

External evaluation of mobile phone technology based nutrition and agriculture advisory services in Africa and South Asia

Mobile phones, nutrition and agriculture in Ghana:
Business Modelling Baseline Report

Nigel Scott, Simon Batchelor, Jennifer Sharp (Gamos)

5 July 2018- final version approved by DFID

Acknowledgements

The authors would like to thank all the stakeholders interviewed who agreed to take part in this research. We are particularly grateful to the Vodafone Farmers Club team in Ghana for their cooperation, ESOKO and the GSMA for their ongoing cooperation, and to DFID and OPM for their continued support. We would also thank all stakeholders that were interviewed (often several times) for their time and patience. Finally, we would like to thank all internal and external reviewers of draft reports.

Disclaimer

This report has been prepared by the e-Pact consortium for the named client, for services specified in the Terms of Reference and contract of engagement. The information contained in this report shall not be disclosed to any other party, or used or disclosed in whole or in part without agreement from the e-Pact consortium. For reports that are formally put into the public domain, any use of the information in this report should include a citation that acknowledges the e-Pact consortium as the author of the report.

This confidentiality clause applies to all pages and information included in this report.

This material has been funded by UK aid from the UK government; however, the views expressed do not necessarily reflect the UK government's official policies.

This project is being led by the Institute of Development Studies (IDS) together with GAMOS and the International Food Policy Research Institute (IFPRI) as part of the e-Pact consortium led by Oxford Policy Management (OPM) co-managed with Itad. The IDS project manager is Jessica Gordon [j.gordon@ids.ac.uk]. The report authors are Simon Batchelor, Nigel Scott & Jenny Sharp (Gamos). For further information please contact j.gordon@ids.ac.uk

The contact point for the client is Louise Horner [l-horner@dfid.gov.uk]. The client reference number for the project is PO6420.

e-Pact	Level 3, Clarendon House 52 Cornmarket Street Oxford OX1 3HJ United Kingdom	Tel +44 (0) 1865 207300 Fax +44 (0) 1865 207301 Email admin@opml.co.uk Website www.opml.co.uk
--------	--	--

Executive summary

This is the baseline report for the business modelling analysis of the Vodafone Farmers Club, Ghana (VFC), a Value Added Service supported by a grant from the GSM Association (GSMA) as a part of the mNutrition programme. It presents a baseline description of the service and an analysis of the business models based on data available at the beginning of the mNutrition evaluation. mNutrition is a global initiative supported by DFID, organised by 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. This report forms part of the evaluation of mobile based services, which draws on a number of methods and interlinked components to gather evidence about the impact of the intervention in Ghana supported by the mNutrition programme.

This report presents baseline data to inform further analysis to address the following research questions in the Terms of Reference (see Annex B), which state: “How commercially viable are the different business models being employed at country level?” and “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?”

The report is one of four baseline deliverables for the “External evaluation of mobile phone technology based nutrition and agriculture advisory services in Africa and South Asia”. The scope of the evaluation is therefore the mobile based service as deployed under the mNutrition programme, rather than the incremental impact of support provided through the mNutrition programme. This report should be read in conjunction with the baseline Cost-Effectiveness Report (Batchelor, Sharp & Scott 2017). The deliverables Quantitative Baseline Report (Billings et al 2017) and Qualitative Baseline Report (Barnett et al 2017) give insights into the consumer environment that the service is targeted at. Much of the report is based on insights provided by stakeholders, and ongoing activities will continue to depend on sharing of data by stakeholders.

Given the complexity of the partnerships involved in the mNutrition projects, Osterwalder and Pigneur’s (2010) inductive approach to business model generation is being used as a framework for the research. The aim of this baseline report is, therefore, to provide a detailed description of each of the building blocks of the business model canvas as at the beginning of the independent study. It also provides a review of operating experience since the beginning of the mNutrition project that may provide context for changes that have already taken place in the product design.

Figure 1 Building blocks in the canvas (derived from Osterwalder and Pigneur (2010))



Authors own

After setting the scene with some contextual and historical insights, the report outlines the vision for the Vodafone Farmers Club service as documented on the grant application. The grant given by GSMA as a part of the wider mNutrition programme was given to Vodafone and Esoko to provide an innovative bundle of services designed to “support farmers in adopting improved agricultural practices”. The bundle comprises:

- 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: one weekly recorded voice message in the selected local language with seasonal agricultural or nutrition tips (3 agri tips and 1 nutrition tip¹ per month) for the selected crop.
- Call centre: free access to a call centre with advice available from an agricultural expert.
- Free calls and SMS messaging to other VFC members.
- Discounted SMS and calls to non-VFC members.

Innovative features in the application distinguishing this from competitor services were:

- A platform for peer to peer sharing and learning – free community calling
- A more active engagement than just receiving voice and SMS calls – helpline, free calling to other farmers, mobile money transactions, content tailored to crops/livestock and to location.
- Mobile money to complete transactions.

The target of 400,000 users by 2016/17 was based on a 18% take-up rate. In practice, a number of pragmatic changes had to be made over the last 24 months; the monthly subscription was

¹ Negotiations to increase the number of nutrition messages from 1 to 3 messages a month are currently underway as of August 2017.

dropped, and membership was opened up to Vodafone's existing subscriber base as a means of achieving a reduced target of 200,000.

The report then examines each building block on the canvas in Figure 1, in as much detail as was available by end March 2017. On this basis, it is proposed that the business model can be regarded as a Business to Business to Consumer (B2B2C) model. Esoko provides services to Vodafone, who then deliver services to consumers, but VFC does not really fit a standard model because of the way both core partners share the delivery of services (and interaction with consumers). Variations of B2B2C business models are determined by the nature of the relationship between the two businesses, and how they interact with consumers. VFC is built upon the complementary capability of each of the partners. Vodafone may have the technical capability to develop and deliver VAS, but it is Esoko who has the technical capability to develop locally relevant content, to profile farmers, and who has the platform to schedule messages appropriately. It is proposed, therefore, that VFC is built upon a partnership model, which is distinct from conventional B2B2C models. The business model will continue to evolve and there are considerable changes underway at the time of writing this report – therefore the official end of baseline data collection was considered a reasonable point at which to document findings. Key points from each of the building blocks of the canvas are as follows:

- Customer segments (page 23) – while the grant application targeted the 5 million smallholder farmers in Ghana, the various activities have refined the understanding of the customer segmentation. User experience field studies conducted by frog design developed an archetype typology; noting that “competent optimists”, “local helpers” and “agri-businessmen” will adopt the product first.
- Value proposition (page 27) – the service provides several elements of value. Content provision has been a focus of the wider mNutrition programme, and VFC has benefitted from a localisation process of the global content. However, the value proposition also includes free voice minutes within the closed user group. While early feedback suggested this was not so important to farmers, as the user numbers have grown this seems to have become more important. Information on the weather and markets remains important to users, and information provided by the call centre appears to be highly valued among those who have used this service (according to M&E reports).
- Channels (page 42) - There were originally three channels through which Vodafone acquired VFC members (before membership was offered to the existing subscriber base):
 - Agents – Agents have been employed since the beginning of the project. They follow a schedule moving from village to village. Vodafone (VF) have contracted 2 organisations to promote VFC (only) – one in the north, one in the South. Teams of 12 with a bus move from community to community.
 - Freelancers – VF employ around 3,000 individuals to go out into communities and promote Vodafone products in general, rather than only VFC. Agents serving rural areas are trained in VFC and if they engage an eligible farmer they can sell the VFC package. They are the ‘business as usual’ acquisition vehicle.
 - There are also ‘retailers’ – these are stationary (e.g. have a table at the market). There are 30,000 of them, but most are in urban areas, so only relatively few in rural areas have been trained and equipped to sell VFC.
- Customer relationships (page 46) – the analysis in this section covers a broad range of features. The product has both Vodafone and Esoko branding and, as such, the reputation of both is at stake on the product as a whole. Esoko handle the call centre which, while currently accessed by a small proportion of customers, has considerable potential for being one of the most valuable elements. Those people in rural areas with poor connectivity tend to feel ‘trapped’ in their choice of MNO by network coverage and signal availability. While it can be

argued that the quality of Customer Relationship has little influence on customer retention in these areas, it will be of importance where Vodafone is on a level playing field with other MNOs in terms of network quality.

- Revenue Streams (page 52) – while the service initially had a monthly charge, this was temporarily removed in order to increase uptake. How customers will react when the charge is reintroduced in June 2017 will be important in the longer term.
- Indirect benefits (page 54) – in terms of indirect benefits much is made of the changes in Average Revenue Per User (ARPU) and reduction of churn (customer moving to another provider). While the data to perform this kind of analysis has yet to be made available by Vodafone, other studies within the mAgri GSMA programmes show up to 10% increase in ARPU and up to 50% reduction in churn.
- Key resources (page 55) – As part of the wider mNutrition programme, a number of institutions have provided specialist expertise, and user experience research in particular, in the early stages of product development. However, the key partners brought key resources as outlined in Table 1.

Table 1 Key partners and Key Resources

	Vodafone	Esoko	GSMA / GAIN and partners
Physical	Network infrastructure Billing systems	Call centre Software platform	
Intellectual	Brand Customer base	Agricultural content database Experience of working with agri VAS Experienced staff	Nutrition content Quality control processes
Human	Product development Experienced staff Marketing	Expert network Software developers Network of market enumerators	User Experience researchers Business intelligence Monitoring, evaluation and learning (MEL) Business consultancy

- Key Activities (page 57) – As the VFC services are distributed to customers over the Vodafone network, operating this network is a key activity for Vodafone. In the same way, information services are delivered to customers by the Esoko platform, so operating this platform is a key activity. This may seem like stating the obvious, but there is evidence that these activities are not straight forward – consumers complain of poor network quality, and many VFC customers were not receiving content. This highlights the importance of SIM registration by Vodafone, and customer profiling by Esoko to the customer acquisition. Both of these activities are being improved. The mNutrition programme also provided funding for Vodafone to contract a local user experience (UX) research partner (Cobalt).
- Key Partnerships (page 59) – Parties to the partnership model are illustrated in Figure 18. The case study describes the following roles for each (GSMA 2016a): Vodafone Ghana – lead partner, funding, marketing and billing; Esoko – main partner, content, platform, helpline; Cobalt – local UX design research; frog – global UX partner; GSMA – co-fund, business intelligence, consultancy; GAIN – global content partner; ALIne – global monitoring, evaluation and learning (MEL) partner.
- Cost structure (page 61) – Table 12 in the report presents a draft cost structure based on limited data plus estimates. The overall cost of SMS messages (messages² plus Esoko scheduling) accounts for over one third of costs, and support provided by the mNutrition

² Based on a bulk SMS rate that is roughly half of the ‘market’ value of SMS.

programme for product development (e.g. design and business intelligence) accounts for roughly 20% of costs. At the time of writing, Vodafone were preparing a sustainability report for GSMA that may include more detailed costs. Costs are also expected to change over the lifetime of the intervention as new approaches to marketing and service provision (and customer charges) are explored.

- Investment (page 66) – There has been investment from DFID and GSMA in the wider programme costs that stimulated and supported this action. There has also been matching investment from Vodafone. Esoko received prior investment for their work and grant support for the deployment of Fasiba/Tulaa in 2016. The Tulaa platform may be a key component of the end of grant negotiations and may play a strong role in the sustainability plan.

Tulaa.

Tulaa is a platform designed to help farmers save and pay for inputs. Smallholder farmers register on the system through local agents or the call centre. Tulaa has arrangements in place with a small number of suppliers, who offer agricultural inputs at a discount. Farmers select products they want to purchase on the system, and can then either save for this purchase, or they can take out a loan from Tulaa's banking partner. Tulaa offers flexible savings arrangements in terms of frequency of payments and amounts. The system sends farmers reminders on their savings plan and offers incentives such as free airtime.

The report considers some alternative approaches in Ghana and concludes that while they offer some similarities to the VFC, they by no means constitute a competition threat to the VFC.

The report ends with an assessment of each of the building blocks described using a range of criteria, scored (using a Likert scale from -5 = very poor to +5 = very good); these scores are referred to throughout the report as key points are made. This analysis shows a fairly mixed picture of strengths and weakness throughout the business model, but in terms of trends, it highlights the value of the partnership and the way that works, and it highlights weaknesses in revenues.

The synergy between the two core partners is one of the key features of the emerging business model. Esoko get to deploy their system and Vodafone create a new mass marketing segment. However, even at this stage it appears that both parties are thinking to the future, implying that the existing arrangement may only be a stepping stone towards creating a product of even greater value. Both parties described the attraction of making the Fasiba/Tulaa savings and loans platform more widely available to farmers, and this appears to match the most pressing need among farmers identified by qualitative research (Barnett et al 2017), so the idea would appear to have enormous potential.

Although it is not possible to draw any firm conclusions from a baseline report, the analysis has highlighted some interesting findings, which can be summarised in terms of the following narrative:

- The current business model is a B2B2C model, in which both of the core partners provide services directly to customers. Vodafone generates both direct revenue from customers, and imputed benefits in terms of increased loyalty. Esoko, on the other hand, generates revenue through a contractual relationship with Vodafone.
- Strengthening the value proposition. Evidence to date suggests there is sufficient willingness to pay, and that this is based largely on the free calls part of the bundle. This may well become a stronger driver as networking affects become evident, whereby free calls become more attractive as more people become members. People may also realise greater value from VFC if

they fully understand all the components. The current acquisition mechanisms have left many customers with gaps in their understanding of the product (both features and payment mechanisms).

- People like face to face contact, and farmers rely on peer to peer discussions for accessing new information. The call centre is an innovative and effective addition to agricultural information systems that is well received by farmers. However, it is expensive and has already experienced problems keeping up with demand. It remains to be seen how demand picks up.
- Farmers appreciate the value of the closed user group (free calls), and previous research has shown that farmers are able to benefit from access to market price information. However, it is not yet clear how valuable farmers will find the agriculture tips type of information, given that they are accustomed to getting information for free, and to sharing information with each other. The qualitative research found that information on nutrition was not perceived as a priority by farmers. Low income farmers tend to be risk averse, and improved agricultural practices tend to be expensive, all of which will tend to make them reluctant to innovate and act on tips.
- Access to finance appears to be an important enabling factor for farmers, and evidence suggests that the impact of VFC may be greater if farmers can access financial services, so there appears to be good synergy between Fasiba/Tulaa and VFC, and there may be opportunities for enrolling VFC members in Vodafone Cash (although Vodafone Cash does not currently offer credit).
- The gender gap in access to phones may not affect growth in subscriber numbers in the early stages of roll out, during which early adopters are likely to be mostly men. If the gap persists, however, it may impede subscription to VFC among women farmers who are more likely to be in the late adopters. Low levels of literacy and technology literacy (i.e. familiarity with using a phone) are also more likely to constitute barriers to adoption among women.
- Low literacy rates in rural areas of Ghana mean that most farmers cannot read. Some get their children to help with reading and sending SMS messages. Nevertheless, information sent to farmers via SMS text messages is unlikely to be read. This will be less of an issue for higher status, early adopters, but more so for the majority users.

Table of contents

Acknowledgements	i
Executive summary	ii
List of abbreviations	xi
1 Introduction	1
1.1 Objectives	2
1.2 The m-Nutrition intervention in Ghana	3
1.3 Purpose and scope of the baseline report	5
1.4 Organisation of the report	6
2 Methodology	7
2.1 Aims of the Business Modelling baseline report	7
2.2 Data collection methods	8
2.2.1 Process of information processing	9
2.3 Ethical considerations and approval	10
2.4 Limitations	11
2.5 The Osterwalder and Pigneur framework	11
3 Setting the Scene – Ghana	14
3.1 Vodafone and telecoms in Ghana	14
3.2 History of Esoko	15
3.3 Agricultural and Nutritional context	15
4 Vodafone Farmers Club	17
4.1 The vision	17
4.2 Adaptation and Key Performance Indicators	18
4.3 The mNutrition Programme	20
4.4 The near future	21
5 The Canvas	23
5.1 Customer Segments	23
5.2 Value Proposition	27
5.2.1 The content generation process	28
5.2.2 User Feedback and product development	30
5.2.3 Evaluation and monitoring	34
5.2.4 Perceived value of bundle components	35
5.2.5 Behaviour change	39
5.2.6 Financial transactions	40
5.3 Channels	42
5.4 Customer Relationships	46
5.4.1 Purpose of Customer Relationship	46
5.4.2 Call Centre	47
5.4.3 Billing	50
5.4.4 Branding	51
5.5 Revenue Streams	52
5.6 Indirect Benefits	54
5.7 Key Resources	55
5.8 Key Activities	57
5.9 Key Partnerships	59

5.10	Cost Structure	61
5.11	Investment	66
6	Alternative Approaches in Ghana	68
6.1	mAgri VAS Context	68
6.2	Implications for VFC	70
7	Discussion	71
7.1	What is the Business Model?	71
7.2	How robust is the Business Model?	73
7.3	Assumptions in the Business Model	78
8	Conclusions	81
	References / Bibliography	83
Annex A	GSMA's theory of change (mAgri)	87
Annex B	Terms of reference	88
Annex C	Stakeholders consulted	99

List of tables, figures and boxes

Figure 1	Building blocks in the canvas (Osterwalder and Pigneur (2010)).....	iii
Figure 2	Building blocks in the canvas (Osterwalder and Pigneur (2010)).....	12
Figure 3	Market share of voice subscribers (March 2017, NCA)	14
Figure 4	Organisations providing support through the mNutrition programme.....	21
Figure 5	Adoption lifecycle (frog (2014))	25
Figure 6	Mobile subscription rates per 100 people (Ghana)	27
Figure 7	Content generation process (GAIN 2014)	28
Figure 8	Local content process (CABI 2017).....	30
Figure 9	Intent to use information from different VFC elements (ALINe 2015).....	37
Figure 10	Mapping perceived value of bundle elements against farmer needs	37
Figure 11	Reported benefits of VFC by agency that signed them up (ALINe 2016).....	38
Figure 12	Vodafone Farmers Club Product Timeline (GSMA 2017)	44
Figure 13	Registering and Profiling of SIMs (GSMA 2016).....	46
Figure 14	Why farmers called the helpline (ALINe 2015)	48
Figure 15	Recalling VFC advice (ALINe 2015).....	48
Figure 16	Calls to helpline by category (GSMA 2016a).....	48
Figure 17	Frog Circle of trust exercise (Ghana) (frog 2014)	51
Figure 18	Partners and other key players (GSMA 2016a)	59
Figure 19	Partnership types	60
Figure 20	Promotional material for Vodafone Farmers Club.....	72
Figure 21	B2B2C Partnership model.....	73
Table 1	Key partners and Key Resources.....	v
Table 2	Description of Building blocks in the canvas	12
Table 3	Archetypes of Farmers (frog (2014))	24
Table 4	Matching UX research with qualitative research.....	32
Table 5	Design insights and recent evaluation findings.....	33
Table 6	Monitoring activities.....	34
Table 7	Voice and SMS bundle (Vodafone (2014) Feasibility Study Report)	35
Table 8	Summary of resources brought by key VFC partners	57
Table 9	Summary of activities conducted by key VFC partners.....	58
Table 10	What parties give and get from Partnership relationships.....	60
Table 11	Cost structure.....	63
Table 12	Cost data available (at end March 2017)	64
Table 13	Quality of Business Model - by Canvas Building Blocks	75
Table 14	Comment on assumptions in Business Model	78
Table 15	Stakeholder contact list	99

List of abbreviations

ADMIRE	Adaption Mitigation Readiness
AFRRRI	Africa Farm Radio Research Initiative
AGRA	Alliance for a Green Revolution in Africa
ALC	Active Listening Community
ALINe	Agricultural Learning and Impacts Network
API	Application Programming Interface
ARPU	Average Revenue Per User
B2B	Business to Business
B2B2C	Business to Business to Customer
B2C	Business to Customer
BI	Business Intelligence
BM	Business Modelling
BMI	Body Mass Index
BMJ	British Medical Journal
BTL	Below the Line
CABI	Centre for Agriculture and Biosciences International
CB	Community Based
CDC	US Center for Disease Control and Prevention
CGIAR	Consultative Group for International Agricultural Research
CRBT	Caller Ring Back Tone
CSR	Corporate Social Responsibility
CTA	Technical Centre for Agricultural and Rural Cooperation
CUG	Closed User Group
DALY	Disability Adjusted Life Year
DDS	Dietary Diversity Scores
DfID	Department for International Development
DSF	Demand Side Financing
FBO	Faith Based Organisation
FHI 360	Family Health International 360
FMCG	Fast Moving Consumer Goods
FY	Financial Year
GAIN	Global Alliance for Improved Nutrition
GCP	Global Content Partnership
GDP	Gross Domestic Product
GFRAS	Global Forum for Rural Advisory Services
GH	Ghana
GHS	Ghana cedis
GSMA	GSM Association
HAZ	Height for Age Score
HDDS	Household Dietary Diversity Score
HNI	Human Network International
ICPD	International Conference on Population and Development
ICT	Information and Communication Technologies
IDS	Institute of Development Studies
IFDC	International Fertiliser Development Centre
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
IP	Intellectual Property
IVR	Interactive Voice Response
KPI	Key Performance Indicator
LCP	Local Content Partners
M&E	Monitoring and Evaluation
MDD-W	Minimum Dietary Diversity - Women
MDG	Millennium Development Goals

MICS	Multiple Indicators Cluster Survey
MNO	Mobile Network Operator
MNP	Mobile Number Portability
MOA	Ministry of Agriculture
MOFA	Ministry of Food and Agriculture
MTN	Mobile Telephone Network
MVP	Minimum Viable Product
NBS	National Bureau of Statistics
NCA	National Communication Authority
NGO	Non- Governmental Organisation
O&P	Osterwalder and Pigneur (Business Model)
OBD	Outbound Dialling
OCGS	Office of Chief Government Statistician
OECD	Organisation for Economic Co-operation and Development
OPM	Oxford Policy Management
OTT	Over the Top
PPS	Phone Proficiency Score
PRC	Participatory Radio Campaign
PSI	Population Services International
Q4	Quarter 4
QA	Quality Assurance
QALY	Quality Adjusted Life Year
QC	Quality Control
R&D	Research and Development
RNI	Recommended Nutrient Intake
SARI	Savannah Agricultural Research Institute
SIM	Subscriber Identity Module
SMS	Short Messaging Service
SSA	Sub Saharan Africa
ToC	Theory of Change
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USSD	Unstructured Supplementary Service Data
UX	User Experience
VAS	Value Added Services
VF	Vodafone
VFC	Vodafone Farmers Club
VFM	Value for Money
VP	Value Proposition
WAPP	West Africa Power Pool
WHO-CHOICE	Choosing Interventions that are Cost Effective
WHO	World Health Organisation

1 Introduction

The Vodafone Farmers Club (VFC) has been introduced in the context of a mature telecoms market, where growth in subscriber numbers is slowing down. The remaining, untapped market for voice and SMS will be made up mostly of low income consumers in rural areas. This is a market segment characterised by high dependency on agriculture, and relatively poor health outcomes. VFC has been designed to deliver value within this context.

Nutrition: Child stunting is 19 percent nationally in Ghana and higher in the Northern (33 percent), Central (22 percent), and UW (22 percent) regions (GSS and GHS, 2015). Varied and high-quality diets are key to addressing child and maternal undernutrition. The percentage of children 6-23 months who consume the minimum diet diversity of four food groups is 46.8 percent and, on average, women consume four out of nine food groups (Kothari and Noureddine 2010).

Mobile penetration in Ghana has risen dramatically in the past ten years, increasing from less than 20 subscriptions per 100 people in 2005 to 108 subscriptions per 100 people in 2013³. According to the Ghana Living and Standards Survey (GLSS Round 6), mobile phone penetration in 2013 was 80 percent in Ghana, with 70 percent of rural households reporting owning a phone and 88 percent of urban households reporting owning a phone (GLSS 2014). However, access to mobile phones in Ghana varies dramatically by region, socioeconomic status, and gender. In USAID's Feed the Future zone of influence (districts in Northern, UW, and Upper East regions), only 38 percent of males and 41 percent of females report having a mobile phone in the household (USAID 2012). Access to mobile phones in these regions is also lower among females, with only 14 percent saying they are the principal owner of their phones, while 57 percent of males say they are the owner.

Literacy in Ghana: According to the GLSS Round 6, adult literacy rates in rural areas are quite low, with only 41.7 percent of the adults knowing how to read or write in English or any Ghanaian language.⁴ Among rural women, rates are even lower, at 31.4 percent. These low rates have implications on the design of the Vodafone Farmers' Club product and its ability to reach an illiterate population.

Agriculture in Ghana: A little over half (51.5 percent) of households in Ghana own or operate a farm. Farming is predominantly rural, with 82.5 percent of rural households involved compared to 26.6 percent of urban households.⁵ The proportion of females involved in agriculture is 41.2 percent, and there is virtually no difference in urban and rural areas. The main crop harvested is maize, followed by cocoa and groundnut/peanut. The number of households harvesting crops and the types of crop grown vary extensively across ecological zones. Per the Ghana Socioeconomic Panel Survey baseline report (Aryeetey et al 2011), 51.7 percent of all households surveyed received agricultural advice from other households and the proportion of households receiving agriculture extension advice through radio varies from 13.79 percent in the northern region to 0.26 percent in the Greater Accra region.

³ <http://databank.worldbank.org>

⁴ GLSS Round 6, August 2014.

⁵ *Ibid.*

mNutrition within the mAgri program aims to promote behaviour change around key farming decisions and practices by delivering nutrition information to farmers.⁶ The objective of mNutrition and mAgri is to create and scale commercially sustainable mobile services that enable smallholder farmers to improve the nutritional status of their household and increase their productivity (see Annex A for GSMA's theory of change of mAgri). The stated GSMA targets are the following (GSMA M4D 2013):

- At least 20 percent of registered households that act on information and advice report consuming at least **four food groups** on a daily basis for at least nine months of the year as a result of more diverse agricultural output, increased income, and/or behaviour change in terms of nutrition.
- At least 50 percent of registered households that act on information and advice report a 25 percent increase in **agricultural productivity**.
- At least 50 percent of registered households that act on information and advice report increases in **agricultural income** of 20 percent.

1.1 Objectives

The mNutrition evaluation is intended to understand and measure the impact, cost-effectiveness and commercial viability of mNutrition services using a mixed methods evaluation design. The evaluation includes a quantitative component, a qualitative component and a business model analysis. The evaluations are being conducted by a consortium of researchers from Gamos, the Institute of Development Studies (IDS) and the International Food Policy Research Institute (IFPRI). The team draws on a number of methods and interlinked work streams to gather evidence about the impact of the mNutrition intervention in Ghana.

- A **quantitative impact evaluation**, employing a randomised encouragement design to determine the causal effect of the intervention. This component will conduct large-scale, statistically representative household surveys at the start of the programme implementation and roughly 18 months later.
- A **qualitative impact evaluation**, which consists of three qualitative data collection rounds (i.e. an initial qualitative exploratory baseline, in-depth case studies at midline, and rapid explanatory qualitative work after the quantitative endline survey data collection) and aims to provide understanding of the context, underlying mechanisms of change and the implementation process of mNutrition.
- A **business model and cost-effectiveness evaluation** employing stakeholder interviews, commercial and end user data, document analysis, and evidence from the quantitative and qualitative evaluation data to generate a business model framework and estimate the wider imputed benefits from the value-added service for the range of stakeholders involved.

⁶ For a detailed landscape analysis on the context for implementing mNutrition and mAgriculture programs see the report Barnett et al. 2016.

The business model and cost-effectiveness component of the evaluation is designed to contribute evidence to help answer the first of the broad research questions specified in the Terms of Reference (Terms of Reference, Annex B), and the last two:

- What are the impacts and cost-effectiveness of mobile phone-based nutrition services on nutrition, health and livelihood outcomes, especially among women, children and the extreme poor?
- How commercially viable are the different business models being employed at country level?
- 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?

The mNutrition intervention is being externally evaluated in two countries. In Ghana, the intervention is implemented via an mAgriculture programme in which nutrition information has been integrated with crop information as part of a package of agriculture support services. The target group is low income farmers in rural areas throughout the country. In Tanzania, the research consortium is evaluating mNutrition within a broader mHealth programme that promotes behaviour change around maternal and early childhood health and nutrition. The Terms of Reference refer to the impacts and effectiveness of mobile phone based services, so the scope of the evaluation is the mobile based service as deployed under the mNutrition programme, rather than the incremental impact of support provided through the mNutrition programme.

The intended audience for the business modelling baseline report is DFID, along with other organisations involved in mNutrition and mAgriculture programmes globally (including local MNOs and NGOs implementing mNutrition services), national governments, international agencies, and donors.

1.2 The m-Nutrition intervention in Ghana

mNutrition is a global initiative supported by DFID, organised by GSMA, and implemented by in-country mobile network operators (MNOs) and third party providers to use mobile technology to improve the health and nutritional status of children and adults in low-income countries around the world. mNutrition is implemented through 6 mAgri and 8 mHealth programmes in 12 countries throughout sub-Saharan Africa and South Asia. The nutrition content aims to promote behaviour change around key farming practices and around dietary and child feeding practices that are likely to result in improved nutritional health within a household.

The m-Nutrition intervention that is the focus of the evaluation in Ghana is the Vodafone Farmers' Club. The Vodafone Farmers' Club (VFC) service is a mobile agricultural extension service, offering agricultural and nutrition information via voice and SMS channels. The objective of Vodafone's mNutrition program is to create and scale commercially sustainable mobile services that enable smallholder farmers to improve the nutritional status of their household and increase their productivity. Vodafone began offering the VFC service in May 2015. Smallholder farmers with access to mobile telecommunications are the primary target for VFC enrolment. The service operates across 71 districts of Ghana, which were selected

based on network access and crop cultivation patterns to ensure that farmers could receive messages and that content would be relevant to their location and crop choices. Promotion and active subscription of farmers via Vodafone Farmers Club agents varies between regions.

The value-added services components 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:** one weekly recorded voice message in the selected local language with seasonal agricultural or nutrition tips (3 agri tips and 1 nutrition tip⁷ per month) for the selected crop.
- **Call centre:** free access to a call centre with advice available from an agricultural expert.
- **Free calls and SMS** messaging to other VFC members.
- **Discounted SMS and calls** to non-VFC members.

In total, 20 messages per month are sent to the subscriber. The mode of content are SMS text messages for weather and price information and voice messages for agricultural tips and nutrition information. While SMS are in English, voice messages are available in ten local languages. Esoko Ghana, a mobile phone-based rural information service, develops and curates the message content and operates the platform to send tailored SMS and recorded voice messages to member farmers. Esoko also operates the Farmer Helpline call centre.

Nutrition message content was developed by GAIN. GAIN created a large library of nutrition-sensitive agriculture messages and nutrition-specific tips designed to complement the agriculture messages provided by Esoko. GAIN created 312 crop-specific messages (13 messages per crop for 24 Esoko-supported crops) with nutrition information on topics including food preparation, food hygiene, safety and storage, and processing. GAIN also developed many general nutrition-specific tips as well as messages for 13 crops that were not originally part of the Esoko profile. Agri tips developed by Esoko cover recommended planting time and information on best practices for cultivation and harvest.

The VFC service is available through a dedicated Farmers' Club SIM and is activated upon subscribing monthly to the service. The subscription fee for the mNutrition packages was initially GHC 2 (USD 0.45) per month. At first members had to initiate monthly payments using airtime credit on their phone. As a result of very low rates of monthly membership activation, the program was modified to automatically deduct GHC 2 from a member's airtime credit each month. If a member's credit fell below GHC 2, their membership status would become inactive until they loaded sufficient credit on their phone to cover the monthly subscription fee, which would be automatically deducted when the credit was loaded. From October 2016 to June 2017, the monthly fee was dropped in order to increase subscriptions. In June 2017 the monthly service fee was reinstated at GHC 0.5.

⁷ Negotiations to increase the number of nutrition messages from 1 to 3 messages a month are currently underway as of August 2017.

The VFC service is designed to offer customised information to farmers based on their selected preferences. Initially, each new member was profiled by a Vodafone agent at the time of registration, indicating their preference of location for weather and market price information, their preferred language for receiving recorded voice messages, and their preferred crop choice for agricultural tips and price information. It became apparent that much of the profiling data was not being collected by agents at the time of SIM registration. As a result, Esoko and Vodafone modified their strategy so that all profiling would be done through a follow-up call to new members by the Vodafone Farmers Club call centre after the SIM registration process was completed. However, when Vodafone suspended the monthly service fee and initiated a large push to increase the program member base, it became infeasible for Esoko to follow-up with each new VFC member individually. Instead, new members were given default profile options based on their district of residence, receiving agri and nutrition tips on the crops most widely grown in that district. Farmers were given the option to contact the call centre themselves to request customised profile options.

Vodafone Farmers' Club is available to farmers and people in the farming ecosystem, such as market women and input dealers in 71 districts of Ghana, although promotion and active subscription of farmers via Vodafone Farmers Club agents varies between regions.

The mNutrition programme has supported mAgri projects in 6 countries through the development of nutrition content, and GSMA has assisted projects with product development primarily through user experience research and business intelligence support. The original Esoko service dealt only with agricultural information such as market prices and agricultural tips, so the nutrition content contributed through GSMA under the mNutrition programme represents an extension of the scope of information.

1.3 Purpose and scope of the baseline report

This report is a milestone in the evaluation study; it documents some of the journey of the Vodafone Farmers Club (VFC) project in Ghana supported by GSMA (and DFID) and takes a snapshot of the business model at the moment. The report is one of four baseline deliverables, each of which will be followed up by a final report at the end of the evaluation exercise in 2019. This report should be read in conjunction with the baseline Cost Effectiveness report (Batchelor, Sharp & Scott 2017). The deliverables Quantitative Baseline Report (Billings et al 2017) and Qualitative baseline report (Barnett et al 2017⁸) give additional insights into the consumer environment that the service is targeted at.

The business model is constantly evolving. If we consider the last year, the VFC basic minimal product has had its location within Vodafone Ghana transferred from Innovation to Mass Marketing, it has been trialled with a monthly charge then changed to a free monthly subscription, grown from a few thousand users to 200,000 subscriptions, and reworked its contract with its principle supplier of content. At the end of the data gathering stage (March 2017), the GSMA grant was finishing, and Vodafone were taking the opportunity to renegotiate the contract with Esoko, their main content supplier. This will likely lead into further changes in the product. This report focuses on the data available as at the end of March 2017.

⁸ This qualitative research report is commonly referred to simply as the "qualitative research" throughout this report.

The findings from the four baseline deliverables described above will be combined and triangulated in a workshop planned for December 2017. The two-day workshop will examine the insights from the quantitative, qualitative, cost-effectiveness and business modelling components of the evaluation and will be attended by the lead partners from IDS, IFPRI and Gamos responsible for each of these components. It will inform the development of the integrated mixed methods baseline report on the Vodafone Farmers Club impact evaluation in Ghana.

1.4 Organisation of the report

After the description of the methodology in Section 2, Section 3 will present a brief overview of the telecoms industry in Ghana along with an overview of the agriculture and nutrition context in Ghana, and an introduction to the development of the Esoko platform. The VFC product itself is described in Section 4, as well as key features lying behind this evolution. Each of the building blocks of the Osterwalder and Pigneur Canvas are then described in detail in Section 5. Some insights into how other services are approaching the market in Ghana are presented in Section 6, before an evaluation of the VFC business model itself in Section 7. This includes an assessment of each of the building blocks described using a range of criteria (scored using a Likert scale from -5 = very poor to +5 = very good); these scores are referred to throughout the report as key points are made. Finally, Section 8 draws key findings together to make some conclusions.

Throughout the report, some interesting learning points have been identified. Keeping an eye on these issues as the project develops over the next two years will enable more detailed insights to be made by the time of the final report. These preliminary learning points are described in the “Prelude to learning” boxes, along with specific questions which have yet to be addressed. Further information on these issues will enhance the final reporting, both in terms of more detailed understanding of the business model, and compiling a narrative of how the model evolves over the duration of the evaluation.

2 Methodology

2.1 Aims of the Business Modelling baseline report

As will become evident from the narrative below, identifying and documenting all elements of a business model is not a simple process. The model itself constantly changes as the MNO and other stakeholders get insights into the product and service, and in response to consumer feedback. This report is based on data gathering up to 31st March 2017. This was the end of the first official phase of data gathering. Given that the business model continually evolves, it provides a reasonable date for a snapshot of the business model, and insight into the possible trajectories. The Impact study team will continue to gather data and discuss with the relevant stakeholders the evolution of the business model, and the plan is to provide an endline in 2019 which links the insights into the business model with the insights into the impact on the users. Impact on the users is being gathered through an experimental designed quantitative survey supported by qualitative data.

This report is constructed from interviews with key stakeholders and access to secondary data. A list of contacts made during the baseline collection can be found in Annex B.

In the inception report (Barnett et al 2017), we stated that we would be using the Osterwalder and Pigneur canvas for structuring insights into the business model (Osterwalder and Pigneur, 2010). Few business models in the 21st Century are straight forward and simple. Production of a product, sales of the product and revenue from that product are only a small section of the overall model. Revenues are often made on associated advertising, or on the value the product adds to the brand. The landscape report published as part of this study, details some of the possibilities for Mobile Network Operators (MNOs) (Barnett et al. 2016).

In this report, we use the O&P canvas to structure the report. While this generally works well, we acknowledge that in this baseline documenting the timeline and history of the product is important. These business model insights are intended to answer the key research question: “How commercially viable are the different business models being employed at country level?” (as well as contribution to the cost-effectiveness and the continued private sector engagement).

In a development sector where public funds are increasingly under scrutiny for value for money (VFM), the roll out of a public good via a private sector commercially sustainable mechanism is very attractive. The heart of the question is predicated on assuring that future actions taken by donors and private sector regarding similar products are informed and lessons are learned, in order to increase the chances of sustainability. Hence while we try to use the O&P framework in an applied manner, there are times when we need to document the ‘back story’ that led up to certain decisions.

The aim of this baseline report is, therefore, to provide a detailed description of each of the building blocks of the business model canvas as at the beginning of the independent study. It also provides a review of operating experience since the beginning of the mNutrition project that may provide context for changes that have already taken place in the product design.

2.2 Data collection methods

Business models traditionally describe how a business is going to make a profit from a product or service, and identify the direct relationship between the two. It considers who its customers are, why they will buy the product or service (the value proposition), as well as how the company is going to provide the product or service. On the financial side, it considers both revenues (and pricing) and costs. The role of VAS within mobile network operators (MNOs) is not always straight forward. There are imputed benefits, and these are recognised as important within the DFID logframe for the whole GSMA programme. The challenge here then, is to identify the broad business model, including the non-monetary benefits of the service – to each stakeholder.

Given the complexity of the partnerships involved in the mNutrition projects, Osterwalder and Pigneur's (2010) inductive approach to business model generation is being used as a framework for the research.

The baseline has consisted of ongoing mixed data collection, drawing on:

- Qualitative interviews conducted with stakeholders and MNOs in Ghana.
- Commercial data provided by stakeholders and MNOs (or aggregated by GSMA if necessary).
- Findings from the qualitative baseline research led by IDS, and quantitative baseline research led by IFPRI.
- Monitoring data gathered by ALINe.
- Cost and impact performance data available in published literature.
- Government stakeholders and alternative service providers as a source of additional, unpublished information on costs and impact.

In addition, this component draws on data gathered by the quantitative and qualitative evaluation components described in Section 1.1. The qualitative baseline research employed multiple data collection tools to explore four thematic areas:

1. Access, use and attitudes towards and acceptability of mobile phone technology by male and female small-scale farmers.
2. Barriers to and facilitators of the up-take of mobile-phone based messages by female and male small-scale farmers.
3. Small-scale farmers' information needs and current information-seeking behaviours related to agriculture and nutrition.
4. Social, economic and environmental factors that may influence behaviour change related to agriculture and nutrition.

Data collection tools included semi-structured in-depth interviews with farmers, key informant interviews (KIIs), expert interviews and community member interviews, and focus group discussions (FGDs). Field work was carried out in two clusters of three villages selected from two different regions – Upper West, and Central Region. Details of the sampling strategy, participant numbers and composition are described in the Qualitative Baseline Report (Barnett et al 2017). Findings from each of the qualitative research areas has

contributed to various of the building blocks described in Section 5. Findings relating to information needs, current sources of information, and barriers to uptake all affect the perceived value of the service. Patterns of handset ownership and access, and poor network coverage and literacy all inform the viability of the service, and SMS as a medium, in reaching target farmers.

The quantitative research component employs a randomised encouragement design to determine the causal effect of the programme on dietary diversity, agricultural income, and production. The focus of the baseline report was on demonstrating that the treatment (or encouraged) and comparison communities sampled were indeed similar, which confirmed that the randomization was successful. However, it also gathered data on patterns of use of mobile phones, and access to agricultural information, which are directly relevant to the business model. The results of a willingness to pay exercise have also informed discussion on potential revenues.

2.2.1 Processing information

Evaluation activities carried out by Gamos to inform the baseline report include:

- Field visits to establish relationships with key stakeholders. Interviews conducted with key representatives of stakeholder institutions to gather additional data to populate the Osterwalder and Pigneur (O&P) framework. Ongoing communication and field visits undertaken to monitor developments in services and to track the commercial justification for changes.
- Populating the Osterwalder and Pigneur (O&P) canvas with information gleaned from reports previously published under the mNutrition programmes (e.g. User experience testing, case studies, Rapid Feedback surveys, etc.), as well as grey literature.
- Working with IDS and IFPRI to contribute to the design of both qualitative and quantitative instruments (both baseline and endline) to incorporate indicators relating to non-financial attitudes of customers to services, and to MNOs in particular, such as customer satisfaction and brand loyalty. These instruments also explore attitudes towards alternative services offered by other providers, e.g. media, face-to-face extension.
- Interview alternative service providers to explore alternative business models (among alternative mobile services).

The process of enquiry and information collection has needed (and will continue) to be flexible and responsive to events on the ground, given that the service offerings are constantly evolving. Particularly portentous times are expected to occur following the end of GSMA mNutrition contracts, for example. Other times might coincide with the publication of significant outputs from the research project that might be likely to inform product review decisions. This component of the evaluation is based on opportunistic data gathering from key individuals such as representatives of the core partners and other partners to the project.

As stated above, the Vodafone Farmers Club service continues to evolve so in order to create this baseline report, the end of March 2017 was taken as a cut-off point. While new information has arisen since this time, and continues to be given to the team even during the

report writing phase, we have tried to restrict the baseline to that known as at March 2017 in order to create a clear boundary for the analysis.

2.3 Ethical considerations and approval

As an overall guiding principle, the research team sought to conduct themselves in a professional and ethical manner throughout the baseline phase of work, with strict respect for principles of integrity, honesty, confidentiality, voluntary participation, impartiality and the avoidance of personal risk. These principles were informed by the OECD (2010) DAC Quality Standards for Development Evaluation and DFID's 'Ethics Principles for Research and Evaluation' which will be followed for the duration of the evaluation.

Overall, this component will draw on the qualitative and quantitative data collected in the other two components of the evaluation. Other data sources will be stakeholder interviews with MNOs and data collection (commercial and monitoring data) from MNOs and other relevant organisations.

Although most research participants will be familiar with the mNutrition programme, and the principle of an independent evaluation, this component will seek informed consent of participants. This will be achieved by emails and briefing documents describing the research. In particular, it will describe the relationship between the consortium, DFID, and GSMA, in order to avoid any possibility of deception. Research activities with participants involve interviews only; there are no observational activities.

Whilst this evaluation component does not involve any primary data collection from human subjects at community / household level, ethical considerations are still considered important for all work carried out under this component. In particular, GSMA remain highly aware of the commercial sensitivities of their partner MNO's, so the issue of commercial confidentiality is very important for this area of work given that it relies on sharing of sensitive commercial data. Therefore, the Gamos team will pay specific attention to this issue as part of their ongoing work.

The Gamos team is currently operating under the Non-Disclosure Agreement (NDA) signed by GSMA and OPM during the inception phase of the project. Where relevant, stakeholder respondents are informed that an NDA with their trade association has been signed, and that the interview is bound by it. All the data being gathered falls within the scope of this agreement (e.g. development, business plans, marketing, operations, and finances), although there is a provision that such information should be designated as proprietary or confidential⁹.

For the avoidance of doubt, all internal reports shared by Gamos are being marked as confidential and are not to be circulated outside of the evaluation team. Any outside reporting will not contain any detail that could be construed as proprietary or confidential information.

All external reports will be shared with key research participants in early draft form in order to establish principles of trust and reciprocity. This will ensure that participants will have an

⁹ The agreement permits Gamos to share confidential information among the team if: 1. They need to know; 2. They have entered into a confidentiality agreement; 3. They are not a competitor

opportunity to confirm that their views have been reported accurately, and that publications do not breach their confidentiality requirements.

As this component draws on qualitative and quantitative data collected through the other two work streams, appropriate measures will be taken to ensure that the shared data is anonymised and there is no risk of confidentiality breach. For the quantitative data, a unique household ID has been assigned to each household which allows for following up with respondents as necessary without providing access to any personal information on datasets that are made available for analysis. Similarly, all qualitative transcripts are anonymised, pseudonyms given, and any information that can lead to personal identification has been removed.

2.4 Limitations

The methodology relies on the willingness of key stakeholders to share their data and their thoughts. In a commercial environment this is not always forthcoming, and a limitation of the report is that it relies on this shared data. Risks associated with this transfer of data have been mitigated as much as possible by clear communication and follow up with stakeholders. The degree of engagement to date with stakeholders is reflected in the insights and level of data presented in the report but will become evident over the duration of the project. Changes in relationships and personnel (among all stakeholders) are the principal threats to the mitigation strategy.

As described above, this baseline is a snapshot as at March 2017. As the evaluation continues the product will evolve, new data may come to light and the business model itself may change. The risks associated with the evolving nature of the business model have been mitigated as much as possible by setting a milestone data point, and will use the subsequent phase to inform the changes between baseline and endline.

2.5 The Osterwalder and Pigneur framework

The O&P framework is commonly used as a framework or canvas for describing a business model. Businesses in 2017 rarely have a simple model of selling a product and gaining revenue from that product. A simple income vs expenditure model is insufficient to describe the business. Instead, a product might enhance the brand of a company, or enhance the overall experience of the consumer, causing them to buy other associated goods or services. This idea was at the very heart of the submission of GSMA to DFID. The logical framework of the GSMA grant application, described in the next section, discusses indirect benefits or imputed benefits.

In order to map the various components of the business model and to capture these indirect or imputed effects (beneficial or otherwise), we use the O&P canvas. The nine elements (or building blocks) of the canvas form the basis of our analysis below. Note that we propose amending the framework slightly by splitting the Revenue building block into two components, considering cash generated and imputed benefits separately. We also propose splitting Costs into two, considering operating costs and previous investments separately. This has been proposed because of the importance of indirect costs to VAS business models, and because some of the key resources brought to partnerships have benefited from prior investments. Table 2 presents a generic overview of the framework, i.e. the

descriptions and example questions illustrate how the framework is applied to business models in general, so not all are directly relevant or applicable to the VFC service.

Figure 2 Building blocks in the canvas (derived from Osterwalder and Pigneur (2010))



Authors own

Table 2 Description of Building blocks in the canvas¹⁰

Canvas building block	Description	Example Questions
Customers		
Customer Segments	The business model should define different groups of people or organisations to reach and serve. Distinct segments will have common needs, behaviours, or other attributes. The business model should be designed around a strong understanding of customer needs.	For whom are we creating value? Who are our most important customers?
Channels	How a company communicates with customer segments. Channels are customer touch points that shape the customer experience, e.g. communication, distribution, sales.	How are we reaching customer segments? How do they want to be reached? Which ones work best and are most cost-efficient?
Customer Relationships	The types of relationships a company establishes with specific customer segments. Relationships may be driven by various motivations, e.g. customer acquisition, customer retention, boosting sales.	What type of relationship does each of our Customer Segments expect us to establish with them? How costly are they? How are they integrated with the rest of our business model?
Offering		

¹⁰ Authors' table, generated from Osterwalder and Pigneur (2010).

Canvas building block	Description	Example Questions
Value Propositions	The bundle of products and services that create value for a specific Customer Segment by satisfying a need or helping solve a problem. Value propositions may be innovative (disruptive) or similar to others, but with added features.	What value do we deliver to the customer? Which of our customers' problems are we helping to solve? Which needs are we satisfying?
Business Operations		
Key resources	Those assets required to make the business model work. Resources that allow and enterprise to create and offer the value proposition, to reach markets, to maintain relationships, and to generate revenues. They can be physical, financial, intellectual, or human.	What key resources do value propositions require?
Key activities	Things a company must do to makes its business model work. Activities required to create and offer the value proposition, to reach markets, to maintain relationships, and to generate revenues.	What activities do your value propositions require?
Key partnerships	The network of suppliers and partners that make the business model work. Companies forge partnerships for many reasons, e.g. reduce risk, acquire resources.	Who are our key partners? Who are our key suppliers? Which key resources are we acquiring from partners? Which key activities do partners perform?
Finances		
Revenue streams	The cash generated from each Customer Segment. Revenue streams will depend on what customers are willing to pay. Revenue streams can be either one-off payments, or recurring revenues. Each revenue stream may have different pricing mechanisms.	For what value are customers willing to pay? How are they currently paying? How would they prefer to pay? How much does each revenue stream contribute to overall revenues?
Cost structure	Costs incurred to operate the business model. Creating and delivering value, maintaining customer relationships, and generating revenue all incur costs.	What are the most important costs inherent in our business model? Which key resources are most expensive? Which key activities are most expensive?
Investment	Number of investors, type of investors, and commitments made to investors. These will influence acceptable profit margins, and may affect cash flow.	Who has invested in the company? What kind of returns are expected? And over what timescales?
Indirect benefits	Ways in which the service can benefit the company other than by direct revenue generation.	How does service increase acquisition and loyalty? Does service boost other sales? How does service improve brand image?

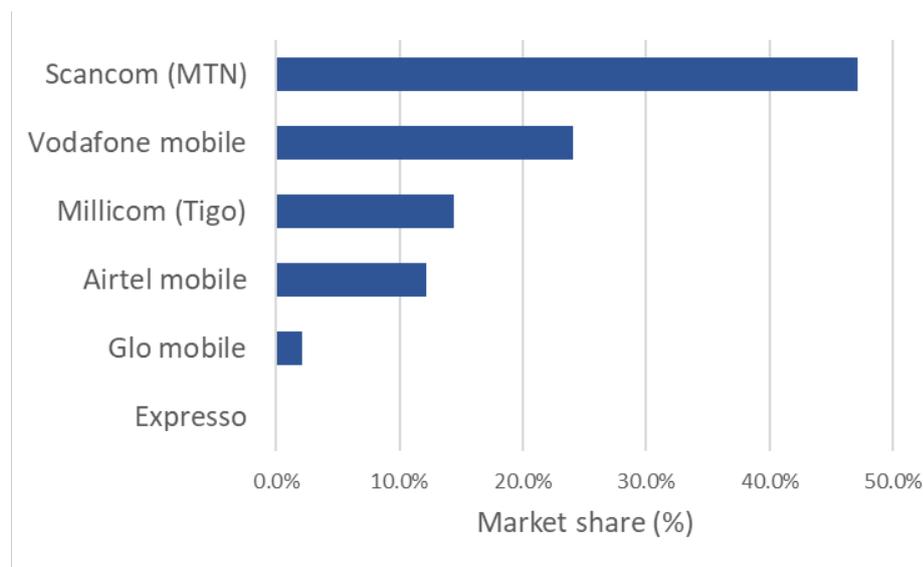
3 Setting the Scene – Ghana

3.1 Vodafone and telecoms in Ghana

Much of the general telecom landscape has been covered in Dial N for Nutrition (Barnett et al 2016). As GSMA summarise it; “Ghana is a Discoverer market in Western Africa with 9 operators and 34.3 million mobile connections”¹¹ in Q4 of 2015. According to the latest figures published by the regulator, the total number of voice subscriptions had risen to 36 million in April 2017¹². Given that the population is 28 million (increasing by 2.3% per year), this represents a penetration rate of 127%. NCA figures show that growth is slowing down; from January 2015 to January 2016, subscribers grew by 15.7%, but over the following 12-month period, growth slowed to 9.5%.

The market is served by 9 MNOs: Airtel (Bharti Airtel), Blu, Busy (Afrimax), Expresso (Sudatel), Glo Mobile (Globacom), MTN, Surfline, Tigo (Millicom), and Vodafone. MTN has the largest market share, with over twice the number of subscribers of the second provider, Vodafone – see Figure 3. Over the period January 2016 to January 2017, MTN has shown the highest growth (20%), followed by Vodafone (9%).

Figure 3 Market share of voice subscribers (April 2017, derived from NCA data)



Authors own

The higher than population penetration is mainly due to the lack of coherence of interconnectivity rates. Making a call on one network is often much cheaper than making a call across networks, and so Ghanaians have adapted to the situation by carrying multiple sim cards. People will call their colleagues using a sim card on the same network that their colleague is on.

98% of the connections in late 2015 were prepaid, and this was reducing by 0.42% over the previous 3 years. It is likely that it continues to reduce as a few people move to contract particularly with the emergence of broadband on the phone. 31% had some form of

¹¹ GSMA Intelligence

¹² <https://nca.org.gh/industry-data-2/market-share-statistics-2/voice-2/>

broadband in Q4 2015, although it is not clear whether this figure includes the role of “Facebook free”, also known as Free Basics. In some contracts, internet data per se is not included, but access to Facebook (and WhatsApp) is. Given that this was growing by 25% per year over the previous 3 years, and that phones continue on their path to sophisticated data handling, it is likely that this now sits at 40 to 45%.

3.2 History of Esoko

Esoko has a relatively long and important standing in Ghana. Founded by Mark Davies, a high net worth individual who saw the opportunities that ICT might bring to Ghana, Esoko began as Busyinternet. This was primarily an internet café in Accra, as well as an internet service provider, and became a business incubator in partnership with the World Bank. It became the largest technology centre in West Africa. As mobile phones became more common, in 2005 Busy created a plan to facilitate agricultural e-commerce under an endeavour they called ‘TradeNet’. Their first product became an application that enabled the dissemination and collection of price information for market commodities like grains and vegetables using simple SMS.

“In 2006 a partnership was formed between TradeNet and Mistowa, a regional program funded by USAID that aimed to remove trade obstacles in West African markets. Through this partnership, TradeNet emerged to provide an electronic agribusiness information exchange platform that enabled peer-to-peer trading. The initiative was able to offer access to real-time market information including commodity prices, offers to buy and sell between farmers, merchants and traders as well as business contacts on more than 300 products, from over 500 markets throughout West Africa” (Belachew 2011). Tradenet later was rebranded as Esoko – where soko means “market” in Swahili.

By 2010, Esoko was promoting itself as a platform. It sought to present as an ‘out of the box’ market information platform with training and support. Esoko then had a history of being a resource for other projects - organisations could bring in Esoko as an outside expert for the tools they needed, rather than re-inventing the technology wheel each time. It is this history that Vodafone Farmers Club builds on in its partnership with Esoko. In particular, Esoko touts itself as actively seeking feedback from users and stakeholders to drive improvements and new product development. This ‘innovation driven’ approach allows the company and its products to stay relevant as it continues to bring real value to its customers. This, it is said, will lead to better sustainability and profitability.

3.3 Agricultural and Nutritional context

Again, the landscape of nutrition and agriculture can be found in Dial N for Nutrition (Barnett et al 2016). However key points to note for Ghana include that agriculture is one of the largest sectors of the economy, employing more than half of the adult population. In northern Ghana, the majority of households depend on agriculture (75% of households); this comprises agriculturalists (46% of households) and the agro-pastoralist group (29%) (WFP 2012). These two groups are followed by traders (10%), regular employment (5.2%), unskilled labour (3.8%), artisans (3.5%), fishermen (1.6%) and food processors (1.1%). Close to 88% of households in northern Ghana rely on crop cultivation as their chief livelihood activity. However, most small scale farmers consume a large part of what they

produce. The livestock sub-sector is dominated by small scale operators who are mainly crop farmers keeping livestock to supplement their incomes and/or for security purposes.

In their summary of food and nutrition security, the GAIN briefing for GSMA on Ghana (GAIN 2014) stated that 'food is 51% of household expenditure' and that '37.7% females are working in agriculture'. Relating to agriculture inputs, 'a lack of fertiliser and/or pesticides and soil infertility are a constraint to increasing yields. Ghana suffers from seasonal food insecurity based on food availability in the market during the lean season and seasonal changes in supply from farmers. Women lack access to productive resources.'

Ghana is not on track to meet the MDG indicator eradicate extreme hunger. The national prevalence of stunting is 23% for children under 5 (MICS, 2011), 6% are wasted, and 13% are underweight (MICS 2011). Acute and Chronic Malnutrition have different geographic correlations (Acute malnutrition focused in the north regions). 8% of women are undernourished (BMI <18.5), and 21% are overweight or obese (BMI ≥25.0).

4 Vodafone Farmers Club

4.1 The vision

This section emphasises the dynamic nature of VFC product development by describing firstly the original vision based mostly on the application to the mAgric Challenge Fund run by Coffey, then changes that have taken place since product launch, and finally makes some comment on possible developments in the near future. The dynamic nature of product development is central to the GSMA mNutrition project process, which is based on concept testing, field testing, and data analysis. This is reflected in the mNutrition project support for user experience (UX) design and testing, and business intelligence services provided by GSMA. Despite the changes described throughout this report, GSMA have pointed out that, of the six mAgri projects, VFC is one of those that most closely resembles the original description given in the Challenge Fund application.

In the grant application, after stating the problem, the Vodafone / Esoko request for assistance states that based on the low levels of productivity and income of Ghanaian farmers it is evident that the agricultural segment is in need of specific and locally appropriate information that would allow farmers to make key production and commercial decisions. These information needs are as follows:

- Market information: to determine best price or best market to sell goods
- Local weather forecasts: to inform farming activities based on weather
- Advisory information: receive specific agricultural extension information or best practices advice from experts in various local languages

The application draws on recent evidence to support its case. From a study undertaken by Cirad, it showed that some farmers receiving weekly price information, were making up to a 10% increase in income; thereby indicating that they derived value from the service.

The original application form describes an innovative bundle of services designed to support farmers in adopting improved agricultural practices.

- Voice minutes: on & off network minutes
- Free Community calling: free calls to other Farmer Club users
- Weekly agricultural content: advisory, weather, price & offer information via SMS & Voice SMS
- Caller-Ring-Back Tones: to passively share entertaining yet engaging content
- Access to the Farmer Helpline
- Discounted mobile phone purchases
- Completing transactions via Mobile Money: Vodafone will introduce mPesa in FY 2015/16
- SMS bundle

Innovative features in the application distinguishing this from competitor services were:

- A platform for peer to peer sharing and learning – free community calling

- A more active engagement than just receiving voice and SMS calls – helpline, free calling to other farmers, mobile money transactions, content tailored to crops/livestock and to location.
- Mobile money to complete transactions.

The target of 400,000 users by 2016/17 was based on a 18% take-up rate.

The application went on to argue that this bundle differs from other agricultural services because:

- It covers the farmer's complete communication needs (including voice and SMS)
- It builds and fosters community amongst farmers and the agricultural value chain by including the Farmer community free calls
- The farmer will receive information relevant to their crop/livestock type and location
- Mobile money allows the farmer to complete financial transactions
- The farmer is an active and willing participant in the service rather than passively receiving information.

Advisory and extension information were to include nutrition sensitive information; disease awareness and prevention information; best agricultural practices for both livestock and crop farming; best practices information on inputs and chemical usage, and smart climate adaptation techniques.

The mode of content was intended to be SMS text messages for weather and price information and voice messages for nutrition information. While SMS was to be in English, voice messages would be available in five local languages. The content for all agricultural messages is provided by Esoko Ghana, a mobile phone-based rural information service, and the nutrition content is developed by GAIN. In total, 23 messages per month (3 on nutrition¹³ and 20 on weather and price) are sent to the subscriber.

The Vodafone Farmers' Club product was initially available only through a dedicated Farmers' Club SIM and was activated upon subscribing monthly to the service. The subscription fee for the mNutrition package was 2 cedis per month. Subscription was automatically deactivated if the necessary credit for the subscription was not available on the phone.¹⁴

As will be discussed below, not all features in the grant application were implemented (e.g. No Caller Ring Back Tone), however the grant gave a clear vision of what was intended.

4.2 Adaptation and Key Performance Indicators

After some User Experience design, a basic product was launched in June 2015. Following initial UX research, the mobile money transaction component and the purchasing of mobile phones were dropped from the original concept. The original target was for non-Vodafone users, i.e. to sign people up who currently prioritised other MNOs. A number of strategies were employed and these are explored further in the Channels section (Section 5.3) below.

¹³ The number of nutrition messages to be sent has recently been increased from 1 to 3 messages per month.

¹⁴ Since October 2016 the m-Nutrition service has been offered free-of-charge to farmers. However, Vodafone has decided to re-introduce the monthly fee in early June 2017.

One of the features of the initial product was the pricing model. Users were asked to pay an upfront cost of 2 cedis and then a monthly charge of 2 cedis. For this they had the free phone calls within the closed group, an on-net tariff (to other Vodafone numbers) of 9 pesewas (Gp) per minute and an off-net tariff (to other networks) of 11 pesewas per minute (comparable to 11 Gp/min and 13 Gp/min respectively in other Vodafone tariff packages), and content provision. Regarding content, farmers received 3 agricultural/ 1 nutrition tips per month on their chosen and other relevant crops via voice SMS. They also receive 12 weather updates and 4 relevant market prices via SMS per month.

Uptake was slower than expected, but steady. By September 2016, there were approximately 70,000 users. Since the grant application had stated 400,000 users by January 2017, Vodafone undertook two key actions. The first was to revise the milestone target down to a by then more realistic 200,000, negotiated with and accepted by GSMA, and the second was to remove the monthly charge and broaden the eligibility criteria for the product.

Eligibility was revised to include low value customers from the existing Vodafone customer base. These near dormant sim cards received an SMS blast inviting these existing customers to change to the VFC tariff. A peak in uptake was experienced in October 2016, reaching a total of 242,000 users. However, many of these new subscribers were urban based and data suggested they had signed up mainly to use the closed group free voice calls. From their behaviour, Vodafone concluded they were not signing up for the content. Some subscribers were changed to another more relevant tariff, and invitations to subscribe to existing users was made on a more geographical basis through the various channels.

This resulted in steady rise in subscription numbers and by February 2017, the KPI of 200,000 was reached. GSMA report that by March 2017, over 300,000 users had been profiled. Many of these new subscribers had gone through the automated profiling process. In the early days (see Section 5.3), agents spent time profiling farmers in order to tailor messaging. Their crop preferences were asked during the sign up process and content targeted accordingly. In the rapid growth of subscriptions during the period October 2016 to February 2017, it was not possible to interview each new subscriber to tailor the messages. A short cut was proposed whereby, knowing what agro-ecological zone they came from by their registration location, they would be allocated the main crops of that area. They could at any time change their profile, although qualitative feedback suggests that few did.

As numbers grew there was also a growth in closed user group voice calls. In the early days of the product free calls to other VFC members was of limited use if none of your friends or neighbours were part of the group. As numbers reached a critical mass, the free calls came to the foreground of the marketing and user wants.

At the application stage, the services to be made available to VFC members included completing transactions via Mobile Money. However, following an initial joint UX research activity carried out by Cobalt and other design partners, mobile money was dropped from the revised minimum viable product (Cobalt 2014). Farmers had concerns about mobile money, and Cobalt highlighted a propensity for short term thinking. It could, therefore, be argued that these concerns might have been based on a lack of awareness of mobile money products, especially given that “Vodafone Cash” was not introduced until late 2015. However, incorporating some kind of link to Vodafone Cash remains a possibility. Discounted phone purchases have also never been included as part of the bundle – it was launched as a SIM only product.

In brief, the Vodafone Farmers Club minimal viable product, developed on the basis of UX design research, had most of features proposed in the original grant application, and has reached more than 200,000 subscribers.

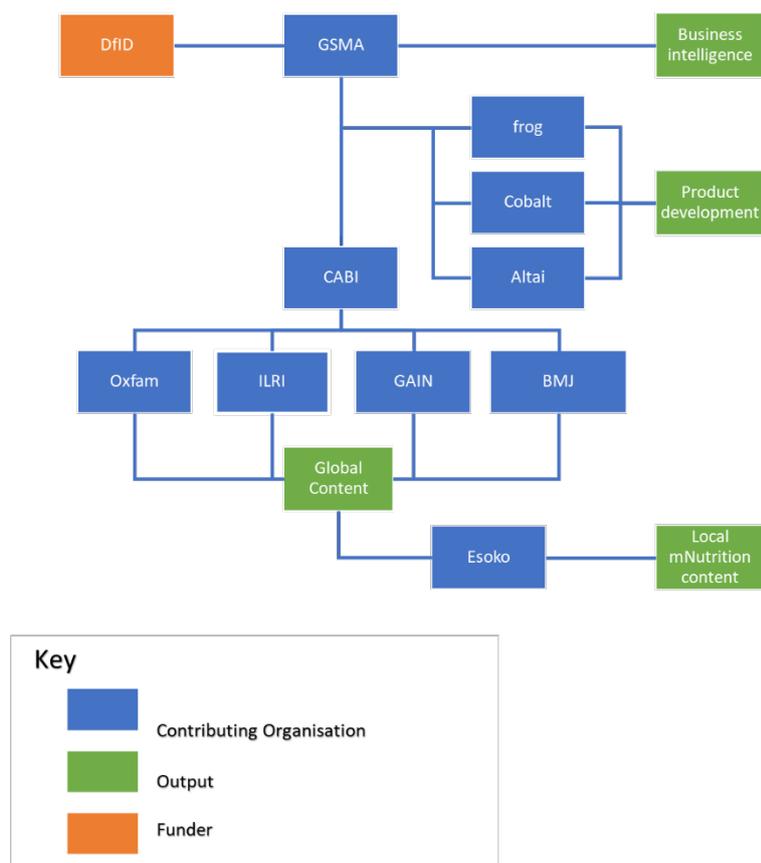
4.3 The mNutrition Programme

DFID funding channelled through the mNutrition programme provides support for mAgri projects in three ways:

- Development of locally relevant agriculture and nutrition related content, as described in Section 5.2.1. At the end of the content development process, partners can access tested and approved messages in a 160 character format. A Global Content Partnership supported Local Content Partners to prioritise agricultural and nutritional information needs, to ensure that information aligned with national policies, to make sure messages were locally relevant and accessible, and to set up robust quality control procedures.
- Product development. GSMA have provided funding for a range of user experience design and testing assignments (by frog and Cobalt) as well as ongoing monitoring activities (by ALINe). GSMA itself has also provided business intelligence support. All of these have provided valuable insights that have help further refine the messages and the service itself. Monitoring activities are summarised in Table 6.
- A grant made to Vodafone.

Key institutions involved in delivering support to Vodafone Farmers Club are represented in Figure 4.

Figure 4 Organisations providing support through the mNutrition programme



Authors own

4.4 The near future

As this report is being published, Vodafone concludes its grant arrangement with GSMA. The current VFC product has evolved substantially from the minimum viable product initially launched, and sits now within Vodafone Ghana in Segment Marketing. GSMA have given Vodafone a two month no cost extension through to end May and are encouraging the development of a sustainability plan.

Without the monthly charge, it is not obvious from a commercial point of view how the product can be sustained. Vodafone pays Esoko for its services, which to date has been covered by the grant, and covers the messaging and closed group free calls (and reduced on-net and off-net tariffs) by appropriate allocation of costs within the business. At the end of the baseline the Vodafone team questions whether such expenditure can be sustained and is profitable so is looking to negotiate a new deal with Esoko. This coincides with negotiations with GSMA to revise downwards the target numbers of users (see Section 4.2), all of which has put a strain on relationships between the partners, so “working relationships” in Table 13 has been given a score of -2.

At the time of writing Esoko have a mCommerce product that they could make money from. One option for negotiation is that perhaps a swap of promotion of Esoko's mCommerce platform by VFC could be offset against content provision costs for VFC. While the VFC tariff is less than some other tariffs and the service has the added cost of providing and maintaining content, there is emerging evidence that members of the VFC product are building up their Average Revenue Per User (ARPU). This suggests that VFC may yet prove to be attractive to Vodafone on the basis of total direct revenue. Despite cheaper tariffs, their ARPU is comparable to other Vodafone users (in the same wealth bracket). An analysis of churn data has not yet been possible, but through discussion it is now likely that the sustainability plan will make comment on ARPU and churn associated with the VFC product. The timing of the baseline is such that the sustainability plan was not available, however the plan is in progress and is expected to be made available as soon as agreed by other stakeholders.

Based on the baseline data collection, the following sections present the Business Modelling Canvas for the VFC product as found at 31st March 2017.

5 The Canvas

The building blocks of the canvas were introduced in Section 2.5, but the order in which they are addressed in this section follows a certain logic implicit in the original book by Osterwalder and Pigneur. The starting point of any business is the Customers to be served. The Value Proposition must then be designed to meet those Customers' needs, and will be delivered through various Channels. Customer Relationships will be largely influenced by Channels through which the organisation engages with Customers. Finally, the business model will want to extract Revenue (or Indirect Benefits) from Customers. Key Resources cover everything needed to carry out the Activities required to deliver the Value Proposition to Customers. These Resources may be sourced through Partnerships, and indeed some Activities may be performed by Partners. Finally, there will be Costs incurred in delivering the Value Proposition to Customers. A brief description of each of these building blocks is given in Table 2. In summary, the first part of the canvas deals with Customers (Sections 5.1 to 5.6), and the second part looks internally at how an organisation delivers the Value Proposition to Customers (Sections 5.7 to 5.11).

5.1 Customer Segments

“The business model should define different groups of people or organisations to reach and serve. Distinct segments will have common needs, behaviours, or other attributes. The business model should be designed around a strong understanding of customer needs.” (Table 2).

The intended customers for the service were described in the original application to the mAgric Challenge Fund run by Coffey (see Section 4.1). The primary target for VFC was clearly articulated as 5 million smallholder farmers in Ghana, who account for 77% of the entire agricultural base in the country (GSMA, 2014). However, the application form went on to describe three key segments:

- Female farmers – estimated at 2.8 million (56% of the agricultural labour force);
- Semi-literate and illiterate smallholder farmers – estimated at 3.3 million (30% of entire agricultural base is estimated to be illiterate), who also lack numeric skills
- Rural residents without access to mobile phones – estimated at 3.2 million. If roughly one half of the rural population of 12 million are children (aged under 16) then the potential rural market is around 6 million adults. The application form quoted 2.3 million rural mobile owners, i.e. one third of this population, leaving an additional two thirds to be targeted (i.e. 3.7 million, slightly different to the 3.2 million figure given in the application form). It was asserted that these people are familiar with mobiles and able to make and receive voice calls.

These segments are not mutually exclusive.

A further segment not articulated in the Application form is rural residents who do have a mobile phone, but subscribe to a competing network. Encouraging this group to switch to Vodafone is considered part of the indirect benefits of VFC (see Section 5.6). These are still quite broad segments

During discussions with Vodafone, the impression was given that VFC is somehow different to the normal commercial products. For example, the objective of the product is to meet the needs of the ‘underserved’ in rural areas, and the poor and underserved are indeed implicit in the key segments described above. Although no data is available on the poverty status of VFC subscribers, the quantitative research component of the evaluation will provide insights into links between adoption and poverty status of subscribers. A randomised encouragement design of experiment is being conducted among households in 5 districts of the Upper West region and 5 districts of the Central Region. Data from the baseline survey showed that “the average PPI score for households in our sample is 60.5.... A PPI score of 60 corresponds to a household having a 10.6 percent chance of being below 150 percent of the national poverty line in Ghana, and a 1 percent chance of living on less than \$2.00 per day in 2005 US dollars.” (Billings et al 2017).

Vodafone stopped charging the monthly subscription fee for VFC in October 2016, and started migrating base subscribers (on other packages). Base subscribers could transfer simply by calling in to Vodafone. This resulted in an ‘avalanche’ of new members which took them to 242,000 subscribers in October 2016. Although this meets the KPIs, it is not good for Vodafone as it represents lost revenue, so this migration was only made available for one month. They were also keen to retain the integrity of the original concept, which is to support farmers. The numbers declined after October as they weeded out ineligible subscribers. They were evident from inappropriate behaviour, particularly exclusive use of the Closed User Group (CUG) – bona fide customers will also make some use of calls outside the CUG.

As part of the user oriented design process, frog design conducted field research in October 2014 (frog 2014). The purpose of the exercise was to gain an understanding of farmers’ needs, and to establish a framework to inform product design. It was based on 15 in-depth interviews with farmers plus 30 interviews with various agricultural stakeholders. They proposed the six farmer archetypes described in Table 3.

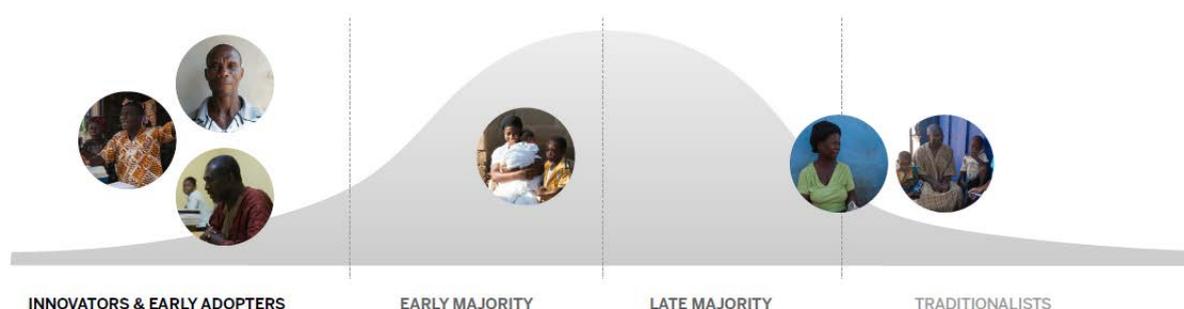
Table 3 Archetypes of Farmers (frog (2014))

Archetype	Description	Access to information
Trapped	They feel highly dependent on the discretion of middlemen and often feel cheated because they have to sell their goods for whatever price is offered. This archetype does not enjoy farming and would take every opportunity to change his or her profession.	Main information sources are other community members and shared devices like a TV. Low contact with Extension Officers.
Escapist	After experiencing difficulties with farming, they start a side-business to complement his or her farming.	Not very eager to keep up with farming news, but likely to still attend farming group meetings to keep up with running the farming business.
Acceptor	Need assistance maintaining a profitable farming business. They trust the information they receive from partners, extension officers and media and follow best practices. Their family’s well-being is more important to them than business growth.	They regularly watch TV, listen to radio and attend community meetings.

Archetype	Description	Access to information
Competent Optimist	They run a productive farming business that they feel in control of by keeping books and staying up to date about new farming developments. They are the first ones to try new methods and share their results with farming groups.	They actively reach out to information sources like extension officers, training, companies, radio and TV programs or even the internet.
Agri-businessmen	They have matured from being active farmers to managing a farming business at a bigger scale. They consider the entire farming ecosystem to uncover business opportunities and become independent from other players. They develop tools to manage their business.	They have access to modern media and global knowledge.
Local helpers	Local helpers are employed by MOFA, NGOs, FBOs or social companies like Esoko. They are based in the local communities and provide their members with training and advice.	They are often dependent on public information like TV or the radio. Combined with their training, they spread this knowledge to the community.

When considering innovation uptake, frog note that the likely uptake of VFC among each of these archetypes groups will be determined by whether people are early adopters, early majority, late majority and traditionalists, referring to the bell curve of adoption as illustrated in Figure 5. This figure shows that they expect early adopters to include competent optimists, local helpers, and agri- businessmen. Based on the characteristics of the archetypes described in the report, although all are from rural areas, all of these will be literate (and numerate), all will own mobile phones, and, judging by the photos, all are likely to be male. There is, therefore, a mismatch between early adopters and the intended customer segments. There is an expectation from other studies that younger people are also more inclined to be early adopters (e.g. Aker & Mbiti (2010)). It can be argued that, in order to accelerate the adoption lifecycle, marketing should deliberately target the early adopters, even if the majority of the target market constitute different archetypes. It should be noted that there is no evidence that customer acquisition activities have specifically targeted distinct groups of farmers.

Figure 5 Adoption lifecycle (frog (2014))



Reproduced with permission

ALINE conducted an outcome fieldwork exercise more recently in May 2016 (ALINE 2016b), which explored behaviour change based on the experiences of a non-representative sample of 28 VFC users. These users were categorised using the frog archetypes (1 Trapped, 4 Escapist, 20 Acceptor, and 3 Competent Optimist). The outcome Fieldwork report (sample of 28) shows consistent trends:

- Younger participants reporting they had used the information to change the kind of food they eat or how to prepare it (only 1 older participant);
- Participants with higher phone proficiency scores¹⁵ (PPS) made more behaviour changes (more able to access information);
- Literate farmers made more changes (literacy is prerequisite to accessing SMS information);
- Change in agricultural practice was most common among Competent Optimists, then Acceptors, confirming the assumptions made in Figure 5, although it is interesting to note there was some evidence of change among Escapists.

This early feedback on the profile of the users from ALINe, although from a limited sample, shows what we might expect: behaviour change is linked to youth, competency and literacy. Given the target users stated in the grant application, it is reasonable for Vodafone to expect the intended target users to be early majority rather than early adopters. In this case the critical mass and the channels become key. There may be an opportunity to exploit the influence of those early adopters acting as ‘Local Helpers’ – people willing and concerned to help their family and friends to gain useful information and technology. This has been explicitly expressed in the project documentation, which talks about the use of local champions, or ambassadors – influential local people who are well respected within their communities. However, interviews suggested that, although this model for channels has been tried, schemes for incentives have so far failed (see Section 5.3). It remains an idea that may be incorporated into ongoing evolutions of the product. In the meantime, matching with customer segments and segmenting of customer base have both been given a neutral score (-1) in Table 13 because the majority customers have yet to adopt the service, and problems with profiling mean that tailoring of farmer profiles is not yet working optimally (see Section 4.2). On the other hand, “Continually acquiring new customers” has been given a positive score (2) because, although take-up has been slower than expected, the service promises to acquire large numbers of customers if it gets to the tail end of the adoption curve.

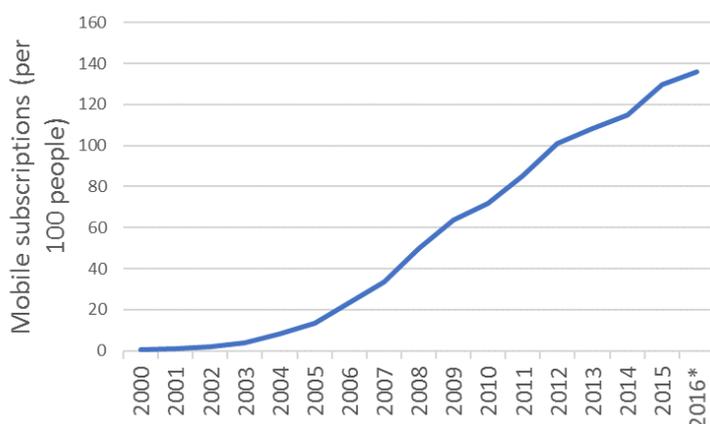
Men and women adopt technologies at different rates, with men typically adopting innovations more rapidly than women (Ragasa 2012). Again, this would seem to make the VFC task of reaching women farmers more difficult. However, there is emerging evidence that gender differences are not due to the technology itself, but to differential access to agricultural inputs resulting from gender inequities (Morris & Doss, 1999). Although mobile phone ownership is lower among women than among men (GSMA & Cherie Blair Foundation for Women, 2010), this does not necessarily translate into lower access to, and use of, phones as women tend to borrow phones or use handsets given to them by spouses (ibid, Scott, Batchelor, Ridley, & Jorgensen, 2004). This tends to suggest that gender specific barriers to the adoption of VFC as a mobile phone technology may be less than for other agricultural innovations. However, while qualitative research confirms that mobile phone ownership is lower among women, it found that men were not willing to share phones with their spouses.

Rural residents without access to mobile phones were initially identified as a key customer segment. Evidence from the qualitative research suggests that there undoubtedly remains a minority of farmers who do not own phones. However, it is less clear how willing this minority

¹⁵ For example, ALINe devised a 4 point scale based on users’ ability to open and delete SMS messages.

might be to get a mobile phone. On the one hand, per capita subscription figures continue to increase without any sign of saturating (see Figure 6), suggesting that more people continue to get mobiles, although additional subscribers may in fact be existing subscribers simply getting additional SIMs from competing networks. On the other hand, the qualitative research has identified some resistance to mobile phone ownership, especially among the poor, who may feel subject to peer pressure yet can ill afford to pay for airtime (Barnett I. et al 2017).

Figure 6 Mobile subscription rates per 100 people (Ghana)¹⁶



* estimated from NCA reports Authors own

Prelude to Learning

VFC seems to be actively managed so that it addresses the original target segments. Key customer segments are likely to be in the early and late majority category of adopters, so it will take time until they subscribe in numbers, i.e. after early adopters have used the service. Customer acquisition activities need to specifically address the target customers, e.g. through most appropriate channels. As a line of enquiry, we will seek to monitor VFC subscriber profile data to assess distribution of subscribers among segments.

5.2 Value Proposition

“The bundle of products and services that create value for a specific Customer Segment by satisfying a need or helping solve a problem. Value propositions may be innovative (disruptive) or similar to others, but with added features.” (Table 2).

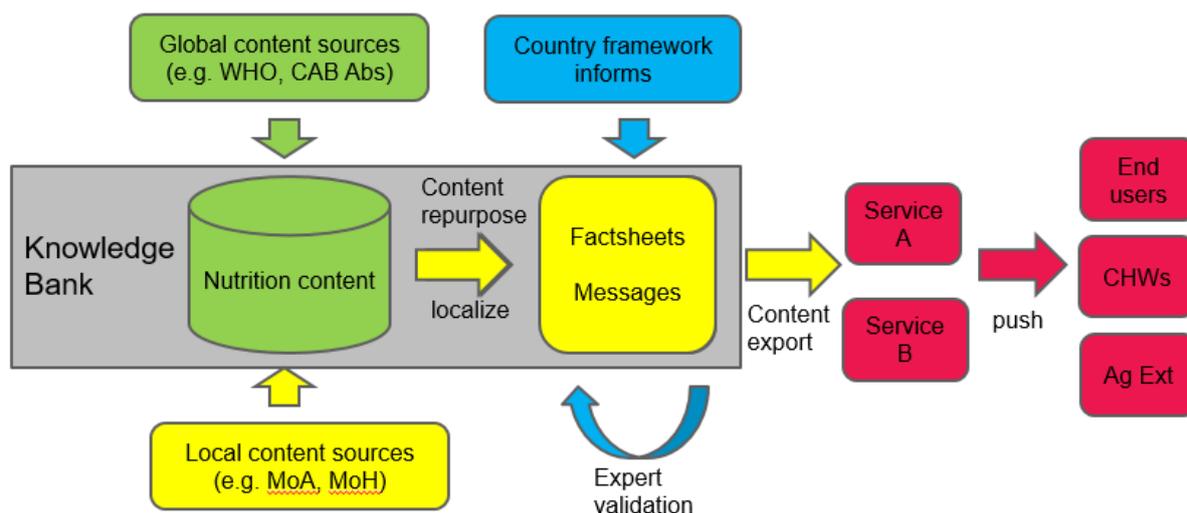
This section considers value added specifically by the mNutrition programme through content generation, user experience and monitoring and evaluation research. It then draws on prior research to comment on how components of the VFC bundle are valued by customers.

¹⁶ World Bank data.

5.2.1 The content generation process

The content generation process has been led by the Global Content Partnership consortium, comprising CABI, the Global Alliance for Improved Nutrition (GAIN), Oxfam, the International Livestock Research Institute (ILRI), and the British Medical Journal (BMJ). The Global Content Partnership (GCP) was responsible for conducting a landscape analysis in each country that identified the current state of nutritional needs, and content availability. A key feature of the content generation process was building the capacity of in country partners to provide mobile content. The GCP therefore worked closely with local content partners (LCP), who produced the content. The GCP supported LCPs by creating content structures, specifying content validation and quality control processes, and mentoring LCPs throughout the programme. Each of the GCP members took responsibility for activities in different countries; GAIN was the organisation that took responsibility as the lead partner in Ghana. A Local Content Partner was selected in each country to generate content to suit the local context, to validate content, and to translate as necessary (see Figure 7).

Figure 7 Content generation process (GAIN 2014)



Reproduced with permission

Esoko was appointed as the local content partner for Ghana, on the strength of their experience in generating agricultural content for mobile systems. They bid for the GAIN contract to develop local content for the mNutrition project quite separately from the VFC contract with GSMA. A report by CABI (on behalf of the global content consortium) endorses this choice, highlighting the value of the Esoko team and their expert network:

“Esoko maintains an online expert roster (containing mostly recognized specialists at the Ministry of Food and Agriculture). Content was channelled directly to the appropriate expert for review through the online portal. Once content was reviewed, the body of content was submitted to MOFA with the names of the reviewers. A validation letter was subsequently sought and issued with ease.” (CABI 2017).

The local content generation process, outlined in the schematic presented in Figure 8, was comprehensive and intensive. Esoko is responsible for ensuring that content is relevant and

timely, even though content QA stipulates that MOFA has to sign off on content. The process involved multiple steps and liaison with a number of external bodies:

1. In house checking
2. External checking, by members of the Expert Network
3. Edit and review
4. In house checking by Content Manager
5. Only then is content sent to MOFA for validation by a staff committee, and then sent to Director of Crop Services to be signed off.
6. Esoko submits MOFA letter and content to GAIN
7. GAIN submit to GSMA who give final approval.

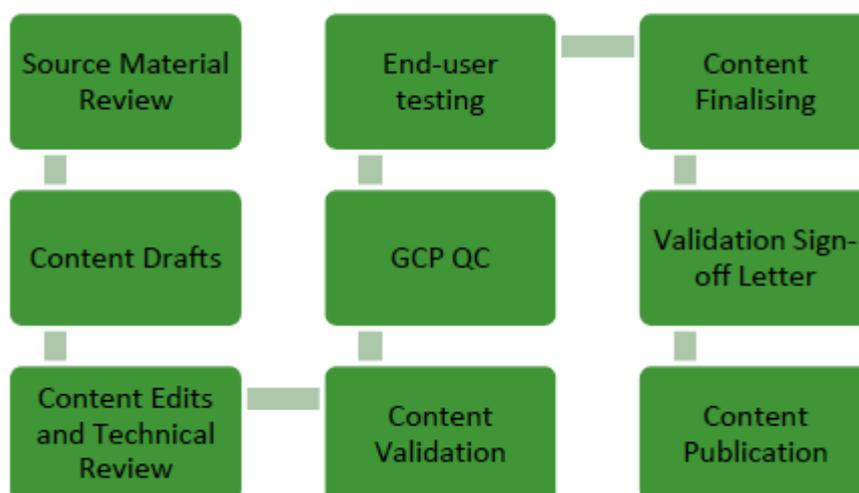
Esoko has a long history of developing content for mobile services, and employs qualified and experienced content specialists, one for agriculture and one for nutrition (Jordan C. 2016).

Members of the Expert Network each have a contract with Esoko to review a certain number of articles each month and are equipped with passwords to access content on the system (and their activity is logged). In this way, the validation process covers not only the new messages developed for GAIN, but also the content previously developed by Esoko (and converted to the GAIN format by Esoko). Members of the expert network are drawn from a range of prestigious agricultural institutions including:

- Savanna Agricultural Research Institute (SARI).
- Crop Research Institute.
- Ministry of Food and Agriculture (MOFA) (Crop services).
- International Fertiliser Development Centre (IFDC).
- Private sector (consultants).

One issue that caused some difficulties was that of determining locally appropriate content, e.g. post-harvest storage techniques. Tips should only recommend practices that are within the remit of farmers, otherwise they will dismiss the service as irrelevant. Local practice may well be different from best practice, and this caused some disagreements between the Esoko team and GSMA. Members of the Expert Network were useful in resolving disagreements.

Esoko started developing content in 2012, and had 5 crops on the system before getting support to develop and digitise further content from a USAID project, which took their database up to 30 crops. The mNutrition project enabled them to add a further 13 crops (plus fish) to their database. Under the mNutrition agreement, the original Esoko content belongs to Esoko, and GAIN content belongs to GAIN. Esoko had exclusive rights to the nutrition content for a one year period that expired in September 2016, after which the content was to be made open access.

Figure 8 Local content process (CABI 2017)

Reproduced with permission

Prelude to Learning

Prior experience of developing agricultural content for mobile services contributed to the value of Esoko as the local content partner. Not only did they have content specialists, but they had also established an Expert Network for quality control purposes, which proved useful in the localising of content.

5.2.2 User Feedback and product development

It would seem from the current experience, that user feedback is a vital part of getting the best out of the product. For the last few decades, development literature has promoted a participatory process for projects. Early consultation with communities and ongoing feedback on the outworking of projects are said to lead into actions that are owned by the participating communities, and more relevant to their daily lives. WASH services in particular are best undertaken with communities primed for ongoing ownership and maintenance, and with the WASH water and sanitation points in the right place within the geography of the community.

Customer feedback and early user input to the design of a product or service can be found in the private sector generally, but surprisingly it is not as embedded in corporate culture as might be expected. “Rapid prototyping” is used widely, however its purpose is more to ensure usability of the product rather than to explore how products might meet potential needs and fit within the socio-cultural context of potential users. Indeed, in terms of ownership, private sector rolling out a national product is not so much concerned as to whether consumers feel this is a “product for them”, but rather will customers be willing to buy it. Customers’ willingness to pay plays a strong role in development of a product or service, although alternative revenue streams are well recognised (see GSMA 2016c).

The other strong influencer on this arena is time. Even within the development sector, participatory approaches are often compromised because of the timeline of a defined project. Community engagement is difficult to plan, given that some communities might engage quickly, others more slowly. When we now factor in commercial pressure to meet corporate Key Performance Indicators, the time required for user feedback is further sidelined.

One of the value propositions that GSMA brought to the MNOs was user experience (UX) services. The importance they attached to UX testing was based on their learning from other mAgri and mHealth projects, and so this was built into their support to MNOs. The application stated, *“the consortium will engage the services of a User Experience (UX) expert who will lead the product design team to create a proposition that carefully takes into consideration the users end to end experience. The UX consultant shall define what key components need to be introduced and determine the best formats and mode of implementation would be needed for a valuable solution to be built for the agricultural user. With a huge demand for voice interaction the consortium will take direction from the UX expert, to ensure that voice interaction services (Voice SMS and Farmer Helpline) provides engaging content and a seamless user experience”* (Application, GSMA 2014).

Thus, frog design was commissioned as global UX partner to the GSMA programme, including engagement with the VFC project in Ghana. The GSMA grant support for VFC enabled Vodafone to contract the services of Cobalt as local UX partners. Frog was commissioned to undertake a user orientated design process, building in early user feedback on rapid prototyping and getting MNO staff to engage with users. While this had some traction in the early days of the VFC product, frog’s engagement with other MNOs has come up against the ‘time pressure’ and ‘get it done rapidly’ culture. In some cases, frog got involved after the minimal viable product design, and it has been a case of frog trying to persuade the MNO to change their product (as opposed to design a new product that fits the users’ needs).

Cobalt’s initial UX research for Vodafone, in which they tested ideas for the minimum viable product (MVP), involved field research with 8 farmers in 2 locations (Cobalt 2014). The MVP was subsequently revised during a Concept Development Workshop in December 2014. In addition to discussing service offerings, SMS packaging and pricing, Cobalt used specific tools including:

- Cash calendars - tracking expenditure on airtime
- Low fidelity prototyping - testing content, icons etc.

Figure 9 Example of low fidelity prototyping (Cobalt 2014)



Reproduced with permission

The Cobalt exercise identified three new ideas, but what is interesting is that, although the ideas were not incorporated into the current VFC bundle, they closely reflect needs subsequently highlighted by the qualitative research (see Table 4).

Table 4 Matching UX research with qualitative research

Cobalt idea	Qualitative research findings
FC Partners Programme – farmers can redeem rewards coupons at partner input dealers, and hire inputs.	Agricultural information is best assimilated through discussion, demonstration, and experience. Cost of inputs is a barrier.
Farmer Power - farmers aggregate crops in order to sell as a group would allow them to reduce their transaction costs and would give them greater bargaining power in the market. mTrader – farmer who acts as broker between farmers, buyers, and storage providers.	Farmers can use market prices to negotiate but have no bargaining power when selling at farm gate.

Elsewhere, frog did some interesting work on what customers want. For example, Dialogue, Sri Lanka's largest MNO, launched a mobile agriculture product, but pulled it after 6 months because it did not attract enough customers. Frog researched why the product had failed, and tested a number of hypotheses that the product had been based on, which they found to be incorrect:

- Hypothesis: Farmers don't have access to latest market prices and buyers, resulting in diminished bargaining power and income.
 - Finding - Getting official prices for crops is only the beginning of an ad-hoc, complex negotiation process
- Hypothesis: Farmers don't follow best agriculture practices and misuse chemicals because they lack expert knowledge and advice.
 - Finding - The fear of losing an entire crop is just too high to follow the instructions on chemicals' package
- Hypothesis: Farmers and buyers can complete a buy/sell transaction over the phone.
 - Finding - Quality of crop is subjective, making it difficult to standardise pricing

Early in the VFC design process, frog conducted a detailed UX exercise based on over 30 interviews with farmers, market traders, extension officers and other stakeholders from 8

communities. As part of a comprehensive qualitative research methodology, frog used specific tools including:

- Farming cycle calendars –to identify farmers’ priorities and expenditures
- Participant archetypes – to describe characteristics of key farmers types.
- Trust and influence circles – to map who farmers trust and why
- Product value testing – to evaluate high level product propositions.

Their Insights and Product Proposal document (frog 2014) provides some insights into various aspects of the service, including farmers’ appetite for information; many of these insights have been corroborated by recent findings from the ALINe evaluation activities (see Table 5):

Table 5 Design insights and recent evaluation findings

Frog insights (2014)	Outcome Study Report (ALINe 2017)
Farmers lack negotiation power so having the market price doesn’t guarantee that they will get it.	They don’t get the prices given on the phone because there is no competition in farm gate purchasing (they have no alternative), especially when they need cash urgently.
Farmers are keen to get information but when it includes a human connection, it is more reliable	Phone is the most important information source for both VFC users and non-users. Non-users are much more likely to use extension officers (second source of information for both groups).
Experiencing the information’ is more valuable and influential than just reading about it.	n/a
Farmers need more information on what to do during the post-harvest phase.	Most common changes were in planning (52% of users), then land management (38%), and third was harvest/storage (29%)
There is a need to connect buyers to sellers.	Most farmers use prices to negotiate with buyers rather than seek other buyers. There is evidence of deferring sales to get better prices.

Evidence to date suggests that there remain some areas in which the product design has not yet successfully addressed user insights identified early on. For instance:

- It is not enough to have market prices. Marketing the farm product is through a complex web of middle men, and the farmers generally have low levels of leverage even though they may know the ‘right’ price. At the moment, the VFC gives the farmer the market price, but does not yet enhance their levers for getting that price. This is being tackled in the current round of discussions between Vodafone and Esoko.
- The early frog and ALINe work confirms that the inclusion of a human within information processes enhances the trust in that service. Hence helplines are important. However, the use of the helpline has reduced, possibly because as the VFC service expands, the waiting times are getting longer or because the information is less tailored to the profile of the farmer. The answer would seem to be to put increasing investment in the call centre – and this might occur but as at this baseline is not yet occurring. The point being, there is currently a disconnect between the user feedback on trust and the plan regarding the VAS.

Prelude to Learning

At the moment, user centred design activities are funded by the GSMA grant. The work of frog in the early stages, and ALINe on regular M&E, has informed refinement, and possibly future refinement of the product. When the grant finishes it is unknown as to whether the mobile network operator (MNO) will put in the resources to gather such nuanced user feedback. Experience across the whole GSMA network suggests that in general MNOs do not invest enough into user feedback mechanisms. This will be an area that might influence the evolution of the product.

It has been said in a number of interviews that MNOs are not good at participatory learning processes. They are good at getting a minimum viable product up and running within tight timescales. What value do Vodafone / Esoko ascribe to user experience (UX) processes? It is not clear that UX processes resulted in a radical departure from the original concept for services described in the application form. How did these design methodologies differ from standard product testing and development approaches within Vodafone?

5.2.3 Evaluation and monitoring

The application form refers to a number of evaluation activities:

- “Esoko will continue to provide field support, trainings, deployment and evaluation across all their subscribers and partners in Ghana. This monitoring will not only be looking to measure some level of impact, but also with a high degree of attention to usability”.
- “Revenues for the bundle will be tracked by the Customer Value Management team in Marketing to understand customer behaviour and response to the product. This will inform any modifications that need to be made to the offering”.

As part of the mAgri stream, various partners have carried out the range of monitoring activities presented in Table 6.

Table 6 Monitoring activities

Activity	Description	Implementing partner
BI Analysis	data from users' interactions with the service	GSMA
Phone surveys	quick satisfaction survey	Survey created and data analysed by ALINe, data collected by Vodafone
The Outcomes Survey	telephone survey	Survey created and data analysed by ALINe, data collected by Vodafone
In-field Face to Face Research	face to face interviews	ALINe
Case Studies	small number of individuals over time (not completed)	ALINe

5.2.4 Perceived value of bundle components

The VFC bundle includes the following components:

- Weather information: three SMS messages in English with local weather information per week.
- Market price information: one SMS message in English with local market price information per week for a selected crop and selected market.
- Agri and nutrition tips: one weekly recorded voice message in the selected local language with seasonal agricultural or nutrition tips (3 agri tips and 1 nutrition tip per month) for the selected crop.
- Access to Farmer Helpline call centre: free access to a call centre with advice available from an agricultural expert.
- Free Community calling: free calls to other Farmer Club users (see Table 7 for details).
- Discounted SMS and calls to non-VFC members (see Table 7 for details).

Table 7 Voice and SMS bundle (Vodafone (2014) Feasibility Study Report)

GHC 5 Bundle	Quantity
Off net	30 mins
On net	150 mins
CUG	500 mins
On net SMS	10
Content	4 messages per week

In 2016 the messaging structure was split between the following four components (N.B. this represents a bundle of 20 SMS messages a month, already more than envisaged in Table 7):

- Market price – 4 messages/month.
- Weather – 12 messages/month.
- Agri tip - 3 messages/month.
- Nutrition – 1 message/ month.

The key to assessing the value proposition is to consider how it meets the needs of the customers. In this section, we consider each element of the VFC bundle, and comment on the likely value to customers based on research findings so far.

Voice minutes. The Vodafone Ghana website simply offers ‘competitive call rates’. Vodafone explained that they have increased the discounted voice call tariffs from 5/9 Gp/min (on/off net) to 9/11 Gp/min. This is still a good offer, as most MNOs offer 12-13 Gp/min for off net calls, and Vodafone’s normal tariff is 11/13 Gp/min.

Free community calling (closed user group). In practice free calls are capped at 600 minutes/month but few users get near this cap; they estimate the average is less than 300 minutes. Free calls are a big selling point and are the feature of the product that farmers talk about. Vodafone appear to have realised the potential value of peer to peer

communications, and are also offering free community calls (and SMS) under other packages such as Vodafone X. It is not clear the extent to which these compete, as Vodafone X is targeted at youth, offering data allowances for both internet and applications (WhatsApp, Facebook, Titter, and Instagram).

Agricultural advisory content. This element has limited appeal, based only on anecdotal evidence to date. However, this is somewhat at odds with the finding from the qualitative research that most farmers actively look for ways to solve information related problems. The quantitative research found that government extension workers were the most important source of agricultural information in Upper West district, and the second most important source (second to spouses) in Central Region (Billings et al 2017). Note that a number of confounding issues have been identified, such as problems with getting farmers registered and receiving content (see Section 5.4.1), and the fact that some agencies do not appear to be informing customers about the agricultural information service (see section on “Awareness” below).

Weather. ALINe found weather to be the second most commonly used type of information (ALINe 2016b). Farmers did not mention weather forecasts as one of their information needs relating to agriculture during the qualitative research, although determining the best time for harvesting and planting was a high priority. This suggests that farmers are generally satisfied with existing sources of weather information, which may be more or less reliable.

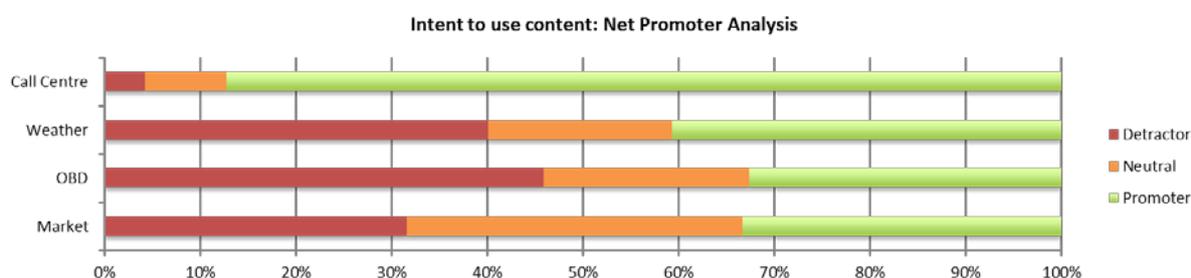
Market prices information. Vodafone estimate this is second most popular feature and ALINe found market prices to be the most commonly used type of information (ALINe 2016b). This is consistent with previous research into Esoko services, which found that farmers receiving SMS price alerts got up to 10% higher prices for certain crops (Subervie 2011). Another study showed that farmers receiving price alerts got 9% higher prices, but only for yams, which have high price variability (Hildebrandt et al. 2015). They also showed that eventually even non-users benefited from higher prices as traders started to offer higher prices (spillover effects). Findings from the qualitative research suggest that the value of market price information depends on geographical location (access to variety of markets) and the type of farmer. For example, it is of limited value to Trapped farmers, as they lack bargaining power with farm gate traders, and they are likely to have an urgent need for cash. Competent Optimists are able to seek out new markets, or to store goods to sell when prices rise, and so can make good use of price information. Agri-businessmen are most likely to grow cash crops, for which prices are set by the government, so this service is of limited value.

Nutrition advisory content. Information on nutrition was not perceived as a priority by farmers. The qualitative research found that information on nutrition was not perceived as a priority by farmers, and that men were generally less concerned with nutrition and food choices than women. Furthermore, most farmers had never actively looked for information about nutrition. Main sources of information were older family members (mainly mothers and grandmothers) and formal sources such as health workers encountered during antenatal and postnatal visits.

Farmer helpline. Farmers love it! There are anecdotes of farmers being astonished that they can talk to a real person. ALINe research showed that of all the VFC elements, information from the call centre was most actionable (see Figure 9). Users mostly called the helpline for farming tips. This corroborates the frog insight that information is more reliable when it has a human connection. The qualitative research also concluded that the helpline

can potentially play a key role in the product by offering an interactive experience to support adoption of improved practices.

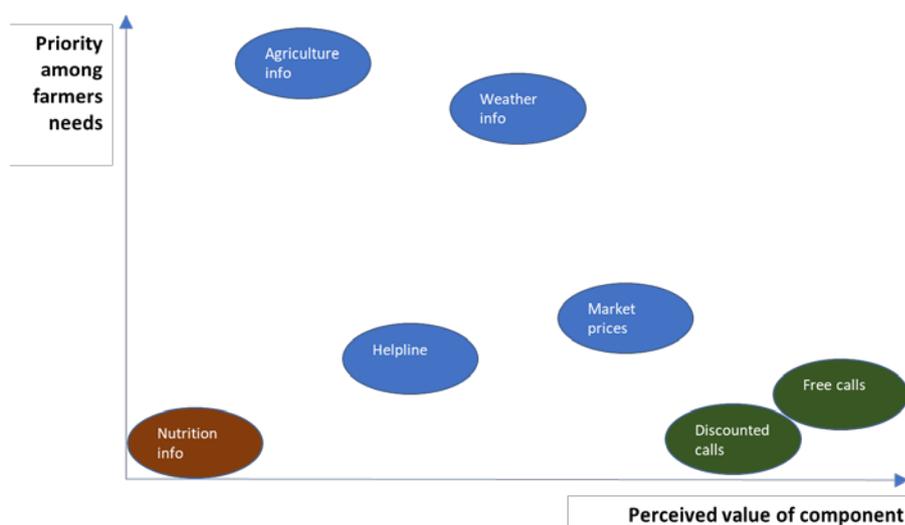
Figure 10 Intent to use information from different VFC elements (ALINe 2015)



Reproduced with permission

Displace existing sources of information. When perceived value of elements (based on ALINe findings and views expressed by Vodafone) are mapped subjectively against information needs of farmers (see Figure 10), it appears that there is an inverse relationship, i.e. those parts of the service that address the highest priority information needs are valued least. One hypothesis is that precisely because they are priority information needs, farmers have already sought out reliable sources of information. Indeed, the qualitative research found that most farmers actively seek agricultural information from agricultural extension workers and social networks. It will take a long time (several growing seasons) for farmers to learn to trust agricultural content from VFC, and to figure out how best to integrate this information source into their decision making. The availability of existing sources of information implies that substitute services exist, and there are also several other content providers in Ghana (see Section 6.1), so a score of -2 has been given in Table 13. However, free calls and the call centre are unique, so a slightly higher score of -1 has been given for “new service”.

Figure 11 Mapping perceived value of bundle elements against farmer needs



Authors own

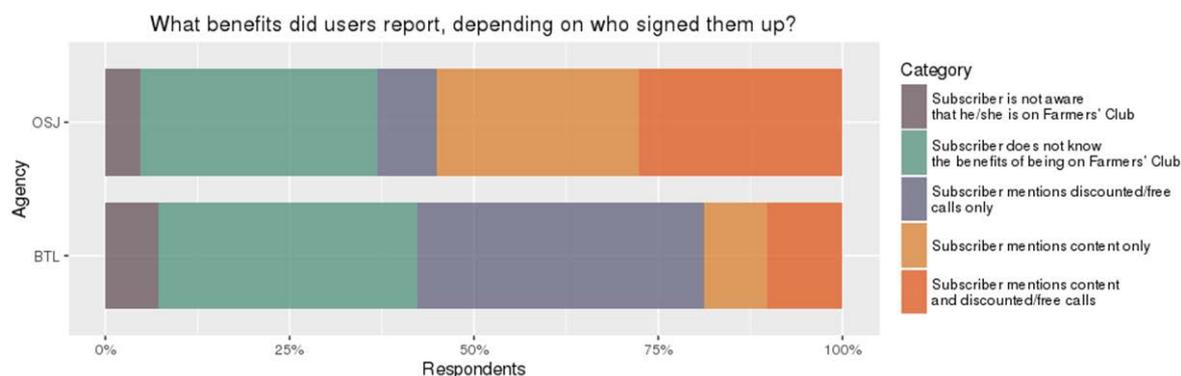
An estimated ranking of perceived value of these elements is presented in Figure 10 (mapped against an estimated ranking of information needs priority). This is a subjective assessment made by the authors. Assessments of perceived value are based on the

findings discussed above. Assessments of how each component ranks in terms of meeting the needs of farmers have been based on insights from the qualitative research. For example, after access to finance, farmers’ main information needs revolved around increasing yields, e.g. use of agrochemicals, crop timings, combating disease, so the agricultural tips component has been given top priority. Although farmers themselves did not mention weather, this is regarded as a priority by experts. This is not a particularly rigorous exercise, as priorities attributed to agricultural information needs will be tempered by the extent to which farmers can currently access information, and the extent to which their ability to change their practices is constrained (both of which are included in terms of value in the discussion above). Nevertheless, it serves to illustrate a point that the most highly valued components of the bundle, which drive adoption, are not directly related to agriculture. Alignment with customer needs has, therefore, been given a negative score (-2) in Table 13.

The low value placed on the content elements is a recognised problem: “The popularity of the free group calling detracts from the total value proposition of the product” (GSMA 2016). This case study suggests that the Value Proposition can be strengthened by increasing perceived value of the content. Perceived value is not an inherent characteristic of each element of the bundle – it is influenced by customers’ experience of the product. Neither is it static – it is likely to change over the next few years. The following forces will be at work.

Awareness. ALINe highlighted a fascinating difference in reported benefits of the VFC product between subscribers signed up by the two different agencies operating in the north and south of the country (see Figure 11). They pointed out that subscribers signed up by the OSJ agency were much more likely to be aware of the content elements of the product, whereas those signed up by BTL were more likely to be aware of free and discounted calls. This highlights how the different agencies are marketing the VFC product differently. Perhaps more worrying is the proportion of users (roughly one third) signed up by both agencies that were unaware of any of the benefits of VFC. This illustrates the crucial role played by Channels in educating customers and establishing the Value Proposition. It is expected that Vodafone will take steps to improve the Agents’ performance in the near future. This also indicates that customers can use certain elements of the bundle in isolation, so a score of -2 has been given in Table 13 for synergies between elements.

Figure 12 Reported benefits of VFC by agency that signed them up (ALINe 2016)



Reproduced with permission

Confidence. Although they believe that the agricultural content has limited appeal at present, Vodafone also believe that this will change and that it is simply a matter of time until farmers understand the value of crop information, and using VFC becomes part of their farming practice. For example, sometimes it is only when farmers experience a shock (e.g.

drought) that they realise the value of access to specialist information. The findings from the qualitative research show that farmers are most likely to change their practice when their peers can demonstrate results. This also suggests that it may take a few growing seasons before farmers become convinced of the benefits of the agriculture tips.

Networking effects. Many products benefit from a networking effect whereby once the ‘early adopters’ have started using a product, others start to join in. VFC will undoubtedly benefit from a networking effect as more subscribers join the closed user group (free calls). As more people within any given social network join the CUG, the utility to individuals increases – a person can call more people for free. Given that this takes place with no change in price, it represents a shift in the demand curve. Networking effects result in an increase in consumer surplus. The positive score (3) given in Table 13 for network effects reflects the potential of free calls, although this has yet to be demonstrated. Another feature that shifts demand in a similar way is increased confidence in the product, described above, which can be enhanced through network effects – if more people use a product, then others will be convinced that it is good value.

Prelude to Learning

Farmers do not seem to perceive high value in the agriculture tips, possibly because they have existing sources of information, notably extension advisors. Changing practice depends on a complex set of relationships and judgements. However, this may well change over time as farmers see the benefits enjoyed by early adopters, gain confidence in the information, and become more familiar with VFC.

Farmers like being able to speak to an advisor in the call centre, confirming the value of personal interaction in promoting changed behaviour.

The initial sign up ‘pitch’ from VFC representatives (Channels) will set up the consumer with expectations that may then go on to affect their experience, either positively or negatively. If, for example, Customers are unaware of the content services, then they may feel they are being spammed by the text and outbound dialling (OBD) voice messaging.

Is there any evidence of VFC disrupting the way in which people make farming decisions – by acting on information alone rather than through discussion and demonstration?

5.2.5 Behaviour change

ALINe’s Outcome Fieldwork survey (sample of 28 face to face interviews) confirmed the finding from their earlier Outcome Survey (sample of 420 phone interviews) that around 97% of users reported some kind of behaviour change arising from use of VFC (ALINe 2016b). The in-depth surveys indicated that the most commonly **reported behaviour change** among users was negotiating a better price at markets (N.B. this was both selling produce and buying to feed household) (ibid.). Other commonly reported changes included changing the way they keep their soil fertile, and using weather information to change the timing of farming activities. Positive scores have, therefore, been given in Table 13 for both acquiring knowledge (3) and changing behaviour (4). Acquiring knowledge has been scored slightly

lower because behaviour change most commonly revolved around marketing, which does not necessarily reflect improved knowledge.

The qualitative research highlighted economic factors as the main potential barrier to change in agricultural practices. Agricultural inputs tend to be expensive, especially fertilisers, and labour intensive practices such as land preparation may require hiring farm labour. Information alone is not good enough. Findings from the qualitative research suggest that people are reluctant to change farming practices on the basis of information alone, even if that comes from trusted sources such as agricultural extension officers. This finding is consistent with Esoko's experience from previous research. Rather, farmers tend to test new ideas through discussion with elders, peers, and leader farmers. They prefer to see some form of demonstration of new techniques, ideally along with proof of the benefits, before adopting new practices. Nevertheless, findings from ALINe's Outcome Fieldwork Survey illustrate how information on the effect of bush burning on soil fertility, for example, has been widely accepted and has changed behaviour. It is not possible to determine from the report whether this information was delivered by VFC in isolation, or whether it simply reinforced other sources of information, and neither does it counter the received wisdom, but it does illustrate that information can have the power to change behaviour.

Prelude to Learning

Low income farmers tend to be risk averse, making them reluctant to innovate. Improved agricultural practice tends to be expensive, so farmers will go through a complex process of testing information before changing practices. However, behaviour change associated with access to price information carries relatively low risk and is commonly reported.

Monitoring activities have gathered evidence of behaviour change, but it is not clear whether this was as a result of access to information alone, or whether there were additional factors that reinforced this information.

5.2.6 Financial transactions

Vodafone launched the 'Vodafone Cash' product in December 2015¹⁷, and by December 2016 it had attracted 280,000 users¹⁸. This represents 3% of the 8.3 million mobile voice subscribers of Vodafone as of December 2016¹⁹. Finding reliable figures is tricky, given that the number of mobile money users is increasing rapidly, but across the country as a whole, even in 2015, 40% of mobile phone subscribers were estimated to be mobile money customers²⁰. One report makes a distinction between registered users (estimated at 17 million in 2016), and active users (estimated at over 5 million)²¹. All of which suggests that Vodafone are late entrants, so their service has a good deal of catching up to do. As with voice subscriptions, MTN have the largest market share (estimated at 9 million users²²).

¹⁷ <http://www.vodafone.com/content/index/media/vodafone-group-releases/2015/mpesa-ghana.html#>

¹⁸ <https://www.african-markets.com/en/news/west-africa/ghana/m-pesa-hits-280-000-users-in-ghana>

¹⁹ <http://www.nca.org.gh/assets/Uploads/Voice-Statistics-December-2016.pdf>

²⁰ <https://www.theigc.org/wp-content/uploads/2016/03/Ghana.pdf>

²¹ <https://www.ghanaweb.com/GhanaHomePage/business/Mobile-Money-sees-118-growth-481141>

²² <http://www.mtn.com.gh/about-mtn/press/mtn-pays-over-gh-22-million-interest-to-mobile-money-subscribers>

Among the non-representative sample of VFC users selected for in-depth interview as part of the qualitative research, only 3 out of 13 (23%) used mobile money services.

ALINE (2017) observed that lack of finances to buy fertilisers is a major constraint on farmers' ability to put into practice the advice they received through VFC. In the qualitative research, farmers themselves identified information on how to access credit as their top information priority. This appears to confirm there is indeed a need within the marketplace for Esoko's Fasiba product, which was launched in Ghana at the end of 2016. Fasiba is a virtual platform that enables farmers to save or borrow money and then to pre-pay for agricultural inputs (e.g. fertilisers, seeds, pesticides) at discounted prices using a mobile wallet²³. They can then redeem a voucher at registered dealers. Farmers benefit from access to credit, a mobile savings facility, and discounted prices. Vodafone have intimated that future incarnations of VFC are likely to incorporate this kind of service, although negotiations are currently under way. Since the baseline visit, Esoko has rebranded the Fasiba product as Tulaa²⁴.

At this point, access to finance appears to be an important enabling factor for farmers, and evidence suggests that the impact of VFC may be greater if farmers can access financial services, so there appears to be good synergy between Fasiba/Tulaa and VFC, and it will be important to follow ongoing negotiations. On this basis, it can be argued that enrolling customers in Vodafone Cash will increase incentives for them to join VFC. However, it can be viewed the other way round. There is growing evidence that the introduction of pay as you go services can stimulate demand for mobile money services²⁵, which can yield substantial revenues.

Tulaa.

Tulaa is a platform designed to help farmers save and pay for inputs. Smallholder farmers register on the system through local agents or the call centre. Tulaa has arrangements in place with a small number of suppliers, who offer agricultural inputs at a discount. Farmers select products they want to purchase on the system, and can then either save for this purchase, or they can take out a loan from Tulaa's banking partner. Tulaa offers flexible savings arrangements in terms of frequency of payments and amounts. The system sends farmers reminders on their savings plan and offers incentives such as free airtime.

Prelude to Learning

Given that lack of access to finance may constrain farmers' ability to improve agricultural practices, the impact of VFC may be enhanced if coupled with financial services. Mobile money services also tend to be profitable for mobile operators.

²³ <http://citifmonline.com/2016/11/10/esoko-launches-fasiba-m-commerce-product-for-farmers/>

²⁴ <https://www.esoko.com/tulaa>

²⁵ <http://www.cgap.org/blog/daily-energy-payments-powering-digital-finance-ghana>

5.3 Channels

“How a company communicates with customer segments. Channels are customer touch points that shape the customer experience, e.g. communication, distribution, sales.” (Table 2).

This section considers the variety of ways in which customers engage with the product in the awareness and registration stages of the customer journey. It then goes on to consider issues associated with the delivery of the service itself, notably payment mechanisms.

How does the VFC product reach the user? As described above there has been some evolution of responsibilities and locations of action within Vodafone. Initially the product was targeted at those not currently on the Vodafone network. The idea was that the new product would attract people from other MNOs and be the instrument by which they switched their allegiance. Due to the slow pace of take up and the need to reach certain KPIs, the product was subsequently offered to existing Vodafone customers. Vodafone sent out a blast SMS message to low ARPU customers in rural areas inviting them to port onto the VFC service.

The principle Channels through which customers come into contact with Vodafone are:

- Customer acquisition – enrolling in the club (SIM registration).
- Registration or profiling – once enrolled, farmers need to enter details of their farming practice in order for the Esoko system to send them information tailored to their needs.
- Helpline – free access to agricultural experts in Esoko’s call centre.
- Payment – airtime vendors and automated billing systems.
- The automated services themselves (voice and SMS messages).

There were originally three channels through which Vodafone **acquired VFC members**:

- Agents – agents have been employed since the beginning of the project. They follow a schedule moving from village to village. Vodafone have contracted 2 organisations to promote VFC (only) – one in the north, one in the South. Teams of 12 with a bus move a roadshow from community to community.
- Freelancers – Vodafone employ around 3,000 individuals to go out into communities and promote Vodafone products in general, rather than only VFC. Agents serving rural areas are trained in VFC and if they engage an eligible farmer they can sell the VFC package. They are the ‘business as usual’ acquisition vehicle.
- There are also ‘retailers’ – these are stationary (e.g. have a table at the market). There are 30,000 of them, but most are in urban areas, so only relatively few in rural areas have been trained and equipped to sell VFC.

As a ‘one off’ exercise, Esoko will also be enrolling farmers from existing Esoko projects who are at the end of the project financing period, to switch over and sign up to the Vodafone Farmer Club.

The highest number of acquisitions are achieved by Agents, followed by Freelancers – few are brought on by retailers. All work on commission, although Agents’ commission is higher

because their costs are higher, going to more remote locations. The cost per acquisition is also highest for Agents. This trade-off between effectiveness and cost is reflected in weak scores (2 each) for both efficiency and effectiveness of channels in Table 13. The face to face presence of agents through road shows is effective in reaching illiterate consumers, so a score of 3 has been given to matching of channels to customer segments.

Local Ambassadors were a key feature of the original marketing concept. These were to be respected and knowledgeable individuals with extensive social networks who would be able to reach into local farming communities and endorse the VFC product. However, the incentives were ineffective; *“they were given a VFC branded bicycle but this was not deemed sufficient.”* (GSMA 2016). Different Ambassador models were piloted, but none of the incentive mechanisms proved effective; the concept was abandoned as an overly expensive means of customer acquisition. The ambassadors approach may yet be incorporated into forthcoming iterations of the product. Vodafone have also considered working with large corporate customers to acquire farmers, and have even talked to some, but they have not worked out how to do it, so it is not currently being considered.

It has been pointed out in Section 5.2.4 that customers’ understanding of the VFC Value Proposition was strongly influenced by the performance of the Agents who signed them up. One agency clearly sold VFC on the basis of free / discounted calls, whereas the other emphasised content elements of the bundle. Clearly both approaches undersell the product, so it can be speculated that time pressures in the field led to an incomplete explanation of the product.

Problems with **profiling farmers** were identified early on (GSMA 2017). Originally, field agents were expected to profile farmers onto the Esoko system at the same time as they signed them up to VFC, but they were incentivised by the number of farmers signed up, and as the profiling process was time consuming, it was often skipped. This meant that farmers then did not receive any content messages. Esoko’s call centre was then asked to call those farmers who were not profiled, and enter their details into their platform, but the call centre capacity was stretched so that around one quarter of incoming calls were not answered (GSMA 2017), and not all farmers could be reached. When membership was opened up to existing Vodafone customers, an automated profiling process was adopted, whereby farmers were allocated a ‘typical’ profile based on the crops most commonly grown in their geographical location. Thereafter, there are 3 possible methods of profiling:

- Farmer calls Esoko call centre.
- Esoko calls farmers.
- Agent can do the profiling.

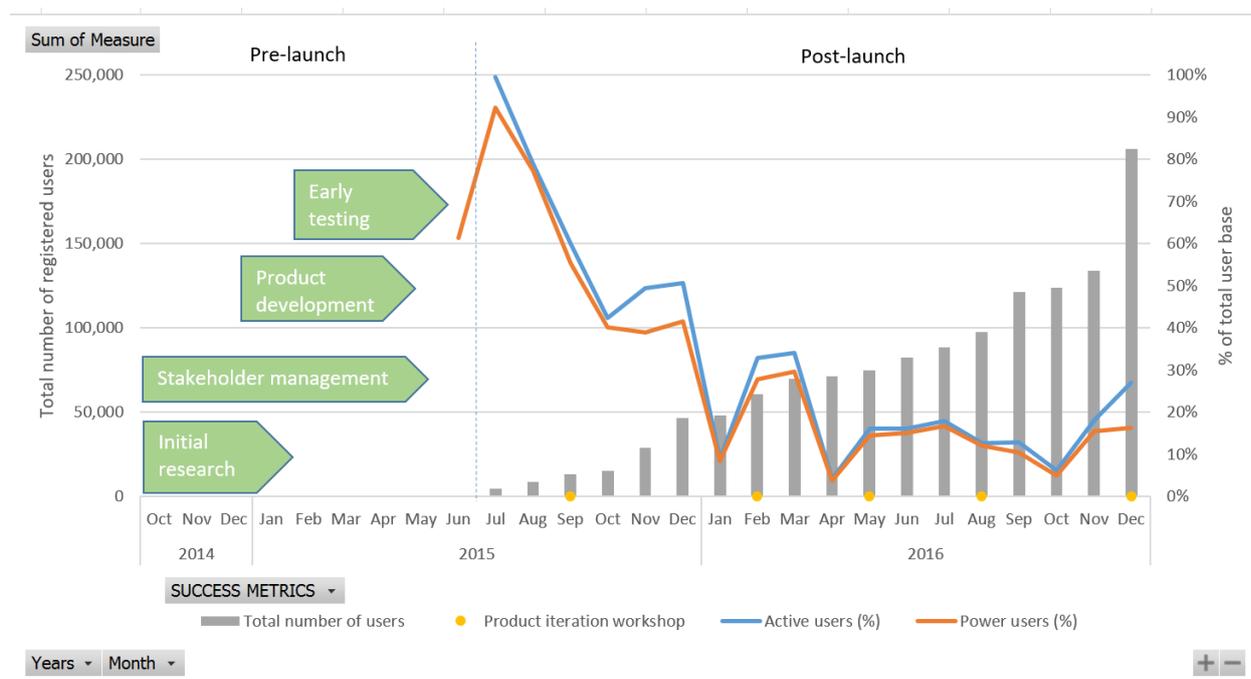
However, field work indicates that farmers are not aware that they can amend their farming profiles (GSMA 2017). From an early stage, profiling was identified as a barrier to the agent model of customer acquisition and improved incentive mechanisms were discussed, but it then proved difficult to renegotiate incentives for VFC as Vodafone’s contracts with the agencies covered multiple products.

Esoko have now expanded the **call centre**. They now have 10 staff and can pull in temporary staff.

VFC has long struggled with devising an effective **payment mechanism**. Initially, farmers had to make a payment each month (manual renewal), but dropout rates were high and despite positive indications from UX research, farmers did not understand the system well. An autorenewal service was introduced in late 2015, but again farmers did not understand the system and complained of the service eating their money. The autorenewal system initially dropped many customers who did not have sufficient airtime balance on the day their subscription was due. It was recognised that farmers would be willing to pay their subscription at a later date once they had enough cash to buy airtime, so the rules were relaxed to give farmers a 90 day window in which to pay their subscription before they are removed from the system.

The biggest problem is figuring out how to get farmers to pay in a way that is consistent with their patterns of behaviour. Farmers struggled to pay 2c/month, but not necessarily because it was too expensive, but because they are also not accustomed to the concept of paying a monthly subscription for a service (remember 98% use prepaid mobile). Under the autorenewal system Vodafone were taking the money on a calendar month basis because farmers were not familiar with the rolling 30 day contract period approach.

Figure 13 Vodafone Farmers Club Product Timeline (GSMA 2017)



Reproduced with permission

*Total number of users: count of users who have ever been sent content.
 Active users: proportion of total users who received content during that month.
 Power users: proportion of total users active during the month who have received multiple messages since registration.
 Product iteration workshops: quarterly workshops where service data is reviewed and changes planned.*

Problems with payment have temporarily disappeared because, although subscriber numbers were growing steadily (Figure 12), a step change in acquisitions was needed in order to meet KPIs, so two changes were made:

- Opening up membership to existing Vodafone customers.

- Temporarily dropping all subscription charges from October 2016.

There are strong indications from the qualitative research that farmers prefer voice messages, preferably in local languages. As most farmers are illiterate, information sent to the farmers via **SMS text messages** is unlikely to be read. This suggests that rich interaction applications delivered over data networks are likely to offer a better experience to resource constrained farmers. However, this will only be viable at some point in the future, so the risk of channels becoming obsolete has been scored at -2 (Table 13).

Whilst the qualitative research confirms the premise of mobile service provision, which is that extension workers on the ground are too few and thinly spread, it also suggests that VFC is more likely to achieve its intended outcomes if it can incorporate some kind of experiential or interactive learning. Practical demonstrations and experiments were highlighted by many farmers as influencing adoption of new practices. Mobile phone based messages were perceived as potentially useful reminders, reinforcing messages given by extension workers. In this way, VFC messages may achieve greatest impact in supporting campaigns / curricula of extension services, rather than attempting to change the agricultural practices of farmers alone, which will require more information than can be communicated in 160 characters. This tends to endorse the potential of Ambassadors, who can provide the face to face interaction that farmers prefer.

In the absence of any local presence, farmers may have little or no exposure to VFC after the agents move on to the next village, so both reach into customers and customers' ability to see channels have been given negative scores in Table 13 (-2 and -3 respectively).

Prelude to learning

Opening up VFC membership to existing subscribers could create tensions within Vodafone. Teams have targets, and the movement of customers from one tariff to another, while increasing the VFC uptake, could lower another team's results. For commercial sustainability within Vodafone, the product will need to be aligned not only with the VFC team's targets but with wider corporate strategies.

Marketing strategies have evolved, and this is likely to continue. Customer acquisition incentives are spread across Agents, Freelancers and Retailers. Agents were very much a strategy attached to the grant, and their employment to go village to village was a specific expenditure in the VFC grant. As the grant comes to an end, it may be that Vodafone feels that this is not an effective enough strategy to justify the cost. Ambassadors (where local people are paid an incentive to promote the product) was trialled as a strategy but wasn't implemented in the end. It remains under discussion and may yet prove to be an effective way of acquiring customers. The roles of Freelancers are likely to evolve as they gain experience of VFC, and Ambassadors may yet be adopted; it will be interesting to watch how the mix of marketing channels evolve. It may be worth considering talking to retailers and freelancers as a part of the endline qualitative data gathering.

5.4 Customer Relationships

“The types of relationships a company establishes with specific customer segments. Relationships may be driven by various motivations, e.g. customer acquisition, customer retention, boosting sales.” (Table 2).

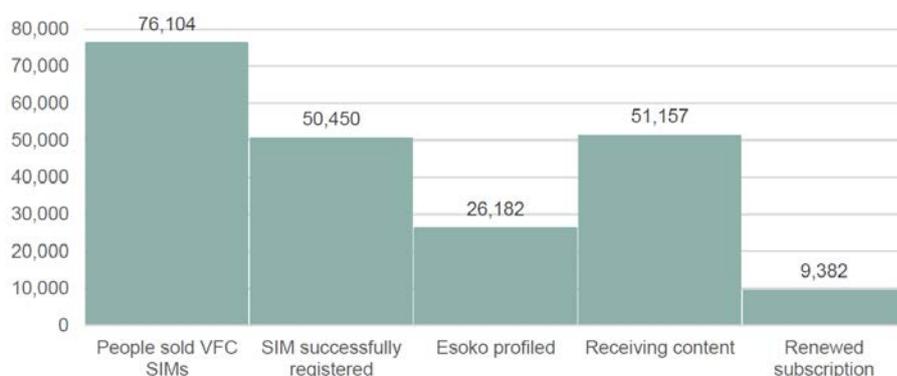
The customer relationship is determined by a mix of automated activities such as billing, and personal contact through face to face marketing and the call centre, for example. Branding and trust are also important aspects of securing the target market segment.

5.4.1 Purpose of Customer Relationship

What kind of relationship does Vodafone want to foster with VFC customers? Several features described in the original Application form indicate that the product was intended to create quite a personal relationship with farmers. For example, Ambassadors were described as a Channel for reaching large numbers of farmers, exerting their social capital (personal relationships and their standing within the local agricultural community) to endorse the product, to encourage farmers to join, and to provide assistance to help farmers get the most out of the product. Academies were another idea whereby Vodafone would foster personal and durable relationships (lasting at least as long as children were enrolled in the Academy) with individuals from within target communities. However, in its current form, VFC has dropped both of these features, leaving customers with a highly impersonal experience after they have been enrolled through Agents or Freelancers, based largely on automated billing and automated SMS / voice messages.

Furthermore, the automated type of relationship has not been a particularly good one. Figure 13 shows that, as of March 2016, one third of VFC SIMs had not been properly registered, and only one third had been successfully profiled on the Esoko platform. Vodafone have also been working hard to resolve issues with billing for the product (GSMA 2016). Negative scores (-3 and -2) have, therefore, been given in Table 13 for both customer relationships, and the strength of integration of channels respectively. Only one fifth of those registered renewed their subscriptions, so a negative score (-2) has also been given for recurring revenue streams.

Figure 14 Registering and Profiling of SIMs (GSMA 2016)



Reproduced with permission

Vodafone Farmers Club is branded as a club, which implies some sort of exclusivity. Normally, business models that aim to create an exclusive type of Customer Relationship are concerned with high end markets. However, in the case of VFC, the offering is indeed exclusive, in that Vodafone have been fastidious in ensuring that it is only made available to farmers in rural areas, but the Customer Segment is at the low end of the market.

VFC exclusivity is based on more than perceptions, as membership entitles farmers to call other members for free, which is a real benefit. Exclusivity associated with high end markets is based on the ability to pay for the product, but the exclusivity of the VFC product is based on value for money – only members can make free calls.

However, there is little evidence that Vodafone has attempted to create any sense of exclusivity or privilege in the Customer Relationship, although this might have been achieved had the relationship been brokered through Ambassadors. Fostering exclusivity in a low end market may be an innovative approach, but it is expensive to create exclusive Customer Relationships, leading to conflict. To an extent, VFC has already experienced this, as although Agents can provide a personal, face to face service, they are a relatively expensive means of acquiring subscribers, and even then, they failed to deal with the Esoko profiling procedures diligently.

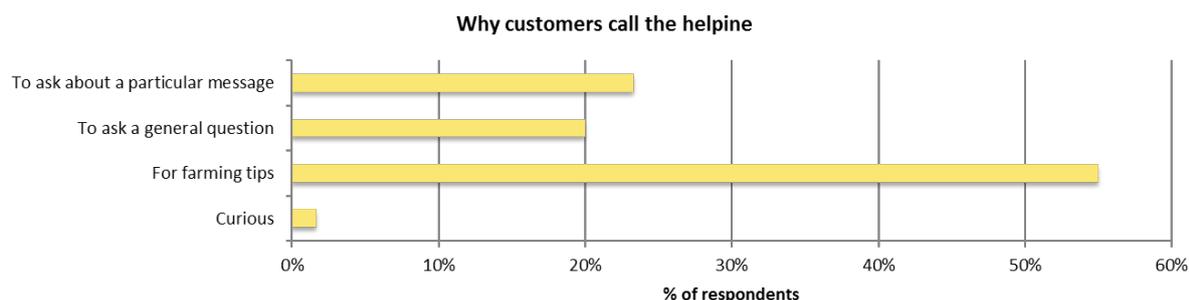
When Vodafone dropped the VFC subscription charge in October 2016, they also offered the product to existing customers. At this point, Vodafone changed their intended Customer Relationship into one that was simply appropriate to acquiring new customers. Customers migrating in this way did not have the opportunity to engage with Agents and Freelancers. Fees are to be re-introduced in June 2017. Table 13 includes a positive score (4) for matching of customer relationship to segments, on the basis that focusing on acquisition was appropriate at the time; this will need to be reviewed when subscription fees are reintroduced.

GSMA have articulated business models for agricultural VAS that rely on indirect benefits to the MNO (GSMA 2016b), and this is expected to be the case for the VFC product. In this case, the Customer Relationship needs to focus on upselling – increasing sales of other, related products. In the case of Vodafone, this will be airtime, reflected in increased ARPU and reduced churn. In essence, the Customer Relationship needs to keep subscribers on the network.

5.4.2 Call Centre

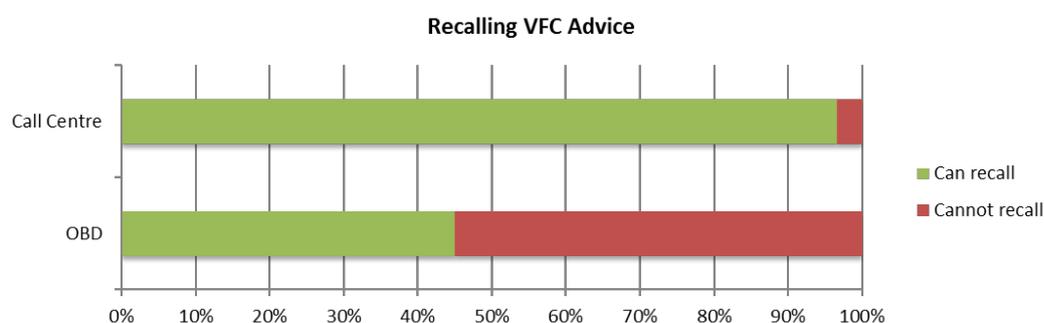
Early on in their work, ALINe (2015) concluded that farmers understood how to use the call centre, as over 60% of VFC users had called the call centre (although this dropped to around 25% in subsequent surveys (ALINe 3rd May 2016)). At this point (September 2015), most farmers used the call centre for advice on farming matters (see Figure 14). Moreover, recall figures show how the interactive call centre experience is an effective mechanism for transferring (and assimilating) information (see Figure 15).

Figure 15 Why farmers called the helpline (ALINe 2015)



Reproduced with permission

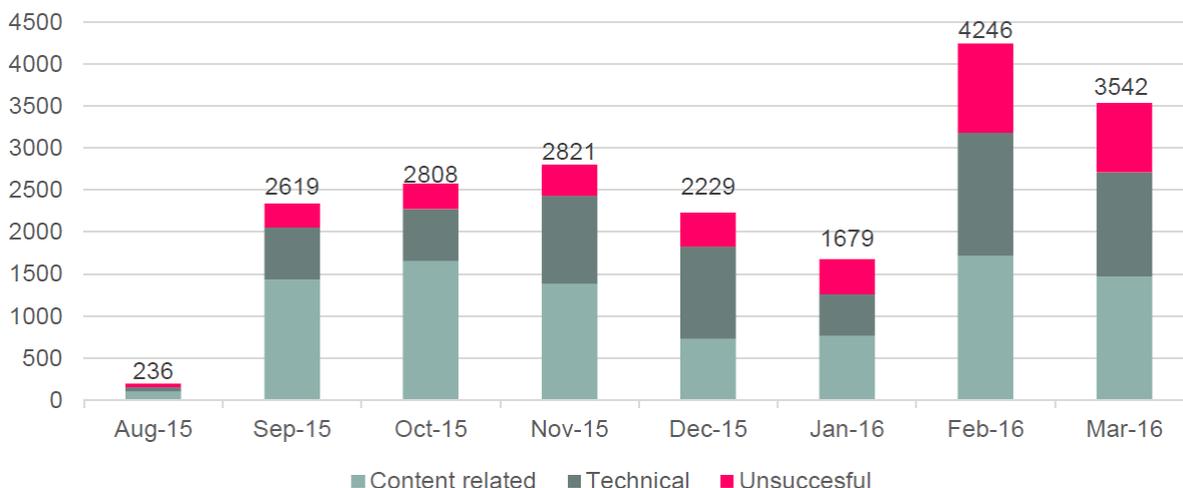
Figure 16 Recalling VFC advice (ALINe 2015)



Reproduced with permission

Subsequent research has shown a change in complexion of call centre use. In their case study, GSMA reported that calls to the call centre had increased in the beginning of 2016 (see Figure 16), but by this time nearly one half of answered calls concerned technical issues such as billing (21%), subscriptions (63%), and network problems (16%).

Figure 17 Calls to helpline by category (GSMA 2016a)



Reproduced with permission

In Hughes and Ridley (2017), they state that the reason MKopa renewable energy lighting products were able to grow to 360,000 users in Kenya has been the role of the call centre. A centre of 300 people now responds to consumers, tackling issues including payments, maintenance, remote repairs, repair scheduling and other requirements. The characterisation of a PV renewable energy product as dependent on a well-oiled call centre is interesting and perhaps a phenomenon of modern life.

Esoko currently have 10 people in their call centre. With the rapid growth of users, this has led to an increasing number of 'unsuccessful' calls (see Figure 16). Changes in the profiling procedure meant that the call centre was required to call customers in order to complete their profile, and currently it is customers that need to call the centre if they want to edit the default profile they are allocated upon registering. Other, transient, demands are placed on the call centre when certain messages are distributed, for example, when farmers are not sure of the content, as was the case when people tried preparing a nutritious porridge mix, but it didn't look right (see box below).

The porridge mix.

There is a ready made mix of different cereals available on the market, and the nutrition advisor came up with messages telling people how to make this more nutritious mix for themselves. After the tip was broadcast, the helpline got lots of calls asking to confirm the recipe was correct, and asking for assurance that it was cooked correctly because it looked different to normal porridge.

Clearly there is a role for the call centre to play in supporting the adoption of messages. However, if the number of unsuccessful calls grow it is possible that consumers will stop trying. This will be something to watch – how the presence of the call centre and its responsiveness affects the consumer experience.

Prelude to Learning

A well staffed call centre is an innovative and effective addition to agricultural information systems. This might be something to watch – how the presence of the call centre and its responsiveness effects the consumer experience.

African telecoms consumers show a remarkable resilience and tolerance of poor quality of service (e.g. Commonwealth Telecommunications Organisation 2012). It may be the case that customers are not in fact deterred or put off by poor quality of service from the call centre.

We will seek to consider how demand for the call centre increases with subscriber numbers, and familiarity with the service and reputation of the service (linked to quality of service).

5.4.3 Billing

From early on in the VFC journey, Vodafone have been aware that payment mechanisms have been a problem, and that continues to be the case. For example, back in 2015, ALINe showed that most people who tried VFC but failed to resubscribe either did not know how to resubscribe, or were simply unaware of the need to resubscribe (ALINe 2015). In an attempt to improve resubscription rates, an autorenewal system was introduced in late 2015 with some success: *“An auto-renewal process was created for new users from November 2015 which led to an increase in users paying for the product from 4% of the user base in September to 12% in March 2016.”* (GSMA 2016a). However, autorenewal brings its own problems, and there are concerns that farmers will not understand the system, and it may exacerbate distrust among Customers who feel they have been charged unfairly (ibid). ALINe’s subsequent Rapid Feedback research showed that in early 2016, most users (62%) still did not know how to pay for the service (ALINe 2016a).

Preliminary research shows that it is not that Customers are unwilling to pay for the service – it’s just that they don’t understand the billing mechanisms to date, so a negative score (-2) has been given for ‘captures willingness to pay’ in Table 13. In ALINe’s Outcome Study Report (ALINe 2017) all respondents felt that the service was worth the money paid, and all intended to continue using the service. A willingness to pay experiment was carried out as part of household surveys conducted under the quantitative research (Billings et al 2017). This suggests that most farmers (over 85%) are willing to pay a small subscription fee (up to 1 GHC/month), but that demand drops dramatically at prices beyond 1 GHC/month, such that only 50% were willing to pay 2 GHC/month. Although these may seem like low subscription rates, they should be considered in the context of an ARPU for VFC users of only 3.6 GHC/month²⁶.

Vodafone reported that the biggest problem is figuring out how to get farmers to pay in a way that is consistent with their patterns of behaviour. Farmers struggled to pay 2c/month, but not necessarily because it was too expensive, but because they are also not accustomed to the concept of paying a monthly subscription for a service, given that 98% of mobile users use prepaid. Similarly, when the autorenewal system was introduced, Vodafone took the money on a calendar month basis, rather than the more conventional rolling 30 day contract period approach because farmers are not familiar with the concept of a rolling contract period.

Since October 2016, when they removed subscription fees, VFC has temporarily avoided problems with billing.

The renewal fees may affect the ongoing use of the VFC product, however at the moment, because there is no monthly charge, consumers do not experience ‘autorenewal’ in any substantial way. This may change with the renegotiation and possible restructuring of the product following the end of the grant. This will be one to watch, from both the effect on the consumers (whether they renew) and how they feel about autorenewal (if it is introduced), and whether the government has any concerns with autorenewal on a product designed for the poorer sections of the population.

Another feature of Customer Relationships loops back to the Channels that are being used and which might be used in the future. If retailers or freelancers sell the product without

²⁶ GSMA, personal communication.

adequate explanation of the advantages, i.e. emphasising the free calls aspect over the content provision, it is possible that consumers will feel they are being spammed by the text and OBD voice messaging. The initial sign up ‘pitch’ from the Vodafone representative might set up the consumer with expectations that may then go on to affect their experience, either positively or negatively.

Prelude to Learning

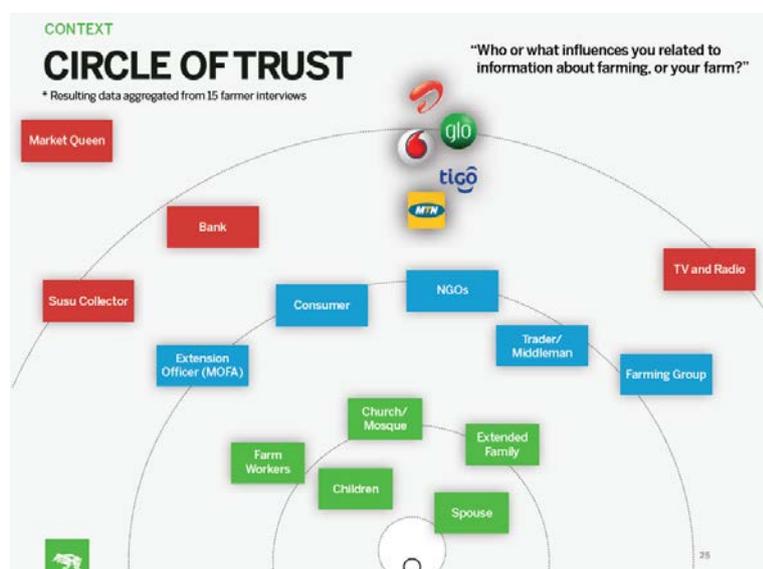
To date, Channels have not been effective in explaining payment mechanisms to Customers.

Neither manual subscription nor autorenewal have been particularly successful, although it is not clear whether it is the mechanisms that are flawed, or whether they have just not been adequately explained to Customers. What happens to subscriber numbers when fees are reintroduced, and what mechanism will be introduced?

5.4.4 Branding

As part of their early user centred research on product development, frog used the circle of trust (2014). They highlighted the fact that mobile operators, and mobile agriculture services, work in a pluralistic service and provider context (see Figure 17)²⁷. They also suggest that farmers tend not to regard MNOs as trustworthy. This is corroborated by findings from the qualitative research that farmers believe that MNOs are mainly interested in making a profit, and they cannot be trusted, especially with accurate charging²⁸.

Figure 18 Frog Circle of trust exercise (Ghana) (frog 2014)



Reproduced with permission

²⁷ 'Market Queens' are women who supervise an entire market.

²⁸ N.B. this kind of study cannot determine whether these claims are true, or whether customers simply misunderstand tariff structures.

Having said that, the qualitative research indicates that people in rural areas with poor connectivity tend to feel ‘trapped’ in their choice of MNO by network coverage and signal availability. This suggests that there is little point in Vodafone investing in improving the Customer Relationship, as it has little influence on customer retention. The customer relationship is only likely to be of importance where Vodafone is on a level playing field with other MNOs in terms of network quality.

Vodafone is keen to create an emotional bond between farmers and the Vodafone brand. Farmers are a group that are largely ignored by all the MNOs. If Vodafone are present at community events (e.g. National Farming days), then all departments are represented, not only VFC. Vodafone (and Esoko) has been invited to an agriculture seminar hosted by a government agency, which indicates that they are establishing a profile in agriculture nationally. It is not viable for Vodafone to make alliances with government agencies (they could not be seen to be endorsing any MNO in particular), but with time, they may recognise ways in which VFC supports agricultural extension work.

Overall, a neutral score (1) has been given in Table 13 for brand strength on the basis that, although MNOs are not trusted, Vodafone are fostering an association with farmers. Even though customers have a low opinion of MNOs (see discussion of trust above) their options for churning are limited, not only by being trapped by network coverage, but also through low awareness of number portability (see Section 5.6). On the other hand, they can easily opt out of the VFC service if they feel the customer service is poor, so a negative score (-2) for danger of customer relationships deteriorating in Table 13 reflects a potential threat to the business model.

Prelude to Learning

The Customer Relationship seems to be of little value in securing imputed benefits for Vodafone. Will this change over time?

Are Agents / Freelancers sufficiently well trained to have a positive impact on the perceived Customer Relationship?

5.5 Revenue Streams

“The cash generated from each Customer Segment. Revenue streams will depend on what customers are willing to pay. Revenue streams can be either one-off payments, or recurring revenues. Each revenue stream may have different pricing mechanisms.” (Table 2).

The original business model was built on a hybrid approach, generating revenue from both usage fees (discounted airtime tariffs), which is the traditional telecommunications model based on selling airtime, and from subscription fees. However, the way airtime fees are charged is not straight forward. Calls to numbers on the Vodafone network and to numbers on other networks (off network) are charged by the minute, but calls within the closed user group (to other VFC members) are nominally free. In fact, there is a cap on the number of

free minutes (600 minutes per month), and any calls in excess of this amount are charged at the discounted rate.

During the life of VFC, revenue streams have changed. On October 2016, the subscription fee was dropped in the interests of attracting higher subscriber numbers in order to meet targets. Whilst this was successful, it was feared that this was not a sustainable approach in the longer term, and the subscription charge was re-introduced in June 2017, albeit at a much lower rate. The original Application form mentions a proposed fee of 5GHS/month, but when the product was launched this was reduced to 2 GHS/month, and when fees were re-introduced in 2017, they were set at 50p/month. They were set at this level to enable Vodafone to recover the cost of delivering the bundle of messages to customers. It is hoped that such a low rate will not present a barrier to re-subscription, given that GSMA's research suggests that users feel that the service offered good value of money (GSMA 2017), and the quantitative research indicates that most farmers are willing to pay up to 1 GHS/month (Billings et al 2017). Changes in subscription fees and step changes in subscriber numbers mean that at this point, revenues are not predictable, so a score of -1 has been given in Table 13.

One striking finding from this research was that users recognised that the benefit they enjoyed from the free calls facility alone more than payed for the 2 GHS/month subscription fee (ibid.). Combined with the finding that free calls are what drives adoption (see Section 5.2.4), this suggests that customers regard VFC as offering good value, so a score of 3 has been given in Table 13. But what of the information services? One characteristic of call minutes is that they are not shareable - each VFC member will make unique calls on the network. This is not necessarily the case with information service such as weather, market process, or knowledge on how to use fertilisers, which can be shared. Indeed, there is evidence that farmers simply share information among themselves, reducing the incentive for peers to join VFC. In their Outcome Study Report, ALINe (2017) highlighted spillover effects, and the overwhelming propensity for VFC users to share information with family, friends, and other farmers. The finding arose from a limited number of in-depth interviews (10 out of 12 respondents), but also showed that farmers shared information extensively – with between 5 and 30 contacts (mean of 10).

Although this is not yet a statistically validated finding, it is consistent with the strong tradition of cooperative farming among smallholder farmers in Ghana. Salifu, Funk, Keefe, & Kolavalli (2012) estimate there to be around 10,000 farmer based organisations in the country, both formal and informal. They assert that the motivation for forming groups is to access some kind of economic benefits, be that capturing resources such as training, grants, loans, or through economic activities such as production, marketing, or processing. Farmers groups can be convened by government extension agencies, as a means of extending their reach. The sharing and mutual promotion of information and new ideas is central to this model of extension. However, the more effective farmers are at sharing information accessed from VFC, the less likely their peers may be to sign up for themselves.

Furthermore, farmers are accustomed to getting information for free. Weather information is freely available on the radio and television, and farmers do not expect to pay either government extension workers or agricultural input suppliers for advice.

One of the Customer Segments described in Section 5.1 is rural residents without a mobile phone. Where network coverage exists, these people will tend to come from the poorer part of the rural population, which means that, if tempted to sign up, their expenditure on phones

is likely to be less. This effect can be seen as African telecom markets mature. ARPU in African markets was always relatively low, but it is declining still further as increasing penetration and subscriber bases means taking on customers that spend lower amounts on airtime. Therefore, this represents a customer segment that may well have difficulty justifying the monthly subscription.

Ongoing negotiations between Vodafone and Esoko regarding incorporating the Fasiba (or Tulaa) service (or some variation thereof) into the Vodafone product will have major implications for potential revenue streams. As a service brokering financial transactions, it will be relatively straight forward to extract revenues, and it should be possible to do so in a non-contentious way that farmers can understand. These negotiations also have the potential to alter the balance of revenue streams, especially if costs are cut significantly. For example, Vodafone may be able to sustain the current model with no monthly charge, justifying it internally by the increased ARPU and reduced churn of the VFC users. If such justification can be made, and the deal with Esoko is that their service fees are mitigated by some quid pro quo on other products, then VFC in terms of revenue could be seen as sustainable. On the other hand, the corporate indicators of profitability may require that VFC has a more direct income to offset content delivery – and when a monthly charge is reintroduced, that may not just change the bottom line for the product but change the value proposition as a whole and the resulting consumer experience.

Prelude to Learning

Evidence of willingness to pay available to date suggests that VFC should be able to generate value directly through subscriptions.

Farmers are accustomed to getting agricultural information for free, and there is a culture of sharing information among farmers. Messages obtained via VFC appear to be shared in the same way, which may tend to dilute the appeal of VFC membership.

5.6 Indirect Benefits

“Ways in which the service can benefit the company other than by direct revenue generation.” (Table 2).

During discussions with Vodafone, the impression was given that VFC is somehow different to the normal commercial products. For example, renegotiating scenarios (for VFC cost structure) was done without considering revenues. If this is the case, then there must be other justifications.

Customers can easily (at no cost) shift between operators providing nominally identical services. The qualitative research confirmed that the majority of farmers own multiple SIMs. In areas where viable network coverage is provided by only one network, consumers have no choice. However, in areas with multiple network coverage, and this was the case in each of the six communities selected for the qualitative research, consumers can choose between different operators. Deciding which SIM to use is based on a number of factors, most important of which is network availability, but also cost, especially important given that

operators charge a high premium for off-net calls (to numbers on other operators' networks), and special offers, promotions, and bonuses.

In fiercely competitive markets, such as telecoms, operators strive to increase their share of customers' communications wallets (or budget). This is what we mean by Indirect Benefits here. It means increasing revenue from the customer, but other than from subscriptions to the VFC. Where customers have a choice, it means persuading customers to choose your SIM.

One way of influencing this choice is through differentiation – adding some feature to the product to make it more attractive than competing products – and this is where VAS fit in. GSMA have identified that Agri VAS can contribute to higher use of SIMs for making calls, which will result in increased ARPU, reduced churn, and increased brand awareness (GSMA 2016b). Vodafone indicated that these kinds of metrics had not yet been investigated, and promptly offered to commission some analysis. It was proposed to compare metrics of a cohort of VFC customers with a cohort from another mass product group. While this analysis has not yet been completed, analysis by GSMA of data from other studies within the mAgri GSMA programmes show up to 10% increase in ARPU and up to 50% reduction in churn²⁹. In the absence of any direct revenue when subscription fees were dropped (see Section 5.5), the only value to Vodafone will be indirect; as this has yet to be demonstrated, a score of -5 has been given in Table 13 for margins.

The qualitative research highlighted an issue of loyalty whereby people stick with the first operator that they signed up to. However, rather than a positive characteristic of loyalty to the operator, this turns out to be a negative reluctance to change, based on the “cost” to the customer associated with changing to a new number. Mobile number portability (MNP) was introduced in Ghana in 2011, so this indicates that people are unaware of their right to keep their existing number when changing operator. As people become aware of MNP, they may become more willing to change (which could cut both ways for Vodafone).

Prelude to Learning

There is a recognition within Vodafone that VFC will yield imputed benefits to the company, but it is not clear that any analysis has yet been done to quantify or demonstrate these benefits. This begs the question whether, as a Mass Marketing product, VFC is in fact expected to operate as a profitable product in its own right. We will seek to liaise with Vodafone on their analysis of churn and loyalty.

5.7 Key Resources

“Those assets required to make the business model work. Resources that allow and enterprise to create and offer the value proposition, to reach markets, to maintain relationships, and to generate revenues. They can be physical, financial, intellectual, or human.” (Table 2).

²⁹ Personal communication.

For many VAS developers, partnering with an MNO is the key to achieving scale, because an MNO offers nationwide reach (infrastructure), and they can push services to existing customers (customer base). MNOs also offer a relatively low effort route to scale, because they have systems that deal with billing and handling large numbers of micro-payments - services that can be costly for an independent company to source. All of these are resources that Vodafone bring to the table in the VFC partnership. However, because VFC is more than a third party VAS, and is branded as a Vodafone product, they also bring marketing and product development skills and effort, drawn from a number of cost centres across the organisation. For example, the product was initially conceived and developed under the Innovations department, but when it achieved scale it migrated to the Mass Marketing department. A small team are responsible for the product, and they in turn can call upon other departments for assistance with sales strategy, financial intelligence and so on. Vodafone has a nationwide network of 3,000 regional freelancers that can educate users on VFC features, and up to 30,000 Point-of-Sale agents (see Section 5.3).

Esoko have a long track record of working with agri VAS, having set up Tradenet in Ghana over ten years ago. During this time, they have developed a database of locally relevant agricultural content that they bring to the partnership, but which remains their intellectual property. Moreover, they have agriculturalists on their staff who have worked on developing content, and who have been able to fulfil the role of the local content partner in the mNutrition project. GAIN developed content for an additional 13 crops, and Esoko adapted them to be locally appropriate. They also had quality control and data validation processes in place, which were of value in developing the VFC product (described in more detail in Section 5.2.1). However, GAIN introduced a new set of quality control procedures that involved converting information into a different format, e.g. factsheets. Esoko then restructured their data into this new format at their own expense. Esoko continued to rely on their Expert Network as part of the revised quality control procedures, and maintain that this is a particularly valuable resource, which they have fostered over time (see box below).

Esoko has a network of 35 enumerators covering 43 markets across Ghana, which provides data on market prices. Developing nutrition content has been something new for Esoko, and they have employed a nutritionist to manage the development of this.

The Expert Network

Nutrition content for the mHealth project in Ghana was developed by Grameen, also under a contract from GAIN, and went through their own, similar verification procedures but were rejected by GSMA. GAIN then asked Esoko to validate the content, but there was no money left to pay Esoko for this additional work, so validation was eventually done by the Ghana Health Service. Esoko believes that this illustrates the value of the network of contacts that they have built up over the years, in particular the Expert Network that was established under the earlier USAID work. It takes not only contacts in the right places (e.g. Esoko staff have worked in Ministry and agricultural research positions), but also time to establish robust validation procedures. If shortcuts are made in order to meet tight timescales then quality will suffer. Now the GAIN contract has ended, there is no financial support for the Expert Network, so it is not clear if this will continue.

In their earlier incarnations, Esoko focused heavily on technology, developing platforms to meet information and transaction needs among farmers and stakeholders in the agricultural

value chain, and they provide the platform currently used to profile customers and distribute information to farmers.

As part of the wider mNutrition programme, a number of institutions have provided specialist expertise, and user experience research in particular, in the early stages of product development. Throughout the mNutrition programme, GSMA have analysed commercial information submitted to them and have synthesised project data and learnings from their experience into a number of case studies and publications, which are publicly available. These resources have been summarised in Table 8.

Table 8 Summary of resources brought by key VFC partners

	Vodafone	Esoko	GSMA / GAIN and partners
Physical	Network infrastructure Billing systems	Call centre Software platform	
Intellectual	Brand Customer base	Agricultural content database Experience of working with agri VAS Experienced staff	Nutrition content Quality control processes
Human	Product development Experienced staff Marketing	Expert network Software developers Network of market enumerators	UX researchers Business intelligence Monitoring, evaluation and learning (MEL) Business consultancy

Other MNOs with national reach can offer similar resources, which, combined with the fact that several other companies in Ghana are currently offering agricultural information services (see Section 6), suggests that the resources behind VFC are not difficult to replicate, so a negative score (-5) has been given in Table 13. On the other hand, it is a repeat product, so once the service has been successfully set up, resource requirements should be stable and predictable (scored 4 in Table 13). Positive scores for synergy of partnerships and balance of activities between partners (5 and 4 respectively) have been based on the synergies of capabilities that enables partners to deliver the service to a national market, along with clear demarcation of responsibilities.

Prelude to Learning

Creating VFC as a partnership with Vodafone, rather than simply offering it as a third party value added service, means that it can access a wide range of capabilities from within Vodafone Ghana (and beyond).

5.8 Key Activities

“Things a company must do to makes its business model work. Activities required to create and offer the value proposition, to reach markets, to maintain relationships, and to generate revenues.” (Table 2).

As the VFC services are distributed to customers over the Vodafone network, operating this network is a key activity for Vodafone. In the same way, information services are delivered to customers by the Esoko platform, so operating this platform is a key activity. This may seem like stating the obvious, but there is evidence that these activities are not straight forward – consumers complain of poor network quality, and only one third of VFC customers were successfully profiled by Esoko (see Figure 13).

Closely linked to network operation is customer billing, an activity done by Vodafone. It is, of course, essential that this is done accurately, otherwise customers will have reason to complain, causing long term reputational damage to the product (problems are discussed in Section 5.4.3).

Creating relevant content for information services is a key activity, as is managing this content so that it is distributed in a timely and appropriate way. The former activity has been managed by GAIN in a two part process of global and local content generation, and the latter is managed by Esoko as part of their software platform. CABI have pointed out that content cannot be regarded as a static commodity because, as local conditions change, it will go out of date. Looking to the future, it will, therefore, be necessary to continually update content to address new challenges, changes in policy, advances in knowledge and technology, and so on.

Customer acquisition is a key activity, currently being done by Vodafone. The process, along with problems encountered to date, are described in Section 5.3. Part of customer acquisition is registering new SIM cards on the network, a key activity done by Vodafone. Data presented in Figure 14 suggests that up to one third of SIMs were not successfully registered, indicating that this activity needs further attention. Esoko cannot profile customers that are not registered on the Vodafone network. The same data suggests that Esoko have only been able to profile one half of registered SIMs (see Section 5.4.1). This highlights the importance to customer acquisition of both SIM registration by Vodafone, and customer profiling by Esoko. Even then, given that indirect benefits associated with increased customer loyalty are a key part of the business model, it will not be sufficient simply to get customers registered on VFC – rather they will need to be retained as regular users of the product.

These activities have been summarised in Table 9.

Table 9 Summary of activities conducted by key VFC partners

	Vodafone	Esoko	GSMA / GAIN
Platform/network	Operate network Billing customers	Operate Esoko platform (distribute content)	
Production		Create content Update content?	Create content
Marketing	Customer acquisition Customer retention		

Findings from research conducted to date suggest that there is a need for customer education. Resubscription rates have been low because customers were not aware of how to pay their fees, which harms revenue streams and has the potential to damage Customer Relationships. The fact the Customers were not aware of the services available in the bundle is an indictment of the marketing practice, and detracts from the original concept of the complementary value of the VFC bundle of services.

For the purposes of Table 13, problems with registration and profiling have been taken to indicate that resources were not adequate, have not been deployed adequately, and that activities have not been executed efficiently (each scored at -2). Both the threat to quality of resources and the quality of executing activities have been given neutral scores (1 each) because difficulties with these activities have yet to be resolved, and processes for curating content in the future are not yet clear. However, these difficulties may highlight that it is not easy to set up this kind of service. Neither is it easy to localise the content, which is an area where Esoko have expertise (see Section 5.2.1), so a positive score (2) has been given for “activities are difficult to copy”.

Prelude to Learning

Focusing on customer education has the potential to strengthen the value Proposition, and to increase revenue Streams. Related to the feedback processes and user experience studies, the evaluation will seek to consider how customer education is pursued within VFC.

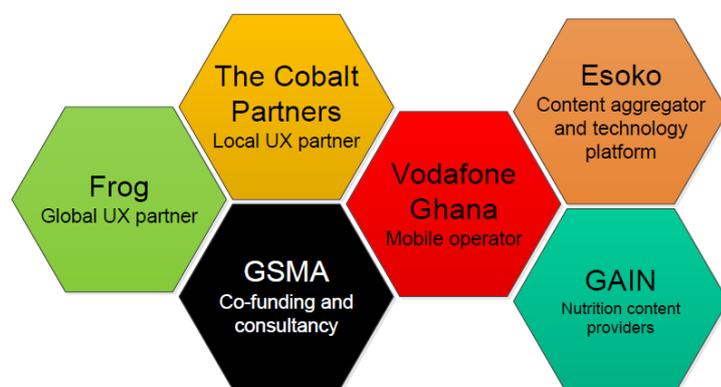
5.9 Key Partnerships

“The network of suppliers and partners that make the business model work. Companies forge partnerships for many reasons, e.g. reduce risk, acquire resources.” (Table 2).

Parties to the partnership model are illustrated in Figure 18. The case study describes the following roles for each (GSMA 2016a):

- Vodafone Ghana – lead partner, funding, marketing and billing
- Esoko – main partner, content, platform, helpline
- Cobalt – local UX design research
- frog – global UX partner
- GSMA – co-fund, business intelligence, consultancy
- GAIN – global content partner.

Figure 19 Partners and other key players (GSMA 2016a)



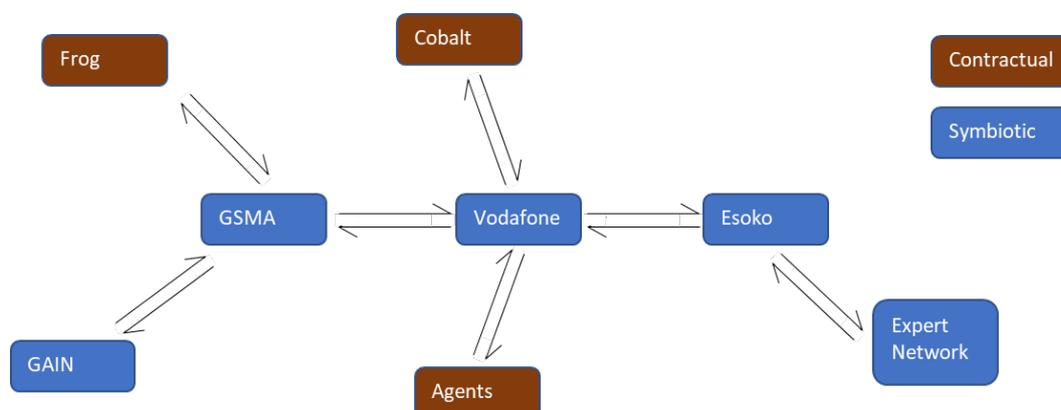
Reproduced with permission

It can be helpful to consider the nature of partnerships, in particular the degree to which partners are invested in the product. In the following table, a couple of additional players have been added, on the basis that the roles they play have been highlighted by research to be particularly important; they are the sales Agents, contracted by Vodafone to do customer acquisition, and the Esoko Expert Network, which has been instrumental in the content validation process. The layout of Figure 19 reflects the nature of contractual arrangements, and each relationship is described in Table 10.

Table 10 What parties give and get from Partnership relationships

Partnership	Contribution of parties		Type
	1st set of partners	2nd set of partners	
Vodafone - Esoko	Vodafone: Reach, marketing (customer acquisition), billing	Esoko: Agricultural expertise & database (content), content platform, content management	Symbiotic, acquisition of resources; Vodafone want VAS, Esoko want scale
Vodafone - GSMA	Vodafone: project lead	GSMA: funding, technical assistance	Symbiotic: reduces risk to Vodafone of new product; VFC contributes to GSMA Development strategy
GSMA - GAIN	GSMA: funding, project management	GAIN: agricultural content expertise	Symbiotic: open access database fits GAIN mandate, and adds value to mNutrition project.
Esoko – Expert Network	Esoko: financial compensation	Network members: refine product (reduce risk), credibility	Symbiotic: VFC contributes to members' mandate to improve agriculture
GSMA – frog	GSMA: funding	frog: design resources	Contractual
Vodafone - Cobalt	Vodafone: funding	Cobalt: design resources	Contractual
Vodafone - Agents	Vodafone: funding	Agents: marketing resources	Contractual

Figure 20 Partnership types



Authors own

The Application form mentions a wider range of parties that were intended to play a role in the VFC product. Many of these are represented in Table 10, but others appear to have been dropped from the product. Some of these were to have been associated with the financial service, which was dropped from the original version of VFC. Most were suggested as playing a role in reaching customers:

- Sinapi Aba (a financial institution for farmers in Ghana) manage a large base of the agricultural community; a channel to reach out to the agricultural base.
- Farmer associations as key educational and acquisition drivers. FAs can work with VFC Public Information Vans to complete educational events. Corporate FAs (and related organisations) can reach members as corporate clients of Vodafone, and they can advertise their services to farmers through CRVT functionality.
- Farm Radio International - educational programs broadcast on local and community radio station in local languages.
- major agricultural input, appliance, or service dealers to sponsor promotional activities mainly targeted at female farmers, e.g. an annual lottery
- Ambassadors – have been tried and dropped, but remain under consideration for future iterations (see Section 5.3).

Vodafone have indeed considered working with large corporate customers to acquire farmers, and have even talked to some, but they have not worked out how to do it, so it is no longer being considered. This experience suggests that the transactional cost of negotiating with third parties such as commercial institutions, farmers' organisations, NGOs, etc. can be too high. Indeed, it may not even be possible to establish relationships with institutions that are reluctant to, or may even be prohibited from, aligning with one MNO. Note that this comment is made in the context of customer acquisition and is not intended to contradict the role of commercial and governmental organisations in mAgri applications, such as B2B business models (GSMA 2016c).

Prelude to Learning

There is a high degree of synergy between the core partners (Vodafone and Esoko), and this is likely to be strengthened still further if the Fasiba/Tulaa service is incorporated into future iterations of VFC, pending ongoing negotiations. This relationship will be one to watch.

5.10 Cost Structure

“Costs incurred to operate the business model. Creating and delivering value, maintaining customer relationships, and generating revenue all incur costs.” (Table 2).

Based on the description of the building blocks given above, the primary cost components have been identified in Table 11, along with those stakeholders likely to bear relevant costs. In the cost-effectiveness report, we have sought to differentiate the setup and ongoing costs, the wider programme costs, and the societal costs, such as the cost to farmers of adopting new practices (in Table 11). In this business modelling baseline, we present only the setup

and ongoing costs, mainly derived from the grant application and some reported costs from the content providers. Table 12 presents estimates based on information gathered so far along with authors' estimates. At the time of writing, Vodafone were preparing a sustainability report for GSMA and we expect more detailed costs to be included in that. We also anticipate these costs to change over the lifetime of the intervention as new approaches to marketing and service provision (and customer charges) are explored.

Table 11 Cost structure

	Vodafone	Esoko	GSMA	Gov't (other)	Farmers
Content					
Global content partners (share attributed to GH)					
Local content partners					
content from previous partnerships (Esoko, USAID)					
content validation					
translation					
recording IVR messages					
keeping content up to date					
weather data					
Product development					
Cobalt					
frog					
business intelligence					
Software development					
initial Esoko system					
accommodating new agriculture content					
accommodating new nutrition content					
Admin / Overheads					
M&E (e.g. ALINe)					
staff salaries (various cost centres)					
rent					
depreciation (computer equipment)					
Marketing					
Agents					
Ambassadors - others?					
training					
radio / TV					
advertising					
monitoring / management / supervision					
Network					
cost per SMS					
cost per IVR USSD session					
opportunity cost of CUG free calls					
opportunity cost of discounted calls					
Esoko platform					
Vodafone network - contribution?					
Action taken by farmers					
use of fertiliser					
increased water use					
new crops?					

Table 12 Cost data available (at end March 2017)

	Partners involved in expenditure	Source of data	Detail	Year 1	Year 2
Localisation Content development.	Esoko, Expert Network, GAIN, WIAD	Global content Partnership (2017), CABI, 2016, DFID 2016	Staff Costs	£23,499	£6,107
			Direct Costs	£ -	£8,526
			LCP payments	£72,300	£13,266
UX, Baseline, Monitoring and Evaluation	Frog, Cobalt, ALINe, GSMA, Vodafone, Esoko	Grant application (GSMA, 2014)	Vodafone/Esoko M&E 1500 per quarter	£ 6,000	£ 6,000
		Stakeholder communication (GSMA, 2017)	ALINe Firetail	£39,000	£39,000
		Stakeholder Communication (GSMA, 2017)	UX expert and design consultants	£ 74,300	£74,300
		Global content Partnership (2017) CABI, 2016, Stakeholder Communication (GSMA, 2017), Authors' estimates	Business Intelligence (GSMA)	£55,384	£55,384
Capital costs.	GSMA, Vodafone, Esoko	Grant application (GSMA, 2014)	Esoko farmer helpline	£ 22,000	
			VF software	£ 26,000	
			Integrations	£ 22,000	
Management/ Personnel costs.	Vodafone	Estimates Based on Stakeholder communication (Vodafone, Gamos, 2017)	Project Management	£ 7,810	£ 7,810
Promotion and marketing.	GSMA, Vodafone,	Grant application (GSMA, 2014)	Marketing 11000 per quarter	£ 44,000	£ 44,000

	Partners involved in expenditure	Source of data	Detail	Year 1	Year 2
	Esoko, Agents		Acquisition events 16000 per quarter	£ 64,000	£ 64,000
			BTL activities 5000 per quarter	£ 20,000	£ 20,000
			salesforce 15000 per quarter	£ 60,000	£ 60,000
Recurrent costs of messaging.	Vodafone, Esoko	Grant application (GSMA, 2014)	Esoko call centre maintenance 2000 per quarter	£ 8,000	£ 8,000
		Estimates Based on Stakeholder communication (Vodafone, Gamos, 2017)	Message scheduling (esoko)	£ 61,200	£244,000
	Vodafone	Estimates Based on Stakeholder communication (Vodafone, Gamos, 2017), Vodafone website (2017)	cost of messages (SMS) ³⁰	£83,160	£332,640
Content curating.	Esoko, (GSMA) WIAD	Esoko Sustainability Plan (GAIN, 2016)	Operational costs for content sustainability	£34, 000	£34,000
			Totals	£722,653	£1,017,833

Only the cost of message scheduling and the cost of sending the SMS messages themselves have been assumed to be variable costs. This means that costs are predictable,

³⁰ These are in-kind contribution made by Vodafone (not included in the original application), and have been costed at the prevailing market rate for individual customers (0.055 GHS/SMS).

and potential economies of scale are high, so positive scores (5 and 4 respectively) have been given in Table 13. These costs have been based on estimated average numbers of users of 30,000 in Year 1, and 120,000 in Year 2 (assuming exponential growth from zero to 200,000 users at the end of year 2) (Vodafone user data 2017). We have taken the costs of all the messaging on the basis that the quantitative component is assessing the service as a whole, and that the synergy between nutritional messages and livelihood messages cannot be disaggregated.

The total of these costs (£1.74m) can be divided by the number of subscribers at the end of year 2 (200,000) to give a figure of £8.70 per farmer reached (this estimate assumes all farmers in Year 1 continue into Year 2). If it can be assumed that there is no material cost to Vodafone of sending the SMS messages, then this ratio drops to £6.6 per farmer reached. Although interesting, these figures tell us nothing about value for money as they take no account of impact achieved.

With the caveat that the figures in Table 12 are based largely on assumptions and estimates, a number of points arise from the relative magnitudes of categories of costs:

- The value of SMS messages delivered accounts for one third of operational costs³¹ and is the largest single cost component. Even if bulk purchasing meant that these costs could be halved³², they would still represent the largest single cost component. The overall cost of messaging (SMS plus message scheduling by Esoko) accounts for 42% of all estimates costs over the 2 year period.
- Support provided by the mNutrition programme for product development, including design and business intelligence, account for 20% of costs over the 2 year period. Further research is required to determine the value that this is regarded as having added to the value proposition, and how much the partnership might be willing to continue to invest after the end of the mNutrition project.

If we assume that ARPU is roughly £2.50/month³³, then VFC would need to attract (and retain) 33,000 new customers to cover these annual costs, which is well below the numbers currently on the system. Although this calculation is unrealistically crude, it does imply that the proposition could be viable.

5.11 Investment

“Number of investors, type of investors, and commitments made to investors. These will influence acceptable profit margins, and may affect cash flow.” (Table 2).

As the cost-effectiveness report states, the above costs are only those directly associated with the VFC offering. In addition, there has been investment from DFID and GSMA in the wider programme costs that stimulated and supported this action. There has also been matching investment from Vodafone.

³¹ These are based on a ‘market’ value of 0.055 GHS/SMS

<http://support.vodafone.com.gh/customer/portal/articles/1823814-sms->

³² Bulk SMS providers offer SMS at less than 0.03 GHS/SMS e.g. <http://smsonlinegh.com/pricing.php>

³³ MTN, for example, published 2016 ARPU data for Ghana at around 12.5 GHS/month (www.mtn.com)

“In the mFarmer component, as part of the overall grant award process, recipients are required to ensure they have matched funding in place. This means that there is at least 1:1 leveraging of grant funds by private sector investment throughout the lifetime of the programme. However, over the course of the programme, the leverage of private sector funds is anticipated to be closer to 1:3. For example, in mFarmer phase 1, \$400,000 was provided to four new services which will cost over U\$ 1 million to set-up and operate over the 2 year engagement. The ratio is increased if looking at the private capital investment during the full project’s lifetime and the number of programmes launched without GSMA’s direct support, but because of the information shared by GSMA. It is therefore estimated that these total funds of up to £14.5m of public money will generate over £40m of private capital over the next 5 years” (Business Case and Intervention Summary. Title: mNutrition–business models for mobile phone based delivery of nutrition services in Africa and South Asia)

For instance, when Vodafone temporarily dropped the monthly charge for VFC, they effectively invested an amount equivalent to the lost revenue from that period into the development of the product. As the grant ends, it will be interesting to see if the product can sustain itself or requires further investment.

As discussed in Section 3.2 above, it is worth noting that Esoko has a history and brings that history to the table. It has had various investments over the years but, in particular, in August 2016, Esoko received grant support (\$867,788 grant) from The Alliance for a Green Revolution in Africa (AGRA) for the deployment of Fasiba/Tulaa to help 80,000 smallholder farmers in Ghana overcome challenges associated with access to affordable and quality inputs to increase productivity and incomes. The Tulaa platform may be a key component of the end of grant negotiations and may play a strong role in the sustainability plan.

6 Alternative Approaches in Ghana

6.1 mAgri VAS Context

Ghana was identified by GSMA as one of the largest potential VAS markets (GSMA 2016c); they estimated that the market would be worth \$5 million by 2020. Data published by NCA indicates there are over 100 VAS providers in the country (as of September 2016³⁴), but even this may not be comprehensive. This section presents a brief overview of a small number of mAgri service providers that were kind enough to take part in the baseline field work.

Voto provides services for the [Vodafone 321](#) service launched in April 2016. [321 is an initiative of HNI](#) and services are made available in multiple countries across Africa, in partnership with different MNOs (one per country). It's a "freemium" IVR service covering a range of topics including health, agriculture, governance etc. (the first 10 calls per month to the service are free, but the users pay thereafter). Users call the number then navigate through menus using their keypad. In Africa, they negotiated with the Vodafone Foundation to adopt the 321 service, on the basis that the Foundation had a presence in multiple countries across the continent. However, the Foundation then foisted it onto national operating companies, who never bought into the idea, so it lacks leadership support. This explains why Vodafone have not actively marketed the service in Ghana. Furthermore, there is no agricultural content on the service in Ghana yet, which also explains why there is little competition between 321 and VFC.

The 321 service was first introduced in Madagascar, and has been a great success. The key feature is that it provides information on demand (as opposed to pushing messages). The concept evolved from the NGO run internet café – a place where people would go to seek information (for free). By December 2016 they had expanded to many countries. Results from Malawi show that 321 users are more loyal. There is a lot of below the line marketing³⁵ of the 321 service. However, GSMA research suggests that services offering a blend of push and pull messaging can offer an even better user experience.

The 321 service follows a business model similar to that of VFC, using an exclusive partnership with an MNO to achieve nationwide reach, and selling information to individual customers. One distinction is that the 321 service is a true value added service that is offered as an optional addition to any Vodafone customer, whereas VFC comes as part of a SIM package that is being actively targeted at a specific (and limited) low value market segment. Voto are also using their platform to disseminate information under a different business model, one in which the Customer is an agricultural development programme. Under the [ADMIRE](#) project they provide [agricultural information](#) (IVR messages) tailored to crop cycles and reached 4,600 farmers. Under USAID's ADVANCE programme they disseminated information on maize and rice (they want to add cocoa), reaching 113,000 farmers over 5 years, and they developed content on groundnuts for USAID's [SPRING](#) programme. Customer acquisition is straight forward with this type of approach, as the programme manager provides a list of mobile numbers, and Voto then have to do the

³⁴ <https://nca.org.gh/media-and-news/news/list-of-authorized-value-added-services/>

³⁵ Below the line marketing is targeted at specific individuals using one to one activities, as opposed to above the line marketing, which uses mass media to reach large audiences.

profiling. They also provide a hotline that farmers can call to listen to a repeat of the IVR message.

Syecomp have developed a platform for delivering SMS and IVR messages to farmers. Their strengths lie in satellite technology and the interpretation of satellite imagery (e.g. for crop monitoring and certification) and weather modelling algorithms. Their customers are mostly large scale players in the agriculture industry, such as farmer based organisations, NGOs or banks. Development of the system was supported by World Bank WAPP programme, which set up call centres across the country. They looked at Esoko as a digital platform to support the call centres, but decided to develop their own system 'efarm'. CTA helped develop the efarm platform through a grant, and business modelling workshops. Staff were getting personal calls from farmers, so they decided to set up a helpline; this comprises an easy to remember number, or a set of numbers, one from each MNO, that rings in the office, so at this point it is less formal than the Esoko call centre.

Farmerline is another Ghanaian technology enterprise that has developed a platform for disseminating information to farmers via mobile phones. They have been generating content themselves from publicly available information from national institutions, NGOs, etc. and have created messages based on crop calendars. They offer a service to potential clients to reach farmers. When clients want to reach farmers with particular messages, Farmerline will develop the additional content required, and they retain IP for new content so that they can develop their database. They have a split set of customers because, in addition to institutions implementing agricultural interventions, farmers themselves also pay for content. Farmerline agents go into communities to raise awareness and enroll farmers, and to provide training on the system.

Farmerline are undecided on the most appropriate business model for them at this time. Is it better to go with an MNO to reach scale, or is it better to stay independent? One of the advantages of partnering with an MNO is that farmers can pay subscriptions using airtime. At the moment, farmers can pay one of two ways: either in cash by finding the local agent (which they say is not too difficult given the small size of communities), or through a mobile payments system (any network). On the other hand, a benefit of not being tied to an MNO is that they can potentially reach more farmers from all networks.

Farmerline recognise that as young people become better educated, and smartphones become more widespread, there will be opportunities for developing agriculture apps. They also believe that games are a powerful vehicle for behaviour change communication.

The advent of smartphones and data based services presents potential threats to VFC, but not in the immediate future, so a neutral score (-1) has been given for new technologies' impact on revenues in Table 13. Over the top (OTT) services³⁶ pose a threat to airtime revenues, which will erode the potential value of indirect benefits (see Section 5.6). However, this is long term threat, so a score of only -1 has also been given for revenue streams disappearing in future.

³⁶ Over the top is where telecommunications services such as voice and messaging are delivered via the internet.

Prelude to Learning

The 321 experience indicates the value of below the line (BTL) marketing, yet these were the activities and Channels that VFC dropped from the original concept.

The quality of agricultural content is crucial for any agri value added service (VAS) provider. Each of these providers is investing effort in developing their own database, and guards their intellectual property fiercely. The mNutrition project threatens to disrupt this state of affairs by putting a database into the public domain that will help lower the barrier to entry to agricultural information systems.

Billing may become easier as more farmers use mobile payment systems. This is a potential threat to VFC as billing is clearly one of the attractions of mobile network operator (MNO) based VAS.

These VAS providers target higher status farmers than those described by VFC, presumably on the basis that they are more able and willing to pay.

Most of these VAS providers have institutions as their customers, and are acting as intermediaries for reaching farmers (a Business to Business to Consumer model). This at least reduces the dependency on extracting revenue from farmers.

Smartphones are becoming more widespread, especially among young, educated farmers, and despite their limitations will provide opportunities for OTT services to reach farmers without the need to partner with an MNO.

6.2 Implications for VFC

At the start of this section, these alternative service providers were described as kind enough to take part in the research. On reflection, it seems they are all struggling to find the best business model to help them get to scale, so rather than being altruistic, they may simply be keen to learn any lessons arising from the VFC experience. One clearly articulated this to be the case – perhaps this is an area where some kind of partnership between competitors, or cooptation, might serve the interests of all players. Indeed, to a certain extent, this is the role GSMA is playing by regularly publishing their experience on mAgri VAS. Although there are several viable systems searching for ways to scale up in Ghana, none has yet identified a business model for doing so, so a positive score (2) has been given in Table 13 for speed of competition intensifying.

At this point it is not immediately obvious that any of the alternative services offers better services or threatens to take market share from VFC, so neutral scores (0 and -1 respectively) have been given in Table 13. The risk of losing market share is slightly higher because the 321 service is already being made available through the Vodafone Ghana Foundation.

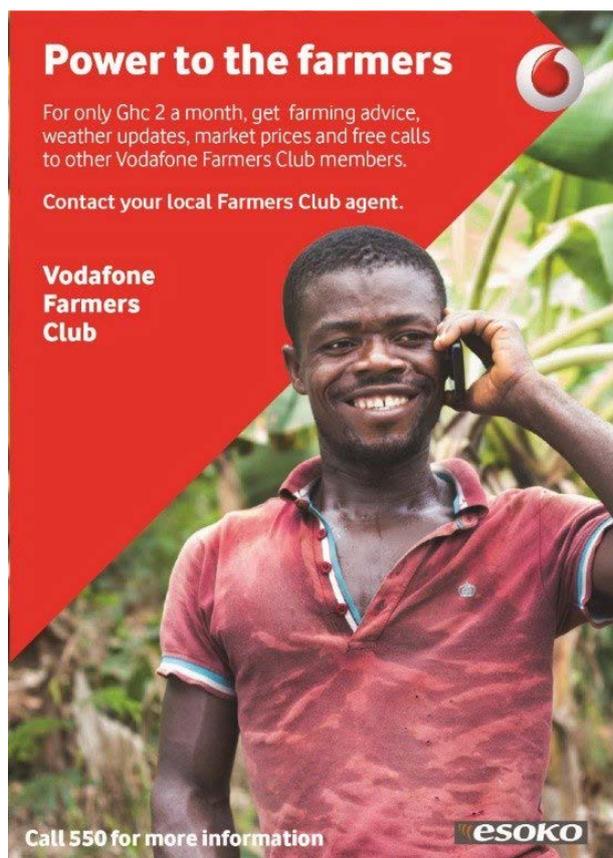
7 Discussion

Most of this report is dedicated to describing the range of aspects of the Vodafone Farmers Club service represented by the building blocks of the Canvas framework. In this section we draw on this understanding to propose a business model that represents the plan currently being followed to deliver the service. Having already described different aspects of the business model, in this section we go on to make qualitative assessments of each as a way of commenting on the strength of the model. We also highlight some assumptions that appear to be made in the business model, and comment on their validity. This is, by its very nature, a subjective exercise, but it draws on insights gained during the baseline activities of the evaluation.

7.1 What is the Business Model?

From a customer experience point of view, most customers will interact with the service through Vodafone moderated channels such as field acquisition activities (e.g. Agents sub-contracted by Vodafone), billing and payments systems, as well as receiving SMS messages, and using the SMS and voice calling features of the bundle. For those who choose to amend their registration details or to call the helpline, however, they will interact with Esoko moderated channels. Even some of the promotional materials are branded by both core partners (see Figure 20). At this point, it is not clear how ownership of the service is perceived by users, nor what the implications of this might be.

The component services that have been combined to create the value proposition are also delivered by either one or other of the core partners: discounted airtime and free calls are provided by Vodafone, price and weather information, agriculture and nutrition tips and the helpline are provided by Esoko.

Figure 21 Promotional material for Vodafone Farmers Club

Reproduced with permission

The VFC would appear to be a Business to Business to Consumer (B2B2C) model, whereby Esoko provides services to Vodafone, who then deliver services to consumers, but VFC does not really fit this model because of the way both core partners share the delivery of services (and interaction with consumers). Variations of B2B2C business models are determined by the nature of the relationship between the two businesses, and how they interact with consumers. At one extreme, the information provider can be regarded as a sub-contractor, who provides content that the MNO then delivers to consumers – a contractual relationship. At the other extreme, the MNO simply provides a platform that a third party can use to deliver a VAS to customers, by opening up APIs to VAS developers. So how can we define the relationship between core partners in the business model?

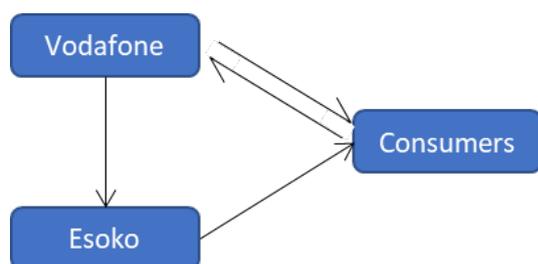
VFC is built upon the complementary capability of each of the partners. Vodafone may have the technical capability to develop and deliver VAS, but it is Esoko who has the technical capability to develop locally relevant content, to profile farmers, and who has the platform to schedule messages appropriately. It is not clear that these capabilities are entirely unique within Ghana, given that a number of start-up companies are offering alternative mAgri services, but there will be quality issues at stake – Esoko have developed their own agricultural content database over many years. So, although it may theoretically be possible for Vodafone to switch to an alternative content provider at any time, the cost of switching is likely to be high. Although the revenue received by Esoko is determined by a contract with Vodafone, it is tied directly to the success of the product through the number of users, so both parties shoulder a share of risk associated with the product. Both parties have also

invested in the product, although it is not yet clear to what extent this risk has been mitigated by the mNutrition grant funding. It appears, therefore, that VFC is built upon a partnership model, which is distinct from either of the B2B2C models described above.

GSMA have pointed out that VAS business models can be based either on direct revenue generation (e.g. subscription fees), or on indirect benefits, such as increased ARPU and customer loyalty (GSMA 2016c). Although not explicit in the VFC application form, indirect benefits are clearly regarded by Vodafone as at least part of the justification for VFC. The business model takes a hybrid approach, relying on both direct revenue from subscription fees and indirect benefits. The relative importance of each appears to have changed up until the baseline, given that direct revenue has been based on different fee rates and zero-rated altogether. The zero-rating was in response to other pressures, but it illustrates the fluid nature of the ratio of direct and indirect revenues as VFC seeks to establish itself in the market. Only as the product matures will the ability of the product to generate each type of revenue become evident, which is likely to inform future pricing decisions.

The VFC partnership model is simplified in Figure 21. In this arrangement, both Vodafone and Esoko provide services directly to consumers, but only Vodafone generates benefits from customers, either through direct revenue, indirect revenue, or both. Although the amount of revenue received by Esoko depends on the number of consumers, it is raised indirectly through the contractual relationship with Vodafone.

Figure 22 B2B2C Partnership model



Authors own

7.2 How robust is the Business Model?

Each of the building blocks described above has been assessed using a range of criteria presented in Table 13, each of which has been scored (using a Likert scale from -5 = very poor to +5 = very good). Subjective assessments have been made on the basis of information made available to date, and on feedback from reviewers. This represents a subjective snapshot of the quality of the business model at the baseline. This analysis shows a fairly mixed picture of strengths and weakness throughout the business model, but in terms of trends, it highlights the value of the partnership and the way that works, and it highlights weaknesses in revenues:

- There is good synergy between the core partners. Esoko have experience of developing agricultural content, and have developed the technology platform. Vodafone bring the capability of reaching large numbers of customers nationwide. Relationship tensions appear to reflect pressures in the grant contracting process rather than flaws in the partnership itself.

- Direct revenue generation is clearly an area of weakness, with difficulties in payment mechanisms and low subscription fees. The VAS is, however, an important tool for acquiring new customers in new markets, and for increasing loyalty (i.e. indirect benefits).
- It may take time for the business model to work. Uptake has been slower than hoped. There will be a networking effect whereby the free calling component of the bundle becomes more attractive as more people are members. It may take several growing seasons (i.e. years) for farmers to recognise the benefits of VFC and to then incorporate it into their decision making, but on this basis a score of 2 has been given for the sustainability of revenue streams (Table 13).
- Negative aspects of the Value Proposition mostly question the potential value of the information services. Farmers will have their own sources of information, they readily share information and experiences, and they are accustomed to getting agricultural information for free. Notwithstanding positive findings from previous research on market price information, the value of VFC information components, especially nutrition content, has yet to be proven and may take time.
- New Customers are hard to get. Temporary contact through face to face marketing channels may be effective in getting people signed up, but it is expensive, and appears to be inadequate for helping customers fully understand the complexities of the product.

Table 13 Quality of Business Model - by Canvas Building Blocks

Feature of Canvas Building Block	Score	Comment
Value Proposition		
VP well aligned with Customer needs	-2	farmers' main priority is finance / credit. Poor farmers need mechanisms for trading that empower them. Value of ag tips is constrained. Weather info can be useful (if accurate)
VP matches customer segments	-1	customers are not homogeneous, content is tailored to profile, and customers can choose what components to use
VP have strong network effects	3	CUG has clear network effect - impact to be monitored. Content not engaging, but VF believe effect will grow as farmers integrate VFC into decision making
Synergies between elements	-2	they are more stand alone. Farmers can use CUG alone, could use weather info but not the tips. Call centre complements ag tips nicely
Customers regard VFC as good value	3	Yes, primarily based on saving cost of calls
Customers acquire knowledge	3	Yes, example of not burning crop residue commonly quoted by farmers
Customers change behaviour	4	Over 90% say they have changed something (mostly land management)
Customers better off	?	too early to tell? Wait for quant endline research
VP offers new service	-1	People can get weather info for free & ag extension advice (except Trapped archetypes), but CUG and helpline are something new
Are substitute products & services available?	-2	Yes, people can get weather info for free, they access extension workers, BUT free calls is unique
Are competitors threatening to offer better?	0	not that we're aware of
Cost / Revenue assessment		
Strong margins	-5	low cost product, indirect benefits play a large part in business model
Revenues are predictable	-1	organic subscriber base growth was low, so huge effort to get numbers up. Take-up remains to be seen after new subscription fees
Recurring revenue streams	-2	Customers have difficulty with payment mechanisms. Customers are fickle? VF believe it will take time for farmers to integrate VFC into decision making
Revenue streams sustainable	2	time will tell. If farmers do adopt VFC into decision making, or indirect benefits are realised (as evidence from elsewhere suggests), then yes
Charging captures willingness to pay	-2	Early adopters and frequent callers would pay more; poorest might struggle
Are new technologies likely to impact revenues?	-1	Data services / smartphones may compete (long term future)
Which revenue streams are likely to disappear in future?	-1	Long term trend is for airtime charges to be replaced with subscription (fixed) charges. Threat to airtime from OTT services

Feature of Canvas Building Block	Score	Comment
Costs are predictable	5	Mostly fixed costs
Costs are matched to the business model	?	Suspect content costs are highest, but generate no direct revenue. Difficult to say when indirect benefits play such an important part
Operations are cost-efficient	?	
Benefit from economies of scale	4	Given most costs are fixed, huge economies of scale if large numbers can be attracted
Which costs threaten to grow disproportionately?	0	customer acquisition costs may increase, especially if growth in subscriber numbers is slow
Infrastructure		
Key resources are difficult for competitors to replicate	-5	other MNOs have similar resources
Resource needs are predictable	4	it's a repeat product; charging and airtime offers may change a little, and content may be updated. New resources only if substantially revised, e.g. Tulaa
Deploy resources in right amount at right time	-2	there have been problems with registering and profiling, and with getting the billing system right (product development resources)
Resources are adequate	-2	customer acquisition and education are key, yet this is subcontracted out to Agents, who are not invested, and incentives have not been well targeted
Threat to quality of resources	1	QC processes have been thorough, and Esoko have proven capability, although updates might not necessarily follow the same procedures
Efficiently execute key activities	-2	Problems with customer acquisition, registration and profiling remain as challenges
Key activities are difficult to copy	2	Any MNO can manipulate CUG and tariffs, others can set up tech for information dissemination. Content database is unique, BUT open source. Updating skills are unique
Quality of executing activities	1	There have been difficulties in all activities. May be different in the future once sorted?
Balance of activities between partners	4	no duplication of effort, clear demarcation of activities
Synergy of partnerships	5	good synergy between core partners. Product fits with government policy
Good working relationships between partners	-2	started off well, deteriorated towards end of grant, tensions in content localisation.
Danger of losing partners	-1	unlikely, given degree of synergy between VF/Esoko. But other MNOs could poach??
Customer interface		
Customer base is well segmented	-1	Archetypes representing target groups tend to be on tail end of adoption curve
Continuously acquiring new customers	2	Yes, but slower than expected - target customers at tail end of adoption curve
Competitors threatening market share	-1	Vodafone 321 is likely to adopt agricultural content at some point, mobile money likely to move into agriculture

Feature of Canvas Building Block	Score	Comment
How quickly will competition intensify?	2	several nascent systems in GH are waiting to get a break
Channels are efficient	2	Agents are most costly way of getting customers, but they achieve volume. Could VF do more with Freelancers?
Channels are effective	2	They seem to be getting people registered. BUT, they may have an uphill struggle in areas where VF signal is poor (how much of the country is this?)
Channels have good reach into customers	-2	Agents visit and disappear, may not be enough to convince customers. Missing original concept of working with agricultural stakeholders
Customers can easily see channels	-3	Once agents are gone, there is no local presence
Channels strongly integrated	-2	problems with registration and profiling. Agents may not make customers aware of services. Helpline complements ag info well.
Channels well matched to customer segments	3	Roadshow is good way of reaching illiterate, isolated individuals. Could be more focussed approach to reaching early adopters
Channels at risk of becoming obsolete	-2	Not as long as people are using mobiles, but data and smartphone apps will appeal to early adopters
Nature of Customer relationships	-3	Impersonal relationship, low levels of trust
Relationship quality matched to Customer segments	4	Focus on acquisition is appropriate but need to keep users on VAS. Difficult to foster club exclusivity with automated relationship
Cost to customer of switching	1	Switching MNO is easy, although awareness of number portability probably low. Depends on how much customers value the product, and if competing services are introduced.
Brand strength	1	No evidence that it is strongly associated with farmers, but time will tell. MNOs not trusted - only interested in profit.
Customer relationships in danger of deteriorating	-2	Yes, if customers get fed up of poor service, but African mobile customers are resilient, and you could argue relationships can't get much worse.

7.3 Assumptions in the Business Model

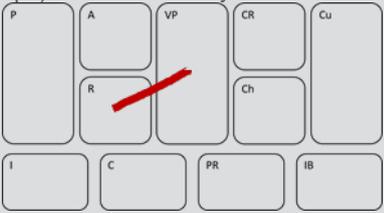
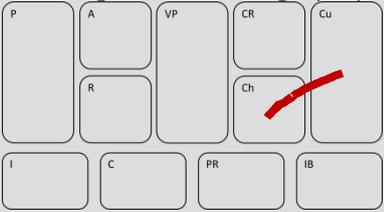
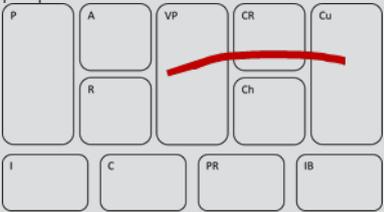
The narrative above describes each of the building blocks of the canvas, based on information accessed at this point. In this section we highlight a number of assumptions that appear to be implicit in the way the building blocks are intended to fit together to make a working business model. In Table 14 we have presented these as links between different building blocks, making comment on the validity of these assumptions, based on findings to date (drawn from a range of sources).

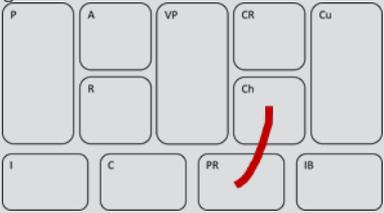
Table 14 Comment on assumptions in Business Model

-  assumption does not appear to be valid
-  assumption appears to be partly valid
-  assumption appears to be valid
-  insufficient information to comment

Canvas legend: P = Partners; A = Activities; R = Resources; I = Investment; C = Costs; VP = Value Proposition; CR = Customer Relationships; Ch = Channels; Cu = Customers; PR = Product Revenue; IB = Indirect Benefit.

Canvas link	Assumption	Comment	
<p>The Vodafone network will reach target customers.</p> 	Network will be available in rural communities	3 networks were available in Qual research communities, but these were only in 2 parts of the country. Participants in all 6 villages complained about patchy network coverage and regular fluctuations in the network signal strength, making communication difficult and at times impossible.	
	Farmers will have phones	Qual research found even poor farming households usually owned (at least one) mobile phone. The review suggested that 70 per cent of rural households own a mobile phone and that even very poor households are likely to have a mobile phone.	
	The key customer segment (women) will have access to phones	Farmers estimated that 70% of all mobile phones in the village were owned by men and 30% by women. Male farmers were opposed to the idea of sharing their phone with their wives.	
	Phones will be working	Charging is a challenge, especially in villages with no electricity supply. People take them to neighbouring villages. Stand alone solar PV panels are becoming affordable. VFC messages can still be received if phone has no credit. Number will be deactivated if SIM has no credit for 90 days. Hardware issues with phone were seldom reported.	

Canvas link	Assumption	Comment	
<p>Knowledge base (agri and nutrition tips) will be valued by customers</p> 	<p>Farmers will be able to act on tips.</p>	<p>Farmers need access to finance to buy agricultural inputs at the right time – lack of finance can prevent farmers from putting advice into practice. Few of the interviewed farmers had ever mobile money service themselves. Farmers will not implement advice based on information alone – it needs to be corroborated. Information provided by fellow farmers was most likely to be followed when the other farmer had successfully employed the suggested advice him/herself and could present the results.</p>	
<p>Marketing will reach the right people</p> 	<p>Vodafone marketing approaches (subcontracted agents visiting communities, roadshows) are engaging with key customer segments.</p>	<p>Agents - teams of 12 with a bus move from community to community Freelancers – VF employ around 3,000 individuals to go out into communities and promote VF products in general. Retailers – stationary, but few in rural areas. Qual research found: <ul style="list-style-type: none"> • Poor farmers are reluctant to travel • Women are pressed for time So, marketing approaches may well be missing key customer segments.</p>	
<p>VFC will increase customer loyalty</p> 	<p>Farmers will value VFC services so that they will stay with Vodafone, and keep the VFC SIM in their phone (reduced churn, increased ARPU)</p>	<p>Network coverage, stability and strength were generally described as the determining factors when choosing a network operator. Loyalty to a specific mobile phone provider is relatively common. Respondents were also reluctant to switch operator in the absence of number portability, i.e. they don't want to lose their number. So perceived value of VFC is likely only to have a weak influence on network choice. Vodafone market share among qualitative research respondents was 50% (not representative).</p>	
<p>Customers will appreciate the value proposition</p> 	<p>Key customer segments will benefit from the value proposition</p>	<p>Low levels of literacy are unlikely to stop people enjoying the benefits of discounted tariffs and free calling, nor the helpline. However, illiteracy will stop people accessing agricultural and nutritional content sent by SMS (but not messages sent by OBD). Mobile spam was common, but did not bother most farmers as they could not read text messages. Low levels of phone literacy may be a barrier – people only know how to make and receive calls, they don't know how to open SMS messages or playback voice messages.</p>	

Canvas link	Assumption	Comment	
<p>Channels will enable revenue to be generated from Customers</p> 	<p>Satisfied customers will provide regular subscription income</p>	<p>Early on, it became clear that Customers did not understand how to resubscribe. When autoenrollment was introduced, people did not understand the concept, and it gave rise to ill feeling. Payment mechanisms to date have not been intuitively understood by Customers, so there needs to be a mechanism for explaining adequately. Channels such as Agents are the explicit means of presenting the Value Proposition to Customers, but it appears that this has not been effective in explaining payment mechanisms.</p>	●
<p>Vodafone billing systems will work with VFC</p> 	<p>Farmers would be familiar with the concept of paying a monthly subscription.</p>	<p>Customers have struggled with manual subscriptions and with understanding autorenewal. The problem has been temporarily avoided by dropping subscription charges, but will reappear when charges are reintroduced.</p>	●

The main area where assumptions have not been met is finding a viable payment mechanism, which VFC is well aware of. Given that evidence to date suggests that there is sufficient willingness to pay, problems may be due to lack of awareness, which in turn may reflect marketing channels (e.g. Agents) not explaining processes adequately.

Most households likely to own a phone, but patchy network coverage and difficulties in charging phones means that there may well be delays in VFC members receiving messages. While this is unlikely to be a problem for the agricultural tips type of information, it may detract from the value of other services such as weather information and market process, which need to be more timely.

The gender gap in access to phones may not affect growth in subscriber numbers in the early stages of roll out, during which early adopters are likely to be mostly men. If the gap persists, however, it may impede subscription to VFC among women farmers who are more likely to be in the late adopters. Low levels of literacy and technology literacy (i.e. familiarity with using a phone) are also more likely to constitute barriers to adoption among women.

8 Conclusions

In their publication on agri VAS, GSMA describe two groups of business models (GSMA 2016c):

- Direct revenue – the agri VAS generated cash revenue from Customers. They note that Customers may be farmers themselves (a business to consumer, or B2C model), or they may be some kind of agricultural organisations, in which case this is a business to business (B2B) model.
- Indirect revenue – MNOs derive benefits other than from the VAS itself, typically through acquiring customers, higher expenditure on core services (voice and SMS), and greater customer loyalty.

These are not mutually exclusive. As VFC has demonstrated it has the ability to generate direct revenue for Vodafone, and there is emerging evidence that it has the potential to generate imputed benefits, VFC is clearly a hybrid of these two approaches.

From Esoko's point of view, the VFC partnership offers the possibility of achieving the scale and the impact on smallholder farmers that they have aspired to since their inception. Over the years, Esoko has developed its own content database, content verification processes, content management platform, and commercial systems such as billing, so whilst they have amended their systems to accommodate mNutrition project procedures, none of this represents a step change in practice.

The synergy between the two core partners is one of the key features of the emerging business model. Esoko get to deploy their system and Vodafone create a new mass marketing segment. However, even at this stage it appears that both parties are thinking to the future, implying that the existing arrangement may only be a stepping stone towards creating a product of even greater value. Both parties described the attraction of making the Tulaa platform more widely available to farmers, and this appears to match the most pressing need among farmers identified by qualitative research, so the idea would appear to have enormous potential.

The boundaries between industries are blurring – or disappearing altogether. MNOs are a case in point as their traditional business model is being threatened by advancing technology, and the growth of data services and OTT services in particular. There is evidence that some MNOs are investing in communications based start-ups as a means of diversifying and reducing risk, Safaricom's mPesa being perhaps the best known example. At this point Vodafone Ghana has no equity stake in Esoko, but it will be interesting to see how MNOs diversify over the forthcoming years.

The VFC bundle as a whole is likely to be most valued by leader farmers (competent optimists and agri- businessmen from the frog archetypes), as these are the farmers most able to take risks associated with new practices, and who have the resources to buy any inputs required to put advice into practice, e.g. they will have the money to buy fertilisers, to organise transport to new markets etc. Elements of the bundle, such as free calls, will be valued by all archetypes of farmers. Within elements of the VFC bundle, there appears to be an inverse relationship between the cost of providing the service, and the perceived value among farmers. Those elements that are most attractive, such as the free calling, cost little to set up, whereas those elements that have required a lot of investment, such as the nutrition content, are not regarded as important by farmers.

Vodafone believes it will take time for farmers to adopt VFC as part of their farming practice, but in the meantime, they can benefit immediately from free calls. One of the strengths of the business model is its potential to benefit from networking effects. Free calls to other members will increase in value (to members) as more farmers sign up but more importantly, as farmers start to realise the benefits of agriculture related information, there is the potential for VFC to become an 'industry standard' within local groups of farmers.

Early research suggests that the VFC product does indeed yield the intended benefits – farmers can recall information, farmers have changed behaviour, and most importantly, they regard the service as good value for money. However, billing procedures, and customer education have been a problem. VFC is quite a complex product – not only are there several distinct elements to the bundle that customers need to be made aware of, but some services are not familiar to farmers (e.g. farmers express wonder at being able to talk to an informed agent in the call centre), and the profiling process is detailed and complex, although an automated system has since been introduced. Communicating this via automated channels in the absence of any face to face or personal relationships presents a challenge. The experience of Vodafone's 321 service in Malawi indicates the importance of below the line marketing, yet these are the kind of activities that have been dropped from the original VFC concept.

Customers are not homogeneous. The early adopters of VFC will be better educated, better resourced, and predominantly male farmers. It will take time for the product to advance through the adoption bell curve to reach the target customers – smallholder farmers, especially semi-literate and illiterate women. It would be interesting for reporting procedures to track this development over the next two years.

The exclusive membership approach of VFC is an innovative aspect of the business model. Exclusivity is normally associated with premium products, so it is interesting to see exclusivity targeted at the bottom of the pyramid. Exclusive membership usually requires premium customer relationships, but this cannot be afforded by the VFC model. Low income telecommunications consumers are remarkably tolerant and resilient, so it may well be that they are not put off by the low level of customer service provided by automated channels.

Throughout the development of the VFC product, Vodafone has deployed its resources to address challenges in a commercial manner. However, this commercial approach has been compromised to a certain extent (at least temporarily) by the decision to introduce changes in order to meet target subscriber numbers within project timescales. This has had significant implications on the development of the business model. It completely removed the direct revenue part of the model, albeit temporarily, and it substantially changed the Customer Segment by opening up membership to the existing customer base. This illustrates the additional and potentially disruptive impacts that can be experienced by donors funded programmes.

References / Bibliography

- Aker, J. C., & Mbiti, I. M. (2010). Mobile phones and economic development in Africa. *The Journal of Economic Perspectives*, 24(3), 207-232.
- ALINe (2015). Rapid Feedback Survey Results: Vodafone Farmers' Club
- ALINe (2016a). Vodafone Farmers' Club: 3rd Rapid Feedback Survey
- ALINe (2016b). Vodafone Farmers' Club: Outcome Fieldwork Report
- ALINe. 2017. Ghana: Vodafone Farmers' Club service - Outcome Study Report
- Aryeetey, E., Osei-Akoto I., Darko Osei, R., and Udry C. (2011). Ghana Socioeconomic Panel Survey. Report of the Baseline Survey.
- Barnett, I., Batchelor, S., Gilligan, D., Haddad, L., Hidrobo, M., Ledlie, N., Palloni, G., Scott, N., and Shyam, T. (2017) 'External evaluation of mobile phone technology based nutrition and agriculture advisory services in Africa and South Asia: Inception Report' (revised version). Brighton: IDS
- Barnett, I., Scott, N., Batchelor, S., and Haddad, L. (2016) Dial "N" for Nutrition? A Landscape Analysis of what we know about mNutrition, mAgriculture and mDevelopment'
- Barnett, I. and Srivastava, S. (2016). Desk-review: Smallholder farming, nutrition and m-Agriculture services in Ghana.
- Barnett, I., Srivastava, S., and Gordon, J. (2017). 'Mobile phones, nutrition and agriculture in Ghana: Qualitative Baseline Report.' External evaluation of mobile phone technology based nutrition and agriculture advisory services in Africa and South Asia. IDS, e-Pact Consortium.
- Batchelor, S., Sharp, J. & Scott, N. (2017). 'Mobile phones, nutrition and health in Ghana: Cost Effectiveness Baseline Report.' External evaluation of mobile phone technology based nutrition and agriculture advisory services in Africa and South Asia. GAMOS, e-Pact Consortium
- Belachew (2011) ICTworks Profile of Esoko: Bringing the Market to Africa's Fingertips. ICTWorks. Retrieved from <http://www.ictworks.org/2011/10/04/draft-ictworks-interview-sarah-bartlett-and-esoko/>
- Billings, L, Gilligan, D, Hidrobo, M, Ledlie, N, and Palloni, G. (2017). 'Mobile phones, nutrition, and agriculture in Ghana: Quantitative Baseline Report' External evaluation of mobile phone technology-based nutrition and agriculture advisory services in Africa and South Asia. IFPRI, e-Pact Consortium.
- Blomberg (2013) GSMA M4D mNutrition Initiative, mNutrition Overview.
- Blomberg, J (2014) Ghana nutrition landscape analysis. Part 1 and 2. GAIN.
- CABI (2016) 'GCP spend to date and projected', Charlotte Jordan, Unpublished. Last edited 14/11/2016.
- CABI (2017). Lessons Learned from the Content Development Stream of the mNutrition Initiative
- Cobalt. (2014) Concept testing of the Vodafone Farmer Club Minimum Viable Product

Commonwealth Telecommunications Organisation (2012). Nigeria Consumer Satisfaction Survey Final Report Part 1: Overview.

DfID (2013) Business Case and Intervention Summary. Intervention Summary Title: mNutrition–business models for mobile phone based delivery of nutrition services in Africa and South Asia.

DfID (2015) Annual Review (1) Project Title: mNutrition–business models for mobile phone based delivery of nutrition services in Africa and South Asia.

DfID (2015) Annual Review (2) Project Title: mNutrition–business models for mobile phone based delivery of nutrition services in Africa and South Asia.

DfID (2016) Annual Review (3) Project Title: mNutrition–business models for mobile phone based delivery of nutrition services in Africa and South Asia.

DfID (2017) Accountable Grant. Accountable Grant Arrangement for mNutrition- Business models for mobile phone based delivery of nutrition services in Africa and South Asia.

DfID (2017) Contract: DFID 6420 External evaluation of mobile phone technology based nutrition and agriculture advisory services in Africa and South Asia

Doss, C. R., & Morris, M. L. (2000). How does gender affect the adoption of agricultural innovations? *Agricultural Economics*, 25(1), 27-39.

Frog (2014) Vodafone and GSMA. mAgri Insights and Product Proposal.

Frog (2016). Think you know your customers? Think again. GSMA Breakfast and learn.

GAIN (2014) Nutrition Landscape Analysis: Part 1.

GAIN (2016) GAIN/ESOKO mAgri/ mNutrition Project. Project Sustainability Plan. Charlotte Jordan. Unpublished. Last edited 01/09/2016.

Gamos (2017) Mission Report Ghana, Accra, Interviews Held 21/06/2017. Unpublished.

Global Content Partnership (2017). Lessons Learned from the Content Development Stream of the mNutrition Initiative (Draft).

GLSS Round 6, August 2014.

GSMA M4D 2013, mNutrition Initiative, October 2013 presentation.

GSMA (2014) Ghana Country Report Version 3 Final.

GSMA (2014) Insights from mAgri Services. mFarmer Learnings.

GSMA (2014) M4D Impact and GSMAi Datasheets.

GSMA (2014) Pan- African mHealth Initiative. Consumer Survey Ghana.

GSMA (2014) Vodafone Esoko Application.mAgri challenge fund application form, Coffey International Development. Unpublished.

GSMA (2015) GSMA mHealth Ppt Report Ghana, Pan- African mHealth Initiative. Consumer Survey Ghana.

GSMA (2016a) Vodafone Farmers Club Ghana. Case Study.

GSMA (2016b). Agricultural Value-added Services How to design, develop and market next generation VAS for the rural market

GSMA (2016c). Agricultural Value-added Services (Agri VAS) Toolkit 2.0 How to design, develop and market next generation VAS for the rural market.

GSMA (2017) Personal Communication. Average breakdown of costs per country; Cost estimates for Gamos. Email received 24/08/2017. Unpublished.

GSMA (2017). Vodafone Farmers' Club. A mobile agriculture service by Vodafone Ghana. Case study.

GSMA and Cherie Blair Foundation for Women (2010) Women & Mobile: A Global Opportunity. A study on the mobile phone gender gap in low and middle-income countries

GSMA mHealth (2015) Ghana Consumer Research, Inputs to Service Design.

Ghana Statistical Service (GSS), Ghana Health Service - GHS, and ICF International. 2015. Ghana Demographic and Health Survey 2014. Rockville, Maryland, USA: GSS, GHS, and ICF International. Available at <http://dhsprogram.com/pubs/pdf/FR307/FR307.pdf>.

Hildebrandt N., Nyarko N., Romagnoli G., and Soldani E. (2015). Price Information, Inter-village Networks, and "Bargaining Spillovers": Experimental Evidence from Ghana.

Hughes N. and Ridley J. (2017) 'M-Kopa, State of play', Presentation made at Innovate UK Network day. Feb 2017

Jordan C. (2016) GAIN/ESOKO mAgri/ mNutrition Project. Project Sustainability Plan for the GAIN/ESOKO mAgri/ mNutrition Project.

Kothari, M and Nouredine, A. (2010) 'Nutrition Update 2010. Calverton', Maryland, USA: ICF Macro.

OECD, (2010) DAC Guidelines and Reference Series Quality Standards for Development Evaluation.

Osterwalder, A. and Pigneur, Y. (2010) Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers, John Wiley & Sons, London.

Palmer, T and Darabian, N (2017) Creating scalable, engaging mobile solutions for agriculture A study of six content services in the mNutrition Initiative portfolio. GSMA.

Ragasa, C. (2012). Gender and Institutional Dimensions of Agricultural Technology Adoption: A Review of Literature and Synthesis of 35 Case Studies. Paper presented at the International Association of Agricultural Economists (IAAE) Triennial Conference.

Scott, N., Batchelor, S., Ridley, J., & Jorgensen, B. (2004). The impact of mobile phones in Africa. Commission for Africa, 1-18.

Scott, R (2012) mAgri Infographic. GSMA.

Salifu, A., Funk, R. L., Keefe, M., & Kolavalli, S. (2012). Farmer based organizations in Ghana. Ghana Strategy Support Programme. IFPRI.

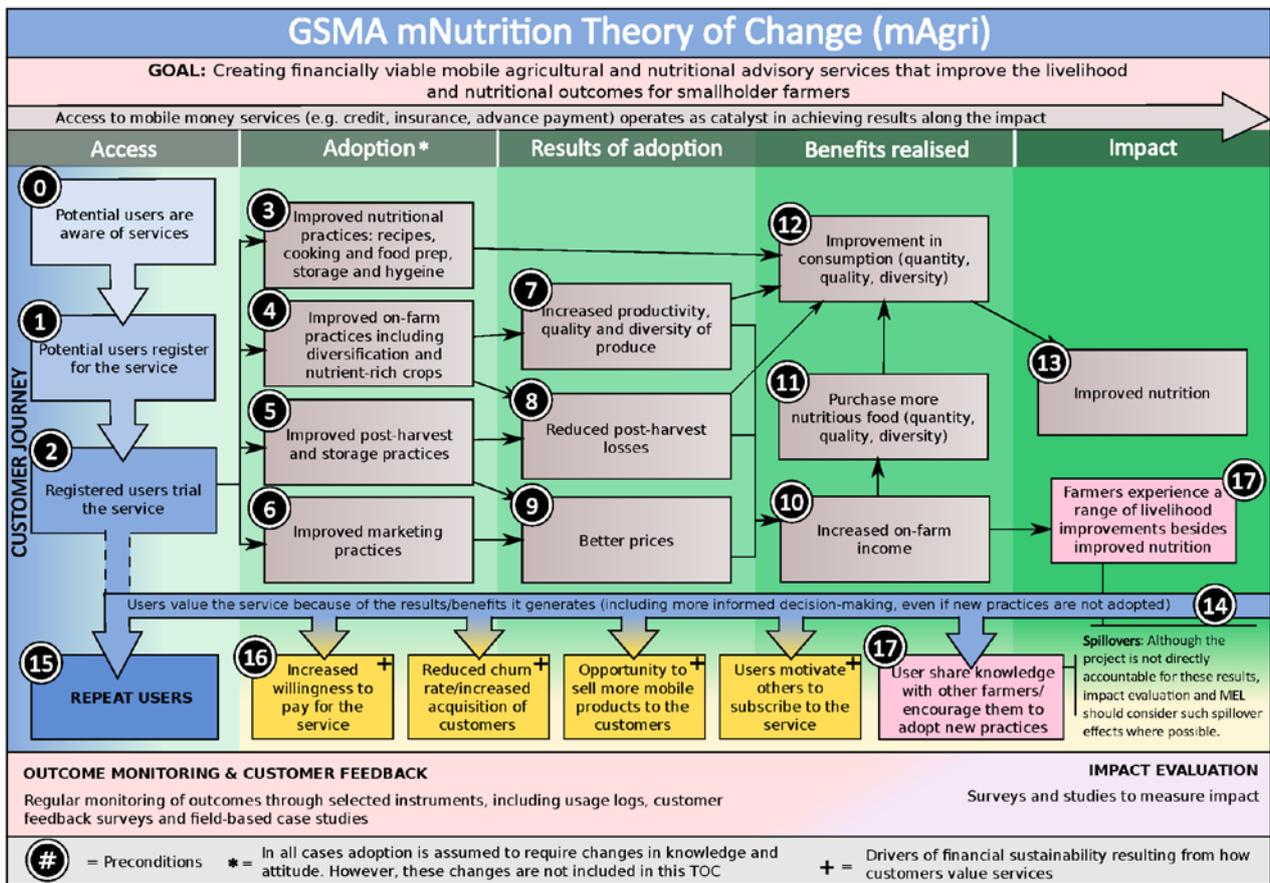
Subervie, J. (2011). Evaluation of the impact of a Ghanaian mobile-based MIS on the first few users using a quasi-experimental design. <https://www.slideshare.net/Esoko/cirad-research-on-esoko>

USAID, Ghana Feed the Future Baseline Survey 2012.

Vodafone (2014) Feasibility Study Report (restricted document, unpublished).

WFP (2012) Comprehensive Food Security and Vulnerability Analysis Ghana 2012: Focus on Northern Ghana, Rome: World Food Programme

Annex A GSMA's theory of change (mAgri, GSMA 2016)



Reproduced with permission

Annex B Terms of reference

PO 6420: External evaluation of mobile phone technology based nutrition and agriculture advisory services in Africa and South Asia

Introduction

DFID (Research and Evidence Division) wishes to commission an external impact evaluation of mNutrition, a mobile phone technology based nutrition and agricultural advisory service for Africa and South Asia. mNutrition is a programme supported by DFID that, through business and science partnerships, aims to build sustainable business models for the delivery of mobile phone technology based advisory services that are effective in improving nutrition and agricultural outcomes.

mNutrition is primarily designed to use mobile phone based technologies to increase the access of rural communities to nutrition and agriculture related information. The initiative aims to improve knowledge among rural farming communities especially women and support beneficial behaviour change as well as increasing demand for nutrition and agriculture extension services. The mNutrition initiative launched in September 2013 will work in 10 countries in Africa (Cote d'Ivoire, Ghana, Malawi, Mozambique, Nigeria, Tanzania, Kenya, Rwanda, Uganda, Zambia) and four countries in South Asia (Bangladesh, India, Pakistan and Sri Lanka). The desired impact of mNutrition will be improved nutrition, food security and livelihoods of the poor.

Mobile phone based services have been endorsed by WHO as an effective strategy for behaviour change and for driving adherence to anti-retroviral treatment protocols¹. There is currently scant evidence on the impact and cost-effectiveness of mobile phone technology based services for nutrition and agriculture and on the sustainability of different business models for their provision. A rigorous evaluation of mobile phone technology based nutrition services would add significantly to the current evidence base. An external evaluation team managed by the Evaluator, independent of the programme delivery mechanism, will conduct an assessment of the impact, cost-effectiveness and sustainability of mobile phone technology based information and behaviour change messages for nutrition and agriculture.

Background to mNutrition

Introduction

Undernutrition is a major challenge to human and economic development globally. It is estimated that almost one billion people face hunger and are unable to get enough food to meet their dietary needs. Agriculture is a major source of livelihood in many poor countries and the sector has a potentially critical role in enhancing health, specifically maternal and child health and nutritional status. A well-developed agriculture sector will deliver increased and diversified farm outputs (crops, livestock, non-food products) and this may enhance food and nutrition security directly through increased access to and consumption of diverse food, or indirectly through greater profits to farmers and national wealth. Better nutrition and health of farmers fosters their agricultural and economic productivity. Current agricultural and health systems and policies are not meeting current and projected future global food, nutrition and health needs.

Despite major investment in agricultural and nutrition research and its uptake and application, there is significant social and geographic inequality in who benefits from these investments.

Furthermore, in many developing countries, public extension systems for agriculture, health and nutrition are inefficient, have limited capacity and have a poor track record of delivery, especially in terms of supporting women and girls and the most marginalised populations².

Several research and mobile network operators (MNOs) are testing a range of information and communication technology (ICT) solutions for improving access to a wide range of information and advisory services. Mobile phone based technologies are among the most promising ICT strategies, although current initiatives in nutrition are relatively small and fragmented.

What is mNutrition?

Enhancing access to the results of nutrition and agricultural research and development is potentially critical for improving the nutrition, health and livelihoods of smallholders and rural communities. mNutrition will harness the power of mobile phone based technologies and the private sector to improve access to information on nutrition, health and agricultural practices especially for women and farmers (both male and female). Specifically, mNutrition will initiate new partnerships with business and science to deliver a range of services including:

- An open-access database of nutrition and agriculture messages for use in mobile phone based communication (for example, information and behaviour change messages on practices and interventions that are known to have a direct impact on nutrition or an indirect impact via for example agriculture);
- A suite of mobile phone based nutrition and agriculture information, extension and registration services designed to: improve knowledge and generate beneficial behaviour change in nutrition and agriculture; increase demand for nutrition, health and agriculture goods and services; register and identify target populations for support; and, using real-time monitoring, support the conduct of nutrition risk assessments by community health workers.

The impacts of mNutrition are expected to include improved nutrition, food security and livelihoods of the poor, especially women in 10 countries in Africa (Cote d'Ivoire, Ghana, Kenya, Malawi, Mozambique, Nigeria, Rwanda, Tanzania, Uganda and Zambia) and 4 countries in South Asia (Bangladesh, India, Pakistan and Sri Lanka). This impact will result from the increased scale and sustainability of mobile phone based nutrition and agricultural-based information services, delivered through robust public private partnerships in each country.

mNutrition has two major outcomes. One outcome will be cost-effective, sustainable business models for mobile phone enabled nutrition and agriculture services to 3 million households in 10 countries in Africa and 4 countries in South Asia that can be replicated in other countries. Linked to this outcome, the second outcome will expect these services to result in new knowledge, behaviour change and adoption of new practices in the area of agriculture and nutrition practices among the users of these mobile phone based services.

These outcomes will be achieved through four outputs:

- Improved access to relevant mobile based health, nutrition and agricultural advisory services for 3 million poor people and community health workers across 10 SSA and 4 Asian countries;
- Launch and scaling of mobile phone based health, nutrition and agricultural advisory services targeted to poor people and community health workers;

- Generation and dissemination of high quality research and evidence on the impact, cost-effectiveness and sustainability of mobile phone based advisory services in nutrition and agriculture in South Asia and SSA; and
- Development of locally relevant content for mobile phone technology based agriculture and nutrition services meeting demands from users and community health workers.

In terms of promoting behaviour change and/or adoption of new practices, mNutrition will seek to achieve changes in one or more of the following areas:

- Adoption of new agricultural practices that are nutrition sensitive, improve agricultural productivity and utilise post-harvest technologies
- Changes in nutrition practices in either one or several knowledge domains including improved maternal nutrition practices during pregnancies; infant and young child feeding practice; and micro-nutrient supplementation to children at risk (i.e. Vitamin A, Zinc and Oral Rehydration Solution (ORS)).

mNutrition has started implementation from September 2013. For the 2 countries selected for the impact evaluation (Tanzania and Ghana), mobile network operators and content providers have been identified through a competitive process during the first half of 2014. The MNOs and content providers started developing and launching their services during the 4th quarter of 2014 and early 2015. The mobile phone based advisory services are expected to run at least till 3rd quarter of 2018.

mNutrition Project Coordination

DFID support to mNutrition will be channelled to GSMA, as well as directly to this associated independent external impact evaluation. GSMA is a global body that represents the interests of over 800 mobile operators. GSMA already works with the major mobile operators across Africa, (including Airtel, MTN, SafariCom/VodaCom) with a collective mobile footprint of more than 67% of total African connections. GSMA has a number of existing development initiatives, including mHealth and mFarmer, that are part of GSMA's Mobile for Development which brings together mobile operator members, the wider mobile industry and the development community to drive commercial mobile services for underserved people in emerging markets. GSMA will provide technical assistance to mobile phone operators, and support new partnerships with content providers to develop and scale up new nutrition and agriculture message services. GSMA will ensure sharing of best practices and promote wider replication and uptake of effective business models.

Objective and Main Questions

The objective of this work is to conduct an external evaluation of the impacts and cost-effectiveness of the nutrition and agriculture advisory services provided by mNutrition compared to alternative advisory services available in the two selected countries (Ghana and Tanzania), with particular attention paid to gender and poverty issues. The impact assessment is required to answer the following questions that relate to impact, cost-effectiveness and commercial viability:

- What are the impacts and cost-effectiveness of mobile phone based nutrition and agriculture services on nutrition, health and livelihood outcomes, especially among women, children and the extreme poor?

- How effective are mobile phone based services in reaching, increasing the knowledge, and changing the behaviour, of the specific target groups?
- Has the process of adapting globally agreed messages to local contexts led to content which is relevant to the needs of children, women and poor farmers in their specific context?
- What factors make mobile phone based services effective in promoting and achieving behaviour change (if observed) leading to improved nutrition and livelihood outcomes?
- How commercially viable are the different business models being employed at country level?
- 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?

Further evaluation questions related to other aims of mNutrition will be addressed in at least 1 country (either Ghana and/or Tanzania):

- Are mobile phone based services a cost-effective way to register and identify at risk populations to target with nutrition support?
- Are mobile phone based services a cost-effective way for community health workers to improve the quality and timeliness of data surveillance (a core set of nutrition-related indicators)?

The content for the mobile phone based advisory services will be based on international best practices and widely endorsed protocols (i.e. by the World Health Organisation) and evidence-based nutrition-sensitive agricultural practices identified by international experts. Through an iterative multi-stakeholder process, international and country experts will localise and adapt the content to make it relevant to the specific target audience in the 14 countries. The adapted content and nature of messages is expected to vary across specific target audiences within and across countries. The main purpose of assessing the relevance of the content is not to evaluate the overall health and nutrition content but on how this content has been localised and adapted and to what extent the needs of the specific target groups within their particular context have been met.

In assessing the commercial viability, it is recognised that evaluating the sustainability/long-term financial viability of the mobile phone based advisory services will be difficult as mobile network operators may not be willing to provide this potentially commercially sensitive information. Therefore, GSMA will provide support through its access to aggregated confidential financial results of the mobile network operators providing the service. GSMA will provide a financial summary report on the commercial viability of the business models without compromising the commercial sensitivity of the data for the mobile network operators. The evaluator will assess and validate commercial sustainability through an analysis of the aggregated information provided by GSMA and additional qualitative business analysis approaches.

The Evaluator has the option of proposing refinements of the existing evaluation questions during the inception phase as part of developing the research protocol. These suggestions will be considered by the Steering Committee and an independent peer review during the review of the research protocol as part of the inception phase.

Output

The output of this work will be new and robust evidence on the impact, cost-effectiveness and commercial viability of mobile phone based advisory services focusing on nutrition and agriculture delivered by public and private partners, and including the development of robust methodological approaches to impact assessment of phone based advisory services.

Recipient

The primary recipient of this work will be DFID, with the beneficiaries being GSMA, governments, international agencies, foundations, MNOs and other private companies and civil society involved in policies and programmes in nutrition and agriculture that are aimed at improving nutritional, health and agricultural outcomes. The findings of this impact evaluation are intended as global public goods.

Scope and timeline

The scope of this work is to:

- Develop a research protocol for the external evaluation of mNutrition;
- Design and undertake an external evaluation of mNutrition in two countries: Ghana and Tanzania;
- Contribute to the communication of the learning agenda, evaluation strategy and evaluation results.

The evaluation will be in two of the 12 mNutrition target countries; Ghana and Tanzania. These countries have been selected based on the phased start-up of mNutrition programme activities. The focus and approach in the two respective countries will be different allowing for a comparison of the effectiveness of approaches applied. In Tanzania, mNutrition will focus on mobile phone technology based nutrition and health services and registration and identification of target population. In Ghana, the mobile phone technology will focus on nutrition and agriculture sensitive services.

In terms of coverage in number of people being targeted for these services, in total 3 million people will be reached through mNutrition; including 2 million for nutrition sensitive agriculture advisory messages in 4 Asian and at least 2 African countries and about 1 million beneficiaries for mobile phone based nutrition services in 10 countries in SSA.

The evaluation contract period will be September 2014 to 31st December 2019. The development of the research protocol must be completed by month 4 for review and approval by DFID. Full details on tasks and deliverables are provided in sections below.

Statement on the design of the mNutrition evaluation

The evaluation design is expected to measure the impact, cost-effectiveness and commercial viability of mNutrition, using a mixed methods evaluation design and drawing on evidence from two case study countries and the M&E system of the programme. Overall, the proposed design should ensure that the evidence from the two case study countries has high internal validity and addresses the priority evidence gaps identified in the Business Case. Being able to judge the generalisability/replicability of lessons learned from the programme is of equal importance and so a credible approach to generalization and external validity will be an important component of the

overall evaluation design. The final evaluation design and methodology to generate robust evidence will be discussed in detail with DFID and GSMA before implementation.

For assessing cost-effectiveness, the Evaluator will further fine-tune their proposed evaluation approach and outline their expectations in terms of data they will require from implementers. A theory based evaluation design, using mixed methods for evaluating the impact has been proposed. During the inception phase, the Evaluator will put forward a robust evaluation design for the quantitative work, either an experimental or a quasi-experimental method, with a clear outline of the strengths and limitations of the proposed method relative to alternatives. During the inception phase, the Evaluator is also expected to identify clearly what will be the implications of the design for implementers in terms of how the overall programme would be designed and implemented and for evidence to be collected in the programme's monitoring system. The Evaluator will also assess the degree to which it is realistic to assess impacts by early 2019 for a programme where implementation started mid 2015 and, if there are challenges, how these would be managed.

The Evaluator, in its 6 monthly reports, will be required to provide information to feed into the DFID Annual Review and Project Completion Report of mNutrition.

Gender and inclusiveness

The impact evaluation will pay particular attention to gender and other forms of social differentiation and poverty issues. From current experiences, it is clear that access to and use of mobile services is differentiated along a range of factors, including gender, poverty, geographic marginalisation, education and illiteracy levels. Therefore, the impact evaluation will look at and analyse differentiated access to and potential utilisation of mobile phone based services for improved nutrition and agricultural production. Based on the findings, it will identify opportunities and challenges in having an impact on women in general and more specifically the poor and the marginalised.

Tasks

The Evaluator will perform the following tasks:

A. Finalise a coherent and robust evaluation approach and methodology based on their proposal (inception phase)

- Conduct landscape analysis of existing experiences in mobile phone based services for nutrition and agriculture based on available publications and grey project documents to identify additional critical lessons and priorities for evidence gathering and programme design and implementation;
- Ensure that gender issues and poverty issues are well integrated into the impact evaluation design;
- Develop robust sampling frameworks, core set of indicators and research protocols that allow the consistent measurement and comparison of impacts across study countries, taking into account differences in business models and programmes as needed;
- Work closely with mNutrition programme team in GSMA to familiarise them with impact assessment methodology, discuss evaluation approaches, identify and agree on data provided by programme monitoring system and possible modifications to design;

- Identify risks to the evaluation meeting its objectives and how these risks will be effectively managed;
- Review existing evaluation questions and if deemed relevant propose refinement of existing questions and/or add other questions;
- Prepare a research protocol, including an updated workplan, project milestones and budget. The research protocol will be subject to an independent peer review organised by DFID; and
- Develop a communication plan.

B. Implement and analyse evaluations of impact, cost-effectiveness and commercial viability in accordance with established best practices

- Based upon the agreed evaluation framework, develop and test appropriate evaluation instruments which are likely to include data collection forms for households, community health workers, service providers including health and agricultural services, content providers and private sector stakeholders including mobile network operators. Instruments will involve both quantitative and qualitative methods;
- Register studies on appropriate open access study registries and publish protocols of studies where appropriate;
- Conduct baselines and end-lines, qualitative assessments and business model assessments in both of the two impact evaluation countries;
- Conduct and analyse the evaluations and present findings in two well-structured reports addressing the evaluation questions. The reports should follow standard reporting guidelines as defined by, for example, the Equator Network. Primary findings should be clearly presented along with a detailed analysis of the underlying reasons why the desired outcomes were/were not achieved;
- The Evaluating Organisation or Consortium may sub-contract the administration of surveys and data entry, but not the supervision of those tasks, study design, or data analysis; and
- The country-specific mixed methods evaluation reports, cost effectiveness and business models studies and final evaluation report will be subject to an independent peer review organised by DFID.

C. Contribute to the communication of the learning agenda, impact evaluation strategy, and evaluation results.

- Develop a communication plan outlining the main outputs and key audiences;
- Conduct lessons learnt workshops in each of the 2 impact evaluation countries and key dissemination events; and
- Assist in communicating the results of the evaluation and contribute to the development and communication of lessons learnt about mobile phone based extension approaches in nutrition and agriculture.

Deliverables

The Evaluator will deliver the following outputs:

During the design and study inception phase of maximum 4 months:

- A publishable landscape analysis report highlighting lessons learnt from existing initiatives on mobile phone based advisory services related to nutrition and agriculture by month 4;
- A updated work plan with project milestones and budget by end of month 1 (possibly adjusted based on the approved research protocol by month 4);
- A communication plan outlining the key outputs, audience and timeline for review and approval by month 4; and
- A full research protocol by month 4 for review and approval. The research protocol should be registered with appropriate open access study registries;

Interim reports:

- 4 biannual progress reports for the External Evaluation as a whole, and for each country evaluation, against milestones set out in the workplan;
- Two desk reviews submitted by June 2016
- Two Baseline quantitative reports submitted by April 2017
- Two Baseline qualitative reports submitted by February 2017
- Two Cost-effectiveness reports 1 submitted by March 2017
- Two Business Model reports 1 submitted by March 2017
- Two Mixed Methods Baseline reports completed by September 2017
- Two Midline qualitative reports submitted by March 2018
- All survey data collected during the evaluation provided in a suitable format to DFID for public release.

At project's end:

- Two Endline quantitative reports submitted by June 2019
- Two Endline qualitative reports submitted by August 2019
- Two Cost-effectiveness report 2 submitted by July 2019
- Two Business Model report 2 submitted by July 2019
- Two Evaluation reports submitted by October 2019
- At least 1 article, based on the findings from the country evaluation reports, published in a research journal;

- A shared lesson learnt paper published and at least one presentation highlighting key lessons for similar initiatives of promoting mobile based technologies for providing extension services and the promotion of uptake of technologies by December 2019.

Research protocol and all final reports will be independently peer reviewed. This will be organised by DFID. Outputs are expected to be of sufficiently quality so that a synthesis of findings can be published in a leading peer-reviewed journal.

Coordination and reporting requirements

A mNutrition Advisory Group (AG) will be established for the programme which will a) provide technical oversight and b) maximise the effectiveness of the programme. The Advisory Group will meet on a bi-annual basis and comprises of representatives of DFID, NORAD and GSMA representatives and independent technical experts. The Evaluator will be managed by DFID on behalf of the mNutrition Advisory Group. The Evaluator will work closely with the mNutrition programme team in GSMA and its specific country implementing partners. The Evaluator will:

- Ensure coherence and lesson learning across all pilot impact assessments on the key evaluation questions and indicators identified.
- Incorporate a clear code of ethics; incorporate plans for open access publications and public access to data sets.

The Evaluator will work closely with the mNutrition project management team, in particular in the design of the overall evaluation framework and the evaluation plan for the specific project components and the countries selected for the evaluation. Collaboration and regular communication between Evaluator and mNutrition project management team and implementing partners in selected case study countries is crucial as the evaluation design may have implications for project implementation and vice versa. The mNutrition project management team will lend support in communication as requested by the Evaluator or the Advisory Group. The Evaluator will report directly to DFID who will manage the evaluation on behalf of the mNutrition Advisory Group. The main point of contact for technical matters is Louise Horner, Livelihoods Adviser and Hugh McGhie, Deputy Programme Manager for all other project related issues. The mNutrition Advisory Group will be the arbiter of any disputes between the evaluation function and the overall programme implementation.

At the end of each 6 months, the Evaluator will submit a brief report outlining key achievements against the agreed deliverables. Pre-agreed funding will then be released provided that deliverables have been achieved.

In addition to the 6 monthly reports outlined above, the Evaluator will provide information to feed into the DFID Annual Review of mNutrition. The 6 monthly reports will be a key source of information used to undertake the Annual Review and Project Completion Report for the programme. These reviews will be led by the Livelihoods Adviser and Deputy Programme Manager, in consultation with the mNutrition AG. All reviews will be made available publicly in line with HMG Transparency and Accountability Requirements.

Mandatory financial reports include an annual forecast of expenditure (the budget) disaggregated monthly in accordance with DFID's financial year April to March. This should be updated at least every quarter and any significant deviations from the forecast notified to DFID immediately. In addition the Evaluator will be required to provide annual audited statements for the duration of the contract.

Contractual Arrangements

The contract starts in September 2014 and will run till end of December 2019 subject to satisfactory performance as determined through DFID's Annual Review process. Progression is subject to the outcome of this review, strong performance and agreement to any revised work plans or budgets (if revisions are deemed appropriate).

A formal break clause in the contract is included at the end of the inception period. Progression to the implementation phase will be dependent on strong performance by the Evaluator during the inception period and delivery of all inception outputs, including a revised proposal for implementation period. Costs for implementation are expected to remain in line with what has been agreed upon for this contract, with costs such as fee rates fixed for contract duration. DFID reserves the right to terminate the contract after the inception phase if it cannot reach agreement on the activities, staffing, budget and timelines for the implementation phase.

DFID reserves the right to scale back or discontinue this assignment at any point (in line with our Terms and Conditions) if it is not achieving the results anticipated. The Evaluator will be remunerated on a milestone payment basis. DFID has agreed an output based payment plan for this contract, where payment will be explicitly linked to the Evaluator's performance and effective delivery of programme outputs as set out in the ToR and approved workplan. The payment plan for the implementation phase will be finalised during the inception period.

Open Access

The Evaluator will comply with DFID's Enhanced and Open Access Policy. Where appropriate the costs of complying with our open access policy should be clearly identified within your commercial proposal.

Branding

The public has an expectation and right to know what is funded with public money. It is expected that all research outputs will acknowledge DFID support in a way that is clear, explicit and which fully complies with DFID Branding Guidance. This will include ensuring that all publications acknowledge DFID's support. If press releases on work which arises wholly or mainly from the project are planned this should be in collaboration with DFID's Communications Department.

Duty of Care

The Evaluator is responsible for the safety and well-being of their Personnel (as defined in Section 2 of the Contract) and Third Parties affected by their activities under this contract, including appropriate security arrangements. The Evaluator is responsible for the provision of suitable security arrangements for their domestic and business property. DFID will share available information with the Evaluator on security status and developments in-country where appropriate.

The Evaluator is responsible for ensuring appropriate safety and security briefings for all of their Personnel working under this contract and ensuring that their Personnel register and receive briefing as outlined above. Travel advice is also available on the FCO website and the Evaluator must ensure they (and their Personnel) are up to date with the latest position.

The Evaluator has confirmed that:

- The Evaluator fully accepts responsibility for Security and Duty of Care.

- The Evaluator understands the potential risks and have the knowledge and experience to develop an effective risk plan.
- The Evaluator has the capability to manage their Duty of Care responsibilities throughout the life of the contract.

Annex C Stakeholders consulted

Stakeholder consultations have been carried out throughout the period with a particular focus on establishing relationships with key individuals in stakeholder institutions in Ghana. A field visit to Ghana was carried out from 23rd – 26th January 2017, during which Gamos personnel visited key stakeholders from VFC stakeholders (Vodafone and Esoko), as well as alternative mAgri service providers (see Table 15). In addition to this specific field visit, Skype has been used to interview additional stakeholders included in Table 15. Data has been captured in internal visit reports and meeting minutes.

Table 15 Stakeholder contact list

Key stakeholders	
GSMA	Natalia Pshenichnaya (Head of mNutrition)
GSMA	Tegan Palmer (Business Intelligence mAgri)
GSMA	Matthew Strickland (mAgri project manager)
ALINe	Anne Delaporte
ALINe	Andre Ling
ALINe	Calum Handforth
CABI	Charlotte Jordan (Nutrition Project Manager)
CABI	Fraser Norton (Mobile Programme Executive)
GAIN	Kyla Stockdale (Senior Programme Manager)
frog design	Lilian Tse (Global Program Manager for Social Impact Practice)
Esoko	Daniel Asare-Kyei (Managing Director)
Esoko	Eugenia Ankomah Malan (senior Business Advisor)
Esoko	Mohammed Issifu (Agriculture content specialist)
Esoko	Frederick K Asare (Nutrition Specialist)
Vodafone	Julius Owusu-Kyerematen (Commercial & Marketing Executive)
Vodafone	Richmond Asante (Mass marketing manager)
Vodafone	Nanama Boa-Essilfie (VFC Manager)
Vodafone	Michael Lartey (Sales)
Vodafone	Cephas Pobi (Manager, VFC)
SARI	Dr. Roger Kanton (Deputy Director, CSIR-SARI)
Ghana Health Services	Kate Quarshie (Senior Nutrition Officer)
Alternative service providers	
Syecom	Solomon Elorm Allavi (Founder, GIS Mapping Specialist)
Farmerline	Alloysius Attah (CEO & Co-Founder)
Farmerline	Worlali Senyo (Director of Business Development)
Voto Mobile	Louis Dorval (co-founder and chief programme officer)

Voto Mobile	Louis Mensah (Director of Partnerships - Private Sector)
Voto Mobile	Collins Boakye Dankwa (Project Manager, ADMIRE)