ANALYSIS

Market size and market opportunity for agricultural value-added-services (Agri VAS)

February 2015
Agenda

Context

Growth of Agri VAS

Model assumptions and methodology

Model outputs

Value proposition
Agriculture workforce and productivity

- 98% of the total labour force in agriculture lives in developing countries, however cereal yield in developing countries is 70% of the yield in developed countries.

- In emerging markets, on average 47% of the labour force works in agriculture, some 1.8 billion people compared to 5% in developed countries (31 million people).

- On average, in developing countries the cereal yield is 3,300 kg/hectare compared to 4,805 kg/hectare in developed countries.

**Figure 1:** Proportion of Labour force in agriculture, developing economies only, 2013
*Source: FAO*

**Figure 2:** Agriculture productivity (kg/hectare), developing economies only, 2013
*Source: World Bank*
Agriculture economic contribution

- Agriculture is one of the main drivers of the economy in developing countries, contributing 11% of GDP.
- Agriculture contribution to GDP is only 2% in developed countries.
- In developed countries agriculture was worth $515 billion in 2013, compared to $2,428 billion in developing countries.

**Figure 3:** Agriculture, value added (% of GDP), developing economies only, 2013
*Source: World Bank*

### Developing countries
- High labour force in agriculture
- Low productivity
- High contribution to GDP

### Developed countries
- Low labour force in agriculture
- High productivity
- Low contribution to GDP

One of the main reasons for the low productivity in developing countries is the lack of access to information such as weather forecasts and tips on disease prevention.
# Use case and benefits – the opportunity for mobile

## Key Challenges

### Productivity losses
- Poor knowledge of agricultural practices, new technologies, inputs
- Non-availability of market information around prices of agricultural produce, buyers and markets
- Lack of accurate weather information

### Supply chain inefficiencies
- Gap in supply-demand match
- Intermediaries act in silos
- Poor logistics and weak infrastructure, causing wastage

### Farmers’ financial exclusion
- Non-availability of loans, payment facilities, savings
- Non-availability of insurance for protection against crop failure or loss of livestock

## Mobile agriculture applications and services

### Information and Monitoring services

<table>
<thead>
<tr>
<th><strong>VAS</strong></th>
<th><strong>M2M</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Information services</td>
<td>Equipment monitoring</td>
</tr>
<tr>
<td>Weather</td>
<td>Precision agriculture</td>
</tr>
<tr>
<td>Market information</td>
<td>Environment monitoring</td>
</tr>
<tr>
<td>Agriculture (crop, livestock)</td>
<td>Livestock &amp; fishery management</td>
</tr>
<tr>
<td>Peer-to-peer</td>
<td></td>
</tr>
<tr>
<td>Input authentication</td>
<td></td>
</tr>
<tr>
<td>Data Collection</td>
<td></td>
</tr>
</tbody>
</table>

### Focus of the report

## Mobile Financial services for farmers

<table>
<thead>
<tr>
<th><strong>VAS</strong></th>
<th><strong>M2M</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Matching platforms</td>
<td>Smart logistics</td>
</tr>
<tr>
<td>Traceability and tracking systems</td>
<td></td>
</tr>
<tr>
<td>Management of supplier/distribution network</td>
<td></td>
</tr>
</tbody>
</table>

### Focus of the report

## Supply chain services

<table>
<thead>
<tr>
<th><strong>VAS</strong></th>
<th><strong>M2M</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Payments to farmers via mobile money</td>
<td></td>
</tr>
<tr>
<td>Savings &amp; credit products</td>
<td></td>
</tr>
<tr>
<td>Micro insurance for inputs, crops, livestock</td>
<td></td>
</tr>
<tr>
<td>E-vouchers for agri-related products (e.g. inputs)</td>
<td></td>
</tr>
</tbody>
</table>
Agenda

Context

Growth of Agri VAS

Model assumptions and methodology

Model outputs

Value proposition
• Mobile agriculture value added services (VAS) have been developed to overcome the information gap faced by farmers in developing countries

• Currently the GSMA Mobile for development tracker tracks 98 live Agri VAS deployments among other mobile agriculture services throughout Asia, Africa, the Middle East and Latin America

• 6 of these Agri VAS offer also mobile financial services to farmers

• Africa has the largest number of live Agri VAS (52), followed by Asia (37), Latin America (6) and the Middle East (3)

Figure 4: Agri VAS evolution
Source: GSMA Product and Service tracker
Note: The analysis focuses only on Agri VAS for which all the data is available
Agri VAS provider landscape

- Globally, operators lead more Agri VAS than NGOs (22 versus 16)

- In Asia, operators are dominant in the space by leading 33% of total services, followed by NGOs and foundations with 15% of Agri VAS

- In Africa, NGOs and foundations are dominant in the space by leading 26% of total services, followed by mobile operators and technology vendors with 23% of Agri VAS

**Figure 5:** Lead organisation involvement in Agri VAS
Note: Other includes academia, agri suppliers, consultants, associations, agri financial services providers
Source: GSMA Product and Service tracker
Agenda

Context

Growth of Agri VAS

Model assumptions and methodology

Model outputs

Value proposition
Countries included in the model

The regions of focus for the report are Sub-Saharan Africa and South Asia

Countries have been selected if the agricultural value add (% of GDP) in 2013 was greater than 10%

*Source: World Bank*

**South Asia (7 countries)**
- Afghanistan
- Bangladesh
- Bhutan
- India
- Nepal
- Pakistan
- Sri Lanka

**Africa (30 countries)**
- Angola
- Benin
- Burkina Faso
- Burundi
- Central African Republic
- Chad
- Comoros
- Cote d’Ivoire
- Ethiopia
- Gambia
- Ghana
- Guinea
- Kenya
- Liberia
- Madagascar
- Malawi
- Mali
- Mauritania
- Mozambique
- Niger
- Nigeria
- Rwanda
- Sao Tome and Principe
- Senegal
- Sierra Leone
- Tanzania
- Togo
- Uganda
- Zambia
- Zimbabwe
Introduction to the market sizing model

Across the 37 countries chosen, the Agri VAS market size was derived from two main factors:

1. An estimate of the number of agricultural workers with a mobile phone, and, among those, the ones subscribing to Agri VAS. This will result in the number of potential Agri VAS users.
2. An estimate of farmers' expenditure on Agri VAS.

The model has been sense checked with operators in the industry.

Potential Agri VAS users:
- Labour force in agriculture
- Agricultural workers with a mobile phone
- Agricultural workers with a mobile phone and subscribing to Agri VAS

Applied rural mobile subscriber penetration rates to labour force in agriculture
Applied Agri VAS penetration rates to agricultural workers with a mobile phone

Potential Agri VAS users × Annual ARPU = Agri VAS market size
Potential Agri VAS users – agricultural workers with a mobile phone

The following steps have been applied to each of the 37 selected countries:

1. Calculating the total mobile subscriber penetration split by smartphone/feature phone
2. Taking “Penetration Urban” = 1.3 x “Penetration Rural” (over time this factor will reduce as urban and rural get closer to parity)
Potential Agri VAS users – agricultural workers with a mobile phone and subscribing to Agri VAS

Countries have been classified according to two metrics, income and productivity, to establish the potential uptake of Agri VAS.

Countries have been classified as high potential (more likely to subscribe to Agri VAS), low potential (less likely to subscribe to Agri VAS) and mid potential.

<table>
<thead>
<tr>
<th>Propensity to spend</th>
<th>Improved cereal yield</th>
<th>Likeliness to subscribe to Agri VAS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Income</strong> (GDP per capita)</td>
<td><strong>Productivity</strong> (Cereal yield)</td>
<td><strong>Potential</strong> Potential take-up of Agri VAS</td>
</tr>
<tr>
<td>Lower income ≤ $1,045</td>
<td>Lower productivity ≤ 2,310</td>
<td>=</td>
</tr>
<tr>
<td>Higher income &gt;$1,045</td>
<td>Higher productivity &gt;2,310</td>
<td>=</td>
</tr>
<tr>
<td>Higher income</td>
<td>+</td>
<td>Lower productivity</td>
</tr>
<tr>
<td>Lower income</td>
<td>+</td>
<td>Higher productivity</td>
</tr>
<tr>
<td>Higher income</td>
<td>+</td>
<td>Higher productivity</td>
</tr>
<tr>
<td>Lower income</td>
<td>+</td>
<td>Lower productivity</td>
</tr>
</tbody>
</table>
Potential Agri VAS users – country split by potential take-up of Agri VAS

Average cereal yield of the 37 selected countries (= 2,310 Kg per hectare)

UN classification of low income country (GDP per capita < $1,045)

Cereal yield (kg/hectare) vs. Income (US $)
Potential Agri VAS users – Agri VAS adoption rates

The adoption rates of Agri VAS were estimated by considering adoption rates of other VAS and through discussions with VAS managers in the industry.

In addition, the uptake of Agri VAS was estimated as a share of unique subscribers for the different country categorizations (high, mid and low potential).

Potential users expressed as a share of agricultural workers with a mobile

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>High potential countries</td>
<td>30%</td>
<td>32%</td>
<td>33%</td>
<td>35%</td>
<td>37%</td>
<td>38%</td>
<td>40%</td>
</tr>
<tr>
<td>Mid potential countries</td>
<td>20%</td>
<td>22%</td>
<td>23%</td>
<td>25%</td>
<td>27%</td>
<td>28%</td>
<td>30%</td>
</tr>
<tr>
<td>Low potential countries</td>
<td>10%</td>
<td>12%</td>
<td>13%</td>
<td>15%</td>
<td>17%</td>
<td>18%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Potential users expressed as a share of total unique mobile subscribers

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>High potential countries</td>
<td>5%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>Mid potential countries</td>
<td>5%</td>
<td>5%</td>
<td>6%</td>
<td>6%</td>
<td>7%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Low potential countries</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>4%</td>
<td>4%</td>
<td>5%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Table 1: Agri VAS uptake
Potential Agri VAS users - by delivery channel

Given the number of potential Agri VAS users, the addressable market for different delivery channels (IVR/voice, SMS and rich media) was estimated.

The three delivery channels are not mutually exclusive, Agri VAS users can use more than one channel at a time.

<table>
<thead>
<tr>
<th>IVR/ VOICE</th>
<th>SMS</th>
<th>RICH DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>The addressable market for IVR/voice based services is the total number of agricultural workers with a mobile phone and subscribing to Agri VAS.</td>
<td>The addressable market for SMS based services has been estimated by using the literacy rates for each country.</td>
<td>The addressable market for rich data services has been estimated by applying the percentage of agricultural workers subscribing to Agri VAS to agricultural workers with a smartphone.</td>
</tr>
</tbody>
</table>
ARPU

The ARPU of Agri VAS has been estimated by:
1. Analysing Agri VAS for which ARPU figures are available
2. Analysing the pricing structure and usage of live Agri VAS
3. Talking to organisations leading the implementation of Agri VAS

The output of this analysis provides a regional weighted ARPU

South Asia

South Asia Agri VAS
ARPU assumption = $0.60

Mobile ARPU, by connections: $2.42 (2013)
Mobile ARPU, by subscribers\(^2\) = $5.58 (2013)

Considering the pricing structure of current live services, an ARPU of $0.60 would give, on average:
- 20 SMS or 10 minutes IVR call per month in Bangladesh
- 25 minutes IVR call per month in Pakistan

Africa

Africa Agri VAS
ARPU assumption = $0.25

Mobile ARPU, by connections: $5.64 (2013)
Mobile ARPU, by subscribers\(^2\) = $10.12 (2013)

Considering the pricing structure of current live services, an ARPU of $0.25 would give, on average:
- 5 SMS per month in Kenya
- 6 minutes of IVR call in Ghana

---

1 ARPU estimates are weighted to reflect the fact that not all providers charge for the service
2 Total recurring (service) revenue generated per unique subscriber per month in the period. Different from ARPU by connection, ARPU by subscriber is a measure of each unique user’s spend
Agri VAS market size

Given the number of potential Agri VAS users and the regional ARPU estimates, the Agri VAS market size was estimated.

Annual revenue

The annual addressable market for a given country is given by:

\[
\text{Market size} = \text{Agricultural workers with a mobile phone and subscribing to Agri VAS (end of period)} \times \text{Annual ARPU (ARPU assumption X 12)}
\]

(annual revenue, million US$)
Agenda

Context

Growth of Agri VAS

Model assumptions and methodology

Model outputs

Value proposition
The potential number of Agri VAS users for both Sub Saharan Africa and South Asia by 2020 has been estimated to be just over 80 million farmers.
Market size – users (by region)

South Asia is expected to have the most number of Agri VAS users by 2020, with just over 50 million compared to Africa with 30 million.

**Figure 7: Addressable market for Agri VAS – South Asia**
Source: GSMA Intelligence, World Bank, FAO

**Figure 8: Addressable market for Agri VAS – Sub-Saharan Africa**
Source: GSMA Intelligence, World Bank, FAO

1 Agricultural workers with a mobile phone
The number of Agri VAS users will depend on the type of channel used to deliver the service

Note: The three delivery channels are not mutually exclusive, Agri VAS users can use more than one channel at a time. These are therefore greater than the number of actual humans using an Agri VAS service.
The market size for Agri VAS has been estimated to be around $200 million in 2014, this is expected to be more than double in 2020.

Source: GSMA Intelligence, World Bank, FAO
Agenda

Context

Growth of Agri VAS

Model assumptions and methodology

Model outputs

Value proposition
Business models

Agriculture VAS are mainly based on two different business models:

1. Direct revenue (purely ARPU dependant)
2. Indirect benefits (increase in loyalty/ reduction in churn/ increase market share)

Business model can vary between countries or depending on the leading organisation

Direct revenue model – B2C

mKisan India
- Provides advice and information on crop agronomy, animal health, weather forecasts and market prices via SMS and IVR
- Subscription package cost $0.02 per day (purchasable in packs of 10, 20 or 30 days)

Airtel Kilimo Kenya
- Offers agronomy, livestock, weather and market price information via USSD
- Customers are charged $0.22 per week to access subscribed content

Tigo Kilimo Tanzania
- Provides agronomic practices on major crops, market price information, and weather forecasts via USSD, Push SMS, IVR and helpline
- The text-based service is free to subscribers and voice channels are charged ($0.03/access for IVR and $0.004/second for helpline)

Direct revenue model – B2B

Connected Farmer Kenya, Tanzania and Mozambique
- Platform that facilitates communication between agribusinesses and product suppliers
- It is focused on helping agribusinesses connect to farmers
- Agribusiness access the service over an Android smartphone app or a web portal
- Agri-businesses are charged for individual farmer use of the service on a monthly basis

Indirect benefits model

IKSL India
- Provide market prices, farming techniques, weather forecasts via a helpline. The service free of charge
- Revenues: increase loyalty, reduction in churn rates among IKSL users

3-2-1 Madagascar
- Provides on demand information via USSD, SMS and IVR
- Unlimited free SMS and USSD, 4 IVR free calls per month
- Revenues: reduction of churn, increased ARPU/SMS/ voice among 3-2-1 users
Value proposition – direct revenues

Direct revenues are available to Agri VAS providers (which includes both operators and VAS providers). The annual revenues from Agri VAS have been estimated in this report.

Figure 12: Agri VAS potential annual revenue
Source: GSMA Intelligence, World Bank, FAO
Value proposition – indirect benefits

For mobile operators, in addition to direct revenues, Agri VAS offer indirect benefits such as reduction in churn rates, increased customer loyalty, uptake of new customers and cross selling of other services.

**Churn reduction**

**Grameenphone Bangladesh**
They will launch an Agri VAS in 2015, their projected estimate of annual churn reduction rates is 8-12% for Agri VAS customers compared to non Agri VAS customers.

**Indian operator**
Annual churn reduction rates of 9.6% for Agri VAS customers compared to non Agri VAS customers.

**Cross-selling of other services**

**Agri MFS**
Existing user base of Agri VAS users provides opportunity to offer mobile financial services for agri sector the amount of outgoing SMS compared to non-3-2-1 users from July 2014-November 2014.

**Other VAS**
Subscribers of Agri VAS could decide to subscribe to other VAS, such as health, education, news.

**New customer acquisition**

By providing services which are beneficial for large parts of the population, such as agriculture information services, operators could benefit by bringing new customers on their network, especially currently unconnected rural segment.

**Other**

**3-2-1 Madagascar**
3-2-1 users have double the amount of outgoing SMS compared to non-3-2-1 users from July 2014-November 2014.
About the authors

**Barbara Arese Lucini**  Analyst, Emerging Markets

Barbara is an Analyst at GSMA Intelligence focusing on research for emerging markets. Before joining GSMA in April 2013, Barbara worked for FrontlineSMS in London and at Accenture in Italy. She holds an MSc in Development Studies from SOAS, London and an undergraduate in Mathematics from Università Statale di Milano, Italy.

**Tim Hatt**  Senior Manager

Tim is a Senior Manager at GSMA Intelligence, having joined the team in October 2012. In this capacity, Tim has responsibility for the team producing research reports and presenting externally at conferences and public speaking engagements. Prior to joining the GSMA, Tim spent 6 years in London as an analyst covering telecoms and a variety of other sectors.
About GSMA

GSMA Intelligence is the definitive source of mobile operator data, analysis and forecasts, delivering the most accurate and complete set of industry metrics available.

Relied on by a customer base of over 800 of the world’s leading mobile operators, device vendors, equipment manufacturers and financial and consultancy firms, the data set is the most scrutinised in the industry.

With over 25 million individual data points (updated daily), the service provides coverage of the performance of all 1,400+ operators and 1,200+ MVNOs across 4,400+ networks, 65 groups and 237 countries worldwide.

For more information, visit gsmaintelligence.com/about/

© GSMA Intelligence 2015. Unauthorised reproduction prohibited.

Please contact us at info@gsmaintelligence.com or visit gsmaintelligence.com. GSMA Intelligence does not reflect the views of the GSM Association, its subsidiaries or its members. GSMA Intelligence does not endorse companies or their products.

GSMA Intelligence, GSMA, The Walbrook Building, 25 Walbrook, London EC4N 8AF

About Mobile for Development:
Serving the underserved through mobile

Mobile for Development brings together our mobile operator members, the wider mobile industry and the development community to drive commercial mobile services for underserved people in emerging markets. We identify opportunities for social, economic impact and stimulate the development of scalable, life-enhancing mobile services.

About the GSMA mAgri programme

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, the agricultural organisations and the development community to foster sustainable and scalable mobile services that improve the livelihoods of smallholder farmers.

For more information, visit gsma.com/mobilefordevelopment/programmes/magri

About GSMA Intelligence

Whilst every care is taken to ensure the accuracy of the information contained in this material, the facts, estimates and opinions stated are based on information and sources which, while we believe them to be reliable, are not guaranteed. In particular, it should not be relied upon as the sole source of reference in relation to the subject matter. No liability can be accepted by GSMA Intelligence, its directors or employees for any loss occasioned to any person or entity acting or failing to act as a result of anything contained in or omitted from the content of this material, or our conclusions as stated. The findings are GSMA Intelligence’s current opinions; they are subject to change without notice. The views expressed may not be the same as those of the GSMA Association. GSMA Intelligence has no obligation to update or amend the research or to let anyone know if our opinions change materially.

© GSMA Intelligence 2015. Unauthorised reproduction prohibited.

Please contact us at info@gsmaintelligence.com or visit gsmaintelligence.com. GSMA Intelligence does not reflect the views of the GSM Association, its subsidiaries or its members. GSMA Intelligence does not endorse companies or their products.

GSMA Intelligence, GSMA, The Walbrook Building, 25 Walbrook, London EC4N 8AF