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Nutrition Challenges and Changing Food Systems: Global and National Perspectives

Diet Matters: Approaches and Indicators to Assess Agriculture's Role in Nutrition

Summary

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I. Key Issues

1) How can agriculture improve nutrition? To help answer this question, we need an information base that enables monitoring the impacts of policies and programs on diet. This paper focuses on the "food side" of the classic malnutrition causal framework, augmenting it with specific details on the links between agriculture, household food security and dietary intake, and referencing these links to entry points for specific interventions. The paper reviews indicators and data collection systems with the ability to measures progress along this framework by assessing individual dietary intake, household food on security and national food availability.

2) **Augmented causal framework**: A household's access to food is a key determinant of both the quantity and quality of individual diets. Households acquire food largely through purchase or own production. Interventions to enhance household production – such as those focused on animal husbandry, aquaculture, horticulture, or bio-fortification – can increase micronutrient and energy availability. Efforts to increase yields of cereal staples can also increase energy availability. However, home-produced food can usually be sold, so the net impact of increases in availability on household consumption is shaped by consumer knowledge and preferences, prices and income. Since income is a key determinant of purchases, increasing cash crop production can also affect consumption. Enhancing women's

agricultural production can have additional impacts, as women usually have a higher propensity for food spending than men.

3) Intra-household allocation behavior shapes how household consumption is turned into individual diets. This is influenced by many factors, including the education of household adults and their control over resources. Gender-sensitive agriculture to address women's constraints in access to tools, credit, and other inputs can enhance their position within households. Ultimately, the adequacy of individual diets is shaped by both intakes and requirements. By reducing energy expenditures and thus requirements, labor-saving agricultural technologies can improve the adequacy of diets. Similarly, water conservation and forestry projects can reduce the time spent, and the energy needed for collecting water or firewood.

4) **Individual-level measures**: To understand whether agricultural interventions translate into better diets, individual dietary status needs to be monitored. Dietary status is complex because of its multi-dimensional nature, so nutritionists have developed ways to aggregate dietary data into a single index. These include indices on the intake of nutrients in relation to requirements, such as the Mean Probability of Adequacy and indices of diet quality based on food group intakes, such as the U.S. Healthy Eating Index. These have been used to assess interventions and monitor population level changes in diet. As with all summary measures, aggregation results in lost information and requires judgments about how to weight individual items.

5) Collecting dietary data is time-consuming and requires trained enumerators. Because of these costs, substantial research has been conducted on simpler proxy indicators of dietary quality, such as the Women's Diet Diversity Score. These use simple food frequency tools to collect data, instead of a detailed 24-hour recall, and have been validated against various outcomes, including the summary nutrient intake indices described above. The proxies usually correlate well with these, but their predictive power is not strong. Additional problems include lack of universal thresholds for identifying adequate diets across countries as well as the error introduced from small quantities of intake that inflate diversity scores, but no nutritional relevance .

6) **Household-level measures**: Most agricultural interventions that improve diets operate through improvements to household food security, which is also a multi-dimensional phenomenon. Several types of indicators have been developed to assess it: (1) the food energy available to the household; (2) food poverty, which compares the value of a household's food consumption to the cost of an energy-adjusted, typical food basket; and (3) proxies for household-level dietary diversity, such as the Food Consumption Score. The first two are based on data from household income and expenditure surveys, commonly used in poverty monitoring. The third group uses much shorter household-level food frequency modules. None of these measures can address intra-household allocation, so dietary assessment is still needed to see whether improvements at this level are translated into improvements at the individual level.

7) **Population-level measures**: National measures of food supply assist in understanding the availability dimension of food security. The FAO Food Balance Sheet methodology enables calculation of the aggregate amount of food available for human consumption for a list of commodities. The sum of energy available from these foods is divided by the population size to estimate the available calories per capita. FAO uses this as well as additional information about energy needs and measures of variation from other data in order to create its Prevalence of Undernourishment indicator. Others have used food supply data to assess availability of specific nutrients in the food supply, or to assess the quality of the overall food supply. These measures allow for national comparisons over time, but cannot provide insights on the within-country distribution of food insecurity.

8) **Data collection systems**: A number of ongoing data collection systems contribute to our understanding of agriculture's role in diet. The Demographic and Health Surveys (DHS), funded by USAID, collect food frequency data on children (and previously women) that allowed for calculation of diet diversity scores, as well as anthropometry, infant feeding practices, and anaemia. UNICEF's Multiple Indicator Cluster Survey (MICS) collects similar data and the two systems often coordinate to prevent duplication. The World Bank's Living Standard Measurement Study (LSMS) uses income and expenditure surveys that include a consumption module on food available to households. WFP's VAM unit collects household food security data in comprehensive national and emergency surveys, and via an ongoing monitoring system. FAO STAT is a repository of information from agricultural sources that includes national food supplies.

II. Policy Recommendations

9) *To evaluate agricultural programs and policies, assess outcomes proximal to interventions*. Clarity is needed on where interventions are made within the causal framework and what they plan to change. Assessing outcomes close to the point of intervention allows for understanding if objectives were met. Distal impacts can also be measured, but would likely reflect on other factors not addressed by a programme. For example, using anthropometry to evaluate an agricultural intervention can be misleading, since nutritional status is influenced by health, sanitation, and care.

10) *Seek collaboration in survey implementation*. Reliable data collection is costly, so we should look for synergies between agencies wherever possible. One approach would be for agencies to pay for a module to be included in an existing survey. For example, WFP has sponsored its food frequency modules on the World Bank's LSMS surveys. The cost is much less for WFP than a national survey and the World Bank benefits by having data to carry out additional country-level analyses.

11) *Seek collaboration in instrument and indicator development*. Specific variants within a class of indicators, such as diet diversity use similar data elements. A harmonized platform of data collection would allow for different indicators of the same class to be calculated from the same data, advancing our knowledge of which of different indicators works best. FAO and WFP have harmonized their data collection instruments so that their diversity indicators can be calculated from the same data.

12) *New validation research should integrate several indicators and include information on costs*. Often researchers focus their validation efforts on a newly-developed indicator. But there is wide variation in the 'gold standards' employed, the criteria for judging success, and the country-level data being used. This makes it difficult to draw conclusions about which indicators are most effective. Integrated research is needed that allows for better comparisons of different types of indicators. Much of the testing of proxy indicators has been justified on the grounds that the 'gold standard' for dietary intake (e.g. the 24-hour recall) is too costly. Yet costs of the proxy approach are rarely reported, which limits our ability to make useful decisions about which indicator to support.

13) *New research is needed on developing indicators of energy expenditure*. Good field methods do not exist for assessing energy expenditure, which is central to assessing an individual's dietary adequacy. One approach tested in the U.S., uses a 24-hour time diary recall, and merges the information from this with reference values on the energy cost of activities. Adaptations and testing will be needed to use this or other methods in the context of low-income countries.

14) *Focus more on making 'gold standards' less expensive, than on making more low-cost proxies*. Technological changes allow for new possibilities in survey implementation. Distance learning can assist capacity-building to implement complex modules. Smart phones and tablets offer applications that can simplify the interview process, reduce data entry errors and costs, and achieve rapid data transmission. Given these developments and the middling performance of many diet proxies, a long-range strategy should develop state-of-the-art measurement procedures more economically, rather than continue the emphasis on proxy approaches.

15) *Use representative expert panels to develop consensus on specific indicators and on an overall measurement approach*. Individuals and agencies develop attachments and even constituencies around specific indicators. But there are too many variations of specific indicators. To be more efficient in accumulating knowledge of dietary changes, we should develop standardization in the way indicator data are collected, analyzed, and interpreted. Panels composed of a diverse set of experts from a broad set of disciplines and countries which are financed jointly by interested agencies can facilitate this approach. Results of these panels should be distributed widely, including to academic journal editors, so that researchers, agency officers and ministry officials use common approaches to collecting and analyzing data.

16) *The threshold problem in food security assessment needs particular attention*. Many indicators have been validated using continuous measures, but thresholds are needed so we can count the affected and determine the magnitude of a problem. Thresholds require judgment, but too often cut-points have been determined in an ad-hoc way. Expert interdisciplinary panels are needed to make judgments about where cut-points should be drawn and to communicate the method and reasoning behind their approach in a transparent way. At a minimum, the panels should include professionals from the nutrition, economics, communications and policy fields.

17) *Continue to foster a diverse set of indicators for population monitoring* . Diverse indicators allow for triangulation and a better understanding of changes. The Women's Diet Diversity Score would get widespread use if it is returned to the DHS and MICS survey platforms. The Food Consumption Score provides a simple way to monitor diversity of household consumption, and should continue in WFP's VAM survey system, in addition to the LSMS. Where possible, the LSMS should begin experimenting with a 24-hour diet recall on a target individual in the household. This would allow for a greater understanding of how household food gets translated into individual consumption. Finally, use of the Food Balance Sheet data, and calculation of the related Prevalence of Undernourishment indicator should be continued, as a way of providing insights into the availability dimension of food security.