

Part 1.

Improving food security information from country experiences

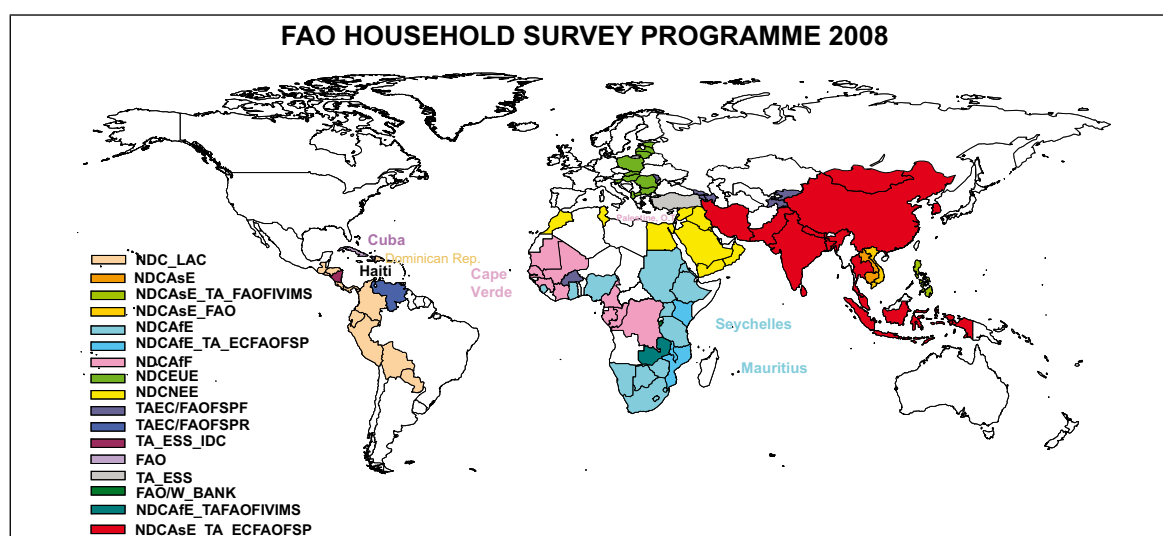
Deriving food security statistics from national household surveys: experiences, achievements and challenges

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ABSTRACT

The FAO Household Survey Programme (HSP), which started in the mid-1980s, has helped many countries to improve the capacity of their national statistics offices (NSOs) concerning the derivation of food security statistics from national household survey (NHS) food consumption data. In 1994, HSP published the *Compendium on Food Consumption* and the *Sixth World Food Survey* as inputs for the World Food Summit (WFS) held in 1996. Since then, HSP has provided technical assistance to countries through regional seminars and workshops on how NSOs can estimate food security statistics from NHS data. Six regional workshops, in Asia (Bangkok 2002), English-speaking Africa (Accra 2003), Eastern Europe (Sinaia 2004), the Near East (Cairo 2005), French-speaking Africa (Bamako 2007) and Spanish-speaking Latin America and the Caribbean (San José, Costa Rica 2008) have covered 79 countries. Country representatives from NSOs and national institutions involved in food security have implemented the FAO methodology for estimating food deprivation (hunger) at national and sub-national levels. Participants from 12 country projects and four countries participating at the recently launched International Demonstration Centre (IDC) on Food Security and Consumption Statistics at FAO Headquarters have prepared technical reports on food insecurity assessments based on NHS data. This paper discusses the results, main issues and challenges for future development arising from these experiences to improve the statistical capacity of NSOs to produce food security statistics at national and sub-national levels, and of national food security units to perform food security analyses for national and international stakeholders.

Keywords: food security statistics, household surveys, food deprivation



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BACKGROUND

Within the framework of its Household Survey Programme (HSP), FAO has implemented three major activities to support countries in strengthening their statistical capacity to analyse the food consumption data collected in national household surveys (NHS) conducted by national statistics offices (NSO). These activities are: 1) regional workshops, known as national demonstration centres (NDCs) on food consumption and security statistics from NHS, implemented in support of the Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS) initiative; 2) the FAO Headquarters International Demonstration Centre (IDC) on Food Consumption and Security Statistics from NHS, for training country technical teams on food security in support of country projects financed by sources as the European Community (EC)-FAO and the World Bank; and 3) technical assistance for on-the-job training projects at the country level. Since 2002, HSP has covered 85 countries: 68 countries through the NDCs; four through IDC, which was launched in November 2006; and the remaining 13 countries through technical assistance within the framework of country projects, such as the EC-FAO Food Security Programme. Three IDC countries have been supported by EC projects and one by its own financial resources.

OBJECTIVE

The main objective of this paper is to discuss how experiences and achievements can help to overcome challenges in the search for ways to improve food security statistics and information that support committed national decision-making platforms in the fight against food deprivation and poverty.

EXPERIENCES

National demonstration centres

The NDCs on food security and consumption statistics from NHS were initially designed to review and discuss what could be done with the available NHS data collected on food consumption (in quantities and monetary values), income, non-food consumption and other household and member characteristics. The first NDCs were seminars rather than workshops, and few participant countries were able to produce food security statistics at the time.

Since 2002, the NDCs have been designed to work with NHS data to produce food security statistics. The NDC in Asia involved officers from the NSO only. This experience made it clear that deriving food security statistics is a rewarding challenge from a data processing and statistical analysis viewpoint. It was also clear, however, that users from various national sectors and the international community were unable to interpret food security statistics and were unaware of the possibility of producing them from already collected data. The NDC in Asia underlined the importance of collecting, processing and reviewing inconsistencies of data on food quantities consumed and the corresponding monetary values. It also made evident the importance of collecting food consumed data in standard measurement units, such as kilograms and grams for solid food items, and litres and millilitres for liquid and semi-solid food items. Several participating countries have improved their NHS as a result of this NDC.

The 2003 NDC with English-speaking African countries, in Accra, involved an officer from the NSO and one from national institution in charge of food security for each participating country. Producers and users of food security statistics interacted in the review of questionnaire design, data processing, statistical estimation and analysis, interpretation of the statistics produced, and presentation of findings.

The NDCs conducted in 2004 in Romania with Eastern Europe countries, in 2005 in Egypt with Near East countries, in 2007 in Mali with French-speaking

African countries and in 2008 in Costa Rica with Spanish-speaking countries in Latin America and the Caribbean involved the corresponding two national officers from each participating country. These NDCs have enabled software improvement to take place, speeding up productivity and ease of use of FAO's Food Security Statistics Module (FSSM), which is a set of statistical programs.

Technical assistance to on-the-job training projects

Simultaneous to implementation of the NDCs, technical assistance to on-the-job training of data processing and statistical analysis was provided by the FAO Statistics Division in countries participating in projects to improve food security information for supporting decision-makers on food security policies and actions. In 2002, four countries from the Commonwealth of Independent States (CIS) were supported by the EC within the framework of the EC-FAO Food Security Programme. In 2004 and 2005, four countries in Africa and Asia were supported by FIVIMS and World Bank projects. In 2006 and 2007, 13 countries from the CIS, Asia, Africa and the Caribbean were supported by the EC within the framework of the EC-FAO Food Security Programme. All countries have prepared national technical summary reports entitled *Food insecurity assessment based on food consumption statistics derived from the NHS*, using their most recently conducted national surveys. Most of these countries participated in the Side Event on Food Security Statistics and Information for Targeting Poor and Hungry Populations at Sub-national Levels, at the Fourth International Conference on Agriculture Statistics (ICAS-4) held in 2007, Beijing, and supported by FAO in the framework of the EC-FAO Food Security Information for Action Programme.

The International Demonstration Centre

The IDC on Food Security and Consumption Statistics from NHS was launched in November 2006 in response to country requests. IDC is located at FAO Headquarters and provides country participants with the opportunity to perform data processing, statistical analysis, report writing and dissemination of food security statistics. During the one-month training period, officers from each country's NSO, nutrition office and food security institution, work together as a team to produce a draft summary report to be presented to national and international stakeholders at a national seminar.

METHODOLOGICAL ISSUES

The training activities in more than 80 countries implemented through NDCs, IDC and direct technical assistance have provided outputs that merit close review. The methodological issues derived from these experiences are discussed in this section.

Scope, purpose and sample size of the NHS

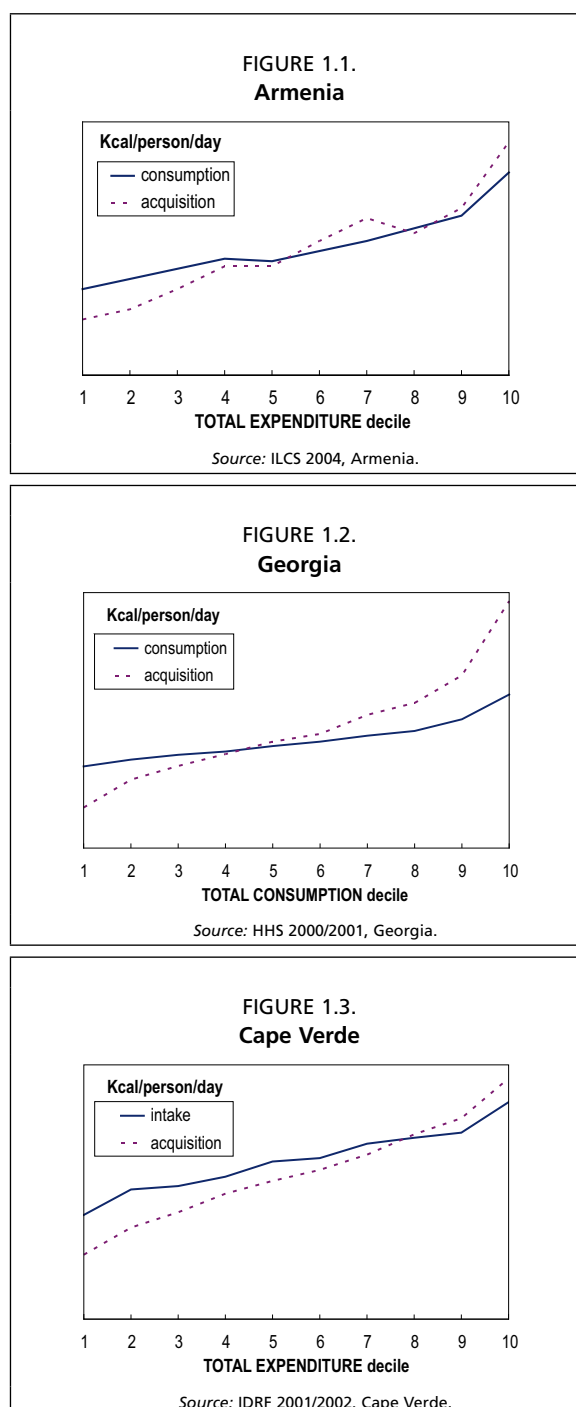
The main purpose of conducting an NHS is to assess poverty, in order to provide inputs for national accounts and the elaboration of consumer price indices (CPIs), both total and food. Although most NHS collect food consumption data in quantity and monetary values, only a few countries process data on food consumption in quantities, limiting the estimation of statistics to those related to food monetary value. National counterparts in food data analysis have realized that many NHS require additional work for the estimation of food security statistics, in particular for estimating the prevalence of food deprivation. Modifications are required to NHS, diary designs and, in some cases, data collection procedures, to add value to ongoing NHS by including food security statistics as an extra purpose. In 2003, the International Conference of Labour Statisticians at the International Labour Organization (ILO) included food security as a purpose of household surveys of food consumption data. The sample sizes of most NHS are too small to yield reliable food security statistics at sub-national levels to match administrative criteria. Larger

sample sizes may be needed to obtain food security statistics at such sub-national levels as provinces and to obtain identifiers and underlying factors of food insecurity.

Food data as acquisition versus as consumption

Most current questionnaires capture food data using the acquisition approach, that is, food acquired during the household reference period, regardless of when it was consumed. The effect of using acquisition data on food security statistic estimates is to flatten the distribution of food within the population, as illustrated in Figures 1.1 to 1.3 (Martirosova, 2007; Kvinikadze, Pantsulaia and Sibrian, 2007; Pereira, Troubat and Sibrian 2007).

FIGURES 1.1 TO 1.3.
Dietary energy from food data collected using acquisition and consumption approaches

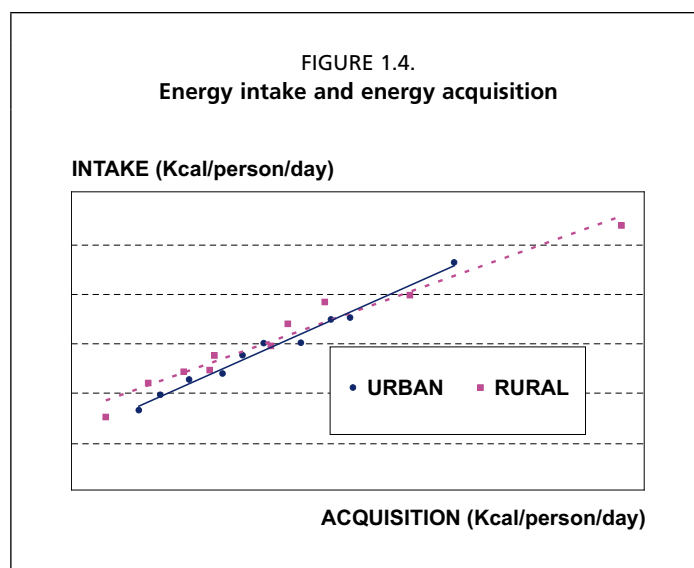


In all three cases, the use of food acquisition data led to underestimation of food consumption or intake in households of low income levels (proxy total expenditure or total consumption) and overestimation of high income levels in households; hence, food deprivation was overestimated in low-income population groups, and underestimated in high-income population groups. The pattern of under or overestimation differed among countries.

Estimating food consumption from food acquisition

In Georgia, the NHS for 2001/2002 provided inputs for estimating consumption from acquisition in the Integrated Household Survey (IHS) for 2005.

In Cape Verde, intake and acquisition in a sub-sample of households allowed the estimation of intake from acquisition for the complete sample of households in the 2001/2002 Household Expenditure and Income Survey (IDRF - *Inquérito Às Despesas e Receitas Familiares*). Figure 1.4 illustrates the relationship between intake and acquisition in the sub-sampled households, for both urban and rural populations.



Data on food given away

The majority of diaries and questionnaires do not capture transfers of food (in-kind) to other households or people as payments, and only a small number record food received as payments. The sharing of prepared food with visitors or workers is usually not recorded. As a result, the food data recorded in high-income households are overestimates, and in low-income households are underestimates. High-income households hire workers from low-income households. High-income households tend to be food givers, while low-income households tend to be food receivers. The effect of this over and underestimation of dietary energy consumption (DEC) is to produce an apparent distribution of food that is more unequal than it really is, particularly in rural populations (Kachaka, Mtembezeka and Chilimbila, 2007).

Data on food from own production

A significant proportion of households in rural areas produce food for own consumption. Most NHS questionnaires capture food consumption from own production, but few capture the quantities of a household's total production that it consumes itself during the reference period. This results in several NHS for Africa overestimating food consumption from own production in rural areas. As a consequence, food consumption is overestimated.

Data on food for non-consumption

Data on food acquired for purposes other than consumption should be clearly separated from data on food for consumption by household members. Food for re-sale may also be consumed, and if the portion of food for re-sale that a household consumes itself is not recorded, food consumption will be underestimated. Conversely, if all food for re-sale is recorded as consumption, then food consumption will be overestimated. Households' food industries may also be a source of household food consumption; if the portion of food produced that is consumed by the household is not recorded, food consumption will be underestimated; if all the food items used in the household food industry are recorded as consumption, food consumption will be overestimated. This situation is more frequently observed in urban households.

Data on food wastage

A significant proportion of the food acquired may be wasted during preparation as non-recycled leftovers and as leftovers on serving plates; this is highlighted in a study from Ankara, Turkey (Peckan *et al.*, 2005). The share of food wastage varies by food item and season. Food wastage also varies with households' income level and the amount of food they acquire and consume, as found in a study based on reported food intake and food consumption data in the Philippines (Sibrian, Komorowska and Mernies 2005). Food that is consumed away from home may also be wasted. Few NHS collect data on food wastage, which can range from negligible levels to more than 25 percent in terms of dietary energy. Food leftovers that are recycled for future meals or for feeding animals are not considered as food wastage. The consequence of not removing food wastage is thus overestimation of food consumed.

Data on food for animal feeding

Few NHS questionnaires include a section on food for human consumption that is also used to feed animals in or near the household. In urban households, pets (cats and dogs) benefit from food prepared for household members; in rural households, animals for production (pigs, hens, etc.) and pets share the food prepared for family members. An important amount of food can be devoted to this purpose. The share of food, prepared, raw or left over, for animal feeding is not considered as food consumption, but as food for non-consumption. In many cases, food leftovers for animal feeding are not food wastage.

Data on food sources

Food sources vary. The most important in the context of livelihoods are purchases for home preparation and food eaten away from home in urban areas, and own production and purchases in rural areas. In some countries, other sources include institutional food aid, such as for maternal and child care, food aid and school feeding. Few NHS record food received as payment, given by relatives and others, or gathered from fields or through hunting. Very few NHS also record food given away as payments or gifts. Most NHS use the classification of individual consumption by purpose (COICOP) coding system, which includes non-alcoholic and alcoholic consumption and food eaten away from home as food consumption. Tobacco consumption is considered non-food consumption.

Data on food description

Most NHS describe food items very briefly. In some, food items are grouped, which can lead to misinterpretation of food item descriptions when matching with food composition tables (FCTs). Mismatching of food items is a source of bias in energy and nutrient value estimations. The NHS lists of food items are often too short, and

are rarely very long. In many countries, non-standard measurement units (bundles, packs, cups, heaps, plates, cans, bags, boxes, etc.) vary significantly in weight or volume among food products and regions. This practice poses a serious threat to the use of food quantities for estimating nutrient consumption. Additional information on food items improves their identification in FCTs. For example, the specification of cooked or raw, with/without bones or skin, dry/semi-dry/non-dehydrated, fresh/canned, lean/fatty, sweetened/unsweetened, homogenized/non-homogenized and with/without non-edible portions has allowed better nutrient consumption estimates to be made. In NHS, non-standard measurement units are standardized using food samples and units from different local markets. Some NHS have prepared conversion tables for this purpose. These state average typical units of, for example, 125 grams for tomatoes and 50 grams for eggs. In most NHS, exogenous density factors are used to convert volumetric measurements of liquid or semi-liquid food items to their equivalent gram weights.

Data on food prices for own production/business consumption

When household food expenditure is not available because of own production of food items on farms, in household food industries or from re-sale businesses, a detailed description of the food items consumed allows estimation of the monetary value of food consumed, by matching food items consumed with local market prices collected during the survey period, at the community level, which is the lowest administrative unit of sampled households. These data are useful for consistency checking of food prices at both household and local-market levels. Food item prices collected from the local market are also useful when adjusting for price seasonal variations over the NHS period.

Income and total consumption expenditure aggregates

Using the FAO methodology, food security statistics require income or proxy total consumption expenditure data for estimating food consumption and inequality in access to food owing to income level. Income is generally difficult to aggregate, and proxy total consumption expenditure is useful for ranking households on a per capita income level basis to estimate the inequality of food consumption owing to income within a population. In low-income households, a large share of total consumption is devoted to food. The quality of the estimates of income, total consumption expenditure and food expenditure (the monetary value of food consumed) is also important for estimating the prevalence of critical food poverty. In NHS, total consumption expenditure is used more frequently than income for estimating the prevalence of both food deprivation and critical food poverty.

Gender analysis

Gender analysis studies of food insecurity have been prepared from NHS. Food security statistics, such as the prevalence of food deprivation and of critical food poverty, DEC, income, food expenditure, and dietary energy cost have been differentiated between female and male-headed households in urban and rural populations in Georgia, Cambodia and the Philippines.

COMPLEMENTARY DATA

Sex and age population structure

The minimum dietary energy requirement (MDER), which is needed for deriving the prevalence of food deprivation and of critical food poverty at sub-national level, are estimated in most NHS using the sampled age and sex population structures of the corresponding sub-national population groups.

Attained heights by sex and age

Few NHS collect height data contemporaneously with food consumption data. Some NHS are conducted independently from anthropometric surveys, but during the same year. In both situations, MDER is estimated using updated height data. When no updated height data are available, previous survey data are used; when these are not available, heights from a similar country are used.

Minimum dietary energy requirement

The amount of energy required by an individual varies by sex, age, body weight for attained height and physical activity level. MDER is the average minimum energy requirement, corresponding to the minimum normative weight for height for a given age and sex for sedentary physical activity levels. The estimation of MDER is based on data of attained heights by age and sex in the sampled population, at national level or from other height data, and the age and sex population structure of the sampled population or at national level.

The minimum levels of DEC are derived from the FAO/World Health Organization (WHO)/United Nations University (UNU) 2001 Expert Consultation on Energy Requirements, published in 2004, for different sex and age groups, for minimum acceptable body weight for attained height to maintain weight and growth while performing minimum acceptable light physical activity and to maintain a healthy life.

The cost of MDER

The cost of MDER is valued at energy-yielding nutrient cost (proteins, fats and carbohydrates). The costs of protein, fat and carbohydrates are based on the food consumed by households in the lowest income quintile, which is assumed to be within the reach of the entire population. MDER is nutritionally balanced when proteins, fats and carbohydrates contribute 12.5, 22.5 and 65 percent, respectively, as recommended by experts (WHO, 2003). In many countries, the cost of a balanced MDER for estimating the critical food poverty line is significantly higher than the cost of the current MDER based on food prices for the food consumption pattern of households in the lowest quintile; in countries with a near-to-balanced food consumption pattern, the balanced MDER is similar to the current MDER. In these countries, households in the lowest income quintile have access to food of proper nutritional quality.

Statistical frameworks

As FSSM uses the FAO methodology, the prevalence of food deprivation and critical food poverty are estimated based on the parametric approach. Other approaches are not taken into consideration because of their weaknesses; more details on this are discussed in Sibrian, Naiken and Mernies, 2007.

CHALLENGES

The major challenges for the near future concern improvement of NHS and national capacities to implement statistical procedures and analyse the food security statistics derived from food consumption data collected for the NHS and other surveys in a multi-sectoral manner, for better policies and interventions.

NHS improvement

Several countries have realized that NHS can include a section that estimates food acquisition as inputs to the elaboration of CPIs and national accounting system, and a section that estimates food consumption for the purpose of food security assessments. The changes required to existing questionnaires and diaries are

relatively small compared with the benefits of expanding the usefulness of NHS for food security, as recommended by the ILO International Conference of Labour Statisticians in 2003.

Few countries have sections on sub-sample nutrition surveys for estimating intake. Food intake measures what household members have actually eaten, using direct weights or recalling methods based on food models to estimate the quantities of food eaten. The nutrition survey module is similar to food consumption modules, but nutrition surveys can be complex and expensive because they involve calculating the ingredients in prepared food. The food consumption data collected in NHS consider the food items consumed as those acquired, taking into account food given away to other households or people and prepared food used for purposes other than consumption by the sampled household members. In this sense, food consumption lies somewhere between food acquisition and food intake. Nutrition surveys are usually undertaken on small samples of households and preclude the identification of food-insecure population groups; NHS usually collect food consumption data for more disaggregated levels, such as geographical regions and household characteristic criteria. Other developments linked to NHS improvements regard the input data for estimating MDERs, such as attained heights for given age and sex.

Statistical capacity improvement

The statistical capacity of NSOs varies from country to country. Many NSOs are specialized in collecting data, but leave statistical analysis to users. There have been good results achieved by multi-sectoral teams working on cross-cutting issues such as food security. Food security is an important national subject for economic (agriculture, trade, labour, industry, commerce, etc.) and social (health, education, housing, etc.) sectors. Support from research and academic institutions, and a productive international community interacting and coordinating policies and interventions are also important.

The producers of food security statistics and indicators (NSOs, nutrition offices and ministries of agriculture and of trade) interact with users in the task of monitoring food insecurity. NSOs face increasing demand from users, and hence require more support in building their statistical capacity.

Policy analysis and interventions with an impact on food security

Every stakeholder in food security has its own role in monitoring food security at national and sub-national levels. Many countries have already set up national multi-sectoral working groups on food security, but others still lack these, for various technical or political reasons.

CONCLUSION AND REMARKS

NHS are major sources of information for deriving food security statistics and indicators that can help in making decisions with a positive impact on food security.

NHS can incorporate food consumption and food acquisition, focusing data collecting procedures on household member characteristics.

NSOs can process and analyse food security statistics and indicators, jointly with users, for the purpose of assessing and monitoring food insecurity at national and sub-national levels.

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