



Creating scalable, engaging mobile solutions for agriculture
A study of six content services in the mNutrition Initiative portfolio



The GSMA represents the interests of mobile operators worldwide, uniting nearly 800 operators with almost 300 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces industry-leading events such as Mobile World Congress, Mobile World Congress Shanghai, Mobile World Congress Americas and the Mobile 360 Series of conferences.

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mAgri catalyses scalable, commercial mobile services that improve the productivity and incomes of smallholder farmers and benefit the agriculture sector in emerging markets. The GSMA mAgri Programme is in a unique position to bring together mobile operators, agricultural organisations and the development community to foster sustainable and scalable mobile services that improve the livelihoods of smallholder farmers.

For more information about GSMA mAgri Programme visit our website at: www.gsma.com/mobilefordevelopment/programmes/magri
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ABBREVIATIONS

AEDO	Agriculture extension department officers
Agri VAS	Agricultural value-added services
ARPU	Average revenue per user
B2B	Business to business
B2C	Business to consumer
B2P	Business to person
BI	Business intelligence – using data generated by service users to make decisions about product/service design
CAPEX	Capital expenditure
COGS	Cost of goods sold
CUG	Closed user group – a group of people who are not charged for calls made in that group
DFID	UK Department for International Development
GDP	Gross domestic product
IVR	Interactive voice response – a dial-in menu which allows users to interact with automated messages by pressing the keypad
KPI	Key performance indicator
LCP	Local content partner
MFS	Mobile financial services
MNO	Mobile network operator
OBD	Outbound dialling, also called voice SMS or ‘robo-calling’ – a pre-recorded message sent over the GSM network
OPEX	Operating expense
PAYG	Pay as you go
PIW	Product iteration workshop – quarterly workshops which aim to review data collected over the quarter from BI, user feedback from phone surveys, and UX-led research to inform the evolution of the service
QA	Quality assurance
SMS	Short messaging service – written messages sent to phones with limited character length
UX	User experience – how the user engages with a product, practically and emotionally

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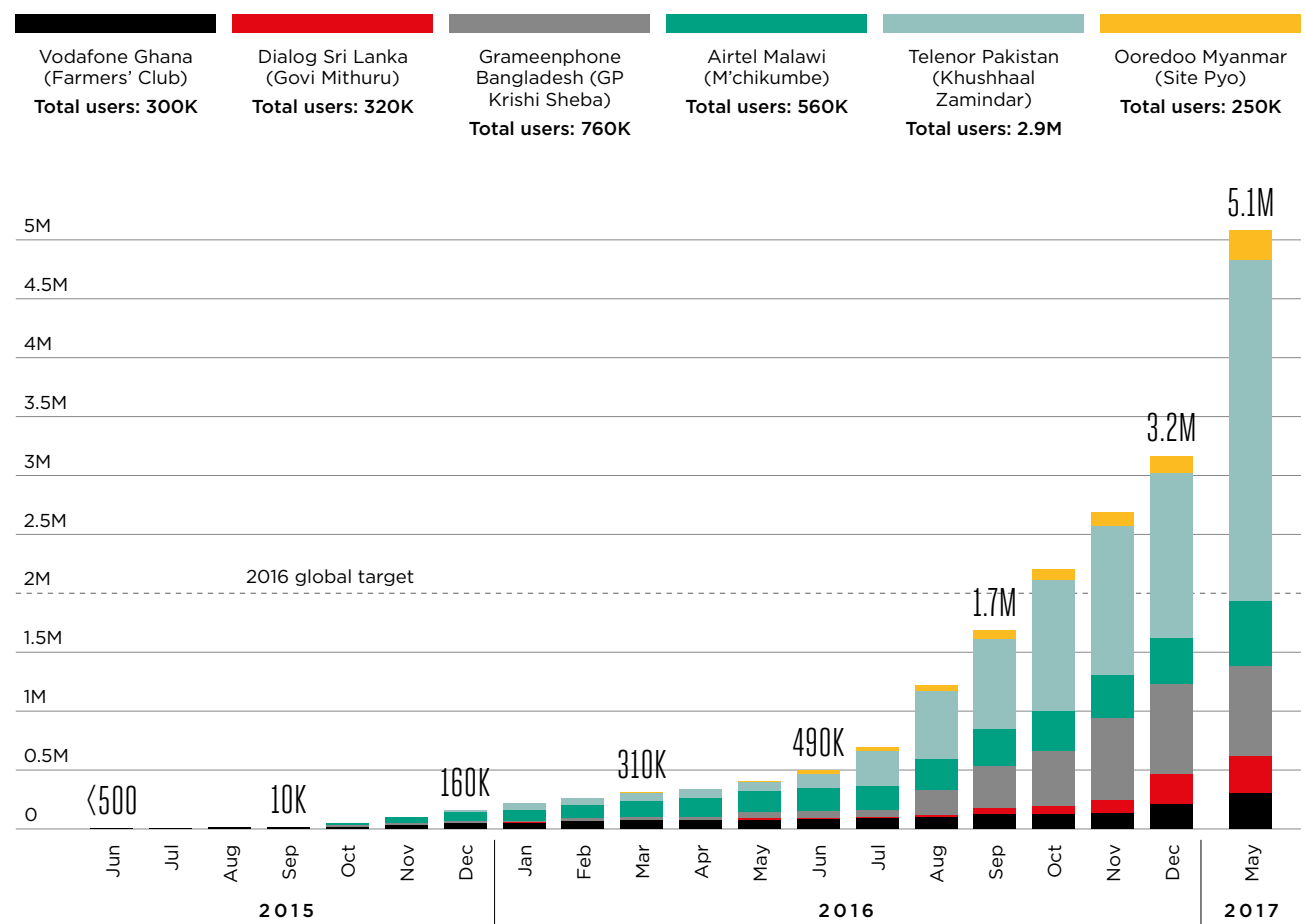
Executive Summary

Mobile network operators are in a strategic position to successfully scale agricultural value-added services

Agriculture presents a significant opportunity for mobile network operators (MNOs) across much of the developing world, as largely uncaptured rural markets often depend on farming for their livelihoods. As the

most ubiquitous technology in these markets, mobile gives MNOs the opportunity to have a real impact on the lives of rural users living in poverty and to contribute to Sustainable Development Goal (SDG) 2, Zero Hunger.¹ In

FIGURE 1
The scale of the GSMA mAgri portfolio under the mNutrition initiative



The number of registered users on each of the six Agri VAS services, from the first service launch in June 2015 to May 2017.

1. United Nations Sustainable Development Goals (SDGs), 2015

turn, MNOs can benefit both directly (through business-to-consumer (B2C) charging and/or building a platform that other businesses can leverage, leading to business-to-business (B2B) transactions) and indirectly (through greater customer loyalty).

The GSMA mAgri team, under the mNutrition Initiative funded by UK aid (the UK Department for International Development, DFID), has been working with six MNOs to support the launch and scale of agricultural value-added services (Agri VAS), sharing knowledge and leveraging the findings from user experience (UX) design, business intelligence (BI), and customer feedback. In just over two years, the product teams developed services that cumulatively reached more than five million registered users worldwide (Figure 1). This report presents key findings on the set-up and implementation of the project, service design, and the impact on end users.

Key findings

- **Dedication to UX, drawing on customer feedback and behavioural data from BI, ensured high acquisitions and user engagement.** The six Agri VAS reached five million registered users worldwide. Due to an iterative and user-centric approach to product development, 60% of all users were active in December 2016.
- **27% of the target markets in these six countries were acquired by the six Agri VAS in 2016.**² With these target markets set to increase by 40% overall by 2020, there are even more opportunities for Agri VAS.
- **Successful services require a robust product team, including a core team of dedicated staff and cross-functional links to other departments (marketing, BI, technology, sales and distribution).** A high degree of ownership from MNOs results in high activity and user engagement rates. Those who led UX research internally and empowered their team to make service design decisions based on lessons in the field were more likely to get foundational issues right, like design and requirement specifications.
- **Highly targeted interactive outbound dialling (OBD) marketing has played a significant role in new customer acquisition.** Using BI to target interactive OBD messages has been a successful technique. Telenor and Dialog were both able to achieve a conversion rate of around 5–6% (versus 1–2% for untargeted OBDs). See p. 30 for more on Telenor's approach.
- **Setting up a dedicated agent network requires careful thought and cannot simply mimic existing networks.** Finding the right incentives for an MNO agent network to promote the service proved to be difficult. On-boarding NGOs to leverage their networks was tough at an early stage, especially asking them to work for 'mutual benefit'. However, it was feasible to bring them in at a later stage when more farmers were on the platform. The ability to leverage the existing network of agricultural officers proved invaluable for both acquisitions and trust (see p. 24).
- **Removing barriers to registration is critical for successful customer acquisitions.** 'One-click' registration has been key to success for all the services. On-boarding processes that take longer than this lead to drop off during self-registration. Agent-based profiling has been difficult to scale cost effectively, but interactive profiling over time seems a good solution. For example, Dialog Sri Lanka's profiling methodology collects user data via interactive OBD over the first few weeks of service use (see p. 25). Providers may wish to consider a multi-pronged approach.
- **Dynamic, informative push messages increase user engagement.** The services with the most active and engaged users send regular OBD messages with an opening jingle followed by tailored content. This gives the service its own voice, customised to different country or regional contexts. Delivering timely, personalised content is a challenge, but achievable. Timing content to the farming calendar has been found to be vital for customer satisfaction across the board. In a changing climate, weather content has been consistently highly valued (p. 26).

2. Target market is defined as the number of agricultural workers across the six countries with mobile phones who are likely to pick up VAS. For the full methodology, see GSMA, 2015, "Market size and market opportunity for agricultural value-added services", <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/02/Market-size-and-market-opportunity-for-agricultural-value-added-services-Agri-VAS.pdf>

- **Willingness and ability to pay for Agri VAS depends on the context.** In Sri Lanka, Dialog offers the service on a pay-as-you-go (PAYG) basis (SLR 1 / USD 0.006 per crop per day), as subscribers are used to paying for value-added services. This simple pricing model has been key to the success of the service. In other countries, the target segment has shown low willingness or ability to pay for services, particularly before they have seen the value of them.
- **Operators have had early success with B2B charging models.** In Q1 2017, Telenor Pakistan ran a pilot advert for a local fertiliser company which targeted a specific segment of the user base. In countries where rural marketing is not well understood, a robust database with profiles of this segment is of great potential value.
- **The potential of Agri VAS to drive behaviour change has been proven by power users (active repeat service users), who report significantly more on-farm changes than comparable non-users (e.g. planting, land management, harvesting). Over 1.5 million users are estimated to have made changes globally.** Self-reported changes were tracked in planting, land management, and harvest and storage practices, as well as other locally relevant changes. Overall, 36% of all registered users are estimated to have made on-farm changes.³
- **Power users in Pakistan are 1.9 times more likely to report an increase in income than non-users, and power users in Malawi are 3.6 times more likely to report an increase in production than non-users.** In other cases, users reported increases in production and income, but not significantly more so than non-users.
- **Most users of the six selected Agri VAS are men living below the poverty line.**⁴ More than half of power users live below the poverty line and one in five service users is under 25.
- **Four out of six MNOs found lower customer churn and increased average revenue per user (ARPU) among Agri VAS users compared to non-users.** Four service providers were able to show substantially lower churn in their Agri VAS user bases than in comparable network users. Correlations between subscription to the mAgri service and an increase in ARPU were also identified, in one case, more than 10% within 3 months of subscribing.
- **The future is bright for mobile agriculture.** Opportunities to further engage the rural market with digital services, mobile financial services (including value chain digitisation, market place applications, and credit and loans) and Internet of Things (IoT) solutions, are growing as smartphone technology penetrates emerging markets.

Background: the mNutrition Initiative

Launched in February 2014, the GSMA mNutrition Initiative is a programme supported by UK aid (UK DFID). It aims to improve nutrition for underserved populations as a result of behaviour change promoted by accessible mobile-based services, delivered at scale through sustainable business models.

As part of the mNutrition Initiative, the GSMA mAgri programme launched the mAgri Challenge Fund, which aimed to reach two million users with life-changing mobile agriculture services by 2017. In total, 27 concept notes were received from applicants in 14 countries. Thirteen were invited to develop full business plans and, after a competitive process, the following applicants were chosen:

- Airtel Malawi
- Dialog Sri Lanka
- Grameenphone Bangladesh
- Vodafone Ghana
- Ooredoo Myanmar
- Telenor Pakistan

The fund provided risk capital – up to GBP 325,000 per project – with a minimum of GBP 250,000 matched by the selected service providers. To help the projects succeed, GSMA also provided business consultancy and technical support throughout the implementation period (24 months for each project). Each project received content support, service design consultancy, BI support, monitoring and evaluation, as well as end-to-end support on design implementation and development provided by the GSMA mAgri team and its global partners (Figure 3). The GSMA mAgri programme also facilitated global knowledge-sharing sessions between the six MNO grantees to allow them to learn from each other's challenges and successes.

This report incorporates the lessons learnt from the six MNO-led Agri VAS supported by the mNutrition Initiative. Their individual stories appear in more detail in the mAgri mNutrition Initiative case study series.⁵

3. Based on five out of six services where sufficient data is available.

4. At USD 2.50 per day.

5. See GSMA, 2017, mNutrition Case studies, <https://www.gsma.com/magri/creating-scalable-mobile-solutions>

Global context

Agriculture is one of the main income-generating activities in the world. The sector employs over 1.34 billion people globally and contributes a substantial proportion of gross domestic product (GDP) in many developing country economies.⁶ Although most of the world's agricultural labour force lives in developing countries, farmers there face a major productivity gap compared to their counterparts in developed countries, with cereal yields nearly one-third less per hectare on average.⁷

With the next wave of mobile connections expected to come mainly from rural areas (due to saturation in urban centres), mAgri services provide an opportunity for MNOs to engage with rural customers more effectively. Funded services were chosen from countries where agriculture is a major contributor to GDP (from 11% in Sri Lanka to 48% in Myanmar)⁸ and a large proportion of the

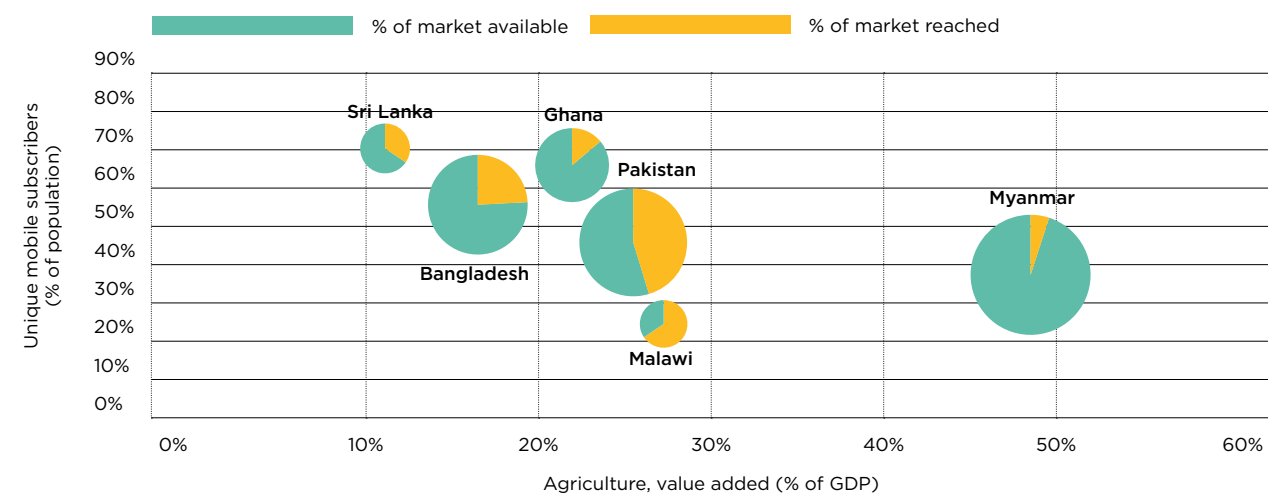
labour force depends on agriculture for their livelihoods (from 39% in Sri Lanka to 64% in Malawi).⁹

Drawing on a number of factors (including mobile penetration and importance of agriculture in the country), GSMA Intelligence estimated the size of the target market for Agri VAS in Sub Saharan Africa and South Asia at almost 50 million in 2016 and potential direct revenues of USD 170 million.¹⁰ Twelve million (24%) of those in the total target market lived in the six countries where mAgri mNutrition services were offered in 2016.

Overall, GSMA mAgri's MNO partners have reached 27% of the target market in all six countries (ranging from 5% in Myanmar to 72% in Malawi, see Figure 2). With this target market set to increase by 40% overall by 2020, there is clearly more opportunity for Agri VAS.

FIGURE 2 SOURCE: GSMA INTELLIGENCE, WORLD BANK DATABANK, mAGRI SERVICE PLATFORM DATA

mAgri global reach under the mNutrition initiative (2016)



The global reach of mAgri mNutrition services showing mobile subscribers reached and the remaining market opportunity. Market potential is assessed using a number of inputs, including mobile penetration (unique mobile subscribers, % of population) and importance of agriculture in the market (including agriculture, value added (% of GDP)). For the full methodology, see GSMA, 2015, "Market size and market opportunity for agricultural value-added services (VAS)".

6. Data from FAO and The World Bank.
 7. GSMA 2016, "Agricultural Value-added Services (Agri VAS) Toolkit 2.0".
 8. World Bank national accounts data and OECD National Accounts data files, Sri Lanka (2013) and Myanmar (2004).
 9. International Labour Organisation, Key Indicators of the Labour Market database; World Bank (2013). Data not available for Myanmar.
 10. Target market is defined as the number of agricultural workers with mobile phones who are likely to pick up value-added services across 38 markets in South Asia and Sub Saharan Africa. For the full methodology, see GSMA, 2015, "Market size and market opportunity for agricultural value-added services (VAS)".



IMAGE COURTESY OF FROG DESIGN

Implementation

Structuring the engagements

The mNutrition Initiative involved a network of global and local partners

MNOs are the product owners of the Agri VAS and hold contracts with third parties to implement the services.¹¹

The mNutrition Initiative's global content consortium is co-ordinated by the Centre for Agriculture and Bioscience International (CABI) and includes knowledge and implementation partners, International Livestock Research Institute (ILRI), Global Alliance for Improved Nutrition (GAIN), Oxfam, and the British Medical Journal. The consortium was responsible for researching the nutrition landscape in each country, contracting local content partners (LCPs) and assuring the quality of their output. An online repository of the content was created as part of the mAgri Initiative.¹²

Frog design supported a five-week kick-off phase of design research in each country with two designers on the ground.¹³ The team made two additional visits after the initial research period and provided support with regular check-ins during the first half of the project.¹⁴

Firetail structured the monitoring, evaluation, and learning framework for the mAgri Initiative, conducting quarterly 'rapid feedback' phone surveys, which provided quantitative data for product iteration workshops (PIWs). It also conceived of and implemented the outcomes study, which tracked behaviour changes and livelihood benefits for service users (p. 31).

Key lessons

- Working with a large global partnership provided expertise on many subjects, but was challenging to manage.
- Facilitating communication between the partners was particularly challenging. For example, the UX workstream did not have a strong link to content development, and content was sometimes user-tested separately from the main UX work on the service.
- Engaging LCPs in the content development process was seen as a way to develop locally relevant content while also building their capacity. However, decentralising responsibility for content production compromised the quality of the content. Future projects could consider more active involvement of a global content development team that could collaborate with local teams.
- Incentivising user acquisitions within grant contracts was essential to get the internal support needed to scale the services. However, key performance indicators (KPIs) which incentivise how scale is reached could be considered in future projects.
- Including quality KPIs in contracts and linking deliverables to payments has improved service delivery. Development projects could benefit significantly from applying commercial frameworks for implementation contracts more frequently. As the project evolved, contracts with global partners had to be amended to clarify requirements and meet new challenges. Ensuring that contracts include key shared objectives, while also being sufficiently flexible to adapt to changes, will be a priority in future projects.
- Local communication was enhanced by quarterly PIWs (see p. 17), which provided visibility into product functions and gave partners space to plan next steps. However, with such a widespread global partnership, it was not always cost effective for all parties to be represented at these workshops, which affected the quality of communication.

11. For details on individual services, see GSMA, 2017, "mNutrition case studies".

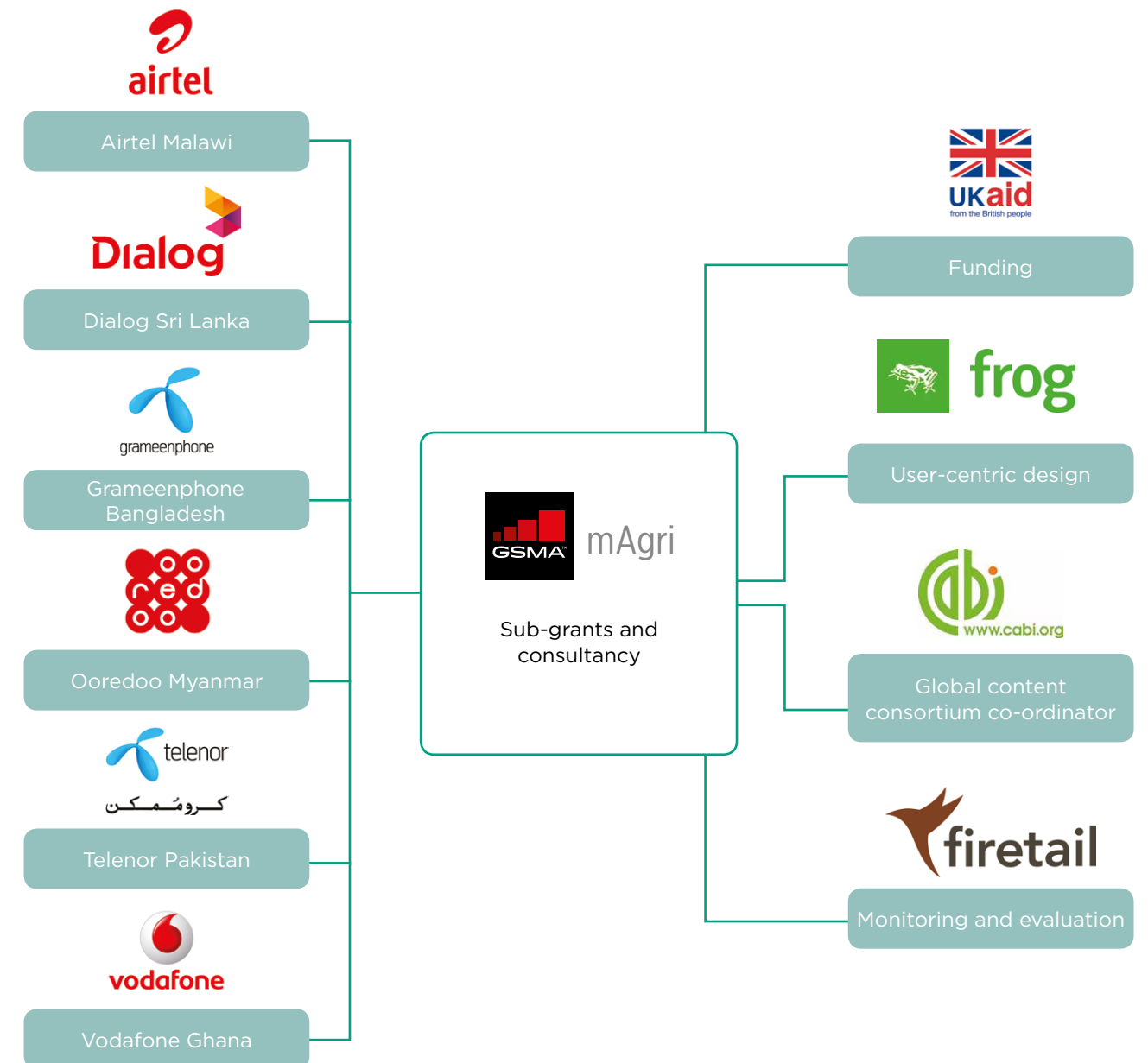
12. <http://www.cabi.org/nutritionkb>

13. With the exception of Pakistan, where support from frog design was more limited due to travel restrictions.

14. For more information on the tools and methodologies employed, see GSMA and frog design, 2015, "The mAgri Design Toolkit".

FIGURE 3

The global partnership structure for the mAgri mNutrition Initiative



GSMA support structure

The GSMA grant model was enhanced by a range of in-kind support:

Market engagement manager

- Primary source of support for MNO product management and GSMA oversight.
- Provided ongoing support for the initial implementation and iterative improvements (identifying risks, proposing mitigation strategies, and managing escalation) and facilitated product iteration workshops.

Business intelligence manager

- Provided quarterly BI analysis of platform data.
- Facilitated feedback phone surveys (tracking customer satisfaction) and outcomes surveys (tracking on-farm changes and livelihood benefits).

Content specialist

- Key point of contact for global content consortium; ensured timely delivery of quality-assured content.
- Organised content user-testing activities with operators and LCPs.

Structure of in-house product team

MNO teams with a core team of dedicated staff and cross-function links into other departments (marketing, BI, technology, sales, and distribution) had the most leverage to develop “sticky” products. Teams that were free to go into the field and meet the end user before engaging on the product were empowered to make user-centric changes to the product. The most sustainable results came from partners with a flexible team at the MNO, rather than outsourced (see p. 43, ‘Commercial sustainability’).

CXO Sponsor

- Not part of the product team, but their buy-in and support is essential.
- Reaching the rural segment is ideally a key organisational objective.

Product manager

- A dedicated full-time resource from product inception to development.

- Reports to senior management; has freedom to make budget decisions and change the product.
- Has a VAS background, enthusiasm for the product and an iterative, user-centric approach.

UX lead

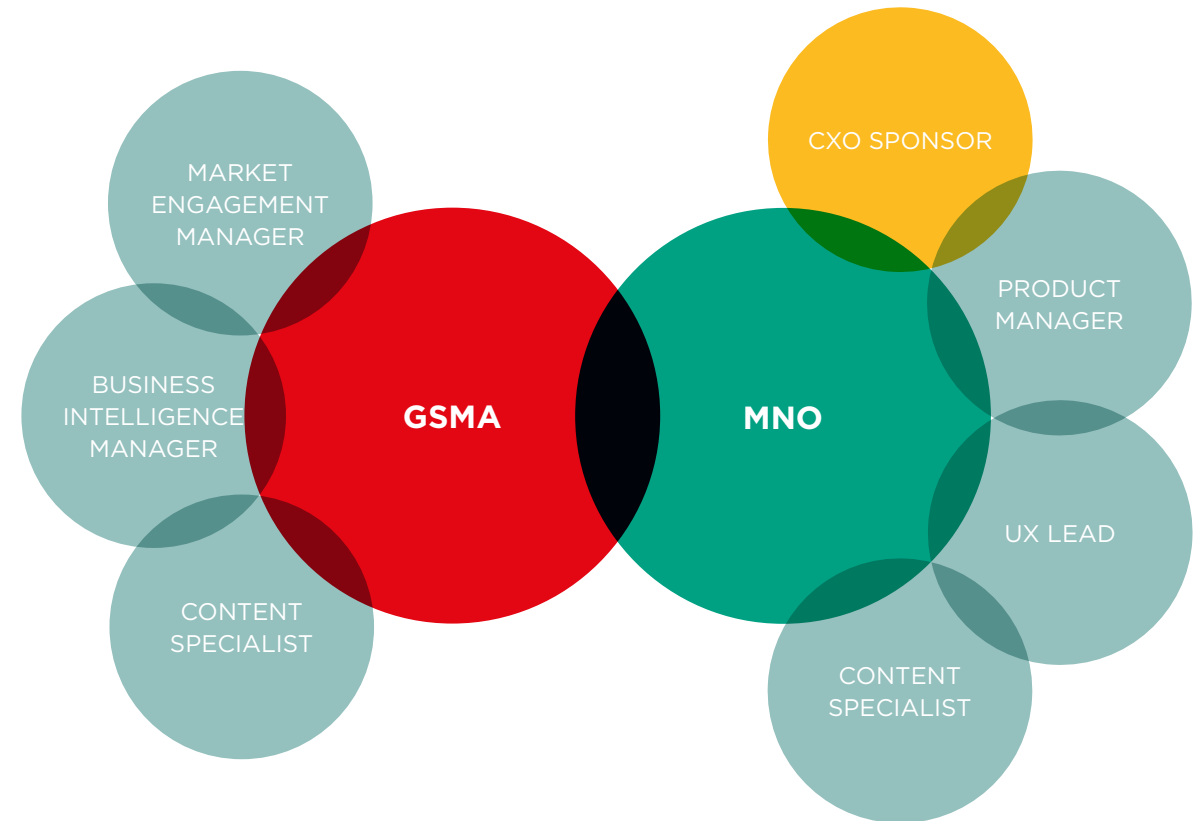
- A dedicated resource throughout product inception and development periods.
- Responsible for user research and service design.

Content specialist

- In-house resource responsible for the deployment of tailored, local-language content.

FIGURE 4

Structure of GSMA and ideal MNO teams on Agri VAS products

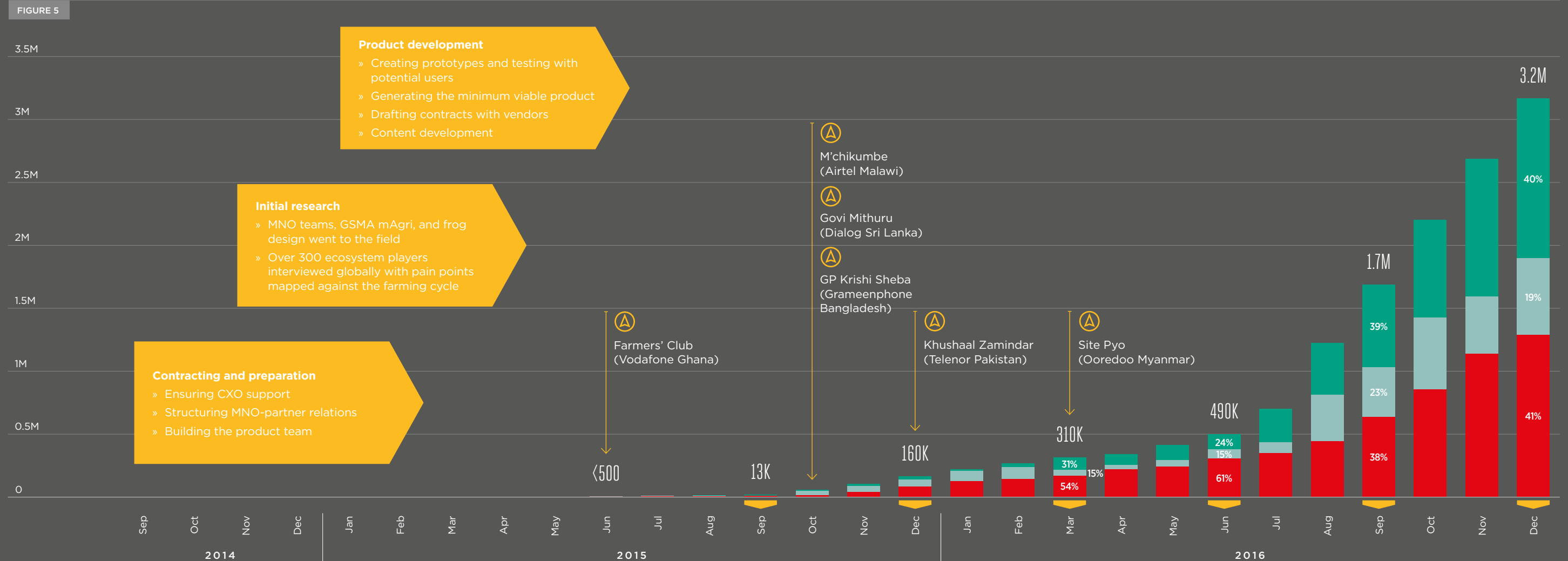


Project timeline and life cycle

Source: platform data from six Agri VAS services, September 2015 - December 2016

Most MNOs took nine months to a year to soft launch a product

For contracting, research and development, and launch stages and PIWs, note that different MNO partners started and finished these processes at different points, so an idealised timeline is shown.



MNO	SERVICE	PUSH/PULL	CALL CENTRE	END USER REVENUE MODEL
Vodafone Ghana	Farmers' Club	Push	Yes	Subscription
Airtel Malawi	M'chikumbe	Pull (with SMS push)	No	Freemium
Telenor Pakistan	Khushaal Zamindar	Hybrid	No	Free
Dialog Sri Lanka	Govi Mithuru	Hybrid	No	Subscription
Grameenphone Bangladesh	GP Krishi Sheba	Hybrid	Yes	Subscription
Ooredoo Myanmar	Site Pyo	Pull (with SMS push)	No	Free

- Registered users who have not accessed a service during the month
Inactive users
- Registered users who have accessed a service during the month
Active users
- A subset of active users, those who have used the service during the month who are returning users
Power users
- An idealised timeline of quarterly workshops between the GSMA mAgri team, the MNO and key local partners. Data which has been collected throughout the quarter (from BI, UX and phone surveys) is presented along the customer journey and solutions are suggested.
Product iteration workshop
- Initial service launch (usually a pre-marketing 'soft' launch)
Launches

Key lessons

Contracting and preparation

- **Structuring mutually beneficial partnerships with vendors is crucial.** Objectives must be aligned to ensure the MNO and its partners share the same goals for the product.
- **Sync with the business planning cycle to avoid delays.** Most GSMA grant agreements with MNOs were signed in Q3 2014, but most business planning cycles begin in Q2, so mAgri services were not always considered in the early planning stages.
- **Finding local UX talent can be time consuming.** It would be preferable to work with in-house UX teams.

Initial research

- **When mapping pain points throughout the farming cycle, lack of access to geographically relevant farming information was identified as the main addressable pain point in all six markets.** Lack of access to markets and finance were also key challenges, but the assessment in 2014 was that these markets were not yet ready for mobile financial solutions at scale. Agri VAS were conceived as platforms upon which additional services (e.g. insurance, vouchers for farming inputs) could be built.
- **Potential Agri VAS users placed MNOs on the outer edge of the circle of trust for agriculture.** In no instance during the early research was an MNO considered a trusted source of agricultural information. This finding reinforced the need to work with trusted partners for content development, marketing, and distribution.

Product development

- **Product teams went back to the field to test early versions of the service for swift iteration.** Low-fidelity prototyping, such as paper prototypes and recordings on mobile phones, helped to save costs and time when iterating the products.
- **Academic approaches to content development led to delays in product launch.** All six services are content-driven, and content delays were common due to under-developed content ecosystems and complex quality assurance (QA) processes.

Following launch, quarterly PIWs were held with the GSMA mAgri team and local cross-functional teams. Each quarter (at minimum) is considered a cycle of product iterations and improvements. The GSMA advocated and supported data collection from the platform (BI), from the field (UX) and through phone surveys, on at least a quarterly basis (some grantees had a shorter iteration period). During PIWs, all available data is mapped along the customer journey and solutions are ideated and prioritised before being incorporated into product roadmaps. Product roadmaps are then signed off by the C-level sponsor for resourcing and auctioning.

Customer journey framework explained

The customer journey framework has been a key tool in understanding the barriers to service adoption. The framework has been used at PIWs to sort data from BI, UX research, and feedback phone surveys, reveal the main barriers to adoption, and devise possible solutions or identify areas for further research.

Collecting usage data, such as the unique subscriber identifier, time stamp, duration, and content accessed per service use, has been vital for identifying product development issues along the customer journey. Service providers should collect and store service data from soft launch onwards to better understand the product and make improvements.

FIGURE 6

Examples of insights along the customer journey

Marketing	On-boarding	Navigation and content	Payment
How do users become aware of services? How are they educated on the value proposition of the services? What types of marketing are most effective for Agri VAS?	How are users registered for services? How do service providers offer both a personalised service and a simple registration process?	How do service providers ensure excellent user experience once users are on-boarded? What are the best channels for enhancing user engagement?	Are smallholder farmers willing to pay for Agri VAS? If so, how much?
EXAMPLES			
Phone surveys show that over half of users first heard about the service via radio ads, but BI shows users from the radio struggle to register.	BI shows 50% of new diallers get through two of the four steps, but do not complete the entire registration process, so they do not receive push messages.	BI shows that 40% of users drop off the interactive voice response (IVR) menu before they reach content.	UX research suggests that smallholders in this country are willing and able to pay the prevailing rate for VAS.
Perform user testing to refine the radio advert, leveraging findings from more effective marketing techniques to deliver the value proposition more effectively.	Change the registration process to a maximum of two steps. Think about ways to collect additional data after the vital details are secured.	Explore ways to improve product education remotely, for example, through an OBD campaign.	Research prevailing VAS rate in the country and implement. If this does not cover costs, consider other revenue streams that could be added.

A simplified customer journey with key questions and examples of problems and solutions

Proving the methodology

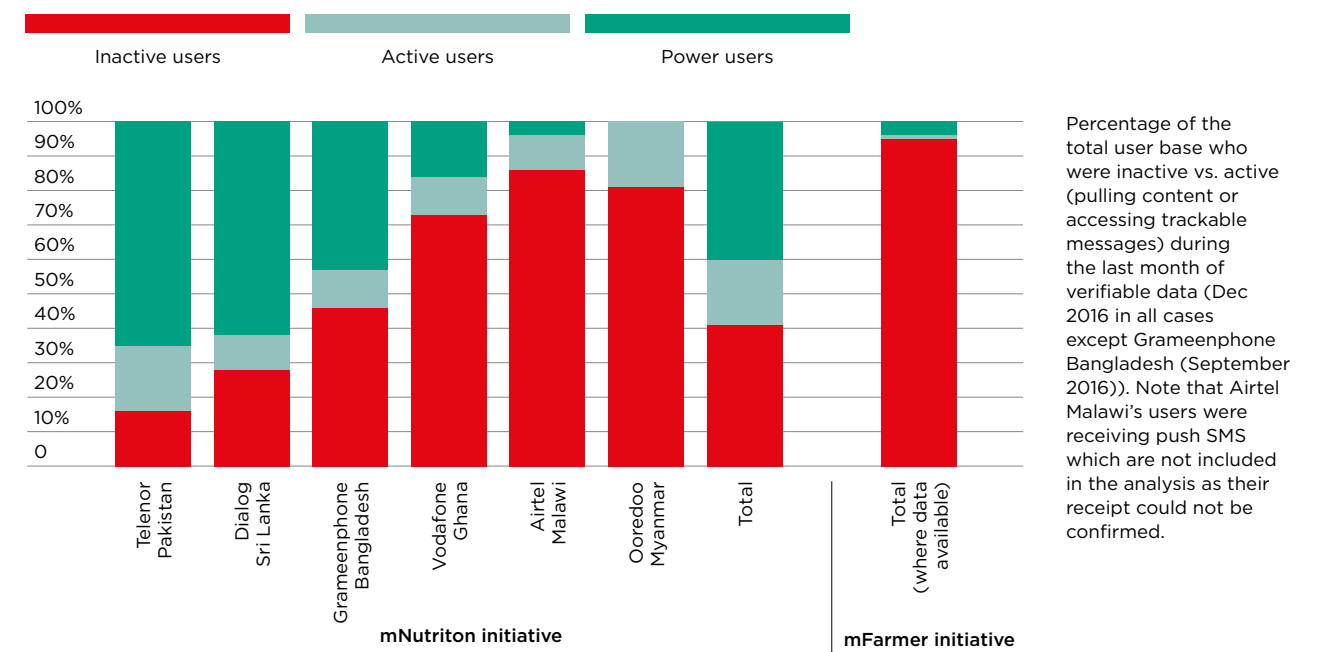
Dedication to UX and drawing on customer feedback and behavioural data from BI ensured user engagement and uptake

The GSMA mAgri team funded four products under the mFarmer Initiative between 2011 and 2014. Targets for the mFarmer Initiative offered incentives for user acquisitions, but not user quality. The products they created did not change drastically in response to identified user needs, and levels of user engagement remained low. Having learned this lesson, the GSMA mAgri team set out to support services under the mNutrition initiative which not only acquired users, but also engaged them and made them into long-term service users. Investment in user-centric design, field research, BI analysis and customer feedback, alongside a commitment to iterating products throughout their lifecycle, were expected to lead to higher quality services and more engaged users.

Engagement levels on mNutrition services have varied throughout the product lifecycle, but most have shown either strong continued engagement or an improvement in user engagement over time. Comparing the final results for user engagement on mNutrition portfolio products with those on mFarmer, the level of user engagement is much higher. Sixty percent of users who had ever registered on mNutrition portfolio services were active in December 2016, compared to only 5% of the total base in the final months of the mFarmer Initiative (Figure 7). Power users are a sub-group of active users who have accessed services multiple times. At the end of the mFarmer Initiative, these users made up just 4% of the total base. With dedication to intelligent, user-centric design principles, the number of power users under the mNutrition Initiative has increased tenfold to 40%.

FIGURE 7

User segmentation in the mNutrition and mFarmer Agri VAS portfolios



Key findings

IMAGE COURTESY OF FROG DESIGN

The customer journey

Findings from BI, UX, and phone surveys laid out along the customer journey framework reveal key operational pain points and solutions



“When I am about to grow crops I just watch [the app] to know what I need [...]. Now I am going to grow sesame, then I open this app by typing sesame to know the period of preparing land and choosing seeds.”

Site Pyo user, male, 34, Optimist/Opportunist, Shwe Bo district, Myanmar

	Marketing	On-boarding	Navigation and content	Payment
Customer journey	27% of the target market across the six countries registered for the services	96% of registered users accessed content	77% of users accessing content became repeat users	67% of users paid for the services ¹⁵
Key findings	<ul style="list-style-type: none"> • Early UX research grounded future marketing efforts. It helped to identify the farmer archetypes who would be early adopters of the service (see p. 28) and the key value propositions for these customers. Including a marketing representative in some of the UX research can help to ensure the value proposition speaks to the target audience while also satisfying internal branding requirements. • Setting up a dedicated agent network from scratch requires a large investment, which may not be feasible for standalone Agri VAS. Finding the right incentives for the MNO agent network to promote the service proved to be difficult. On-boarding NGOs to leverage their networks was tough at an early stage, especially asking them to work for ‘mutual benefit’. However, it was feasible to bring them in at a later stage when there were more farmers on the platform. The ability to leverage the existing network of agricultural officers has been invaluable for both acquisitions and trust (see p. 24). • Traditional marketing for VAS is rare, as is evidence and benchmarks for how well it works. A lot of users first heard about the services on the radio, but it was difficult to track the effectiveness of the radio campaign — an additional push was often needed to on-board customers. • Highly targeted interactive OBD marketing has been the biggest contributor to reaching scale. Using BI to target interactive OBD messages has been a successful technique. Telenor and Dialog were both able to achieve a conversion rate of around 5–6% (versus 2% for untargeted OBDs). See p. 30 for more on Telenor’s approach. 	<ul style="list-style-type: none"> • Removing barriers to registration is critical for successful customer acquisitions. ‘One-click’ registration has been key to the success of all VAS. On-boarding processes longer than this lead to drop off during self-registration. • Agent-based profiling has been an unscalable solution. Offering a personalised solution is vital to the value proposition of the content services, and requires collecting data on what content the user would like to receive. When trying to scale a low-revenue product, relying solely on field agents or call centre agents does not allow for cost-effective profiling. For word-of-mouth marketing (which brought on two-thirds of Telenor Pakistan’s new users during peak acquisition periods) to be effective, potential users need to be able to self register. Many MNOs have turned to default profiling based on location, but users may not necessarily be most interested in the dominant crop grown in their area and may not be aware they can change their profiled crop. • Interactive profiling over time seems to be a powerful solution. Dialog has a more interactive profiling methodology that collects profile information from the user via interactive OBD over the first few weeks of service use (see p. 25). • Bundled solutions have the most comprehensive offerings, but the value proposition is less concise and the on-boarding process takes longer. Additionally, perks like free calls to a closed user group (CUG) require paying close attention to who registers for the service and ensuring the correct target market benefits. 	<ul style="list-style-type: none"> • Content is the key value proposition; delays with content approvals/sign-off cause delays throughout the product lifecycle. Involving the Department for Agriculture may pay dividends in terms of user trust, but securing their time can be difficult. • Dynamic, informative push messages increase user engagement. The services with the most active and engaged users send regular OBD messages with an opening jingle followed by tailored content, which gives the service its own voice. • Delivering timely, personalised content is achievable. Timing content to the farming calendar has been found to be vital for customer satisfaction across the board. See how Dialog Sri Lanka achieved this on p. 25. In a changing climate, weather content has been consistently cited as highly valued content (p. 26). • Getting users straight to content increases engagement. Grameenphone’s user base in Bangladesh, for example, had a surge in power users (from 1% to 55%) by porting new users from registration straight to the IVR service menu, giving them a chance to experience content immediately. • Translating navigational prompts has been a regular pitfall. In Malawi, there is no Chichewa word meaning to ‘press’ a phone button, and the Burmese word for ‘submit’ caused similar trouble. • Content must be locally relevant and actionable. Having a content specialist on the product team to ensure messages can be understood has been a strong advantage. Regular content testing with end users is also essential to getting it right. 	<ul style="list-style-type: none"> • Willingness and ability to pay for Agri VAS depends on the context. In Sri Lanka, Dialog offers the service on a PAYG basis (SLR 1 / USD 0.006) per crop per day, as subscribers are used to paying for VAS. The simple pricing model has been key to success. • In general, the target segment has shown low willingness or ability to pay for services, particularly before they have seen the value. Several of the services enjoyed more popularity once the charges were removed completely. • A one-month free trial period attracts attention. Dialog Sri Lanka experienced a big difference in uptake depending on how they sold their one-month free trial: 40% of users who agreed to pay before the free trial converted to paying customers, compared to 6% of users who were asked to pay after 30 days. • Operators have had early success with B2B charging models. In Q1 2017, Telenor Pakistan ran a pilot advert for a local fertiliser company targeting a specific segment of the user base. In countries where rural marketing is not well understood, a robust database with profiles for this segment is of great potential value. • User experience is badly affected when pricing structures are not well communicated. Having unclear or confusing pricing structures, or turning charging on and off without clear messaging, could confuse users and cause them to lose trust in the service.

15. Across the Vodafone Ghana’s Farmers’ Club, Dialog Sri Lanka’s Govi Mithuru and Airtel Malawi’s M’chikembe services (those which charge and where data is available).



COURTESY OF FROG DESIGN



COURTESY OF FROG DESIGN



Spotlight

Airtel Malawi leverages government extension networks to gain loyal customers

Malawi's extension services are stretched. The ratio of government extension workers to farmers ranges from 1:1,500 to 1:3,900, limiting the dissemination of agricultural information in harder to reach farming communities.

To help bridge this gap between extension officers and farmers, the government developed the "lead farmer approach", whereby selected farmers (more progressive farmers, respected in their community) are asked to volunteer to offer extension services to fellow farmers. Once trained, they become responsible for passing on important agricultural information to the farming community.

In collaboration with Airtel, over 1,100 staff from regional offices have been trained to use M'chikumbe, Airtel Malawi's mainly IVR-based Agri VAS offering, covering 15 crops from preparation to post-harvest, who in turn train lead farmers. The service helps them to learn new agricultural techniques which they share in regular meetings and training sessions with their farmer groups.

Airtel Malawi's M'chikumbe has been a support tool for both agricultural extension department officers (AEDOs) and lead farmers. Interviews with extension office staff, lead farmers, and farmers reveal that M'chikumbe is seen as a complement to the extension network, enabling agricultural information to reach a wider audience in more remote rural communities.

"They have these messages with them all the time so they can always refer to them if they want to re-read or re-listen to the message. They do not have to walk or go to where the extension worker resides to ask for help... Farmers are beginning to use conservation agriculture and this is a big shift from what they have believed in and practiced for a long time."
W.N. Simon, male, Head of Balaka and Bazale Extension Planning Area, Malawi

Department of Agriculture workers report that M'chikumbe helps them to do their job. This, and the government buy-in on the project, allows Airtel to leverage their presence on the ground as a distribution network for M'chikumbe without the need for financial incentives.

Having AEDOs also increases trust in the service as a source of agricultural information. UX research found that users prefer to be informed about the service by an authority figure. Only 12% reported hearing about the service through AEDOs, but all these users had tried the service content, with 67% accessing it multiple times.¹⁶ In comparison, more than half of M'chikumbe users first heard about the service through radio campaigns, but 44% of these users have never accessed content on the service.

Find out more in the M'chikumbe 212 case study.¹⁷



Spotlight

Dialog Sri Lanka uses intelligent interactive profiling to ensure personalised content

Content personalisation was identified during early UX research as a key success factor for Govi Mithuru, an IVR and OBD push service for which users pay SLR 1 (USD 0.006) per crop per day to receive and access information on paddy and a range of other vegetable crops. To ensure the content was highly tailored to farmers' needs, Dialog Sri Lanka implemented a registration process which required users to create a profile based on their language and crop preference, seeds used, agro-climatic zone, and irrigation method. They developed specialised content delivery software, which allowed precisely timed agricultural information to be pushed to different user segments at the right time based on these parameters.

Initially, users completed a multi-step registration process by dialling 616 and navigating through an IVR menu. All the vital information was collected upfront. However, BI analysis showed that as many as two-thirds of potential users were dropping off in the middle of registration process, unable to complete their profile, and UX research quickly confirmed that many were having difficulty answering multiple questions on the IVR menu.

To make this process less cumbersome, Dialog's team revamped their approach. Interactive OBD marketing was introduced which allowed users to register for the service with a one-touch response, choosing their preferred crop. The user's language is inferred from the language of the OBD they responded to. After registration, more interactive OBD messages were sent, asking individual questions about seed type, agro-climatic zone and irrigation method, to further personalise the content offering.

Additional changes were required to refine this system. UX research found that users were initially irritated by the frequency of the profiling calls, so OBDs were rescheduled to optimise the customer experience. This included not sending profiling OBD at all after a certain period, leaving the user with an intelligently assigned default profile. Users interviewed in the field say they are happy with the timely and personalised content.

Find out more in the Govi Mithuru case study.¹⁸

16. 'Rapid Feedback' phone survey, September 2016 (N=758)

17. See GSMA, 2017, [mNutrition case studies](#).

18. See GSMA, 2017, [mNutrition case studies](#). For other innovations in service design at Dialog, see: "[Dialog Sri Lanka putting farmers at the core of service design](#)".



COURTESY OF FIRETAL



Spotlight

Ooredoo Myanmar's app helps farmers be more resilient to climate change

Myanmar is one of the world's most vulnerable countries to climate change. The Ayeyarwady Delta and Sagaing regions are prominent agricultural production areas heavily affected by changing weather patterns, including floods, cyclones, and droughts. These changes are affecting crop production as new pests and diseases emerge in paddy and gram production, increasing the risk of harvest loss.

To help them cope with a changing climate, farmers are increasingly relying on sources like Site Pyo, Ooredoo Myanmar's weather-centric agricultural app, to plan and manage their crops. Dr. Tun Lwin, a famous Burmese meteorologist, provides forecasts and weather alerts which help users take steps to protect their crops, for example, by deciding when to plant seeds, harvest and take interim crop protection measures.

Users reported they had successfully protected paddy seeds which would otherwise have been destroyed by heavy rainfall, and that they had been better able to manage the application of pesticides and fertilisers. Users were also able to plan the storage of their harvest thanks to the rainfall alerts.

"When the weather forecast said there could be sporadic heavy rains in the upper part of Myanmar, and risk of floods in the delta

(lower Myanmar), I called my sister to warn her. If it is early rainy season, I check whether she has finished paddy planting or has done broadcasting of seeds. I suggest that she plants paddy in a timely manner to avoid flood. By checking the weather information, we could harvest early if needed, in that case, we could avoid crop damage."

U Than Oo, Site Pyo user, male, 37, Ayeyarwaddy region, Myanmar

"By harvesting earlier, we could reduce fertiliser cost. If we harvest paddy before it's too hot, we reduce the application of fertiliser. We saved 30,000 MMK (USD 41) per acre in fertiliser usage."

U Zaw Pine, Site Pyo user, male, 32, Sagaing region

"I spray pesticides, water the roses and harvest the roses based on the weather forecast from Site Pyo. I mainly use it to plan pesticide and water usage. I give water to the rose fields based on the weather alert. If there is a possibility of rain, I delay spraying and the watering of the rose fields."

U Zin Ko Hlaing, Site Pyo user, male, 23, Sagaing region, Myanmar

Find out more in the Site Pyo case study.¹⁹

FIGURE 8

Screenshot of the weather forecast on the home screen of the Site Pyo app by Ooredoo Myanmar, featuring a five-day forecast (by scrolling right), weather alerts, and the forecast by Dr. U Tun Lwin.



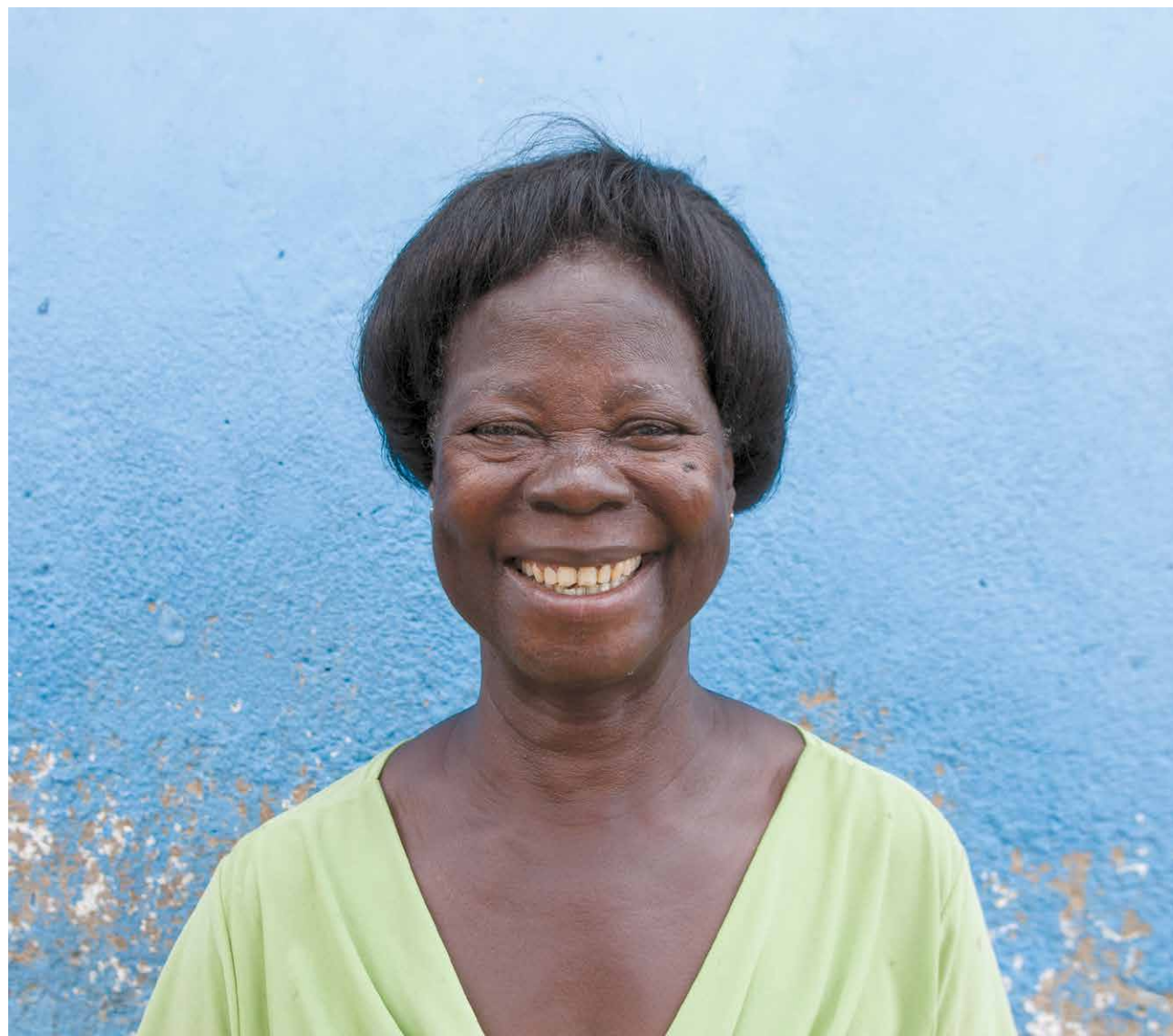
19. See GSMA, 2017, [mNutrition case studies](#).

Farmer archetypes

Farmer archetypes helped product teams target their offering to likely early adopters

Farmer archetypes were identified during early design research in five of the six countries.²⁰ The archetypes shown in Figure 9 are generalised from these findings. The 'Optimist/Opportunist' farmer was identified as a likely early adopter in all five due to their status as local innovators, and these users were






found to benefit from the services as well as cite other sources for their on-farm changes. Furthermore, other farmers were likely to mimic their actions, creating a trickle-down effect. The 'Shifter/Escapist' was also considered a key target where identified.



20. The approach taken in Malawi was different and not found to be comparable to the others.

FIGURE 9

Farming Archetypes across five countries

COUNTRIES /5	ARCHETYPE	TECH LITERACY	BUSINESS SENSE	ATTITUDES AND BEHAVIOURS	COMMUNITY ENGAGEMENT
		1 = very low	5 = very high		
<input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	 Optimist/Opportunist	<input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	Proudly manages a productive farming business. Optimistic outlook on the future, open, and financially able to experiment and take risks. Flexible with a high risk appetite.	Receptive to training and seen as a lead farmer in the community. Reaches out to information sources like extension officers. A key source of 'what works' for other farmers.
<input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	 Trapped	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>	Mostly reactive to outer circumstances and does not feel empowered to change the situation.	Engages with the family and other farmers in a similar situation. Not empowered to reach out to extension officers.
<input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	 Receptive/Acceptor	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	Hardworking but limited by lack of knowledge. Relies on traditional practices passed down from earlier generations and sees no reason to change.	Very engaged in the community, attending farmer association meetings and leading local initiatives.
<input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	 Established/Traditional	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	Cares most about taking care of the family. Well respected in the community and a confident authority due to their experience, but not always up to date.	May be involved in local farming groups, but ultimately trusts own judgement.
<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	 Shifter/Escapist	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	Difficulties with farming (e.g. low income, physical problems) have spawned a side business. Time and money poor with a low risk appetite.	Engaged in farming groups, but may need one-on-one training to overcome barriers to change.

COURTESY OF FROG DESIGN

Generalised farming archetypes across five countries, identified during design research. Other country-specific archetypes can be found in the mAgri case study series. Images courtesy of frog design.



IMAGE COURTESY OF FIRETAIL



Spotlight

Telenor Pakistan leverages network intelligence to target early adopters

Khushaal Zamindar is Telenor Pakistan's IVR and OBD-based Agri VAS offering daily weather forecasts and comprehensive crop information, as well as livestock tips. To onboard early users, the product team arranged some field events to raise awareness of the product. However, they knew that to scale they would need a marketing methodology with a broader reach, so they designed and tested interactive OBD messages and leveraged their internal BI capacity.

Telenor's aim was to identify the factors that differentiated people who sign up for the service from those who do not. To do this, the Advanced Analytics team randomly selected 60,000 users of the Khushaal Zamindar Agri VAS service and 60,000 other rural Telenor subscribers to create a model based on variables such as voice, SMS, data and VAS usage, engagement indicators, and the type of handset they used. Through repeated iterations, a total of 36 variables were determined to display significantly higher or lower values for the mAgri base when compared to the mean for the Telenor base.

The next step was to see how accurately this model predicted sign-up for the mAgri service based on these differentiating variables. The model was tested with a base of 20,000 users, and was not aware which 10,000 Telenor users were Khushaal Zamindar subscribers and

which 10,000 were non-subscribers. It was able to predict whether people in the group were users or non-users with approximately 85% accuracy, and the results provided the Telenor Pakistan product team with a valuable list of 1.1 million "potential" Agri VAS subscribers: existing Telenor Pakistan customers whose GSM behaviour matched very closely with existing Khushaal Zamindar users, but who are not yet subscribers. In this way, likely early adopters were targeted and the user base scaled rapidly.

As a result of this segmentation, Telenor was able to focus its mobile marketing to a specific segment that had a higher chance of becoming new Agri VAS users. This improved the conversion rate on outbound calls five-fold — for every 100 promotional OBD calls pushed out, five users sign up for the service, compared to less than one before targeting. Starting in mid-June 2016, the user base grew from around 60,000 to 2.9 million by May 2017. Such accurate segmentation meant that the service has grown by focusing specifically on "high potential" users while allowing other services to target their potential base in a similar manner, avoiding spamming.

Find out more in the Khushaal Zamindar case study.²¹

21. See GSMA, 2017, mNutrition case studies. For more details on the segmentation approach, see "Telenor Pakistan uses data science and analytics to boost mAgri uptake".

Finding the benefits

Phone surveys and field research to explore the benefits of Agri VAS were conducted in all six countries between December 2016 and February 2017. These interim studies, performed only nine to 15 months after launch, tracked changes to farming behaviour across several 'change areas' (as indicators of possible future benefits) alongside improvements to on-farm production and/or income.

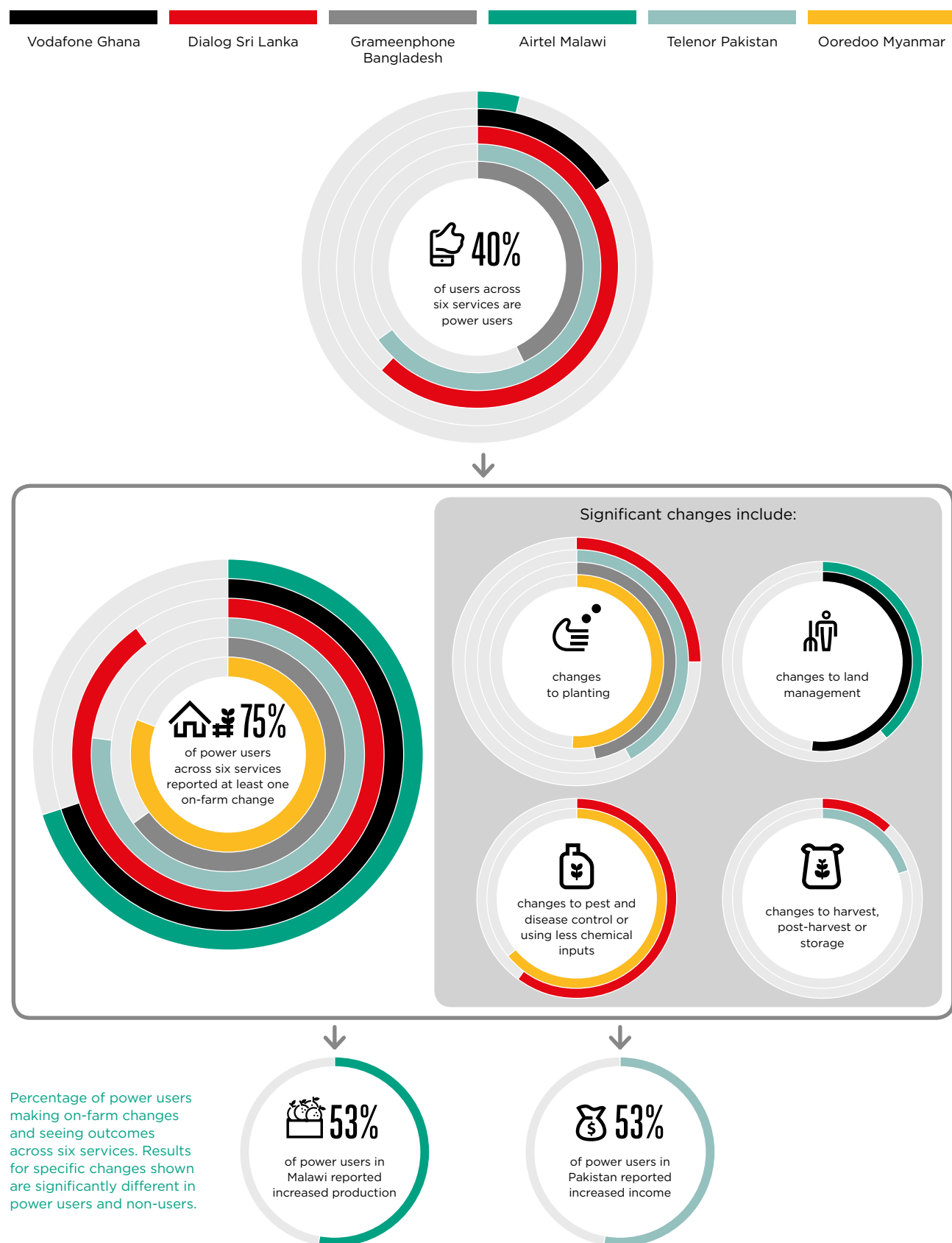
Call centres surveyed treatment groups of power users (users who had repeatedly accessed content over a period of six months, where possible) and a small sample of non-users (who registered before the phone survey date, but had not accessed any information). The non-user group was selected based on the likelihood they would have similar profiles to the user group, but would not have benefitted from the service during the previous farming season. A sample of respondents were interviewed in the field, selected to provide a range of perspectives from different service users.



IMAGE COURTESY OF FROG DESIGN

FIGURE 10

The outcomes pathway for mAgri mNutrition-funded services



Percentage of power users making on-farm changes and seeing outcomes across six services. Results for specific changes shown are significantly different in power users and non-users.

The potential of Agri VAS to drive behaviour change in the user base is most evident by power users reporting significantly more on-farm changes than other users

Power users are more likely to report on-farm changes between the last season and the previous season than non-users, in at least one area for each service. A comparative analysis was performed to understand whether changes in behaviour and outcomes could be attributed to the services. This was done by controlling for several potentially confounding variables, like farm size, income type, age and sex, using a matched subset of participants in each country.²² Figure 11 shows all the significant findings across the six services. Power users on Airtel Malawi, Dialog Sri Lanka, and Telenor Pakistan services showed the most significant differences from non-users (three per service). Users of Airtel Malawi and Dialog Sri Lanka's services displayed the highest odds ratios, meaning the likelihood of a power users to report a change was the highest compared to a non-user. For example, in Malawi, power users were 3.8 times more likely to report changes to land management practices than a matched group of non-users.

Changes to planting were the most frequently reported and significant change (four of the six services). This may be because there are more financial or comprehension barriers to implementing changes further along the farming season. Delays in collecting outcomes survey data may also have contributed to more positive service-related findings in the non-user group towards the end of the farming season, as data collection took over two months to complete in some cases.

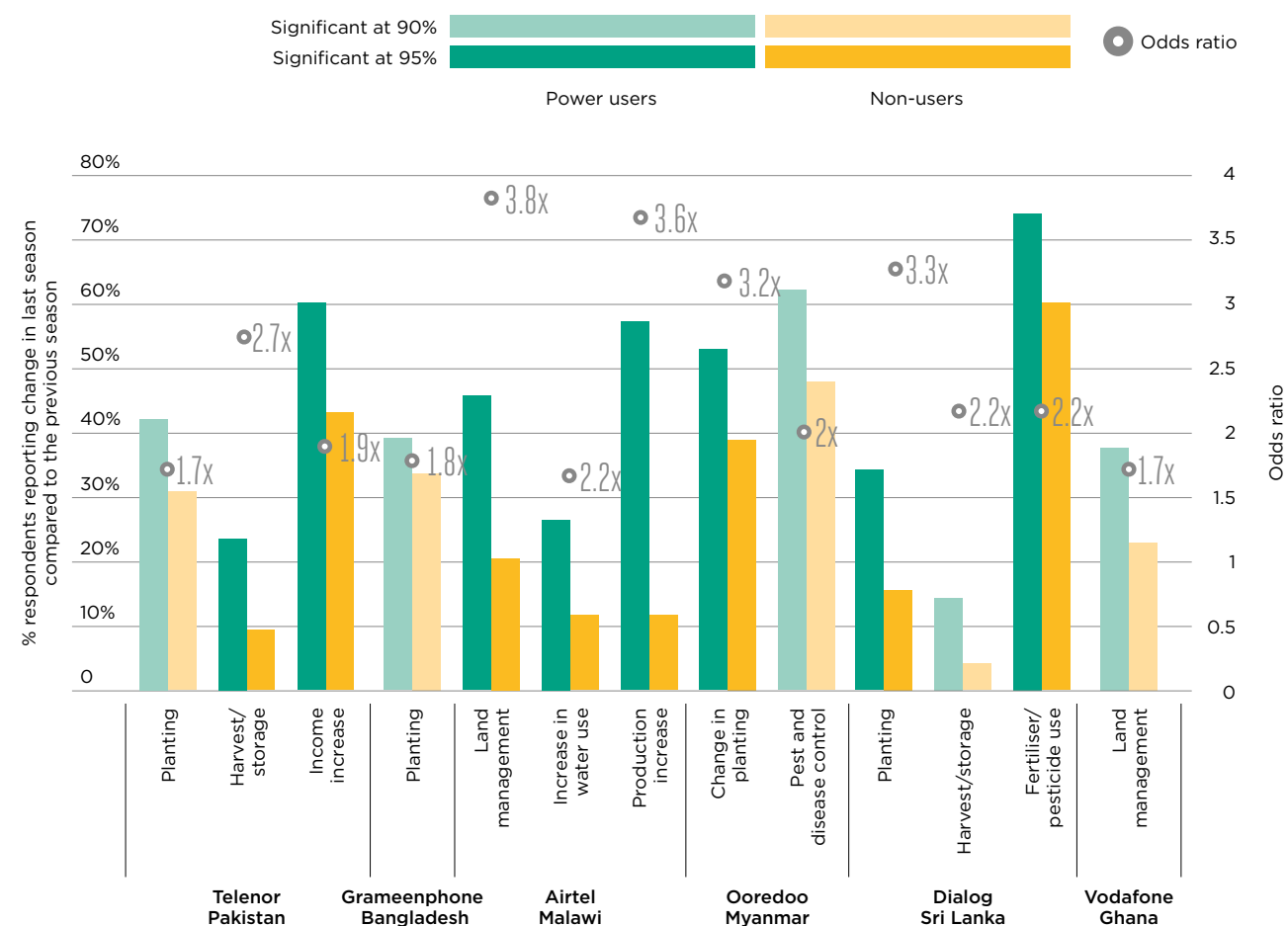
Power users generally reported more on-farm changes than non-users. Self-reported on-farm changes were tracked across all services. In five of the six countries, power users were more likely than non-users to report making any on-farm change (65% in Bangladesh to 90% in Sri Lanka). In four of the six countries, power users were more likely to report three or more on-farm changes than non-users.

Significant odds ratios for increases in income and production were found in Pakistan and Malawi, respectively

22. The comparison was made between sub-groups of power users and non-users using coarsened exact matching. Please contact mAgri@gsma.com for the full methodology.

FIGURE 11

Behaviour changes and outcomes



Behaviour changes and outcomes where a significant odds ratio was found between power users and non-users across all six services, controlling for variables such as age, sex and location. A significant odds ratio (the odds that the change/outcome will occur given exposure to the service compared to the odds of the outcome occurring in the absence of that exposure) greater than one suggests that the Agri VAS is more likely to lead to the stated behaviour change or outcome than its absence.

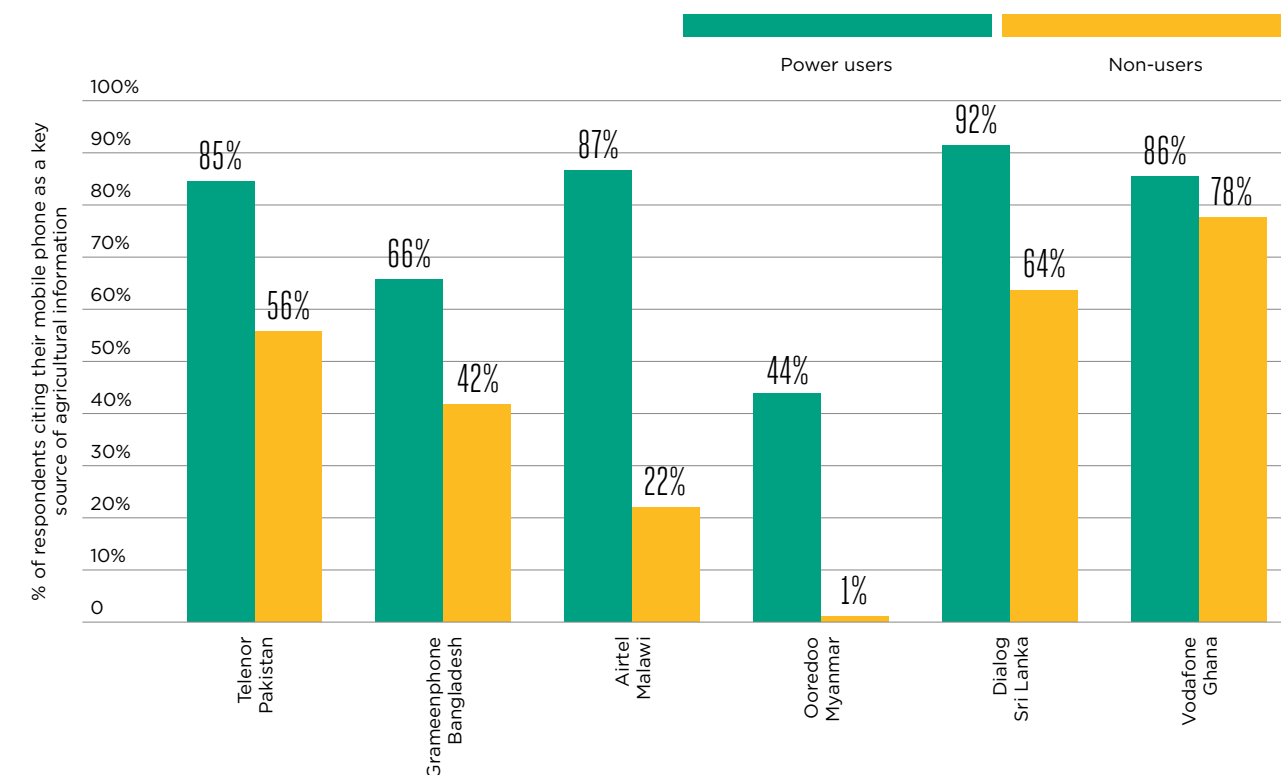
Power users in Pakistan are 1.9 times more likely to report an increase in income than non-users, and power users in Malawi are 3.6 times more likely to report an increase in production than non-users. In other cases, users reported increases in production and income, but not significantly more than non-users. See the mAgri mNutrition Initiative case study series for more details.²³

Power users cite their mobile phones as a source of agricultural information. Agri VAS are often cited as one source of agricultural information which contributes to improved practices and benefits for farmers. Across all six countries, power users were more likely than non-users to say their phone was one of the two main sources of agricultural information influencing on-farm changes (Figure 12). Qualitative data from the fieldwork suggests that power users have come to trust their mobile suppliers as a source of agricultural information – a reversal of the original design research finding.²⁴

The mAgri portfolio under the mNutrition Initiative is estimated to have encouraged behavioural changes in over 1.5 million farmers. The estimated proportion of users across all services who have implemented an on-farm change is 36% – a total of over 1.5 million farmers who have made on-farm changes in response to the services.

FIGURE 12

Power users cite their mobile phones as a key source of agricultural information more often than non-users



Across all six services, power users identify their phone as a source of agricultural information contributing to on-farm changes more than non-users

23. GSMA, 2017, [mNutrition case studies](#).

24. See p.18.

User demographics

More than half of Agri VAS power users live below the poverty line. Outcomes studies found that 60% of power users worldwide are living below the poverty line. These findings are from different contexts with different national poverty levels ranging from 7% in Sri Lanka to 88% in Malawi.

One in five power users worldwide is under 25. This ranges from over 40% in Bangladesh to under 4% in Ghana. In Bangladesh, phone sharing is very common. Many young users reported registering for the service to help out their fathers, even though they were not on-farm decision-makers.

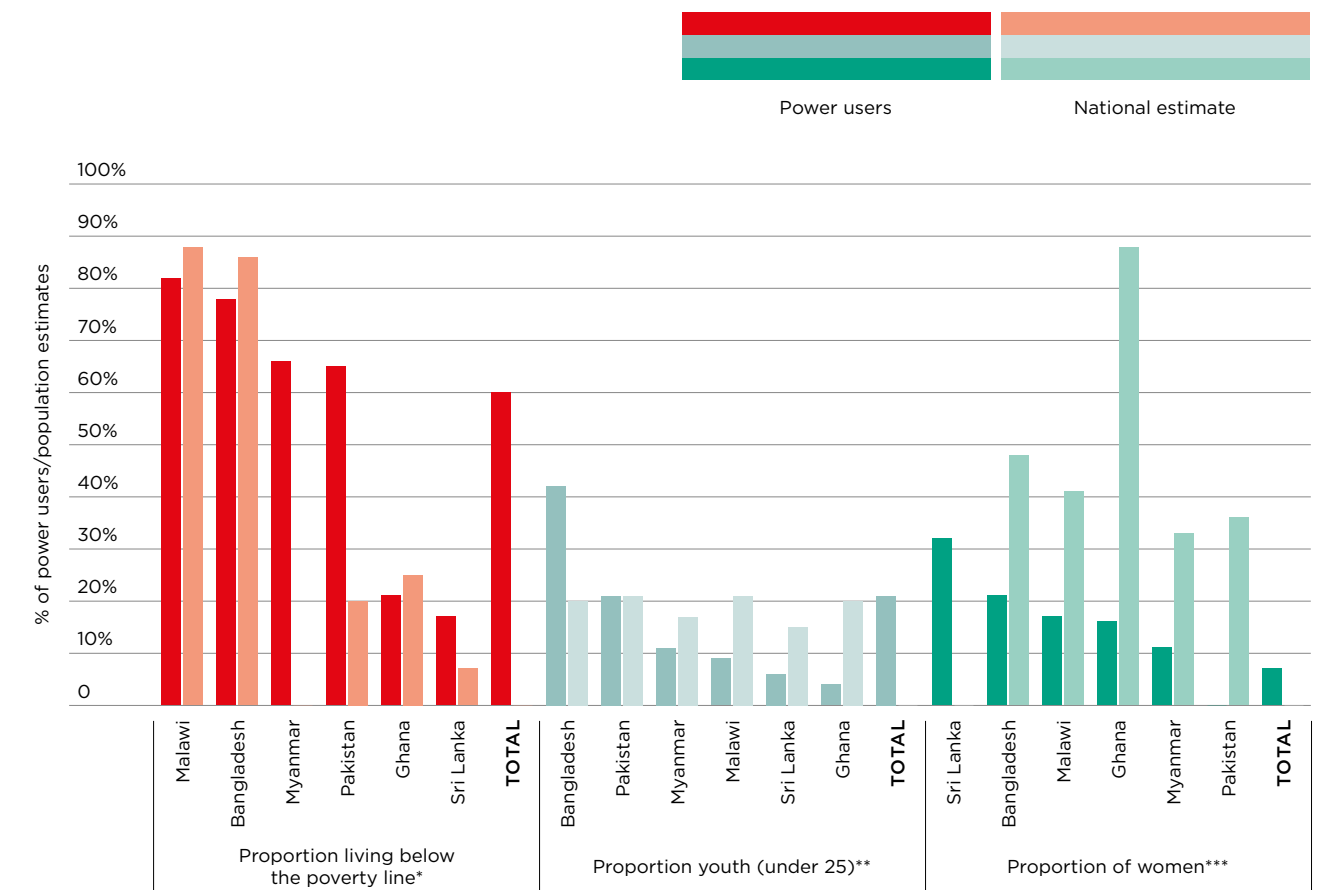
Nine out of ten power users surveyed worldwide are male. Women play a variety of roles in agriculture in these six countries. Outcomes studies found that only 7% of power users globally were women (from 0% in Pakistan to 32% in Sri Lanka). This figure was skewed strongly by Pakistan, where Telenor had the largest number of power users of all the six services. However, cultural barriers may prevent women receiving calls from an unknown number in rural Pakistan, calling into question the reliability of random sampling in this instance. Telenor estimates that 20% of the user base was female in January 2017.

The services with the highest proportion of female users targeted content specifically for women, allowing the service to be equally accessible by both men and women. Dialog Sri Lanka used BI to identify housewives (using their phone location during the day and in the evening as key indicators) to market home gardening content, which is the only part of the service to be recorded in a woman's voice. This led to a surge in female users. Content targeted for women was also used in Bangladesh, which had the second-highest proportion of female users despite a strong patriarchal culture. Grameenphone and their partners also targeted women's groups through partnerships with NGOs to engage women specifically (see p. 38).

Few of the MNOs could give a clear indication of the number of female users they were reaching using internal data. Discovering the scale of the gender gap is the first step towards improving women's access to services.²⁵ Collecting gender data through mAgri services and other large VAS would contribute to this understanding.

FIGURE 13

Demographics in power users compared to the national average



* National data from [PovertyNet](#), World Bank (not available for Myanmar).

** National data from World Bank estimates from the database, Health Nutrition and Population Statistics: Population Estimates and Projections.

*** National figures for the proportion of women who own mobiles from [finclusion.org](#), Malawi data from [Afrobarometer](#), Myanmar data from GSMA and LIRNEasia, 2016, "[Mobile phones, internet, and gender in Myanmar](#)", data for Sri Lanka not available.

25. See, for example, GSMA, 2016, "[Using your data to drive growth in women's use of mobile money services](#)".



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Spotlight

Grameenphone Bangladesh helps women use Agri VAS

Bangladesh has a strong patriarchal social system. Women are often subject to discrimination and recognition of their contribution to agriculture is limited. Although 68% of women in Bangladesh are directly involved in agricultural production and rearing livestock,²⁶ they are frequently excluded from agricultural extension support, have limited access to markets and a negligible role in decision-making.

In an effort to reach out to female users and help them benefit from valuable agricultural information, Win Miaki and Grameenphone partnered with local NGOs²⁷ to deploy GP Krishi Sheba, an OBD and IVR service covering 16 crop, livestock, and fish topics from preparation to post-harvest, as well as weekly nutrition content, with activities aimed at empowering women farmers.

Female users interviewed said they listen to messages with other female family members in their homes. They discuss this new information with other women in the neighbourhood in the afternoons after their household chores, and openly share the information with other women who do not have access to the service.

“Sometimes I put my phone on loudspeaker to listen to the calls with my co-workers and neighbours. When I get a call, I turn on the

loudspeaker and let everyone around me to hear the message. People see that what I am doing in my fields is working, so they want to know more.”

Mosammat Farida Begum, female GP Krishi Sheba user and CARE SHOUHARDO beneficiary, Rangpur division, Bangladesh

“I advised my neighbours and relatives since we have the phone. We discussed in meetings and help each other. We always help those who do not have a phone, sometime we call in the call centre on behalf of others. I have shared with around three or four people and with my husband, relations, and neighbours.”

Mst. Farzana Parvin, female GP Krishi Sheba user and CARE SHOUHARDO beneficiary, Rangpur division, Bangladesh

The nutrition content, which is sent as an OBD once a week, is considered by female users to be very relevant content.

“I share the tips regarding nutrition with my friends. I discuss what I learn with my mother. I now buy more nutritious foods like beans and eat more fish.”

Mst Farzana Parvin, female GP Krishi Sheba user and CARE SHOUHARDO beneficiary, Rangpur division, Bangladesh

Find out more in the GP Krishi Sheba case study.²⁸

On-farm changes and outcomes: user stories from the field

Power users of all six services told how information from the services had led them to make on-farm changes

PLANTING



“This year, we used different type of seeds. Sowing same seed in the same field in consistent basis does not give good harvest. In past, we used to plant cucumber seeds without properly knowing. Now I have learnt that cucumber seeds are to be placed keeping a gap of 10-12 feet. That will give us better production.”

GP Krishi Sheba user, female, 35, Shifter/Escapist, Nilphamari district, Bangladesh



“The weather app announced that La Niña is likely to happen most after El Niño. After [El Niño] we grew the crops early for avoiding the cold. But later we know that La Niña is weaker; we can grow the crops late and we grew them late. But for those who were worried the weather and grew crops early faced pests’ infestation. Most farmers suffered.”

Site Pyo user, male, Receptive/Acceptor, Shwe Bo District, Myanmar



IMAGES COURTESY OF FIRETAIL

26. World Bank Data, 2005

27. Women’s groups were affiliated with the following NGOs: National Development Programme, Oxfam, Care Bangladesh, and Polliree.

28. See GSMA, 2017, mNutrition case studies.

LAND MANAGEMENT



“I was further told that after germination I should apply 23:23:0 fertiliser and lastly [when seedlings are] knee high I should apply urea. I did all this and the crop is doing much better than the rest of the crops grown.”

M'chikumbe user, female, 24,
Balaka district, **Malawi**



“It is helpful because they update me on the prices of products and the weather, when they tell me it's going to rain, I will not water my crops again. I will wait for the rain to fall and the money I would have used to buy petrol would be used for something else.”

Farmers' Club user, male, Shifter/Escapist, 32,
Mampong district, **Ghana**

DECREASE IN FERTILISER AND PESTICIDE USE



“I received information on water management. After first ploughing I irrigated the field based on the instructions of Govi Mithuru. I also maintained the water level in paddy field as it was advised. Earlier we didn't pay much attention to water management and we didn't maintain a standard water level in the field. But this time we were able to change our practice and follow the standard irrigation practices. It helped to control the weeds.”

Govi Mithuru user, female, 37, Trapped,
Anuradhapura district, **Sri Lanka**

HARVEST AND STORAGE



“Before it was problematic as the crop used to go bad when we use to store it and it had major losses. Now as far as drying is concerned this time we have tried to ensure that we dry it and then store it and it has been very useful for us.”

Khushaal Zamindar user, male, 49, Optimist/
Opportunist, Faisalabad district, **Pakistan**



BETTER NUTRITION PRACTICES



“At first we used to take only banku but now [...] I add beans to it. [...] I didn't know but now that the Vodafone Farmers' Club gave us information on that, I have added it into my menu.”

Farmers' Club user, female, 35, Trapped,
Suhum district, **Ghana**



There is strong evidence that the services have helped farmers to increase production and incomes

INCREASES IN PRODUCTION AND INCOME



“The growth of the crops has improved and now we get more to sell in the market. Last year it was approximately 25 mun (1,000 kg) and now it is 40 mun (1,600 kg) of sugar cane this year. God has been very kind to us, let’s see how this sells in the market.”



Khushaal Zamindar users, male, 34, Optimist/ Opportunist, Faisalabad district, Pakistan



“My harvest increased compared to previous season. I learned many new things on paddy cultivation from Govi Mithuru. I received 2,500 kg to 3,000 kg before I joined Govi Mithuru. After registering to the service my harvest increased to 4,000 kg to 4,200 kg.”

Govi Mihturu user, male, 57, Trapped, Anuradhapura district, Sri Lanka



“I got advice of bitter gourd and pumpkin. I planted them on 5 katha (unit of area) field according to the advice. Income increased from BDT 40,000 [USD 499] to BDT 50,000 [USD 624].”

GP Krishi Sheba user, male, 30, Optimist/ Opportunist, Rangpur district, Bangladesh



“For the season 2015, I harvested 5 bags of 50 kg each while during the 2016 season I harvested 22 bags. [...] The increase was due to the advice I got from the service and I implemented it.”

M’chikumbe user, male, 35, Lilongwe District, Malawi

Service sustainability

Working towards commercial sustainability is an important goal with implications across the service development process. MNOs who are genuinely enthusiastic about the design process and carefully consider their partnerships tend to have stronger services and are more likely to have a sustainable service over the long term.

Designing, launching, and maintaining mAgri services requires meaningful investments. During the mNutrition Initiative, the average investment in Agri VAS was around £600,000. Regardless of the source of funding (for-profit commercial organisations, NGO, donors, or government), a clear commercial case is needed to justify the allocation of funds for the service. This question of longer term commercial sustainability needs to be kept top of mind through all stages of mAgri service development.

Most of the mAgri MNO partners set conservative commercial goals (e.g. operational breakeven) and used this as an opportunity to increase their rural presence and generate indirect (non-financial) commercial returns. Others had more immediate shorter term KPIs based on generating meaningful direct revenue by charging farmers.

Analysis of key performance indicators shows a correlation between MNO ownership and commercial sustainability. “Ownership” is defined as the degree to which the MNO relies on partners versus internal capacity to drive service management. The MNOs who have demonstrated the highest degrees of ownership over the service experience the highest activity and engagement rates (Figure 14). Those who led UX research internally and empowered their team to make service design decisions based on their lessons in the field, are likely to be more interested and motivated to get foundational issues right, like design and requirement specifications.

To create a sense of ownership, senior managers need to strike the right balance of KPIs and objectives for commercial KPIs (the desired outcomes) and those which measure careful user research, decision-making, and implementation (the process needed to achieve the outcome). To do this, C-level support for services is vital.

FIGURE 14

Ownership indicators per MNO

MNO	UX DESIGN	CXO INVOLVEMENT
Vodafone Ghana	Outsourced	Low
Airtel Malawi	Hybrid	Medium
Telenor Pakistan	Insourced	High
Dialog Sri Lanka	Insourced	Medium
Grameenphone Bangladesh	Outsourced	Low
Ooredoo Myanmar	Hybrid	Low

Capital expenditure (CAPEX) is minimised by partnering with existing vendors who are invested in the service and willing to share or bear the development costs. Designing, planning, developing, and launching Agri VAS can be resource intensive. MNOs have found ways to reduce this need for CAPEX (to as little as 10% of the total budget) by engaging their existing ecosystem of vendors and service providers. The largest costs incurred were around software and technology integration between the MNO network and their vendor's. Development costs were often born by the vendors.

The services with the greatest impact spent most of their operating expenses (OPEX) on staffing. Traditional MNO service delivery models minimise operational costs by engaging vendors on a revenue-share basis. However, new and innovative services come with new costs for MNOs, primarily cost of goods sold (COGS), staffing, and marketing. The most sustainable services invested most of their OPEX in staffing, which may have had a positive effect on the efficiency of COGS and marketing spend (Figure 15). COGS is made up primarily of content and costs billed by technology vendors.

Farmers may have little to no willingness or ability to pay conventional tariffs for value-added services. Half of the MNO partners are offering the service for free, while the other half offered it at cost or at mark-ups well below commercial norms.

Four out of six MNOs found lower customer churn and increased average revenue per user (ARPU) among Agri VAS users compared to non-users. Four service providers were able to show substantially lower churn in their Agri VAS user bases than in comparable network users. Correlations between subscription to the mAgri service and an increase in ARPU were also identified, in one case, more than 10% within 3 months of subscribing.

B2B revenue models can subsidise the end user. MNOs are well positioned to generate direct revenue under a B2B model. For example, Telenor Pakistan signed up a fertiliser company who wanted to advertise to their mAgri base through the OBD/IVR channel. The 2.9 million farmers on the service (in May 2017) showed high activity levels and, combined with Telenor's ability to segment users along multiple parameters, presented a strong value proposition for the agribusiness. Telenor is now in discussion with other agribusinesses to extend B2B partnerships. They have also signed an agreement with local state government to provide digital services for the agriculture segment.

FIGURE 15

Allocation of OPEX per MNO

	Vodafone Ghana	Airtel Malawi	Dialog Sri Lanka	Telenor Pakistan	Ooredoo Myanmar	Grameenphone Bangladesh
COGS	34%	53%	9%	24%	55%	50%
Staffing	14%	31%	70%	48%	12%	13%
Marketing	52%	16%	21%	28%	33%	37%

Teams who have a close understanding of the wants and needs of their users tend to take more care in writing detailed and comprehensive service requirements and targeting their marketing more efficiently (depending less on blind SMS/OBD marketing).

Marketing and distribution requires iterations and understanding the customer. The most cost-effective and scalable user acquisition models have been mobile-enabled (see p. 30 for Telenor Pakistan's approach). The most challenging model proved to be agent driven. With on average five times the costs for substantially fewer new users acquired, the objectives behind agent-led models need to be carefully considered. Considering the literacy rates of target users and their need for face-to-face guidance, we can learn from a few key challenges:

- The traditional MNO sales and distribution model, which has proven successful for urban SIM and airtime scratch card distribution, cannot be "copy and pasted" to Agri VAS in rural markets. Newer approaches to agent recruitment and training need to be explored,²⁹ and the development of a rural model needs to be carefully managed by the MNO's mAgri team rather than outsourced to a firm which operates conventional SIM and airtime distribution.
- As newer approaches to agent management are explored, so must incentives be carefully tailored to motivate the desired agent behaviour. To yield better quality subscribers, agents must have service-specific incentives related to farmer registration, education and driving repeat usage, and not be incentivised solely to sell SIM cards.

29. The GSMA Mobile Money team have begun to explore this problem for Mobile Money agents. See GSMA, 2015, "Spotlight on Rural Supply: Critical factors to create successful mobile money agents".

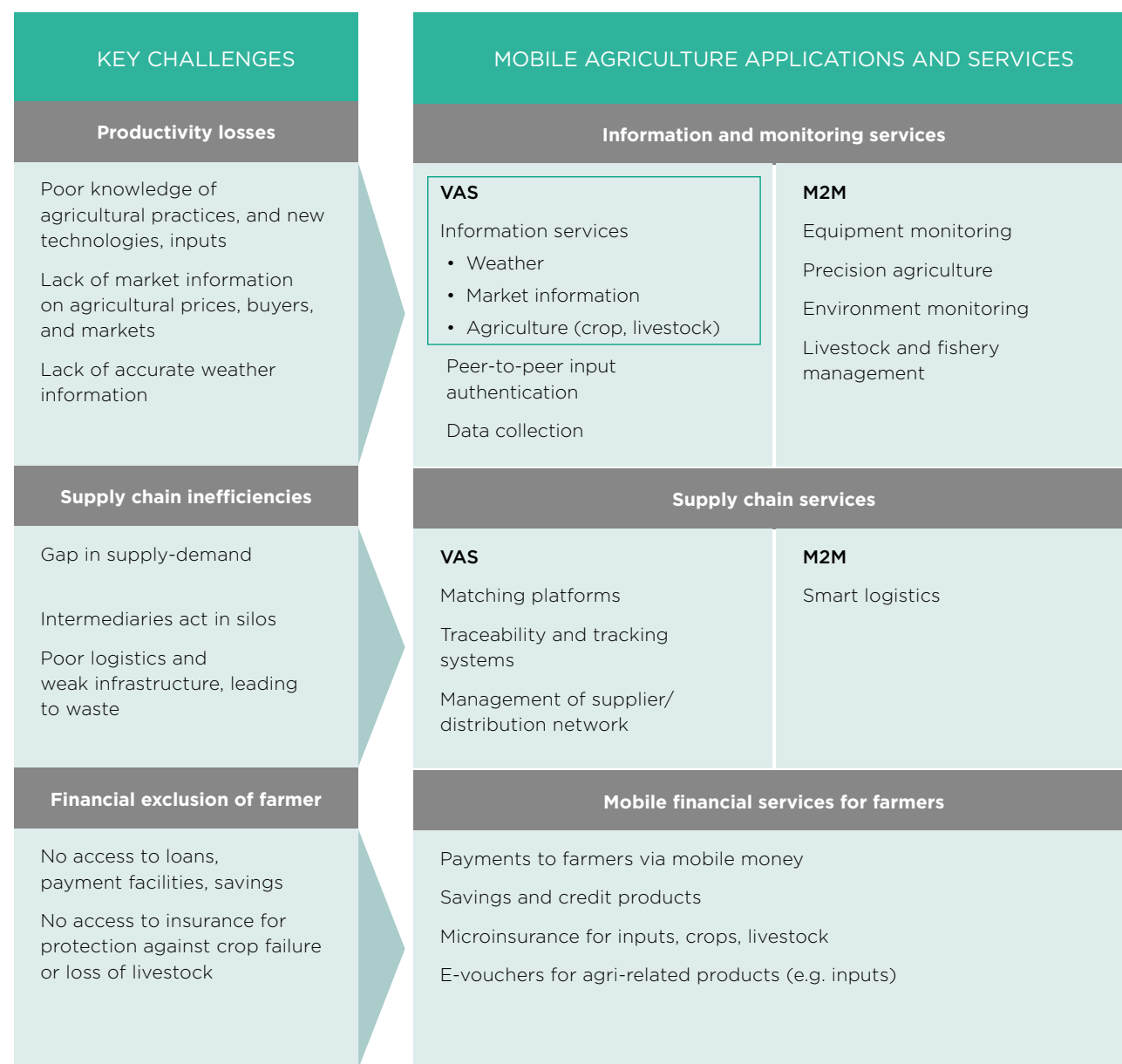
The future roadmap for mAgri services

The six services under the mNutrition initiative show how, with the right approach, Agri VAS can be successfully scaled. However, considering the many challenges rural smallholder farmers face and the range of needs they have, Agri VAS on their own provide a

narrow value proposition. Taking a more holistic view of the challenges in the growing agriculture sector yields many opportunities for service providers to expand their value proposition (Figure 16).

FIGURE 16

Opportunity for mobile solutions in agriculture



The highlighted box (VAS - Information services) is the focus of the six services showcased in this report

Service providers may be faced with multiple opportunities to expand and will need to consider which options are most attractive and worth their investment. Deciding where to begin expansion should start with pressing challenges in agriculture and from farmers, agribusinesses, or other stakeholders. Service providers who have a good understanding of farmers' wants and needs are in the best position to build complementary products and services by applying new technology.

Short-term opportunities for digital technology in agriculture value chains include:

- **Agri apps.** As the cost of smartphones come down and mobile broadband penetration increases in rural areas, more options for delivering multi-media content will open up. While questions remain about the role and strategy for MNOs in the app space,³⁰ there is clear opportunity to integrate mobile money for emerging e-commerce solutions in the agriculture sector.³¹
- **Agri payments.** Some markets with emerging mobile money networks in rural areas can already begin digitising payments for farmers. This can range from a simple application of bulk payments from agribusinesses to farmers to more sophisticated systems digitising instant payments.

GSMA Intelligence estimates that digitising business-to-person (B2P) payments in agricultural value chains in emerging markets could result in up to USD 2 billion annual revenue in 2020 for mobile money service providers.³²

- **Mobile financial services (MFS).** Savings represent an immediate opportunity for MFS, with the mobile money account becoming a tool for efficient cash management. In addition, farmers with digitised payment histories and an enhanced digital profile are also in a better position to apply for appropriately priced agricultural credit and medium-term asset financing for equipment, livestock, and other investments. As mobile money adoption and technological and financial literacy grow, insurance offerings can be considered as a secondary use case.

30. See GSMA, 2016, IFFCO Kisan Agricultural App - Evolution to data driven services in agriculture, <http://www.gsma.com/mobilefordevelopment/programme/magri/iffco-kisan-agricultural-app-evolution-to-data-driven-services-in-agriculture>

31. Read more: [A future without supermarkets](#)

32. Study of 69 markets across South Asia and Sub-Saharan Africa. GSMA, 2016, "Market size and opportunity in digitising payments in agricultural value chains"



For case studies on the six service in the mAgri mNutrition portfolio, please visit www.gsma.com/magri/creating-scalable-mobile-solutions

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