NATIONAL NUTRITION INFORMATION SYSTEM

The Fundamentals Series

Module 04

What are the main attributes of a national nutrition information system?

Acknowledgements

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PDF versions of these modules can be downloaded from the following website:
https://data.unicef.org/resources/nutrition-nnis-guides/
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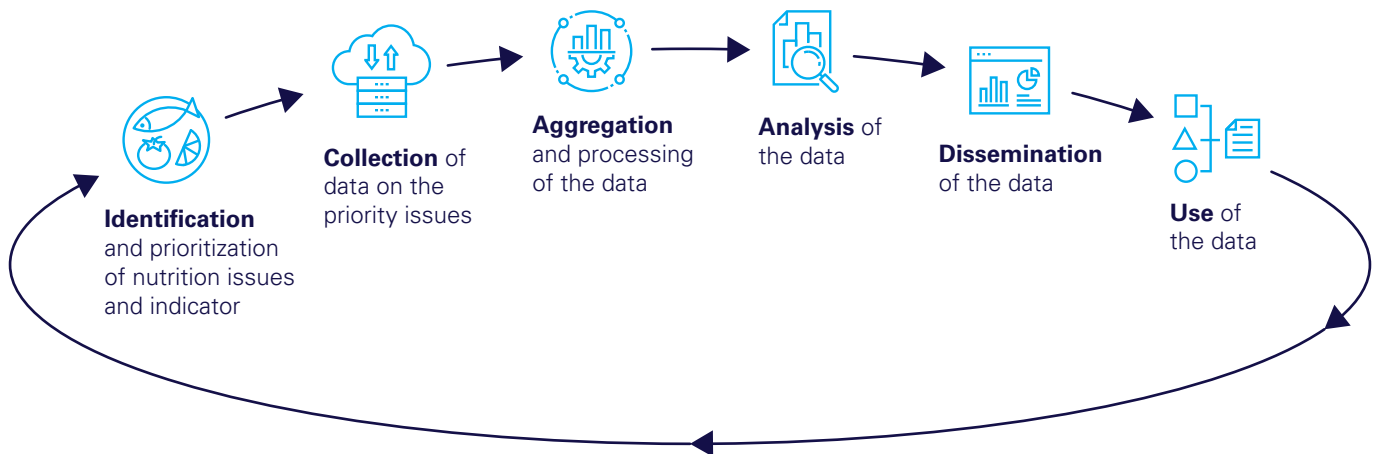
Module 04

What are the main attributes of a national nutrition information system?

The main attributes of a national nutrition information system (NNIS) are a mix of processes and data. An NNIS uses this mix to identify and extract value from data to support national nutrition policies and programmes:

- Identification and prioritization of nutrition issues and indicators

- Collection of data on the priority issues

- Aggregation and processing of the data

- Analysis of the data

- Dissemination of the data

- Use of the data

The progression of the main attributes creates a data value chain for nutrition. This value chain is a framework used to guide the transformation of raw data into a vital resource, which can give stakeholders (government, civil society, academia, etc.) a better understanding of what is happening with nutrition and can help them make better decisions to improve specific programmes.

Information systems evolve over time. New data become available; better ways to collect and process data are implemented; and the analysis and use of data becomes more sophisticated. However, the main attributes of an NNIS are flexible enough to adapt to this evolution while maintaining the overall integrity of the data value chain.

Identification and prioritization of nutrition issues and indicator

Collection of data on the priority issues

Aggregation and processing of the data

Analysis of the data

Dissemination of the data

Use of the data

Main attributes of a national nutrition information system: Nutrition data value chain

IDENTIFICATION AND PRIORITIZATION OF NUTRITION ISSUES AND INDICATORS

The issues included in the NNIS should align with the country's nutrition priorities, which are typically captured in a multisectoral national nutrition policy, strategy and/or plans. The corresponding indicators should be selected because they capture relevant data on key aspects of the activities, outcomes and/or targets associated with the nutrition priorities. It is also important to confirm data are available for the selected indicators; this information may be available in monitoring and evaluation frameworks and/or plans.

It can be a challenge to identify and agree on a manageable number of priority issues and indicators to incorporate in an NNIS. It is important that these decisions be taken through an inclusive process. For example, a representative working group of stakeholders, led by government, can be an effective way to manage the process of determining which national nutrition priorities should be included in the system.

There can be pressure from different sectors, stakeholders and partners to monitor a large and diverse set of issues and indicators, some of which may not be national priorities. However, international experience has shown that efforts to monitor an extensive set of issues and indicators can be impractical because the capacity to implement the necessary data collection, processing and analysis is limited. The resulting burden undermines the quantity, quality and utility of the system.

Questions to consider...

- **Does the country have clear national nutrition priorities? Are the priorities identified in order of importance? In other words, are the priorities "prioritized"?**
- **Is there a consensus on the nutrition priorities among key stakeholders? If not, what can be done to secure agreement on the priorities that will be included in the NNIS?**
- **Are there systems in place that can be used to collect accurate and timely data on the priorities? Are key indicators part of a national nutrition monitoring and evaluation framework?**

COLLECTION OF DATA ON THE PRIORITY ISSUES

Once the issues and indicators to be included in the NNIS have been selected, the next step is to identify the sources of data for these issues and indicators and work with them to ensure timely access to quality data.

There are three main sources of data on core nutrition indicators: 1) routine data (e.g., facility data and programme/project monitoring data); 2) survey data; and 3) surveillance data. In general, collecting data from multiple sources can provide a more comprehensive picture of the situation, with data from various sources complementing each other. Every country needs to identify the most appropriate data sources to meet its nutrition information needs and determine what data are available from those sources that align with the selected indicators. The process of reviewing the data and data sources is also an opportunity to reconfirm whether the selected indicators actually reflect the nutrition priorities in the country.

Routine data typically come from health facilities and nutrition-related programmes and projects.

Health facilities are a source for patient data entered in a health management information system (HMIS), such as the District Health Information Software 2 (DHIS2). They are also a source for aggregate data on critical issues (e.g., growth monitoring) taken from registers and reported upward at regular intervals. Data from nutrition-related programmes and projects reflect their activities (e.g., counselling on breastfeeding, counselling on dietary diversity, food fortification, micronutrient supplementation, treatment of acute malnutrition and treatment of anaemia). Ideally, these data also reflect the link between the activities and nutrition priorities being monitored in the NNIS.

Survey data can be generated using a wide range of instruments, including periodic, large-scale population-based surveys, recurrent facility surveys, and one-off targeted surveys designed to collect specific information about a specific population at a specific point in time. Two examples of well-established instruments used to collect nutrition data are the

Demographic and Health Survey (DHS), which collects data on nutrition as one part of a larger survey on various health-related issues, and the Multiple Indicator Cluster Surveys (MICS), which collect household-level data on various issues, including nutrition, that are relevant to women and children. In addition, the SMART methodology (Standardized Monitoring and Assessment of Relief and Transitions) is often used for national and subnational nutrition surveys to collect data for development and emergency/humanitarian purposes.

Surveillance data are collected at specific time intervals as part of an ongoing process to monitor trends and identify signs of current and/ or potential changes in nutrition programmes and the nutrition status of a selected population.

The ongoing or repeated nature of the data collection is the cornerstone of an effective surveillance system. In general, surveillance data are collected using two approaches: 1) repeated representative or cross-sectional surveys; and 2) recurrent monitoring at selected locations (e.g., health facilities and schools).

Questions to consider...
- **What are the reliable sources of nutrition data? Do these sources have data for the priority issues and indicators? What are the strengths, weaknesses and gaps in the data that are available?**
- **What checks and balances are in place to ensure the quality of the data being generated and collected?**

AGGREGATION AND PROCESSING OF THE DATA

There are a number of critical activities to prepare data for analysis, including data cleaning, classification, coordination, quality, storage, privacy and security. These activities may be carried out by data sources and/or the core team responsible for the NNIS. All of these activities are standard procedures for individuals and organizations with experience working with data.

Data cleaning. Identify inaccurate, incomplete and/or questionable data and correct any errors or omissions. The process also removes major errors and inconsistencies that are inevitable when multiple sources of data are being aggregated in one data set. Data cleaning is an integral part of ensuring the quality of the data and the quality of the analysis.

Data classification. Organize data by relevant categories so they can be used more efficiently and effectively. The process of data classification is to tag data to make them more searchable and easier to retrieve. It also enables better cross-referencing. Data classification can be considered a component of data coordination.

Data coordination. Bring together data from different sources to prepare it for analysis. This process is also referred to as data curation or data collation. Data coordination is a way to manage data in order to make them more useful, including improving the interoperability of

data and data systems to ensure that users are getting a well-rounded picture of the situation.

Data quality. Ensure consistently high-quality data are collected and used. There are many different frameworks and tools for assessing and improving data quality. In general, these frameworks and tools address issues such as the completeness, consistency and timeliness of the data. Many countries have data quality systems in place that can be adapted for use with nutrition data.

Data storage. Establish and maintain a secure and accessible way to store the data that are collected. The storage system must take into account who needs access to the data and how these data are being used. There are advantages to a centralized storage system, but it is also possible to have a distributed system where different data sets are stored and accessed in different places.

Data privacy and security. Ensure the NNIS is in compliance with the relevant laws and policies for data privacy and security. Data privacy focuses on how data are collected, processed, shared, stored and deleted. Data security is the policies and procedures in place to prevent any unauthorized access to and use of data.

Questions to consider...
- **Is the technical expertise required to complete the various tasks related to aggregating and processing the data**

generally available in the country? Are mechanisms in place to hire and/or retain staff or consultants with this expertise?

- **Are the systems, tools and equipment need for the work in place? If not, what needs to be developed and/or sourced?**

- **Do the managers who would oversee implementation of the various tasks have the knowledge and skills to do the job?**

ANALYSIS OF THE DATA

Analysis is the opportunity to extract useful knowledge and insights from the aggregated data. There are many different variations of analysis that can be done with data in an NNIS. The main types of analysis are:

Descriptive analysis. Uses data to show *what is happening and/or what happened*. It is the most straightforward type of data analysis. Its ability to assess performance also makes it a widely used type of analysis. Findings are often displayed on data dashboards. For example, the DHIS2 health management information system supports basic descriptive analysis and data visualizations such as dashboards.

Diagnostic analysis. Uses findings from descriptive analysis as the basis for a more in-depth analysis of *why something happened.* This type of analysis looks for connections between different data points and data sets, including possible trends. It is also useful for considering factors and events that help explain the outcome.

Predictive analysis. Uses findings from descriptive and diagnostic analysis to understand *what is likely to happen*. This type of analysis produces estimates, the accuracy of which depends on the quality of both the available data and the analysis. Predictive analysis is a more difficult type of analysis to undertake.

Prescriptive analysis. Organizations with sophisticated skills and technology may also be able use this advanced type of analysis, which attempts to determine *what is the best course of action to take.*

Data analysis is most effective when it follows a clear and thoughtful plan. A good data analysis plan is a road map to guide and focus the process, ensuring it aligns with the national nutrition priorities and making sure the analysis is providing stakeholders in the NNIS with the knowledge and insights needed to make well-informed decisions. The plan can consider where triangulation of data from different sources may be necessary and/or beneficial to fully understand a situation. A good analysis plan does not have to be complicated. It can be very effective to start with the basics and refine the plan — and the analysis — over time.

Data analysis is increasingly using graphics or **data visualization** to make the findings more understandable and useful. Charts, graphs and maps are some of the most frequently used visualizations, but there are dozens of options that can bring data to life in ways that spreadsheets and data tables cannot. For example, communicating data visually can allow trends and patterns to be more easily recognized.

Questions to consider…

- **Is it feasible to build consensus among key stakeholders around the practical priorities for analysing the data? Is the expertise to conduct the data analysis generally available in the country (i.e., within government, academia, civil society organizations, multilateral organizations, donor organizations or programme implementers)?**

- **What types of data visualizations would best highlight the status of nutrition priorities and programmes? Who could be involved in developing effective data visualizations?**

DISSEMINATION OF DATA

The contributions of an NNIS to nutrition programmes depends on the active and ongoing dissemination of the findings from the data analysis. These findings are a valuable resource that play an essential role in improving the understanding and use of the nutrition data. Consequently, a good dissemination plan is as important to the success of an NNIS as a good data analysis plan.

The importance of active dissemination must be emphasized. In an era of vast quantities of information, a passive approach that simply makes the findings and supporting data available is inadequate. Active dissemination uses a focused plan and specific steps to ensure key audiences receive relevant information on a regular basis. It uses the dissemination process to engage stakeholders with the information.

In addition to active dissemination, it is equally important to provide open access to the findings and data to the full range of stakeholders and interested parties, from the general public to politicians. The combination of active dissemination and open access is an effective way to ensure the findings and data in the NNIS are an integral part of efforts to strengthen

nutrition programmes and improve nutrition outcomes.

Different stakeholders have different information needs and an NNIS needs to be able to present and disseminate information in a range of formats that are appropriate for different groups and types of stakeholders. Many countries use scorecards to present information on core nutrition indicators in an accessible way to policymakers and decision makers; others are data visualization tools to build nutrition dashboards. In recent years, social media has become a powerful way to bring key data points to the attention of decision makers. Traditional approaches such as workshops, meetings, journal articles and the mainstream media also continue to be valuable channels for dissemination.

Questions to consider...
- **How widely are nutrition-related data circulated currently? What obstacles must be overcome to ensure open access to the NNIS data and findings?**
- **How could better dissemination of nutrition-related data be a useful tool for advocacy and awareness?**

USE OF THE DATA

While every attribute of an NNIS is individually important, the integrated use of data to improve decision-making should be the driving force behind the system. Specifically, the NNIS can enable stakeholders to take an evidence-based approach to assessing, planning, developing and implementing programmes.

In general, the use of data generates demand for more and better use of the data, as well as demand for more and better data. These demands are the reason why it is so important to understand how and why data are being used and to feed that information back into the NNIS processes. This information can influence the NNIS in multiple ways, ranging from the indicators used to collect data to the sources of data to the types of analysis and visualizations.

The combined challenge and opportunity is to build a culture of data use around nutrition, to encourage stakeholders at every level —

frontline workers to policymakers — to consider the data when thinking about nutrition. The data generated by the NNIS may not lead to a single conclusion or an obvious course of action, but they will provide stakeholders with a strong foundation for realistic discussions about the current situation and possible ways forward. Ultimately, a commitment to data use and evidence-based decision-making has the potential to transform how nutrition issues are understood and addressed in a country.

Questions to consider...
- **Are there sectors in the country where there is a strong culture of data use? What can be learned from these sectors about building a culture of data use around nutrition?**
- **How would an evidence-based approach to nutrition change how decisions are made? Would managers be willing to take an evidence-based approach to their work?**

KEY TERMINOLOGY

Data	Facts and/or figures; pieces of quantitative or qualitative information
Database	An organized collection of data stored electronically for rapid search and retrieval
Data provider	An organization that produces data; may be referred to as a data generator; see also data source
Data source	Type of data and/or modality of data collection (e.g., routine data, survey data); can also be synonymous with data provider
Data value chain	A framework used to guide the transformation of raw data into a valuable resource to better understand situations and improve decision-making
Disaggregated data	Data that have been broken down into detailed sub-categories (e.g., by age, gender)
Indicator	Indicators make collected data understandable and useful for monitoring performance, assessing achievement and determining accountability. They can be used to determine a proportion (e.g., prevalence) and are often designed to track inputs, outputs, outcomes and impact.
National data	Data that are common to or characteristic of a whole nation; see also subnational data
Qualitative data	Data collected using qualitative methods, such as interviews, focus groups, observation and key informant interviews; generally expressed in narrative form, pictures or objects (i.e., not numerically)
Quantitative data	Data that are measured on a numerical scale, can be analysed using statistical methods and can be displayed using tables, charts, histograms and graphs
Routine data	Data continuously collected as part of a regular activity/procedure
Sentinel site	A dedicated location (e.g., facility, community) where surveillance data are collected
Subnational data	Data disaggregated by administrative units below the national level (e.g., provinces, districts, counties); may also include other breakdowns below the national level (e.g., urban, peri-urban, rural)
Surveillance data	Data collected on a recurring basis from designated locations (see sentinel sites) to provide insights on trends into a broader area and/or larger population