The Power of Mobile Platforms for Data Collection

How to leverage them to provide real-time information and insights

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Key messages

> When leveraged correctly, mobile data collection can be a valuable tool for collecting nutrition data remotely from populations that are difficult to reach via traditional methods – an approach that has already been tested by multiple organizations.

> Considerations for incorporating mobile methods into research include: type of technology available, education level and literacy rate, financial and practical barriers to access, and respondent trust.

> Certain mobile-based modes are more appropriate for certain projects – for example, as SMS has character limits, it is best for shorter questions and questionnaires. Voice calls administered via computer-assisted telephone interviewing can collect longer and more qualitative data.

Collecting and analyzing nutrition data in order to develop effective interventions, monitor long-term health outcomes and ultimately reduce the prevalence of malnutrition globally have been a focus of governments and development agencies for decades. In 1974, the United Nations Food and Agriculture Organization (FAO), the United Nations Children's Fund (UNICEF) and the World Health Organization (WHO) first developed methods for nutrition surveillance,[1] and nutrition remains a high priority through the Sustainable Development Goals (SDGs), which aim to end global hunger[2] by 2030 through measurable indicators.

However, the practice of collecting the data needed to measure progress has proved difficult for as long as food security and nutrition have been at the forefront of the development conversation. The original Millennium Development Goals (MDGs) were plagued with issues surrounding reliable data[3] from the countries that are most in need of assistance, as low-income countries struggled to provide census data or to invest in gathering data from hard-to-reach populations. This has left it to agencies such as the United Nations World Food Programme (WFP) and FAO, as well as organizations such as CGIAR, to measure progress through data, but these organizations must also balance data needs with budgets and competing country priorities.

One persistent challenge around gathering nutrition data has been the fact that those who suffer the most from malnutrition are often in places that are difficult to conduct research in – including remote areas in Sub-Saharan Africa, conflict zones that are unsafe for researchers to travel to and regions that are inaccessible due to disease outbreak or natural disasters. As mobile connectivity has grown around the globe in the past decade, mobile phones have become an increasingly valuable tool for gathering data remotely from areas that are geographically difficult to reach. Emerging countries now have high mobile penetration rates: recent data from Pew Research revealed that 93% of people in South Africa, 86% of those in Kenya, 83% in Nigeria, 77% in the Philippines and 83% in Brazil own at least a basic mobile phone.[4] In Sub-Saharan Africa as at 2018, overall mobile phone penetration was 45% and smartphone penetration 36%.[5] Penetration rates from low-income countries from 2017 show the differences by country, with Uganda at 41% penetration, Mozambique at 47% and Malawi at 27%.[6] While smartphone and internet penetration rates remain lower, there is clear value in the use of basic mobile technology such as SMS and voice calls to reach people in areas that suffer from food insecurity and malnutrition.

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While mobile data collection is a relatively new method for collecting food security and nutrition data, it has already been used with success by multiple agencies. One study by GeoPoll and the WFP conducted in the Democratic Republic of Congo in 2015 demonstrated that food security indicators could be adapted for SMS: mobile-sourced data from the conflict-ridden Kivu region showed that SMS could be used as a high-frequency, low-cost method for data collection.[7] A similar study examined the strengths and limitations of using voice calls, through computer-assisted personal interviewing, to gather nutrition data in rural Kenya, and concluded that dietary diversity scores were not significantly different when comparing data collected via face-to-face modes versus mobile modes; however, other nutrition indicators had somewhat higher averages, indicating less malnutrition, when collected using mobile technology. More research should be done to optimize nutrition questionnaires for mobile, but it is clear that it can be a valuable tool when leveraged correctly.

As more organizations evaluate mobile data collection for nutrition initiatives, there are several factors for them to consider. Below we go into some of the considerations for utilizing mobile phones for nutrition data collection, and how to optimize research studies for the mobile phone.

Considerations for collecting nutrition data through the mobile phone
Choosing the best mobile mode for data collection
One of the first items to consider when collecting data via mobile is the mobile-based mode through which you will conduct research. Mobile devices can be used to conduct surveys through multiple channels, including text message (SMS), voice call and web links viewable on mobile browsers. The most common mobile-based research modes are:

> **SMS surveys:** surveys sent via two-way SMS can reach literate populations with mobile phones and are a less expensive way to conduct research around the globe. As surveys are administered remotely and on a respondent's own device, data can be collected from hard-to-access areas, and privacy concerns may be alleviated without an interviewer being present. Data quality controls in SMS surveys include automatically detecting unusual response patterns such as repeated 'yes' or 'no' answers, putting hidden number ranges in place for range questions and randomizing the order in which multiple-choice answers appear.

> **Voice calls:** voice call interviews can be faster and more cost-effective than in-person interviews as they present fewer logistical challenges around reaching a large number of respondents. As with in-person interviews, voice calls also allow illiterate populations to respond. Quality control mechanisms for voice calls are similar to those used in SMS, and include flagging up unusual response patterns and validating that answers are within an expected range or meet a certain set of criteria. Voice call modes include:

> > **Computer-assisted telephone interviewing (CATI):** trained enumerators place live calls from a remote call center and conduct interviews that can include open-ended questions and more qualitative data.

> > **Interactive voice response (IVR):** an automated system places calls with pre-recorded questions that are answered via respondents keying in numbers on their phone keypads.

> **Online modes:** data can be collected via online modes, which include mobile-friendly links or mobile applications, and link-based surveys sent to desktop computers. These modes are inexpensive but only reach wealthier and more literate populations that have smartphone access; they are therefore a less common choice for reaching low-income populations. In online modes, detailed location data can be collected to verify exact location, in addition to the standard quality control methods mentioned above. Modes include:

> > **Mobile application:** mobile applications require participants to download an application onto their smartphone and use it to take available surveys. This mode allows for advanced features such as location-based questions but requires respondents have a smartphone.

> > **Mobile web:** mobile web surveys are administered through an online link that can be opened in a basic mobile browser. These surveys support video and picture content and require a mobile internet connection.

> **Computer-assisted personal interviewing (CAPI):** face-to-face interviews are one of the most traditional methods of survey data collection, but can be time-consuming and costly. These interviews require enumerator training,

and data is collected via a mobile-based application that guides the interviewer through the questions and allows for answers to be recorded. GeoPoll's CAPI application allows for data validation by tracking the location of interviewers to ensure they are in the expected location and immediately uploading responses to a secure location, and flagging up responses that are entered in and then changed at a later time.

Table 1 is a quick guide that is helpful for differentiating between various mobile survey modes and their respective characteristics. However, consulting with an experienced research agency will provide researchers with more in-depth information on how to conduct nutrition research via mobile.

In addition to mode differences, the following should be considered when conducting nutrition research through the mobile phone.

Technology access and education levels

Although globally mobile penetration is over 67%,[8] smartphone penetration rates are still gaining momentum. The Global System for Mobile Communications (commonly known as GSMA) presented research that shows, as at 2016, that less than 50% of connections in emerging markets are smartphone connections.[9] Rates in Sub-Saharan Africa are even lower. This is an important factor to consider when deciding how to integrate mobile data collection into nutrition research, what populations can be reached using mobile phones and which mobile-based research mode, such as text message (SMS) versus voice call, is most appropriate for a project. While online surveys implemented through links or mobile applications are inexpensive and often readily available, they can only reach mobile phones with an internet connection. For reaching rural areas and lower-income groups, online modes are ineffective. Instead, SMS or voice call surveys, which can reach any handset, should be explored as a more viable option.

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"For reaching rural areas and lower-income groups, SMS or voice call surveys can be a viable option"

TABLE 1: Mobile mode characteristics

Mobile mode characteristics	SMS	CATI	IVR	Mobile web	CAPI	Application
Self-administered	X		X	X		X
Interviewer administered		X			X	
Literacy required	X			X		X
Supports multiple response options	X	X		X	X	X
Complex sampling framework	X	X	X		X	X
Limits to number of questions	X	X				
Able to verify responses		X			X	
Requires a reliable network signal		X	X			X
Cost-effective	X	X		X		X
Immediate data monitoring		X			X	
Suitable on all mobile phone types	X	X	X			
Sensitive questions are applicable	X		X	X		
Limit on the type of questions	X	X	X	X		
Limit on individual question length	X					
Real-time communication		X			X	
Ability to save data	X	X	X	X	X	X
Supports visual aids				X	X	X
Multi-language accessible	X	X	X	X	X	X
Verification of repondents					X	
High response rates		X			X	X
High completion rates		X			X	
High breakoff rates			X	X		

Source: GeoPoll

Women rice farmers using their mobile phones in a paddy field

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Literacy rates should also be taken into consideration when evaluating mobile-based research. If literacy rates are low, surveys administered through voice calls are the best remote research method, as they reduce accessibility barriers for participants. For extremely poor regions, mobile phones can be used to gather and upload data collected through in-person interviewers, removing any technological or educational barrier to entry while still offering the benefits of mobile in terms of streamlined data collection and interview tracking.

Financial and practical barriers to entry

When trying to reach people in low-income areas who are suffering from food insecurity and malnutrition, it is important to consider the financial and practical barriers to entry that they may have to overcome in order to be able to participate in research at all. Respondents may not have time to take a long survey during the day when they are working, so consider the time of day you are reaching respondents and whether they might be able to participate at a later time if the original engagement is inconvenient for them.

Incentives should also be provided for participation, whether through airtime credit via a partner with direct connectivity to mobile network operators such as GeoPoll or through mobile money. If a longitudinal study is being conducted, the researcher should consider an incentive that will compensate participants for their involvement in each round and an additional amount for participating in all rounds. This could be through mobile money, airtime credit or cash in the case of an in-person interview. To reduce the cost of participation, certain mobile platforms including GeoPoll are able to send surveys through 5–6 digit codes known as shortcodes, which do not incur costs when responded to, so that anyone can receive and respond to messages, even if they have no airtime in their account.

Privacy concerns and respondent trust

Hunger and malnutrition can be a sensitive topic, especially when questions are being asked about children, who are often the focus of nutrition studies. Guidelines covering research with children set by organizations including the American Association for Public Opinion Research (AAPOR)[10] state that parental consent should be provided and that children should be involved in the decision-making process when practicable. When surveying via mobile phone, this may mean extra messages, with the appropriate language built into the questionnaire.

In addition, survey participants may have privacy concerns around what the data collected is being used for, and they may not want to answer questions directly to another person due to the stigma surrounding hunger. Remote mobile data collection can address some of these privacy concerns, as surveys are administered in a participant's own home, at the time of their

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Example of an SMS survey on a basic mobile phone

choosing, and questions are answered through their own mobile phones, which provides more anonymity than an in-person interview. In the case of SMS, respondents do not have to speak to anyone, allowing them to feel even more safeguarded from judgment.

Ensuring that potential respondents view the company conducting the survey as reputable and trustworthy will improve response rates and data quality. Using the name of the organization or conducting surveys is a good way to build trust and can help response rates, especially if it is a well-known academic organization or nongovernmental agency. Depending on the study's goals, organizations often do not reveal their identity in order to reduce bias, and working with a third-party provider that is trusted locally, such as GeoPoll, ensures unbiased results. Because GeoPoll's system is directly integrated with mobile networks around the globe, incentives from GeoPoll surveys are immediately deposited into a respondent's account, providing them with reassurance that the promised incentives will be paid out.

Interview length and wording considerations for mobile

Because mobile interviews are deployed remotely, clear, concise wording results in survey respondents doing less guess work and increases the accuracy of the collected data. Several food security and nutrition indicators have been adapted for mobile to achieve this goal. Survey fatigue is also a concern when developing questionnaires for mobile phones, and length should be considered. Longer surveys can be split into multiple questionnaires or offset by higher incentives.

Questions must be written for the technology that they will be viewed on. Each question for an SMS survey must be 160 characters or fewer, including the full question and the respective list of response choices. This makes SMS an ideal mode for shorter surveys and questions that can be cut down. Voice calls, in particularly CATI, in which trained enumerators administer interviews, are a good mode for longer questionnaires because of the way in which the survey is conducted. In addition, voice calls can collect more qualitative data than SMS surveys, which can ask open-ended questions but typically get less detailed data back.

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Conclusion

Mobile research is most suited to projects that allow for remote data collection, and it often requires that organizations have the flexibility to adapt a questionnaire for the mobile phone. Extremely long questionnaires and projects that require a large amount of qualitative data collection may not be as suited for mobile as shorter, primarily quantitative surveys. As more organizations utilize mobile-based research, it is imperative that they share findings in order to add to the knowledge base around how to best implement mobile research. By doing this, we can ensure that mobile continues to grow into a sustainable method of high-quality data collection.

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About GeoPoll

GeoPoll is a leader in providing fast, high-quality market research from areas that are difficult to access using traditional methods, and conducts over 10 million surveys per year through the mobile phone. Working with partners including NGOs, academic groups, media houses and brands, GeoPoll facilitates projects that measure vital indicators.
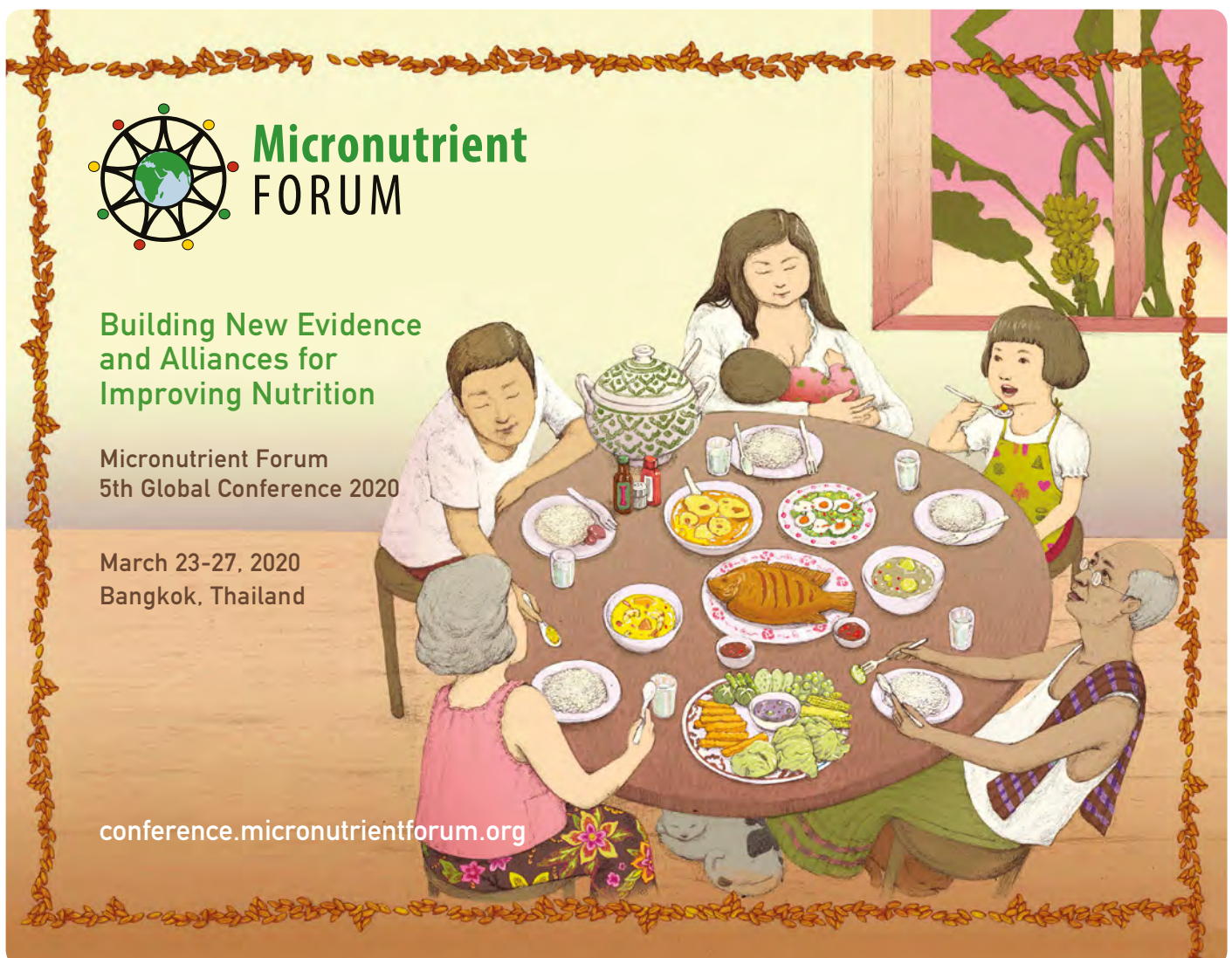
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