



Digital Identity for Smallholder Farmers: Insights from Sri Lanka





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Introduction: Smallholder Farmers and Identity

According to the United Nations Food and Agriculture Organization, more than 3 billion people – almost half of the world’s population – live in rural areas, and roughly 2.5 billion people depend on agriculture for their livelihoods¹. Smallholder farmers form the backbone of agricultural production in most developing countries and sell nearly 70 per cent of the food consumed worldwide. However, the same farmers also represent the majority of people living in absolute poverty and account for half of the world’s undernourished people². For this reason, supporting smallholder farmers is seen as critical to achieving the UN’s Sustainable Development Goals (SDGs) and reducing poverty, hunger, malnutrition and inequality.







Advancing the productivity and profitability of farmers – and the agricultural industry at large – presents a significant opportunity for mobile network operators (MNOs) across much of the developing world. As the most ubiquitous technology in rural communities, mobile is uniquely positioned to deliver the critical services and information farmers need to make better-informed decisions, manage their day-to-day finances and boost their livelihoods. The deployment of last-mile digital solutions in agricultural value chains also allows agribusinesses³ to address a range of business challenges, maximise operational efficiencies and real-time visibility in the supply chain, and promote farmer loyalty.

However, the rural poor are one of the least likely demographics to have access to an official proof of identity⁴, which is increasingly essential to securing

access to mobile connectivity, financial services and social protections. Even where identity coverage is widespread, a tension exists between a farmer’s ‘fixed identity’ (i.e. the demographic and biometric details recorded on their identity document), and their more fluid ‘economic identity’, which accounts for their shifting, dynamic social and economic circumstances. Farmers who are unable to prove their creditworthiness or validate other vital credentials (for example, income and transaction histories, ownership of land, crop types, geo-location or farm size) are more likely to face barriers accessing formal services or connecting to the global economy. For this reason, the GSMA’s mAgri programme has identified ‘digital profiles’ as one of the key bottlenecks, and opportunities, for digitising the agricultural value chain⁵.

Figure 1

Solutions for digitising the agricultural value chain

BUSINESS CHALLENGES	Farmers do not follow best practices, and lack skills and access to agri-related information, educational resources etc.	Cash payments are risky and costly for agribusinesses and for farmers. A cash economy also prevents farmers from accessing credit savings and insurance	Farmers do not possess formal and/or economic identities that capture transactional history, geolocation, farm size etc.	Agribusinesses need full and real-time visibility for traceability and certification of goods when sourcing from smallholders	Agribusinesses rely on manual systems which do not capture the data required equipment, farm and warehouse management	Agribusinesses rely on manual data management systems and lack real-time visibility into their business data
						
DIGITAL SOLUTIONS	1. Information services: Agricultural extension, education, certification standards, skills development	2. Mobile money: Transfers, payments and digital financial services	3. Digital profiles: Mobile for authentication and verification and as a tool to create economic identities/ digital profile	4. Track and trace systems, farm management systems	5. IoT applications for agriculture: Equipment logistics, crop, soil and weather monitoring, smart warehousing	6. Agribusiness analytics: Predictive analytics, precision agriculture

This report highlights key findings from the GSMA Digital Identity programme’s qualitative research in Sri Lanka, which was designed to help improve the mobile industry’s understanding of farmers’ identity-related needs and pain points, as well as their attitudes and perceptions towards digital identity. The research also sought to explore how agribusinesses and other service providers (e.g. MNOs, financial service providers) could gather and/or authenticate digital information for farmers in order to help build robust and recognised ‘economic identities’.

Key agricultural stakeholders such as buyers, financial service providers, local government officials and mobile network operators were also engaged in this research to ensure that their own perspectives and identity-related needs were captured. The research was designed to build on previous publications from the GSMA’s Digital identity and mAgri programmes. This includes existing Digital Identity research on end-user attitudes and perspectives on identity in Tanzania, Côte D'Ivoire and Pakistan⁶, and insights that the mAgri programme has collected through engagement on the highly successful Govi Mithuru service, an information service for smallholder farmers delivered by Dialog Sri Lanka⁷.

1. FAO (2013). 'Statistical Yearbook of the Food and Agricultural Organization for the United Nations'. Available at: <http://www.fao.org/docrep/018/i3107e/i3107e01.pdf>
 2. See: <http://www.ifpri.org/topic/smallholder-farming>
 3. The term 'agribusiness' denotes the collective business activities that are performed from farm to fork. It covers the supply of agricultural inputs, the production and transformation of agricultural products and their distribution to final consumers.
 4. World Bank (2016). 'Identification for Development: Strategic Framework'. Available at: <http://pubdocs.worldbank.org/en/21571460567481655/April-2016-ID4D-Strategic-RoadmapID4D.pdf>
 5. GSMA. 'Last mile agricultural value chain digitisation' Available at: <https://www.gsma.com/mobilefordevelopment/last-mile-agricultural-value-chain-digitisation>

6. GSMA (2017). 'Driving Adoption of Digital Identity for Sustainable Development: An End-user Perspective Report'. Available at: https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/02/Driving-Adoption-of-Digital-Identity-for-Sustainable-Development_An-End-user-Perspective-Report.pdf
 7. GSMA (2017). 'Govi Mithuru/Uzavar Tholan: A mobile agriculture service by Dialog, Sri Lanka'. Available at: <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/06/govi-mithuru-mobile-agriculture-service-dialog-sri-lanka.pdf>

Key themes shaping digital identity opportunities in developing markets

Sri Lanka presents its own highly-contextualised challenges and opportunities for MNOs and other service providers seeking to develop and implement digital identity solutions for farmers. However, our research has highlighted a number of important cross-cutting themes that are likely to shape the opportunity for identity solutions that target farmers in other emerging markets:



1) Identity needs vary by farmer type: A farmer's attitudes towards identity can be influenced by a wide range of factors, including the types of crops they grow, their age and the social capital they possess. By looking at a farmer's day-to-day needs and behaviours through an 'identity lens', we have found that two particular variables – financial stability (i.e. wealth) and attitudes towards change – were the most useful way to segment farmers and predict their identity-related needs and priorities. It will therefore be important for service providers to take a targeted approach when designing digital identity solutions for this diverse population.



2) Identity documents have both practical and emotional value: Official, government-issued identity documents are appreciated by farmers for their practical value (enabling access to formal services) as well as their symbolic and emotional value (anchoring a person to their identity as 'Sri Lankan'). In the same way, farmers overwhelmingly agreed that there would be value in possessing a proof of identity that enabled others to recognise their status as successful 'cultivators' and 'producers' - this could facilitate easier access to formal services and also build pride in their profession.



3) Face-to-face relationships are vital: In the close-knit rural communities where farmers live, informal networks and social forms of identity such as reputation are vitally important. Agribusinesses and local government officials are successfully building trust and loyalty among farmers by providing personal, accessible touchpoints for them to navigate services and support. Other formal service providers, such as MNOs and banks, hold more distant relationships with farmers; this might require them to partner with the 'known' institutions to gain a farmer's trust when capturing or sharing personal and agricultural-related information.



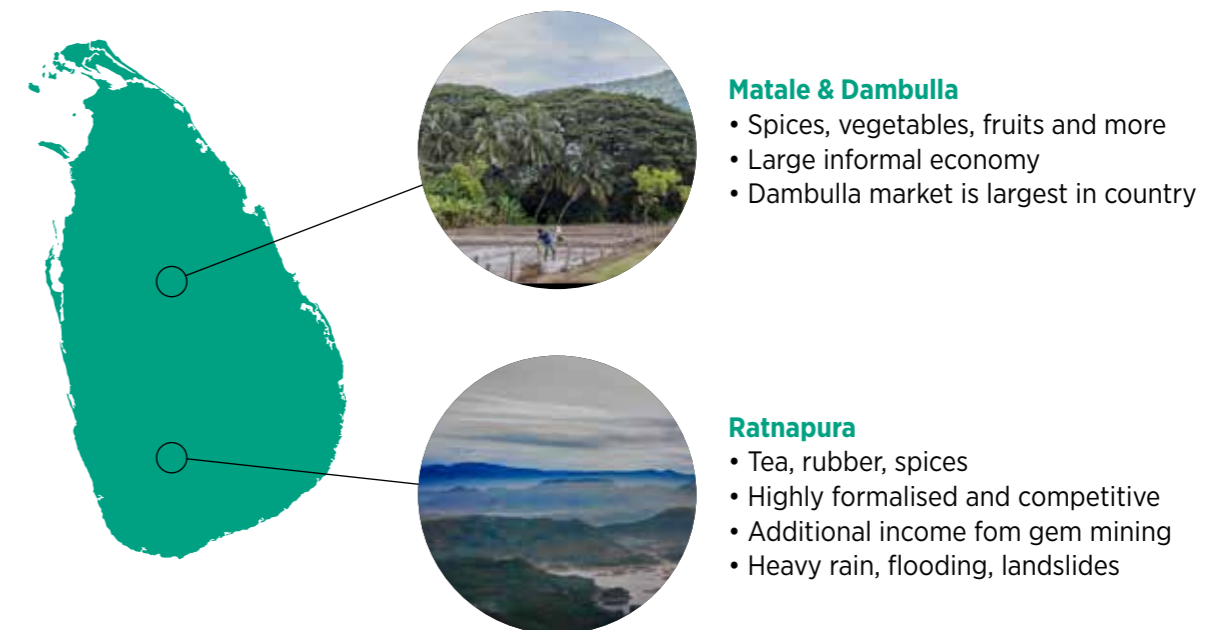
4) The agricultural landscape is changing: New influences such as climate change and the globalisation of agricultural markets are creating new challenges and opportunities for farmers. Traditional, inherited knowledge is losing some of its practical value, causing farmers to look beyond their local networks for information and advice. Younger and more entrepreneurial farmers are more aware of the growing tension between their local lives and the changes happening around them. Digital identity solutions that help farmers establish new forms of connection and access relevant information will be meaningful.

Research Approach and Locations

Our research used a staged, multi-method approach to capture the perspectives of over forty smallholder farmers and a multitude of service providers across three locations in Sri Lanka: Ratnapura, Matale and Dambulla. Focusing on these areas allowed us to explore two key agricultural value chains: tea, and tropical fruits and vegetables. Both value chains have been identified in previous research from the GSMA mAgri programme as having a high potential for digitisation⁸. This was determined based on an analysis of the size and value of the markets, the relatively high level of transparency and formalisation with each value chain, and the high frequency of farmer transactions. As farmers in these areas tend to grow more than one crop at a time, we were also able to explore the identity-related needs and opportunities in other, less formal value chains such as rubber and spices (e.g. pepper and cinnamon).

Figure 2

Research locations and value chains



The research took a targeted approach with smallholder farmers, who participated in in-depth interviews or focus group discussions. All participants were chosen on the basis that they were active in the priority value chains, were not subsistence farmers⁹ and had regular interactions with agribusinesses or buyers. Participants also included a mix of socio-economic groups, ages, genders, life-stages and education levels. **Additional details on the research approach can be found in the Appendix.**

8. GSMA (2016). GSMA mAgri Programme Market Sizing and Opportunity. Available at: <https://www.gsmaintelligence.com/research/?file=29e480e55371305d7b37fe48fb10cd6&download>

9. For the purposes of this research, subsistence farmers were described as those who are likely to focus on growing enough food to feed themselves and their entire families, rely substantially on remittances and/or social subsidies; be among the poorest and most vulnerable farmers; include a high number of women-headed households; and are not likely to own land.

Agriculture and Mobile in Sri Lanka: Contextual Considerations

Agriculture remains one of the most important sectors in Sri Lanka's economy, providing a source of employment for nearly a third of the workforce¹⁰. The pace of urbanisation in the country has been relatively slow, with 80 per cent of the population still living in rural areas – a share that has remained relatively stable over the last sixty years¹¹. Many farmers maintain a deep connection to their land, which is likely to have been handed down through their family over multiple generations. They also tend to live very local lives, with relatively limited connections to urban centres and other parts of the country.

Compared to other countries in the region, Sri Lanka provides a higher standard of living and is considered to be relatively more equal and less patriarchal in terms of cultural norms and practices¹². From 2005 - 2015, poverty was cut in half (dropping from 15 per cent to 7 per cent), and today disparities in wealth are roughly on par with many developed countries. Sri Lanka has also achieved a high level of financial inclusion compared to other South Asian markets, and a large share of households are able to access financial institutions for their basic savings needs¹³.

Despite facing various challenges in their profession, our research found that farmers enjoyed good access to local government services, good local provision of agricultural support, and good rural

infrastructure. However, as detailed later in the report, changing contexts are creating new needs and pain points for farmers. This was also found in previous research by GSMA¹⁴, which highlighted that most farmers' access to information and support is deficient. Timely advice on dealing with pests, diseases and localised weather conditions is not always available, and even when farmers have access to expert advice, many deliberately ignore this if it seems risky, choosing to simply follow their own instincts. There is also significant scope to improve financial access and inclusion for farmers by enabling greater access to a broader range of affordable and relevant financial services such as mobile money, digital payments, credit and insurance.



'We have been here for more than two hundred years on this land.'

Buddhika, Matale

'My goal is to have an easy life. We are happy with what we have.'

Sunil, Ratnapura

The mobile landscape

Sri Lanka boasts promising mobile indicators: two-thirds of Sri Lankans have a mobile subscription, nearly one third own a smartphone, and the proportion of the population covered by a 3G or 4G network is significantly higher than the regional average¹⁵. Mobile devices are integral to farmers' lives and businesses, and are used day-to-day to arrange harvest collections, enquire about market prices, or call expert field agents for advice. However, our research found that mobile use is basic amongst this segment - most respondents were using feature phones for basic services such as calling and texting, with limited use of other value-added services (VAS). Mobile internet penetration is rising nationwide¹⁶, but is likely still not in use for the majority of the farmers due to low awareness and digital literacy. Some younger farmers in our sample used smartphones for social media or to look up information on agriculture, but knowledge of the mobile internet seemed limited to a small number of services and sites.

Mobile money adaption has room for growth in Sri Lanka, particularly in rural areas. Lower migration and travel, and the fact that many farmers' transactions remain both local and cash-based, meant that the farmers in our sample felt less need

for the digital remittance and payment services which have driven uptake of mobile money in other countries. However, we expect that new mobile financial service offers, broader efforts to digitise payment systems in agricultural value chains and MNOs seeking to increase the transaction limits of mobile wallets will drive greater uptake and usage in the near future.

'I visit the wholesale shops to deliver kangkung. If someone inquiries from me, I get the contact number from him and call around to get to know the market prices.'

Jindasa, Dambulla

10. See World Bank data at: <https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?end=2017&locations=LK&start=1991>

11. World Bank (2015). 'Leveraging Urbanization in Sri Lanka'. Available at: <http://www.worldbank.org/en/country/srilanka/brief/leveraging-urbanization-sri-lanka>.

12. World Bank (2017). 'Sri Lanka Overview'. Available at: <http://www.worldbank.org/en/country/srilanka/overview>

13. ADPI (2014). 'Financial Inclusion, Regulation, and Education in Sri Lanka'. ADPI Working Paper. Available at: <https://www.adb.org/sites/default/files/publication/156359/adpi-wp504.pdf>

14. GSMA (2017). 'Govi Mithuru/Uzavar Tholan'

15. See GSMA Intelligence data at: <https://www.gsmainelligence.com/research/?file=131003-sri-lanka.pdf&download>

16. *ibid*

Key Finding 1: Identity needs vary by farmer type

As seen throughout this report, a farmer’s digital identity needs can be influenced by a wide range of factors, such as their social capital, the types of crops they grow, their age or the degree to which they are motivated to improve their farm. For example, many farmers conveyed that they were content with their current levels of productivity, were risk-averse, and were happy to maintain the ‘status quo’ with their farm; but we also spoke with farmers who were ambitious, entrepreneurial and digitally-savvy – turning to new digital platforms to enable long-distance connections and access to information. Similarly, while some farmers were often worried about meeting their day-to-day financial needs through farming activities, others were upbeat and enjoyed comfortable, predictable incomes.





Previous research with smallholder farmers in Sri Lanka, conducted by the GSMA mAgri programme, has identified distinct farmer archetypes that can be segmented based on four key variables: access to finance, technical literacy, attitudes and behaviours, and access to information¹⁷. These archetypes can

be broken into the categories of ‘Stuck’, ‘Optimistic’ and ‘Established’. By looking at farmers through an ‘identity lens’ we were able to further develop our understanding of these archetypes. We found that an individual’s financial stability (or wealth) and the extent to which the farmer is embracing change (i.e. changes to farming practices, or the use of new technologies) have the most significant influence on their digital identity needs and priorities. We have therefore introduced a new farmer archetype, called ‘Striving’, to highlight an additional farmer segment that is more financially stable than the ‘Stuck’ archetype, and also more able and willing to embrace new technology and change.

By speaking with farmers from each of these archetypes, a wide breadth of insights and perspectives on digital identity-related challenges and opportunities have been captured. To help bring these to life, case studies from each of the archetypes found in Figure 3 are included in this report.

Figure 3

Farming archetypes in Sri Lanka

Farmer Archetype	Financial Access	Tech Literacy	Wealth	Embracing Change	Attitudes and Behaviours	Challenges	Digital Identity Needs and Priorities
 Stuck	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	Hardworking but limited by traditional knowledge – tends to listen to new advice with heavy scepticism. Trapped by financial circumstances, and short-term economic survival typically is a priority over longer-term growth. Is risk-averse and the least socially mobile.	Unreliable income and can struggle to make ends meet. Needs access to credit from time to time. Relying on support from government and community, but low social capital creates barriers.	Access to small loans would help during tough times. Want banks to recognise that they earn a decent living, but worried this could result in losing welfare if shared with government. Would value better advice and instruction on which crops to grow, and better parity in access to government support and services.
 Striving	<input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	Understand their economic and agricultural situation and are looking for a way to improve upon it, but face challenges accessing the services they need.	Lacking information to implement changes on farm, such as better techniques or advice on which crops to grow. Limited access to credit to make long-term improvements.	Wishes financial institutions could look past poverty and recognise creditworthiness. Looking for new information and connections outside of community to help farming business get ahead. Interested in obtaining more market price and demand information to become more competitive.
 Optimistic	<input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	Upbeat outlook on the future, open and financially able to experiment and take risks to improve the farm. Usually “in the know” about the latest trends.	Lacking information on ways to get ahead, tap into new markets, or grow crops that give them a competitive edge.	Seeking connections to buyers and information outside of the local area and want to tap directly into new markets. Would value more advice on which products to grow, and which crops will be most profitable in the future. Would be willing to try digital payment and traceability services (for organic crops) if it helps grow their business and earn a premium for their crops.
 Established	<input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	Principal interest is in taking care of family. Has an established set of principles that has led to success on the farm, and doesn’t often deviate from them.	Desire to expand, but happy to use tried and tested formulas. Not very interested in new approaches.	Limited interest in new services and solutions, prefers to stick to the approaches relied on in the past. Vested interest in the status quo: is able to get priority access to subsidies and support from the government through connections with local officers. Has real concerns about formalisation of the farming business due to income tax implications.

17. GSMA (2017). ‘Govi Mithuru/Uzavar Tholan’

Key Finding 2:**Identity documents have both practical and emotional value**

Sri Lanka is a market in which formal identity documents are robust, widely-accepted, and valued by users. Official proof of identification is ubiquitous and easy to acquire, even in rural areas. The paper-based National Identity Card (NIC) is regarded as the most important identity document, and is required to access a wide of formal services, including mobile SIM registration. Recently, the Sri Lankan government has begun to roll out the 'Smart NIC' – a smart card which will be used to facilitate digital payments, digital signatures and registration for social welfare services.

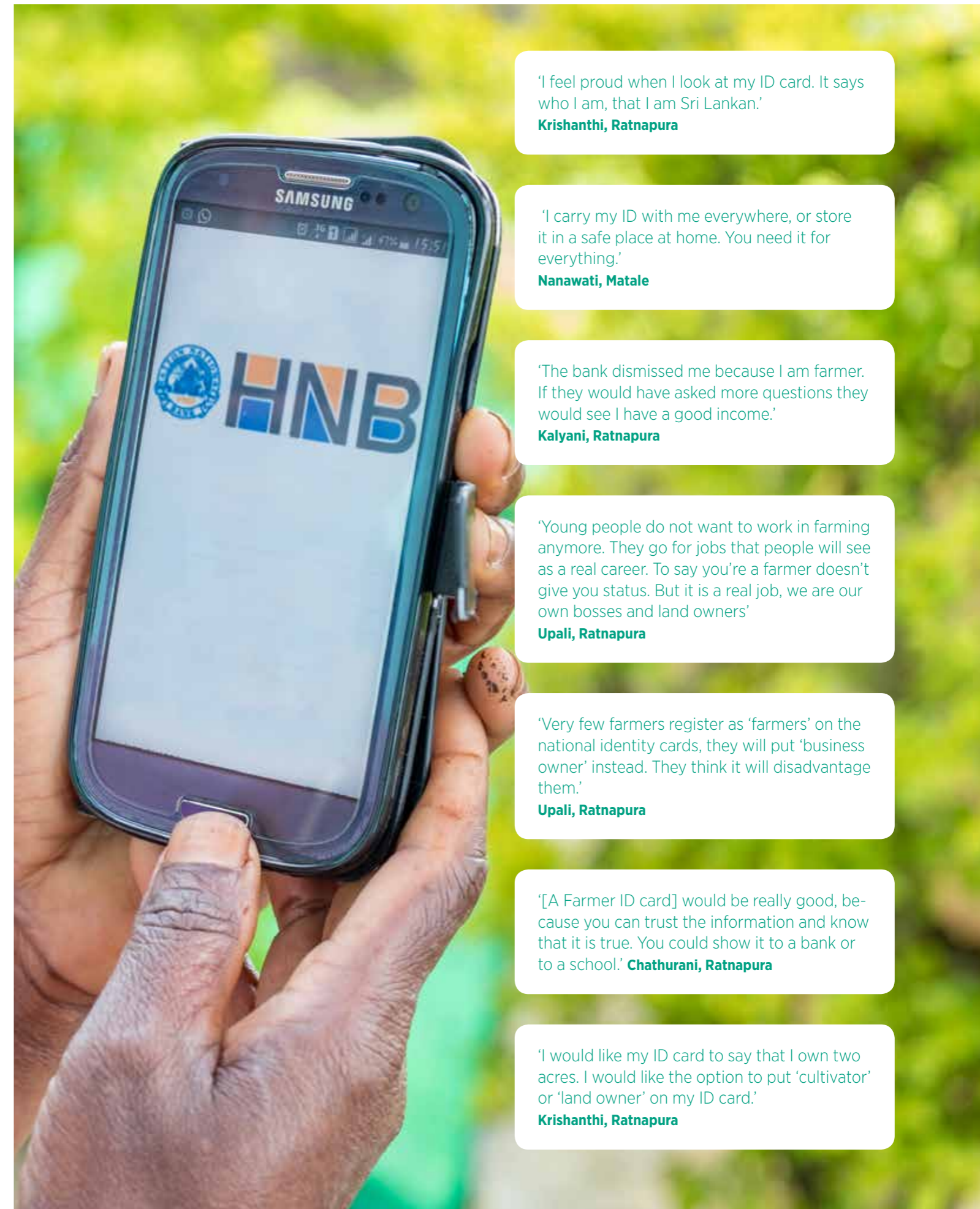
In general, widespread access to the NIC and other official forms of identification meant that farmers generally assumed that they would be able to access the services they needed with the forms of identity they already possess; there was not immediately a strong understanding of how new digital approaches to identity could fill 'gaps' in the market or make service access easier. It was also clear that the government-issued NIC was appreciated by Sri Lankans for its functional purpose as well as its symbolic and emotional value: it has become a familiar part of everyday life, and for many it is both reassuring (anchoring you to your identity) and a matter of nationalistic pride.

Farmers in our sample were also proud of their profession, taking satisfaction in their connection to the land and their respectable incomes. However, this sat in contrast to the way they felt others in society viewed them: as people of lower economic standing. Farmers could point to instances where they were denied certain services by formal institutions on the basis of their profession, and several felt that government service providers overlooked them, focusing on more established land owners with larger farms. Feelings of being 'written

off' were most clearly articulated when farmers described their relationships with banks and, more specifically, their access to formal credit.

The majority of farmers we interviewed were trying to avoid misconceptions about their economic status by declaring their occupation on their NIC as 'students', 'business owners', 'marketers', or even 'gem miners'; few had registered as farmers on their identity card. As further evidence of prejudices, older farmers pointed to the decreasing number of young people who are interested in farming. There are widespread concerns that younger Sri Lankans are feeling social pressures to pursue more 'well-groomed' office or government jobs in urban centres.

Farmers were overwhelmingly positive in their response to the idea of a 'Farmer ID Card', which was used as a projective exercise to explore the discernible link between identity and pride. They saw significant practical and emotional value in strengthening the way that the outside world – i.e. their community, peers and service providers – recognised their 'economic identity', both in terms of their financial stability and their professional status and expertise. They took pride in their agricultural knowledge and achievements, and wanted to be able to distinguish themselves as 'small or medium-scale cultivators', 'producers' or 'land owners', rather than just a generic 'farmer'. In particular, they wanted a way to differentiate themselves from their peers on the basis of their plot sizes, crop types, levels of productivity (crop yields), the depth of their farming lineage and their education and training.



'I feel proud when I look at my ID card. It says who I am, that I am Sri Lankan.'

Krishanthi, Ratnapura

'I carry my ID with me everywhere, or store it in a safe place at home. You need it for everything.'

Nanawati, Matale

'The bank dismissed me because I am farmer. If they would have asked more questions they would see I have a good income.'

Kalyani, Ratnapura

'Young people do not want to work in farming anymore. They go for jobs that people will see as a real career. To say you're a farmer doesn't give you status. But it is a real job, we are our own bosses and land owners'

Upali, Ratnapura

'Very few farmers register as 'farmers' on the national identity cards, they will put 'business owner' instead. They think it will disadvantage them.'

Upali, Ratnapura

'[A Farmer ID card] would be really good, because you can trust the information and know that it is true. You could show it to a bank or to a school.'

Chathurani, Ratnapura

'I would like my ID card to say that I own two acres. I would like the option to put 'cultivator' or 'land owner' on my ID card.'

Krishanthi, Ratnapura

CASE STUDY 1: 'Established' Farmer

Niroshan
Fruits and vegetable farmer



Niroshan (middle), is the eldest son in a respected family that has been farming the same piece of land for five generations, and after studying at an agricultural college he was put in charge of the family's plot. He's proud to be a farmer, and says that farming is in his blood.

Niroshan is part of a close-knit community, and works in cooperation with farmers in a similar situation to him; for example, he and his neighbours have started to share the cost of transporting produce to their local market. These close ties extend to government officials: he has close relationships with the Grama Nilhardi (village officer) and the local agricultural officer, which prove very useful in getting the inputs or information he needs.

Niroshan grows fruit and vegetables on just under two acres of land, and has another half an acre that is uncultivated. He wants to grow the farm, but in a way that is 'slow and steady'. His aspirations are linear: he wants to do more of the same, but better and bigger. He's not really looking for new opportunities, and not interested in revolutionising the farm. 'I'm a simple man,' Niroshan explained. 'I have a farm. I want to make the farm bigger. That's it'.

In many ways, Niroshan is satisfied with the status quo: he is able to get priority access to subsidies, and enjoys good support from the government through his connections with local officers. In fact, he has real concerns about formalising his business too much, as he believes this will make him subject to unwanted income tax.

Niroshan tends to rely on traditional farming methods, taught to him by his father. However, he is not completely stuck in his ways, and will take new advice on how to improve yields, and seeks out information from vegetable buyers on supply and demand for different crops. He has access to a bank, but is proud of the fact that he and his father have never borrowed money, even to invest in their farm. 'We are living freely. We've established our lives without bank loans. Bank loans in Sri Lanka have high interest - we can't bare it'.

Niroshan owns a feature phone and his mobile usage is limited to basic services: communicating with his friends and neighbours, calling local government officers, and arranging the collection of subsidies. However, he is less engaged with his mobile phone than many of the other farmers we met. He often leaves his phone at home when he goes to the village and has limited interest in new mobile services.

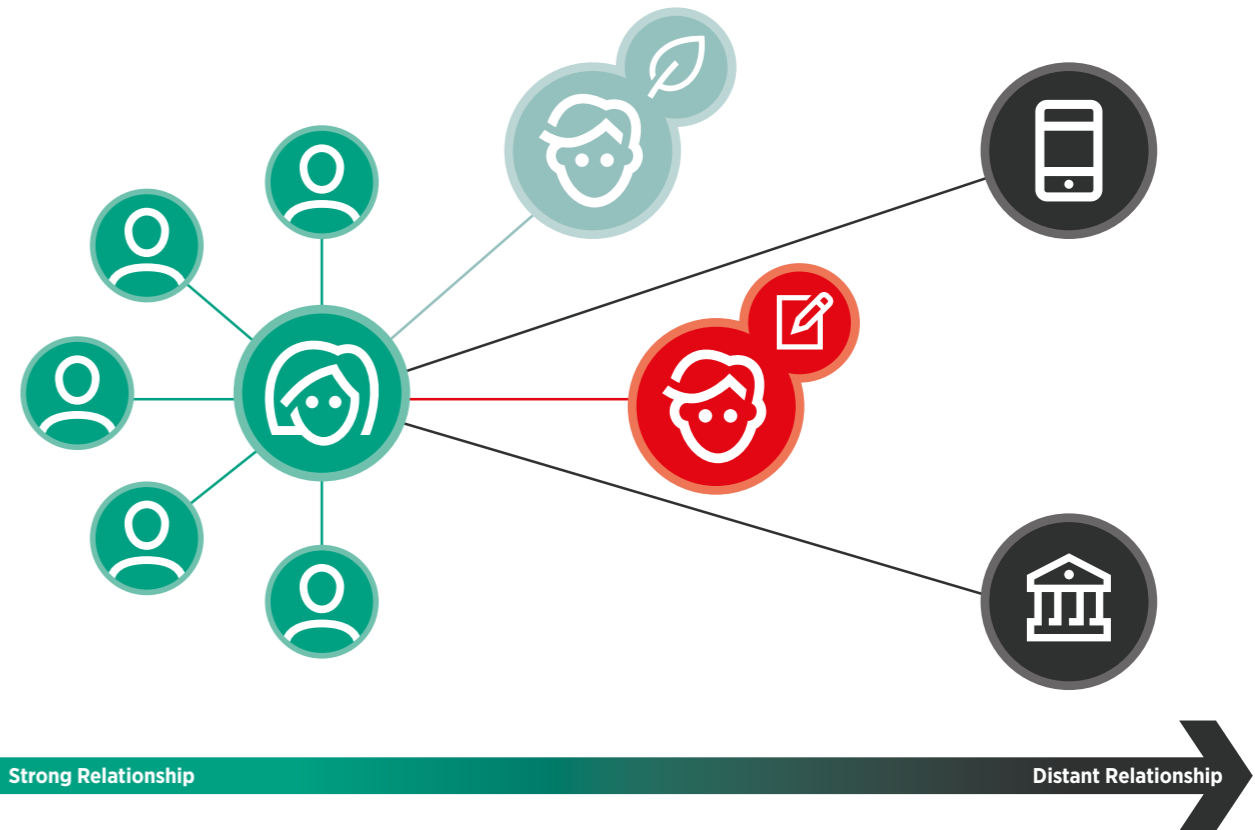
Key Finding 3:

Digital identities must build on face-to-face relationships

The relationships farmers have with their community, agribusiness/buyer, local government and other service providers has a critical influence on their behaviour and attitudes towards digital identity. When asked to rank the people and institutions that 'know them best', most farmers ranked agribusiness representatives (e.g. field agents or collectors) and other buyers on the same level as their family, friends and neighbours. The relationships farmers have with local government officers was also strong, while formal service providers such as mobile operators and banks felt more distant.

Figure 4

Smallholder farmer relationships



FAMILY, FRIENDS, COMMUNITY MEMBERS, SOCIETIES AND AGRIBUSINESSES/BUYERS	LOCAL GOVERNMENT REPRESENTATIVES	MOBILE OPERATORS AND BANKS
Through almost daily interactions, these individuals have grown to know the farmer on a personal level and are a reliable and trusted source of information, support and advice. They know the farmer's successes and challenges, are likely to know detailed information on their farming-related activities and productivity.	Village officers are only a phone call away. They know farmers by name, and are up to speed on community affairs. They are reliable sources of advice and support, and also help locals apply for official identity documents.	These institutions feel more distant to farmers and lack a face-to-face relationship. They might have basic KYC information on the farmer, but this information is incomplete.

Community life: the importance of reputation and social capital

Within close-knit rural communities, local networks provide a vital channel for accessing agricultural advice and support. There are well-established communal social structures for this: organised crop societies hold seasonal meetings to share advice and discuss challenges, and informal farming collectives and loose-knit groups of farmers support each by working on each other's plots. Farmers also regularly turn to the community for financial support, often borrowing money (interest free) from family, friends and neighbours. Group savings schemes such as funeral societies are also common, and farmers will sometimes turn to these for cash in the event of an emergency.

Farmers often get together to share information about agricultural techniques or to discuss which crops are selling for the best price, and are generally transparent about their successes, challenges and aspirations. Information about one's income, however, is an exception to this rule – particularly when it related to non-agricultural income such as profits earned through gem mining. Among farmers, income is seen as a particularly private piece of information that, even when shared informally, has potential risks and consequences. A farmer who is perceived to be doing relatively well by the community, for example, may be asked for handouts and favours by others. Conversely, farmers who are perceived as doing less well financially might face challenges accessing these informal loans. For additional insights on issue related to income, see page 19.

Social capital, reputation and openness are vitally important in rural communities - farmers regularly conveyed an aspiration to be known by others as well-connected, honest, trustworthy, generous and 'not a burden'. Reputable and well-connected farmers have far better access to information and resources compared to farmers with weaker community identities and networks; they are the first to hear about changes in crop prices or the availability of subsidies or farming inputs, and find it easier to borrow larger amounts of money from others.

For more excluded members of society, services built on robust digital profiles could bring significant value if they helped provide fairer access to trusted sources of information, advice and support. They might be designed to build on and digitise records kept by informal organisations such as cooperatives and funeral societies, or tap into existing social networks to build and verify a farmer's credentials. Blockchain-based platforms which allow farmers to build an 'economic identity' by connecting to and interacting with other actors in their 'banked network' (including family, friends, agribusinesses, service providers and associated NGOs) have been documented previously by the GSMA and could be worth further exploration and testing¹⁸.

'In towns, people say that they make more money than they do. In villages, they say that they make less money than they do.'

Upali, Ratnapura

CASE STUDY 2: 'Stuck' Farmer

Chathurani
Rubber farmer and labourer



Chathurani lives at home with her parents, sister and son. After the death of her husband, thirteen years ago, it became difficult to provide for her child and share responsibility for supporting her parents. Chathurani and her sister inherited a small parcel of land with rubber trees from their father. They split this land between them, an example of the growing land fragmentation challenges which leave each generation of farmer with a smaller plot of land than their parents.

Chathurani doesn't see herself as a farmer, but has limited alternatives for generating an income - farming is something she's fallen into, not something she has chosen. 'There are no other jobs so this is what I do', she explained. At the moment Chathurani lives day-to-day, struggling to think beyond the immediate future. Her income regularly falls short of her needs, and she survives by borrowing from friends and family. 'When I sell the rubber sap, the money doesn't stay, by then I already owe money to neighbours'.

Farming rubber on her small plot of land has been especially difficult in recent years. Heavy rains damage the rubber trees and reduce their output. 'When the rains are heavy, you can't get rubber from the trees. Then I'm stuck'. She's beginning to look at other crops she could grow, such as tea or spices; she sees tea as relatively stable, and spices as low maintenance and something that can be harvested regularly. However, she doesn't know where to start. She currently gets information from her small social circle, mostly consisting of family and neighbours. In her experience, expert advice and support from the government is only given to established farmers or those with good connections. 'By the time we hear that the government is giving away plants, they are all gone. We miss the deadlines for grants and subsidies because we find out too late.'

Chathurani uses a basic feature phone to communicate with family while she's at the farm, to get price information from buyers, and to learn about odd jobs on other farms that might provide extra cash. She describes her phone as one of her most important possessions, but has limited awareness of the mobile internet or other value-added services. Chathurani also has a bank account, but only visits the branch to collect her government welfare payments. She doesn't enjoy her trips to the branch: she feels unwelcome by staff and believes they do not take her seriously as a customer. 'We struggle to give the right information to the banks. If we could use rubber receipts to show we are making money, that would help.'

The welfare support (Samurdhi) she receives can be unreliable and infrequent. When it does arrive, it involves a long trip to the bank with her ID and savings group passbook, and waiting in queues. 'It takes about one day to get the money. I have to take a bus to the bank, and wait in the queues. If there was a better way to do this, I would be happy'.

18. GSMA (2017). 'Blockchain for Development'. Available at: <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/12/Blockchain-for-Development.pdf>

Agribusinesses and buyers: investing in face-to-face relationships

In value chains with high levels of competition (especially tea), agribusinesses and other buyers often seek to secure crops by embedding themselves in farming communities. Agribusiness field agents and collectors maintain daily contact with farmers to ensure they can cater to their broader agricultural needs, and many farmers turn to their buyers as the first port of call when they need agricultural advice or support. This is also delivered face-to-face, with agribusiness field agents visiting farms in person to help educate farmers on how to pluck tea or spread fertilizer, or to hold seasonal 'contact' meetings to push information to farmers. Larger buyers often actively participate in community life by donating to local hospitals, schools and temples, sponsoring students, providing chairs and tables for funerals and weddings, or helping villages clean up after landslides and floods.

Many agribusinesses and buyers also provide financial support to farmers, and see this as an opportunity to strengthen their relationships with their suppliers, improve their productivity, and ultimately secure high-quality crop. Loans are often given as interest-free cash that is deducted from the farmers' next payment, or as a tangible asset such as farming equipment, chemicals or seeds.

Buyers and agribusinesses currently collect a wide range of information on farmers; at a minimum, this tends to include the farmer's name, location, income history, size of plot, monthly production levels (in kilos), fertilizers and other inputs used, and full transaction and production histories. More forward-thinking agribusinesses are currently seeking opportunities to digitise their collection and payment processes, which would allow them to improve transparency, monitor individual farmer performance and crop quality, and help farmers

access formal services (such as bank loans). Here, there may be opportunities for MNOs to act as a technology partner for agribusinesses to help improve the digital services they are providing to smallholder farmers

Agribusinesses engaged in our research are motivated by commercial objectives (i.e. driving loyalty and securing their supply of quality crops) to support farmers' access to information and financial services. Some were already facilitating access to small bank loans by signing letters for farmers which validate information related to their incomes and productivity, and were largely open to the idea of digitising these processes to make them more efficient and enable new service providers, such as MNOs, to provide their suppliers with other targeted services.

Farmers are often aware that detailed information is being collected and stored by their buyers, but rarely understand the potential for this data to be used in a way that benefits them. For instance, most farmers held on to their paper receipts and other transaction records until the end of the month, but discarded them once they had secured their payments. The high level of trust instilled in agribusinesses meant that farmers were comfortable with the idea of their buyers sharing personal information with other organisations, so long as there was a clear benefit attached to this. For example, most liked the idea of their tea factory or vegetable buyer sharing transaction histories and other farm-related information with banks or MNOs to help them access loans, believing the factory or buyer knew them well enough to act on their behalf and for their benefit.



'If we need a loan, we just visit the tea factory. They look at how much you can produce, and then decide how much they will give you.'

Upali, Ratnapura

'I speak to the collector every day, he calls and we arrange when to give my tea.'

Kalyani, Ratnapura

'If there is problem, we just call the factory and next day they're here.'

Sankar, Ratnapura

'We give (loans) on trust...they don't give anything as a guarantee because the farmers actually don't have anything.'

Market Trader, Dambulla

Local government: maintaining personal relationships with community members

Sri Lanka has a well-established system of local government at the provincial and sub-provincial levels. Each village has a host of local representatives that act as touchpoints for government services, including agricultural officers, welfare officers, development officers and health officers. They often live in and amongst the community, and have personal relationships with each of the families in their catchment. The Grama Nilhardi (village officer) is the key local official and is responsible for numerous administrative duties, such as issuing identity documents, gathering statistics, maintaining the voter registry, settling personal disputes and issuing character certificates on behalf of residents (when requested). Agricultural officers work in a similar way to agribusiness agents; farmers are able to call local contacts who will visit their farm to give advice or help resolve issues.

Grama Nilhardis maintain a one-page article on every household which includes details on the family's names, address, occupations and land ownership. There are no digital records or linked databases at these government offices, and despite their close relationships with community members, Grama Nilhardis know (and accept) that locals are less than transparent when it comes to their income.

Some district officers are beginning to investigate new ways to bring improved transparency to the social welfare system, and are already investigating opportunities to work with farmers and local organisations to better measure household wealth.

There is recognition from local government that robust digital identities that capture a farmer's location, crops, productivity and other economic indicators would enable agricultural officers to analyse and respond to farmers' 'real needs' and ensure that welfare payments reached the people who need them most. Ultimately, they believe that having access to digital profiles would help them encourage farmers to think more ambitiously about how to increase their income and productivity over the long-term, rather than focusing on the short-term implications of losing access to various forms of welfare.

'You can call the [agricultural] officer if there's any problems, the next day he is at your farm. I trust him with my heart – he tells us when they get information.' **Upali, Ratnapur**

'People here are not poor – they just need to be pushed to do more.'
Government officer, Ratnapura

'I needed to get my ID card replaced, I went to the Grama Nilhardi and he filled out the forms for me. When it was taking a long time, I went to see him again and he reassured it was coming. It arrived a short time after this.'
Sunil, Ratnapura

Understanding sensitivities around income:

It is widely understood that there are strong incentives for farmers to under-report or misrepresent family income and wealth, as this is used by the government to prioritise the recipients of subsidies, discounted utility rates, scholarships, and other forms of welfare. Farmers who are thriving in the informal cash-based economy are worried about government efforts to crack down on income tax, which can sometimes feel like a financial shock. 'I was OK until I bought a truck,' said one spice farmer in Matale, 'but I had to sign some forms for it. When the government heard about it they said I needed to pay income tax'. Farmers also felt that there is a disconnect between the fixed nature of income tax, and their fluctuating farming revenues which can easily be impacted by low crop prices, bad weather, or crop failures. As a tea farmer from Ratnapura explained, 'Just because you paid tax this year, if you have a bad year next year, you don't get a refund'. This brings about an obvious tension for digital identity. On one hand farmers want to demonstrate their financial stability and be recognised as valuable customers by formal institutions; on the other hand, they do not want to release information that would disqualify them from government support. Digital identities that show credit-worthiness (e.g. assets, repayment success, long-term income) appear less problematic in these situations than those that show current patterns of income.

MNOs and formal service providers: a more distant relationship

Many of the interactions that farmers have with service providers take place on a face-to-face basis and at touchpoints within their community. In contrast to this, the relationships farmers have with MNOs and banks can feel more distant. The majority of farmers in our sample had limited physical interactions with these institutions or their agents beyond the initial SIM registration process or through the use of an ATM machine. This is likely because most were only using entry-level bank accounts and basic services on their phones, and therefore had limited exposure to mobile money or other value-added services (VAS) that might be relevant to them (for example, Dialog's Govi Muthuru service).

A number of farmers said they have faced difficulties accessing affordable credit from financial service providers (FSPs) due to their inability to provide information that demonstrates their creditworthiness. Few banks are willing to offer microcredit solutions for farmers who lack verifiable credit histories, fixed incomes or assets to borrow against. Some banks have been able to increase lending to farmers through 'rural enhancement' units, which send loan officers to a customer's farm to physically record information about the applicant's crops, farm size, productivity and even their character. Small guaranteed loans, where farmers group together and agree to guarantee one

another's loans on a quid pro quo basis, are also common. Banks who participated in our research were adamant that digital profiles for farmers would allow them to extend credit in a way that is more convenient and commercially sustainable, while also making the loan application process easier and less intimidating for farmers. More insights on this opportunity are found on page 24.

When asked, most farmers assumed that MNOs only had access to the basic demographic information found on their NIC, as this information was needed to register their mobile SIM card. Other (often daily) interactions with MNOs such as airtime top-ups are less memorable from the farmers' perspective, as these transactions typically take place at local stores or convenience shops. Farmers weren't considering the digital footprint that these activities were creating, or how this information could be used for their benefit. Farmers viewed MNOs more strictly as providers of a commercial service and were therefore wary of an MNO's motivation to share or analyse their digital, or 'economic' identities. In order to build digital profiles for farmers or introduce new identity-linked services, MNOs might benefit from partnering with third parties (such as agribusinesses or local government officials) that have closer relationships with farmers.

CASE STUDY 3: 'Striving' Farmer

Nandavathi
Fruit, vegetable and spice farmer



Nandavathi lives with her husband and two children on 1.5 acres of land. Together they grow pepper to sell at the local spice dealers in Matale, and a wide range of vegetables and tropical fruits to sell at the market in Dambullah. Nandavathi and her husband recognise that she is the more able farmer, so she has taken charge of all of the family's business and financial decisions. Their farm is quite far and isolated from the market towns, but Nandavathi feels well-connected in her local community. She and her friends look out for one another; they work on each other's farms during more labour-intensive times of the season, and they support one another financially when one farmer has a poor harvest. 'We work together as one, together we are stronger.'

The farm has not been easy to cultivate, but Nandavathi shines with pride when she talks about how much she's achieved and the land she's put under cultivation. 'When we arrived here it was a jungle. Look at it now, all cultivated.'

Despite this success, she still faces difficulties accessing formal financial services due to her informal and fluctuating income. She wishes financial institutions could look past her poverty and recognise what she's capable of: 'We have to build trust with the bank and show them we could pay loans back.' The process of obtaining loans is also time consuming and fraught with complications: 'It is a lot of work to get a loan now, I have to pay transport fees for all the guarantors to come and sign the papers, but we have to do it'.

Nandavathi uses her feature phone to communicate with local agricultural and government officers, who inform her of subsidies and input handouts in Matale. She embraces new mobile value-added services that she feels are suited to her, but is typically wary of new offers until they prove their reliability. She is always on the lookout for ways to get ahead, whether this means growing new crops or investigating different production methods, but worries the information she's currently getting isn't helping her stay competitive. Advice from local officers can seem overly complicated or too traditional - she's interested in new ways of farming.

Nandavathi relies on word of mouth to get crop prices and demand information, and has no way of knowing how either will change in the short or long-term. In a volatile market, this often leads to her selling at low prices or having to dump crops that no longer match demand. 'There is no exact way to get pricing information, we hear it through others and then we decide if we will sell or wait. We dug up the paddy to grow manioc (cassava) here...it made sense at the time, but now we can't sell it'. She's looking for new information and connections outside of her immediate network to help her farming business get ahead.

Key Finding 4:

The agricultural landscape is changing

The practical value of traditional farming approaches and knowledge is beginning to lessen across much of Sri Lanka, with the effects of climate change, increasing crop volatility and globalisation creating new challenges - and opportunities - for many smallholder farmers. This could increase the value of digital Identities, if MNOs and other service providers are able to communicate the benefits of new forms of information and connection. Younger farmers are likely to present a more immediate

opportunity here - they appeared more conscious of the sweeping changes taking place around them, were better connected to, and more aware of the outside world, and were more digitally literate compared to farmers in higher age brackets. They were also more likely to have attended agricultural classes, use mobile broadband to access agricultural-related information (including YouTube) and were more likely to be thinking about how to reach international buyers.

Managing the impact of climate change

Many farmers reported that as a result of climate change, they are now facing new and more localised weather-related challenges. Tea and rubber farmers in Ratnapura, for instance, were experiencing ever-changing weather patterns and are increasingly struggling to predict rainfall patterns and plan their crop cycles. This has created a need for more accurate and hyper-localised weather forecasting, and we found that younger, more digitally-literate farmers are already turning to mobile services to support this.

Adverse weather conditions, combined with volatile crop prices, are also pushing farmers to trial new types of crops. Many farmers in the Ratnapura area are beginning to replace their tea and rubber crops with more rain-resistant spices (such as cinnamon) to help boost their income and lower their risk of crop failure. However, with less local knowledge about these crops in the community, some are struggling to find expert information or advice to support them through this transition.

Farmers must continually consider which crops will be most profitable and viable for their land, both now and in the long-term. In the absence of clear advice on planning, farmers are left to follow others in the community: if one person is successful with a crop, neighbours and associates are likely to try to replicate that success. However, price and demand can fluctuate rapidly, and multiple farmers producing the same crop can adversely impact the price farmers earn for their harvest.

'It's becoming very difficult to know when rain will come. I use the weather app on my phone, but if you could tell me when it would reach my farm, it would really help us.'

Krishanthi, Ratnapura

New Opportunities: Organic produce

There is also a new and growing influence in the Sri Lanka's agricultural market: the emergence of ethically and organically-certified agribusinesses that buy produce at a premium and sell directly to international markets. These arrangements typically require farmers to change their techniques; for example, by growing crops without harmful chemical fertilizers. Farmers are also learning to work more transparently with organic buyers, who are typically required to implement sophisticated traceability solutions to meet certification requirements.

This opportunity is helping to drive formality and digitisation into many value chains, presenting an interesting starting point for digital identity. Out of necessity, organic buyers tend to hold the richest set of data on the farmers who supply their crops, including their demographics, location and land size, crops grown, training history, transaction histories, as well as more sophisticated agricultural information on soil types, fertilizers used, and geo-tagged farm plots. This data could be used to establish comprehensive digital identities for farmers, and might ultimately be repackaged or made available to other organisations (such as financial service providers) to help provide farmers with better and broader access to services.

'I don't use pesticides, I'm keen in organic. I supply [organic kangkung] to the markets, and those buying keep on asking for it. Earlier there wasn't a good market for organic products, but now it has built up and there is a good standard for crops.' **JIndasa, Dambulla**

'It's becoming very difficult to know when rain will come. I use the weather app on my phone, but if you could tell me when it would reach my farm, it would really help us.'

Krishanthi, Ratnapura

'With rubber, due to the rain we are not able to extract milk. But rain is good for cinnamon and it does not need fertilizer. We tried different things. This is by trial and error. When one earns a lot another person also will try. It takes two to three years for word of the mouth to spread.' **Krishanthi, Ratnapura**

CASE STUDY 4: 'Optimistic' Farmer

Buddhika
Spice and vegetable farmer



Buddhika (far left) lives with his wife and children on the farm he inherited from his father in Matale. He is well educated, and he and his wife treat the farm as a business: working together to identify new markets, differentiate themselves from competitors, maximise the farm's revenue, and achieve financial stability. Buddhika is more individualistic than other people we spoke to, but still feels deeply connected to the farm, the village and the local area. "I work with other farmers in the community. They come and ask me for advice."

He has about two acres of land, spread across three different locations: one for pepper, one for vegetables, and one for rice paddy which he grows for home consumption. He learned pepper farming from his father, but has always been keen

to learn more, and work out new ways to earn more money. He loves analytics: he keeps paper records of all transactions related to the farm, and can refer back to them to work out which decisions have been most profitable for him.

Buddhika's latest venture is selling organic kangkung to local shops and restaurants. He's increased production two-fold in the last year and took out a bank loan to invest in a motorised trishaw to make his daily distribution of crops and collection of cash much easier. He knows he can command a premium by growing organic, and is now looking for ways to brand his product and sell directly to supermarket chains and international markets. 'The problem with farming is that the guys in the middle take all the money that should belong to the farmers. I want to take my product directly to the market.' However, he currently has little understanding of how to make these connections outside of his local area.

His feature phone is important for running his business: he uses it to communicate with farmhands, take his daily orders from buyers and discuss prices. He trialled mobile money services to reduce his cash transactions, but found it difficult to keep track of his accounting, and also had difficulties withdrawing money from agent shops in the local area. 'I couldn't keep track of who had paid, and how much. It's better to have everything on paper.' He currently makes all of his money cash-in-hand, and while he's happy to pay more tax in the long run, he expresses concerns about how this might damage his business while it's growing. 'It is a small business, in maybe five years when we are bigger we can pay more taxes.'

Opportunities for service providers

Across regions and value chains in Sri Lanka, the following themes are driving the opportunity for new digital identity solutions:



1. Farmers need better access to formal financial services: There is an opportunity to build digital financial profiles for farmers which would allow them to secure financial services, such as savings, credit or insurance more conveniently and cheaply. Farmers want institutions to recognise their financial solidity, but do not want to show they're earning too much (especially if information is shared with the government) due to concerns around taxation or the loss of welfare support. Digital identity solutions which link creditworthiness to individual profiles will be less problematic than those showing current patterns of income.



2. Farmers are seeking more-targeted information to deal with change: In the context of rapid change, farmers need better access to relevant information and connections. There is an opportunity to leverage a farmer's digital profile to provide them with more tailored, timely and relevant information and advice, and to connect them to people and markets outside of their known network.



3. There is a drive to increase market transparency: A significant challenge for farmers is the lack of transparency around crop price and demand. There is an opportunity to use digital profiles to provide farmers with more information about crop prices and market demand, allowing them to improve their farm planning.



4. There is a need for more-targeted access to government subsidies: Poorer farmers in Sri Lanka are heavily reliant on government subsidies to support their farming activities. However, poorer farmers often face several barriers accessing these. If the government digitally captured and stored key information on individual farmers, this identity could be used to provide direct access to the subsidies they need, and to which they are entitled.

Although farmers did not immediately recognise a need for new forms of identity, the value of digitising their 'economic identities' became easy to understand and appreciate once they were introduced to the identity-linked services that a digital profile could unlock. The four themes above have helped us identify three key opportunities for digital identities to improve access to, and the delivery of: formal financial services, targeted agricultural information and advice, and government subsidies.

A) Formal financial services

Access to financial services, such as small loans and insurance, could provide smallholder farmers with the resources they need to make productive investments in their farm, fill temporary gaps in their income, or reduce financial risk. Informal loans are able to fill this gap to some degree, but these tend to be small in value and are less accessible to farmers who are in informal value chains, have lower social capital, or earn less-stable incomes. For this reason, farmers that fit within the **'Stuck'** and **'Striving'** archetypes are most likely to be seeking access to formal financial services.

MNOs engaged in our research identified opportunities to deliver new mobile financial services for farmers by placing more of an emphasis on building their digital profiles, or 'economic identities'. These could be created without dependencies on external collaboration by: developing a platform through which farmers could register their own information; by interrogating existing customer data such as top-up histories or call records; and/or by building credit profiles through activities such as device financing. MNOs could also choose to expedite this process and build even richer profiles for their customers by partnering directly with agribusinesses, many of whom are likely to be existing corporate (or 'enterprise') clients. Agribusinesses already collect and store valuable information on farmers that could be used to evaluate creditworthiness, and are likely to be given permission from farmers to share information on their behalf.

If regulators allow, these digital profiles could be used to fulfil higher-tier Know-Your-Customer (KYC) requirements, increase farmers' mobile money wallet limits, and improve the uptake of mobile money services in rural areas. In time, MNOs could ask farmer's permission to share their enriched digital profiles with third-party insurance providers, who could offer risk protection products in the form of crop, life and income insurance. They could also work with banks to share information that will allow users to access formal banking services. Banks engaged in our research were primarily interested in having better access to traditional data points that measure creditworthiness, i.e. a farmers' savings and income patterns, transaction histories, and loan repayment history. Secondary to this, banks would like to see a richer set of farming-related data that

could be used to assess a person's economic profile: farm location, plot size, crops grown, training/certification received, and the number of years in farming. Banks currently pay a per-transaction fee of 150 rupees (approximately USD \$1.00) to check each loan applicant's credit history on a database maintained by the Credit Information Bureau of Sri Lanka (CRIB). They were adamant that accessing relevant information on farmers in a similar way would be 'immensely useful', and were willing to pay an equal rate to partners – such as MNOs or agribusinesses – who maintained a similar type of database.

B) Targeted information services

In the context of rapid agricultural change, there is growing demand for information that is more localised (e.g. weather forecasting that is tailored to micro-climates) and timely (delivered at key points to support on-farm changes). Existing agricultural information services, such as Dialog's Govi Muthuru service, could also be improved by placing more emphasis on farmers' digital profiles. Farmers also explicitly talked about their desire for better information on crop prices and demand, complaining that fluctuations in prices were leading to reduced incomes, unsellable crops and a general sense of unease. Information services that are enhanced by digital profiles would allow MNOs to 'push' highly relevant, location-specific information from trusted sources outside of the farmer's immediate network.

The need is greatest amongst farmers who are more open to change and actively seeking farming information – especially the **Optimistic** and **Striving** farmer archetypes. Younger farmers tend to be more aware of the need for new information and more open to trying new sources (especially mobile and digital). This would be particularly beneficial for farmers with lower social capital, as they are more likely to receive outdated or incomplete information.

As a starting point, MNOs could consider how to interrogate information currently held in their customer databases, such as transactions histories or location data, as this will provide some indication of when farmers are earning income or purchasing inputs, the location of their fields, or when and where they travel to markets. They should also look for opportunities to leverage the more-robust information held by agribusinesses (e.g. farm

location, farm size, crops grown, fertilizers used), or link with third-party organisations who can provide real-time data on weather or market pricing. Farmers who were not familiar with Dialog's Govi Muthuru service were wary of information provided by MNOs, as they preferred to receive advice from people or institutions with whom they have established a face-to-face relationship. Therefore, partnering with agribusinesses or local government could also help ensure that the information provided by MNOs is trusted and followed. Ensuring that robust data protection frameworks are in place, and that there is transparency in data sharing agreements that are easily understood by users is also an important element of this emerging ecosystem

In time, improved access to information among farmers will lead to increased demand for new services, equipment and inputs. For example, it is likely that farmers who are introduced to new irrigation methods will inevitably seek out opportunities to invest in modern irrigation technologies that can improve their resilience. It is important to remember that digital identities for farmers will be most valuable if they are recognised by a wide range of product and equipment providers.

C) Improved access to government subsidies

The government is committed to supporting smallholder farmers and the broader agricultural sector, and at the local level they provide a wide range of agricultural services and subsidies to help farmers increase their productivity and financial resilience. However, current systems of service delivery are expensive and inefficient for the government, and farmers often face barriers proving their eligibility or accessing welfare payments in a timely manner. For those who receive payments through an entry-level bank account, long queues and confusing processes at the bank can be stressful, and farmers in more remote areas can spend a full day travelling to the bank, waiting in line, showing their identification and paperwork to receive the cash payments. Access can also be uneven; farmers with better connections to government officers are often the first to hear about and receive subsidies, while poorer farmers with weaker social capital can feel they are deprioritised.

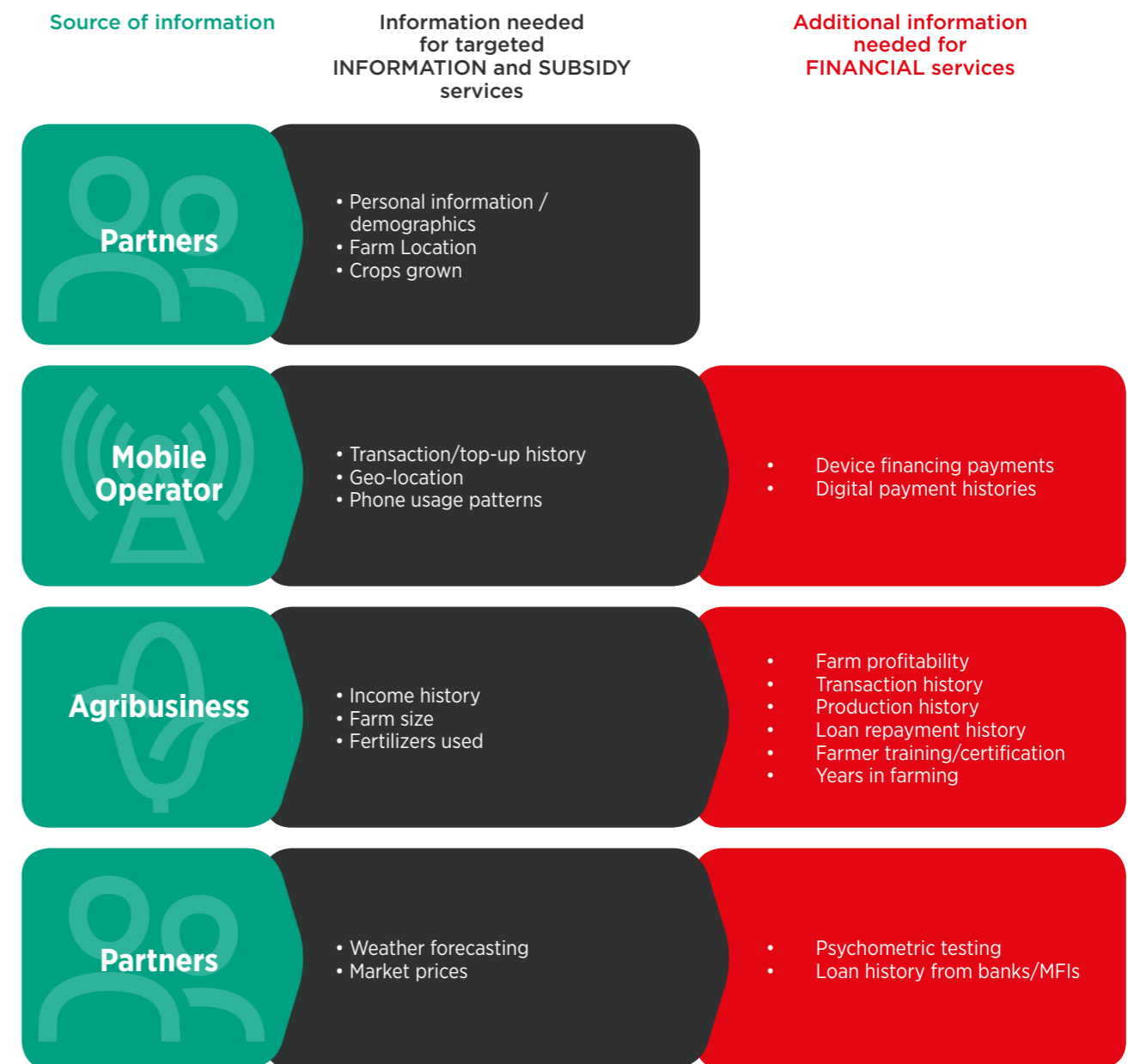
Digitising the identification of beneficiaries and the distribution of welfare payments could be particularly valuable for the **Stuck** and **Striving** farmers. They tend to have a greater need for financial support and are less likely to have the social capital and connections required to give them equal access to government services. Developing a more reliable and targeted subsidy distribution system would provide greater transparency and ease of access, ensuring that poorer farmers were more aware of the subsidies to which they are entitled, and faced fewer obstacles proving their eligibility. Digital identities managed by MNOs could help ensure that subsidies were sent directly to the intended farmer (e.g. direct to mobile wallets, or by sending codes to mobile devices to access payments at local retail outlets), reduce costs, and be tailored to support specific crops or climates.

Building 'Economic Identities'

Interviews with service providers suggests that the following information would be required to develop robust digital profiles, or 'economic identities', for services targeting smallholder farmers:

Figure 5

Smallholder farmer relationships



What to watch out for: considerations for designing digital identity solutions

There are a range of factors MNOs and other service providers will need to consider during the design and implementation processes to ensure that digital identity solutions are inclusive and socially impactful:



Data privacy and security: In principle, farmers were optimistic about trusted partners (especially agribusinesses) sharing their personal and farm-related data with other service providers, as long as the benefits of doing so were clear. Only a few farmers expressed a desire to have control over their personal information (i.e. only allowing their agribusiness to share if they gave permission), or said that they wanted oversight of how and when the data was being used. An understanding of privacy and data security among farmers was generally low. Education campaigns around mobile privacy and the risks associated with sharing personal data should be implemented to help protect the most vulnerable segments of society.



Income sensitivity: Farmers will find systems which require them to declare income information to the government problematic, as there is a concern that providing this information could lead to higher income tax payments or put them at risk of losing subsidies. As mentioned previously in this report, digital identity solutions that show creditworthiness (e.g. assets, repayment success, long-term income) will be more appealing than those that show current patterns of income. Digital identities that are explicitly only shared with agribusinesses (who often already have income details) and banks (who need income details) also appear to be less problematic from the farmer's perspective than open platforms which could share this information with multiple service providers.



Ensure that digitising financial services does not remove flexibility: Informal loans built on face-to-face relationships are inherently flexible; for example, women farmers can borrow money from their tea factories even if their farm is registered in their husband's name. If more-formal digital solutions restrict these options, they will be less desirable. Farmers also have concerns about their ability to meet regular loan repayments, as their income can fluctuate due to factors outside of their control. Loan structures that are tailored to the needs of farmers are more likely to see higher uptake and repayment rates; this might include flexible repayment terms, or grace periods which allows farmers to harvest before they make their first payment.



Farmers need to see the immediate benefits of sharing their data: Some of the farmers in our sample said that they would be willing to trial new services that required them to share personal information, but insisted that they would have to see the benefits of this action immediately. In addition to this, asking a farmer for too much personal information, too quickly, is likely to raise concerns. As MNOs build up a suite of identity-linked rural products, it is important that they follow a staged approach that considers which services will deliver the quickest impact and value for farmers, while requiring the minimal amount of data.

Conclusion

Our research in Sri Lanka has helped develop a more detailed picture of the needs, opportunities and use-cases for mobile-enabled digital identity solutions amongst smallholder farmers. It is clear that functional digital identities have the potential to help farmers build pride in their profession, feel more informed, connect to new markets or buyers, access digital financial service and reduce their financial risk. In the long-term, this will help lead to improved farming practices, increased digital and financial inclusion, and higher productivity.

For MNOs, digital identities could act as a key enabler for digitising the agricultural value chain and extending a wide range of services to rural users and enterprise customers. It will be vital to keep in mind that farmers are not a homogenous group; a number of factors will influence an individual's identity-related needs and priorities, and MNOs

and their partners should take a targeted approach when designing and marketing identity-based solutions. Farmers are also more likely to trust and act on information that comes from someone with whom they have a close, face-to-face relationship. For this reason, it will make sense for MNOs to consider how to partner with agribusiness as they build their credibility in the agricultural space, and also to explore opportunities to leverage the rich set of data agribusinesses hold on each of the farmers that supply their crops. In the long-term, the research suggests that placing more emphasis on digital identity could help MNOs achieve higher revenues and brand awareness in rural areas, decrease churn, establish positive relationships with local government and enterprise clients, and help expand the country's mobile money ecosystem.

APPENDIX: Research Methodology

GSMA would like to thank Copasetic¹⁹ for their collaboration on this project and for their invaluable contributions to the design, implementation, and analysis of the research.

A) Research location and timing

All research was conducted between October 2017 and January 2018. Fieldwork in Sri Lanka took place in November and December 2017. The specific research locations in Sri Lanka were:

- Ratnapura, Sabaragamuwa Province
- Matale and Dambulla²⁰, Central Province

In each location, research took place in the rural communities where farmers live and work. To ensure a range of different local contexts across the fieldwork, some communities were located closer to towns and urban centres, other were more remote and disconnected.

B) Methodology

Researchers used a staged, multi-method approach to capture a wide breadth of smallholder farmer and service provider perspectives.

Framing the challenge: Prior to conducting fieldwork in Sri Lanka, researchers held workshops with key internal GSMA stakeholders (within the mAgri and Digital Identity programmes) to download current thinking on the opportunity, refine key research questions, and identify key experts and who could give researchers a grounding in the opportunity. Following this, the team conducted desk research to review existing knowledge and consulted a range of experts to understand perspectives in the nascent and fast-changing space of digital identity. This included MNOs, NGOs and tech start-ups who are directly involved in digital identity opportunities for smallholder farmers. Expert interviews identified a series of future digital identity scenarios and use-cases which could be explored with farmers in the fieldwork. These covered the following areas: financial profiles, customised information services, government and farmer identity. Researchers created stimulus / story boards to clearly explain these ideas to farmers in the research.

Fieldwork in Sri Lanka: Fieldwork in Sri Lanka was conducted with smallholder farmers and key stakeholders from agribusinesses, government and financial service providers. Given the personal and sensitive nature of information we were asking farmers to discuss (income, assets and land ownership, for example) researchers used two-phase methodology in field that built trust through multiple points of contact and engaged with farmers in different individual and social settings.

1) 10 ethnographic farm visits: in the first phase of fieldwork, researchers met farmers at their farm and spent time delving into the current identity context, attitudes, behaviours and pain points. An initial discussion was held on future identity possibilities and scenarios. These sessions focused on a core respondent, but took a wide-angled and flexible approach to allow for discussion with family, friends, neighbours and other relevant members of the community.

2) 10 reconvened mini groups: in the second phase, researchers reconvened farmers after a few days, to explore future possibilities and trade-offs for digital identity in more detail in a group setting. This comprised of the original respondent plus 2-4 additional respondents, typically the respondent's friends, family members and neighbours. Given that digital identity is a new area for many farmers and that we expected needs to be latent, researchers used to stimulus (story boards) to show farmers future scenarios and digital identity possibilities, and gave farmers time to consider ideas consider ideas before discussing them in detail.

3) 8 stakeholder interviews: depth interviews with key stakeholders were conducted alongside the research with farmers. These covered agribusinesses, informal buyers and middle men, banks and local government departments and officials. Mobile network operators (MNOs) were key stakeholders in the research process. We consulted Sri Lankan MNOs that are actively engaged in agricultural services and seeking to develop and implement mobile-enabled digital identity solutions. MNOs helped to shape the research approach and provided input on the key opportunities.

C) Recruitment and sample

All recruitment and fieldwork logistics were conducted by local research partners in partnership with the lead research agency.

Farmers: Research participants were found using an informal free-find approach, but screened on the basis of a number of different criteria to determine appropriateness for taking part:

- **Non-subsistence smallholder farmers:** Digital identity solutions will be more relevant to farmers who are making financial transactions for their farms, so research excluded purely subsistence farmers.
- **Access to resources:** to ensure a range of socio-economic backgrounds, farmers fit into two broad categories – farmers with fewer resources, assets and knowledge; farmers with greater resources, assets and knowledge. All farmers were from low-income backgrounds, however there was a range of income levels within this category.
- **Mobile phones:** All farmers had access to a mobile phone which they use on a regular basis. Given that we were encouraging farmers to think about future scenarios, some farmers were recruited to own or have regular access to a smartphone.
- **Gender:** there was a 50/50 male to female split in the sample of farmers to explore challenges and solutions through a gender lens. During farm visits, we also made sure to widen out to family so we can speak to both husband and wife (e.g. to talk about family finance management and decision-making).
- **Age:** we recruited a good spread of ages across the sample from younger farmers (18+) to older farmers (55+), so that we could explore an anticipated generational divide.

While core respondents were screened on the basis of these criteria, research also included family, friends, neighbours and colleagues of core respondents. The research took a flexible approach to these participants: they were not pre-screened, rather identified as relevant through the course of discussion, or selected by core respondents to take part in reconvened sessions²¹. This allowed us to explore community dynamics in a more natural way, and gave us the flexibility to respond to new angles as they came up during the research. The total number of farmers included in the research was approximately 40.

19. <http://www.copaseticresearch.co.uk>

20. Dambulla is home to the Sri Lanka's largest wholesale fruit and vegetable market, making it an appropriate location to conduct research.

D) Stakeholders

Categories of key stakeholders were identified by GSMA ahead of the research: agribusinesses, financial institutions and the government. Participating organisations and individuals for the research, were found using a free-find approach, or through contacts put forward by the GSMA mAgri team (who had conducted previous research in Sri Lanka). These participants were selected on the basis of location and involvement in key value chains (tea factories, fruit and vegetable buyers, Dambulla market traders). We also selected participants on the basis of the involvement with digital identity: active organisations and individuals, and more passive organisations and individuals (e.g. advanced tea factories with digital records vs more informal buyers with paper records).

In addition to this, research also endeavoured to include a mix of those in office management positions and those dealing with farmers on day to day basis (e.g. tea factory owners and tea factory agents that collector product from farmers; bank managers and loan officers). The core sample of stakeholders included:

- 4 agribusiness or buyers
- 2 banks
- 1 local government official
- 1 mobile network operator
- A handful of informal interviews with factory agents, middle men, government agricultural agents and bank loan officers

21. All additional respondents were also farmers themselves, or owned farming land which a family member managed



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