideally at –80º C. Portion 1 can be freeze dried (recorded weight before and after drying) and stored with a dessicant for ease in storage and shipping, and processed at a later time. This initial portioning of samples can be done with basic laboratory equipment. If

possible this step can be done close to the field setting to save shipping costs.

Nutrient analysis procedures

Some basic ideas of the separate analytical techniques are given here to assist the data manager who is not skilled in food chemistry. It is necessary to ensure that the basic principles of the analytical method are adhered to for the costs described earlier.

Generally speaking, the reference of authority for food composition analysis procedures are those of the AOAC (Association of Official Analytical Chemists). This reference book known to all food chemists, and present in all quality laboratories, describes a variety of methods for analysis, and in particular for the proximate nutrients (protein, fat, moisture, ash), as well as dietary fiber.

Total carbohydrate can be computed by subtracting the amount (g) of moisture, protein, total lipid and ash from 100 g sample. **Digestible carbohydrate** can be computed after subtraction of dietary fiber.

Energy of food samples can be calculated using the factors of protein x 4, fat x 9, and digestible carbohydrate x 4.

Protein from plant and animal sources is determined by the Kjeldahl method which determines the amount of nitrogen in the sample, which is subsequently multiplied by a factor of 6.25. If other conversion factors are used, these must be clearly recorded.

Fat in food samples is determined by extracting the total fats with organic solvents, subsequently evaporating the solvents, and weighing the residue.

Moisture is usually determined by first weighing the sample, and then drying it in a drying oven, after which it is reweighed. Moisture is calculated from the loss of weight in moisture.

Ash in the sample is prepared by igniting a weighed portion of dried sample in a muffle furnace at 525-550º C. The remaining residue (ash) is weighed.

Dietary fiber is determined in a food sample after treatment with enzymes to digest starch and protein, after which the residue sample is re-weighed. Dietary fiber can be computed after subtraction of protein and ash in the residue.

Iron, zinc, and other minerals can be measured using atomic absorption spectrophotometry or inductively coupled plasma emission spectroscopy. Samples are first prepared by dry or wet ashing.

Vitamin C is determined using fluorometry or high performance

liquid chromatography (HPLC). Both dehydroascorbic and ascorbic acid are measured.

Folic acid (total folate) is determined with a microbiological method using *Lactobacillus casei* or, *Lactobacillus rhamnosus* after the samples are hydrolyzed using enzymes.

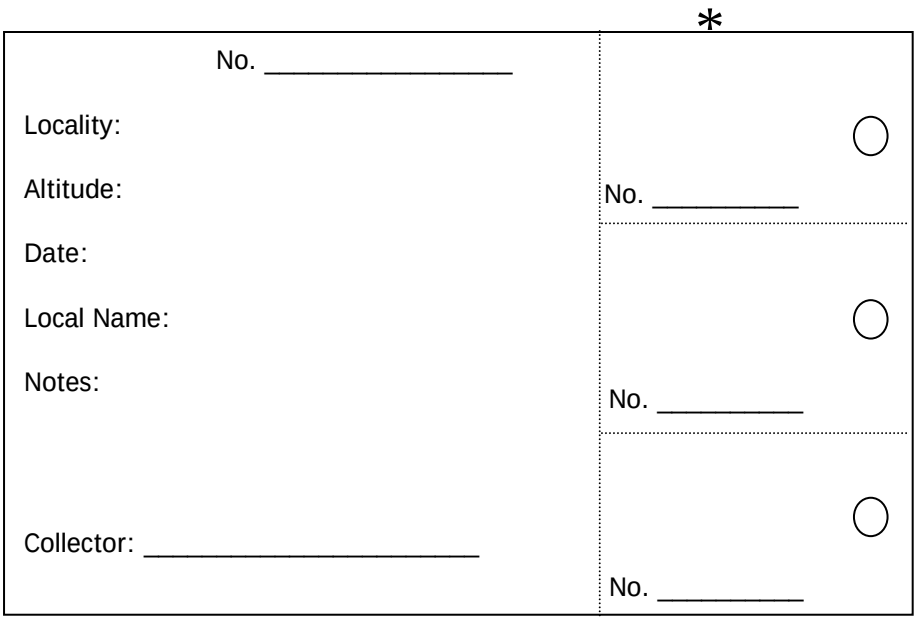
Vitamin A and carotene are determined with HPLC. The samples must be carefully protected from destruction by air, light, acids and trace minerals. Precautions throughout the analysis must be taken to protect the sample/vitamins from air, light, acids and heat

Be sure to record the results received from the laboratory in the Community Food System Data Tables, with a note that these are new data (record field and lab code number, laboratory name, address, and date of laboratory report).

FORM 3.1

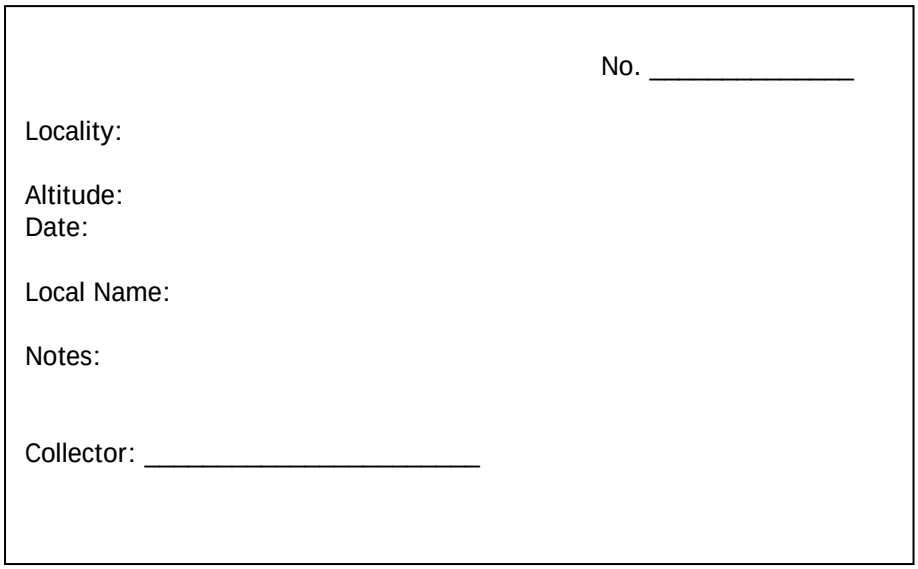
SAMPLE HERBARIUM LABELS

Sample field label



** Labels for 3 replicate samples*

Sample Herbarium Lab label



FORM 3.2

PRIORITIZING FOOD FOR SAMPLING

Food likely good source of micronutrient	Which nutrients?	Missing composition data: Which nutrients?	Used by mothers (m) or children (c)		Priority score*	Rank 0-3
			m	c		
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						
25.						
26.						
27.						
28.						
29.						
30.						

* **Score:** 0 = none 1 = low 2 = medium 3 = high

FORM 3.3

LIST OF SAMPLES TARGETED FOR COLLECTION FOR NUTRIENT ANALYSIS

	Local name / common name	Identification	Season	Nutrient data needed
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

FORM 3.4

SAMPLE COLLECTION DATA SHEET

Food Sample # :

Date: _____
day-month-year

Harvest Location: _____ Herd or Stock (if known)

Harvest Date:

Person Collecting/Harvesting:

Person Packaging:

Animal or Plant Name:

Other Local Names:

Part:

Approx/Actual wt of animal or part sampled:

How prepared:

Date of freezing: _____
day-month-year

Time from harvest to freezing of sample:

Comments (For example – any occurrence of thaw and refreeze; general condition of sample etc.):

Label on packaged, frozen sample should include:

Sample #
Food Name and Parts

For Lab Use:

Date received :

Lab Code :

STEP 4. INDIVIDUAL INTERVIEWS FOR UNDERSTANDING DIETARY FOOD USE AND NUTRIENT INTAKE PATTERNS, AND CULTURAL CONTEXT IN THE COMMUNITY OF INDIGENOUS PEOPLE, PARTICULARLY FOR INFANTS, CHILDREN, MOTHERS AND ELDERS

Introduction

With the community traditional food list, and the selection of the short-list of foods (around 30 items from the traditional food list) likely to be good sources of micronutrients, as developed in Step 2, the team is now ready to conduct individual interviews. The key is to find how these potentially micronutrient rich foods are used in the community, and the meanings and other attributes that people attach to them. This is essential information for understanding how these foods might be used to better advantage to improve micronutrient status. Also important are factors concerning current environmental advantages and constraints for using these foods, which were developed in Step 5—and which round out the picture of the community's potential for incorporating these foods into diets of children and mothers. Keep in mind that the short-list of food items for special study can be revised from time to time, when new information becomes available to identify new foods for inclusion in the short-list. Also be reminded that Step 2 and Step 4 can be conducted in the same time period in the community.

First, review the information compiled during Step 1 with the entire traditional food list for seasonality, harvest characteristics, and general taste appreciation by children and mothers. Step 4 begins with learning more about how children and mothers view the overall characteristics of food items contained in the short-list and how food items are grouped for similar characteristics by conducting card sort exercises. Following this, scoring of overall taste qualities for mothers and children is understood. Other key attributes of the short-listed foods are then questioned with focus on infants, followed by children. This can be combined with interviewing for infant feeding practices. Step 4 is concluded with individual dietary evaluations using 24-hour recall and traditional food frequency interviews of infants, children and mothers, which are then analyzed by the team member responsible for quantitative dietary estimations of food and nutrients. A physical health assessment is included for children 0-12 years of age. With this information, the team will have adequate information to understand ***why***, ***if possible***, and ***how to*** incorporate locally available micronutrient-rich food into the diet.

Selection of individuals for these individual interviews

The leaders of the community of Indigenous People are the first source of advice on which families are available and suitable for conducting these interviews. The team will need an appreciation of the general community practices for traditional food harvesting (for example, do mostly all households participate, do only a few households participate, or do a few households supply the whole village?) With this information, ideally, a random sample is selected from a community list (or map) of households

Dalit elder; workshop; Karen women; Dene interviews.

with resident mothers, infants and children present. You will want a final number of interviews of approximately 30-40 in each category. Thirty randomly selected respondents will usually give sufficient qualitative date to represent the community's diversity on food use and cultural values.

Dietary evaluations which use statistical comparisons require larger sample sizes. Additional considerations on sampling, and larger numbers, are needed if you are planning this data phase as the baseline against which to compare a later post-intervention phase, and you also need to consider other measures of nutritional status for these comparisons (see Step 5). Depending on the complexity of the diet and the skill of the interviewers, up to 100 individuals is a reasonable "ball-park" number for comparisons.

1. Understanding Food Use Patterns and their Cultural Context

Conducting card sorts

This exercise is developed from that published in 1997 by Blum, Pelto, Pelto and Kuhnlein (Community Assessment of Natural Food Sources of Vitamin A: Guidelines for an Ethnographic Assessment, pages 28-31). If you have this reference source, please review these pages for the detail provided. This is a popular and easy exercise for respondents, and a good way to get people thinking about why they choose the foods they do. The basic idea is to understand how people classify and group foods contained in the short list, and how these ideas are reflected in food choices. The person interviewed is asked to take a series (stack or pile) of cards, each with a drawing or picture of one food in the short-list and each with a number on the reverse side, and to place each card into a group with other foods that belong together. Then the person being interviewed is asked why this grouping was made. There should be several reasons given with card sorts made by each person. The results of the groupings and the description of the reason by the individual respondents are recorded on Form. 4.1A.

Before beginning the card sort interviews, the cards need to be prepared. Index cards (3x5 inch) are a good size for handling, although other sizes also work. Use a local artist to make drawings of each food species on the short-list on one side of the card--or else use color photographs; on the reverse side, use the number in the short-list that is being consistently associated with this species. Form 4.1B should be prepared with names of the items in the short-list in the left-hand column. Form 4.1A is for the interviewer to record the grouping characteristics described by the respondent during the interview, and Form 4.1B is used to summarize the individual data.

The purpose of this exercise can be described as a game to the respondent, and it should always be stressed that there are no right or wrong answers. The respondent can take as much time as they would like. You may wish to begin the game with a demonstration of how foods can go together to stimulate thinking of the respondent. For example, by using

Karen Buddhist monk sorting food names by categories; Karen pile sort for food qualities; Arctic card sort.

color (green foods go together), food species type (animal foods go together, plant foods go together in a separate place), seasonality (wet season foods in one pile, dry season foods in another), etc.. What you are looking for is ***cultural reasons*** why people group foods together, particularly foods for infants and children. Other examples include "hot" or "cold" characteristics, or "blood building" characteristics. Using a short-list of various micronutrient rich foods contained in the food system, you can begin to understand how and why certain foods have cultural definitions, and this information will be useful in planning a food-based nutrition promotion program. You will already have clues about these groupings from your key-informant interviews.

On Form 4.1B summarize the individual data by recording all the characteristics noted across the top of the table. You can then tabulate the number of times each food in the short-list was given by the respondents for each characteristic. It will then be obvious what are the most important characteristics and how the entire set of interviewees views the short-listed foods; less frequently mentioned characteristics should also be carefully noted for further data gathering. These data are extremely important for understanding the food system.

Taste appreciation of expected key micronutrient rich foods by children and adults

One of the most important qualities driving food choice and acceptability is taste. In trying to understand how foods can be used in food-based nutrition programs, basic taste appreciation of a food species must be understood. Form 4.2 is a way to guide interviewing and recording of taste appreciation of children and adults.

The name of each food on the short-list should be written in advance next to its corresponding number on the left column of Form 4.2 for ease in the interview. The mother will likely be able to respond with a score of 1-5 for the young child as well as for herself to complete the form. Alternatively, older children may be able to score their own taste scores for each food.

When each food contains a score, the short-list of micronutrient rich foods can be ranked. It is possible to separately summarize the short-list foods rich in the various micronutrients under review. In this way, the most taste-popular foods (highest rank) can be identified and prioritized for their usefulness in a food-based promotion strategy. As well, micronutrient rich foods that receive low scores may be good items for discussion in key-informant interviews or focus groups to understand how and if taste qualities can be improved.

Focus on micronutrient-rich complementary foods for infants

Each of the short-listed micronutrient rich traditional foods can be questioned for their particular attributes for introduction to infants as

Karen children's anthropometry; Karen infant; Karen mother and infant; Karen child height measurements

complementary foods during the first 2 years (Form 4.3A). You can begin the interview by describing the general information you have from key-informant interviews about community practices for complementary feeding. You can then show the cards, one by one, and ask the respondent, "How would you describe this food as being suitable for infants?", and "When would be a good time to start giving this food?" You can begin with an example, to give the respondent an idea of the kind of information you are looking for. Usually, the interview moves quickly once the respondent has the idea of what is wanted, and you can then proceed to complete the information for each short-listed food.

The various attributes of each short-listed food can be given on Form 4.3A, and a summary of the individual responses can then be prepared on 4.3B, using a separate form for each of the short-listed foods. Be sure to record the number of interviewees from which the % figures are calculated.

An identical procedure is followed for understanding how these micronutrient-rich foods are useful for children 2-12 years of age, and recording responses on Form 4.4A and summaries for each food on 4.4B. A caveat is that the mother interviewed may prefer to identify a particular child for referring to the micronutrient-rich food attributes, and perhaps for a particular attribute. If so, be sure to record the age and gender of the child considered directly on Form 4.4A.

Infant food history

Another interview tool to capture information about infant feeding and nutrition is to use Form 4.5. In this procedure you are asking the mother about a particular young child in her care, and asking about the kind and duration of milk feeding as well as complementary foods.

You begin by explaining to the mother that you are there to understand how infant feeding is usually done in the community, and what kind of foods are introduced to the infant during what time period. In Form 4.5 you record the use of the first milk of the infant, usually this is breast milk, and then ask if and when other milks have been given, and during which month first introduced. This is then followed by asking about complementary foods given to the infant, and in which month first introduced. If many new foods are introduced during the same month, the back of the form can be used to record this.

This information on infant complementary foods is intended to be free-listed by the mother. At the end of this free listing, you can prompt the mother to explain if, how and when the micronutrient-rich foods in the short-list are introduced to the child before the age of 2 years.

Recording dietary intake: 24-hour recall and traditional food frequency; dietary data entry and analysis

If an infant is cared for by someone other than the mother during

Dene children gathering berries; drying fish; young Miao girl; Arctic family.

certain times of the day, the interviewer should contact that individual for answering the relevant time period of the interview.

24-hour recalls for all members of the family (infants, children, adults)

Two 24-hour recalls during the same week (but not consecutively) for the same individual should be taken to estimate usual dietary intake. It is expected that dietary interviews will be conducted for infants (0-2 years of age), children (>2-12 years of age) mothers, and elders (>60 years). Form 4.6 can be used for collecting 24-hour recall information for infants, children, mothers, and elders.

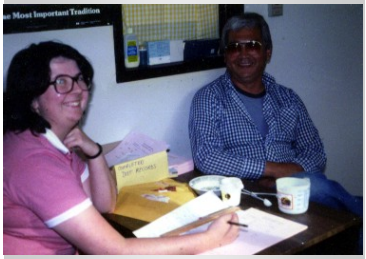
The overall objective of dietary evaluations is to understand food use, as much as is possible, on a year-round basis; to understand the amount of micronutrients consumed; to understand the proportion of traditional food of the Indigenous community used in contrast to purchased food; and if necessary, to provide a baseline of dietary intake against which a comparison can be made following a food-based dietary intervention. Two interview tools are used for this procedure: the 24-hour recall, described above, and the traditional food frequency interview.

The 24-hour recall tool is useful to obtain group a3verages of food intake and nutrient intake, but ***cannot be used to establish average intake for the individual*** because of the diversity of intakes from day to day. Food frequency interviews give information useful for understanding seasonal traditional food use, and the number of times a food may be consumed. ***Frequency data cannot be used for quantitative estimation of food or nutrient intake, because portion sizes are irregular, and difficult to summarize.*** Even though 24-hour recalls and frequency interviews are conducted at the same time, it is usually the case that fewer traditional foods are mentioned in the recalls. However, using both tools gives a good estimate of the parameters under review for this project.

The breadth of information in understanding what food, and in what form and quantity it is consumed, is important information for understanding the food system. It may be that few traditional food items, including those on the short-list of micronutrient-rich foods, are consumed during this time, and key informants should be asked to confirm these facts, and the reasons for them.

The seasonality of interviews should be considered. The intention for this procedure is that two seasons of interview will be conducted: the season when many traditional foods are present in the community, and the season when the least number of traditional foods are used.

Because elders in communities of Indigenous Peoples often consume more traditional foods than other members of the family, a series of 24-hr recalls from elders (>60 years) will often give important clues on the availability of traditional foods, including those on the short-list.



Nuxalk interview; Bhil portion with chapatti; Bhil portion with rice; interviewing a participant.

Therefore, it is recommended that if the household has elder(s) in residence, that they also be asked to complete the dietary interview.

Computing the Percent of Energy from Traditional Food

In many studies emphasizing local or traditional food resources of Indigenous Peoples, it is desirable to understand the percentage of total dietary energy of the population (or of age/gender groups) that is derived from traditional food. This can be easily accomplished using 24-hour recalls. Begin with the list of foods mentioned in the group of recalls, and separate them into two groups: traditional/local food and purchased/other food. Then compute the energy contributions in the recalls in two separate segments, with the addition of these segments being the total energy. It is then a simple matter to calculate the proportion of total energy from traditional food. For example if the mean total energy of the group is 2000 kcal, and the mean traditional food energy is 1500 kcal with the "other" food energy being 500 kcal, 1500/2000 = 75% of energy from traditional food.

Frequency interviews for the short-list of micronutrient-rich foods

All those interviewed for the 24-hour recall (infants, children, mothers, elders) should also be interviewed for the number of times the short-listed foods are consumed during the current season. At the top of Form 4.8, you should record the accepted community definition of the current season, and which months of the year this corresponds to, and fill-in the names of each of the short-listed foods in the left-hand column. For this, a master form can be prepared and photo-copied. Then each of the short-listed foods can be questioned for the times per day, week, or month the individual has consumed them.

On the right side of Form 4.8 the team member can complete a relative rank (0-3) of the vitamin A, iron, and vitamin C content of each of the short-listed foods. With this information the general use of micronutrient-rich foods in the short-list can be understood.

The information obtained from the card sorts, attributes listing and summaries, 24-hour recalls and frequency interviews are essential for understanding the patterns of food use and nutrient intakes of members of communities of Indigenous Peoples.

Physical health assessments for children 0-12 years of age

Form 4.7 is provided to emphasize anthropometry (both overweight and underweight), protein, energy, malnutrition, and symptoms of micronutrient deficiency commonly seen in developing countries (vitamin A, riboflavin, iron, vitamin C). A standing balance sensitive to 100g is required for weight measures. A tape measure attached to the wall and a flat head board can be used to take height measurements, sensitive to 0.1cm. Supine (laying flat) measurement is made for children less than 2 years of age.

For details, see: www.health.gov.au/pubhlth/strateg/food/pdf/anthropometric.pdf or Gibson, R. (1990).

FORM 4.1A

CARD SORT TABLE FOR INDIVIDUALS

Name of Respondent_____ No._____
Name of Interviewer_____ Date_____

Card Numbers in Group	Description of Characteristics Given
First group sort	
group 1	
group 2	
group 3	
group 4	
group 5	
group 6	
group 7	
group 8	
group 9	
group 10	
Second group sort	
group 1	
group 2	
group 3	
group 4	
group 5	
group 6	
group 7	
group 8	
group 9	
group 10	

FORM 4.1B

SUMMARY OF CARD SORT RESPONSES

Trad. Food Item	.....Characteristics.....						
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
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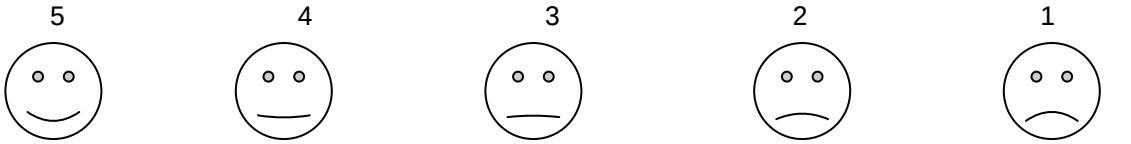
24.							
25.							
26.							
27.							
28.							
29.							
30.							

FORM 4.2

SHORT LIST OF EXPECTED KEY MICRONUTRIENT-RICH TRADITIONAL FOOD: TASTE SCORES AND RANKS BY CHILDREN AND ADULTS

Score each food for general taste appreciation:



Traditional Food Name/item	Children				Adult (age: _____)	
	Child 1 (age:____)		Child 2 (age:____)			
	Score	Rank	Score	Rank	Rank	Score
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						
....						
30.						

FORM 4.3A

Individual Report: Complementary Food Attributes for Infants (<2 years) (Local traditional food short list of micronutrient-rich foods)

Respondent's Name _____ Respondent No._____

Date:_____ Interviewer:_____

Traditional Food Name/item	Attributes
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
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26.	
27.	
28.	
29.	
30.	

FORM 4.3B

Summary of Individual Responses on Complementary Food Attributes for Infants (< 2 years)
(Local traditional food short list of micronutrient-rich foods)

Food name _____

Attribute	Number / % of responses
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
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27.	
28.	
29.	
30.	

FORM 4.4A

Individual Report: Complementary Food Attributes for Children (2-12 years) (Local traditional food short list of micronutrient-rich foods)

Respondent's Name _____ Respondent No._____

Date:_____ Interviewer:_____

Traditional Food Name/item	Attributes
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
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FORM 4.4B

Summary of Individual Responses on Complementary Food Attributes for Infants (2-12 years)
(Local traditional food short list of micronutrient-rich foods)

Food name _____

Attribute	Number / % of responses
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
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FORM 4.5

INFANT FOOD HISTORY (0-2 Years)

Mother's Name: _____Number:_____Village:_____

Interviewer: _____Date: _____

Child's name: _____Age of child (months):____Gender (M or F)____

1. Did this child have colostrum? ( ) Yes ( ) No
2. Did this child have breast milk? ( ) Yes ( ) No
3. At what age did this child stop receiving breast milk? *OR* If child is currently breastfed, at what age does the mother plan on stopping breastfeeding? _____
4. What milk besides breast milk has this child received? At what age?√

Type of milk	Not given? (√ if applicable)	Age that child first received this milk	Still received by child? (Yes/no)	Age that child stopped receiving this milk
Powdered milk				
Condensed milk				
Whole milk, UHT				
Soy milk				
Ovaltin/Milo				
Other				

Continued ...

5. When did the mother give the following supplementary foods to this child? *OR* If young infant, which foods does the mother plan to give, and when?

Age supplementary food was first given	**Supplementary food group***	**Preparation**	**Quantity per serving (Tbsp)**	**Frequency of consumption (times/d, days/wk)**
	Rice			
	Cerelect			
	Banana			
	Fish			
	Vegetable			
	Pumpkin			
	Egg			
	Fruit			
	Chicken/pork			
	Liver			
	(Fried food)			
	Other:			
	Other:			
	Other:			

*Food examples from Thailand

FORM 4.6

INDIVIDUAL 24 HOUR RECALL (INFANT, CHILD, ADULT)

Note: Complete 2 24-hour recalls (use duplicate forms) for each respondent within one week.

Name: _____ No. _____ Community: _____

Interviewer: _____

Gender: ( ) Male ( ) Female Age:_____

Status: ( ) Child 0-2 y ( ) Child 3-5 y ( ) Child 6-12 y
( ) Pregnant ( ) Lactating ( ) Non-pregnant/lactating adult

Self-identification: Indigenous:_____ Other _____ (specify)

Today's Date _____ (day/month/year)

Day Recalled_____ (day/month/year)

Was yesterday a "usual" day?: ( ) Yes ( ) No ( ) Sick ( ) Other (specify): _____

Do you take any vitamin/mineral supplements?: ( ) No ( ) Yes
If yes, please specify: Brand name: _____ Frequency of intake: _____

Continued...

Interviewer, please read to the respondent:
Please, recall as exactly as possible what you ate yesterday, _____ (write which day of the week), from the time you first woke up.

Time of day	Name of food	Ingredients	Cooking method	Food source (purchased, gathered, produced)	Quantity consumed	Food code	Weight for coding (g)	Comments

Interviewer, did you remember to check about: lard, butter, salad dressing, the milk/creamer/sugar in the beverages, any juice, alcohol, jam/honey…? Any snacks, beverages, or foods consumed outside the home? **(Modify to fit your local food situation)**

FORM 4.7

Physical Health Questionnaire for Children 0-12 Years Old

1. Child's name:_____ Gender: ( ) Male ( ) Female Age: _____

2. Mother's name: _____ No. _____
   Date of interview: _____ (day/month/year)

3. Birth date: _____ Source: ( ) Memory ( ) Birth certificate ( ) Don't know
   (day/month/year)

4. Weight: ____ kg (Mother + child ____kg – Mother ____kg)

5. Height/length: _____ cm

6. Has child ever had trouble seeing clearly when the light is dim?
   ( ) No, never ( ) Yes, but is now OK ( ) Yes, currently ( ) Don't know

7. Did mother ever have trouble seeing clearly when the light was dim when pregnant with this child?
   ( ) No, never ( ) Yes ( ) Don't know

8. Clinical signs:

Physical exam	Normal	Abnormal
General physical health (PEM)		( ) Overweight ( ) Underweight
Hair (PEM)		( ) Dry, thin, falls out easily
Bottom eyelid (Fe)		( ) Pale
Mouth (vit B_2)		( ) Wounds on sides of mouth ( ) Scars on sides of mouth
(For child 2-6 y only) In the past month, have you noticed any bleeding during tooth brushing?		( ) Yes ( ) Don't know
Other (specify): _____		

Nutritional status (Anthropometry) W/A:_____ H/A: _____ W/H: _____

FORM 4.8

KEY MICRONUTRIENT-RICH FOOD FREQUENCY FOR INFANTS, CHILDREN AND MOTHERS

Respondent No.: _____ Date: _____ Interviewer:_____

Name of Child: _____ Child's Age: _____ Gender: ( ) Male ( ) Female
.....or.....

Name of Woman of Reproductive Age:_____
(circle one) : Lactating Pregnant Neither

Season of interview: _____

Name of Traditional Food	Frequency of intake (state times per day, week or month)	Usual serving size	Rank *		
			Vit A	Iron	Vit C
1.					
2.					
3.					
4.					
5.					
6.					
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STEP 5. PLAN FOR FOOD-BASED INTERVENTION TO IMPROVE COMMUNITY NUTRITION/HEALTH STATUS

INTRODUCTION

The overall aim of this procedure is to generate knowledge about indigenous food systems that can be useful for micronutrient interventions. In step 5, the knowledge that has been accumulated will be reviewed and synthesized in order to assist planning for a food-based intervention to improve community micronutrient status. This information might be applied in the studied populations or in other culturally similar communities.

In Step 5, guidelines are given for: review of food and food use data, how to consider environmental advantages and constraints of key micronutrient-rich foods in the community; presenting the need for an intervention to the community; working with them to develop and implement an intervention; and measuring outcomes of the intervention.

Review food and food use data

Review of data gathered from each of the steps in the procedure should be conducted with the entire research team, including the designated members of the community of Indigenous People that is under consideration. Data from each of the steps should be reviewed for relevance and "common sense reality check." to the current community circumstances. This can be done in a one-half to one-day workshop with team members.

Especially important is for the group to consider each of the foods in the short-list of micronutrient rich foods and its likely potential for improving community nutritional status. Once likely foods are identified, a review of environmental advantages and constraints for use of the food should be undertaken.

Considering environmental advantages and constraints to use of key micronutrient rich foods.

For this exercise, initial discussion must be held with the team member responsible for understanding the environment in which the community is situated, and who knows the most about the presence of each of the short-list of micronutrient-rich foods. Key members of the community are interviewed for their perceptions of how each food may be optimized in the existing environmental circumstances. Following key-informant interviews, a focus group of community members, including elders, should be held to consider each of the foods on the short list.

Form 5.1 is for recording a summary of environmental constraints and advantages of each of the short-list of micronutrient-rich foods, and for reaching a judgment on whether or not it is feasible to further pursue

Karen results return workshop; studying the results; Arctic workshop; Bhil community meeting; focus group; DDS women.

improving the availability of each food. This information is key for consideration of the local circumstances, and is important before approaching a general community meeting. Other experts who may advise on how to improve availability of micronutrient-rich foods should also be consulted.

The community presentation

Based on the knowledge gained thus far, case study teams should have quite good understanding about the target populations. They should have information on -- the food system, environmental, psychological, economic, political and cultural factors that support and reinforce and/or constrain and prohibit the considered change for micronutrient improvement in the community.

This information can be organized and reported back to the community by focusing on certain specific questions. For example: What are the key issues regarding their food and nutrition practices, particularly for micronutrient nutrition? Who are the most important participants in the development process? What are the roles of those who are important to them? How do they perceive the micronutrient problem? What are the issues regarding micronutrient-rich foods? and What are the other issues necessary to support micronutrient improvement in this community? The team can prepare this presentation so that it is easy for the community to understand.

Advice should be sought from project team members who are actually part of the community how to approach and conduct the presentation session. During this session, the team should allow adequate time for the community leaders and other key members to confirm accurate interpretation of the session, to ask questions, and to make any comments they may have. Then the team can discuss with the community leaders and other members whether they think a food-based intervention to improve micronutrient status is desirable for their community. It is most important that the community themselves express the desire for an intervention.

Working with the community to reach a decision on the target group segmentation

Different influential groups have different motivations, even with respect to a similar issue, and they therefore should be addressed differently in order to obtain successful results. Also, it is necessary to consider possible constraints for each context before deciding which groups and what expected outcomes to be included in the food-based intervention plan. All people receive similar information, but different groups will provide various kinds of leadership to implement the intervention.

The ***First group*** usually includes those individuals whose development is directly affected by micronutrient status, i.e. mothers and children. For this group, expected outcomes are changes in food knowledge, attitudes and behavior necessary to improve micronutrient

status.

The ***Second group*** consists of other important individuals (i.e. women of reproductive age, elderly women, traditional midwives, fathers and community health volunteers) whose support is crucial for the development needed in the first target group. For this group, expected outcomes are, for instance, changes in knowledge and attitudes necessary for future practices or for them to be able to support the first target group.

The ***Third group*** is the necessary community supporters (i.e. religious or spiritual leaders, community leaders, school headmasters, local officers, etc.). Expected outcomes are their advice and encouragement on how to best implement development activities.

The ***Fourth group*** includes High-level government officers, local politicians, business men or women, etc. It is important to keep them informed, because their approval and support of the development activities are essential for an effective intervention.

Based on available time and resources, a decision can be made which groups are to be included in each stage of the intervention process, and with what outcomes. Case study teams should be prepared to assist community members to reach good knowledge-based decisions. It is thus obvious that the entire community must be involved at some level to implement a successful intervention.

Working with the community to develop and implement the intervention

Based on the information gathered, it is important to assist the community to identify environmental and personal factors that require development i.e. food sources, peer pressure, family support, health care practices, indifference, fear and personal preference. This information is necessary for the development of a successful intervention strategy. In general, a good strategy means putting more effort on what is likely to create desired development, while being realistic about what can be expected with regard to time and resources available. At this stage, case study teams should discuss with community leaders and other members what activities should be highlighted for initial intervention strategies. Case study teams should give adequate time for community leader to discuss intervention strategies with others who they think important in the future intervention process. Following this, the team can meet again to revise the strategies.

It is usually helpful to give a preliminary test (pilot) to the intervention strategies, since it is often unknown how the community as a whole will react to the development proposal and whether the first target group will be convinced to adopt the development idea(s). After the pilot, case study teams can assist community members to finalize their intervention strategies and develop them further. At this stage, case study teams should give enough time to assist community members with

communication/media development and production.

Before any implementation activities, it is very important to discuss with community members the actual intervention work plan, what mechanism they would take to ensure that planned activities would be carried out accordingly, and how they will monitor the progress of the intervention.

Working with the community to measure outcomes of the intervention

Case study teams should find ways and means to discuss and train community members about intervention evaluations. Both quantitative and qualitative methods should be applied. Quantitative methods can be used to focus on the prediction of change or impact analysis. Qualitative methods can be used to address the dynamics of change or process analysis.

Quantitative research methodology can be applied to assess food knowledge, attitudes and reported behaviors or practices. Nutritional assessment techniques can be used to measure dietary intake and micronutrient status.

To understand more about how and why the intervention works or not, a qualitative research methodology can be used to look at the effect of the intervention process on individual and community changes and development.

Regular process assessment should be conducted for all activities including individual and group interviews, interventions and training/ education components. The aim is to document people, hours and end products of project activities for use in reporting, tabulating summaries and planning future activities. A sample process indicator documentation form is found in Appendix 11.

It is very important for case study teams to assist community members in understanding not only the need for evaluation, but also the results of their intervention efforts. This is not only essential for this actual intervention, but also for sustainability (long term change and good nutritional status at the community level).

For the case studies in this particular project that aspires to develop a method for documenting traditional food systems of Indigenous Peoples (short term), and to show success stories for using this information to improve micronutrient status (medium term), it is critical that all possible efforts are made to carefully document progress and effects of the intervention. This then gives impetus to others to follow this method for using traditional food systems for improving health of Indigenous Peoples.

Step 5 is illustrated in Figure 1.

Figure 1 - Anatomy of a Planning Process for Food-based Intervention to Improve Community Nutrition and Health Status