ANALYSIS

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

February 2015

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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

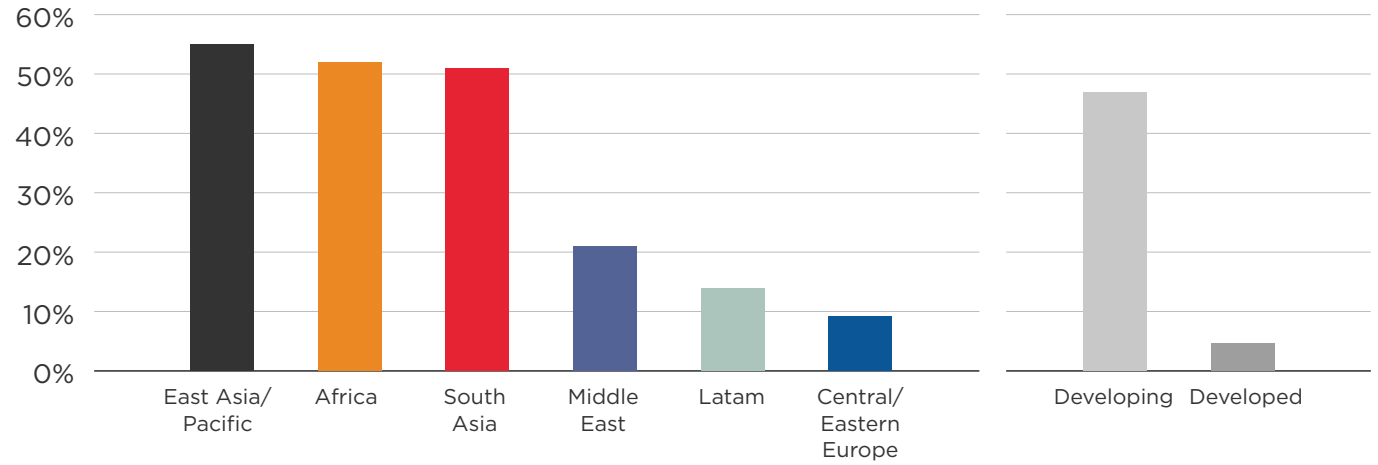

Figure 1: Proportion of Labour force in agriculture, developing economies only, 2013
Source: FAO

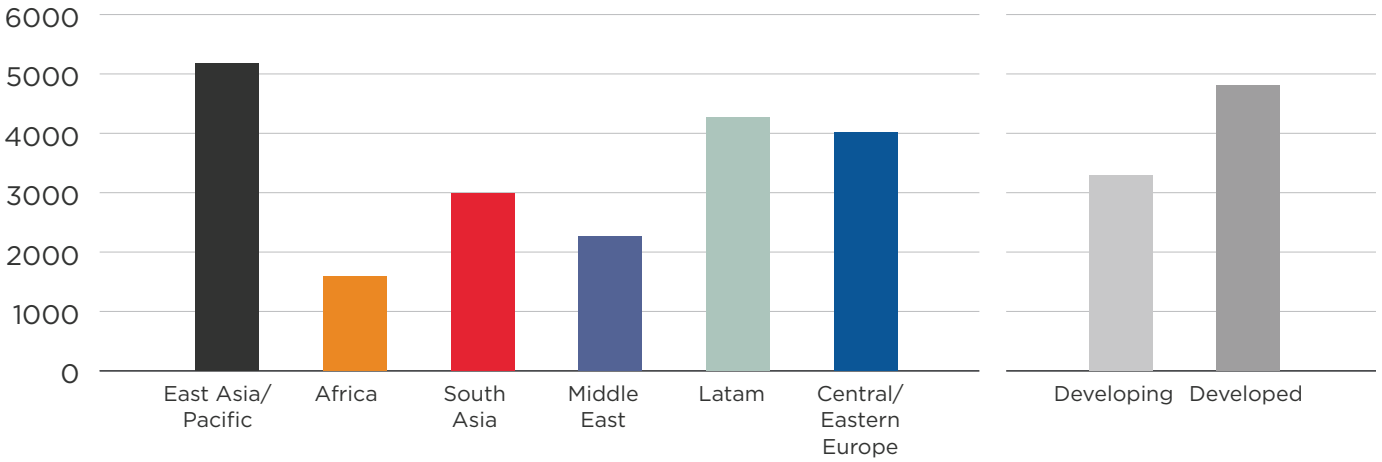

Figure 2: Agriculture productivity (kg/hectare), developing economies only, 2013
Source: World Bank

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

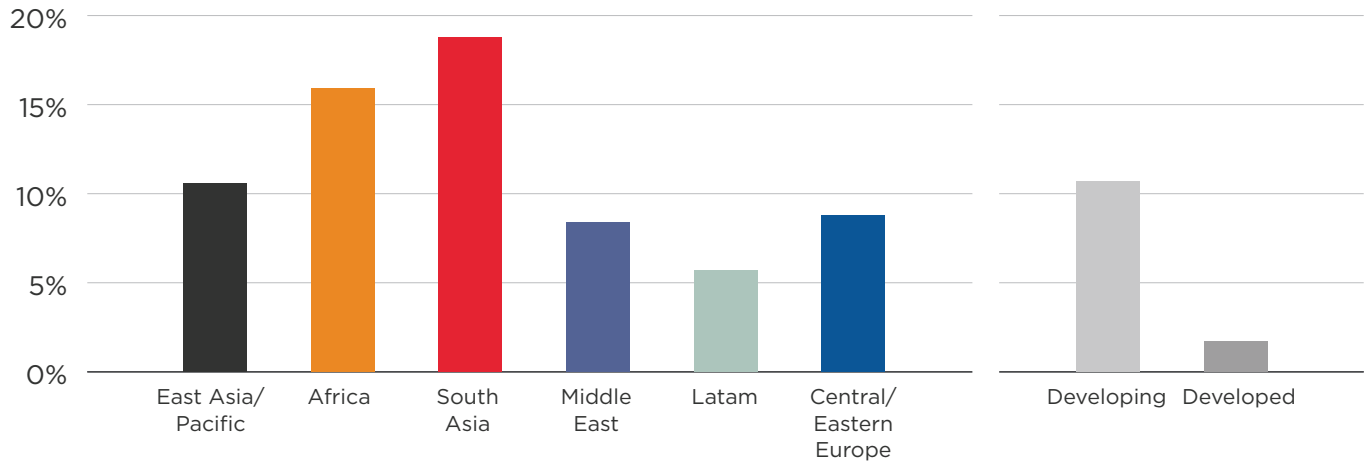

Figure 3: Agriculture, value added (% of GDP), developing economies only, 2013
Source: World Bank

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

VAS

Information services
- Weather
- Market information
- Agriculture (crop, livestock)
- Peer-to-peer

Input authentication

Data Collection

Focus of the report

M2M

Equipment monitoring

Precision agriculture

Environment monitoring

Livestock & fishery management

Supply chain services

VAS

Matching platforms

Traceability and tracking systems

Management of supplier/distribution network

Focus of the report

M2M

Smart logistics

Mobile Financial services for farmers

Payments to farmers via mobile money

Savings & credit products

Micro insurance for inputs, crops, livestock

E-vouchers for agri-related products (e.g. inputs)

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Agri VAS market growth

- 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)

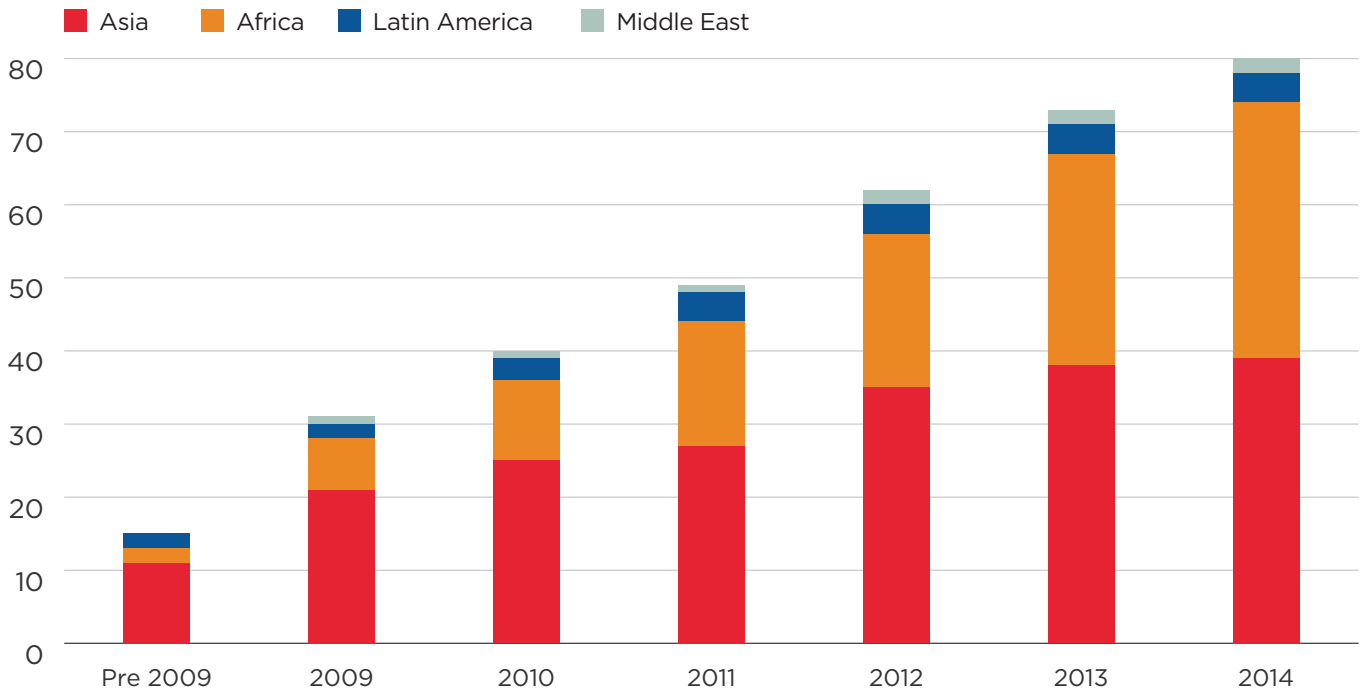

Figure 4: Agri VAS evolution

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

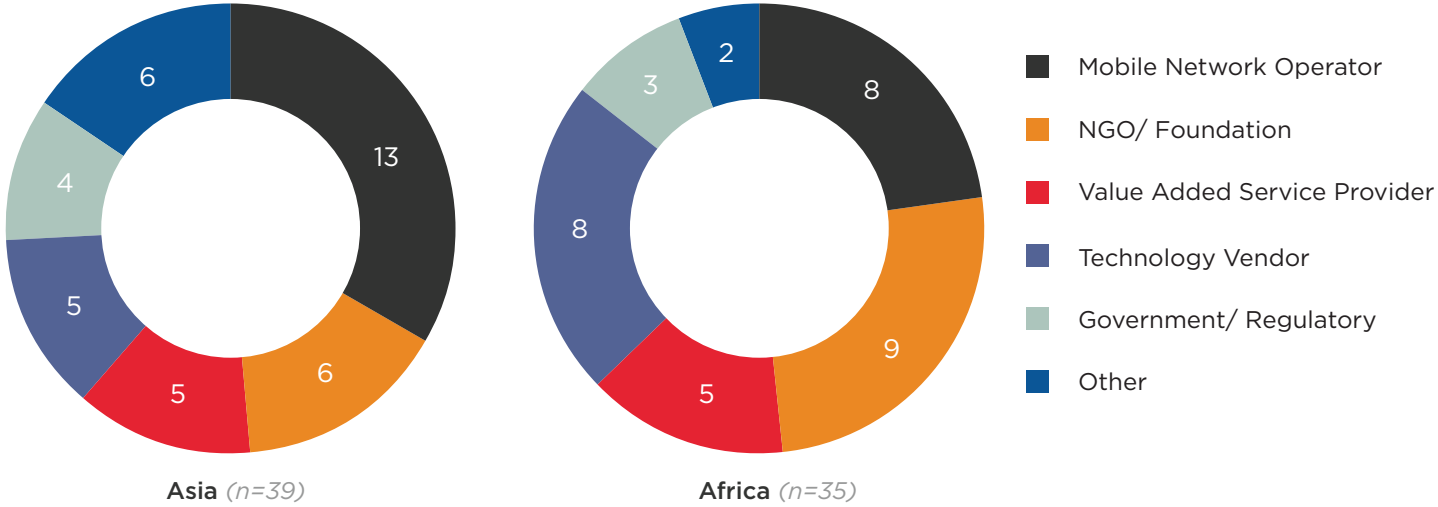

Figure 5: Lead organisation involvement in Agri VAS
Note: Other includes academia, agri suppliers, consultants, associations, agri financial services providers
Source: GSMA Product and Service tracker

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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)

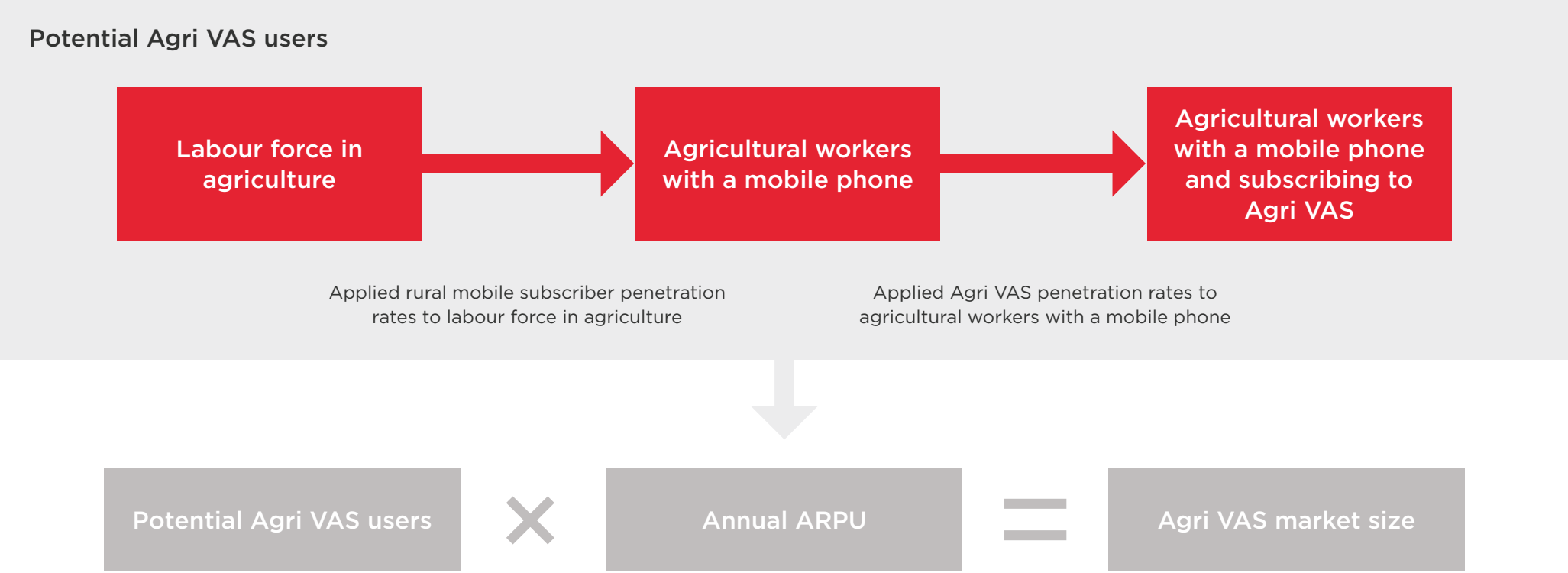
Angola
Benin
Burkina Faso
Burundi
Central African Republic
Chad
Comoros
Cote d'Ivoire
Ethiopia
Gambia
Ghana
Guinea
Kenya
Liberia
Madagascar
Malawi
Mali
Mauritania
Mozambique
Niger
Nigeria
Rwanda
Sao Tome and Principe
Senegal
Sierra Leone
Tanzania
Togo
Uganda
Zambia
Zimbabwe

Introduction to the market sizing model

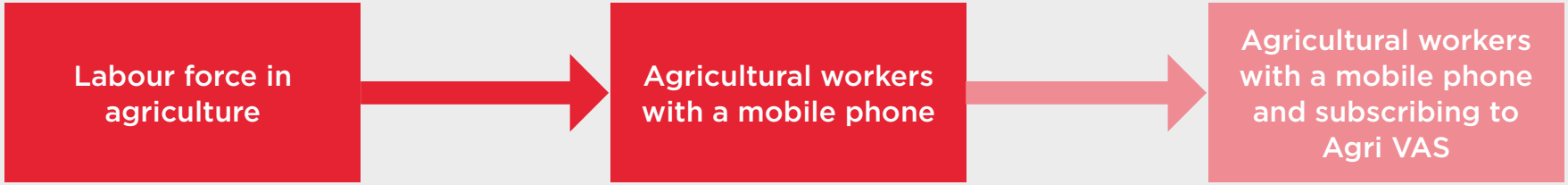
Across the 37 countries chosen, the Agri VAS market size was derived from two main factors:

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**

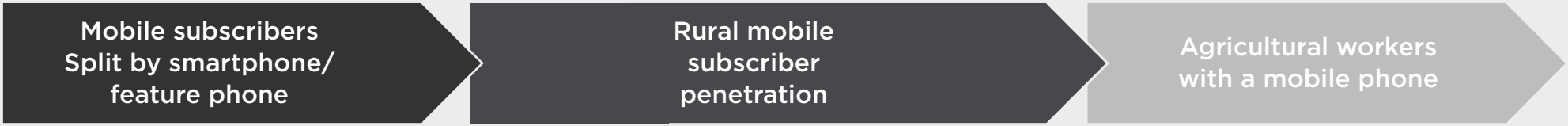
The model has been sense checked with operators in the industry



Potential Agri VAS users – agricultural workers with a mobile phone



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



The subscriber split by smartphone/ feature phone was estimated by applying the share of smartphones/ feature phones as a percentage of total connections to total subscribers

The rural mobile subscriber penetration rate was estimated by:

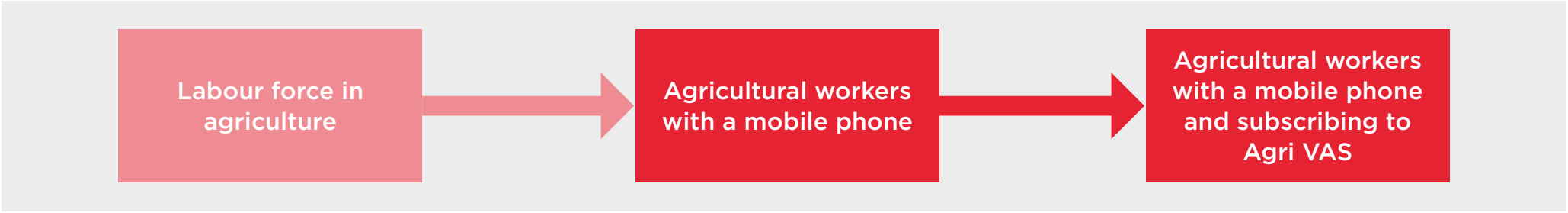
1 Taking the urban and rural population split according to the World Bank
2 Calculating the total mobile subscriber penetration split by smartphone/feature phone
3 Taking "Penetration Urban" = 1.3 × "Penetration Rural" (over time this factor will reduce as urban and rural get closer to parity)

The number of agricultural workers with a mobile phone split by smartphones and feature phones was estimated by applying the rural mobile subscriber penetration rates to the labour force in agriculture

Potential Agri VAS users – agricultural workers with a mobile phone and subscribing to Agri VAS

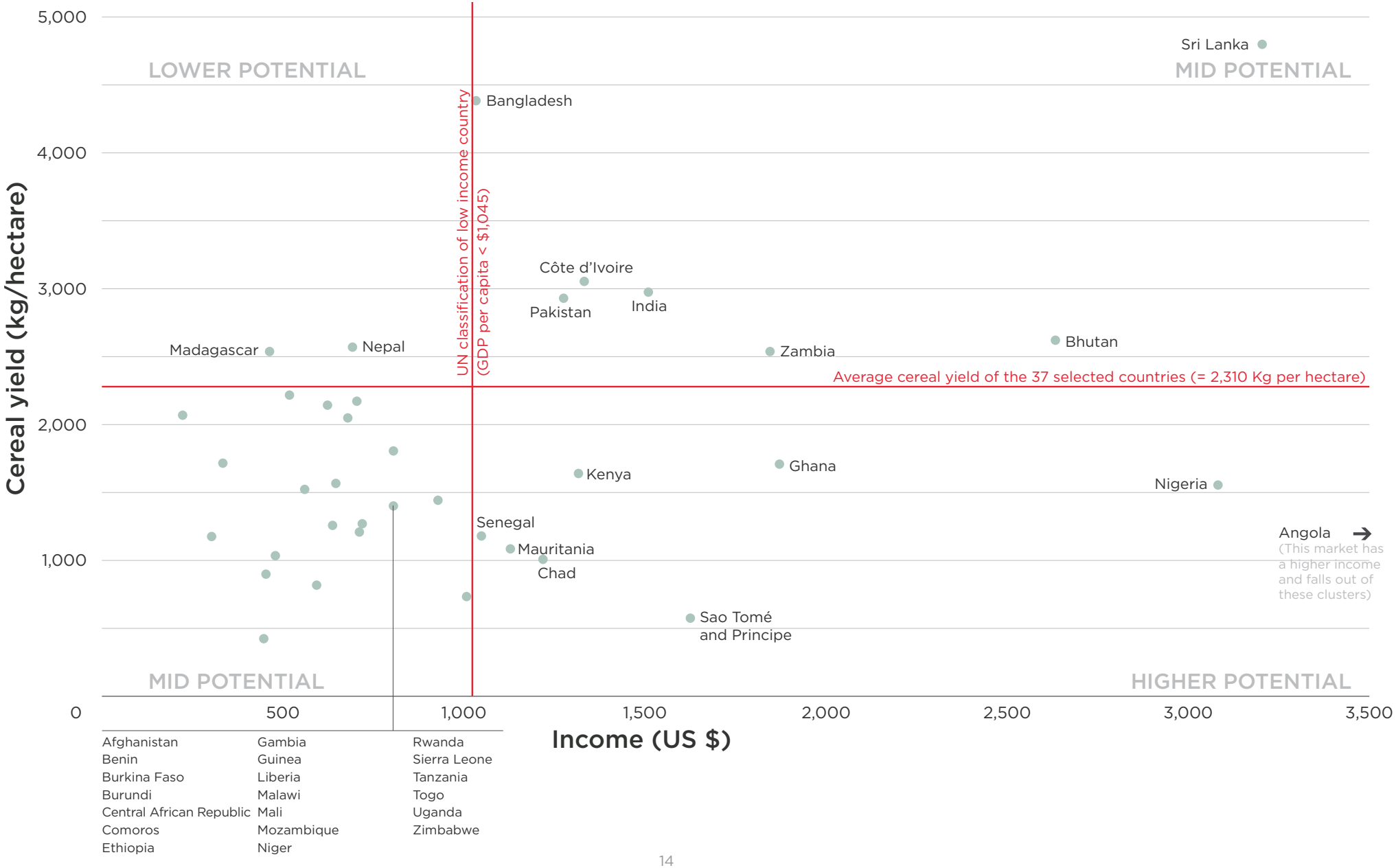
Countries have been classified according to two metrics, income and productivity, to establish the potential uptake of Agri VAS.

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



Propensity to spend		Improved cereal yield		Likeliness to subscribe to Agri VAS
Income (GDP per capita) Lower income ≤ $1,045 Higher income >$1,045	+	**Productivity** (Cereal yield) Lower productivity ≤ 2,310 Higher productivity >2,310	=	**Potential** Potential take-up of Agri VAS
Higher income	+	**Lower productivity**	=	**Higher potential**
Lower income	+	**Higher productivity**	=	**Lower potential**
Higher income	+	**Higher productivity**	=	**Mid potential**
Lower income	+	**Lower productivity**	=	**Mid potential**

Potential Agri VAS users – country split by potential take-up of Agri VAS



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	2014	2015	2016	2017	2018	2019	2020
High potential countries	30%	32%	33%	35%	37%	38%	40%
Mid potential countries	20%	22%	23%	25%	27%	28%	30%
Low potential countries	10%	12%	13%	15%	17%	18%	20%
Potential users expressed as a share of total unique mobile subscribers							
High potential countries	5%	6%	6%	6%	6%	6%	7%
Mid potential countries	5%	5%	6%	6%	7%	7%	7%
Low potential countries	3%	3%	3%	4%	4%	5%	5%

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

IVR/ VOICE

The addressable market for IVR/ voice based services is the total number of agricultural workers with a mobile phone and subscribing to Agri VAS

SMS

The addressable market for SMS based services has been estimated by using the literacy rates for each country

RICH DATA

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

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[1]

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

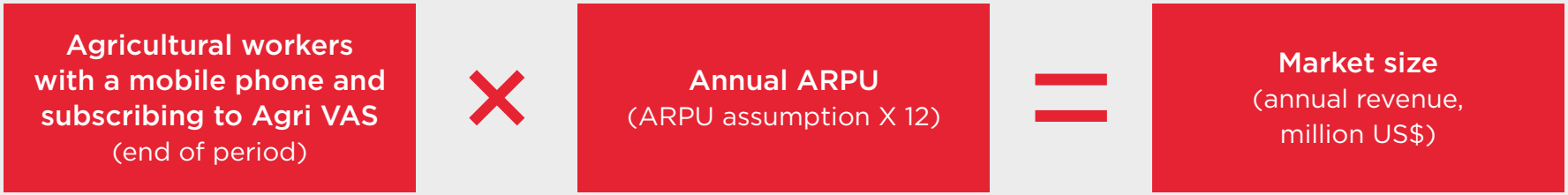
[2] Total recurring (service) revenue generated per unique subscriber per month in the period. Different from ARPU by connection, ARPU by subscriber is a measure of each unique user's spend

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:



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Market size – users (total)

The potential number of Agri VAS users for both Sub Sahrahan Africa and South Asia by 2020 has been estimated to be just over 80 million farmers

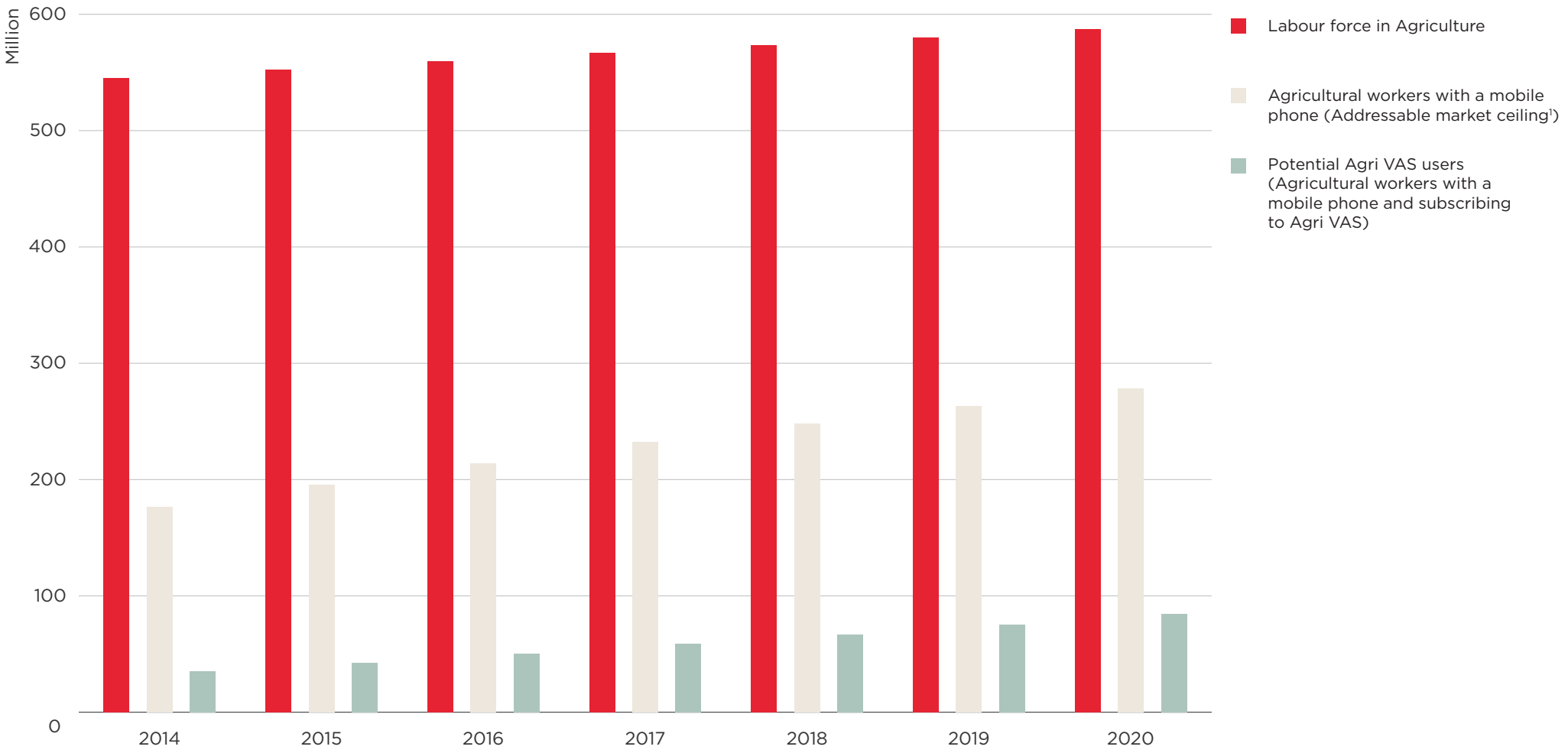

Figure 6: Addressable market for Agri VAS

Source: GSMA Intelligence, World Bank, FAO

[1] Agricultural workers with a mobile phone

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

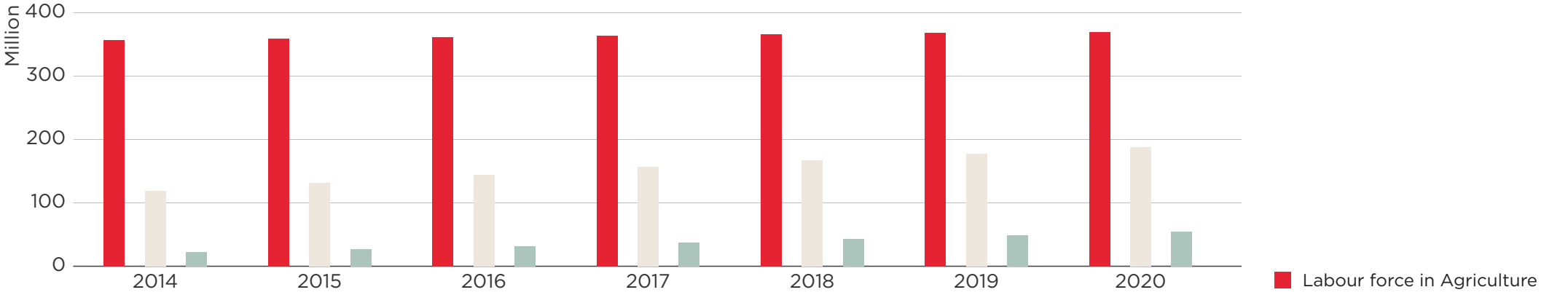

Figure 7: Addressable market for Agri VAS – South Asia

Source: GSMA Intelligence, World Bank, FAO

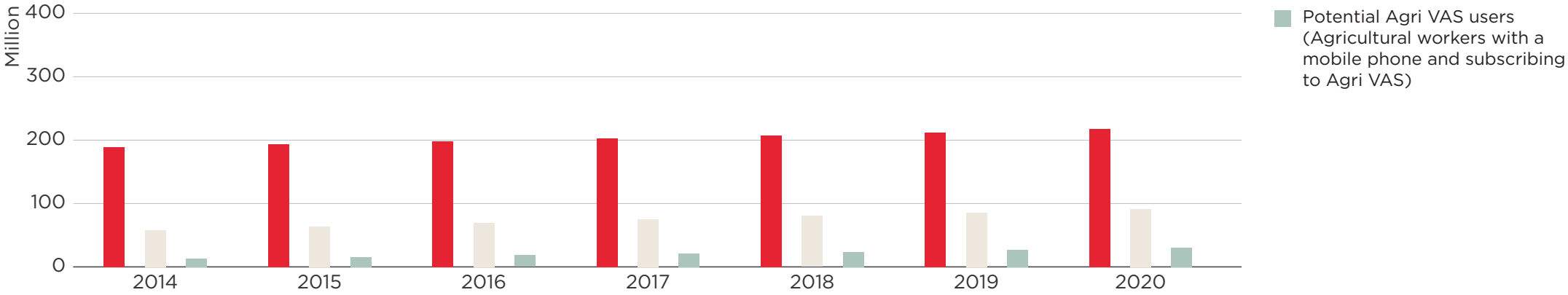

Figure 8: Addressable market for Agri VAS – Sub-Saharan Africa

Source: GSMA Intelligence, World Bank, FAO

[1] Agricultural workers with a mobile phone

Market size – users (by delivery channel)

The number of Agri VAS users will depend on the type of channel used to deliver the service

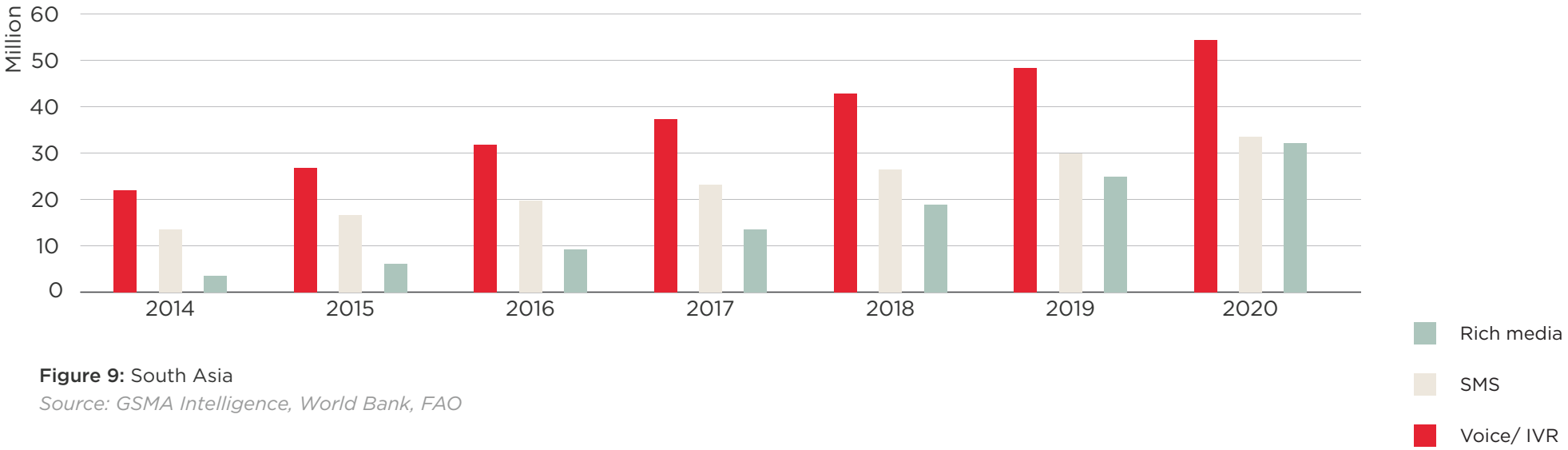

Figure 9: South Asia
Source: GSMA Intelligence, World Bank, FAO

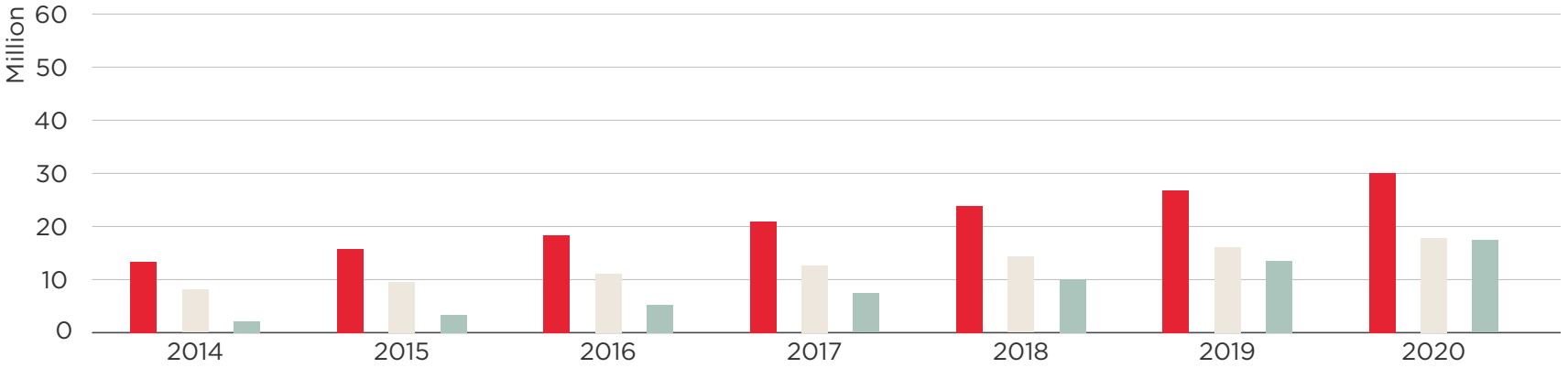

Figure 10: Sub-Saharan Africa
Source: GSMA Intelligence, World Bank, FAO

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

Market size – revenue

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

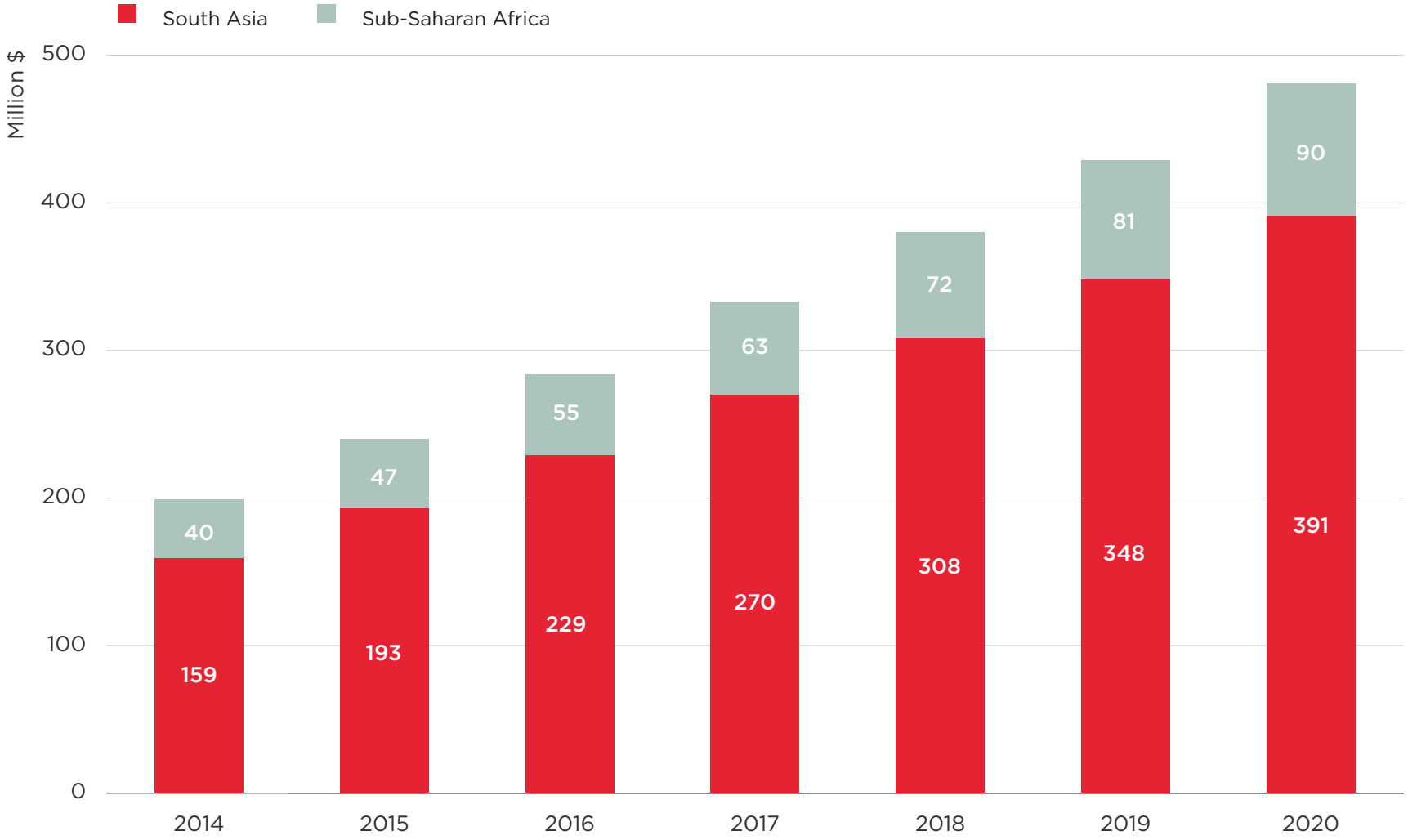

Figure 11: Agri VAS potential annual revenue

Source: GSMA Intelligence, World Bank, FAO

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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

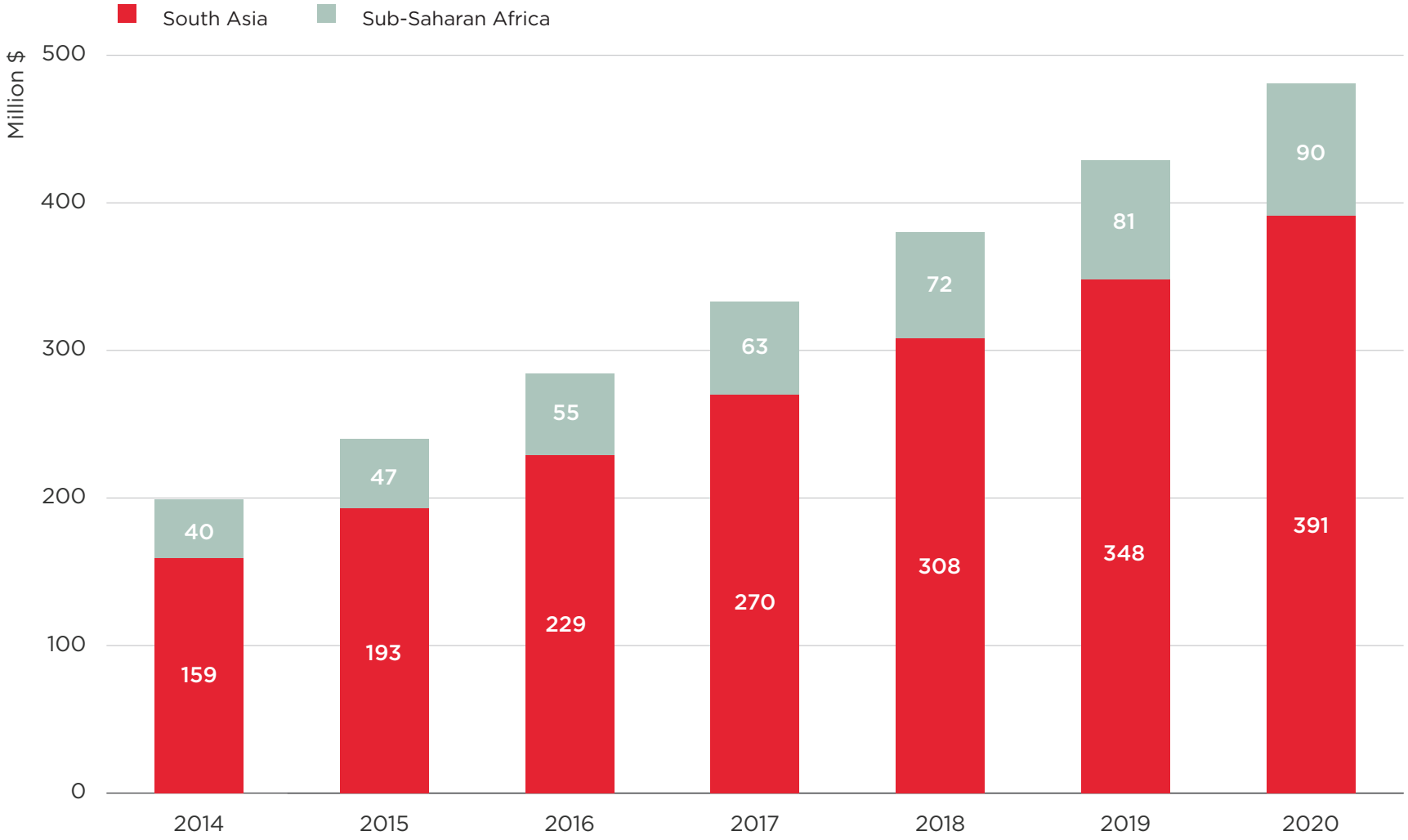

Figure 12: Agri VAS potential annual revenue

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

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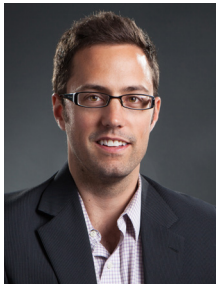
Barbara is an Analyst at GSMA Intelligence focusing on research for emerging markets. Before joining GSMA in April 2013, Barbara worked for FrontlineSMS in London and at Accenture in Italy. She holds an MSc in Development Studies from SOAS, London and an undergraduate in Mathematics from Università Statale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



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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

Mobile for Development

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.

mAgri

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

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.

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