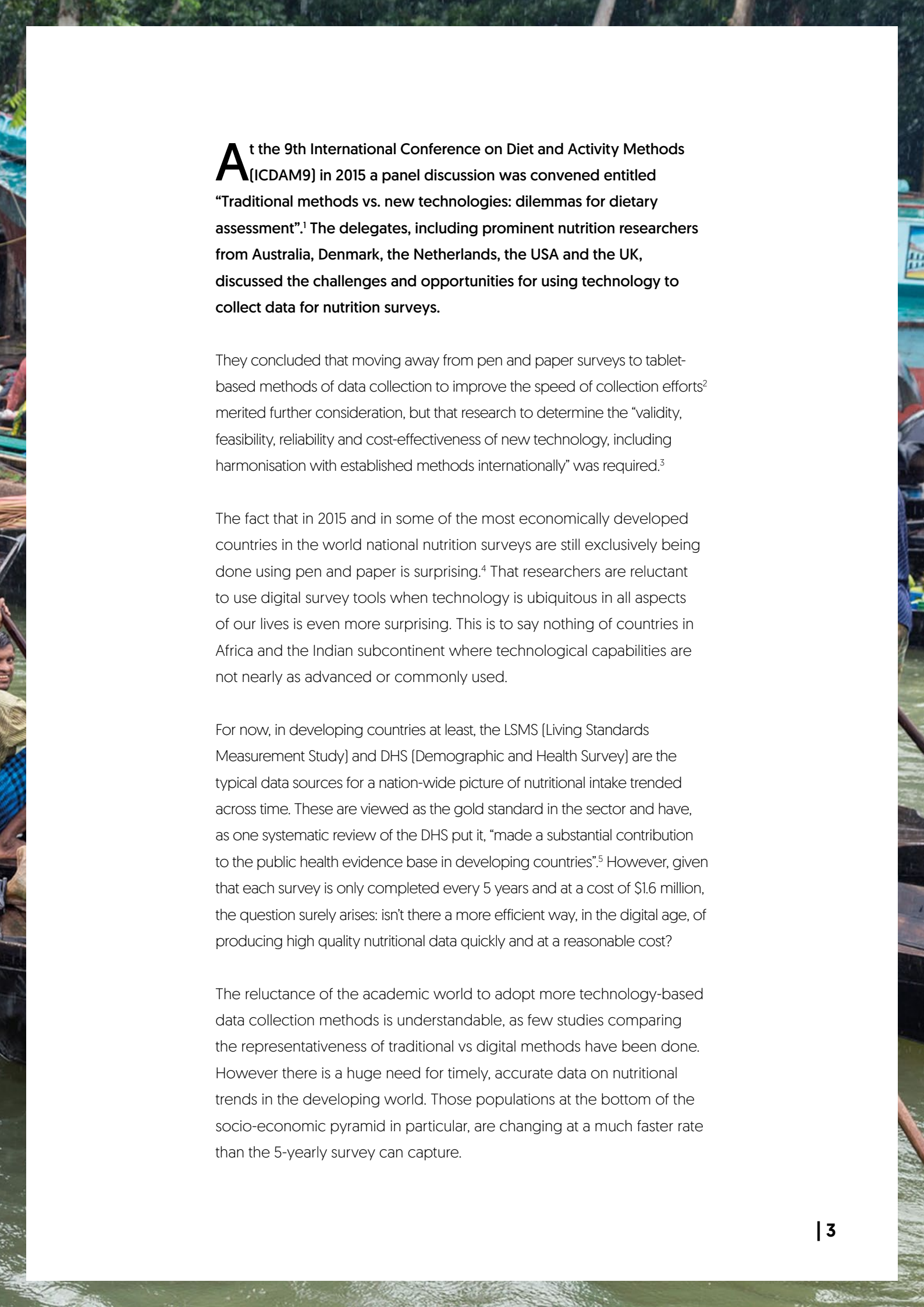
Ipsos

INNOVATION IN LARGE-SCALE NUTRITION SURVEYS

LESSONS FROM THE BOTTOM OF THE PYRAMID STUDY

BILL & MELINDA GATES *foundation*

How private sector methods can be used to improve public health



At the 9th International Conference on Diet and Activity Methods (ICDAM9) in 2015 a panel discussion was convened entitled "Traditional methods vs. new technologies: dilemmas for dietary assessment".[1] The delegates, including prominent nutrition researchers from Australia, Denmark, the Netherlands, the USA and the UK, discussed the challenges and opportunities for using technology to collect data for nutrition surveys.

They concluded that moving away from pen and paper surveys to tablet-based methods of data collection to improve the speed of collection efforts[2] merited further consideration, but that research to determine the "validity, feasibility, reliability and cost-effectiveness of new technology, including harmonisation with established methods internationally" was required.[3]

The fact that in 2015 and in some of the most economically developed countries in the world national nutrition surveys are still exclusively being done using pen and paper is surprising.[4] That researchers are reluctant to use digital survey tools when technology is ubiquitous in all aspects of our lives is even more surprising. This is to say nothing of countries in Africa and the Indian subcontinent where technological capabilities are not nearly as advanced or commonly used.

For now, in developing countries at least, the LSMS (Living Standards Measurement Study) and DHS (Demographic and Health Survey) are the typical data sources for a nation-wide picture of nutritional intake trended across time. These are viewed as the gold standard in the sector and have, as one systematic review of the DHS put it, "made a substantial contribution to the public health evidence base in developing countries".[5] However, given that each survey is only completed every 5 years and at a cost of $1.6 million, the question surely arises: isn't there a more efficient way, in the digital age, of producing high quality nutritional data quickly and at a reasonable cost?

The reluctance of the academic world to adopt more technology-based data collection methods is understandable, as few studies comparing the representativeness of traditional vs digital methods have been done. However there is a huge need for timely, accurate data on nutritional trends in the developing world. Those populations at the bottom of the socio-economic pyramid in particular, are changing at a much faster rate than the 5-yearly survey can capture.

Looking beyond data collection methods, established surveys collect spending and dietary intake, but do not combine these data points with measures of attitudes to spending and food consumption, and their inter-relation with household decision making, particularly around expected trade-offs with income fluctuation. It is also an often-ignored fact that the aims of private companies and NGOs when considering nutrition are more similar than many would like to admit, given their common goal of improving access to food, meaning there is an untapped wealth of potential for public-private collaborations in this area.

The Bottom of the Pyramid Survey

In 2015 the BMGF (Bill and Melinda Gates Foundation) recognised the limitations of how large-scale data collection is currently done and enlisted the support of Ipsos, a market and social research company, to investigate the use of common data collection methods in the private sector to collect nutritional data. Our aim was threefold:

Firstly, we wished to collect data on nutrition and key nutritional indicators from a nationally representative sample, to better understand the position of the bottom of the pyramid in Nigeria, Uttar Pradesh (India) and Bangladesh These regions were chosen because of their high level of poverty and malnutrition, coupled with burgeoning middle classes, which could lead to a "double burden" of nutrition where a proportion of the population are under nourished and a proportion of the population over nourished.[6] Further to collecting this standard nutritional data, we also wanted to combine it with attitudinal information, encompassing spending, economic trade-offs, drivers of household decision making in nutrition and attitudes to fortified and pre-packaged foods.

Secondly, we aimed to use the study as a methodological experiment. We wanted to put faster, more dynamic private sector data collection methods to the test to understand if they could produce data sets comparable in quality to the DHS and LSMS. By conducting two rounds of fieldwork per year (in different seasons) using a CAPI methodology we aimed to collect data that have greater relevance and applicability to organisations which typically rely on more slow-moving cycles.

Thirdly, we aimed to engage the private sector in the results of this research and use the income from their purchases to fund further waves of the study, thus creating a symbiotic relationship between the two sectors, each with similar data needs.

From 2015-2018 we conducted extensive literature reviews, consulted with methodological experts, conducted exploratory qualitative research, designed questionnaires and implemented them in the field to collect two rounds of nationally representative sample in each country.[7] Following extensive analysis, reporting and dissemination of results, we are now in a position to ask: how did we do? Are private sector approaches viable for collecting nationally representative nutritional data?

Innovations in Data Collection and Analysis

In terms of design, our survey followed standard approaches in social research methods, including drawing a nationally representative random sample, using validated questions from previous studies, gaining ethical approval and including measures of socio-economic status and dietary intake in our questionnaire. In combining these standard approaches with methods used in the private sector- for example, employing non-specialised enumerators, using a digital, tablet-based data collection platform and using more innovative questions (such as attitudinal statements and allocation exercises), we believe we have struck a balance between the highest standards of academic research and the efficiencies which come with private sector approaches.

A unique feature of our study design is that we went beyond standard descriptive variables (for example, household income and expenditure, dietary intake, socio-economic status) to capture attitudes and behaviours. This was done using a battery of attitudinal statements that respondents were

Our study went beyond what is usually covered by large-scale nutrition surveys

asked to agree or disagree with using a 5-point Likert scale. These techniques are standard practice in private sector research, but to our knowledge have not yet been widely applied in larger scale nutrition surveys.

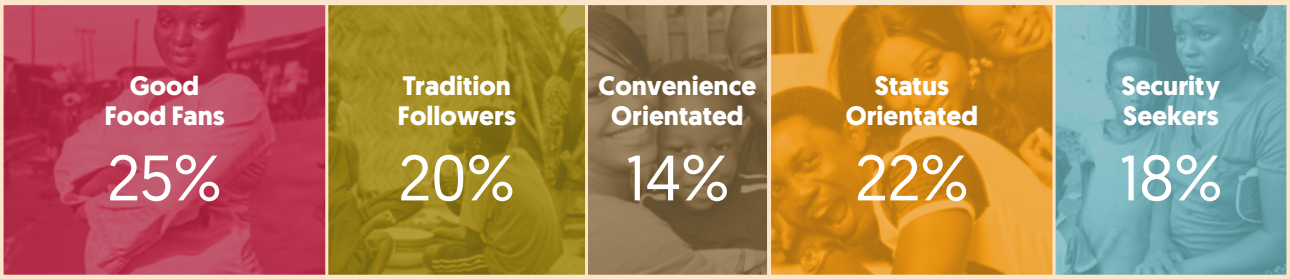
While these data provide valuable insight in their own right, further analysis was done to derive a segmentation. A segmentation uses statistical techniques to divide respondents into groups based on shared attitudes and behaviours in our case, spending habits, attitudes to food, nutrition and fortified and pre-packaged foods. Once again, while commonly used in the private sector, to our knowledge this technique has yet to be used extensively in the public health sphere.

A summary of our segmentation output for Nigeria (one segmentation was conducted per country) is given in Figure 1. As the figure shows, we identified 5 segments in Nigeria, each with a different attitude to food and nutrition. For example, the largest segment in Nigeria, the "Good Food Fans" think a lot about food and their nutritional intake and value quality over convenience. They are concentrated in the urban south of the country and tend to be Igbo or Yoruba. By contrast, 20% of respondents are "Tradition Followers" and prefer to use more traditional food preparation practices, but often fall prey to food insecurity. They are predominantly found in the north of the country and are Hausa.

This model has wide applicability, the potential of which has yet to be fully realised. For instance, marketers in the food industry could use it to tailor advertising campaigns to different groups, in a more targeted, and ultimately more successful, way than a traditional demographic approach. In the public health world, the approach could be used to target health-related interventions, including, for instance, conditional cash transfers, emergency nutritional relief or encouragement to consume fortified food, in a way that maximises available resources and the chance of meaningful impact. This, we believe, is one of the unique aspects of our research and an important innovation that has been imported from the private sector. However, the approach is not well embedded in the public health nutrition arena, and so we believe further use cases are needed to prove its worth.

The added value of a private sector approach is in producing attitudinal data, which can be modelled to give deep insight into the beliefs and behaviours of a group, which can in turn be used to design

Figure 1. Nigeria Segmentation



Summary Base: n=2016 (decision makers in the household)

programmatic interventions or health campaigns and messaging. Therefore, the research has more direct applications than most descriptive studies.

Contributions to Methodological Questions in Nutrition Research

The study was also able to contribute to several current methodological debates in nutrition research. The most significant of these is the question of how to accurately capture dietary recall.[8] This metric is notoriously difficult to record, given the margin for error that can occur, both in respondent memory and data collection. We chose to use both spontaneous recall (where respondents are asked to list everything they have consumed in the last 24 hours while the enumerators codes it into the script) and prompted recall (where the respondent is read a list of food groups and asked to indicate if they consumed that category in the previous 24 hours), marked a departure from convention. Studies tend to include one or other of these measures, but rarely both.[9] We found that including both measures (if time allows) does not place undue burden on the respondent and gives two complementary measures which can be analysed in tandem. It comes as no surprise that our results showed that spontaneous questioning tended to produce a lower score than the prompted recall method, suggesting that the true value lies between the two, with spontaneous questioning providing an underestimate and prompted questioning leading to an overestimate.

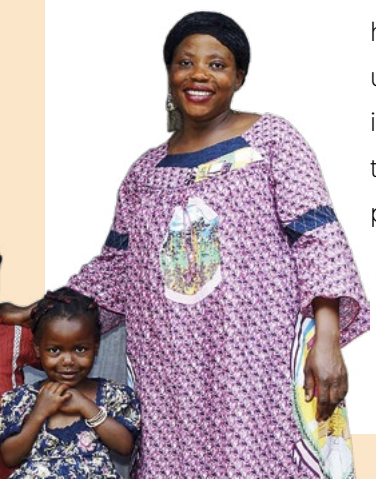
A second important methodological issue we considered was that of measuring the quantity of food consumed by respondents. During the

first wave of data collection in Nigeria (which acted as a pilot for the rest of the programme) we trialled a method whereby respondents were asked to estimate how much food they consumed using a series of images of plates, bowls, spoons and cups, of known volumes. This proved difficult to implement as we had not field tested the measuring devices to validate their applicability to the context, and because there was no efficient way to standardise the many measurements we receive. For instance, how to compare a cup of cornmeal, compared to a cup of vegetable stew, given that we don't know the weights of each? This leads us to conclude that including weights and measurements in a survey such as this is not viable, but given the importance of these data in understanding generational and gender disparities in food consumption, it should be an avenue for further research and innovation.

Public/Private Collaboration

A secondary aim of our study, beyond data collection and methodological innovation, was to encourage partnerships between public and private entities, who often have interlinked goals in the nutrition space. In essence, this part of the research aimed to equip the public sector with the insight necessary to design interventions to improve nutritional outcomes (including, crucially, fortification programmes) while also allowing private companies to explore new commercial opportunities. During the questionnaire design phase, we included standardised questions of interest to the public health community, as well as questions focused on brand awareness and preference that would be of use to private companies.

Although these data are now available to all private sector companies for free, the initial plan was to charge businesses a fee to access this information, which would then be used to fund further waves of research. While in principle potential buyers agreed that this was a good idea, in reality this approach was not workable. At the end of the study we conducted several informal interviews to unpack the reasons why our approach was unsuccessful, and we learned that greater buy-in should have been secured at the beginning of the process, along with regular update calls. The research deliverables were also not tailored to subscribers' individual needs, as the vast majority of the questionnaire was not relevant to their specific business questions. The pricing model also proved problematic, as the cost to ensure sustainability was too high to be borne



Identify important stakeholders at the beginning and consult them throughout

by most of these companies. Critically, companies who saw the benefit of the research were based locally in each of the three countries and did not have the budget to purchase the data. Conversely, global companies who did have the budget did not see the value in data for only three markets. An alternative model to consider for the future would be for both public and private bodies to contribute to costs, rather than just the private sector.

Lessons from the Study

So what, then, should we take from our experiences of conducting this research project? The main lessons we drew were:

1. **Methodological innovation is possible and should be embraced.** It is possible to collect high-quality data using market research techniques, with a much shorter turnaround time than more traditional nutrition approaches. Although more validation of this approach in comparison with more established nutrition surveys is needed, this is cause for optimism.

2. **Acknowledge the limitations.** While there are great possibilities for innovation in this space, there are inherent limitations. Some very specialised types of data such as weights and measures or biometric data, including height and weight or disease screening, are beyond the scope of these methods and should be left to more specialised surveys. Define what is important and what is possible and stick to that.

3. **Understand the importance of collaboration and partnerships.** This research project was conducted independently by Ipsos. NGOs, such as GAIN and the SUN Business Network, were brought in to advise and use the data, when appropriate. Similarly, the data was offered to private organisations after collection. An alternative model should be considered whereby NGOs and businesses are involved from the very beginning, so that they can help shape the survey instruments and sample design, and then can directly use the data for their own purposes when it is collected. This would give them more ownership over the process and ensure the data are used in a more targeted and impactful way.

For more information on this study, including methodological details, full results and a recording of a webinar presenting the project, visit thebottomofthepyramidstudy.com.

Technical Note

This survey was commissioned by the Bill and Melinda Gates Foundation. We surveyed a nationally (or regionally, in the case of Uttar Pradesh) sample of the population in Nigeria, Bangladesh and Uttar Pradesh (India). Sample frames were created using the latest available census data. A multi-stage random cluster sampling approach was used in each country. Two waves of data were collected per country: one in the harvest season and one in the lean season. Respondents aged 16 years and above answered for themselves; those under 16 either answered with help from an adult, or an adult answered on their behalf. Sample sizes and fieldwork dates are given below. Sample sizes indicate households surveyed; a subset of the questionnaire was asked to each individual within the household.

	Nigeria		Uttar Pradesh		Bangladesh	
Sample size	Wave 1 1,265	Wave 2 1,270	Wave 1 1,275	Wave 2 1,259	Wave 1 1,284	Wave 2 1,250
Fieldwork dates	December 2015 to January 2016	October 2016	December 2016 to January 2017	July to August 2017	September to October 2017	March to April 2018

Data were collected using Computer-Assisted Personal Interviewing (CAPI) methods by trained enumerators. Data were weighted to available population statistics in Nigeria but were not weighted in Bangladesh or India due to lack of appropriate data.

For more details

james.bell@ipsos.com
dipika.matthias@gatesfoundation.org

BILL & MELINDA GATES foundation

Footnotes

1 Amoutzopolous, B., Steet, T., Roberts, C., Cade, J., Boushey, C., Collins, C., . . . Page, P. (2018). Traditional methods v. new technologies – dilemmas for dietary assessment in large-scale nutrition surveys and studies: a report following an international panel discussion at the 9th International Conference on Diet and Activity Methods (ICDAM9), Brisban. Journal of Nutritional Science, e11.

2 Often known as "CAPI"- computer assisted personal interviewing

3 Several studies have dealt with the question of differences in responses (in terms of response rate, respondent perception and reporting of socially undesirable behaviour) in paper vs computer assisted interviews, including Caeyers, B., Chalmers, N., & De Weerdt, J. (2010). A comparison of CAPI and PAPI through a randomized field experiment. SSRN Electronic Journal and Ekholm , O., Hesse , U., Norlev, J., & Davidsen , M. (2004). A Comparison of CAPI and PAPI in a Nationally Representative Danish Health Survey. European Conference on Quality and Methodology in Official Statistics, 2004.

4 Amoutzopolous et.al (2018).

5 Fabic, M., Choi, Y., & Bird, S. (2012). A systematic review of Demographic and Health Surveys: data availability and utilization for research. Bull World Health Organ., 604-612.

6 Kapoor, S., & Anand, K. (2002). Nutrition transition: a public health challenge in developing countries. Journal of Epidemiology & Community Health, 804-805.

7 Data in Uttar Pradesh and Bangladesh can be considered representative. In Nigeria, states were chosen purposively because of security concerns in the north-east, but sampling was random within each state.

8 See for example Shim, J.-S., Oh, K., & Kim, H. (2014). Dietary assessment methods in epidemiologic studies. Epidemiology and Health, e2014009.

9 DHS surveys, for instance, tend to include prompted recall measures and not spontaneous questions (https://dhsprogram.com/data/DHS-Survey-Indicators-Maternal-and-Child-Nutrition.cfm).