BRIEFING REPORT

Lessons Learned Brief for Ghana and Tanzania

External evaluation of mobile phone technology-based nutrition and agriculture advisory services

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The mNutrition initiative

mNutrition was a five-year global initiative supported by the Department for International Development (DFID) between 2013 and 2018, organised by GSMA and implemented by in-country mobile network operators (MNOs) and other providers. Mobile services supported by mNutrition use mobile phone-based services to scale up the delivery of nutrition, health and agriculture information and promote behaviour change around key nutrition practices and farming decisions that are likely to result in improved nutritional health within a household. mNutrition was implemented through existing mAgri and mHealth services in 12 countries throughout sub-Saharan Africa and South Asia.

A consortium of researchers from Gamos, the Institute of Development Studies, and the International Food Policy Research Institute was contracted by DFID to undertake an independent impact evaluation of mNutrition services in Ghana and Tanzania (see Box 1 for details).

Box 1: mNutrition programmes in Ghana and Tanzania

Ghana
mNutrition was implemented through an mAgri platform called Vodafone Farmers Club (VFC). This service offered customised agriculture and nutrition information through Short Message Service (SMS) (text messaging) sharing local weather updates and market prices, recorded voice messages with agricultural and nutrition tips, an expert call centre to answer farming- and nutrition-related queries, discounted tariffs and free calls and SMS to other VFC members.

Tanzania
mNutrition was implemented through the ‘Healthy Pregnancy, Healthy Baby’ (HPHB) SMS programme, also known as the Wazazi Nipendeni SMS programme. The programme was run by the mHealth public–private partnership initiated in 2012 by Tanzania’s Ministry of Health and Social Welfare. The service offered customised health and nutrition information through SMS to pregnant women, mothers with newborns, and male supporters to promote good health-seeking behaviour and improve knowledge and practices around optimal childcare and nutrition. Wazazi Nipendeni was not a stand-alone intervention but was rather strongly informed by government policies, actively promoting the use of government services for additional support (e.g. regular antenatal care visits during child growth monitoring).

Evaluation approach

The objective of the evaluation was to assess the impact, cost effectiveness, and commercial viability of mNutrition services in Ghana and Tanzania. The evaluation also aimed to gather lessons learned about best practices in the design and implementation of mobile phone-based information services to ensure behaviour change and continued private sector engagement (see Box 2 for the evaluation questions).

The evaluation used a theory-based mixed methods approach with three interlinked components:

1. A randomised controlled trial (RCT);
2. An in-depth qualitative study with three rounds; and

Data collection took place from October 2016 until March 2019.

Box 2: Evaluation questions

1. How effective are mobile-based information services in reaching poor households?
2. What are the impacts of mobile-based information services on nutrition and livelihood outcomes (including knowledge and behaviour), especially among females and the extreme poor?
3. Has the process of adapting globally agreed messages to local contexts led to content that is relevant to the needs of poor people and their families?
4. What factors make mobile phone-based information services effective in promoting and achieving behaviour change (if observed), leading to improved nutrition and livelihood outcomes?
5. How commercially viable are the different business models for a mobile phone-based platform and how cost effective are they?
Designing and implementing mobile phone-based services to change behaviours

2.1 Effective reach and uptake

In both Ghana and Tanzania, the reach and uptake of mNutrition services among the target populations was lower than expected (based on the evaluation findings and also M&E user data). Some of the common barriers were:

- shortcomings in the available supportive infrastructure (e.g. limited network coverage, difficult electricity access, and multi-SIM card behaviour with frequent loss of SIM cards)
- capacity of the users (e.g. illiteracy and limited familiarity with voice messages)
- issues in the implementation (e.g. users never received the mobile phone-based information service or the service was suddenly discontinued without an obvious reason)
- issues in the design of the service (e.g. lack of human support to encourage continuous engagement).

Additional barriers in Ghana were registration procedures that were seen as too complex and the introduction of the service with a new SIM card in a context where there was limited demand for new SIM cards. In Tanzania, the reach and uptake of Wazazi Nipendeni was reduced because many users mistook messages for spam, due to unclear sender details. In both countries, very poor households who could not afford a phone, women who had limited access to a phone, and the illiterate were often excluded. High levels of self-motivation and an internal locus of control were personal attributes that most subscribers who continued to engage with the mobile phone services shared (both in Ghana and Tanzania). Mobile phone-based information services can only promote behaviour change if they effectively reach and are taken up by the target population. Based on the evaluation, the following factors have been found to be key to optimising the reach and uptake of a mobile phone-based information service:

- **Make sure there is supportive infrastructure in place**: If these requirements are not met, alternative modes of content delivery (e.g. via radio or community outreach), or blended approaches (e.g. radio and community workers) may have a wider reach and be more inclusive.

- **Design your service to match the capacity of the target group**: In areas with high literacy levels and one (or only few) commonly spoken language(s), text-based information can be cost effective. However, in areas with low levels of literacy a voice-based information service might be a better option, although it is also important to ensure people have the required digital literacy to access voice-based messages. Also, it is critical to remember that voice-based messages are considerably more expensive to administer than SMS and could increase the cost of providing the service substantially.

- **Design features to help increase reach and uptake**: Easy registration processes, preferably assisted by a trusted person (e.g. a health worker/agriculture extension worker), a short time period from initial registration, and intensive and interpersonal support is necessary.

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Our findings suggest that there are a number of important factors to consider when developing mobile phone-based services to promote behaviour change.
registration to receiving the first information, clear sender details so that messages are not mistaken for spam, and the possibility of linking service use to more than one SIM all influenced the reach and uptake and should be considered when designing such services.

2.2 Changing behaviours at scale

The effectiveness of mNutrition services in changing behaviours at scale was limited. In Tanzania, we found that access to Wazazi Nipendeni had modest positive impacts on women’s knowledge of infant and young child feeding (IYCF) practices and on dietary diversity for both women and children; but these changes were too limited to have an effect on the nutritional status of children. In Ghana, there was no impact of VFC on household or women’s dietary diversity, agriculture production, or income, or on nutrition or farming knowledge. This lack of impact can in part be explained by the low reach of, and very limited sustained engagement with these services by households.

Based on the learnings from the evaluation, the following factors are key to increasing the effectiveness of mobile phone-based information services in changing behaviours:

- Introduce interactive components (e.g. call centres and/or active information search functions) and face-to-face contact (e.g. local support groups and/or a local service promoter) to promote behaviour change. Do not rely on just pushing out information to passive audiences.
- Include features and content in mobile phone-based services that aim to strengthen self-motivation and improve subscribers perceived locus of control (e.g. through the tone of the messages) could help to motivate a wider audience to continue to engage with VFC.
- Combine mobile phone-based information services with financial services or ongoing interventions (e.g. livelihood improvement programmes or social protection programmes) that provide poor households with the financial resources needed to act upon the information. Users of mobile phone-based services can only act upon information if they have the financial resources to do so.
- Intensive and interpersonal support is necessary to influence practices such as breastfeeding or motivate farmers to try out higher risk changes in their agricultural practices, and should be offered to complement mobile phone-based services (e.g. by encouraging users to seek interpersonal support from local services). Mobile phone-based services alone cannot help households to develop the skills to put the information into practice.
- Integrate a mobile phone-based information services into existing programmes or policies (as was done in Tanzania), where such services can help to re-enforce and embed existing knowledge and ultimately change behaviours.

2.3 The importance of engaging content

The evaluation found that households that used the mNutrition services perceived most of the agriculture, health, and nutrition tips as easy to understand, useful, and relevant. Households appreciated the non-judgemental tone of the messages, especially in Tanzania, where this was seen as contrasting with users’ experiences with health workers who frequently attributed poor child nutrition outcomes such as undernutrition to maternal fault. Trust in the credibility of the content of the service was generally high. Nevertheless, not all content was perceived as relevant to households’ specific needs, and the evaluation also suggests some potential areas for improvement:

- Provide practical, low-cost agriculture, health, and nutrition advice that is actionable and achievable. This type of hands-on information is often missing from other services. Rather than advocating for evidence-based ‘best practices’, messages need to be context-specific and feasible within resource-poor settings.
- Ensure that content is carefully tailored because poor targeting can quickly result in disengagement. Careful and individualised profiling (i.e. selecting information on preferred language, location, priority crop (for VFC) or stage of pregnancy (Wazazi Nipendeni) during the initial registration process is vital to build trust and to ensure well-tailored content. However, it is also time-consuming, laborious, and difficult to conduct at scale. Experimenting with new approaches to profiling might help to achieve effective optimal tailoring without increasing the costs significantly.
- Consider alternative channels to engage male farmers with nutrition issues. Based on our findings from Ghana, nutrition tips as part of an mAgri platform are valued by female but not so much male farmers. Alternative channels are needed to involve men (e.g. nutrition education during antenatal care sessions that are mandatory for both parents; community events or radio spots specifically targeting fathers).
3.1 Product development, partnerships, and political commitment

There are many ways to procure the range of expertise and services needed to launch a mobile phone-based information service and the services in Ghana and Tanzania were quite different. The service in Tanzania was driven by an independent organisation with expertise in health, which worked through contracts and partnerships with multiple MNOs. Meanwhile, the service in Ghana was an MNO-led offering, which relied on contracts with a technology and content partner. Contracting in value-added services (VAS) enables an MNO to set up a service quickly and with minimal up-front costs. However, the contractual nature of the relationship also, at least to some extent, impeded innovation.

The design and viability of a mobile service can depend heavily on the national political context. For example, the service in Tanzania was driven by an independent organisation with expertise in health, which worked through contracts and partnerships with multiple MNOs. Meanwhile, the service in Ghana was an MNO-led offering, which relied on contracts with a technology and content partner. Contracting in value-added services (VAS) enables an MNO to set up a service quickly and with minimal up-front costs. However, the contractual nature of the relationship also, at least to some extent, impeded innovation.

Based on the evaluation, the following factors should be considered when building a business model for mobile phone-based information services:

- Delivering mobile phone-based information effectively at scale needs careful and sustained investment, partnership building, and political commitment. Donors need to understand the importance of these relationships and commitments.
- Where a service is developed in-house by an MNO, it must have high-level backing to source the range of expertise required.
- Where information is regarded as a public good, then government needs to be involved. In Ghana, government agencies collaborated on developing content but, in Tanzania, government bodies were actively involved in the public-private partnership.
- Donor-led support initiatives should include some form of future-proofing to help mitigate changes that will invariably occur over the duration of a programme in business relationships, personnel and the policy context.

Based on the evaluation findings we recommend:

- Considering the use of mobile phone-based information services where access to timely information is a challenge (e.g. because of limitations in public extension services). For instance, in Ghana farmers valued time- and area-sensitive weather, market price, and agriculture information delivered through their mobile phones. In Tanzania, users appreciated information tailored specifically to each week during pregnancy and early childhood.
- Consider the use of mobile phone-based information services where access to regular information is a challenge. In both Ghana and Tanzania, users valued the regular flow of information on agriculture, health, and nutrition. Mobile phone-based services can be especially useful in terms of supporting overwhelmed and underfunded public services, which can only provide very limited contact time for each household.

The advantages of mobile phones over traditional channels

The evaluation identified several features that distinguished mobile phone-based information services from traditional services for agriculture, health, and nutrition information. Mobile phone-based information services are well suited to the delivery of both area- and time-sensitive information (e.g. weather forecasts, market prices, and time-sensitive information for different stages during pregnancy). Moreover, they can do this more effectively and with less effort than most other information sources, even in remote, inaccessible settings (provided, of course, that there is network coverage). Mobile phone-based information is also more convenient, as it can be accessed at a time that best suits the recipient, (for voice-based recorded messages this assumes that voicemail is set up), as well as saved and reread or listened to again. This can help to address information asymmetries and saves time and resources for information seeking.

A participant is interviewed during the pilot phase of the qualitative component of the evaluation in Ghana.

Photo Credit: Sophie Marsden/IDS

2 A value-added service is a popular telecommunications industry term for non-core services, or, in short, all services beyond standard voice calls and fax transmissions.
### 3.2 Adapting to rapidly evolving technological environments

Telecoms markets are currently shifting from voice and SMS to data services. Mobile money services are proving transformational for the unbanked, use of social networks is growing and provides powerful platforms for information dissemination, and data use is driven by entertainment services. Emerging digital Agritech and other mobile information behaviour change services are beginning to provide more comprehensive packages of support, which might result in significant improvements to such things as credit, insurance, and platforms for selling produce. However, the barrier to adoption of these data-driven services is higher in terms of the digital literacy required to use them effectively. Moreover, such services require smartphones rather than feature phones, so they risk widening digital divides and leaving the poorest behind.

These changes in context suggest the following recommendations:

- **Donor-led support initiatives must be agile.** The typical timescale for a programme, drafting the paperwork, and then implementing can be well over five years. Thus, programmes that lack agility are not compatible with the rate of change in the telecoms industry.

- **Promote universal access to mobile communications.** Commercial interest in data services risks diverting attention and investment away from extending network coverage to underserved communities.

- **Initiatives promoting digital literacy should be supported.** Much existing work is driven by the social media industry, which relies on customers being able to manipulate smartphone apps. These initiatives, and government ministry responsibilities, could be expanded to financial and transactional services such as mobile money.

### 3.3 Comparing business models

VAS providers are faced with a dilemma: to market a service themselves, often to institutions (B2B), making it available across all networks, or to enter into partnership with an MNO with national coverage, offering the potential to scale up by marketing the service to all network subscribers (B2C). The mHealth service in Tanzania is an interesting hybrid, as it is freely available across four national networks but is also promoted and supported locally by field partners. Field partners play a crucial role in providing a face-to-face presence that supports users by getting them registered, reinforcing messages, and enhancing the effectiveness of the service.

Evidence from the evaluation indicates that the B2C approach has achieved limited impact in terms of behaviour change and many of the recommendations we have provided above relate to how mobile services can work more effectively when complementing ground-level activities, suggesting that B2B models may be more effective.
The financial viability of a range of business models was explored using data from the two case studies – commercial freemium and subscriptions models in Ghana, and a donor-funded in-house and independent VAS provider in Tanzania. The experience from Ghana was of limited relevance because, unlike most VAS, it was a complex product intended to attract new customers.

We learnt the following from comparing the business models:

- **Achieving sufficient subscriber numbers (hundreds of thousands) is crucial:** Although the B2C model in Ghana failed to maintain sufficient subscriber numbers, similar models in other countries succeeded. The hybrid model in Tanzania reached over 500,000 subscribers. Easy to follow onboarding procedures to the service can be vital to facilitate sufficient numbers of subscriptions.

- **Revenue can be generated through selling additional services, which are then linked to information services.** Evidence from Tanzania shows that women became more familiar with mobile phones as a result of using the information services, leading to increased Average Revenue Per User (ARPU). On the other hand, the turnover rate of subscribers (also called churn) tends to be low in rural areas, so a VAS is likely to have little impact in these areas. The cost of acquiring a customer is high, so offering a range of products can increase revenue. However, this has to be balanced with the need for simplicity in B2C services.

- **Where information can be regarded as a public good, there is a case to be made for the sustainability of non-commercial services.** If either government or non-governmental organisations have a mandate for service delivery in which mobile services can play a part, then they could finance the service provider (e.g. in line with the multi-sided platform model seen in Tanzania). Awarding a range of mHealth services to different suppliers in a competitive market might stimulate innovation and reduce costs but would undermine coordination and economies of scale that stand to be achieved with a single service working in partnership with the Ministry.

- **Further research is required to explore whether B2B models, in which content providers develop tailored services to work with field agencies rather than generic services for MNOs, are indeed more effective in achieving positive development outcomes.**

- **Invest in exploring free-for-use business models, which will be of interest to development agents targeting low-status demographics.** The Tanzania case study provides one example of a multi-sided model funded by agencies with a health mandate and MNOs with a corporate social responsibility agenda. GSMA has already started exploring alternatives within mNutrition services.

- **The donor community should engage in discussion on how commercial returns can be used to reimburse expenditure from public funds.** It has been shown that mHealth VAS can increase ARPU, which raises questions over the ethics of spending public money on services that result in financial benefits for the private sector.

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**Evaluating mobile phone-based information services**

**4.1 A mixed methods approach provides more comprehensive insights**

The evaluation used a mixed methods approach with three components that were integrated for each data collection and analysis activity. While the qualitative and quantitative component focussed on the effectiveness of and experiences with the mobile phone services from the subscribers' perspective, the business component provided insights into the supply side of the services (i.e. MNOs, in-country partners, etc.). The combination of the different perspectives provided more comprehensive insights into the complexity of mobile phone-based services.

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**4.2 The dynamic nature of mobile phone-based interventions**

The fluidity and speed of change in the digital landscape can make it difficult to evaluate the full impact and potential of mobile phone-based interventions. Indeed, the mNutrition services in both Ghana and Tanzania went through several considerable changes during the evaluation.

Lessons learned in regard to finding the most appropriate evaluation designs for dynamic mobile phone-based information services are as follows:

- **Experimental/quasi-experimental designs that explore different ways of providing information (e.g. combining ICT with radio) or different ways of engaging end-users (e.g. quizzes and prizes) are likely to be helpful for mobile operators and stakeholders as they refine and develop services.**

- **Consider broadening the portfolio of evaluation methods to promote systematic and ongoing learning on mobile phone-based information services.** These could involve developmental, utilisation-focused, nimble evaluation designs such as several small-scale rigorous pilots that support learning. Such approaches are particularly useful in terms of facilitating learning about implementation processes, specific design features, and user engagement.

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6 ARPU is defined as the total revenue of a service divided by the number of subscribers.
4.3 The tensions between adapting programmes and measuring impact

The highly dynamic world of digital interventions is characterised by quick adaptations to programme design and decision-making, high staff turnover, and short-term institutional memory. But there is a tension between these timescales and the focus on longer-term impact indicators. Quantitative findings are not available to inform ongoing programme decisions. The primary outcomes of interest for the quantitative evaluation in Ghana and Tanzania were mainly based on longer-term impact indicators around agricultural and nutritional outcomes as these are what ultimately determine the impact of mNutrition services. However, to be able to measure impact on these chosen indicators, a longer intervention period is necessary (e.g. to account for the lag time between planting and harvesting plus slow uptake of the intervention).

Based on our learning from the evaluation, we recommend:

- Including outcomes earlier in the causal pathway as outcome indicators of interest and conducting a quantitative midline to assess progress.
- Considering including multiple rigorous, rapid small-scale quantitative and/or qualitative studies to provide robust evidence to inform ongoing learning and adaptations during the implementation.

4.4 The challenges of access to commercial information

The evaluation found that the mobile services in Ghana and Tanzania (and also in the other 10 countries) were based on different types of stakeholder relationships, business models, contractual arrangements between partners, and accountability to GSMA. Gaining access to sensitive commercial information (e.g. mobile phone user data) beyond MNOs’ reporting obligations to GSMA was often difficult, sometimes even impossible, for the evaluation team.

To improve access to information for evaluation teams going forward, we recommend the following:

- Regular contact between the evaluation team and all relevant stakeholders is vital to build trust. It can help facilitate access to the commercial information needed for the evaluation. Regular points of contact with all partners (e.g. personal visits, review of all outputs before submission, internal newsletter, stakeholder events in country, etc.) should therefore be planned accordingly.
- Contractual agreements, including for the evaluation team, may help to encourage more engagement with key stakeholders. Such agreements should include obligations to report on any financial, technical, and customer data required for an evaluation.

Evaluating mobile phone-based information services

The fluidity and speed of change in the digital landscape can make it difficult to evaluate the full impact and potential of mobile phone-based interventions. When designing an evaluation of these services we would suggest you consider the following important factors.

- Include outcomes earlier in the causal pathway as outcome indicators of interest (and conducting a quantitative midline to assess progress)
- Include multiple rigorous, rapid small-scale quantitative and/or qualitative studies to provide robust evidence to inform ongoing learning and adaptation
- Regular contact between the evaluation team and all relevant stakeholders is vital to build trust and can help to facilitate access to the commercial information
- Contractual agreements (including for the evaluation team) may help to encourage more engagement with key stakeholders
- Regular points of contact with all partners (e.g. personal visits, review of all outputs before submission, internal newsletter, stakeholder events in country, etc.) should therefore be planned accordingly
- Complement traditional rigorous evaluation designs (e.g. RCTs) with more agile, adaptive methods (e.g. A/B testing, nimble RCTs)
- Broaden the portfolio of evaluation methods to promote systematic and ongoing learning
- Experimental designs that explore different ways of providing information (e.g. combining ICT with radio) or different ways of engaging end-users (e.g. quizzes and prizes) are likely to be helpful to find the most effective service for changing behaviour