



ANALYSIS

Market size and opportunity in digitising payments in agricultural value chains

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Contents

Context

Business-to-person (B2P) payments

Government-to-person (G2P) transfers

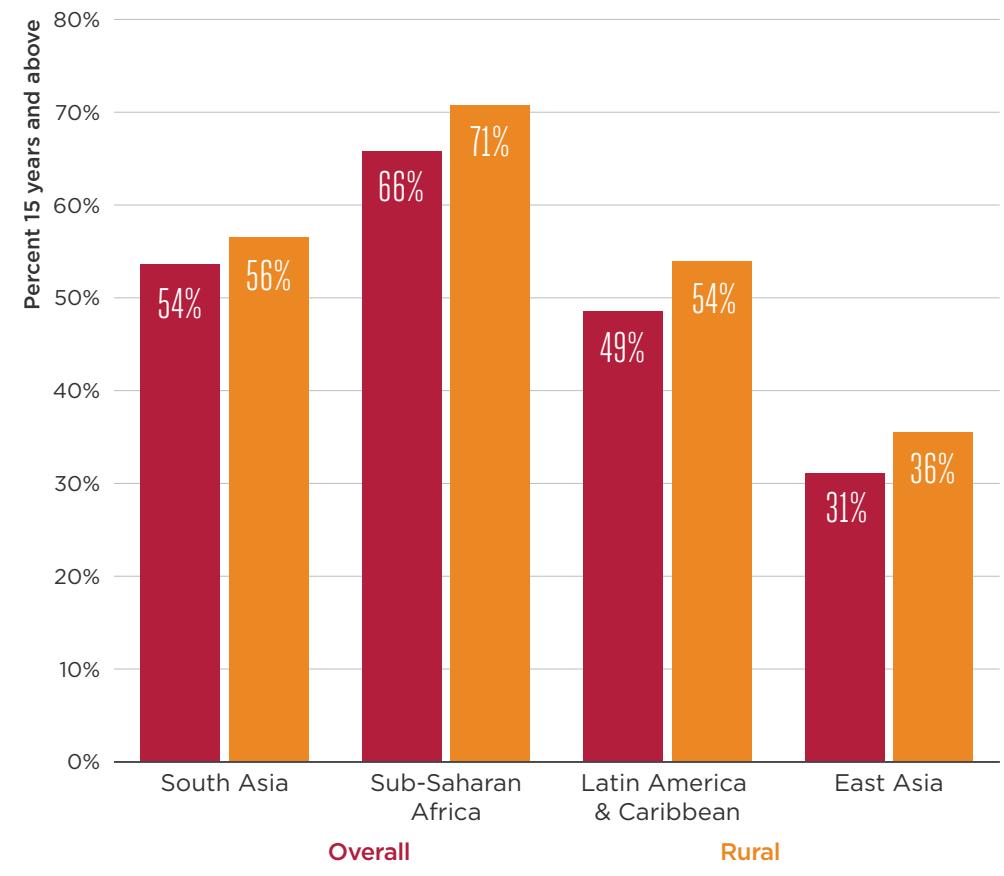
MNO business drivers

Agricultural produce categorisation

Opportunity for digitisation of agricultural payments to smallholder farmers

- Agriculture contributes between 10% and 35% of GDP in developing countries. Agriculture also employs 1.34 billion people globally, including 1.31 billion* in developing countries.
- As global food demand is rising, the vast majority of agribusinesses, including major corporations in the food and beverage industries, directly procure from smallholder farmers, who account for a majority (at least 70%) of the food production consumed worldwide.**
- At the same time, local governments provide agricultural support in the form of subsidies and grants to smallholder families to boost production or, in some cases, to supplement family income from agricultural production.
- However, the financial access gap in rural areas in developing countries, where 53% of the population live, means the majority of smallholders are still unbanked. The vast majority of smallholder farmers operate in a cash economy, receiving cash payments for the sale of agricultural produce and for government transfers.

Financially excluded



Financially excluded are adults without an account at a financial institution or a mobile money account
Source: World Bank Global Findex (data for 2014)

*Source: The Food and Agriculture Organization (FAO)

**Source: FAO: "Coping with the food and agriculture challenge: smallholders' agenda"

The role of mobile in enabling financial inclusion in rural segments

- There were 295 live mobile money services in 97 countries as of August 2016, extending financial services to unbanked populations.
- Digitising formal procurement by agribusinesses and agricultural subsidies can:
 - serve as the entry point to financial inclusion because it moves “real” cash to the farmer mobile wallet
 - reduce costs, increase efficiency and transparency, and improve the safety of payments for agribusinesses and farmers.
- With increasing mobile money penetration in rural areas, mobile operators can take the lead in digitising agricultural payments in developing countries, leveraging the reach, convenience, security and flexibility of mobile technology.
- The direct revenue opportunity for mobile operators in the 69 countries in our analysis from digitising business-to-person (B2P) payments and government-to-person (G2P) transfers in agriculture could potentially reach \$2 billion and \$202 million respectively in 2020. In addition, G2P has the potential to add nearly 360 million new mobile money accounts over the same period.
- Digitising agricultural payments could generate measurable indirect benefits for mobile operators related to the acquisition of new mobile money users, increasing loyalty, increasing frequency/volume of transactions and overall activity on mobile money accounts to support a sustainable agent network.

Opportunities for key ecosystem players

Digitising agricultural payments through mobile money offers significant opportunities for key stakeholders in the agricultural payments ecosystem

FARMERS

- **Time and cost saving** - saving time and associated cost of travelling to either collection centers where farmers are paid for produce or where they cash in subsidies.
- **Efficient cash management** - with mobile money, farmers no longer receive lump sums of cash, which they tend to spend as the cash comes in.
- **Financial identity** - for unbanked farmers, mobile money enabled agricultural payments offer the potential to create a financial identity (transactional records) that can open the door to a broader range of agricultural financial services, such as savings and credit.
- **Convenience** - digitised payment is quick and convenient for users, and can give access to a larger digital commerce ecosystem. For example, some farmers are already using mobile money platforms to pay utility bills and school fees.

MOBILE MONEY PROVIDERS

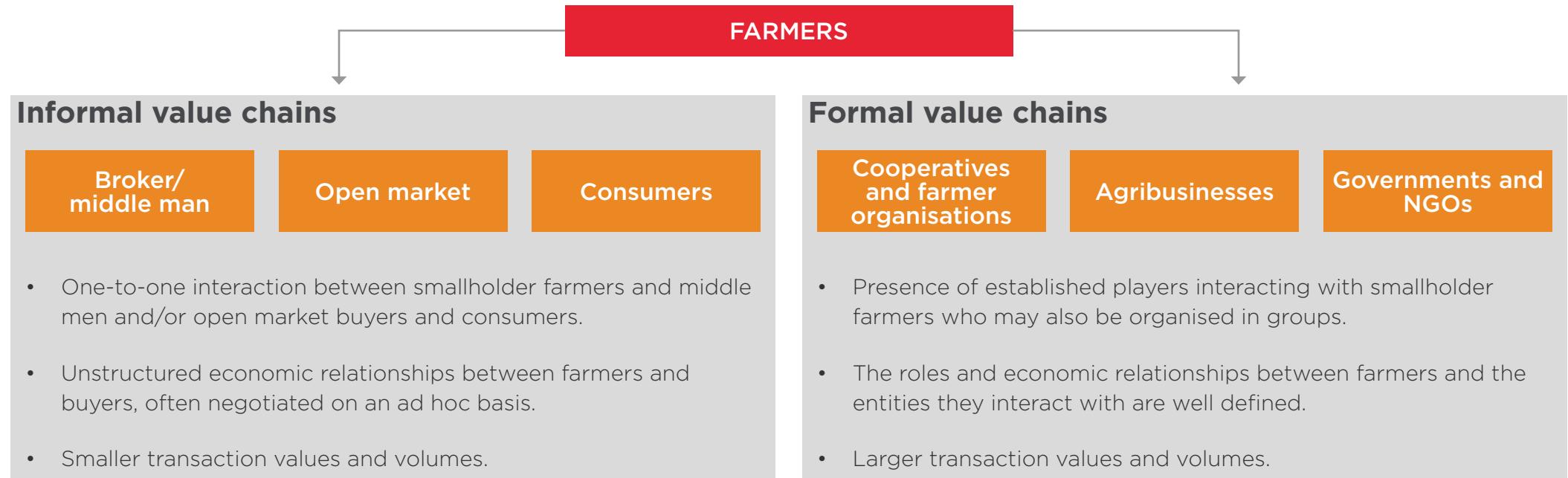
- Direct revenue from digitising B2P and G2P payments
 - **Business-to-person (B2P)** - formalised agribusinesses, cooperatives, governments and international organisations/NGOs procure agricultural produce from farmers directly rather than from an open market or semi-formal aggregator.
 - **Government-to-person (G2P)** - subsidies, grants, income support and other transfers from governments to farmers with the aim of increasing agricultural productivity.
- Indirect benefits for mobile operators around improving operational indices in rural areas (see slide 39).

GOVERNMENTS AND AGRIBUSINESSES

- **Cost** - Digitised transactions lower the costs of withdrawing, transporting and securing cash and distributing payments.
- **Efficiency** - Mobile money can facilitate real-time and scalable payments to smallholder farmers across multiple locations.
- **Accountability and transparency** - Mobile money can help mitigate cash handling risks, such as theft and fraud, and enables transparent and traceable transactions with smallholder farmers.

Agricultural value chains

Agricultural value chains can be divided into two broad categories: informal and formal value chains



Formal value chains offer mobile money providers greater opportunities and a more suitable entry point for digitising agricultural payments:

- Digitising payments for large buyers can provide the transactional volume economics to support a sustainable cash-in/cash-out agent network.
- Payment streams and transaction frequencies are more predictable.
- Fewer players and institutions ease the complexity of client engagement compared to the more fragmented informal value chains.

Countries included in the model*

The regions of focus for this report are Sub-Saharan Africa, South Asia, East Asia and Latin America. Countries have been selected if the agricultural value add (% of GDP) in 2014 was greater than 10% (source: World Bank)

Mexico, Peru and Sri Lanka are the only countries included with agricultural value add under 10%. They have been selected due to the importance of agriculture in their economies and to fully reflect the potential of digitising agricultural payments.

South Asia

(7 countries)

Afghanistan
Bangladesh
Bhutan
India
Nepal
Pakistan
Sri Lanka

East Asia

(11 countries)

Cambodia
Indonesia
Korea, North
Laos
Malaysia
Mongolia
Myanmar
Philippines
Thailand
Timor-Leste
Vietnam

Sub-Saharan Africa

(37 countries)

Angola
Benin
Burkina Faso
Burundi
Cape Verde
Cameroon
Central Africa Republic
Chad
Comoros
Cote d'Ivoire
DRC
Eritrea
Ethiopia
Gambia
Ghana
Guinea
Guinea-Bissau
Kenya
Liberia
Madagascar
Malawi
Mali
Mauritania
Mozambique
Niger
Nigeria
Rwanda
Sao Tome & Principe
Senegal
Sierra Leone
Somalia
Sudan
Swaziland
Tanzania
Togo
Uganda
Zimbabwe

Latin America & Caribbean

(14 countries)

Argentina
Belize
Bolivia
Dominica
Ecuador
El Salvador
Guatemala
Guyana
Haiti
Honduras
Mexico
Nicaragua
Paraguay
Peru

*Data available at country level. For more information, please contact magri@gsma.com

Contents

Context

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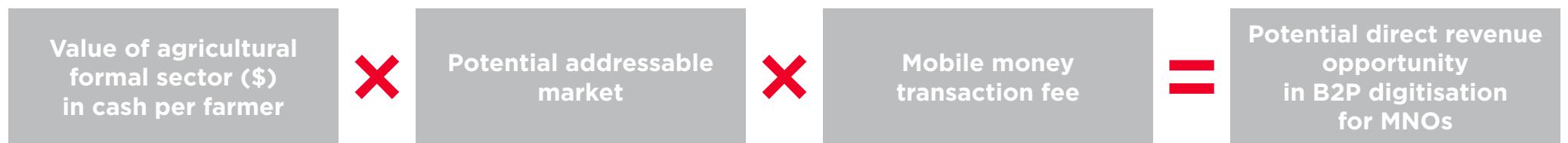
MNO business drivers

Agricultural produce categorisation

Model assumptions and methodology

Across the 69 countries included in the model, the current value and potential for payment digitisation via mobile money was derived from three main factors:

1. An estimate of the volume and value of the agriculture formal procurement
(i.e. the end point of a formal value chain where produce is purchased directly from farmers)
2. An estimate of the current level of digitisation – defined as the use of non-cash channels
(i.e. bank account or mobile money) to receive payments
3. An estimate of the potential addressable market
(i.e. the number of potential mobile money users in agriculture)



Value of the agriculture formal procurement: formal procurement score

The value of the agriculture formal procurement has been calculated in two steps.

Step 1: Estimate the level of formality of each agricultural produce category. This was done by:

- grouping all the crops and livestock in 47 different categories (see Appendix)
- estimating for each category a formality procurement score as a weighted average of three metrics (share of exports, commercial activity in the value chain and structure of the value chain). Scores range from 1 (informal) to 5 (formal). For commercial activity in the value chain and structure of the value chain we have taken as a reference the major producing countries for each of the produce categories.



Value of the agriculture formal procurement

Step 2: Estimate the value of agricultural production in each country and apply a formality percentage to derive the total value of the agriculture formal sector



- For each category we estimated how much of the total production would be consumed in the household versus what would go to market (market surplus).
- For each category of agricultural produce, we assigned a percentage to the formal procurement score, i.e. the share of sales to market of each category that would go through formal value chains.
- For each of the 69 countries, we estimated the share of agricultural production going through formal procurement channels by multiplying the total production going to market for each category by the formality percentages of that category.

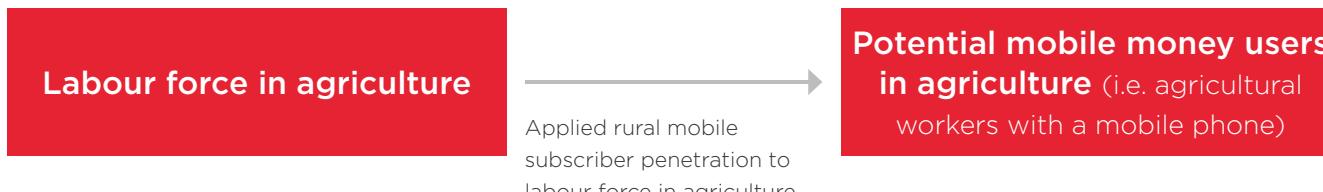
- Value of production measures production in monetary terms at the farm gate level. It is compiled by multiplying gross production in physical terms by output prices at farm gate.
- FAO data.



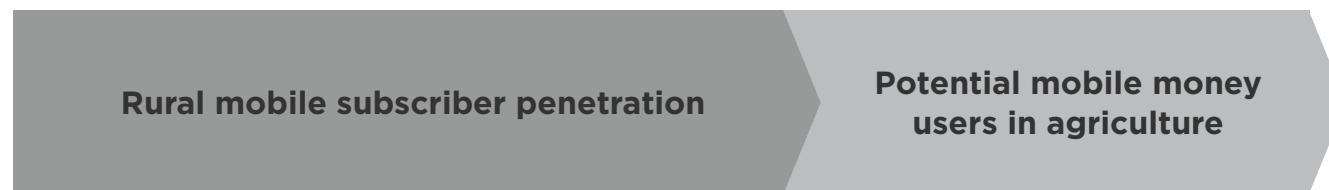
- World Bank Global Findex data.
- Where data was not available, it has been estimated based on income averages.

Potential addressable market - Potential mobile money users in agriculture

Potential addressable market



The following steps have been applied to each of the 69 selected countries



Rural mobile subscriber penetration was estimated by:

1. Taking the urban and rural population split according to the World Bank
2. Calculating the total mobile subscriber penetration
3. Assuming “urban penetration” = $1.3 \times \text{“rural penetration”}$
(over time this factor will reduce as urban and rural get closer to parity)

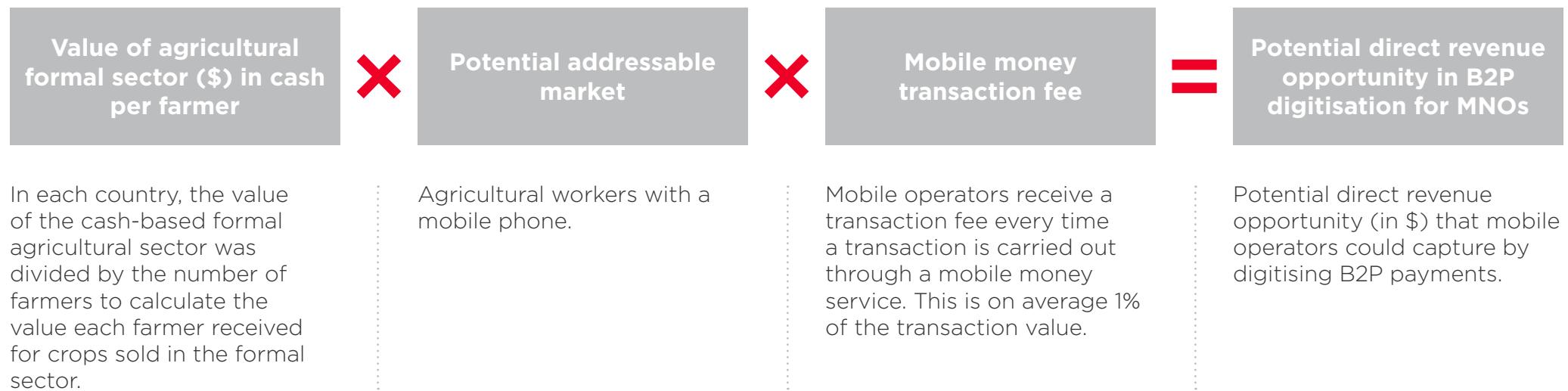
The number of potential mobile money users in agriculture was estimated by applying the rural mobile subscriber penetration rates to the labour force in agriculture

Current addressable market
i.e. agricultural workers with a mobile phone and subscribed to mobile money

To compare the **current addressable market** to the **potential addressable market**, we estimated the number of agricultural workers with a mobile phone and subscribed to mobile money.

We applied mobile money penetration rates in rural areas to agricultural workers with a mobile phone.

Potential direct revenue opportunity in B2P digitisation for MNOs

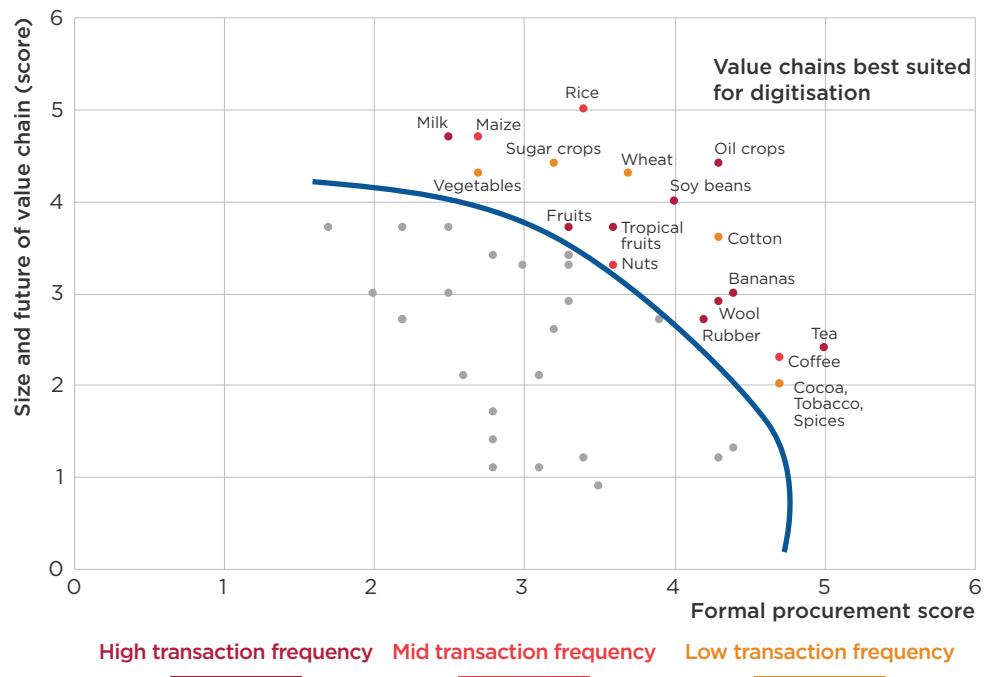


Outputs - Formal procurement

The following agricultural value chains appear to be best suited for digitisation and provide the best entry points for mobile money providers in target markets. Key factors to consider:

- Top produced crops in developing countries
- Crop production increasing in recent years (2000–2014)
- A high level of formal procurement

Top 20 categories of agricultural produce with the highest potential for digitisation



The average share of agricultural production going through formal procurement channels for the 69 selected countries is 26%

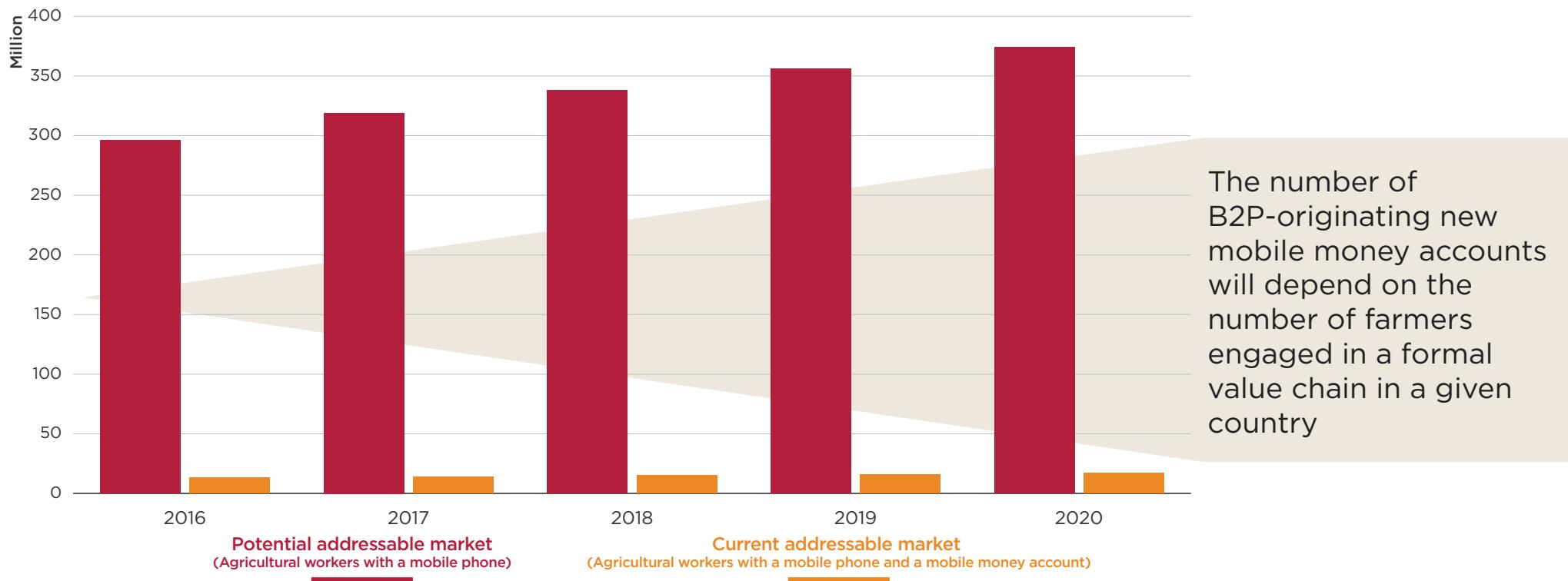
Region	Share of agricultural production going through formal procurement channel
East Asia	30%
Sub-Saharan Africa	20%
Latin America & Caribbean	26%
South Asia	26%
Total average	26%

Source: GSMA Intelligence, FAO

Outputs - Potential addressable market for B2P

Of the 750 million+ farmers in the 69 selected countries, an estimated 295 million have a mobile phone and around 13 million have a phone and mobile money account in 2016.

Provided that MNOs and other mobile money providers are able to operate in an enabling environment, by actively approaching the digitisation opportunity in B2P payments in agriculture, they could add as new mobile money customers a significant share of the 350 million farmers forecast to have a mobile phone in 2020 (potential addressable market).

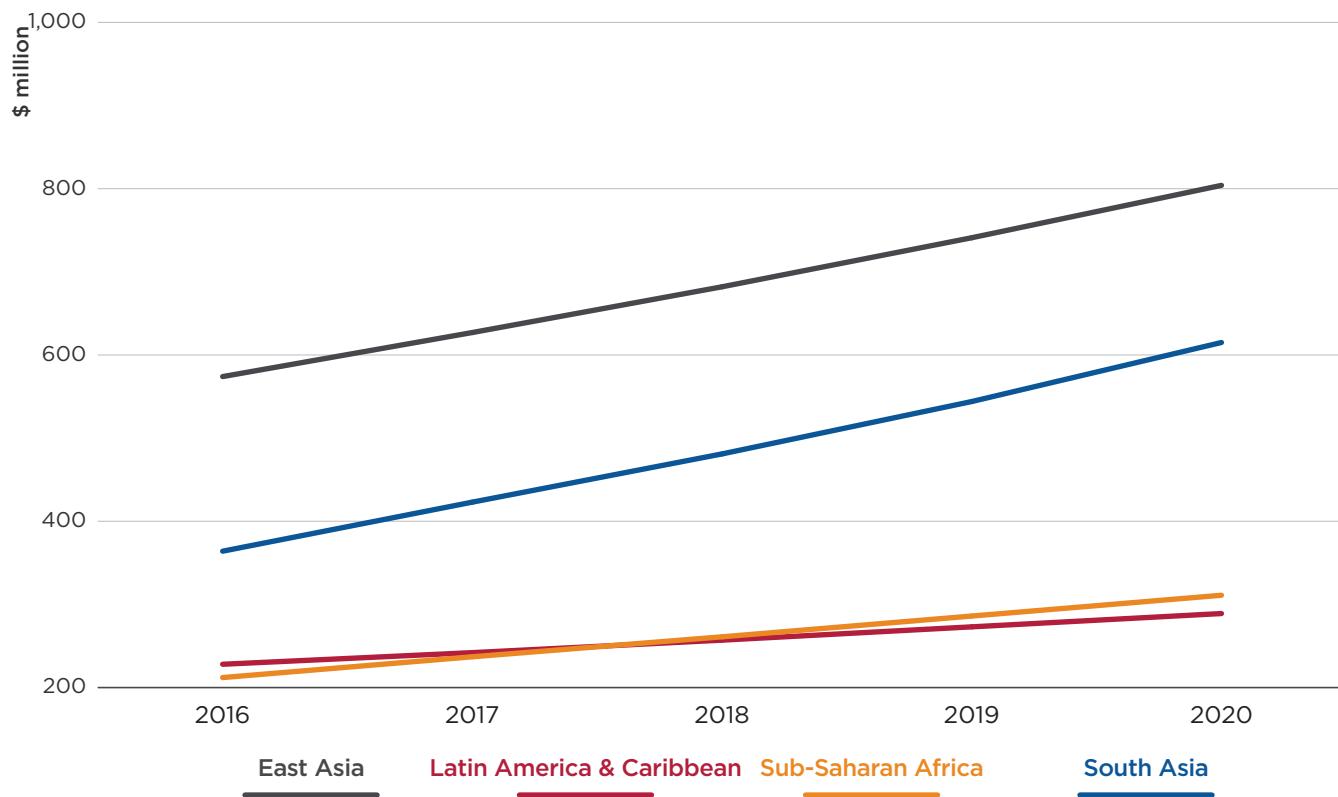


Source: GSMA Intelligence, World Bank, FAO

Outputs – Potential direct revenue opportunity for B2P

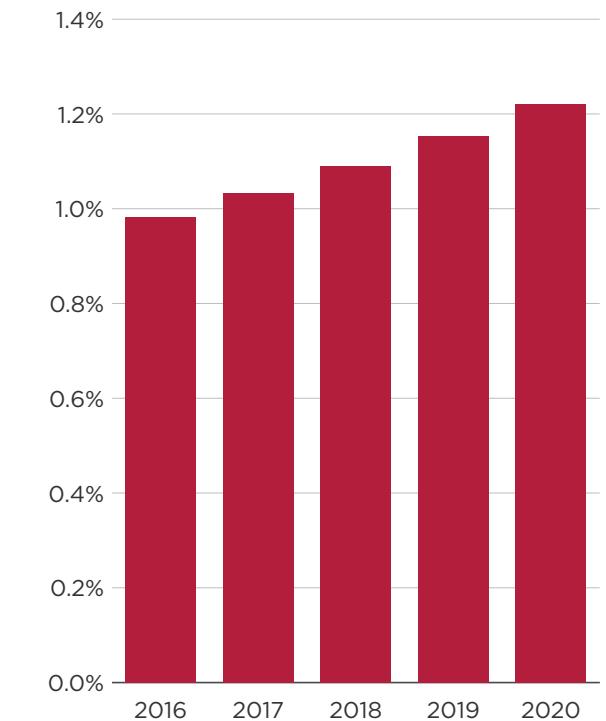
Provided that MNOs and other mobile money providers benefit from an enabling environment, if they actively approach the digitisation opportunity for B2P payments this could result in up to \$2 billion in direct annual revenues in 2020, representing 1.2% of the total recurring revenues for mobile operators in the selected countries.

Potential direct revenue opportunity*



*Data available at country level. For more information, please contact magri@gsma.com

Potential direct revenue opportunity as a share of recurring revenues



Source: GSMA Intelligence, World Bank, FAO

Maximising the B2P opportunity

The total value of transactions, currently in cash and performed via formal channels across the 69 selected countries, available for digitisation of B2P payments is estimated at \$316 billion in 2016. This is expected to grow to \$394 billion in 2020.

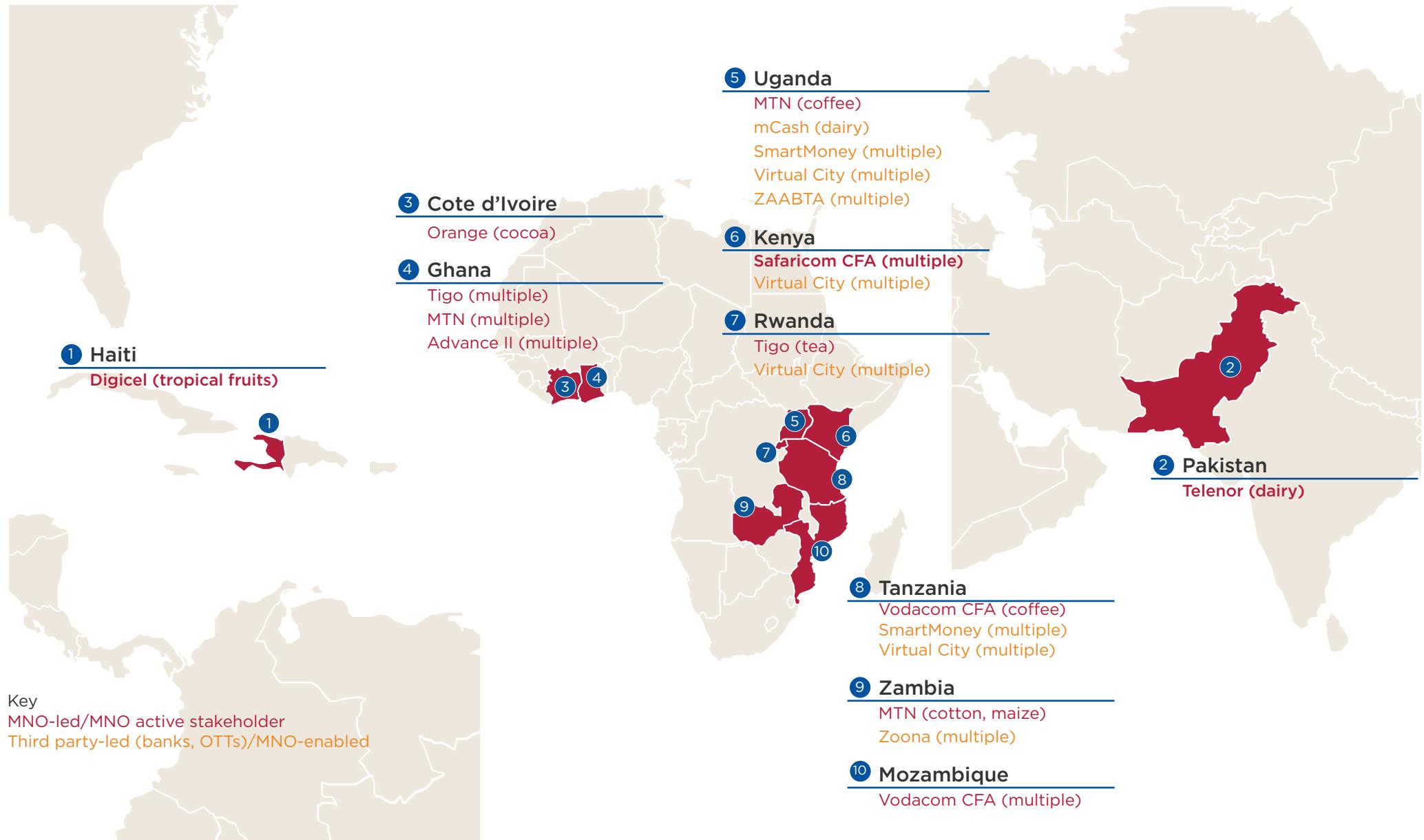
Of the total \$394 billion available for digitisation in 2020, \$121 billion will come from South Asia, \$158 billion from emerging markets in East Asia, \$64 billion from Sub-Saharan Africa and \$50 billion from Latin America and the Caribbean.

Provided that most farmers will engage in both formal and informal value chains, in addition to the potential direct revenue opportunity, mobile operators could also generate a share of the 357 million new mobile money accounts by 2020 (185 million for South Asia, 72 million for East Asia, 88 million for Sub-Saharan Africa, and 12 million for Latin America and the Caribbean).

To maximise this potential, MNOs must operate in an enabling mobile money regulatory environment, allowing in particular agri-specific mobile money use cases (e.g. suitable limits for agricultural transactions) and be able to:

- act quickly in view of potential competition from third-party providers and banks
- implement a suitable market entry strategy around value chain selection and business model to drive uptake
- ensure adequate mobile network coverage in target rural regions
- establish a cash-in/cash-out agent network, supported by training and incentive strategies for agents
- ensure adequate user education on the benefits of digital payments and the use of mobile money.

Examples of B2P digitisation projects in agricultural value chains



Haiti: Market context and digitisation opportunity



Unique mobile subscriber penetration in 2015: 55%, forecast to rise to 61% by 2020 (source: GSMA Intelligence)

Financial inclusion: 19% of the adult population (source: World Bank Global Findex)

Agriculture value add: 24% of GDP (source: World Bank)

Market context: Haiti's 2.4 million farmers represented 56% of the country's total workforce and contributed to a total agricultural production value of approximately \$1.4 billion in 2015. The top five agricultural products in the country are sugar cane, sweet potatoes, yams, cassava and maize.

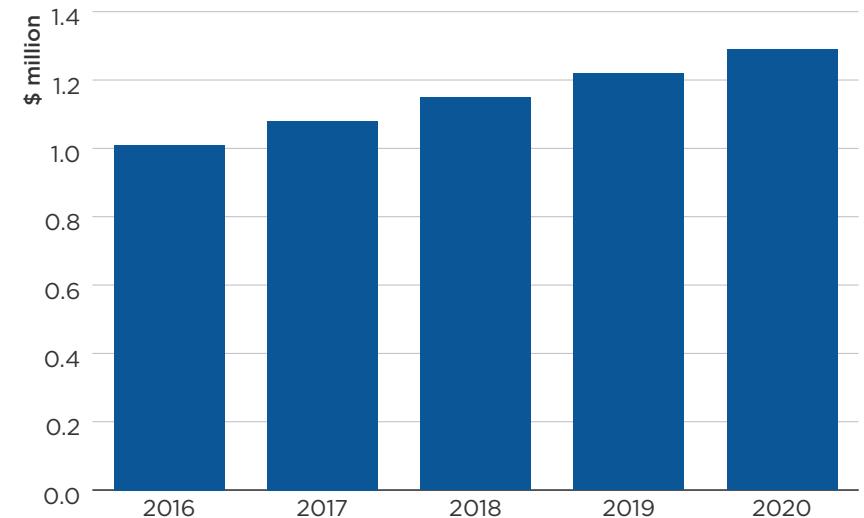
Formal procurement: We estimate that 23% of total annual production is sold through formal procurement channels, equating to \$339 million in 2016. This is estimated to rise to just under \$390 million by 2020.

Digitisation opportunity: Around 25% of formal procurement of agricultural products has been digitised, mostly through mobile money and/or bank transfers; there is an opportunity to digitise the remaining 75% of transactions that are still cash-based (source: World Bank Global Findex).

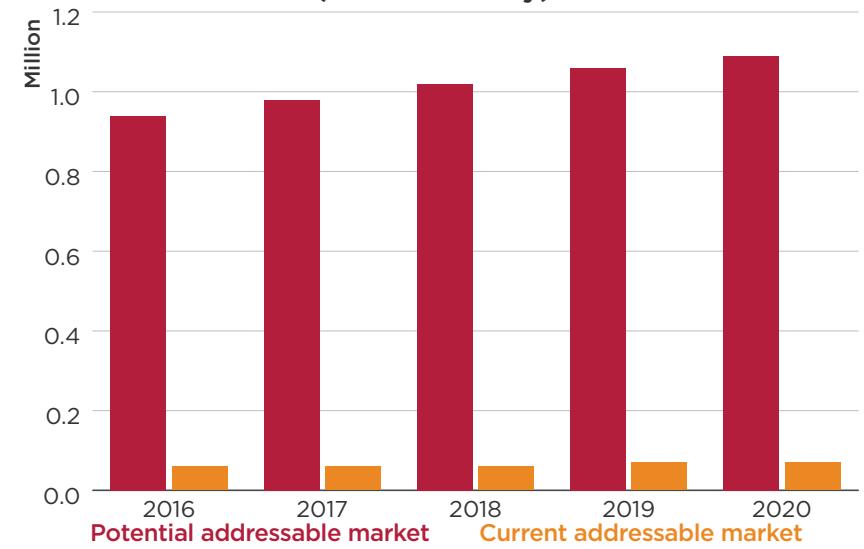
Potential direct revenue opportunity: The potential direct revenue opportunity for operators to digitise existing cash-based transactions through mobile money services is estimated at \$1 million in 2016, and is expected to increase to \$1.3 million in 2020.

Potential addressable market: Mobile operators could generate a share of the estimated 1 million new mobile money accounts by 2020 from digitising B2P payments, depending on the number of farmers engaged in formal value chains.

Potential direct revenue opportunity



Addressable market (mobile money)



Digicel and agribusinesses partner to digitise payments in Haiti



Background

The Haiti Hope Project (HHP) launched a five-year public-private partnership in 2010 between businesses, multilateral institutions, governments and NGOs to create sustainable economic opportunities for 25,000 mango farmers in Haiti. To increase the income of farmers and improve market linkages between farmers and exporters, HHP worked with mango exporter Perry Exports to use mobile operator Digicel's mobile money service Mon Cash to pay farmers. The project began working with 133 farmer associations, called Producer Business Groups (PBGs), representing more than 1,500 smallholder farmers.

Perry Exports makes payments for mangoes to PBGs, represented by a lead farmer, via Digicel's Mon Cash, based on a flat transaction fee negotiated with Digicel. The PBGs cash out the payments from local agents, with cash-out fees depending on the value of the transaction, and distribute the amount due to each farmer in cash.

Outcome and lessons

Over the course of the 2015 mango season, just over 1,500 farmers received payments via Mon Cash for mango sales, representing over \$260,000 in payments. Perry Exports has benefitted from improved traceability and efficiency in dealing with farmers, while farmers see value from receiving payments instantly and avoiding the risk of travelling with cash. PBGs continue to serve as payment intermediaries between farmers and Perry Exports, primarily for the following reasons:

- low mobile ownership among rural farmers means many of them still share devices with other users
- the paperwork involved in opening a mobile money account serves as a barrier for many farmers
- low literacy levels, mainly among the elderly, mean that many farmers do not have the capacity to operate mobile phones and remain inclined to receiving cash payments.

Outlook

There is potential for Digicel and other mobile money providers to digitise payments to more farmers within the mango value chain (HHP estimates that there are about 25,000 of them) and other value chains suited for digitisation in Haiti, notably sugar cane. There is also potential for mobile operators to integrate mobile money payments within a fully digitised farm management system, thus enabling end-to-end supply chain management for agribusinesses.

Pakistan: Market context and digitisation opportunity



Unique mobile subscriber penetration in 2015: 46%, forecast to rise to 52% by 2020 (source: GSMA Intelligence)

Financial inclusion: 13% of the adult population (source: World Bank Global Findex)

Agriculture value add: 23% of GDP (source: World Bank)

Market context: Pakistan's 26.6 million smallholder farmers represented 37% of the country's total workforce and contributed to a total agricultural production value of approximately \$34 billion in 2015. The top five agricultural value chains are sugar cane, milk, wheat, rice and seed cotton.

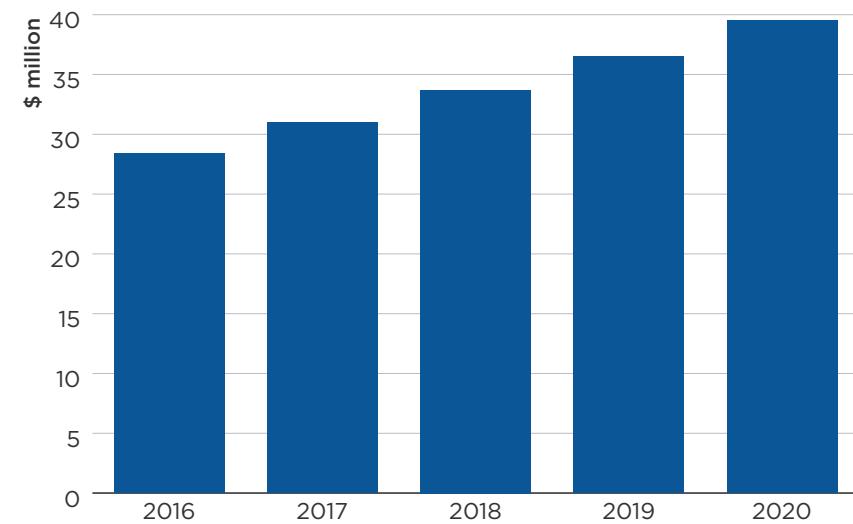
Formal procurement: We estimate that 25% of total annual production is sold through formal procurement channels, equating to \$8.9 billion in 2016. This is estimated to rise to \$11 billion in 2020. This estimate includes government procurement of wheat from farmers at a predetermined support price.

Digitisation opportunity: Only 5% of payments for formal procurement of agricultural products has been digitised by mobile money and/or bank transfers; there is an opportunity for mobile operators and mobile money providers to digitise the other 95% of transactions that are still cash-based (source: World Bank Global Findex).

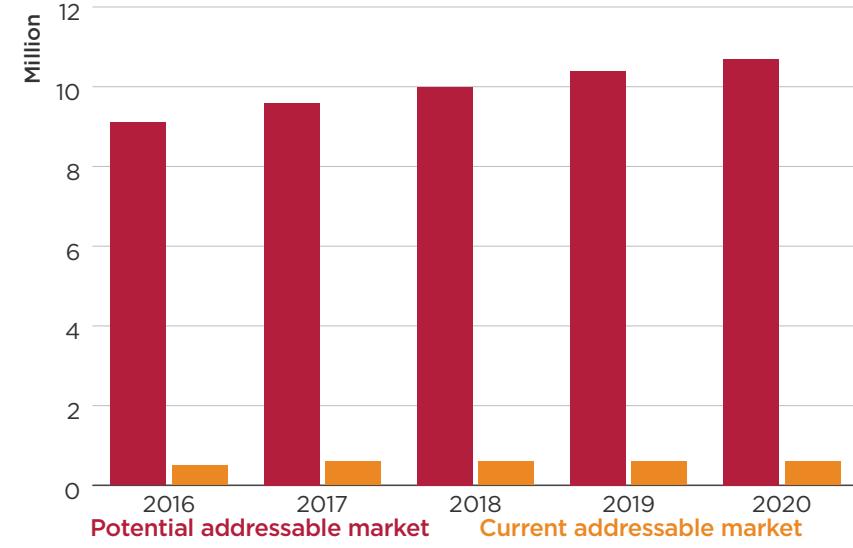
Potential direct revenue opportunity: The potential direct revenue opportunity for operators to digitise existing cash-based transactions through mobile money services is estimated at around \$28 million in 2016, and is expected to increase to just under \$40 million in 2020.

Potential addressable market: Mobile operators could generate a share of the estimated 10 million new mobile money accounts by 2020 from digitising B2P payments, depending on the number of farmers engaged in formal value chains.

Potential direct revenue opportunity



Addressable market (mobile money)



Easypaisa collaborates with Nestle on mobile payment system for dairy farmers



Background

Pakistan is the third largest milk producing nation in the world, behind the US and India, with dairy and livestock accounting for around 12% of GDP, according to government official data*. The local unit of multinational food business Nestle works with around 150,000 dairy farmers across the country. Every year, the company pays approximately PKR22 billion (\$208 million) for nearly half a billion tons of milk through an extensive chain of over 2,500 milk collection centres. Most farmers receive their payments in cash from the supply agent routed via the traditional banking channel. In April 2016, Telenor's Easypaisa collaborated with Nestle Pakistan to make disbursement of milk collection payments swift, easy and transparent.

Outcome and lessons

Easypaisa initially provided Telenor SIMs and registered Easypaisa mobile accounts for around 15,000 farmers across Pakistan for the transfer of funds into their accounts on a weekly basis. Easypaisa is expected to process payments totalling more than PKR1 billion to dairy farmers annually in the initial stage of the partnership. The dairy value chain is an attractive entry point to payment digitisation for mobile operators and other mobile money providers given the high frequency of transactions, number of transactions and number of farmers receiving payments. Usually, smallholder dairy farmers own a handful of cows and deposit milk at bulk buying/collection centres that have the requisite storage facilities almost on a daily basis. Easypaisa already processes more than 650,000 transactions daily for around 20 million registered customers, providing the volume economics to support a sustainable cash-in/cash-out agent network in rural areas.

Outlook

Pakistan has several agricultural value chains that are suitable for digitisation, notably wheat, grains, sugar cane and cotton. This is based on production volume, export potential and government procurement. Additionally, the Pakistan government procures 20-25% of annual wheat production and several tons of cotton and sugar cane under its procurement. In the 2014/15 season, the government procured 5 million metric tonnes of wheat for approximately \$1.6 billion. Digitising payments to smallholder farmers in these value chains offers potential to generate additional direct revenue for mobile money providers as well as increasing mobile usage and financial inclusion in rural areas.

*Economic Survey of Pakistan & Livestock Sector (2013-2014), Veterinary Hub

Kenya: Market context and digitisation opportunity



Unique mobile penetration in 2015: 56%, forecast to rise to 62% by 2020
(source: GSMA Intelligence)

Financial inclusion: 75% of the adult population (source: World Bank Global Findex)

Agriculture value add: 24% of GDP (source: World Bank)

Market context: Kenya's 15 million farmers represent 68% of the total workforce, contributing to a total agricultural production value of \$14 billion in 2015. The top five value chains in the country are sugar crops, milk, maize, potatoes and bananas.

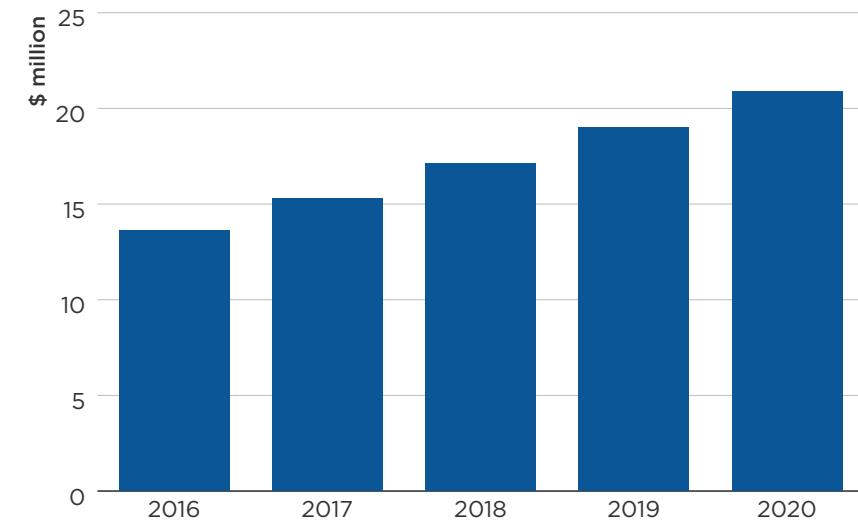
Formal procurement: We estimate that 21% of total annual production is sold through formal procurement channels, equating to around \$3.2 billion in 2016. This is estimated to rise to \$4.1 billion in 2020. Kenya is one of the 20 countries in the World Food Programme's Purchase for Progress* programme which connects smallholder farmers to markets, partly through procurement from farmer organisations. To date, the programme has purchased over 10,500 metric tonnes of food (mainly maize, beans and sorghum) from farmers in Kenya, valued at about \$3.3 million.

Digitisation opportunity: Around 6% of formal procurement of agricultural products has been digitised, mostly through mobile money and/or bank transfers; there is an opportunity to digitise the remaining 94% of transactions that are still cash-based (source: World Bank Global Findex).

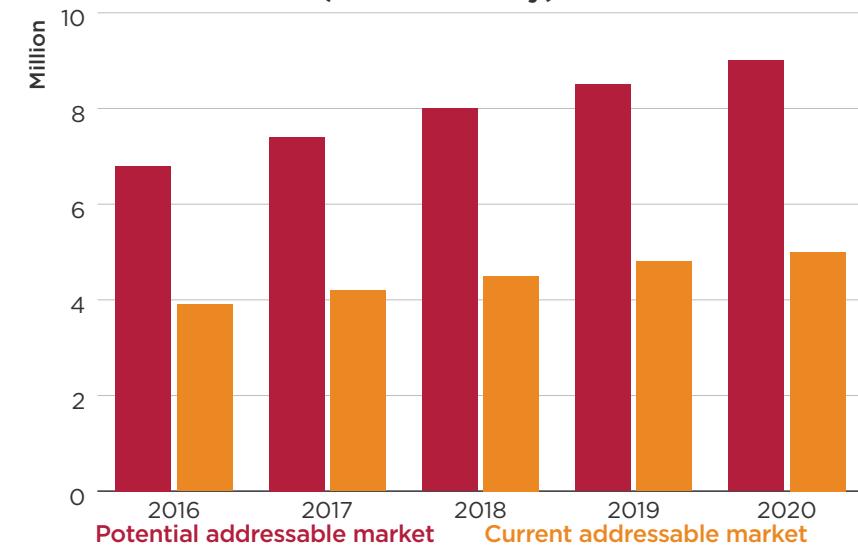
Potential direct revenue opportunity: The potential direct revenue opportunity from digitising existing cash-based transactions through mobile money services is around \$14 million in 2016, and is expected to increase to just over \$20 million in 2020.

Potential addressable market: Mobile operators could generate a share of the estimated 3.9 million new mobile money accounts by 2020 from digitising B2P payments, depending on the number of farmers engaged in formal value chains.

Potential direct revenue opportunity



Addressable market (mobile money)



*WFP P4P countries: Afghanistan, Burkina Faso, Democratic Republic of Congo, El Salvador, Ethiopia, Ghana, Guatemala, Honduras, Kenya, Liberia, Malawi, Mali, Mozambique, Nicaragua, Rwanda, Sierra Leone, South Sudan, Tanzania, Uganda, Zambia. The WFP plans to add another 15 countries.

Source: GSMA Intelligence, World Bank, FAO



Vodafone enterprise platform offers end-to-end digital solution to agribusinesses

Background

The Connected Farmer Alliance (CFA) is Vodafone's enterprise platform for agricultural value chains that helps agribusinesses work more efficiently with smallholder farmers, in turn increasing their productivity and income. The platform is available on Vodafone-owned networks Safaricom (Kenya) and Vodacom (Mozambique and Tanzania) and leverages both the Agri VAS channels and Vodafone's M-Pesa mobile money to facilitate communication and payments between agribusinesses and their smallholder suppliers. The CFA platform encompasses three main features:

Farmer database management – a portal enables entry of key information on farmers – such as registration, profiling, location, crop in production – for field agents to log in their interactions with smallholder suppliers

Communication – direct communication line between agribusinesses and farmers for agribusinesses to keep track of farmers' production cycles and answer/ask potential queries that arise

Transaction management – issuance of e-receipts (sent via SMS) to farmers selling their produce to the agribusiness and enabling payments to farmers via M-Pesa.

Outcome and lessons

The CFA has grown into a sustainable commercial enterprise following its launch in 2012. The integration of farm management tools, communication facilities, and mobile payment offers agribusinesses a comprehensive digital solution for their engagement with smallholder farmers. The CFA is currently facilitating communications and transactions for approximately 30,000 smallholder farmers and five agribusiness clients. Kenya Nuts is the first agribusiness on-board with the CFA platform under a partnership with Safaricom and pays a monthly fee for using the service. The CFA platform also has the flexibility to adjust to multiple value chains and to meet the needs of different agribusinesses, supporting scalability of the overall offering.

Outlook

Kenya has a number of agricultural value chains that provide attractive entry points to payment digitisation for mobile operators and mobile money providers. These are mainly cash driven crops (such as coffee and tea) and those that have high frequency of trade and low value of transaction, making them more prone to mobile money usage (such as dairy, fruits and horticulture). An estimated 4 million smallholder farmers in rural areas already have a mobile money account, highlighting the potential to use mobile money for formal agricultural procurement.

Contents

Context

Business-to-person (B2P) payments

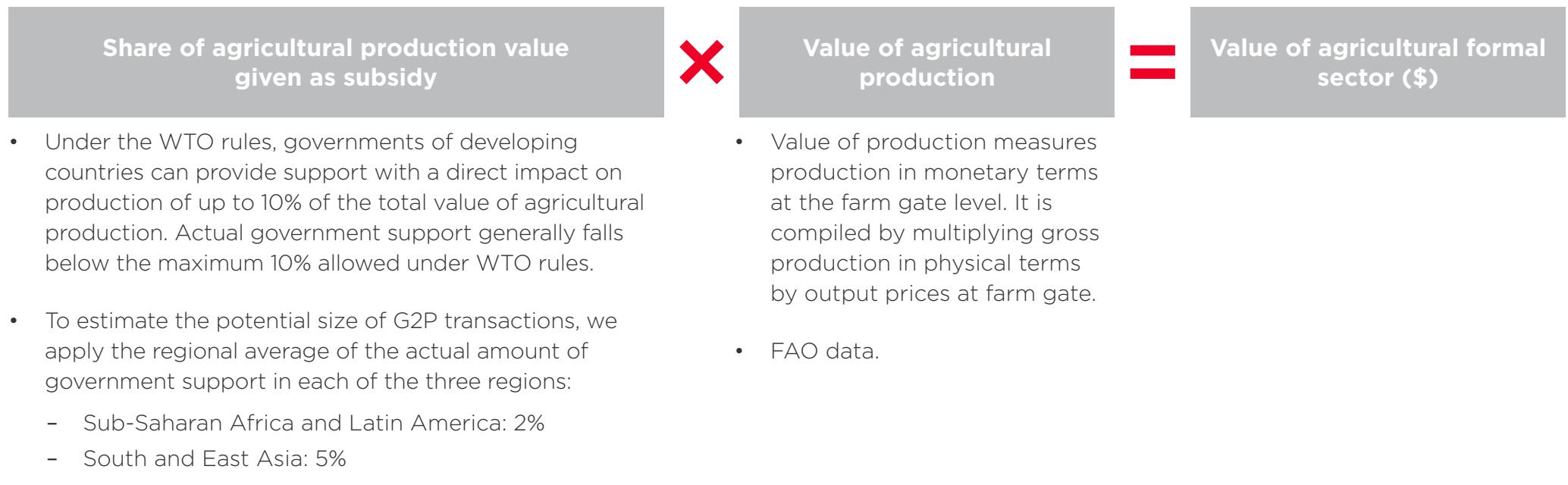
Government-to-person (G2P) transfers

MNO business drivers

Agricultural produce categorisation

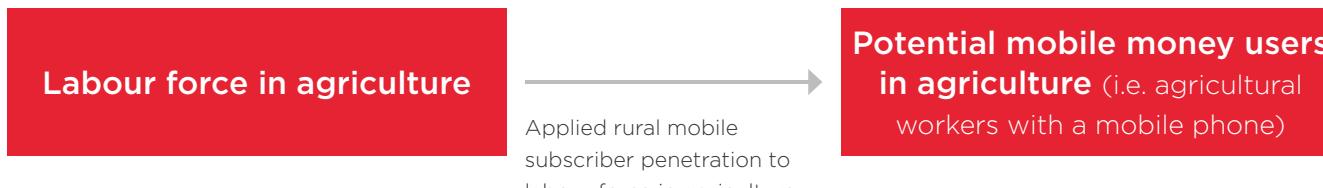
Value of G2P subsidies

Governments in developing countries use several measures, including subsidies, grants and income support payments, to stimulate the use of necessary inputs that enhance agricultural productivity. The value of government agricultural support and nature of distribution vary widely among countries but largely comply with the World Trade Organization (WTO) Agreement on Agriculture in relation to domestic support.

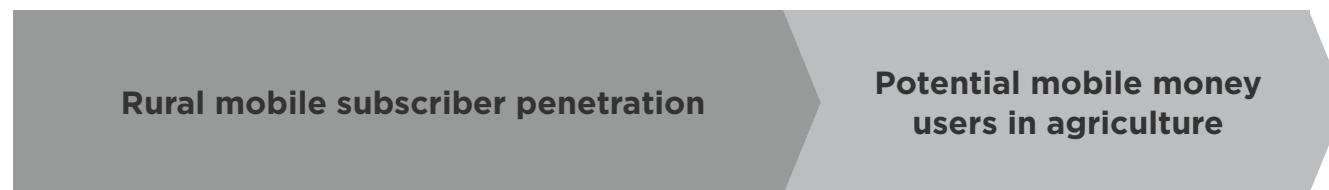


Potential addressable market - Potential mobile money users in agriculture

Potential addressable market



The following steps have been applied to each of the 69 selected countries



Rural mobile subscriber penetration was estimated by:

1. Taking the urban and rural population split according to the World Bank
2. Calculating the total mobile subscriber penetration
3. Assuming “urban penetration” = $1.3 \times$ “rural penetration”
(over time this factor will reduce as urban and rural get closer to parity)

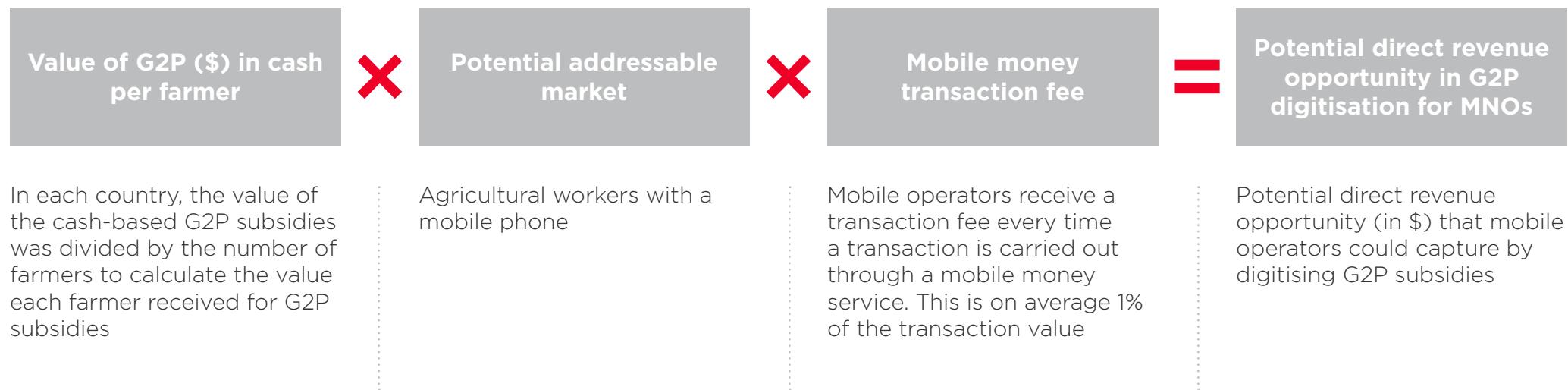
The number of potential mobile money users in agriculture was estimated by applying the rural mobile subscriber penetration rates to the labour force in agriculture

Current addressable market
i.e. agricultural workers with a mobile phone and subscribed to mobile money

To compare the **current addressable market** to the **potential addressable market**, we estimated the number of agricultural workers with a mobile phone and subscribed to mobile money.

We applied mobile money penetration rates in rural areas to agricultural workers with a mobile phone.

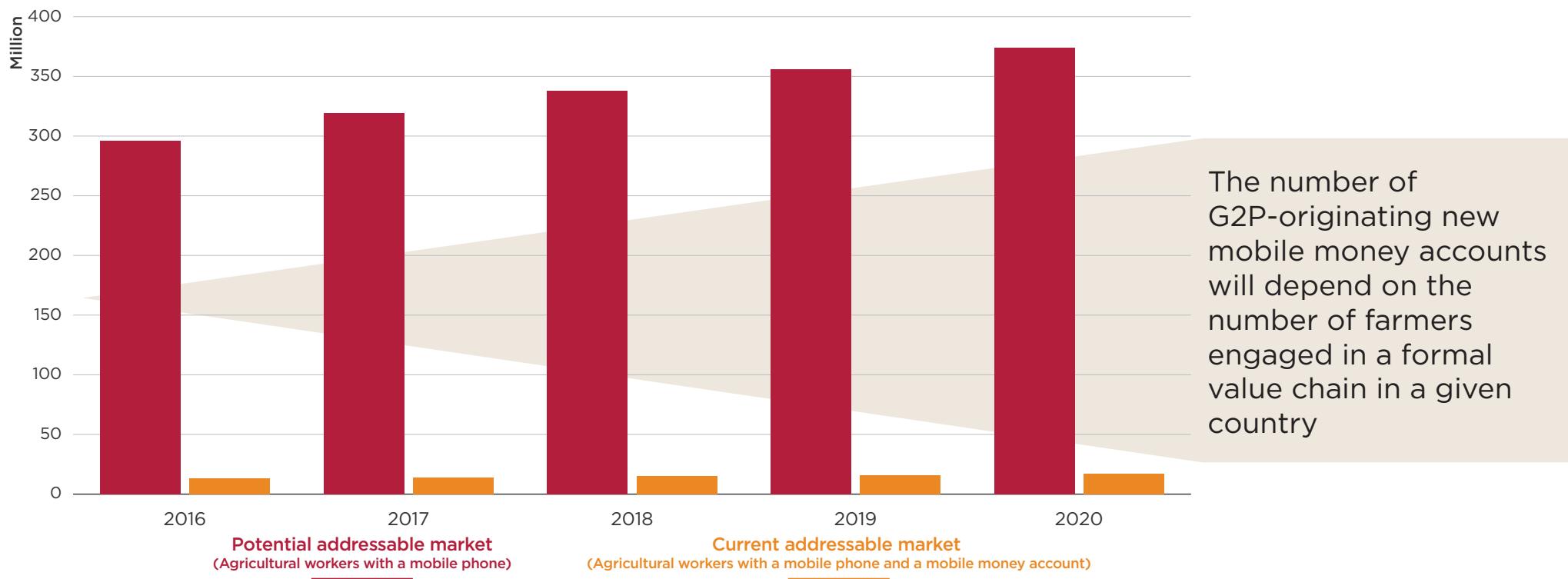
Potential direct revenue opportunity in G2P digitisation for MNOs



Outputs - Potential addressable market for G2P

Of the 750 million+ farmers in the 69 selected countries, an estimated 295 million have a mobile phone and around 13 million have a phone and a mobile money account in 2016.

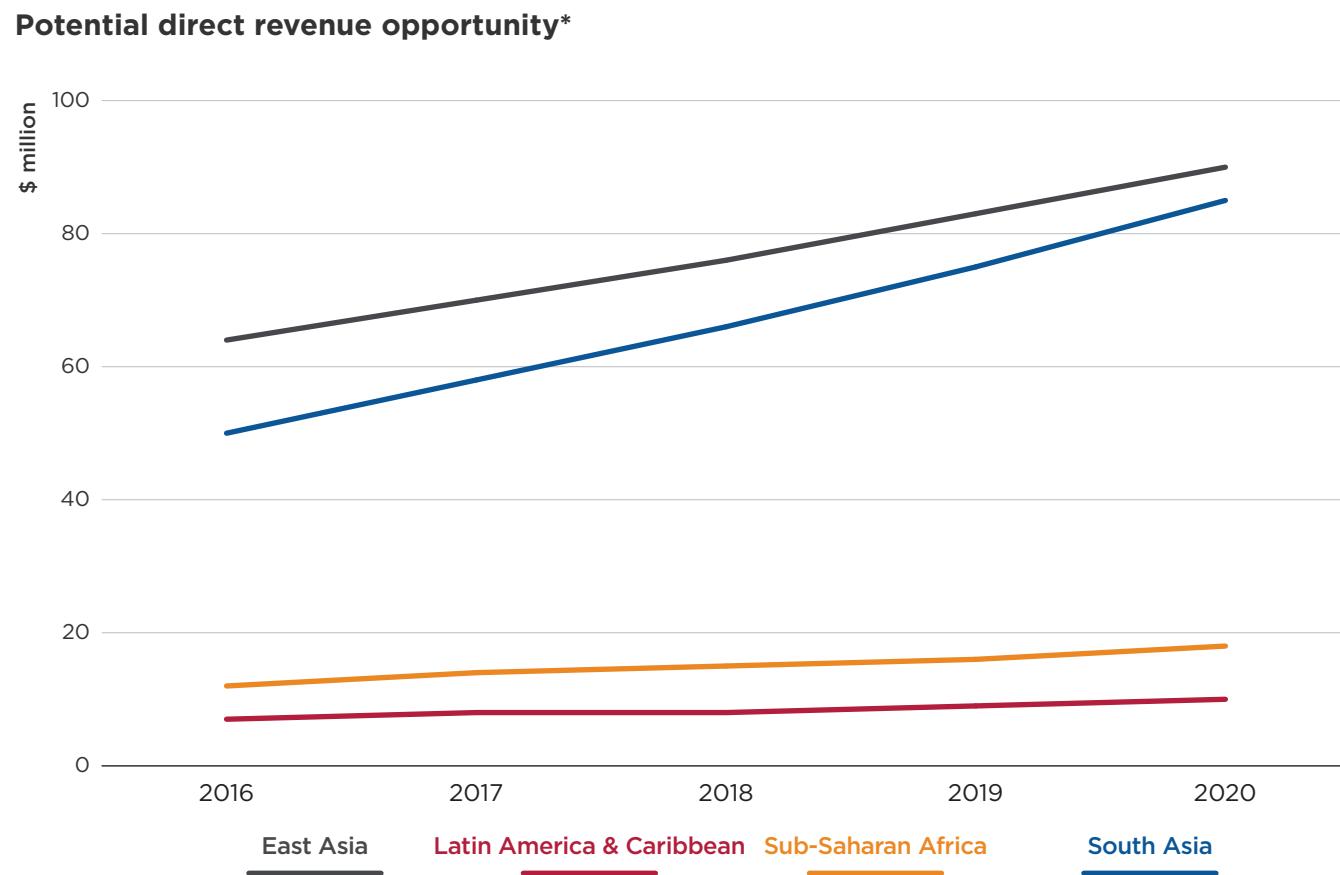
Provided that MNOs and other mobile money providers are able to operate in an enabling environment, by actively approaching the digitisation opportunity in G2P agriculture subsidies, they could add as new mobile money customers a significant share of the 350 million farmers forecast to have a mobile phone in 2020 (potential addressable market).



Source: GSMA Intelligence, World Bank, FAO

Outputs - Potential direct revenue opportunity for G2P

Provided that MNOs and other mobile money providers benefit from an enabling environment, if they actively pursue the digitisation opportunity for G2P subsidies this could result in \$202 million in direct annual revenues in 2020, representing 0.1% of total recurring revenues for mobile operators in the selected countries.



*Data available at country level. For more information, please contact magri@gsmaintelligence.com

Source: GSMA Intelligence, World Bank, FAO

Maximising the G2P potential opportunity

The total value of transactions available for digitisation of G2P payments across agriculture-dependant economies is estimated at \$31 billion in 2016 and will grow to reach \$40 billion in 2020.

Of the \$40 billion available for digitisation in 2020, \$17 billion will come from South Asia, \$18 billion from emerging markets in East Asia, \$4 billion from Sub-Saharan Africa and \$2 billion from Latin America and the Caribbean.

In addition to the potential direct revenue opportunity, the digitisation of agricultural G2P disbursements is a viable use case for mobile money providers to capture a share of the 357 million new mobile money accounts forecast for 2020 (185 million for South Asia, 72 million for East Asia, 88 million for Sub-Saharan Africa and 12 million for Latin America and the Caribbean).

The addressable market includes all farmers with a mobile phone, given that government transfers are generally non-discriminatory between farmers that sell through formal and informal channels.

To maximise this potential, MNOs must operate in an enabling mobile money regulatory environment and be able to:

- act quickly in view of potential competition from third-party providers and banks
- develop collaboration models (joint bids, shared resources) enabling mobile operators to present a strong case to governments for operator-led G2P digitisation platforms
- ensure adequate mobile network coverage in target rural regions
- establish a cash-in/cash-out agent network, supported by training and incentive strategies for agents
- ensure adequate user education on the benefits of digital payments and the use of mobile money.

India - Market context and digitisation opportunity



Unique mobile penetration in 2015: 47%, forecast to rise to 68% by 2020
(source: GSMA Intelligence)

Financial inclusion: 53% of the adult population (source: World Bank Global Findex)

Agriculture value add: 15% of GDP (source: World Bank)

Market context: India's 280 million farmers represent just over 50% of the country's total workforce and contributed to a total agricultural production value of just over \$300 billion in 2015. The main agricultural products include sugar crops, bananas, stem vegetables, rice and cotton.

G2P opportunity: The government of India provides a subsidy on fertiliser and other inputs to support production. We estimate that government subsidy with a direct impact on production could amount to up to 5% of the total value of production, equating to \$16.6 billion in 2016. This is estimated to rise to up to \$22 billion in 2020.*

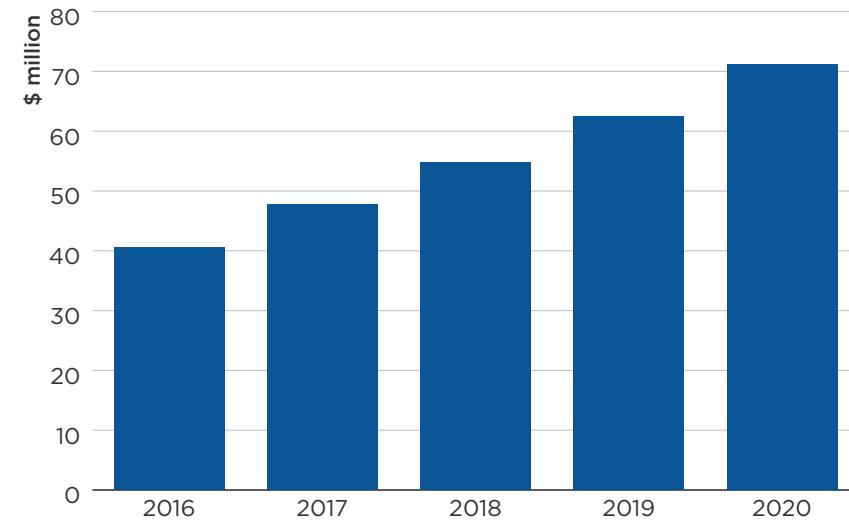
Digitisation opportunity: Around 37% of government transfers have been digitised, mostly through mobile money and/or bank transfers; there is an opportunity to digitise the remaining 63% of transactions that are still cash-based (source: World Bank Global Findex).

Potential direct revenue opportunity: The potential direct revenue opportunity for mobile operators and other mobile money service providers in digitising government subsidies through mobile money services is estimated at around \$40 million in 2016, and is expected to increase to around \$70 million in 2020.

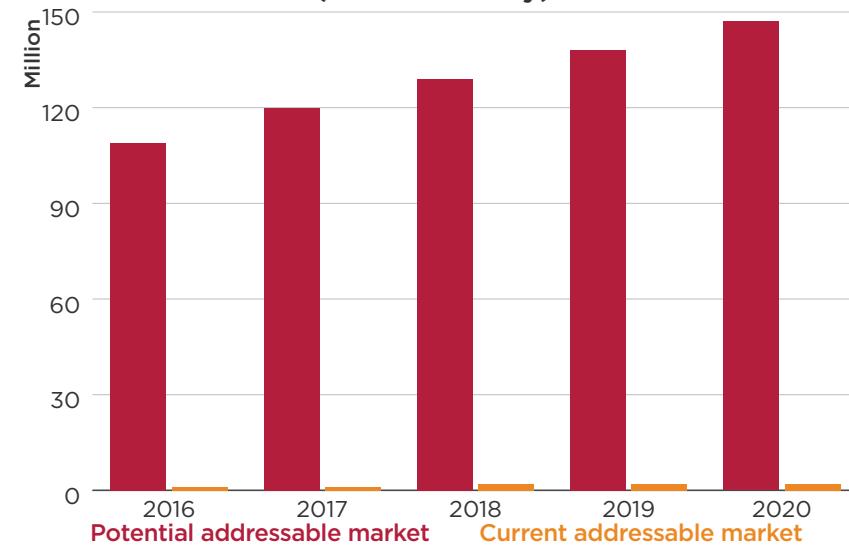
Potential addressable market: Mobile money providers could generate a share of the estimated 145 million new mobile money accounts by 2020 from digitising G2P transfers.

*For reference, in 2013/2014 the government of India disbursed \$13.8 billion in agriculture subsidies

Potential direct revenue opportunity



Addressable market (mobile money)



Mobile operators can help enable newly introduced G2P transfer system for subsidies



Background

Historically, fertiliser subsidy in India is provided 'at source', i.e. farmers pay below-market rates. The gap between the market price and the lower consumer price for these products is covered by the subsidy. However, there have been calls to implement a more efficient and secure subsidy distribution system to address the high cost and abuse of the current system.

Outcome and lessons

The government of India announced in February 2016 that it would introduce the Direct Benefit Transfer (DBT) system for fertiliser subsidies nationwide. This entails transferring the admissible subsidy directly to farmers, who in turn pay the full market price for the farming input upfront to the supplier. The government of Utter Pradesh (UP) trialled the DBT system for seed subsidy in kharif* 2015, allowing around 150,000 farmers to buy seeds from designated retail outlets at market prices. This led to a 70% reduction in the amount of subsidy on hybrid paddy, maize, jowar and bajra seeds over the previous season. Central to the DBT system implemented by the UP government is a farmers database, containing their identity proofs, land particulars and bank account numbers. While the requirement for bank accounts poses a challenge for the implementation of DBT nationwide, given the limited access to traditional financial institutions in many rural areas, it creates an opportunity for mobile operators to play a role in enabling efficient G2P transfer for farm input subsidies.

Outlook

The recent introduction of payment bank regulations has created a more supportive regulatory environment and allowed several non-banks to take on a differentiated banking licence to offer payment services. Four of the eight licensees for the new payment banks in India are operator led (Vodafone, Airtel, Reliance Jio and Idea Cellular). With more than 620 million mobile connections between them and over 5 million physical distribution points that can be transformed to provide financial access to customers, the combined customer base of these operators shows the potential to effectively facilitate digital transfers to farmers and increase financial inclusion.

* Cultivation and harvesting over the rainy (monsoon) season, usually April to October in Southeast Asia

Mexico - Market context and digitisation opportunity



Unique mobile subscriber penetration of 69% at the end of 2015, forecast to rise to 84% by 2020 (source: GSMA Intelligence)

Financial inclusion: 39% of the adult population (source: World Bank Global Findex)

Agriculture value add: 4% of GDP (source: World Bank)

Market context: Mexico's 7.6 million farmers represented 14% of the country's total workforce and contributed to the country's total agricultural production value of \$72 billion in 2015. The main agricultural value chains in the country include sugar crops, maize, milk and bananas.

G2P opportunity: The government of Mexico provides cash transfer to agricultural growers to support their incomes as part of an initiative to facilitate the transition to more market oriented policies from a previous system of guaranteed prices. We estimate that government subsidy with a direct impact on production can amount to up to 2% of the total value of production, equating to \$1.5 billion in 2016. This is estimated to rise to up to \$1.6 billion in 2020.*

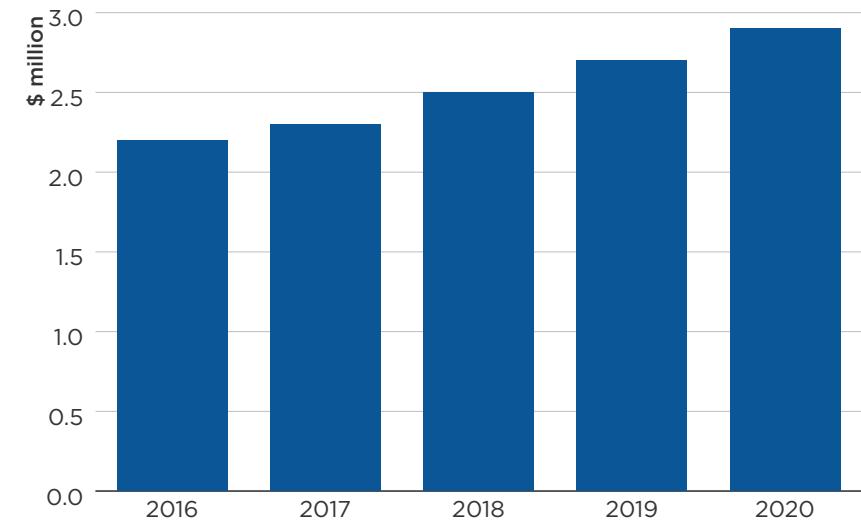
Digitisation opportunity: Around 56% of government transfers have been digitised, mostly through mobile money and/or bank transfers; there is an opportunity to digitise the remaining 44% of transactions that are still cash-based (source: World Bank Global Findex).

Potential direct revenue opportunity: The potential direct revenue opportunity for mobile operators and other mobile money service providers in digitising government subsidies through mobile money services is estimated at around \$2 million in 2016, and is expected to increase to just under \$3 million in 2020.

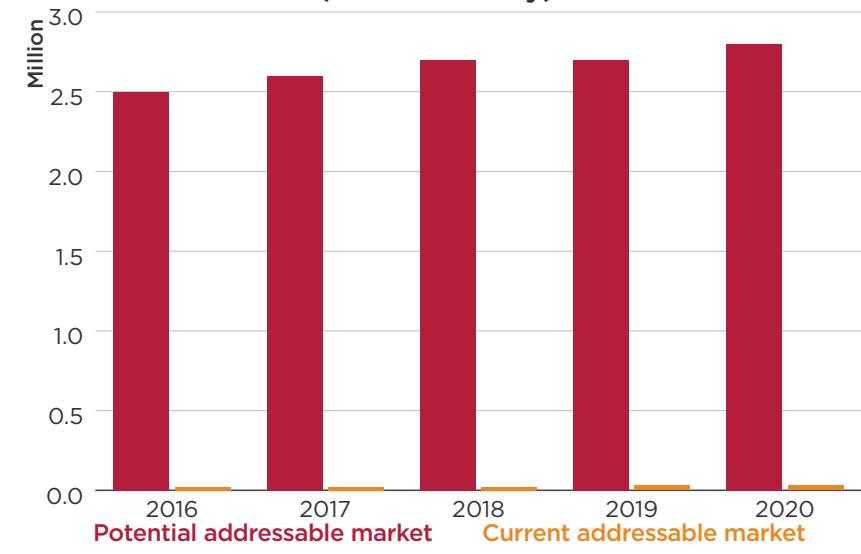
Potential addressable market: Mobile money providers could generate a share of the estimated 2.8 million new mobile money accounts by 2020 from digitising G2P transfers.

*For reference, in 2013 the government of Mexico disbursed \$1 billion in agriculture subsidies

Potential direct revenue opportunity



Addressable market (mobile money)



Source: GSMA Intelligence, World Bank, FAO

Mobile operators can develop solutions to enhance government agricultural transfers



Background

The government of Mexico initiated an agricultural support programme called PROCAMPO (Direct Support to Countryside Programme) in 1993. The programme was modified in 2013, with eligible farmers now receiving PROCAMPO subsidy payments of MXN963 (\$51)/hectare up to a maximum of MXN100,000 per grower and per crop cycle.

Outcome and lessons

PROCAMPO payments already go through a digital channel – the government transfers funds into farmers' bank accounts. However, the existing payment system faces several challenges around cost and inefficiency. For example, it is difficult to verify the eligibility of recipients, resulting in payments into the bank accounts of farmers whose circumstances may have changed. According to a report by the Federal Auditor's Office, MXN7.74 million was granted to 1,850 people in 28 states, all of whom had died before the payment date, in 2014.

There is an opportunity for mobile operators to develop mobile financial solutions that can help address these challenges. In Mexico, operators' mobile money services are interoperable with banks and there is a move towards full account-to-account (A2A) interoperability in mobile money.

Outlook

Mexico does not yet have an enabling environment for operator-led mobile money services. However, there is potential for mobile money providers to develop solutions to enable more efficient distribution of government transfer to farmers, in partnership with other financial institutions, leveraging the wider reach of mobile services compared to bank branches and ATMs. Mobile-based payments also have the potential to bring financial inclusion to rural areas and extend the PROCAMPO payments to farmers that may otherwise be excluded.

Nigeria - Market context and digitisation opportunity



Unique mobile subscriber penetration in 2015: 45%, forecast to rise to 55% by 2020 (source: GSMA Intelligence)

Financial inclusion: 44% of the adult population (source: World Bank Global Findex)

Agriculture value add: 23% of GDP (source: World Bank)

Market context: Nigeria's 12.6 million farmers in 2015 represented 21% of the country's total workforce, and contributed to the country's total agricultural production value of just under \$80 billion. The main agricultural value chains in the country include roots and tubers, cassava, maize and oil crops.

G2P opportunity: The government of Nigeria provides a subsidy on fertiliser to increase crop production and boost the incomes of smallholder farmers. We estimate that government subsidy with a direct impact on production can amount to up to 2% of the total value of production, equating to \$1.6 billion in 2016. This is estimated to rise to up to \$2 billion in 2020.*

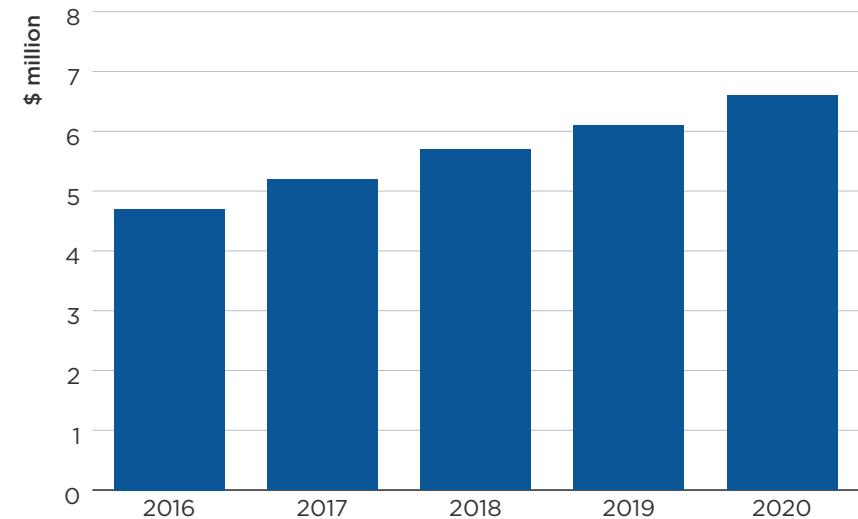
Digitisation opportunity: Around 37% of government transfers have been digitised, mostly through mobile money and/or bank transfers; there is an opportunity to digitise the remaining 63% of transactions that are still cash-based (source: World Bank Global Findex).

Potential direct revenue opportunity: The potential direct revenue opportunity for operators to digitise government subsidies through mobile money services is estimated at \$4.7 million in 2016, and is expected to increase to \$6.6 million in 2020.

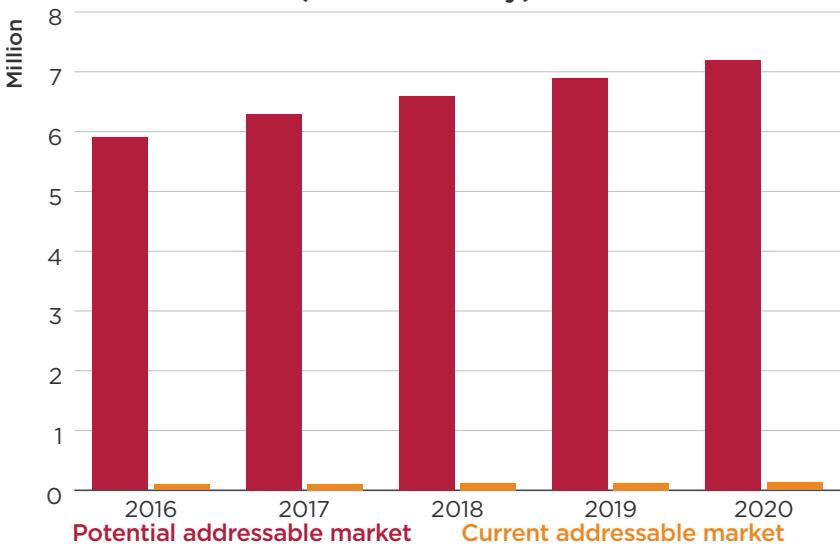
Potential addressable market: Mobile money providers could generate a share of the estimated 7 million new mobile money accounts by 2020 from digitising G2P transfers.

*For reference, in 2014 the government of Nigeria disbursed \$500 million in agriculture subsidies

Potential direct revenue opportunity



Addressable market (mobile money)



E-wallet success in Nigeria underlines potential of digitising G2P transfers



Background

Historically, fertiliser and other inputs were procured by the government and distributed to farmers, but the system was fraught with inefficiencies and fraud, including the diversion of inputs to large-scale farmers or others that profited from resale. To address the inefficiencies, the government of Nigeria established the Growth Enhancement Support Scheme (GESS) in 2011 as part of efforts to liberalise the input subsidy system. The GESS provides subsidised fertilisers and seeds directly to farmers through an electronic wallet system, which allows farmers to receive vouchers on their mobile phones. The federal and state governments contribute 25% each to the subsidy, while the farmer pays the remaining 50% on redemption.

The government's technology partner, Cellulant Nigeria Ltd, developed an e-wallet platform to distribute vouchers to beneficiaries via SMS. The e-wallet system was designed to better monitor and control distribution by assigning a database-linked GES personal identification number (PIN) to each farmer via mobile phone.

Outcome and lessons

Since inception, the GESS has registered more than 12 million farmers across all the states in the country. The programme has also increased the proportion of farmers benefiting from fertiliser subsidy from 11% to 92%, with 1.3 million metric tonnes of fertilisers and 55,000 metric tonnes of improved seeds delivered to farmers so far. In 2014, 7.22 million farmers received a total subsidy transfer of NGN82.4 billion (\$420 million) via their mobile phone. The government has also reported that it saved \$192 million in 2012 through the GESS.

Outlook

The National Agricultural Payment Initiative (NAPI) was developed as part of the second phase of the GESS. NAPI involves the distribution of chip-based national identity cards that provide access to financial services such as loans to farmers, in addition to holding subsidy information. This demonstrates how an e-wallet system can help with the transition to full digital financial inclusion.

Contents

Context

Business-to-person (B2P) payments

Government-to-person (G2P) transfers

MNO business drivers

Agricultural produce categorisation

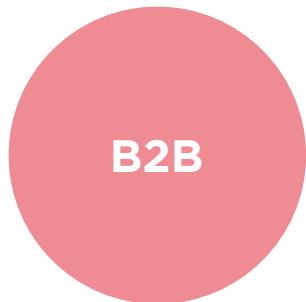
MNO business drivers - B2C, B2B and B2G



Direct revenue: The MNO derives direct revenue from B2P transaction fees (typically up to 1% of transaction) and cash withdrawals (although withdrawals hinder mobile wallet activity and ecosystem development).

Indirect benefits: The MNO derives benefits from the following:

- New customer additions: New mobile money customers in rural areas (increasing mobile money market share) and potentially new mobile users (B2P and G2P as use cases to sign up new mobile users in markets where rural market penetration is low)
- Boosting usage of existing mobile money users via cash inflow into the mobile wallet, leading to outflows for agriculture and non agriculture related services - e.g. agriculture credit/savings products, and P2B payment such as school fees, health fees, utility bills)
- Increasing overall network usage (voice, messaging and VAS)
- Increasing agent activity in rural areas, allowing for development of the mobile money ecosystem



Direct revenue: The MNO enterprise unit (or a third-party provider) derives revenue from agriculture businesses through the licensing of farm management systems, which enable efficient supply chain management in agriculture (track and trace, inventory record, payments to farmers) whereby the payment function is enabled by a mobile money based bulk payment platform.



Direct revenue: The MNO enterprise unit (or a third party provider) derives revenue from governments (e.g. ministries of agriculture, regional governments) through the licensing of ICT platforms, which enable the digitisation of agriculture subsidy programmes, including the digitisation of profiles and data of subsidy beneficiaries and the actual disbursement process of subsidies through mobile money bulk payments.

B2C - Direct revenue

Opportunities

Direct transaction fees. These typically represent 1% of total value in mobile money transactions and are the primary revenue driver. In a B2C model, transaction fees are derived from the wallet activity of farmers, salaried labourers or other intermediaries (e.g. agribusiness field staff) moving digital funds for adjacent services after receiving payments for agricultural produce, or for their labour, into the wallet. Similarly, in a B2C model, transaction fees are derived from farmers using the digital funds for input purchases after receiving subsidy payments.

Cash withdrawals: In a B2C model, cash withdrawals are another source of direct revenue for MNOs, although withdrawals hinder ecosystem development and further revenue opportunities deriving from transactions (P2P, bill payments, merchant payments) as the e-money is converted into cash.

Challenges

Cost of mobile money: Despite the perceived benefits of mobile money agricultural payments for agribusinesses and farmers (increased security, timely payments, improved cash flow management), mobile money has a cost (transaction and withdrawal fees) and competes with real cash, which is perceived as a cost-free option.

Cost mitigation entry strategies: To facilitate the adoption of mobile money payments in agriculture, MNOs pioneering agriculture bulk payments have experimented with reduced transaction fees for farmers that have been enrolled in B2P payment schemes (e.g. Tigo Ghana/ASI rice value chain pilot*) and G2P payment schemes. Such cost mitigation initiatives for early adopters serve to stimulate uptake, usage and consequentially ecosystem development (e.g. P2B payments such as school fees, health fees, agriculture and non-agriculture related derivative financial services, such as savings and credit products) while still generating direct revenue from mobile money users.

Other potential entry strategies to support a B2C direct revenue model include:

- the adoption of hybrid B2P payments, allowing the farmer to choose the portion of payment to be received via mobile money and via cash (e.g. MTN Uganda coffee value chain pilot)
- no-fee transactions for farmers enrolled in B2P (e.g. SmartMoney East Africa agriculture payments; Orange Cote d'Ivoire cocoa value chain pilot)
- G2P schemes, with the cost of transactions subsidised by B2B/ B2G revenue streams (see slides 31 and 32).

*www.asintl.org/our-experience-Ghana-Rice-Mobile-Finance-RiMFin.html

B2C - Indirect benefits

New customer additions: B2P and G2P bulk payments in agriculture serve as an entry point to boost MNO mobile money market share in rural areas. As mobile money growth in urban areas falls, MNOs seek new growth drivers: targeting the largely unaddressed rural market presents an opportunity to continue driving the growth of mobile money business.

Especially in countries where rural mobile penetration of the population is comparatively low, there is an opportunity for MNOs to use B2P and G2P schemes as leverage to sign up new mobile subscribers, provided that MNOs support such schemes with the required customer acquisition initiatives (e.g. digital literacy and affordable price plans).

Increase use of core services and boost loyalty: Agribusiness and government bundles of agri bulk payments with advisory services (e.g. localised weather forecasts, agro advisory via SMS/voice channels) and communication services (e.g. SMS payment notifications) for farmers enrolled in B2P/G2P schemes increase usage of core network operator services.

Overall, bundling agriculture valued added services (agri VAS) with voice, SMS, VAS and new mobile-money based services for the rural segment offers additional potential to drive brand awareness and loyalty in the rural customer base. Evidence from agri VASs shows that the churn rate of agri VAS users is lower than in the overall base.

Increase transactions per user: Increasing the use of mobile money for existing customers in rural areas by boosting cash inflows into the mobile wallet via agriculture-related bulk disbursements allows for ecosystem development and overall growth of the mobile money business. As money flows into the mobile wallet of the rural customer, there is a growing opportunity for MNOs to stimulate the use of existing services (primarily P2P transfers, but also bill and merchant payments and financial services).

Enable uptake of new mobile money services: The cash in-flow of B2P and G2P payments allows for emerging agriculture-related services (e.g. agri input payments; agriculture credit, savings and insurance products). In addition, B2P and G2P transactional records allow for product innovation in agriculture-related financing, with the potential to offer micro credit, micro savings and insurance via mobile money. The transactional records of B2P and G2P in agriculture can be used for establishing credit worthiness, as banks and microfinance institutions can access productivity and transactional records. This way, commodity-based financing is enabled on the basis of a liquid asset (the farmer's crop), as opposed to traditional financing that requires collateral such as land ownership, discouraging farmers from seeking credit from formal entities.

Increase agent activity: B2P and G2P in agriculture provides a solid case for mobile money agent deployment and agent activation in rural areas. By providing the much needed inflow into rural areas and by stimulating the overall mobile money ecosystem, B2P and G2P payments enable sustainable economies for agents. Driving agent activation is especially important in rural areas, where most dormant agents are located.

B2B - Direct revenue

Opportunities:

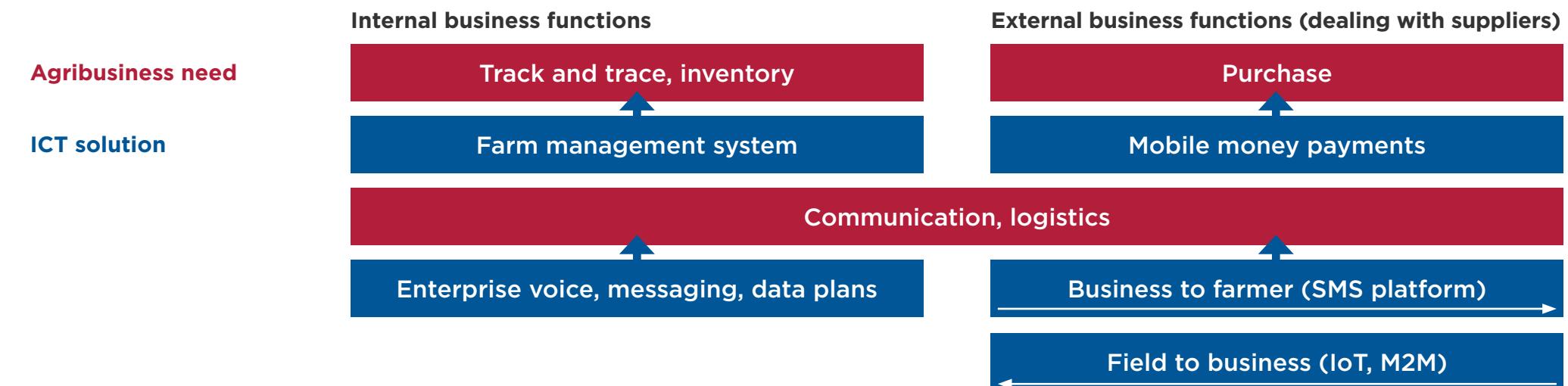
Target a key vertical in emerging markets: Agriculture is one of the largest contributors to GDP in emerging market economies, representing a key vertical to boost the growth of the MNO B2B business. 2015 agriculture share of GDP (World Bank) was 24% in Kenya and India, 23% in Haiti.

Provide mobile technology enabled ICT tools for agriculture supply chain management: MNOs can derive B2B revenue from the agriculture vertical by providing to agribusinesses a range of supply chain management ICT tools enabling real-time payments, track and trace and inventory records, and end-to-end communication. Such tools that leverage efficiency, increase productivity and reduce costs for agribusinesses can be developed in-house or offered through partnerships with specialist firms.

Challenges:

MNO enterprise capacity: In most emerging markets, MNOs are mainly focused on B2C. Agriculture has hardly represented a key strategic focus for B2B enterprise teams given that enterprise solutions in agriculture require a high level of customisation and sales cycles are longer.

Fragmentation of agriculture sector: The agriculture sector, especially in emerging markets, is characterised by a high level of fragmentation. The majority of agribusinesses are small operations, particularly in densely populated and intensively cultivated countries. As a result, the required level of customisation of ICT platforms for farm management is high and the development costs are high.



B2G – Direct revenue

Opportunities

Target one of the largest subsidy schemes: In emerging economies, which are largely dependant on agriculture as one of the biggest contributors to national GDP, and where the agriculture sector is the largest employer, agriculture subsidies are among the largest G2P schemes together with government payments (salaries, pensions), representing for MNOs a primary opportunity to derive G2P revenue in mobile money.

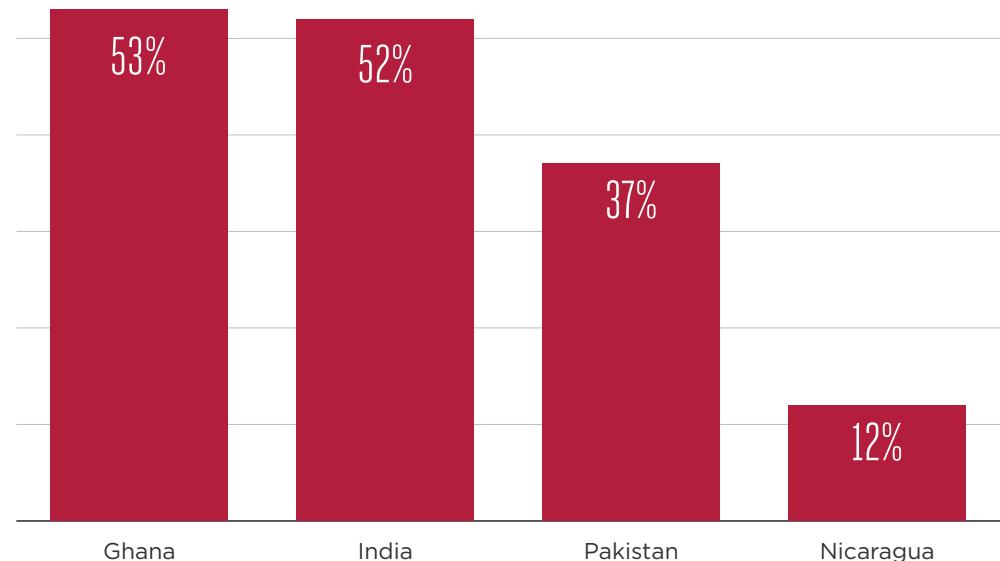
Provide mobile technology enabled ICT tools for agriculture subsidy disbursement: MNOs have an opportunity to derive enterprise revenue from institutional customers (ministry of agriculture, regional governments) by providing ICT platforms that enable secure and real-time disbursement of subsidies (e.g. agriculture inputs), reducing disbursement costs and improving efficiency for such institutions.

Provide digital databases to institutions: Besides mobile money enabled bulk disbursements, there is potential for MNOs to generate revenue from providing platforms that allow the digitisation of the entire G2P and P2G communication flows (e.g. digital farmers registries) to institutions (ministry of agriculture, regional governments).

Challenges

Complexities of working with government. In spite of the opportunity to form exclusive agreements for the distribution of subsidies via the mobile money channel, working with governments in emerging markets can be challenging for MNOs and their partners due to complex and timely procurement processes. Changing priorities and political instability can also undermine existing agricultural subsidy schemes and put at risk ongoing deployments.

Percentage of employment in agriculture (2015), selected countries



Source: FAO

Contents

Context

Business-to-person (B2P) payments

Government-to-person (G2P) transfers

MNO business drivers

Agricultural produce categorisation

Agricultural produce categorisation

Aquaculture – fish

Bananas – bananas, plantains

Barley – barley

Berries – berries nes, blueberries, cranberries, currants, gooseberries, grapes, raspberries, strawberries

Bulb and stem vegetables – asparagus, garlic, leeks (other alliaceous vegetables), onions (dry), onions (shallots, green)

Cassava – cassava, cassava leaves

Cereals, grains – buckwheat, canary seed, cereals (nes), fonio, grain (mixed), millet, oats, quinoa, rye, sorghum, triticale

Citrus fruit – fruit (citrus nes), grapefruit (inc. pomelos), lemons and limes, oranges, tangerines, mandarins, clementines, satsumas

Cocoa – cocoa (beans)

Coffee – coffee (green)

Cotton – cotton lint, cottonseed, seed cotton

Dry beans – beans (dry)

Eggplants (aubergines) – eggplants (aubergines)

Eggs – eggs (hen, in shell), eggs (other bird, in shell)

Fibre crops – agave fibres nes, bastfibres, coir, fibre crops nes, flax fibre and tow, hemp tow waste, jute, kapok fibre, kapok fruit, manila fibre (abaca), ramie, sisal

Fruits – apples, apricots, cherries, cherries (sour), cucumbers and gherkins, dates, figs

Fruit (fresh nes), fruit (pome nes), fruit (stone nes), peaches and nectarines, pears, persimmons, plums and sloes, pumpkins, squash and gourds, quinces

Honey – beeswax, honey (natural)

Hops – hops

Leafy and salad vegetables – cabbages and other brassicas, cauliflowers and broccoli, lettuce and chicory, spinach

Maize – maize, maize (green)

Meat – meat indigenous (ass, buffalo, camel, cattle, goat, horse, mule, other camelids, pig, rabbit, rodents, sheep), meat (ass, buffalo, camel, cattle, goat, horse, mule, other camelids, pig, rabbit, other rodents, sheep, game, nes), offals, nes

Milk – milk, (whole fresh buffalo, camel, cow, goat, sheep)

Natural gums – gums, natural

Nuts – almonds (with shell), areca nuts, brazil nuts (with shell), cashew nuts (with shell), cashewapple, chestnut, groundnuts (with shell), hazelnuts (with shell), kola nuts, nuts (nes), pistachios, walnuts (with shell)

Oil crops – castor oil seed, hempseed, jojoba seed, kapokseed in shell, karite nuts (sheanuts), linseed, melonseed, oil (palm, Oil, palm fruit), oilseeds nes, olives, poppy seed, pyrethrum (dried), rapeseed, safflower seed, sesame seed, sunflower seed, tallowtree seed, tung nuts

Palm oil – palm kernels

Peppermint – peppermint

Potatoes – potatoes

Poultry – meat indigenous (bird nes, chicken, duck, geese, turkey), meat (bird nes, chicken, duck, goose and guinea fowl, turkey)

Pulses – bambara beans, beans (green), broad beans, horse beans (dry), carobs, chickpeas, cow peas (dry), lentils, lupins, peas (dry), peas (green), pigeon peas,

pulses (nes), vegetables, leguminous nes, vetches

Rice, paddy – rice, paddy

Roots and tubers – ginger, roots and tubers (nes), sweet potatoes, taro (cocoyam), yams, yautia (cocoyam)

Rubber – rubber, natural

Silk – silk-worm cocoons, reelable

Skins and hair – hair (horse), hides (buffalo fresh, cattle fresh), skins (goat fresh, sheep fresh, sheep with wool)

Snails – snails, not sea

Soybeans – soybeans

Spices – anise, badian, fennel, coriander, chillies and peppers (dry), cinnamon (canella), cloves, mustard seed, nutmeg, mace and cardamoms, pepper (piper spp.), spices, nes

Sugar crops – sugar beet, sugar cane, sugar crops, nes

Tea – maté, tea

Tobacco – tobacco, unmanufactured

Tomatoes – tomatoes

Tropical fruits – avocados, coconuts, fruit (tropical fresh nes), kiwi fruit, mangoes, mangosteens, guavas, melons, other (inc.cantaloupes), papayas, pineapples, watermelons

Vanilla – vanilla

Vegetables – artichokes, carrots and turnips, chicory roots, chillies and peppers (green), mushrooms and truffles, okra, string beans vegetables (fresh nes)

Wheat – wheat

Wool – wool, greasy

About the authors



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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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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. This report is funded by the UK government's Department for International Development (DFID).

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