EXECUTIVE SUMMARY

The Ghana Mixed Methods Baseline Report
External evaluation of mobile phone technology-based nutrition and agriculture advisory services in Africa and South Asia
mNutrition is a five-year global initiative supported by the Department for International Development (DFID) since 2013, organised by Groupe Spéciale Mobile Association (GSMA), and implemented by in-country mobile network operators (MNOs) to use mobile technology to improve the health and nutritional status of children and adults in low-income countries around the world.

In Ghana, mNutrition is implemented through the mAgri platform called Vodafone Farmers’ Club (VFC) which offers agriculture and nutrition information through SMS and voice message, as well as free calls to others with Vodafone Farmers’ Club SIM cards.

Ghana has one of the lowest agricultural yields per hectare in the world and child undernutrition remains a persistent challenge. VFC aims to promote behaviour change around farming and household practices and decisions that are likely to result in improved nutritional health within a household.

A consortium of researchers from the Institute of Development Studies (IDS), Gamos and the International Food Policy Research Institute (IFPRI) are carrying out a mixed-methods impact evaluation is to assess the impact, cost-effectiveness and commercial viability of mNutrition. This evaluation includes quantitative and qualitative data collection rounds as well as a business model and cost-effectiveness evaluation.

Mobile phone ownership was moderately high across the evaluation sites, with 47 percent of women and 80 percent of men reporting that they owned a mobile phone (based on the quantitative baseline data). However poor network connectivity and unstable network coverage was a common problem.

Our baseline studies highlighted the following issues which might impede the success of the programme.

In the two regions selected for the evaluation: Central Region (CR) and Upper West Region (UWR), Vodafone is not the preferred network for many farmers because of poor coverage which may result in low or no usage of VFC SIM cards.

High levels of illiteracy make SMS a challenging information source or delivery channel; only 17 percent of the women and 31 percent of household heads (mainly men) could read a phrase in English and farmers’ unfamiliarity with voice messages might prevent them from taking up the VFC voice messages.

Farmers already had access to credible information through other channels and did not perceive a need for new information sources.

We also found barriers to the up-take of VFC outside of the influence of the intervention such as poverty, restrictive land tenure systems, and a lack of profitable local markets.
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This short report summarises and integrates the key findings from the initial data collection round of each evaluation component carried out between October 2016 and January 2017. We use the mNutrition theory of change (ToC) to examine the assumptions about causal links between outcomes and draw conclusions about whether and how mNutrition may lead to the desired impact in the context of Ghana.

In Ghana, mNutrition is implemented through an mAgri platform called Vodafone Farmers’ Club (VFC) which Vodafone began in May 2015. This service is a ‘bundled solution’, offering agriculture and nutrition information through SMS and voice messages (provided by Esoko), as well as free calls to others with Vodafone Farmers’ Club SIM cards. The nutrition content aims to promote behaviour change to smallholder farmers around farming decisions and practices and around maternal and other household practices across 71 districts in Ghana.

These services include:

- **Weather information**: Three SMS messages per week in English with local weather information
- **Market price information**: One SMS message per week in English with local market price information for a selected crop and selected market
- **Agri and nutrition tips**: Recorded voice message in the selected local language with a seasonal agricultural or nutrition tip for the selected crop. Initially three agri tips and one nutrition tip were sent per month; the number of nutrition tips increased to three per month in July 2017
- **Call centre**: Free access to a call centre with advice available from an agricultural expert and/or a nutrition expert
- **Free calls and SMS messaging** to other VFC members
- **Discounted SMS and calls** to non-VFC members.

An example of the messages that farmers receive as part of the VFC service. Credit: Sophie Marsden, IDS.
1.2 Evaluating mNutrition in Ghana

The evaluation team are evaluating the mNutrition programme to assess its' impact, cost effectiveness and commercial viability.

Our evaluation addresses the following questions:

1. What are the impacts and cost effectiveness of mobile phone-based nutrition services on nutrition and agricultural outcomes, especially among female farmers and the extreme poor?

2. How effective are mobile phone-based services in reaching, increasing the knowledge and changing the behaviour of the specific target groups?

3. Has the process of adapting globally agreed messages to local contexts led to content that is relevant to the needs of children and pregnant women and mothers in their specific context?

4. What factors make mobile phone-based 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 being employed at country level?

6. What lessons can be learned about best practices in the design and implementation of mobile phone-based nutrition services to ensure (a) behaviour change and (b) continued private sector engagement in different countries?

We use a mixed methods approach to gather evidence about the impact of the intervention with three interlinked components:

- A quantitative impact evaluation to determine the causal effect of VFC on accessibility of information available with regard to dietary diversity, agricultural income, and productivity.

- Three qualitative data collection rounds to explore the context, underlying mechanisms of change and the implementation process.

- Business model and cost-effectiveness evaluation, to generate a business model framework and estimate the wider imputed benefits from the value-added service for the range of stakeholders involved.

The three evaluation components are closely linked and integrated with each other at all stages of the evaluation to inform, enhance and explain the design, the development of data collection tools and the analysis of each individual component.
Agriculture in Ghana

Ghana’s economy is primarily agrarian, with agriculture contributing 23 percent to gross domestic product (GDP) in 2012 and employing about 53.6 percent of the labour force in 2013.

Ghana’s agricultural production has grown at an average annual rate of 5.1 percent since 1983, placing the country among the top five performers in the world. However, most agricultural growth has been due to land expansion and cultivation of land previously not used for agriculture.

Agricultural productivity has remained low. Ghana has one of the lowest agricultural yields per hectare in the world. Even cocoa yields per hectare are far lower than in neighbouring cocoa-producing countries such as Côte d’Ivoire. Productivity is particularly poor in the northern parts of the country due to limited access to agricultural inputs and new technologies and to low coverage of extension services to improve practices. Low productivity in the north has been described as one of the main causes for persistently high levels of poverty. According to the 6th Ghana Living Standards Survey (GLSS), farmers (and in particular self-employed smallholder farmers) are the poorest population group.

Child undernutrition remains a persistent challenge in Ghana. In 2014, 19 percent of children aged under 5 years were stunted (low height-for-age) and 5 percent were wasted (low weight-for-height). Undernutrition in adult women is common in rural areas (7.4 percent of women aged between 15-49 years). Children in rural areas were more likely to be stunted than their urban counterparts (22 percent versus 15 percent).

Cocoa is the main agricultural export in Ghana and the country is the second largest cocoa exporter in the world. Credit: Sophie Marsden, IDS
Baseline findings on agriculture productivity, income and dietary diversity

Our baseline studies showed scope for improvement which could be supported by the VFC initiative. Comparison with other cocoa-producing countries suggests that cocoa productivity and profits might be increased further with more effective farming techniques and methods. VFC could help to increase agriculture productivity and income by supporting a reduction in input costs, for example through assisting farmers with improved farming techniques and cost-effective use of inputs.

We found various contextual barriers to improvements in agriculture productivity and income which are well outside of the control of the intervention but should be taken into consideration in future alterations of the programme. These include: restrictive land tenure systems; the unwillingness of poor farmers to take risks and change established practices; restrictive intra-household decision-making processes; and a lack of profitable local markets and safe crop storage.

Slightly more than half of all women were meeting the minimum dietary diversity requirements but there are several contextual factors that prevent farmers from consuming a diverse diet or otherwise improving nutrition outcomes – with poverty being the main limiting factor. VFC could be successful in improving dietary diversity through sending behaviour change messages addressing the economic constraints to a diverse diet.
A woman fries fish in one the villages that featured in pilot for the qualitative fieldwork. Credit: Sophie Marsden, IDS.
KEY FINDINGS from the baseline studies

1.5.1 Access and use of mobile phones

We found high levels of mobile ownership by men, although access is considerably lower among women. Mobile phone ownership was moderately high across the evaluation sites, with 47 percent of women and 80 percent of men reporting that they owned a mobile phone (based on the quantitative baseline data). While less than half of all women owned a mobile phone, 82 percent said they can access one. However, the qualitative data suggests that while most women may have access to a mobile, access was often strictly controlled and monitored by the owner (usually their spouse). Tightly controlled access to a mobile phone may prevent some women farmers from accessing VFC regularly or at all.

However, poor network connectivity and unstable network coverage was a common problem across the two evaluation regions. For most farmers, network strength and coverage were the main determining factors when choosing a network operator. To access the best network coverage for each location (e.g. across different villages but often also within the same village) many farmers owned SIM cards from different service providers and manually exchanged cards depending on location. Insufficient strengths or stability of the Vodafone network may act as a barrier to regular access to and use of VFC especially in CR.

Although access to, and costs (both direct and indirect) of, electricity have been shown to be barriers to uptake of mobile phone-based health interventions in resource-poor settings [18], the quantitative data showed that nearly three-quarters (73 percent) of farmers were able to charge their mobile phone at home (with farmers in UWR slightly less likely to charge at home compared to CR).

However whilst farmers might engage with mobile phone-based services, distrust about MNOs might pose a considerable barrier to uptake of VFC. Farmers had some strong doubts about the trustworthiness of MNOs. There was a widespread perception that MNOs were mainly interested in generating profits and not in helping ‘poor farmers’.

Voice messages and SMS are communication modalities that are not familiar to all farmers. The majority of men (96 percent) and women (87 percent) said they had used a mobile phone to receive a call in the previous 14 days. However, very few respondents reported ever receiving a recorded voice message. Many farmers were also unsure whether they could repeatedly listen to recorded voice messages.

Less than a quarter of women (23 percent) and nearly half of all men (47 percent) reported having received an SMS in the previous 14 days. The qualitative findings suggest that the reason for low engagement with SMS was farmers’ lack of familiarity with the text message function of their phones and the high level of illiteracy. The quantitative survey found that only 17 percent of the interviewed women and 31 percent of the household heads (mainly men) could read a phrase in English. Farmers’ limited familiarity with voice messages and SMS may pose a barrier to the uptake and use of VFC.

The small monthly subscription fee of 0.50 cedis does not seem to be a major barrier to access to VFC, although some very poor households and women farmers might not be able to pay it. While farmers may be willing to pay for the service, the qualitative data suggest that households frequently face economic constraints when paying for air time.
Ownership of mobile phones:

- 47% of women
- 80% of men

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82% of women said they can access one.

However access to mobile phones for female farmers was often strictly controlled and monitored and this may prevent women accessing VFC.

Other reported barriers to mobile phone ownership:

- Network connectivity and coverage
- Cost of electricity
- Distrust in mobile network operators

Many farmers had used a mobile phone to receive a call. However we found the findings suggest that a lack of familiarity with the text message and voice mail function, illiteracy, and being unable to understand the English messages were all barriers to use of VFC.

The data and graphics presented here are based on the data collection from across the three evaluation components during the baseline stage of the evaluation. You can access all of the scientific reports here: http://bit.ly/mNutritionEvaluation
We found medium agricultural knowledge levels among both male and female farmers, with male farmers on average correctly answering 58 percent of the questions and female farmers 54 percent. The quantitative findings are corroborated by qualitative findings, which highlight farmers’ information gaps on food crop production.

When farmers were asked in the qualitative interviews what specific information they lacked, the majority said that they were lacking information on: (1) how and where to gain access to funding (e.g. loans and credits) for agricultural inputs; and (2) farming practices to increase crop yield. Farmers were also interested in specific information that would help them address day-to-day farming challenges, depending on their level of experience (e.g. crops cultivated, agricultural problems).

While access to agricultural extension workers was a challenge, both radio and TV are currently delivering agriculture information considered trustworthy by farmers. Both qualitative and quantitative data suggest that farmers perceived agriculture extension workers as the most trusted formal source of agriculture information. VFC may help to improve access to credible information on agricultural practices, especially for female farmers.

VFC may help to improve access to credible information on nutrition. However, mobile phone-based information may compete with information delivered through other (well established) channels including from health workers and media outlets (e.g. TV, radio).
The information farmers lacked:

- How and where to gain access to funding (e.g., loans and credits) for agricultural inputs.
- Farming practices to increase crop yield.
- Addressing day-to-day farming challenges around crop cultivation and common agricultural problems.

Sources of information they access and trust:

- Agricultural extension workers
- Radio
- TV

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Despite the large number of smallholder farmers, the intervention is specifically aimed at an ‘underserved’ rural population, which includes many people who do not have mobile phones and women farmers with lower access to mobile phones. The intended customers for the service are five million smallholder farmers in Ghana, who account for 77 percent of the entire agricultural base in the country. More specifically, these intended customers are:

- Female farmers – estimated at 2.8 million (56 percent of the agricultural labour force)
- Semi-literate and illiterate smallholder farmers – estimated at 3.3 million (30 percent of the entire agricultural base is estimated to be illiterate)
- Rural residents without access to mobile phones – estimated at 3.2 million.

These segments are not mutually exclusive. A further segment comprises rural residents who do have a mobile phone but who subscribe to a competing network. Encouraging this group to switch to Vodafone is considered part of the indirect benefits of VFC. Based on the quantitative and qualitative baseline data, access to a mobile phone was particularly challenging for female farmers, which might make it difficult for VFC to reach women farmers.

Another challenge might be the limited Vodafone signal coverage and strength in some areas of Ghana, which made Vodafone one of the least favoured networks (especially in CR). Consequently, farmers may be reluctant to switch to a Vodafone to receive VFC.

The value proposition does seem to satisfy the identified customer segments since several of the components of VFC are attractive and desirable features for farmers, including discounted voice minutes, free community calls to other VFC users and the farmer helpline. Other features may be less attractive, especially as farmers may perceive less of a need for these features, including market price and weather information, agricultural and nutritional advice.

A balance of cost, expenditure, investment and income, both direct and indirect, might make for sustainable commercialisation: but while the costs and economies of scale of messaging are predictable, VFC would need to attract (and retain) 33,000 new customers to cover annual costs.
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Testing the mNutrition theory of change

We used the mNutrition theory of change (ToC) to examine the assumptions about causal links between outcomes and draw conclusions about whether and how mNutrition may lead to the desired impact in the context of Ghana. The programme’s ToC is that mAgri services offer access to mobile-based nutrition and agricultural services while generating direct revenues and indirect commercial value. The mobile-based nutrition services will increase farmers and other service users’ knowledge of nutritional practices that support good nutrition. Acting on this knowledge will lead to improved nutritional practices among users, which may result in improved consumption (with regard to quantity, quality and diversity of food) and thereby contribute to improved nutrition for users.

This model assumes that mobile-based agricultural services will increase farmers and other service users’ knowledge of agricultural practices. Acting on this knowledge will lead to improved agricultural productivity and income for users, which may result in improved consumption (with regard to quantity, quality and diversity of food) and thereby contribute to improved nutrition for users.

The analysis of underlying assumptions found that most assumptions that can be assessed based on baseline data, fully or largely hold true. However, there are a few assumptions that only partially hold true and that may pose considerable risks to the effectiveness of VFC. Some of these assumptions can be addressed by the interventions while others clearly lie outside of the intervention’s influence.

One assumption that only partially holds true and that may significantly reduce the likelihood of success for VFC is related to the strength and stability of Vodafone network coverage. Due to the limitations in network coverage, Vodafone is not the preferred network for many farmers (especially in CR) which may result in low or no usage of VFC SIM cards. Consequently, the VFC voice messages may be missed. This is a considerable risk that lies outside the control of the intervention.

Another assumption that only partially holds true relates to farmers’ unfamiliarity with voice messages, which may hinder them from taking up the messages. In addition, farmers may be reluctant to pick up voice messages as they may fear being charged (a common concern voiced by farmers and the main reason for the widespread distrust of MNOs). To mitigate these risks, farmers need to be familiarised with voice messages and how to access them. Farmers also need to be assured that voice messages from VFC are free of charge.

One of the underlying motivations for VFC and mNutrition is the assumption that farmers lack access to credible information on agricultural and nutrition practices and that mobile phone-based services can help to address these existing gaps. While there are certainly knowledge gaps both with regards to agriculture and nutrition among farmers, no acute lack of access to credible information could be identified. In fact, most farmers had (at least some) access to credible information (e.g. health worker, agriculture extension worker, radio, TV). For VFC and mNutrition voice messages to be perceived as valuable (above and beyond existing information sources) they need to extend existing information, be more tailored to specific needs and/or be more convenient to access. Careful profiling of farmers during the initial sign up to VFC is also vital to ensure that the content is highly relevant to the specific needs of each farmer.
The baseline analysis of indicators that are expected to change as a result of the intervention indicated that there is considerable scope for improvements in agricultural productivity and income as well as dietary diversity in both regions. VFC may trigger and support improvements with carefully tailored and targeted messages. However, the analysis also identified several contextual factors that may hinder the desired improvements; some of these factors may be addressed by careful intervention design, whereas other factors are outside of the influence of the intervention. An increase in agricultural productivity and income may be hampered by a restrictive land tenure system in CR; the unwillingness of poor farmers to take risks and change established practices; restrictive intra-household decision-making processes; and a lack of profitable local markets and safe crop storage. All of these factors are outside the influence of the intervention. The main barrier to improvements in dietary diversity was poverty, which may restrict households from purchasing varied foods (and in particular animal-sourced foods). The intervention may potentially address this limitation by increasing household available income for food purchases. Moreover, nutrition advice should promote the consumption of locally available and inexpensive food items only.

The local research team hold a focus group during the pilot phase of the qualitative fieldwork. Farmers are asked to vote on specific aspects of the VFC service. Credit: Sophie Marsden, IDS
Read the full report here: