



USES OF
FOOD CONSUMPTION AND
ANTHROPOMETRIC SURVEYS
IN THE CARIBBEAN

HOW TO
TRANSFORM DATA
INTO
DECISION-MAKING
TOOLS



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FOREWORD

Nutritional well-being is influenced now more than ever by globalization, trade liberalization, urbanization and dietary transition. Collectively, these trends have had a profound influence on diets and nutritional status in many developing countries, particularly the Caribbean, where significant changes in eating habits have emerged over the past few decades. Analysis and further understanding of the impact of these changes on the people of the Caribbean is a very important preliminary step in the development of food and nutrition policies at the national level. Food and nutrition surveys are the primary tools used to analyze and understand dietary changes and nutritional status.

Dietary change in the Caribbean has generally been characterized by less reliance on domestically produced traditional commodities and foods, such as root crops and fruits, and greater reliance on imported commodities, fast foods, animal products and refined carbohydrates. As diets have changed throughout the region, so too has the impact on public health. Dietary patterns throughout the Caribbean are increasingly linked to a higher incidence of non-communicable chronic diseases (NCDs) – strokes, heart disease, diabetes and cancer – and have become a major public health challenge and one of the primary causes of most deaths in the Caribbean today. Understanding the link between diet and health, is now more than ever before, of vital importance to policy makers and researchers.

Policy-makers and planners recognize that food consumption surveys reveal valuable socio-economic information as well as dietary preferences of targeted groups. The purpose of this publication is to help bridge the gap between analyzing survey results and actively developing well coordinated, holistic approaches to formulate food and nutrition policies at the national or regional level. This publication furthers our understanding of how nutritional well-being may be challenged and is changing in the Caribbean. The methodological framework underlying consumption and nutrition surveys and the collection, analysis and use of relevant dietary, anthropometric and food security information, as presented in this publication, builds on the past work and experience of FAO and CFNI.

Overall, the core objectives of both Organizations are the same. We want to help and improve household food and nutrition security through effective decision-making by policy makers and technical staff in government ministries, NGOs and research institutions, public and private. We want to ensure that these policies incorporate the best and most recent information available on the quality and adequacy of the diet of the Caribbean people. We hope that this publication supports national and regional initiatives to improve nutrition well-being in the Caribbean, and that it ultimately contributes to the formulation of an effective and helpful food and nutrition policy ■

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People in the Caribbean have drastically altered their traditional diets in the last few decades and have also adopted a more sedentary lifestyle. These observations are central to the changing disease and health profile in the region.

That food consumption information is vital to planning the future of Caribbean health is no longer in doubt. What is less clear is the strategy needed to transfer the findings from such nutrition surveys into programs and policy action. While many manuals are available on how to conduct food consumption and anthropometric surveys, few discuss at length the critical aspect of how to apply the results to effectively alter the adverse behaviors studied. There is also poor follow-up of the recommended guidelines that emanate from these studies. This book, in presenting the key components of food consumption and anthropometric surveys, importantly examines the extent to which results were applied in the Caribbean.

Research has shown that investments in appropriate food and nutrition programs can substantially improve health, economic growth and development. Decision makers are not generally aware of this knowledge and many well-intentioned programs fall short of the financial and political support required. All too often policy makers look only at the effects of food policy decisions on production, but less on consumption and nutrition. This publication highlights the need to link those decisions to appropriate data from food consumption and nutrition surveys.

How can this link be made? Among the various barriers two major issues emerge. Firstly, there is clearly a lack of connection between those working at the survey level and those working at the macro policy level. Constructive dialogue between these groups needs to be forged. Secondly, research nutritionists are usually trained in a narrow discipline and have little appreciation of politics, while policy makers often have broad political experience but little technical knowledge. Here again dialogue can bridge this gap somewhat. This publication seeks to provide the rationale for such a dialogue by attempting to link disciplines and sectors in the context of programs and food policy analysis.

This document is an expression of the shared commitment of FAO and CFNI to improve the nutritional and health status of people in the Caribbean by (1) demonstrating the potential uses of food consumption and anthropometric surveys and (2) outlining methodologies to obtain information on, and insights into, food and nutrition problems and possible strategies to stimulate actions to combat them. We hope this publication will command the interest and attention of both researchers and planners throughout the region and beyond ■■■

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PREFACE

BACKGROUND

In the last few decades, the eating habits in the Caribbean have been changing. Food consumption habits and food demand and supply patterns have altered significantly since the 1980s. More unbalanced diets containing a smaller range of nutrients are being consumed. In general, these trends have resulted in less reliance on domestically produced commodities and foods such as root crops and fruits that have made up traditional diets, and greater reliance on imported commodities, fast foods, animal products and refined carbohydrates.

This can be seen as a result of increasing urbanization, the economic reforms emerging from structural-adjustment policies and intensifying globalization. For some countries, the impending removal of traditional preferential trade agreements and the opening-up of markets threaten to undermine the domestic agricultural and food sectors.

A consequence of this is that today chronic diseases – strokes, heart disease, diabetes and cancer – are the cause of most deaths in the Caribbean. Since nutrition is the single most important element in preventing and managing these chronic diseases, assessing dietary intake is vital in determining the nutritional risk associated with these diseases. While food balance sheet data can track trends in food availability, the degree and extent of the dietary changes and food consumption patterns at the individual and household levels have not been quantified in the Caribbean.

Food consumption surveys (research into what people eat) can ascertain the characteristics of groups that might be at risk because of inadequate or excessive intake of nutrients. They indicate the dietary changes needed in order to attain the dietary goals for improved health and well-being. Surveys can detect the extent of these nutritional deficiencies and the necessary educational programmes required to address them. Further, these surveys can identify populations at nutritional risk for possible intervention with fortification, supplementation and programmes.

As a result, it is important that comprehensive food consumption and nutrition surveys are carried out throughout the region. These will generate valuable data on the adequacy of food, energy and nutrient intakes and consumption patterns of individuals and households. This information will enable policy makers to understand, quantify and specify the causes of the health and nutrition problems in the Caribbean and as a result guide the design and implementation of specific food and nutrition related intervention programmes.

PURPOSE OF THIS PUBLICATION

This document is a contribution to both the methodological framework underlying consumption and nutrition surveys and the collection, analysis and use of relevant dietary, anthropometric and food security information. In particular, this publication seeks to build on past work and experiences of two organizations that have assisted Caribbean countries in the conduct of

food consumption surveys in the past – the FAO (Food and Agriculture Organization) and CFNI (the Caribbean Food and Nutrition Institute) – by developing an analytical review to inform the planning and use of household consumption and nutrition surveys in the future. We draw on the experiences of Caribbean countries and outline the lessons learned in conducting food consumption and anthropometric surveys and show how the information can be used in a variety of settings.

The general objective is to improve household food security and nutritional status through an understanding of the quality and adequacy of the diet of the Caribbean people and the factors that affect nutritional status and food consumption. The specific objectives are to:

- evaluate and analyse past experiences in planning and implementing food consumption and anthropometric surveys in the region;
- use these experiences in conjunction with current advancements to build demand by decision-makers for such surveys;
- highlight how important these surveys are as analytical tools in food and nutrition policy and programme design, and in the targeting and monitoring of nutritional goals.

WHO IS THIS DOCUMENT TARGETED TO?

The document is targeted to a wide range of users:

- policy-makers and technical staff in government ministries;
- members of NGOs;
- researchers in academic and private institutions.

Here, it is demonstrated to users how food consumption and anthropometric surveys can:

- ascertain the size and nature of groups that might be at risk of inadequate or excessive intake of nutrients;
- show the dietary modifications necessary to achieve the dietary goals for improved health and well-being;
- determine the extent of nutritional deficiencies and indicate the educational programmes required to address them;
- identify populations at nutritional risk for possible intervention with fortification, education and supplemental programmes.

The intention is not to produce a manual on how to conduct these surveys, but to demonstrate how information that is generated from the surveys can contribute to effective decision-making on food and nutrition in the Caribbean. It is anticipated that the document will also support regional initiatives in capacity building, including training ■■■



EXECUTIVE SUMMARY

Food-consumption and anthropometric surveys are much needed analytical tools to assist policy decisions at this juncture of Caribbean reality when chronic nutrition-related diseases are serious public health problems and significant pockets of undernutrition and micro-nutrient deficiencies persist in several countries. Moreover, there is relatively little empirical evidence available on food consumption patterns and specific nutrient intakes and how these relate to the health, nutritional and socio-economic status of individuals and households. The data and information that these surveys provide are critical to any attempt to assess the health and nutritional situation and to formulate policies and implement programmes to address health and nutrition problems. With a view to building demand by decision-makers for such surveys and to promote the application of the data in food and nutrition policy and programme design, targeting, and monitoring of nutritional goals, this document evaluates and analyses past experiences in planning and implementing food consumption and anthropometric surveys in the region. In this regard, the study provides insights into how data from food consumption and anthropometric surveys can be transformed into information critical for effective policy-making and programme interventions. The general objective is to improve household food and nutrition security through an understanding of the quality and adequacy of the diet of the Caribbean people.

Chapters 1 and 2 discuss the uses, scope and objectives of food consumption and anthropometric surveys. They show that consumption survey data can provide information on nutrient intakes and consumption patterns of both individuals and groups in the population. It will be shown that the data can be used for:

- identifying, predicting and detecting chronic or acute food and nutritional problems;
- targeting population groups for short-term relief efforts and longer-term policy and programme development;
- planning and implementing food and nutrition programmes and interventions;
- monitoring changes and evaluating the impact of interventions and programmes.

Likewise, anthropometric surveys can be used for:

- assessing the overall nutritional status of population groups;
- monitoring trends in nutritional status;
- evaluating the impact of changing socio-economic conditions on health and well-being;
- assessing the impact of intervention programmes.

Combining anthropometric data with food consumption data can clarify the nature of food and nutrition problems identified within a population.

Several preconditions are required in the planning and implementation processes of these surveys and the application of the results. These include:

- convening a multisectoral team;
- formulating relevant research questions and priorities;

- ensuring commitment and a sense of ownership by users and funders;
- guaranteeing that the research design is appropriate to the objectives and resource availability.

In addition, sampling, pre-testing and selecting and training survey personnel can affect the quality of the data generated significantly. Experiences from Belize, Cuba and Jamaica are used to demonstrate how the data and information derived from these surveys have been applied successfully to plan, formulate and evaluate domestic food-production and distribution policies, regulate food imports and exports, establish priorities in food and nutrition, enhance overall food security, design food and nutrition educational programmes, and implement dietary guidelines aimed at reducing the risk of disease.

Since diet is multidimensional and is influenced by biological, psychological, social and cultural factors, the diet–disease relationship requires methods that provide adequate specificity for describing food and quantifying nutrient intakes. It also requires methods that will minimize systematic error and provide reasonably accurate estimates of the variability between individuals and/or groups. These issues are examined in Chapter 3, which shows that quantitative and qualitative methodologies can be used to collect data on:

- amounts of various foods consumed by individuals and/or populations;
- the kinds of food consumed;
- food preparation procedures, food preferences;
- cultural influences and attitudes towards foods.

Chapter 3 emphasizes that no single method of dietary assessment is entirely satisfactory: hence, a combination of methods is recommended. Qualitative research enables investigators to better understand underlying beliefs, perceptions and behaviours, thereby providing a meaningful complement to the quantitative approaches.

Chapter 4 focuses on the use and application of findings from anthropometric assessments. Anthropometric studies assist in identifying nutrition problems, such as under-nutrition, and overweight, among individuals and population groups. Anthropometric indicators such as height-for-age, weight-for-age, and weight-for-height can be used to classify population groups by need, thereby guiding the targeting of appropriate interventions and informing decisions on resource allocation. Where interventions are expected to influence nutrition directly or indirectly, anthropometric measures can be used to evaluate the progress and outcome of the intervention. Although anthropometric studies have traditionally been conducted to investigate the relationship between malnutrition and mortality of children, increasingly attention is being directed to the use of anthropometry for assessing overweight, obesity and body fat distribution and the risk of chronic diseases.

Chapter 5 shows how food consumption and anthropometric data can be transformed into useful information: the raw data that are found in food consumption and anthropometric surveys must be packaged and presented so that the information can be used by planners and programme managers. Attention must be given to the choice of indicators, which must be based on the prevailing nutrition problems in the country. These indicators facilitate national and regional planning and monitoring of food and nutrition goals and targets.

Computers and appropriate software are also essential to the task of transforming data. In this regard, Chapter 5 discusses how statistical applications are easily facilitated with computer packages such as SPSS, SAS or STATA. Additionally, it shows how the computer application,

CERES, provides a useful platform for evaluating and processing data from food consumption surveys.

The final chapter, Chapter 6, stresses the importance of food consumption and anthropometric information in decision-making. The chapter highlights the potential policy applications of this information to different sectors of government, NGOs and other stakeholders in the Caribbean, and discusses how the results from food consumption and anthropometric surveys can be applied effectively. Several areas for application – all relevant to current Caribbean reality – are identified:

- assessment of current dietary intake;
- trend analysis in eating patterns;
- development of dietary guidelines;
- assessment of food safety.

The document concludes by identifying several factors that play key roles in enhancing the use and application of survey data. These include:

- the need to demonstrate to policy makers the relevance of the surveys in improving nutrition and health care;
- appropriate rigour in conducting research so that the results are credible and without controversy;
- the need for participation and inputs of policy makers from different sectors throughout the research process;
- the presentation and dissemination of survey recommendations in a timely manner and in ways that policy makers can understand and use effectively ■■■

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1. THE USE OF FOOD CONSUMPTION SURVEYS IN THE CARIBBEAN

This chapter provides an introduction to the many uses of data from food consumption surveys. Experiences from the Caribbean are used to demonstrate how the data and information derived from these surveys have been applied successfully in food and nutrition interventions. The chapter begins with a brief discussion of the food, nutrition and socio-economic conditions of the region as a backdrop to fully appreciate the utility of food consumption surveys in the Caribbean.

BACKGROUND

Over the last thirty years infectious diseases and malnutrition have declined significantly in the Caribbean. On average, prevalence rates of undernutrition have fallen from 50 percent in the 1950s to about 10 percent presently. However, pockets of malnutrition still exist in several countries, and the problem of iron-deficiency anaemia persists among pregnant women and children under five. Concurrent with these shifts has been a rapid increase of nutrition-related chronic diseases in the region.¹ This epidemiological transition has brought into sharp focus the need for a closer analysis of food consumption patterns and their impact on nutrition and health status.

Periodic assessment of the nutritional status of the population can provide essential data to inform decision-making and policy development. While food balance sheet data for the Caribbean² show a trend of increasing availability of food that is high in refined carbohydrates, sugars and fats and (for some countries) relatively low in fruits and vegetables, more detailed information of food consumption patterns are needed in order to develop sufficient food and nutrition and health policies and programmes. Regular assessment of the nutritional status of a country's population provides vital

information that can guide decision-making and policy development. These observations, and others below, provide compelling arguments for the necessity of food consumption surveys in the Caribbean.

THE USES OF FOOD CONSUMPTION SURVEY DATA

Food consumption surveys can be used to obtain different types of information on how and what people eat. They can provide data on the:

- amounts of different foods consumed by individuals and households;
- the nutritional content and quality of diets;
- the socio-economic and demographic characteristics of the population from which the sample is taken.

These data have several distinct but closely interrelated uses:

- facilitating policy and programme development;
- assessing the nutritional status of individuals and households;
- supporting intersectoral coordination;
- enhancing food security;
- food and nutrition surveillance.

Each of these uses is elaborated below.

FACILITATING POLICY AND PROGRAMME DEVELOPMENT

Regular assessment of a population's nutritional status using food consumption data provides vital information for:

- planning, formulating and evaluating domestic food production and distribution policies;
- regulating food imports and exports;
- establishing priorities for food aid;
- enhancing overall food security.

Food consumption surveys can provide detailed information that can facilitate the formulation and implementation of appropriate food and nutrition policies and targeted programmes. Policies are important because they require government concurrence and commitment and outlive specific programmes and projects. Information from food consumption surveys can also be used to design food and nutrition educational programmes and implement dietary guidelines aimed at reducing the risk of nutrition related diseases.

ASSESSING THE NUTRITIONAL STATUS OF INDIVIDUALS AND HOUSEHOLDS

Food consumption survey data can be used to assess the nutritional status of individuals and households by ascertaining existing food consumption patterns, habits, and the adequacy of food, energy and nutrient intakes; the data can then be compared to *desired* food and nutrition goals. This kind of assessment is particularly important for the Caribbean where nutrition-related chronic diseases such as obesity, diabetes, high blood pressure, stroke, heart diseases, and cancer have replaced malnutrition and infectious diseases as major public health problems. This epidemiological transition warrants a closer look at food consumption patterns and their impact on nutrition and health status. While food balance sheet data for the Caribbean provide some insights on macronutrient availability, much more disaggregated food consumption data are required regarding how these macronutrients are allocated among individuals and groups in the society.

SUPPORTING INTERSECTORAL COORDINATION

Governments that take diet-health relationships seriously can make considerable savings in health expenditures. In the past, the issues of health status, food security, diets and agricultural trade have been approached in the region sequentially, and as originating from disparate, unrelated sectors of the economy. This must be corrected in light of the major challenge currently facing Caribbean policy-makers: to improve and maintain the gains made in reducing malnutrition among children while at the same time addressing the rapid increases in nutrition-related chronic diseases.

Data from food consumption surveys (for example, information concerning macronutrient consumption [carbohydrates, protein and fats] or nutrient sources [fruits and vegetables, food from animal sources] etc.) can galvanize support for intersectoral coordination and demonstrate how efforts in different sectors can be linked to address the broad-based, multisectoral food and nutrition problems. Health and nutrition must be an integral part of policies and strategies of several sectors of the economy because there are strong links between and among these sectors, and recognizing and acting upon them can contribute to the enhancement of health status in the Caribbean.^{3, 4}

ENHANCING FOOD SECURITY

Food security is an important goal for Caribbean governments. It includes not only the physical availability of food supplies but also the socio-economic and nutritional aspects of having adequate economic and physical access to safe and nutritious food. Food consumption data can facilitate decision-makers in designing appropriate food-price policies and other instruments that will enhance food security at the individual and household levels, and contribute to improvements in the nutrition and health status of the population. Food security policies and programmes should strive to fulfil population nutrient goals, whereby food and nutrient intakes for the population as a whole will lead to a low risk of inadequacy and a low risk of excess. The determination of food goals needs careful analysis, and must relate to the agricultural and trade policy, and economic opportunities in each specific country.

A major challenge facing the region is one of inadequate access and inadequate consumption, particularly among vulnerable groups. In this context, food consumption survey data provide the level of details for effective targeting of programmes to address food insecurity.

FOOD AND NUTRITION SURVEILLANCE

Food consumption surveys must be part of food and nutrition information systems and should be conducted regularly for effective planning and implementation of

Box 1.1

USES OF FOOD CONSUMPTION AND ANTHROPOMETRIC SURVEYS (BELIZE)

In Belize, food consumption and anthropometric surveys were conducted in 1978, 1992 and 1997. The data were used to formulate national food and nutrition policy, school-feeding programmes and nutrition education in schools. In particular, the data from these surveys were used to:

- identify high-risk populations;
- design targeted intervention programs and nutrition education;
- guide policy development;
- design advocacy campaigns;
- determine breastfeeding and complementary feeding practices;
- assess poverty for national poverty alleviation strategies;
- assess household expenditure and income survey;
- create consumer price lists;
- screen primary school children;
- determine nutritional status in specific regions and guide the development of regional development plans, the national school-feeding programme and local food and nutrition security projects.

Box 1.2

USES OF FOOD CONSUMPTION AND ANTHROPOMETRIC SURVEYS (JAMAICA)

In Jamaica, data on food consumption and anthropometry have been collected since 1988 as part of the *Survey of Living Conditions*. The data are used to design household level social interventions with a nutritional orientation, e.g. food stamps, safety nets, school feeding and other assistance programmes, and to monitor the effectiveness of these and other poverty-alleviation initiatives.

food and nutrition policies and programmes. From this perspective, data generated by these surveys can be used to:

- identify the existence and extent of food and nutrition problems i.e. who are vulnerable to food insecurity, *where* they are situated, *why* they are food insecure and what form of interventions can be made;
- monitor programmes, for example, school-feeding programmes, food coupons, agricultural projects aimed at improving household food security;
- establish and monitor national nutrition goals.

Box 1.3

USES OF FOOD CONSUMPTION AND ANTHROPOMETRIC SURVEYS (CUBA)

The Cuban experience with food consumption and anthropometric surveys could be grouped into three main categories according to their objectives:

- basic research in food and nutrition;
 - nutritional epidemiology;
 - food and nutrition surveillance system.
- The data collected were used to:
- evaluate the dietary intakes over time of cane cutters, fishermen and miners, different groups of farmers, basic industry workers, elderly people, pregnant and lactating women and students;
 - evaluate these dietary intakes in relation to other nutrition and health conditions;
 - assess the adequacy of food intake and make adjustments in recommended dietary allowances;
 - evaluate the strength of association between food consumption and risk factors of diseases;
 - design and implement the Cuban National Food Guidelines;
 - evaluate programmes in food fortification, nutrition education and nutrition interventions;
 - monitor children's day-care centres, primary and secondary school and workers' lunchrooms.

PREVIOUS CARIBBEAN EXPERIENCES

Past experiences in the Caribbean indicate several applications of food consumption surveys and anthropometric information. Food consumption survey

data have been used to identify food and nutrition problems (Belize); to guide policy construction and identify needed legislation (Cuba, Belize); and to select, design and target interventions and evaluate programmes (Jamaica, Belize, Cuba). Boxes 1.1–1.3 provide summaries of the main examples in different Caribbean settings ■



2. OVERVIEW OF FOOD CONSUMPTION AND ANTHROPOMETRIC SURVEYS

In Chapter 2, the purposes of food consumption and anthropometric surveys are outlined. The types and objectives of surveys are discussed and it is shown how they can be used in different ways to assess the nutritional status of individuals and groups. The importance of making surveys appropriate to different needs and explaining the types of information that can be generated by them is then outlined. Finally, the complementary roles of data from anthropometric and food consumption surveys in the assessment of nutritional status is explained.

PURPOSE OF THE SURVEYS

FOOD CONSUMPTION SURVEYS

The purposes of food consumption surveys are:

- to identify, predict and detect chronic or acute food and nutritional problems;
- to target population groups for both short-term relief efforts and longer-term policy and programme development;
- to plan and implement food and nutritional programmes and interventions;
- to monitor changes and evaluate the impact of interventions and programmes.

Box 2.1 outlines the usual information that can be obtained from food consumption surveys.

ANTHROPOMETRIC SURVEYS

The purposes of anthropometric surveys are:

- to characterize overall nutritional status of population groups and variations by demographic and socio-economic characteristics, e.g. age, sex, location, income;
- to monitor trends in nutritional status;

- to evaluate the impact of changing health and socio-economic conditions;
- to assess the impact of intervention programmes;
- to increase awareness of nutritional problems and define appropriate policies and programmes for addressing them.

Whatever the approach used, it is important to determine what additional information will be needed to interpret the anthropometric data. Nutritional status is influenced by a number of factors, such as age, sex, socio-economic status, culture, household food security, dietary patterns, environmental sanitation etc. Many of these factors have been studied in relation to energy-protein malnutrition in the Caribbean and elsewhere. They may also be important determinants of overweight. Substantial evidence also suggests a relationship between behavioural determinants or lifestyle-related factors and the prevalence of overweight.

When combined with dietary assessment information, anthropometric data can help elucidate the nature of food and nutrition problems identified within

Box 2.1

INFORMATION FROM FOOD CONSUMPTION SURVEYS

- Socio-economic and demographic variables classified according to: sex, race, age, ethnicity and geographical location;
- percentage of adequacy for energy and nutrients compared with the recommended dietary goals;
- per capita consumption of basic food groups;
- variations in per capita consumption within the population;
- mean consumption and distribution of energy, proteins, fats, carbohydrates, vitamins and minerals;
- percentage contribution of foods or food groups to energy from proteins, fats, carbohydrates and other nutrients of interest.

a population. For instance, it can guide decisions on whether specific interventions are necessary, the types of intervention and which groups should be targeted. The data can also be used to construct critical indicators in food and nutrition monitoring and surveillance systems, which in turn can provide vital input into policy and programme planning and management.

WHO CAN USE THIS INFORMATION?

The information generated from food consumption and anthropometric surveys can be used in several policy and programme areas – by policy/programme decision-makers, technical staff or researchers in government ministries, training and research institutions, mass media and other private sector organizations. For example, policy-makers in the Ministries of Finance, Planning and Agriculture can use the information:

- to formulate national policies for food and nutrition security;
- to mobilize and advocate for resources for targeted interventions to achieve food and nutrition security and poverty alleviation;
- to evaluate domestic food production and food imports in relation to recommended food goals;
- to evaluate fiscal/trade policies to enhance nutrition and well-being;
- to strengthen intersectoral collaboration;
- to evaluate local production and food distribution systems for increasing diversity of food supply.

Similarly, users in other government ministries, private-sector agencies and civil society will find specific uses for this information. Annex 1 (adapted from the *Guidelines for National FIVIMS*) summarizes the application and use of food consumption and anthropometric survey data and provides a detailed list of potential users and specific uses for information generated.

TYPES OF SURVEYS

Food consumption and anthropometric surveys can be designed in different ways to facilitate differing

requirements. For instance, they can:

- cover a specific geographic area, i.e. national, regional, community;
- collect consumption data, anthropometric data or both;
- be cross-sectional i.e. gathering data over a specified period in a target group, or longitudinal when data are collected from the same target group periodically.

While *anthropometric* data are always collected from individuals, *food consumption* data can be collected at different levels – national, household or individual levels.

NATIONAL DATA

At the national level, data can be obtained from food balance sheets or food disappearance data. The data can be used to:

- provide information on food and macronutrient availability;
- examine trends in food supply;
- formulate and evaluate health and agricultural policies for planning food production and distribution;
- regulate food imports and exports;
- establish priorities for food aid.

They cannot, however be used to identify vulnerable groups in the population or differences in consumption by socio-economic or demographic groups.

HOUSEHOLD DATA

Household level data on food availability can be used to:

- make comparisons between different communities and socio-economic groups;
- look at trends in diet in the population.

However, these data will not provide information on the distribution of foods within the household.

INDIVIDUAL DATA

Data on food and nutrient intake from individuals are collected using a variety of methods.^{1, 2} The main ones are:

- 24-hour recalls;
- food records;
- diet history;
- food frequency questionnaires.

(These methods are discussed in more detail in Chapter 3.)

Box 2.2

TYPES OF INFORMATION USEFUL IN ANTHROPOMETRIC SURVEYS

Undernutrition:

- age, sex;
- mother's educational level;
- household monthly income;
- household size;
- toilet facilities;
- access to potable water;
- dietary intake;
- infectious disease burden;
- infant and child-feeding patterns.

Overnutrition (obesity):

- age, sex, ethnicity/race;
- educational level of respondent or caregiver;
- socio-economic level;
- dietary intake;
- parity (females);
- chronic disease status;
- family history of overweight;
- smoking habits;
- physical activity level;
- alcohol consumption;
- chronic disease history (CVD, diabetes, etc.).

THE IMPORTANCE OF CLARIFYING SURVEY OBJECTIVES

It is important to have a clear definition of survey objectives in order to determine what anthropometric information should be collected. Decisions will have to be made as to which information will be most useful and can be most easily obtained. A list of factors known to be associated with or to modify the effect of the prevalence of undernutrition and overweight is shown in Box 2.2. An analysis of the anthropometric data by these variables will help in the identification of risk factors and the design of appropriate interventions.

The effective use of anthropometry will depend on:

- sampling procedures;
- choosing the most useful measurements for the target group;
- selecting appropriate instruments;
- using accurate techniques in taking the measurements;
- selecting appropriate reference standards with which results can be compared;
- interpreting the findings carefully.

PLANNING SURVEYS

In this section we look at how to *plan* a nutrition survey. We outline the steps needed to plan, implement, analyse and use the results of a food consumption/anthropometric survey in the Caribbean region. (These steps are

summarized diagrammatically in Annex 2.) If these general points are addressed early on, it helps to clarify the full extent of undertaking a survey and enables appropriate planning.*

The Caribbean experience highlights the importance of involving planners, decision-makers and other end users of the data from an early stage and throughout implementation. In most countries where surveys have been conducted, there has been involvement from relevant ministers of government in the early stages of planning the national surveys. Even more involvement throughout the process may be required to increase the impact of survey findings on policy and programme development.

The steps necessary for planning a survey are to:

1. convene a multisectoral team;
2. assess resources;
3. ascertain the budget;
4. select and train high-quality supervisors and field workers.

These shall be examined in more detail below.

1. CONVENE A MULTISECTORAL TEAM

Step 1 is to convene a multisectoral team, which should be made up of both *implementers* and *end users*. This team will in the first instance:

- define objectives, research questions and priority areas with users and funders in mind;

* Annex 3 provides a checklist of important considerations relating to the planning and implementation of surveys.

- determine what information the potential users and funders need;
- make sure that users and funders are committed to the project and feel a sense of ownership;
- consider the social, economic and other consequences of inaction.

Within the team itself, it is useful to identify a smaller core group to undertake specific tasks that will also help to guide the planning of the survey. This may, for instance, include conducting background work (such as literature reviews) or contacting other Caribbean countries that have carried out surveys to find out their experiences and lessons learnt and possibly to utilize their expertise.

2. ASSESS RESOURCES

One important lesson learned in the Caribbean has been that many surveys have been hampered by insufficient resources – both human and financial. Therefore, a thorough assessment of the resources available to support the survey is vital and should be done at a very early stage of planning. The shortage of human resources is particularly critical in the Caribbean and has had an impact on how surveys have been conducted in the past.

Assessing resource availability will help determine what type of survey is realistic – for example, whether it is to be qualitative or quantitative (or both). It will also help to strike a balance between depth and breadth in survey design, i.e. whether a survey is national or regional, the level of detail that can be collected etc.

3. ASCERTAIN THE BUDGET

Development of an adequate budget to support the final survey design is an important ingredient in determining the final outcome of these surveys. Annex 4 sets out some recommendations concerning resource needs for surveys in the Caribbean.

4. SELECT AND TRAIN HIGH-QUALITY SUPERVISORS AND FIELD WORKERS

It is important to allow adequate time to train and observe selected personnel while in the field and to make changes where necessary. Failure to budget sufficient time and resources for recruitment and training

was frequently cited as a problem in the Caribbean. A detailed training manual and an interview manual for data collectors and supervisors should be developed to guide the training (see Box 2.3). (Suggested criteria are set out in Annex 4.)

OTHER ISSUES TO CONSIDER

Other issues that must be considered by the planning team are:

- the study design and research questions;
- sampling strategy;
- obtaining ethical approval;
- designing and pre-testing survey questionnaires;
- pilot-testing all aspects of the project from data collection to data analysis – this will point out any difficulties before the study begins;
- selecting appropriate analysis software in relation to the study objectives and design;
- development of a data analysis plan and a strategy for disseminating findings.

Box 2.3

RECOMMENDATIONS FOR RECRUITMENT AND TRAINING OF FIELD WORKERS AND SUPERVISORS

Experiences from a number of Caribbean countries point to several issues relating to the recruitment and training of survey staff:

- persons not interviewed prior to selection for training – once the study started, it became apparent that there were differing expectations by those recruited and by project staff;
- staff leaving immediately after training;
- trainees recruited without a thorough assessment of their data collection skills in the field;
- training the exact number of persons required and not making allowances for losses due to resignation or exclusion.

Based on these, it is recommended that:

- criteria for recruiting field workers and supervisors should be developed;
- a detailed interview process should be conducted to provide a thorough explanation of exactly what will be required from the project personnel;
- more personnel than required should be trained in order to make allowances for drop-outs;
- careful observation and assessment of field workers' performance should be carried out during the training and pre-testing phases;
- final recruitment of the survey team should be done after the training and field test.

Box 2.4

RECOMMENDATIONS TO
IMPROVE DATA QUALITY AND
RESPONSE RATES

The main problems that were identified from many of the Caribbean countries in carrying out surveys were inadequate supervision in the field and high rates of refusal by subjects from high socio-economic status households.

Recommendations to improve data quality and response rates include:

- ensuring an adequate supervisor:supervisee ratio;
- ensuring that the supervisors understand their role and functions clearly;
- verifying some data by the project supervisor in the field;
- ensuring the development of interviewing skills, especially the importance of carrying out an effective introduction and explanation of the study and the benefits to the community through practical training sessions and field tests;
- having a comprehensive interview guide/survey manual for reference.

Box 2.5

EXAMPLE OF
HIGH RESPONSE RATE AND
HIGH QUALITY OF DATA (GUYANA)

A high response rate was achieved in Guyana's food consumption and anthropometric survey because of careful selection of interviewers; commitment of interviewers; dedication, initiative and management skills of supervisors and management team; an excellent tracking and storage system; and the use of random field checks.

Data quality was high because of:

- time and effort dedicated to questionnaire design;
- detailed training supported by manuals;
- pre-testing – leading to improvements in skills and questionnaire during the pilot phase;
- input of data entry personnel in training, reviewing and simultaneous data entry.

Box 2.6

IMPACT OF
OTHER SURVEYS ON RESPONSE RATE
(BARBADOS)

Barbados carried out a food consumption and anthropometric survey shortly after the national census and there was a lower than expected response rate because many of those sampled thought the food consumption survey workers were from the census bureau.

IMPLEMENTING SURVEYS

The data collection process must be planned carefully: a detailed time line should be developed and the data collection and data entry organized and scheduled before the survey begins (see Boxes 2.4–2.6). Other factors to be considered are:

- avoiding collecting data when other studies are taking place, particularly the census or elections. Holiday seasons and other special occasions such as carnival or festivals should also be avoided;
- the timing and time frame that will be used to collect data;
- recruitment strategy for data entry personnel;
- whether to use separate teams to collect anthropometry and dietary data;
- keeping track of non-respondents and recording reasons for refusal, if given;
- keeping interviewers motivated by providing a reasonable stipend and incentives if possible;
- having regular contact with the interviewers so problems in the field can be addressed quickly;
- inspecting all questionnaires for completion as soon as possible – payments should only be approved for completed questionnaires

3. QUANTITATIVE AND QUALITATIVE APPROACHES TO DIETARY ASSESSMENT

In Chapter 3, both quantitative and qualitative approaches to dietary assessments that are of particular relevance to the Caribbean are described, and their strengths and limitations highlighted. This chapter also discusses how these approaches can be linked in food consumption studies to aid nutrition policy and planning.

Diet is multidimensional and is influenced by biological, psychological, social and cultural factors. Elucidation of diet–disease relationships requires methods that provide adequate specificity for describing food and quantifying nutrient intakes; it also requires methods that minimize systematic error and provide reasonably accurate estimates of the variability between individuals and/or groups.¹

Over the last century attempts have been made to obtain reliable estimates of food and nutrient intakes in order to relate them to the health of individuals and groups.^{2–7} Two distinct methods have been practised: (1) the *quantitative* method and (2) the *qualitative* method. A quantitative survey provides data on the amounts of various foods consumed by individuals and or populations; *qualitative* research provides information on the kind of foods consumed, food preparation procedures, food preferences, cultural influences and attitudes towards foods.^{4, 8} Several reviews of the subject have concluded that no single method of dietary assessment is entirely satisfactory^{2–5, 9} and it is therefore recommended that a combination of both methods based upon the type and purpose of information required is used.

QUANTITATIVE APPROACHES TO DIETARY ASSESSMENT

Data from quantitative surveys can help inform food and nutrition policy options in several ways.

They can show the:

- average consumption of foods and nutrients by socio-economic and demographic groups;
- frequency of consumption of specific foods or food groups;
- adequacy of diet for different population groups;
- diet-disease relationships.

A quantitative approach to dietary assessment can do this by assessing both current and past intake. These methods shall be examined in more detail below (see also Boxes 2.1 and 2.2).

ASSESSING CURRENT INTAKE

Current intake can be assessed using three main methods:

- 24-hour recall;
- estimated food records;
- weighed food records.

24-hour recalls

In a 24-hour recall, the individual is asked to provide estimates of the amount of food and drink they have consumed during the previous 24-hour period. The greatest value of the 24-hour recall method is its ability to estimate nutrient intakes of population groups. This method is used widely to compare nutrient intakes with specific dietary recommendations. Repeated 24-hour recalls are often used as a comparison method to represent usual intake in food frequency questionnaires (FFQ) validity studies.¹⁰ The major limitation of recalls is that they are seldom representative of usual intake.

Estimated food records

An estimated food record is similar to a 24-hour recall: it consists of a detailed description of food and drink consumed over a period (usually three to five days). The advantage of this method is that it provides detailed

dietary intake data that are more representative of usual intake than a single 24-hour recall. The disadvantages are that a high degree of respondent cooperation is necessary, and the act of recording may alter the usual diet.

Weighed food records

The weighed food record or duplicate-food collection method is often regarded as the most precise method for estimating food and/or nutrient intakes of individuals. Here, the amounts of food consumed are actually weighed and recorded so more accurate measurements of actual intake than calculations based on food composition tables can be obtained. Weighed intakes may be used as the comparison method with other dietary methods. The disadvantage of this method, however, is that it is costly in both time and money, and requires highly motivated subjects with high levels of literacy.

ASSESSING PAST INTAKE

Past intake can be assessed using two main methods:

- dietary history;
- food-frequency questionnaires.

Dietary history

The dietary history method estimates usual food intakes of individuals over a relatively long period lasting several weeks or months. The advantage of this method is its ability to detect seasonal changes, obtain data on all nutrients and to correlate well with biochemical measures. However, major limitations are the necessity for a lengthy interview process (and a corresponding respondent burden) and the difficulty and expense of coding the data gathered.

Food-frequency questionnaire (FFQ)

The FFQ is the best available method for conducting studies on diet and disease relationships: it assesses *habitual* dietary intakes. The underlying principle of the food-frequency approach is that the average long-term diet (intake over weeks, months or years) is a more important exposure period than short-term intakes. The benefit of this method is that it can provide more representative information on usual intake than a few days of diet records or recalls. However, the method is

Box 3.1

QUANTITATIVE APPROACHES TO DIETARY ASSESSMENT

Assessing current intake:

- 24-hour recalls;
- estimated food records;
- weighed food records.

Assessing past intake:

- dietary history;
- food-frequency questionnaires (FFQ).

Box 3.2

FINDINGS FROM QUANTITATIVE SURVEYS THAT COULD INFORM FOOD AND NUTRITION POLICY OPTIONS

- Mean consumption of foods and nutrients by socio-economic and demographic groups;
- frequency of consumption of specific foods/good groups;
- diet adequacy of different population groups;
- diet/disease relationships.

limited in that it may not provide details of accurate quantities or portion sizes.

The Caribbean experience has highlighted the need for practical guidance in the development of validated FFQ instruments. Annex 5 provides an overview of the steps necessary to develop a quantitative food-frequency questionnaire, and shows how to collect the information necessary to analyse and assess diet.

QUALITATIVE APPROACHES TO DIETARY ASSESSMENT*

Qualitative research is the examination of people's beliefs, perceptions and behaviours. Initial qualitative data collection can be gathered rapidly, and can therefore provide information that is up to date. The approach can also facilitate inquiry into sensitive issues, which are often difficult to investigate through standard survey methods.

Qualitative research can inform food and nutrition policy options in several ways. They can:

* Annexes 6 and 7 set out further details of some concepts relating to qualitative approaches as well as some guidance on data analysis and reporting of qualitative studies.

Box 3.3

FINDINGS FROM QUALITATIVE SURVEYS THAT CAN INFORM FOOD AND NUTRITION POLICY OPTIONS

- Identification of specific healthy food options for government subsidy and support;
- identification of foods most appropriate for fortification;
- decision whether to tax or forbid imports/sales of 'unhealthy' foods at the national, regional, local or institutional levels;
- information to guide the development and format of food labeling so that it is culturally appropriate and understandable;
- identification of the most inappropriate marketing tactics and effective controls that could be implemented;
- suggestions regarding the format and content of national or regional campaigns to improve diet;
- suggestions regarding alterations to existing food assistance programs and how they are implemented as a way to improve food security – for example, dispersals twice a month rather than once a month.

- identify specific healthy food options for government subsidy and support;
- distinguish foods most suitable for fortification;
- inform decisions on whether to tax or forbid imports or sales of 'unhealthy' foods at the national, regional, local or institutional levels;
- guide the development and format of food labeling so that it is culturally appropriate and understandable;
- pinpoint the most inappropriate marketing tactics and effective controls that could be implemented;
- suggest the format and content of national or regional campaigns to improve diet;
- indicate alterations to existing food assistance programs and how they are implemented as a way to improve food security (e.g. dispersals twice a month rather than once a month).

HOW TO MAKE THE BEST USE OF QUALITATIVE RESEARCH

On their own, qualitative approaches can generate an extremely rich source of evidence and data and as a result make a valuable contribution to the development of nutrition and food policies and interventions (Box 3.3 provides some examples). In addition, qualitative narratives provide an opportunity to address the non-quantifiable features of food consumption studies such

as settings and backgrounds to dietary practices, interesting anecdotes and beliefs about foods as well as the historical evolution of cooking practices.

Qualitative methods can also be used to complement quantitative approaches. They are particularly useful when an investigator knows little about the subject being investigated – for example, a group's perceptions or beliefs regarding certain foods. Qualitative methods also play confirmatory and elucidating roles as well as add depth, substance and meaning to quantitative results.

Complete descriptions of different types of qualitative approaches and how they can be used may be found in Bernard, 2000¹¹ and Weller and Romney, 1988.¹² The following methods are the most commonly used in qualitative research:

- in-depth interviewing;
- direct observation;
- participant observation;
- focus group discussions.

These shall be examined in more detail now.

In-depth interviewing

This is a type of exploratory dialogue between interviewer and informant, where the informant is seen as teaching the interviewer about their cultural setting. This method is useful for identifying actual dietary practices and for delineating facilitators and barriers to recommended practices such as in young child feeding.

Direct observations

The direct observation technique entails the recording of actual behaviour, as opposed to reported or recalled behaviour. This method is particularly useful in documenting food behaviours among various population groups. Direct observations allow investigators to go beyond the selective perceptions of others and experience the setting first hand, thereby allowing for more relevant policies and plans to be designed.

Participant observation

The participant observation method involves the observer residing in the community of interest for an extended period of time and, as the name suggests, participating in local activities. In this way, the investigator learns about the local setting through

extended and informal contact with community members. By becoming part of the group, the investigator is more likely to see events from the perspective of insiders. In addition, by observing operations and activities directly within the setting, researchers gain a better understanding of the context and process of activities.

Behavioural observations are very useful for examining infant and young child-feeding practices.

Focus-group discussions

Focus-group discussions involve using groups and the group processes to generate discussion on a topic of interest. The aim of the discussion is to explore issues rather than to simply describe or explain. This method allows researchers to reach deeper levels of meaning through the use of the respondents' own words and modes of expressions. The process of local people discussing a topic in their own terms with one another will yield insights and permit natural discourse that would not be available using standard one-on-one interviewing.

The method is exceptionally valuable for obtaining information from children and from individuals who are not highly literate. Qualitative approaches have been used in the Caribbean to examine young child-feeding practices. An example is provided in Box 3.4.

KEY APPLICATIONS FOR THE USE OF QUALITATIVE INFORMATION FOR PROGRAMME DEVELOPMENT

Qualitative information can be used for programme development in several ways. It allows identification of:

- significant subgroups within a population to be targeted by programmes;

- key aspects of how people determine what constitutes a meal;
- relevant systems of food classification;
- important food proscriptions and prescriptions;
- priority food handling-related behaviors (positive and negative) for intervention;
- priority feeding behaviors within the household
- other priority behaviors for intervention;
- key foods for intervention;
- cultural metaphors for communication;
- culturally appropriate intervention materials.

HOW QUALITATIVE APPROACHES CAN BE USED TO AID THE UNDERSTANDING OF CULTURAL FACTORS WHICH MAY BE THE DETERMINANTS OF CHRONIC DISEASES IN THE CARIBBEAN

Cultural norms regarding the types of foods eaten, preparation methods used and *when, where* and *how* such foods should be served are crucial in understanding why chronic diseases, for example, exist in certain populations. In Guyana, in collaboration with the Ministry of Health, CFNI conducted a qualitative study of food consumption habits. The study assisted in identifying key cultural norms associated with food preparation and consumption. Some of the key questions this qualitative survey asked were:

- What are local meal patterns and food preferences?
- What are local norms relating to eating style? For instance, are family members encouraged to finish all the food on their plates?
- How are "favorite" foods prepared and served?
- What are local perceptions of preferred body size? What value is placed on fatness?

Box 3.4

USE OF QUALITATIVE APPROACHES IN EXAMINING YOUNG CHILD-FEEDING PRACTICES IN THE CARIBBEAN

In the 1990s, as part of the process to revise the Caribbean young child-feeding guidelines CFNI conducted a series of qualitative studies, using focus group discussions, on young child feeding practices in selected Caribbean countries. The objectives were to examine feeding schedules, identify the types of foods given at different ages by socio-economic groups and the attitudes to the

current guidelines. The findings of these studies were valuable in:

- updating the knowledge base on young child feeding practices;
- identifying areas of the guidelines in need of revision;
- suggesting possible promotion strategies for the new guidelines.

Box 3.5

USES OF QUALITATIVE RESULTS IN INSTRUMENT DEVELOPMENT FOR QUANTITATIVE SURVEYS

- Help decide what the main nutritional/dietary issues are in a particular setting;
- select the most appropriate dietary assessment instrument for the task;
- select appropriate tools for estimation of portion size.
- help decide who will be the best proxy reporters for the diets of individuals who cannot provide their own report (e.g., small children);
- select foods for inclusion on food frequencies and infant diet histories;
- select appropriate wording (labels) for foods on a food frequency;
- decide on appropriate frequency categories for a food frequency instrument;
- decide on appropriate probing questions for 24-hour recalls;
- design additional survey questions which assess impact of a nutrition intervention programme on cognitive and behavioural factors;
- develop questions for structured surveys;
- aid in the interpretation of quantitative findings.

The study also provided information on commonly eaten foods by ethnic and socio-economic groups and commonly used household measures. These helped guide the development of the data collection instrument for the quantitative phase of the study (see Box 3.5 for further examples). Findings from the survey were also used in the development of food-based dietary guidelines and in designing a pilot community education programme.

COMBINING QUALITATIVE AND QUANTITATIVE APPROCHES IN FOOD CONSUMPTION STUDIES

Ideally, a complete food consumption study will integrate both quantitative and qualitative approaches in order to achieve convergence of results. Qualitative methods will provide context to the quantitative findings and ground them in a specific cultural context, and in this way provide a much broader and deeper analytical and interpretative framework than could be

Box 3.6

USING QUALITATIVE AND QUANTITATIVE METHODS TO ASSESS YOUNG CHILD- FEEDING PATTERNS (JAMAICA)

In 2002–3 CFNI/PAHO undertook a study in Jamaica aimed at:

- documenting complementary feeding practices of infants and young children and typical weaning foods used through quantitative and qualitative methods;
- linking the information above with data from household food purchasing patterns and expenditures;
- collecting information on the availability and price of complementary foods in the commercial market.

A number of qualitative methods were used including semi-structured interviews and opportunistic observations. These were complemented with 24-hour recalls, anthropometric assessment, and market and household food purchase surveys. Results of the study provided the guidelines, procedures and tools to plan intervention programmes for young child feeding.

obtained from either of the two methods being used independently.²

Combining the approaches allows “facilitation”, in which one approach facilitates or “assists” the other.¹³ For example, results from qualitative studies are valuable for improving the quality of quantitative studies by identifying hypotheses that might be tested as well as to inform and improve the quality of the data collection instrument intended to assess dietary intake. Boxes 3.6 and 3.7 provide details.

The implications of results of quantitative studies and their policy relevancy may be analysed using qualitative approaches. This is especially relevant for the development of programmes to improve diet and nutritional status among sub-population groups. Qualitative results help assist the instrument development for quantitative surveys in a variety of ways. They help:

- ascertain what the main nutritional/dietary issues are in a particular setting;
- select the most appropriate dietary assessment instrument for the task;
- choose appropriate tools for estimating portion size;
- decide the most suitable proxy reporters for the diets of individuals who cannot provide their own report (e.g., small children);

Box 3.7

EXAMINING GENDER DIFFERENCES IN DIET AND EXERCISE BEHAVIOUR IN THE CARIBBEAN

In 2002, CFNI/PAHO undertook a study in four Caribbean countries to:

- assess and compare the various stages of readiness of male and female adults for increasing intakes of fruits and vegetables and for adopting regular physical activity;
- examine the relationship between stage of change for fruit and vegetable consumption and psychosocial factors (self-efficacy, pros and cons for changing and social support) for obese and non-obese adults;
- examine the relationship between stage of change for adopting regular physical activity with psychosocial factors for obese and non-obese adults;
- examine the influence of the media on perceptions and attitudes regarding purchasing and consumption habits and activity level.

Both qualitative and quantitative research methods were used in fulfilling the objectives of the study. Data were gathered in two phases: Phase 1 – focus group studies (qualitative) and Phase 2 – cross sectional survey (quantitative). While the qualitative results provided guidance in the further development of the quantitative questionnaire, they were also used in the general analysis combining both types of information in reaching conclusions about readiness to change behaviours regarding the consumption of fruits and vegetables and participating in exercise. Specifically, barriers to and triggers for changing behaviour were identified and explained.

- select foods for inclusion on food-frequency questionnaires and infant-diet histories;
- pick appropriate wording (labels) for foods on a food frequency questionnaire;
- ascertain the appropriate frequency categories for a food frequency instrument;
- decide on appropriate probing questions for 24-hour recalls;
- design additional survey questions that can assess the impact of a nutrition-intervention programme on cognitive and behavioural factors;
- develop questions for structured surveys;
- aid in the interpretation of quantitative findings

4. ANTHROPOMETRY FOR POLICY AND PLANNING

Anthropometry is the study and technique of taking body measurements. It is used widely to measure the nutritional status of individuals or populations.

This chapter outlines how anthropometric research can be used for assessing nutrition problems, examines key considerations in anthropometric assessments and presents several applications of anthropometry in reducing risks in different population groups.

USES OF ANTHROPOMETRY

Anthropometric assessments are useful because they provide a simple and practical way of describing the overall nutritional status of the population groups. Their usefulness stems from anthropometry's close correlation with the multiple dimensions of individual health and development and their socio-economic and environmental determinants.¹ Information on energy and nutrient intakes from food consumption studies will help in the aetiologic interpretation of deviant anthropometry and the planning of appropriate dietary interventions for targeted groups.

Anthropometric studies can help identify nutritional problems such as undernutrition and overnutrition and pinpoint groups with specific nutritional and health needs to be addressed in policy development and programming.² Anthropometric indicators can define the extent of the problems and can be used as one criterion in ranking areas and population groups by need, in this way allowing the targeting of appropriate interventions and informing decisions on resource allocation.¹ Where interventions are expected to influence nutrition directly or indirectly, anthropometric measures may be used to evaluate progress and the outcome of an intervention.

The application of anthropometric measurements in the assessment of child growth, and investigations of

the relation between malnutrition and mortality are well documented.^{1,3,4} Increasingly, attention is being directed to the use of anthropometry in the assessment of overweight, obesity and body fat distribution and the risk of chronic diseases.⁵

While anthropometry measures may help to indicate the existence and extent of nutritional problems, and also serve as markers of risk of ill-health, the information does not, by itself, identify specific causes of nutritional problems or the underlying factors that explain the association between anthropometric status and subsequent risk of morbidity and mortality.¹ This is the major limitation of anthropometry as changes in body measurements may be sensitive to several factors including energy and nutrient intakes, infection, activity levels, altitude, stress and genetic background.⁶ The findings of anthropometric studies, however, can help to increase awareness of nutrition problems and can provide useful starting points for the investigation of these problems. Repeated surveys using similar statistically selected representative samples can be used to assess trends over time and the relationship of such trends to socio-economic conditions and dietary and other lifestyle habits.¹

KEY CONSIDERATIONS IN ANTHROPOMETRIC ASSESSMENTS

CUT-OFF POINTS FOR INDICATORS

Anthropometric indices are essential for the interpretation of measurements: a value for body weight alone has no meaning unless it is related to an individual's age or height.⁷ The indices are derived through combinations of measurements. For example, measurements of weight and height may be combined to produce the body mass index (BMI) (weight/height²)

or weight may be related to height through the use of reference data.

An indicator is often derived from indices, with the imposition of a cut-off point to estimate population prevalence.¹ Cut-off points can also be used to characterize changes and trends within the population and identify persons at higher risk of adverse outcomes.

STUDY DESIGN AND SCOPE

The study design selected – including the question of who should be measured and the type of anthropometric indicator – will depend on the purpose of the survey and the type of information required for planning. In anthropometric assessments of populations, sampling should be on a representative basis, particularly when the findings will be used to determine the extent and severity of problems of public health significance, targeting of interventions, and estimating the degree of coverage (percentage of intended beneficiaries being covered) of interventions.¹ In certain circumstances, a sample of convenience may prove adequate. For instance, in most Caribbean countries, primary-school attendance is high and an anthropometric study of all school entrants may be representative of this target group.

In children, causes and correlates of deviant anthropometry are age dependent; therefore the selection and interpretation of indicators also depends on age.¹ For example, up to the 1990s in the Caribbean, when the primary focus of nutrition studies was on protein-energy malnutrition and mortality risk of young children, the age group of priority was from birth to two years, and most interventions were targeted at mothers, infants and young children. More recently however, this focus has shifted and increased attention is given to estimating the prevalence of obesity in all groups, especially adults, and the development of preventive strategies.⁸

QUALITY CONTROL

If survey findings are to lead to effective decision-making on policy and programme development, they should be based on the correct interpretation of anthropometric indicators and also on high-quality anthropometric data. This is where quality control is essential: taking accurate anthropometric measurements

is a skill requiring specific training. There are a number of useful references with detailed information on the planning of anthropometric studies including the correct techniques in measurement, and the training and supervisory procedures required for quality control in the field.^{9, 10}

APPLICATIONS OF ANTHROPOMETRY IN REDUCING NUTRITIONAL RISKS AT DIFFERENT STAGES OF THE LIFE CYCLE

BIRTH WEIGHT

Anthropometric studies can be applied to reduce nutritional risks at different stages of the life cycle. For example, birth weight influences anthropometric status in early childhood. Low birth weight (defined as birth weight less than 2500 g) is associated with a range of both short- and long-term adverse consequences.¹¹ The aetiology of low birth weight is complex but poor nutrition both before and during pregnancy is recognized as an important contributory cause, especially in developing countries. Most of this evidence was based on pre-pregnancy nutritional status assessed by using anthropometric criteria and the adequacy of dietary intakes during pregnancy.¹¹ Pre-pregnancy weight and gestational weight gain are considered useful predictors of risk of low birth weight.¹²

INFANCY AND EARLY CHILDHOOD

Infants and pre-schoolchildren represent the most nutritionally vulnerable group. It is universally accepted that anthropometry is the most useful tool for assessing the nutrition status, and risks of poor health and survival of these groups. A combination of inadequate dietary intakes and infections are major contributory factors to impaired physical growth and mental development.¹³ Growth retardation in early childhood is linked to socio-economic conditions and living standards. Assessing growth, using anthropometric measures, not only serves as a means of evaluating the health and nutritional status of children but is also regarded as a sensitive indicator of differences in overall socio-economic development at a population level.¹⁴

Three anthropometric indices are commonly used to assess infants and children: length-for-age (or height-for-age), weight-for-age, and weight-for-length (or weight-for-height).^{1, 7} These have biological interpretations which may change with age. It is recommended that anthropometric measurements made in studying populations should be reported in relation to international standards; the reference standards developed by the US NCHS are recommended for international use by the WHO.* Secondly, the measurements should be related to the reference population by standard deviation scores (Z-scores). Children with a Z-score below -2SD are considered moderately or severely malnourished, irrespective of the indicator used.⁷

Stunting, which is a low length or height-for-age index, is usually an indication of long term malnutrition. Stunted growth reflects a process of failure to reach linear growth potential as a result of suboptimal health and/or nutritional conditions.⁷ On a population basis, high levels of stunting are associated with poor overall economic conditions and increased risk of frequent and early exposure to adverse conditions such as illness and/or inappropriate feeding practice. Similarly, decreases in stunting rates are usually indicative of improvements in socio-economic conditions. At the population level, weight-for-height and height-for-age may be useful for identifying sub groups with a high prevalence of wasting or stunting for directing resources to resolve the problems. In evaluating the effectiveness of interventions, it is usually better to use stunting rates of children less than two years of age because the effects of the long-term adverse conditions may not be reversible in older children.¹⁰ High height-for-age has little public health significance.

Children with a low weight-for-age index are described as being underweight. The index is influenced by the height and weight of a child and is thus a composite of stunting and wasting, making interpretation of this indicator difficult.^{7, 15} The index can be used to assess changes in the magnitude of malnutrition over time but will have limited usefulness in

* A revised growth reference, based on a multicentre, international growth study is being prepared by WHO.

Box 4.1

ADDRESSING
PROTEIN-ENERGY MALNUTRITION
IN BARBADOS IN THE 1960S

The analysis of anthropometric data showed a pattern of high levels of malnutrition especially in children less than two years. Based on these findings a number of policy and programme changes were made. For example:

- formation of a National Nutrition Committee aimed at improving the nutritional status of children;
- implementation of a Nutrition Intervention Project which included:
 - study of feeding practices of children under two
 - implementation of an integrated hospital and community programme which involved follow-up visits after discharge and a programme aimed at the prevention and management of malnutrition in the community;
- based on the success of the nutrition intervention the National Nutrition Centre was established in the early 1970s.

decisions on the type of interventions required in specific settings. High weight-for-age is seldom used for public health purposes because other indicators, such as high weight-for-height are more useful in the evaluation of overweight as a proxy for obesity.⁷

Low weight-for-height helps to identify children suffering from current or acute undernutrition or wasting.⁷ This condition reflects a recent and severe process that has produced a substantial weight loss, usually as a consequence of acute shortage of food and/or severe illness. Chronic dietary deficit or disease can also lead to wasting. The index is appropriate for examining short-term effects such as seasonal changes in food supply or short-term nutritional stress brought about by illness.¹⁰ A high weight-for-height is considered an adequate indicator of obesity in young children on a population level. ⁷

Anthropometric studies conducted in the English-speaking countries of the Caribbean during the last thirty years have documented the substantial reduction in childhood malnutrition.¹⁶ Reports in the early 1960s established malnutrition as one of the two major causes of infant and child mortalities at that time. Later findings from anthropometric studies confirmed the magnitude of the problem, and led to the implementation of interventions to improve child health and survival. These included:

- the improvement in the distribution of health care, particularly the strengthening of primary-care services;
- the introduction of growth monitoring/promotion activities at child health clinics;
- the provision of supplementary food for malnourished or at-risk children;
- improving formal and informal educational opportunities.¹⁶

The Barbadian experience in combating childhood undernutrition is described in Box 4.1.¹⁷ Findings from national anthropometric surveys helped in problem identification and led to the design and implementation of interventions for improving child health and nutrition.

SCHOOL-AGED AND ADOLESCENCE

The physical growth of schoolchildren aged six to nine years is the result of the interaction between environmental and genetic factors.³ The risk of undernutrition still exists where adverse environmental conditions are experienced before puberty. In countries undergoing a nutrition transition, the level of overweight and obesity is increasing in children and adults.¹⁸

The anthropometric indices used for pre school children can also be applied to school-aged children and adolescents. An accurate interpretation of anthropometric indices in adolescents is difficult because of the variability in patterns of growth and maturation. During adolescence, hormonal changes accelerate growth in height and as a result nutrient requirements are increased significantly above those in the childhood years.³ The body mass index (BMI) is recommended as the basis for anthropometric indicators of thinness (<5th percentile NCHS/WHO BMI for age) and overweight (> 85th percentile).³

Height census data of schoolchildren have been used for planning, evaluation and advocacy in Central America. Trend data for Costa Rica showed a decline in stunting rates from 1979 to 1997, indicating a sustained improvement in the quality of life.¹⁹ A food and nutrition security policy that was developed during this period included targeted interventions to disadvantaged groups. In Belize, the height census revealed that stunting was more than three times more prevalent in rural areas than in urban areas.¹⁹ This information led to the implementation of community-level interventions for

Box 4.2

CARIBBEAN COOPERATION IN HEALTH

Regional health agencies have used the data on the increasing trends in obesity to advocate for the inclusion of food and nutrition issues as a priority area on the regional health agenda. When the first and second phases of the Caribbean Cooperation in Health Initiative were being developed, these data played a large part in convincing Ministers of Health and other policy-makers to include food and nutrition as one of the regional health priorities. As a follow-up to this, CFNI was mandated to develop a strategic plan to combat obesity in the region.

Box 4.3

PROJECT LIFESTYLE: DEVELOPING POSITIVE HEALTHY LIFESTYLES FOR SCHOOLCHILDREN

Project Lifestyle developed an intervention methodology for promoting healthy lifestyles in schoolchildren in Antigua as a long-term preventive strategy for reducing overweight and obesity. The objective of the project was to develop positive habits gradually, sequentially and systematically from Grades 1 to 12 throughout the school system. The four health habits addressed included: weighing right; eating right; doing daily physical exercise; having a positive self-image.

improving nutrition and food security. Weight-for-height data, which are more useful for programme monitoring in the short term, were used in the evaluation of the adequacy and impact of the provision of free school meals in Trinidad & Tobago.²⁰ The findings indicated that while there was some targeting of children with less favourable social and nutritional status, there was a need for increased coverage and more stringent targeting to increase programme efficiency.²⁰

Anthropometric data from the Caribbean have highlighted the emergence of overweight and obesity in children and adolescents.^{21, 22} The reasons for the increase are not fully understood but appear to be related to sociocultural factors and changes in lifestyle practices. A comparison of actual body size, as measured by anthropometry, with perceptions of body image among adolescents in Trinidad was useful in identifying attitudinal patterns, which must be taken into account in the development of preventive strategies for combating the problems of overnutrition.²²

ADULTHOOD

Body mass index (BMI) is also commonly used to classify underweight, overweight and obesity in adults. The cut-off for undernutrition or thinness is 18.5, and that for overweight is 25.0 (see indicators in Chapter 5).³ The waist-hip ratio (WHR) is used to identify individuals at increased risk from obesity-related illnesses due to abdominal fat accumulation. It is now suggested that waist circumference (WC) alone may provide a more practical correlate of abdominal fat distribution and associated ill-health.²³ Age-specific prevalences of high WC or BMI in a population can be used to assess the overall health burden associated with obesity.⁵

Although anthropometric assessment techniques and cut-offs for elderly people do not differ from those used in adults, height measurements can be problematic. The interpretation of anthropometric

indicators as predictors of risk may also differ with increasing age.³

The increasing prevalence of obesity in adults in the English-speaking Caribbean countries, as revealed by BMI-based classifications from anthropometric studies, has led to an increased awareness of its importance as a major public health problem in the region.²⁴ The problem has been recognized by national governments and efforts to address it are being pursued at a national and regional level.²⁵

Information on key social and behavioural determinants of high BMIs point to the need for a multisectoral approach in the development of appropriate public health interventions. One such intervention (described in Box 4.3) is targeted at school-aged children and seeks to promote positive lifelong habits of dietary and physical activity patterns.²⁶ ■



5. TRANSFORMING FOOD CONSUMPTION AND ANTHROPOMETRIC DATA INTO INFORMATION

Raw data that are generated in surveys are of little use unless they are packaged and presented as information that can be understood and used by planners and programme-managers. Choosing the appropriate indicators and summary statistics to capture the information contained in the data is vital in this process. It is these issues that are discussed in Chapter 5.

Based on the Caribbean experiences in the conduct of other surveys/projects, data analysis has received little attention at the planning stages of the project. This has resulted in inappropriate analysis and restricted use of the information for policy development and programme-planning. It is vital, therefore, that all the steps of data analyses are thought out, planned and budgeted for during the planning stages of the survey

Integral to the plans are the individuals who perform the tasks – statistician, software specialist, food consumption specialist, and data entry clerks. Appropriate food composition tables and computer analysis software are also critical elements in transforming food consumption and anthropometric data into information on nutrient intake that can be used in programme and policy development.

THE ROLE OF FOOD COMPOSITION TABLES IN TRANSFORMING DATA

food composition tables (FCT) are databases containing a list of foods with their respective amounts of energy, nutrients and other substances (usually expressed per 100 grams of edible portion). Most methods for evaluating food consumption use FCT to estimate the energy and nutrient content of each food reported by subjects. The dietary variables contained in the FCT should provide information about foods and nutrients that are relevant to the objectives of the particular

survey. Survey personnel must also know if each food item in the FCT is raw or cooked, and if cooked, the method of preparation. This is crucial as incorrect classification can lead to under- and over-estimations of nutrients.*

COMPUTER APPLICATIONS FOR ANALYSIS OF FOOD CONSUMPTION DATA

Computer software for nutrient calculation should be selected according to the objectives of the survey and the availability of local resources such as trained personnel and appropriate hardware. These latter resources are very important in the Caribbean context where there is a shortage of trained personnel and equipment. There are several types of computer software available for data entry and analysis of food consumption data. Choosing the appropriate software requires careful consideration. This is because food consumption studies often contain different types of data for analyses and as a result require different types of software.

On the one hand, non-nutrient data from the questionnaires – such as demographic details, household-purchasing practices, perceptions of consumption of various food items, food-preparation practices, risk factors associated with health and nutrition, food practices, etc. – are usually entered using one of the general statistical applications widely available, for example, SPSS, SAS or STATA.

On the other hand, another type of software is needed for analysis of nutrient or dietary variables. For

* CFNI has compiled food composition tables for use in the English-Speaking Caribbean. In addition a food composition data base of commonly eaten Caribbean foods is being developed on an ongoing basis as part of process of planning and implementing food consumption surveys in the region.

example, energy, protein, Vitamin C, iron, foods and their amounts consumed by the individuals must be entered in software that is capable of processing this type of data. Extensive information about computer applications for nutrient computation and food consumption data analysis can be found at The Nutrient Databank Directory¹⁻⁹ and at the Food and Nutrition Information Center (FNIC) of the United State's Department of Agriculture's National Agricultural Library. Box 5.1 describes the software CERES, developed jointly by FAO and Institute of Nutrition and Food Hygiene of Cuba .

DATA, INDICATORS AND INFORMATION FOR PLANNING

Trends in dietary habits are influenced profoundly by the current expansion of global food trade. Whether this will bring positive or negative nutritional outcomes will depend on whether the relevant sectors within countries will be able to utilize opportunities to exploit the liberalization process. Governments and planners must therefore be aware of groups at risk of deprivation, such as vulnerable groups in the population, so as to implement and appropriately manage the country's social security and nutrition programmes. (Boxes 5.2 and 5.3 provide examples of how data collected from food consumption and anthropometric surveys were used in this regard for Barbados and Guyana.)

Information garnered from food consumption surveys are essential for generating information about a country's food and nutrition situation. By using the data collected in a survey, various indicators may be derived. Selection of indicators is usually based on the prevailing nutrition problems in the country. In addition, data can be used in order to present a picture of the population at risk of a particular threat related to nutrition.

In deciding how to transform the data into information, characteristics and current trends in food acquisition, availability, and nutritional status may be considered. In the Caribbean over the past few decades, there has been a gradual change in the prevailing nutritional problems – from undernutrition affecting mainly young children to overweight which is prevalent among both the young and the old. Associated with the increased prevalence of overweight there has been an increase in the chronic nutrition-related diseases such as: hypertension, diabetes, heart disease and some

Box 5.1

CERES SOFTWARE

The computer application, CERES, developed by the Institute of Nutrition and Food Hygiene of Cuba and the FAO has a fundamental objective of evaluating and processing data from food consumption surveys. The development of the application is based on the experiences gained while using other applications and trying to overcome the limitations and constraints identified. Up to this point, training courses in the use of CERES have been conducted in Cuba, Mexico, Colombia, Venezuela, Peru, Panama, Barbados, Jamaica, Guyana and Holland.

General description

CERES performs calculations for various kinds of food consumption surveys: individual, family, and individual-family level surveys by 24-hour recall, daily record, and direct weighing of foods, semi-quantitative food frequency at the individual level and food access and family consumption surveys. There is also an option for the estimation of nutrient contents and price of a food basket.

The software offers maximum flexibility because it uses several kinds of reference values (i.e. food composition tables and recommended daily allowances) and the structure, components and dietary variables included as reference values are freely defined by the user. Data entry is performed using all the facilities offered by a Windows environment, including searching for food items and household measuring units.

cancers. Concurrently, there has been a large increase in the amount of food available from animals, fats, oils and sugars and a smaller increase in roots and tubers, cereals, fruits, vegetables, legumes and nuts.

There are direct links between these trends in poor health and food intake. The consumption of too many fats, especially saturated fats, has been linked to an increased risk of obesity and associated disorders such as cardiovascular disease, hypertension, diabetes and some cancers. Recent evidence has also emerged of the contribution of trans-fats to disease.^{10, 11} Dietary cholesterol contributes to elevation of serum cholesterol, a risk factor for many major chronic diseases,¹¹ while high sodium intake is associated with elevated blood pressure and increased risk of stroke in some populations.¹¹ On the other hand, fruits and vegetables contribute a mix of nutrients and bioactive substances such as fibre and phytochemicals to the diet and help to maintain good health and reduce the risk of cancer and heart disease.¹¹

CHOOSING INDICATORS APPROPRIATE FOR THE CARIBBEAN

Indicators relating to population nutrient intake goals, dietary guidelines (where they exist) and recommended dietary allowances (RDA)* can all be used to identify risks related to diseases resulting from dietary deficiencies or excesses. These indicators may be represented as ranges, or may have only either an upper or a lower limit.

Based on the nutritional profile of the Caribbean, the following is a list of suggested indicators for consideration when planning and analysing data for food consumption surveys in the region.

FOOD CONSUMPTION INDICATORS

1. Percentage of persons consuming >30 percent of total energy as fats.
2. Percentage of persons consuming >15 percent of total energy as proteins.
3. Percentage of persons consuming >75 percent of total energy as carbohydrates.
4. Percentage of persons consuming >300 mg/day of cholesterol.
5. Percentage of persons consuming >5 g/day of sodium.
6. Percentage of persons consuming <400 g of fruits and vegetables.
7. Percentage adequacy of energy, protein, fats, carbohydrates.
8. Percentage intake of dietary iron among women of child-bearing age.
9. Percentage contribution of food items to selected dietary variables (i.e. what are the main food sources of energy and other nutrients).

The purpose of food consumption surveys is to compare energy and nutrient intakes with the estimated requirements of the population. Energy in the diet is derived from carbohydrates, fats and proteins. There is no single “best value” for population nutrient intake goals**

* Recommended dietary allowances (RDA) - authoritative, quantitative estimates of human requirements for essential nutrients, usually set out with different amounts (in weight/day) considered to be adequate to meet the nutrient needs of practically all healthy persons. They are also referred to as recommended nutrient intakes (RNI), recommended dietary intakes (RDI) or dietary reference values (DRV).

but based on the relationship between diet and good health, CFNI recommends that contributions of these macronutrients to energy should range from 15 to 30 percent from fats, 55 to 75 percent from carbohydrates and 10 to 15 percent of energy from proteins.

In addition to protein, fats and carbohydrates, there are many other dietary components of importance to health. Over-consumption of some elements can contribute to poor health. For instance, there is a great deal of evidence associating cholesterol with increased incidence of cardiovascular disease. Since cholesterol is synthesized in the body, there is no requirement for dietary cholesterol. Hence, it is advisable to keep dietary cholesterol to low levels, less than 300 mg/day. Sodium intake is directly associated with increased blood pressure. Dietary iron is of importance because of its association with anaemia, which is especially common in pregnant women.

Food consumption surveys can also yield information on consumption of particular foods by the population, such as fruits and vegetables, which have many dietary components important to *good* health. Information on how particular foods and food groups contribute to the diet is also important for planning. The number of different foods or food groups consumed by a household is a measure of the dietary diversity.

ANTHROPOMETRIC INDICATORS OF UNDERNUTRITION***

1. Percentage of young children (0–5 years) who are stunted (height-for-age <-2SD of reference population).
2. Percentage of young children (0–5 years) who are wasted (weight-for-height <-2SD of reference population).
3. Percentage of young children (0–5 years) who are underweight (weight-for-age <-2SD of reference population).
4. Percentage of older children (10–18 years) who are underweight (BMI for age <5th percentile).
5. Percentage of adults who are underweight (BMI <18.5).

Body Mass Index (BMI) is calculated by dividing the weight of a person (kg) by the square of his or her height

** Population nutrient goals - the average intake judged to be consistent with maintenance of health in a population.

*** Indicators i-iii are discussed in Chapter 4.

Table 5.1 World Health Organization (WHO) classification of overweight in adults according to BMI

Classification	BMI	Risk of co-morbidities*
Underweight	< 18.5	Low
Normal range	18.5–24.9	Average
Overweight	> 25.0	
Pre-obese	25.0–29.9	Increased
Obese Class I	30.0–34.9	Moderate
Obese Class II	35.0–39.9	Severe
Obese Class III	> 40.0	Very severe

* Risk of other clinical problems increased

(m) and is used mainly for adolescents and adults. For adolescents, BMI for age is plotted on gender-specific growth charts.^{13, 14} BMI for age less than 5th percentile is indicative of underweight in adolescents.¹³ In adults, the established normal range of BMI is not gender specific and ranges from 18.5 to 24.9 kg/m².¹⁴ BMI has a drawback in that it does not differentiate between muscle mass and fat mass, and body shape and composition are not taken into consideration. However, generally, a BMI lower than 18.5 is considered to be an indicator of energy deficiency.

ANTHROPOMETRIC INDICATORS OF OVERWEIGHT AND OBESITY

1. Percentage of children (0–5 years) who are overweight (weight-for-height >2SD of reference population).
2. Percentage of older children (10–18 years) who are at risk for overweight (BMI for age 85th–95th percentile).
3. Percentage of older children (10–18 yrs) who are overweight (BMI for age > 95th percentile).
4. Percentage of adults who are overweight (BMI 25.0–29.9).
5. Percentage of adults who are obese (BMI ≥ 30).
6. Percentage of adults with high waist to hip ratio (men: >1 and women: > 0.85).
7. Percentage of adults with high abdominal fat (waist circumference for men ≥ 102 cm and for women ≥ 88 cm).

Overweight and obesity, which refer to an excess of body weight compared to set standards, are associated with an increased occurrence of many health problems, including cardiovascular disease, hypertension and

stroke, gallbladder disease, diabetes and certain forms of cancer.^{11, 14} There is an increased risk of premature death due to these and other serious chronic conditions that also reduce the overall quality of life. Of especial concern is the increasing incidence of child obesity.

In young children, weight-for-height more than 2 SD above the reference population is used to define obesity, while in older children BMI charts are used.^{13, 14} Adolescents are seen as at risk of overweight if BMI for age is between the 85th and 95th percentile and overweight if BMI for age is greater than 95th percentile.¹⁵

For adults, the classification of obesity using BMI is based on the association between BMI and mortality. A BMI of 25 or greater is categorized as overweight and a BMI of 30 or greater as obesity, with further subcategories (see Table 5.1).^{11, 14} Care must, however, be taken in the interpretation of BMI measurements, due to ethnic differences between populations, differences between the body composition of the sexes, and differences in the pattern of physical activity which results in variances in the adiposity of the body.

Waist circumference and waist-hip ratio are other valuable indicators used to identify people at increased risk of being affected by the co-morbidities of obesity due to accumulation of fat in the abdominal region.

OTHER RELEVANT INDICATORS ASSOCIATED WITH FOOD CONSUMPTION AND ANTHROPOMETRIC DATA

1. Percentage of pregnant women with anaemia (Hb < 11 g/dL).
2. Percentage of mothers with babies 0–6 months who are breastfeeding exclusively.
3. Percentage of adults with hypertension.
4. Percentage of adults with diabetes.

Based on the purpose of the survey, other data may be collected. It is therefore critical that data on demographic and socio-economic characteristics are also collected and integrated into the analyses of the data so as to provide useful guidance to policy makers and programme managers. For example, iron-deficiency anaemia is the most common micronutrient deficiency worldwide. Data from surveys and health centres in the Caribbean show that the problem is also widespread in this region, and affects many pregnant women as well as

Box 5.2

USE OF INDICATORS TO IDENTIFY GROUPS AT RISK IN BARBADOS

The main purpose of the *Food consumption and Anthropometric Survey* in Barbados was to determine the food intake and dietary patterns of the adult population (18 years and over), the prevalence of obesity and diagnosed nutrition-related non-communicable chronic diseases, and their relationship to dietary patterns as a basis for policy and programme planning.

The survey results included:

- the population's intakes of energy and the macronutrients (carbohydrate, proteins and fat);
- percentage contributions of each macronutrient to energy intake of the population;
- contribution of each macronutrient to energy intake (percent distribution);
- consumption of certain foods e.g. sugar, carbonated beverages;
- BMI status (a measure of obesity/undernutrition);
- physical activity levels of the population.

From the data, a vulnerability profile was derived, identifying lower income households, single sex households (male or female), male headed households, younger men and older persons living alone as most likely to have diets which are less diverse and/or less adequate. Specific recommendations for action could then be made.

This information can be used by policy-makers and programme-planners in targeting intervention strategies and follow-up studies. For example, based on the findings, CFNI/PAHO commissioned a qualitative study on the factors affecting diet and exercise patterns in Barbados.

young children. Pregnant women with a haemoglobin (Hb) level less than 11 g/dL are regarded as anaemic by WHO standards.^{16, 18} Because of differences in ethnicity, a cut-off of 10.0 g/dL is sometimes used in populations of African origin.¹⁸

Exclusive breastfeeding is recommended for babies in the first six months of life: except for medicine, the infant is given no other foods or liquids except for breastmilk. Breastmilk (especially when offered exclusively) has many benefits including decreased rates of diarrhoea, respiratory tract infections, otitis media and other infections. Intellectual and motor development is improved and the risk of chronic disease later in life is decreased. The benefits of breastfeeding can have

Box 5.3

GENERATION OF INFORMATION TO TARGET SOCIAL WELFARE PROGRAMMES IN GUYANA

In order to effectively implement programmes for the relief of vulnerable groups, identification of these groups should not be limited only to a country-wide basis but according to their specific locations (regions, parishes, towns etc.). Additional available information on other threats to food security and nutrition, such as food production or disasters in the specific area, may be used to target programs. If risk-mapping technology e.g. GIS is available, this can greatly enhance depiction of the data to represent the nutrition problems.

The food consumption survey in Guyana was appropriate for this purpose. In the 2002 survey, in addition to food consumption and anthropometry, data collection included:

- household income;
- diet-related practices;
- source of food acquisition;
- expenditure on food.

These data were collected from the country's major ethnic groups (Afro-Guyanese, Indo-Guyanese and Amerindians) and dwelling areas (urban, rural and interior). Data on age, education, employment and other socio-economic characteristics are also available from the survey. Indicators were developed and the resulting information presented to key stakeholders. Use of this information will improve the targeting of social programmes for vulnerable groups.

implications for the economic welfare of the family and lessen the burden on the health care system.

Hypertension and diabetes are chronic non-communicable diseases. Information may be collected on either reported prevalence or by actual measurements. However, more than one measurement is necessary to confirm the existence of either of these conditions.

As mentioned earlier in this chapter, other data on the survey population is needed to make the information useful for policy and program development.

It is therefore critical that data on demographic and socio-economic characteristics be collected and integrated into the analyses of the data so as to provide useful guidance to policy makers and program managers ■■■

6. THE IMPORTANCE OF FOOD CONSUMPTION AND ANTHROPOMETRIC INFORMATION IN DECISION-MAKING

The first section of Chapter 6 describes the potential uses government, NGOs and other stakeholders in the Caribbean can make of food consumption and anthropometric information. The second section shows how the results from these surveys can be applied more effectively.

POTENTIAL APPLICATION OF SURVEYS IN THE CARIBBEAN

Food consumption and anthropometric surveys aim to identify the characteristics of nutrition-related diseases and the eating habits associated with them. The goal is to detect or predict changes that might apply to standards and guidelines intended to improve health and well-being of the population. It is recognized that applications may not be appropriate to all situations; accordingly, the country context will be paramount in the consideration of the applications below. Diagram 6.1 illustrates the linkages between the different phases in moving from data collection to decision-making and captures the main steps described in previous chapters of this document. The direction of the arrows in the diagram emphasizes several feedbacks and interactions that must inform each phase and the overall process.

TYPES OF INFORMATION THAT CAN BE OBTAINED FROM NUTRITION SURVEYS

The withdrawal of the World Food Programme from the Caribbean has led many governments to initiate school-feeding and other supplementation programmes. These initiatives should be guided by the results of appropriate food consumption surveys so that the types, quantities

and balance of these supplements are cost-effective and efficacious. The need for fortification of different types of foods in special and general programmes can also be determined. The surveys can also be used to evaluate such programmes. For example, if designed appropriately, a food consumption survey can determine whether a school lunch programme significantly improves children's diets.

One major factor that retards progress in health development in the Caribbean is the inequity of access to health services and healthy food. Food consumption surveys can expose the inequities of food and nutrient intake by sex, age, income, location and other factors. Identifying these inequities is critical in developing strategies to reduce food insecurity and nutrition-related illnesses in the region.

More and more Caribbean families are eating foods away from their homes in the form of "fast foods", snacks and carbonated drinks. It is well known that these foods are usually high in fats, sugar and salt. Food consumption surveys will help to determine how often, when and where such foods are eaten and, more importantly, to what extent they fail to meet set dietary criteria. In addition, anaemia continues to be a major problem in young children and pregnant women in the Caribbean. A food consumption survey will reveal the range and quantity of iron-rich foods; it will also show the foods that inhibit and enhance the absorption of those iron-rich foods. Clearly, this information is critical in developing strategies to combat anaemia in the region. In addition, previous research shows that Caribbean women over 20 years are especially at high risk of overweight and obesity and that their intakes of fat in particular can be of special importance to programming educational and other interventions.

The Caribbean has not experienced much collaboration between the private and public sector with

regard to food production, manufacturing and promotion. This public–private partnership is very important if healthy foods are to be made available, accessible and consumed by all sectors of the population. Findings from consumption surveys could predict the demand for several foods and beverages and this public-private partnership can jointly plan for the production and promotion of healthy foods for the public.

ASSESSMENT OF CURRENT DIETARY INTAKE

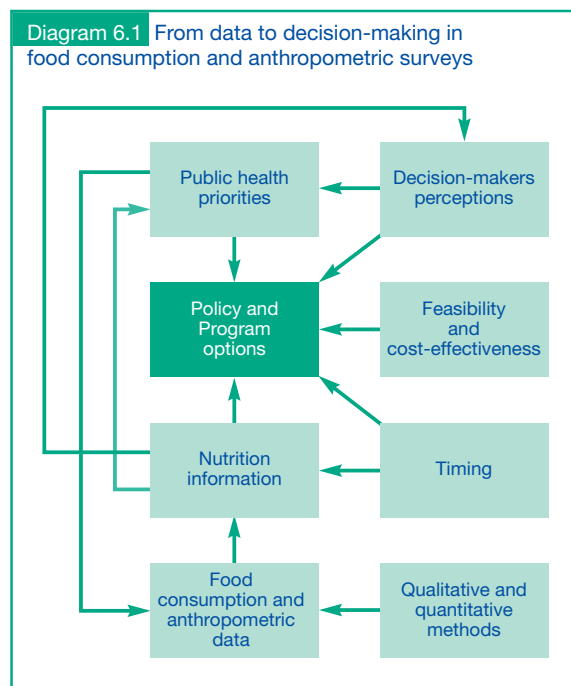
Chronic diseases such as stroke, heart disease, diabetes and cancer are the causes of most deaths in the Caribbean. Nutrition is the most important element in preventing and managing these chronic diseases, and as a result assessing dietary intake is vital in determining the nutritional risk associated with these diseases. In addition, surveys of what people eat give valid information that will allow policy-makers and programme planners to develop education programmes or remedial efforts to improve nutritional status and health. Food consumption surveys can ascertain the size and nature of groups that might be at risk because of inadequate or excessive intake of nutrients. As a result, food consumption surveys will show the dietary changes necessary for meeting the dietary goals for improved health and well-being. They will also shape the direction of educational efforts.

As has been highlighted above, anthropometric data are also very useful for assessing the nutritional status of population groups. When used in conjunction with food consumption data, they provide a more complete nutritional profile. Anthropometry has been included in most of the consumption studies conducted in the Caribbean. This has allowed for the analysis and description of eating patterns in relation to obese and non-obese states. When disaggregated by sex, age, location and other factors, the interpretations of these data are clearer and the recommendations more appropriate.

Eating habits in the Caribbean have been changing in the last few decades. More and more unbalanced diets with a smaller range of nutrients being consumed can be observed. Food surveys can:

- detect the extent of these nutritional deficiencies and the necessary educational programmes required to address them;

Diagram 6.1 From data to decision-making in food consumption and anthropometric surveys



- identify populations at nutritional risk for possible intervention with fortification, education and supplemental programmes.

TREND ANALYSIS IN EATING PATTERNS

The rapid transition of the dominant health problems from undernutrition to the chronic nutritional diseases in the Caribbean necessitates a close examination of the changes in dietary patterns. Regular consumption surveys can reveal the nutrients that are increasing and decreasing in the diet of different population groups by factors such as location, social status, age and sex, among others. These patterns of consumption will enable policy-makers and administrators to plan corrective strategies at different points in the food chain so that healthy foods can be available and affordable to all population groups.

The combination of weight/height and height/age indices provides an excellent opportunity to examine both recent and chronic nutritional deficiencies. The correlation of these data with the current and past food consumption data can provide a much greater understanding of the nutrition problems and assist

tremendously with the appropriate designing of nutrition policies and programmes.

As an evaluation tool, these surveys can also identify changes in food and nutrient consumption that might be expected to reduce risk. Analysts can therefore correlate food consumption and dietary patterns with incidence of disease over time. For the Caribbean, this is especially critical with the heightened interest in chronic diseases and the enormous cost of them to society.

Globalization and liberalization policies have increased the volume of food trade across countries and regions. The Caribbean is particularly affected by this trade and some countries in the region import almost all of their food. Repeated consumption surveys will identify shifts in the types of foods introduced into the marketplace. In addition, information on the nutrient contribution of these foods (e.g. low and high fat, snack products, frozen mixtures, fruits and vegetables) will enable better policy decisions and educational programmes to be developed.

The changing consumption pattern of nutrients over time will help policy-makers determine whether the national dietary standards are achievable and reasonable in relation to the disease profile of the country. The findings of such repeated surveys will allow for the re-examination of standards set.

Food consumption trends can predict the demand for certain agricultural products and marketing facilities. Through such information policy-makers have an excellent opportunity to influence consumption patterns by proving incentives and disincentives for healthy and non-healthy products, respectively.

Dietary trends project the future demand for food in particular socio-economic groups. They also show the effects of certain socio-economic factors on the demand for food. Policy makers can therefore predict the impact of certain interventions given the socio-economic conditions prevailing.

The cost of food consumed over time can be also deduced from these repeated surveys. Because food is a major component of household expenditure, consumption surveys provide essential data in understanding vulnerability of different populations groups. Some Caribbean countries have used food consumption and food-expenditure data as part of their

poverty assessments. This information is therefore vital to the construction of cost-of-living indices.

DIETARY GUIDELINES

Few countries in the Caribbean have up-to-date empirical information on what population groups eat. It is therefore urgent that consumption surveys are conducted so that dietary guidelines based on scientific evidence can be developed. Dietary guidelines are necessary to influence eating patterns that are consistent with good health, and can be developed only if there is a clear understanding of what nutrients do and how much of each may be needed.

FOOD SAFETY

People in the Caribbean should have access to good-quality, safe, nutritious and wholesome food. Unfortunately, many national health authorities do not fully appreciate the critical importance of food safety to public health, tourism and the food trade. Every day people in the Caribbean face many hazards related to the food they consume such as the abusive application of agricultural chemicals, environmental contamination, use of unauthorized additives, genetically modified organisms and improper food-quality control. Although food consumption surveys may not be able to detect these hazards, they can determine the level of intake of the foods that are known to contain these contaminants.

Food consumption surveys can identify the size and nature of populations at risk from use of particular foods and food products. Manufacturers can identify the volume of consumption of certain products of interest. They can also predict food items in which a food additive can safely be permitted in specified amounts. These surveys can also identify extreme and unusual patterns of intake of foods or food ingredients, including food additives. This will provide vital information for food regulation and education.

FACTORS THAT FACILITATE POLICY ACTION

It has been made clear that the purpose of food consumption and anthropometric surveys is to *recommend* and *facilitate* action on short- and long-term

measures designed to prevent and control nutrition-related diseases. The Caribbean experience highlights that key strategies are necessary in order to facilitate policy action on the basis of survey results.

Recommendations include:

- involving decision-makers from the beginning of the process;
- increasing their awareness of the usefulness of data and information that can be generated by the surveys;
- ascertaining key stakeholders' specific information needs;
- securing key stakeholders' commitment to the process and identifying what contribution they can make;
- determining the appropriate method and scope of survey (qualitative vs. quantitative, how much detail, objectives, geographical coverage, target groups);
- ensuring that sample design and strategy will answer policy-oriented questions with the required precision;
- managing data collection and analysis with rigour;
- explaining and interpreting results for different audiences;
- communicating findings by preparing reports for different audiences;
- planning a dissemination strategy for various stakeholders through workshops, scientific and technical papers, mass media, and community meetings.

Factors can enhance this process are:

- relevance;
- quality of the research;
- cost-effectiveness;
- a multi-faceted approach;
- report content;
- timeliness and frequency;
- dissemination;
- messages from the findings;
- partnerships.

These shall be examined in more detail now.

RELEVANCE

It is vital that the relevance of food consumption and anthropometric surveys is highlighted to policy-makers. It is important to make explicit to policy-makers how data from food consumption and anthropometric surveys can be used to improve healthcare programmes

and consumer choices in the particular country context. Researchers should therefore present food consumption reports to policy-makers that show not only current eating patterns but also the linkages and predicted benefits of an altered food consumption pattern and the expected profile of nutritional and health status in the country.

Furthermore, as the nutrition problems change and resources become more limited, it will be necessary to identify more carefully vulnerable groups and risk factors. These concerns have to be highlighted and discussed early in the planning process to ensure that the survey findings will be relevant and useful to decision-makers.

QUALITY OF THE RESEARCH

Particular attention must be given to the survey's design, methodology and analysis. If the survey is conducted with appropriate rigour there will be less room for different interpretations of the data. The quality of the research is vital. Policy-makers will hesitate in making decisions when controversy surrounds the findings so it is necessary to demonstrate the credibility of the results. It is also important to ensure that limited financial resources do not impinge on the quality of the research output. Utilizing the expertise at the University of the West Indies, CFNI and other institutions will encourage professional confidence by policy-makers in the research output. Publishing the results in reputable regional and international journals could also inspire confidence in the work produced.

COST-EFFECTIVENESS

Economic implications are often a major consideration in helping a policy-maker ascertain the worthiness of support. Researchers should consider the cost-effectiveness of any recommendations when designing the original hypothesis and design. For example, in the Caribbean, we know that many children and adults consume huge amounts of "empty calories" i.e. high-energy foods with few nutrients; we also know that more than half of Caribbean women are overweight. Were there to be a recommendation arising from an anthropometric and food consumption survey that urgent steps be taken to counsel and treat all these affected persons individually, the implications of such a

decision would demand an outlay of funds larger than the entire health budget of any Caribbean country. Thus, constraints in resources would in the end modulate the vigour with which survey recommendations are pursued and interventions actualized. Researchers should then consider the cost of possible interventions not only when the recommendations are being made after the survey, but even when developing the original hypothesis and design.

A MULTIFACETED APPROACH

One strategy for the recognition and implementation of food consumption survey findings should be to ensure that policy-makers or their representatives are included in the survey team *throughout the research process*. Clearly, surveys in which officials have been involved from the early stages, and in which findings are discussed with officials and their input sought at every stage have a higher chance of having its findings adopted. In the cases of Barbados and Guyana – the Ministry of Health – and with Dominica – the Ministry of Agriculture – were integrally involved with the food consumption surveys. In Jamaica the University worked closely with the Ministry of Health in the food consumption and lifestyle surveys. The presentation of the survey reports was organized by the respective ministries. Other strategies include:

- community mobilization around the objectives of the survey;
- the adoption of the research findings by the national nutrition and dietetic professional bodies such as the Caribbean Association of Nutritionists and Dieticians.

PARTNERSHIPS

The few consumption studies conducted in the Caribbean were led by one entity - usually a government ministry or university with limited involvement of other sectors or stakeholders. If the results of these surveys are to be used by the key stakeholders then there must be greater collaboration between government, food industry, scientific and professional community the media and the public. This collaboration should start from the setting of objectives. No one group possesses all the knowledge, resources and incentives to achieve positive dietary change. Too often, nutrition research results in the Caribbean have remained in the domain of

academia and the government ministries. To achieve the effective impact from food consumption and anthropometric findings, public-private partnerships will be crucial in nutrition education and other public communications.

REPORT CONTENT

Too often, reports on food consumption surveys to policy makers merely present the results and discussion, rather than transforming them into conclusions and practical recommendations. Two major barriers to the transfer of food consumption data to decision-making are: (1) time to understand the implications of the findings and (2) lack of information in a form that policy-makers can use. Both relate to the type of report that is presented to the policy maker. Policy-makers need information on which standards, norms and guidelines can be established. Although based on empirical data from food consumption surveys, food guidance is an inexact science. It is a compromise between competing nutritional goals and what can be achieved with the kinds and quantities of foods available to the target population. Report recommendations must therefore be presented in ways that the policy-maker can apply.

It is important then to consider publishing the findings not only in peer-reviewed scientific journals but also in local journals and newsletters to which the national policy and programme leaders have access.

TIMELINESS AND FREQUENCY

Policy-makers in the Caribbean need timely information of the current situation. In the past reports took years to be finalized and presented. There needs to be major improvements in the gap between data collection and reporting so that the results can be useful in programme management and evaluation. Methods of handling data must be improved so that reports can be disseminated within a few months of assessment.

Some Caribbean countries have had only one consumption survey in recent history, other have none. Even surveys conducted every ten years tell us nothing about the effects of change in food prices or food supplies or factors related to programme development and operation.

DISSEMINATION

Survey findings can only be useful if they are made known to people who can use them. It is important to ensure that there are effective mechanisms for regular dissemination of the survey results in order to allow an early application of research findings in policy and programmes. The results on many nutrition research studies in the Caribbean have been communicated through publications in journals and presentations at conferences and other scientific meetings. Findings communicated through these channels have only a low probability of reaching policy makers and being applied in policy decisions. Regular reports of the survey process and the findings in simple and non-technical language to community and government officials is therefore vital.

It is worth considering a variety of modes for disseminating the results of food consumption and anthropometric surveys. Some important considerations include reaching a wide variety of audiences, from lay people, to policy-makers to donors. Feedback to local communities, particularly those that participated in the study, is highly recommended.

For example, in 2003 a national workshop was convened in Guyana to present and discuss the findings and policy implications of the food consumption survey. The workshop was followed by a series of regional and community-level meetings where the findings for the particular groups were discussed in more detail. In Barbados, results of the survey were disseminated successfully through a workshop in 2003 for potential users of results. At the workshop the executive summary was distributed. The workshops

targeted food companies, e.g. fast food outlets, supermarkets; non-governmental organizations, cancer support groups, retired persons; government departments, gender affairs, poverty alleviation groups; and ministries: Agriculture, Education, Health and Farmers.

These are recent surveys and the impact of the dissemination process is yet to be determined. However, Cuba has been successful in establishing the link between survey results and their application – especially the ones relating to the nutritional status of children that have helped in identifying the extent of nutritional problems in certain areas and groups.

Despite these efforts, a general weakness of past nutrition and food consumption surveys in the Caribbean has been the lack of attention paid to a communication and dissemination plan for the findings. Furthermore, if a plan existed there was no specific budget allocated to it.

MESSAGES FROM THE FINDINGS

The Caribbean offers numerous avenues to transmit diet and health messages to the consumers through nutrition education, labelling, advertising and the media. While some of this is being carried out already, there is clearly a need to become more sophisticated in constructing and communicating the messages. The goal should be to reach individual consumers with messages of practical value so that they can prepare more healthy meals. Too often, the messages fail to take into account taste, enjoyment and an array of social and cultural forces that influence food choices and preparation ■■■

SUMMARY

In summary, the lessons learnt from the Caribbean experience suggest that in order to increase the use and application of these data some key strategies must be employed. Some of these have been mentioned earlier but will be repeated below for emphasis. Therefore key strategies include:

- involving decision-makers from the beginning of the process;
- increasing decision-makers' awareness of the usefulness of data and information that can be generated by the surveys;
- ascertaining the specific information needs of key stakeholders;
- securing key stakeholders' commitment to the process and identifying their contribution;
- determining the appropriate method and scope of survey (qualitative vs. quantitative, how much detail, objectives, geographical coverage, target groups) based on the identified needs and resources;
- making sure that sample design and strategy will answer policy-oriented questions with the required precision;
- managing data collection and analysis with rigour;
- explaining and interpreting results for different audiences;
- communicating findings by preparing reports for different audiences;
- planning dissemination strategy for various stakeholders through workshops, scientific and technical papers, mass media, and community meetings



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ANNEX I.

POTENTIAL USERS AND USES OF INFORMATION FROM FOOD CONSUMPTION AND ANTHROPOMETRIC SURVEYS

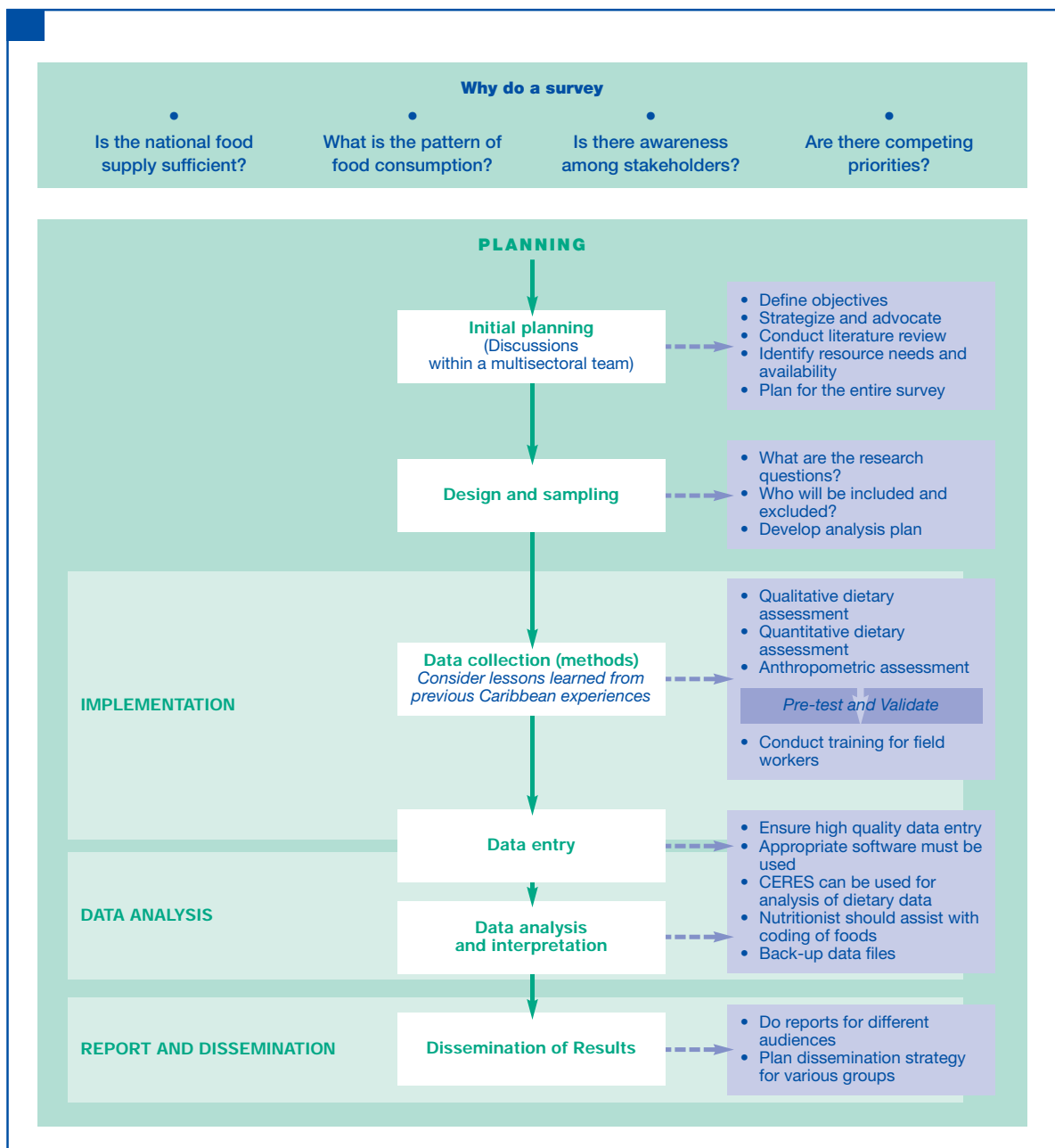
<i>Domain</i>	<i>Information users</i>	<i>Information uses</i>
Finance/planning/ trade	Policy and Programme decision-makers / Technical staff	<ul style="list-style-type: none"> • Development of national policies for promotion of food security and improved nutritional status. • Evaluation of food production and import policies on the basis of recommended population food goals. • Development of food price policies to improve food accessibility among nutritionally vulnerable groups. • Evaluation of sectoral programmes and budgets and prioritizing allocation of resources. Data from the Survey of Living Conditions in Jamaica has had some impact in this area although data are not disaggregated enough and not complemented by food consumption data. • In Guyana anthropometric data from the Living Standards Survey on children under 5 helped to design the national poverty alleviation programme especially with respect to targeting of beneficiaries. • Advocacy to bi-lateral and multi-lateral donors to target resources for poverty alleviation. • Awareness-raising/advocacy to policy makers about health and nutritional implications of development strategies. • Review existing fiscal and trade policies to facilitate healthier dietary choices and activity patterns. • Selection and incorporation of food nutrition-related indicators in monitoring national development goals.
Agriculture/ fisheries	Policy and Programme decision-makers / Technical staff	<ul style="list-style-type: none"> • Formulation/evaluation of food production goals & policies on basis of recommended population food goals. • Strengthening of linkages between agriculture and nutrition at strategy and programme levels. • Review of local food production and distribution systems and development of strategies/programmes for improving diversity in domestic food supply in light of consumption patterns & recommended goals. • Planning and monitoring of targeted agricultural interventions with food security and nutritional objective.
Health	Policy and Programme decision-makers / Technical staff	<ul style="list-style-type: none"> • Awareness raising/advocacy to public and private sectors and civil society re health and economic benefits of interventions to prevent and combat nutrition-related problems. • Development and promotion of dietary guidelines. Guyana will be using data from their survey to guide the development and dissemination of guidelines • Strengthening and reorientation of health services to address nutrition and diet related problems. • HRD policies for nutrition services. • Identification of extent and severity of nutrition problems and vulnerable groups. • Assessment of adequacy of dietary intakes of different population groups.

(Continued)

Annex I (continued). Potenzial users and uses of information from food consumption and anthropometric survey

Domain	Information users	Information uses
Health (Continued)		<ul style="list-style-type: none"> • Planning/evaluation of intervention programmes. • Development/review of norms and standards for nutrition and dietetic services. • Establishment/strengthening of nutrition surveillance systems. • Review existing policies, laws and regulations which impact on dietary and lifestyle practices. • Development/evaluation of educational messages and communication strategies.
Education	Policy and Programme decision-makers / Technical staff	<ul style="list-style-type: none"> • Awareness-raising among planners of impact of food and nutrition problems on educational performance. • Incorporation of objectives and strategies for promoting improved nutrition and activity patterns in sectoral plans. • Selection of procedures for nutritional and activity assessments as part of school health services. • Incorporation of relevant knowledge/skills/attitudinal objectives aimed at promotion of healthy eating and activity patterns in design/revision of curriculum at all levels. • Review/evaluation of school feeding and cafeteria menus based on recommendations for improving dietary practices. • Awareness raising to stimulate community interest and action in improving food and nutrition.
Training institutions (Tertiary level)	Heads of faculties/departments	<ul style="list-style-type: none"> • Training needs assessments in relation to combating food and nutrition problems. • Review of curricula and preparation of training materials.
Researchers	Academic researchers; epidemiology units and research departments in line ministries	<ul style="list-style-type: none"> • Identification of research topics and questions for fuller understanding of problems and issues (e.g. studies on : trends, determinants and health and economic costs of nutrition-related problems; implications of trade and other sectoral policies on household food security; determinants of dietary behaviour change; testing of nutrition education intervention approaches).
Mass media	Print, broadcast and electronic media personnel	<ul style="list-style-type: none"> • Preparation of features to increase public understanding of food and nutrition issues; to solicit ideas, opinions on contributory causes and solutions.
Private sector	Food manufacturers, processors, retailers, food service managers	<ul style="list-style-type: none"> • New product development and promotion; fortification and enrichment schemes. • Review of purchasing and distribution options to meet identified gaps in food supply system. • Menu-planning in food service establishments.
Civil society	NGOs, CBOs, professional associations, consumer groups	<ul style="list-style-type: none"> • Advocacy to government, private sector and donors. • Project preparation. • Social mobilization. • Community education. • Review of professional practice guidelines (e.g. medical care).
General public		<ul style="list-style-type: none"> • Increased awareness of food and nutrition-related problems. • Self-evaluation of food choices and dietary patterns. • Empowerment and participation in public debates on food and nutrition issues. • Advocacy for increased accessibility to nutrition services.
Donors	Bi- and multi-lateral donor	<ul style="list-style-type: none"> • Establishing priorities for technical cooperation and assistance country programmes. • Preparation and monitoring of technical cooperation projects. • Policy advocacy.

ANNEX II. CONDUCTING FOOD CONSUMPTION AND ANTHROPOMETRIC SURVEYS



ANNEX III. CHECKLIST OF CONSIDERATIONS FOR FOOD CONSUMPTION AND ANTHROPOMETRIC SURVEYS

PLANNING

Set out below are some issues to consider at this stage.

Have you:

- defined objectives?
- established research questions?
- developed an implementation plan and timeline covering all stages of the survey?
- developed a data-analysis plan?
- established strategic partnerships?
- established a survey committee?
- undertaken a literature review?
- considered all potential uses of the data?

Sampling strategies

Have you:

- sought advice from a statistician regarding the proposed study design and sample selection? e.g. Statistical Department?
- determined inclusion and exclusion criteria of participants?
- included additional samples based on expected non-response rates?
- contacted the Census Bureau and Nutrition Monitoring Board?
- inspected the survey areas?

Methodology

Have you:

- selected an appropriate dietary assessment method?
- developed the data collection instrument (s)?
- considered how the method will be validated?
- developed a manual of procedures for sample selection and data collection?

Resource needs

Have you considered all human resource needs required?

- Coordinator/manager;
- field supervisor;
- administrator;
- trainer;
- nutritionist/nutritional epidemiologist;
- anthropologist or other qualitative researcher (if necessary);
- recipe data collection staff;
- portion size-collection staff;
- data manager;
- data coder;
- data-entry clerks;
- data analyst;
- driver (if necessary).

Selecting and training personnel

Have you:

- developed the criteria for selecting personnel?
- developed a training manual?
- allowed adequate time in the activity plan to train and to observe the trainees in the fieldwork?

Equipment

Have you:

- identified all your equipment needs? e.g. scales, stadiometers, length boards, measuring tapes?
- ensured that they are appropriate for your target population?
- identified suppliers and requested quotations?
- ensured enough lead time in placing orders?

Ethical clearance

Have you:

- drafted consent forms to be completed by participants?
- obtained the necessary clearances from the relevant bodies? (This can be a lengthy process so plan for it.)

IMPLEMENTATION

Piloting and pre-testing all data collection instruments and equipment

The importance of pilot testing all aspects of the project can not be over-emphasized as this will highlight any difficulties before the study begins. All aspects of the project should be pilot tested from data collection to data analysis.

The pilot study should explore and test:

- communication between target groups and survey staff;
- questionnaires and materials;
- transportation;
- arrangements of appointments and work schedules;
- time taken to complete questionnaires;
- supervision of data collection and checking;
- transfer and storage of survey records;
- data entry software;
- preliminary data analysis.

Have you allowed time and resources for pre-testing the:

- dietary assessment instrument?
- anthropometric equipment and recording sheets?
- recipe-recording forms?
- scales?
- portion-size recording forms?

Data collection

Have you:

- developed a time line?
- organized data collection schedules?
- determined a recruitment strategy?
- considered printing of questionnaires?
- purchased equipment?
- organized transportation?
- decided how you will contact participants?
- considered supervision of data collection?
- made arrangements for storage of survey records?
- developed a method for keeping track of non-responders?
- thought of strategies for keeping interviewers motivated?
- prepared a schedule for frequent meetings with data collection staff?

Data entry

Have you:

- considered the software options and decided on the software package to use?
- allowed time and resources for familiarizing the data-entry personnel with the data-entry programme by entering pilot data before the study begins?
- developed a tracking system for the survey records?
- considered who will code the questionnaires and when?
- developed a system for data entry and checking including backing-up of data?

Data analysis

Have you:

- finalized the research questions based on the original research questions?
- considered how the results will be presented (tables, charts, figures)?
- decided which software package to use?
- considered whether additional software is needed for analysis?
- considered whether the various software packages being used are compatible?

Dissemination of results

Have you considered different dissemination strategies?

- Reports for government;
- public seminars;
- presentation at conferences;
- publications;
- feedback the results to the community.

BUDGET

Personnel costs

Have you included:

- personnel salary and benefits?
- personnel recruitment cost?
- personnel training cost?
- trainer (transportation, housing, meal per diem, honorarium)?
- trainees (transportation, housing, meal per diem)?

Office expenses

Have you included:

- office rental?
- electricity and other utilities cost?
- custodial and security services cost?
- filing cabinets and other storage space cost?
- telephone?
- mail service?
- fax machine?
- internet connection?

Field expenses

Have you included:

- field office rental?
- field office supplies?
- transportation (public transportation fares, gasoline, vehicle rental, vehicle insurance)?
- supplies for field workers: food scales, backpacks, clipboards, notebooks?
- housing allowances?
- incentives for respondents?

Data analysis

Have you included:

- computer?
- printer?
- software for all data?
- software for analysis of nutrients data?

Dissemination

Have you included:

- airfare for conferences?
- hotel cost?
- conference registration fee?
- taxi?
- per diem?
- phone and e-mail service cost?
- publication cost?
- printing of reports?

ANNEX IV. RESOURCE NEEDS

HUMAN RESOURCES

For each phase of the project personnel need to be identified, recruited and trained. Personnel needs – from data collection through data analysis – need to be considered.

The following personnel may be necessary – some of the personnel needs could be combined.

- Project coordinator/manager;
- Field supervisor(s);
- Administrator, for handling budgets;
- Biostatistician/programmer;
- Nutritionist/nutritional epidemiologist;
- Anthropologist or other qualitative researcher;
- Nutrition-data collection staff – for 24-hour recall, food diaries or food frequency questionnaires;
- Recipe-data collection staff;
- Portion-size collection staff;
- Anthropometric data collection staff, male and female;
- Driver;
- Data manager;
- Data coder;
- Data entry clerk.

RECOMMENDATIONS FOR THE SELECTION AND TRAINING OF PERSONNEL FOR WORKING IN FOOD CONSUMPTION AND ANTHROPOMETRIC SURVEYS IN THE CARIBBEAN

Based on the Caribbean experiences, the following are recommendations for the selecting of supervisors and field personnel.

Some criteria for selection of supervisors

- Good references;
- relevant experience;
- good interpersonal skills;
- good communication skills;

- flexibility – willing to work long hours when necessary and weekends;
- honesty;
- motivated;
- leadership skills;
- management skills;
- ability to work full time;
- selecting as supervisors those field workers who excel in training and providing additional training.

Desirable characteristics of field personnel

- Polite and friendly;
- flexibility with working hours as fieldwork depends largely on respondents' hours of availability;
- familiarity with the community;
- familiarity with the languages used in the area;
- previous experience;
- able to do strenuous field work.

Recommendations for training staff based on Caribbean experience

- Training should be mandatory;
- develop a training manual;
- allow adequate time to train and to observe the trainees in the fieldwork;
- evaluate the difficulties in the training and address these before the study begins;
- ensure that the trainees have been trained in how to introduce themselves and the project to potential respondents as this may affect the response rate;
- train just before the survey starts so trainees remember all the details;
- don't select the field staff until after the training is completed;
- check all the trainees in the field situation;
- training on sensitivity of body measurements should be given;

- there may be need to re-train the trainees if the survey is long term;
- training must be given in the importance of respondent's confidentiality;
- make training of supervisors a priority;
- provide additional training for supervisors;
- use role-playing.

Budgetary items for food consumption/anthropometric surveys (personnel and recruitment costs)

- Salary (number of data collectors and supervisors), benefits – such as health, retirement (if relevant);
- training and retraining (if needed) sessions.
For trainers and trainees consider:
 - transportation;
 - housing, meals, per diem;
 - honorarium.

Equipment

- Computer and computer supplies (disks, surge protector, back-up power source);
- printer and printer supplies (toner, paper);
- weight scales and height boards;
- food models.

Office expenses

- Office rental;

- electricity and other utilities;
- custodial and security services;
- filing cabinets and other storage space;
- office furniture;
- telephone service;
- mail service;
- fax machine;
- internet connection.

Field expenses

- Field office (rental, furniture, supplies);
- meal per diem;
- transportation (public transportation fares, gasoline for motor vehicles, vehicle rental, vehicle insurance);
- housing allowances.

Travel

- Flight;
- taxi/boat.

Others

- Food scales;
- watches, tape recorders and supplies (batteries, cassettes);
- miscellaneous (backpacks, clipboards, notebooks, pens);
- materials (flip charts, markers, notebooks) ■■■

ANNEX V. OVERVIEW OF STEPS TO DEVELOP A QUANTITATIVE FOOD FREQUENCY QUESTIONNAIRE

When designing an FFQ, careful consideration should be given to the *objective* of the dietary assessment: is the aim to measure a few specific foods or nutrients or a comprehensive assessment of diet? A comprehensive assessment of diet is generally preferred as:

- in general, one cannot anticipate all dietary factors that should be explored at the early stages of the study;
- a highly restricted food list may not include an item that in retrospect, may be important;
- total food intake, reflected as energy intake, may be related to disease outcome and as a result, confound the effects of specific nutrients or foods.

Furthermore, even if total energy is not associated with disease outcome, adjustment for total energy intake may increase the precision of specific nutrients. A full assessment of diet is advantageous also as data obtained may have long-term use, particularly in multi-centre studies and where opportunities to re-investigate the study population are limited.

However, a full assessment of diet becomes unnecessary and is replaced by short food frequency questionnaires when the aim is to measure intake of a nutrient (e.g. calcium) or specific dietary behaviour (e.g. consumption of fruits and vegetables) is of interest and the objective is to rank individuals according to levels of intake.

To develop a FFQ, a list of foods that contribute to at least 85 percent of the intake of the nutrients of interest for inclusion on the questionnaire needs to be established. This usually assesses food and drink intake over the previous twelve months.

DETERMINE FOODS CONTRIBUTING TO AT LEAST 85 PERCENT INTAKE OF THE MACRONUTRIENTS OF INTEREST

This can be done by collecting dietary data by any of the methods:

- 24-hour recalls;
- food diaries;
- weighed intake.

In the Caribbean because of practical issues such as literacy and unfamiliarity with food weighing, the 24-hour recall method may be preferred. Field workers need to undergo extensive training in how to obtain detailed 24-hour recalls (this usually takes a week for non nutrition trained personnel).

DETERMINE THE PORTION SIZES TO ASSESS QUANTITIES TO BE USED ON THE FFQ

The following could be used for this:

- household units e.g. spoons;
- natural units e.g. slices of bread;
- food models;
- photographs;
- standard portions e.g. small, medium, large.

DETERMINE THE NUTRIENT COMPOSITION OF FOODS LISTED ON THE FFQ

This information can be obtained from:

- food composition tables;
- using values from other food composition table for similar foods (with caution);
- calculating nutrient composition of recipes;
- biochemical analysis.

A programme needs to be developed/accessed that will multiply the food frequency by the portion size by

the nutrient composition of each food item listed on the FFQ (recipe or single food items).

DEVELOPING THE DRAFT FFQ

Foods contributing to at least 85 percent of the intake of the macronutrients and micronutrients of interest should be listed. For populations with less dietary diversity you could list all the foods (100 percent contributors). Foods are usually grouped into logical food groups such as vegetables, fruits and breads. Foods should be listed as single items and mixed dishes, but should not be double-counted. Frequencies of consumption are usually listed as several categories ranging from never to several times a day. FFQs usually ask ‘How many times during the last 12 months did you eat?’ Portion-size estimates will be listed in a separate column. Check questions can be added as well as additional information that may be useful for analysis e.g. if the person was following a weight-loss diet.

PILOTING THE FFQ

The FFQ will be drafted and then piloted to ensure feasible use and to obtain any omitted foods. Under each food group leave a few blank lines where any other foods in that category can be asked about e.g. “In

addition to all those vegetables are there any other vegetables you ate during the last 12 months”.

A manual must be written on how to administer FFQ. After pilot testing the manual should be updated including any changes in portion size estimates if necessary.

VALIDATING THE FFQ

Validation of the FFQ is carried out using another measure of food intake such as:

- 24-hour recall (multiple);
- food diary;
- weighed intake ;
- biochemical measurements using biomarkers in blood or urine.

ASSESS REPEATABILITY OF FFQ

- Consider the standardization of anthropometric measurements and dietary intake measurements (including measurement of inter-observer reliability);
- repeat measurements using different field workers to establish variation between the interviewers;
- repeat measurements using the same interviewer to assess reliability ■■■

ANNEX VI. KEY CONCEPTS IN QUALITATIVE RESEARCH

WHAT IS QUALITATIVE RESEARCH?

Qualitative research can be viewed both as an approach and as a set of techniques for data collection. As an approach, qualitative research enables investigators to examine beliefs, perceptions and behaviours from local people's perspective. Qualitative methods can facilitate inquiry into sensitive issues, which are often difficult to investigate through standard survey methods. A qualitative research approach emphasizes four basic elements: (1) triangulation, (2) iteration, (3) flexibility, and (4) contextualization (Gittelsohn *et al.*, 1994).

Triangulation

Triangulation can be defined broadly to be of three types:

1. data triangulation – comparing different data sources, i.e., from primary and secondary sources;
2. investigator triangulation – comparing the perspectives/interpretation of different investigators;
3. methodological triangulation – the use of multiple methods to study the same social phenomenon.

Use of multiple data sources, investigators, and methods provide the opportunity to better understand beliefs and behaviours. The assumption that different methods will necessarily lead to a convergence of findings and hence greater validity of data is erroneous (Mathison, 1988). Rather, the “value of triangulation lies in providing evidence – whether convergent, inconsistent, or contradictory – such that the researcher can construct good explanations of the social phenomena from which they arise”. As an example, methodological triangulation in the area of infant-feeding might encompass focus groups with mothers, in-depth interviews with individual mothers who represent positive or negative cases and direct observation of infant feeding behavior.

Iteration

Iteration involves the use of earlier steps of data collection and analysis to inform later stages of data collection and analysis. Qualitative research does not, and should not follow a linear progression of planning, collection and analysis. Instead, researchers are encouraged to reflect continuously during data collection and analysis, and to modify approaches, and undertake new types of data collection as the study proceeds. Iteration helps researchers follow up on new and emerging findings, and can occur between methods of data collection, between stages of data collection, and between rounds of interviews with the same informant. In large field teams, it is important to build in regular meetings to review information collected thus far and decide on revised directions. From the infant-feeding example above, preliminary observations of infant-feeding behavior may reveal styles of feeding with the potential to influence infant nutritional status (e.g. passive or active). These findings could be followed up in in-depth interviews with mothers.

Flexibility

Flexibility refers to the qualitative researcher's ability to substantially modify data collection plans in mid-course, as part of the iterative process. If a particular method is found to be ineffective in generating the expected type of data, new methods may be adopted and/or developed.

Contextualization

Contextualization involves understanding the broader set of social, cultural, historical and economic factors that influence human beliefs and behavior. Qualitative research emphasizes understanding why people do the things that they do. In the area of food and nutrition,

while qualitative research can contribute to understanding what people eat, it can make a stronger contribution to understanding why people eat the foods they do. People select, prepare, allocate, and consume foods for a wide variety of reasons that extend beyond availability and economics. This aspect is critical when exploring sensitive issues such as the inequitable distribution of nutritional health within households that is observed in some populations – and which has been attributed to differential valuation of some household members (e.g. men over women most commonly) over others.

The constructs described above reflect key differences between qualitative and quantitative approaches, but also emphasize their complementarity. Qualitative research excels at being part of the early, exploratory, hypothesis generating stages of a research endeavor. While quantitative research is very appropriately used to confirm and test hypotheses.

The discussion in Chapter 3 focuses on the use of qualitative research as formative research. Formative research is defined as information-gathering for the development, implementation and evaluation of intervention programmes (Gittelsohn *et al.*, 1998, 1999). One of the major themes of formative research is cultural appropriateness (Resnicow *et al.* 1999). Formative research can be used to make intervention programmes both culturally and locally appropriate. It has its roots in applied anthropology, social marketing and educational psychology. Additionally, formative research can contribute to instrument development and for the formation of policy.

Formative research can include both qualitative and quantitative methods. It is the process by which researchers define and assess attributes of the community or target audience (Higgins *et al.*, 1996). Formative assessment can also help facilitate relationships between researchers and target populations (Kumanyika *et al.*, 2003; Gittelsohn *et al.*, 1999; Gittelsohn *et al.*, 1998) and can be applied at all levels of behavioural interventions, whether clinic-based (one-on-one and group interventions), school-based, community-based, or population-based, such as national media prevention campaigns (Gittelsohn *et al.*, 1999; Higgins *et al.*, 1996).

QUALITATIVE RESEARCH DESIGN AND DATA QUALITY

Qualitative research is characterized by *emergent* design. The flexible, iterative and exploratory nature of qualitative research ensures that no matter how carefully planned in advance, data collection must be open to exploring new directions. Nevertheless, there are key aspects of research design that characterize all or most qualitative studies. This includes issues of sampling, recruitment of informants, frequency of contact with each informant, the methodological mix, and other related issues.

Qualitative studies generally employ purposive sampling as the primary means of identifying respondents. Purposive sampling refers to the selection of informants based on specialized knowledge and experience. In the area of food and nutrition, most adult women are usually reasonably good informants, and so after selection based on some initial criteria (e.g., having small children, etc.), qualitative researchers will often try and interview/work with mothers or other caregivers who represent a range ages and experience in child-rearing.

Recruitment of respondents in a qualitative study is then linked to the sampling strategy being employed. However, a significant variation occurs in that in a qualitative study, most informants are interviewed multiple times. This permits the building of rapport and a social relationship of communication which is felt to enhance the flow of information.

A final aspect of qualitative research design is methodological triangulation. Multiple sources of information are felt to provide a better, more complete picture of the setting and topic under consideration. Thus, most qualitative studies use multiple forms of data gathering in order to provide those additional perspectives.

Analysis and reporting of qualitative data

Qualitative data analysis involves “the search for pattern in data and for ideas that help explain why those patterns are there in the first place” (Bernard, 2000). Most of the raw data produced by qualitative research is in the form of text, including transcripts of in-depth interviews and focus groups, descriptions from direct observations. This creates challenges for analysis and interpretation, as there are not standard approaches for

working with textual data in the same ways that exist for numeric data.

One principle of qualitative data analysis is clear: there must be continuous and ongoing engagement with the data. The qualitative researcher reviews transcripts (written up interviews, focus groups, observations) on a regular basis and may share findings with other data collectors, the lead researcher, or in some cases, with local informants (which Bernard refers to as “a constant validity check”) (Lincoln and Guba, 1985).

Qualitative data analysis can take one of two main strategies: categorizing or contextualizing. Categorizing strategies for qualitative data analysis involve the cutting and reorganizing of text so that similar items are grouped together (the editing approach). Software programmes such as N6, NVIVO and others have been developed to streamline the process. A related categorizing strategy involves the use of codes and

coding manuals, where sections of text are assigned one or more codes to aid in later manipulation, organization and retrieval.

Contextualizing strategies for qualitative data analysis involve searching for information in texts that fit a broad framework. So for example, an examination of chronic disease might explore the perceived causes of the disease, who is affected by it, what is done about the problem and so forth.

The write-up of qualitative data can take many formats: a formal report, a descriptive monograph (sometimes in the form of ethnography), articles for publication, website brief reports and so on. Within each of these formats, data may be presented in multiple ways, including the use of quotes, tables, matrices, maps and diagrams, taxonomies and decision trees and conceptual models (see Miles and Huberman, 1994 as an excellent resource on forms of presentation) ■

ANNEX VII. SUGGESTED COMPONENTS OF A SURVEY REPORT

One of the primary means of disseminating the results of the study will be in the form of a report. Some key components of the report are suggested below.

EXECUTIVE SUMMARY

This is a stand-alone executive summary for decision-makers that highlights key issues, policy and programmatic implications, and suggests strategies.

In the Barbados Food consumption and Anthropometric Study the executive summary was constructed as a “Tool for Decision-makers” and was used as the basis for a two-day seminar to discuss the survey findings and the implications. The Summary was used as a stand alone document which provided a brief overview of the methods, summarized the main findings and presented some key policy and programme issues for further research/intervention.

ACKNOWLEDGEMENTS

Be sure to acknowledge funders, study participants, etc.

INTRODUCTION AND LITERATURE REVIEW

The literature review is frequently minimal in a report. However, sufficient review is required to identify gaps or biases in existing knowledge and to establish the need for the work.

GOALS/OBJECTIVES/RESEARCH QUESTIONS

This may include some description of the evolution of the research question(s), particularly the qualitative research questions.

ROLE OF THE RESEARCHER(S)

It is important to position the research within a particular historical and locally specific time and place. For the qualitative write-up, this may include disclosure by the

author of his/her biases, values and context that may have shaped the report/narrative.

METHODS OR PROCEDURES

This section will include a brief description of the field site(s)/setting, sampling procedures (along with a table describing the samples), phases of the research (Plan of Work), short descriptions of qualitative methods and the process of developing the FFQ instrument, components of the research (instruments and techniques), selection and training of data collectors, languages used, and how the data were managed and analysed.

RESULTS OR FINDINGS

- Start with simpler forms of presentation;
- Be selective;
- Use quotes/charts/diagrams/models/tables;
- Consider use of case studies;
- Can include a detailed description of the setting;
- Consider dividing into sections, by objective/goal;
- Sections may begin with an illustrative quote.

DISCUSSION AND INTERPRETATION

This may include linkages with theory.

RECOMMENDATION AND CONCLUSIONS

- Programmatic;
- information dissemination;
- research.

REFERENCES

APPENDICES

- Data collection instruments;
- glossary of local terms and their rough english equivalents;
- detailed description of methods;
- additional results, tables



FIVIMS 

 **Caribbean Food and Nutrition Institute**

 **Pan American Health Organization**
Regional Office of the World Health Organization