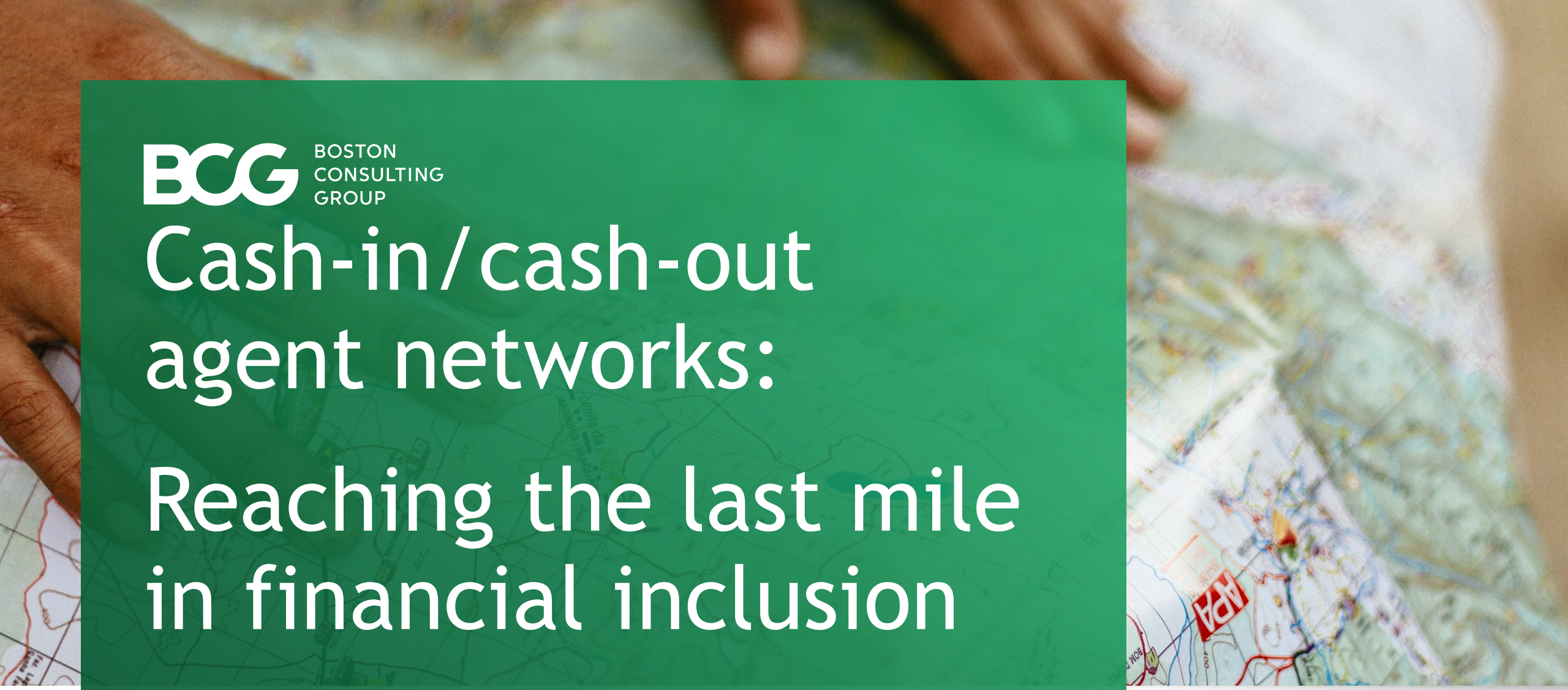

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Cash-in/cash-out agent networks:

Reaching the last mile in financial inclusion

Sizing and locating the CICO agent network expansion challenge & opportunity

APRIL 2020

BILL & MELINDA GATES foundation

Overview of materials available on this microsite

Overview & key highlights from the research

Role of CICO for financial inclusion

Sizing the CICO access challenge

This document

Exploring potential interventions

Illustrative country deep-dives

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Contents of this document

This document lays out the key insights gathered from **geospatial analysis** that was conducted across **7 key markets**: Bangladesh, India, Indonesia, Pakistan, Kenya, Tanzania and Uganda. (A similar analysis is currently underway for Nigeria and will be completed by in 2020).

The geospatial analysis aimed to **size the CICO access/ coverage gap** in each of these markets, the number of new agents that would be needed to fill the gap, and finally estimate the **proportion of these new agents that would likely require external support** in order to set up shop and become viable

The first section of this document highlights the **key 'global' insights across markets**, while the second goes into **detailed analyses for each country**

Also provided on the microsite are **links to interactive geo-visualizations** that bring the analysis to 'life' and allow the readers to zoom into their specific countries/ regions of interest, adding and removing data layers as needed

For more details on the geospatial analysis approach and results, please contact our team at cico_economics@bcg.com

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Note to the reader:

The geospatial analyses included in this material are intended to help estimate the size and nature of the CICO coverage challenge at a global level and identify high level variations by country

Additional and more granular analyses would be required to inform country-specific solution design or policy recommendations

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Geospatial analysis aims to answer 4 key questions

Countries included: Bangladesh, India, Indonesia, Pakistan, Kenya, Tanzania, Uganda

(Nigeria available later in 2020)

1. In given countries[1], how big is the population in the remote rural "frontiers"?
2. What is the coverage gap of people without access to financial services?
3. How many agents do we need for financial inclusion?
4. How many of these new agents will be unlikely to be economically viable?

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Geospatial analysis defines four key geographic segments

Organic CICO network expansion more likely in urban, peri-urban/dense rural, and rural "oases"; viability less likely in the rural "frontier"

	Urban	Peri-urban/ Dense rural	Rural oasis	Rural frontier
				
Description	Large, densely populated with very high infrastructure connectivity and commercial activity	Less densely populated, slightly less infrastructure connectivity and commercial activity	Smaller, sparsely populated, remote, but with points of interest that drive commercial activity	Very sparsely populated, very remote, and no established commercial activity
Implications for CICO viability	**Economically and operationally viable** • More than sufficient population density, size, and economic activity for economic viability • Highly connected with roads and rebalancing locations	**Economically and operationally viable** • Sufficient population density, size, and economic activity for economic viability • Sufficiently connected with roads and rebalancing locations	**Potentially economically viable with operational challenges** • Potentially limited local demand; however commercial points of interest draw customers from surrounding areas • Remote location and infrastructure gaps may present challenges (e.g., liquidity management)	**Significant challenges to economic and operational viability** • Insufficient customer demand • High operating costs and complexity (esp. liquidity management) • Lack of enabling infrastructure also a potential barrier (e.g., mobile connectivity)

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Methodology to size the rural CICO challenge

Geospatial analysis to estimate population in rural segments, size of CICO coverage gaps, and new agent requirements

Develop population segmentation

- Develop baseline map: pop/km^2, infrastructure[1], and commercial points of interest (POI)[2]
- Define and validate urban/rural segmentation
- Separate rural into peri-urban/dense rural, and rural oasis

Size the CICO gap

- Overlay population segmentation with access to CICO (within 5 km of bank branch, ATMs, agents[3])
- Quantify population size lacking access to CICO

Place new agents

- Allocate new agents to provide CICO access within 5 km of whole population[3]
- Run 2 additional scenarios for agent placement to reflect greater willingness to travel or roving agent models:
  - 10km access
  - 20 km access

Contextualize new agent placement

- Assess the expected challenges for new agent placement:
  - Economic challenges due to low population size/density
  - Operational challenges due to infrastructure gaps

1. Infrastructure is defined as proximity to cell towers; proximity to primary, secondary, and tertiary roads, and proximity to power grid
2. Commercial POI is defined as fuel, banks/ATMs, commercial, and medical facilities
3. For India, the definition of access was revised to "access to a CICO point within 1km in urban areas and within 2.5 kms in rural areas" – based on local stakeholders' input

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Geospatial analysis: Summary of findings

Countries included: Bangladesh, India, Indonesia, Pakistan, Kenya, Tanzania, Uganda

(Nigeria available later in 2020)

Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Across the 7 countries (2B+ total population), two-thirds (~1.3B) live in rural areas

- 800M+ are in peri-urban/ dense rural, 170M in oases and 325M (~15%) in frontier

CICO access gaps exists across these rural areas, accounting for a total of ~465M people lacking access within 5km today[1]

While overall 85% of gap is located in rural areas, **country-by-country view highlights significant diversity across markets**

- India represents the largest gap, mostly in proportion to its population size
- Kenya & Uganda show significant coverage (90%+) with gap mainly in rural frontier
- Indonesia has a particular challenge in rural frontier where gap is immense (73% of rural frontier population not covered)
- For other countries (Bangladesh, Pakistan, Tanzania), opportunities to expand in "dense rural" and "rural oases" areas in addition to "rural frontier"

~500K new active agents are needed to cover this need (within 5kms[1]), as expected most in India

- However, the coverage ratio (people/ agent) provides insight into two very distinct challenges: (i) some countries (e.g., India, Bangladesh) have high population/ agent ratios in rural areas that may lead to viable long-term economics, (ii) others (especially Tanzania, Kenya) will have very low population/ agent ratios, especially in frontiers, making long-term economic viability uncertain (without external support)

Only 1/3 of new agents will likely be viable today, the remainder would require support – to overcome economic (e.g., lack of sufficient population) and operational (e.g., lack of infrastructure/ banks) challenges

As expected, **need for new agents goes down when proximity targets revised**. This could suggest potential for different CICO distribution models (e.g., roving agent models) in more remote rural area

1. For India, the definition of access was revised to "access to a CICO point within 1km in urban areas and within 2.5 kms in rural areas" – based on local stakeholders' input

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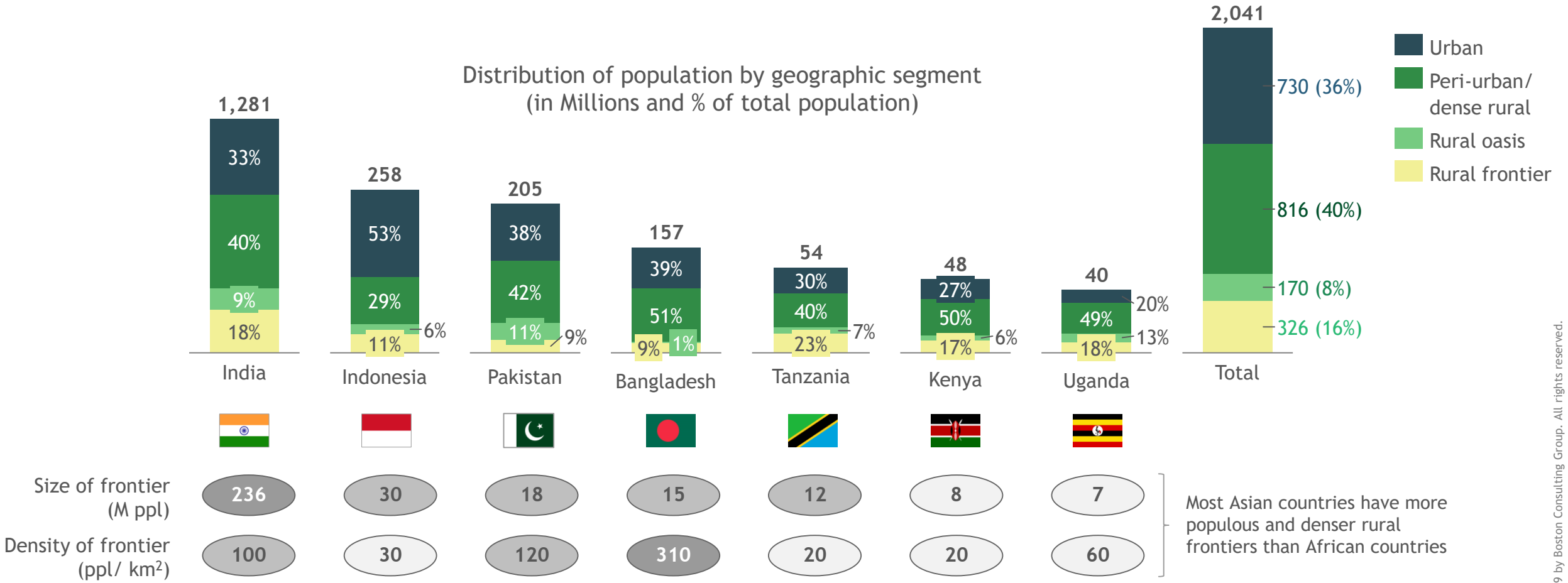
Across 7 countries (2B+ population), two-thirds (~1.3B) live in rural areas

800M+ are in peri-urban/ dense rural, 170M in rural oases and ~325M (~15%) are in rural frontier



Note: Oases defined as concentrations of economic activity within a rural frontier area; number of oases determined by commercial point of interest analysis (some data limitations exist). Source: Landscan – population; World Bank and UN DESA – urban/rural breakdown; UN DESA, government definitions, and BCG Geospatial analysis for rural segmentation

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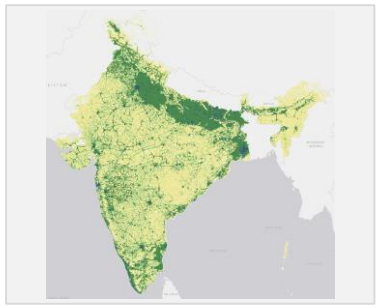
Backup:
While majority of population is rural overall; significant variations in distribution exist across countries

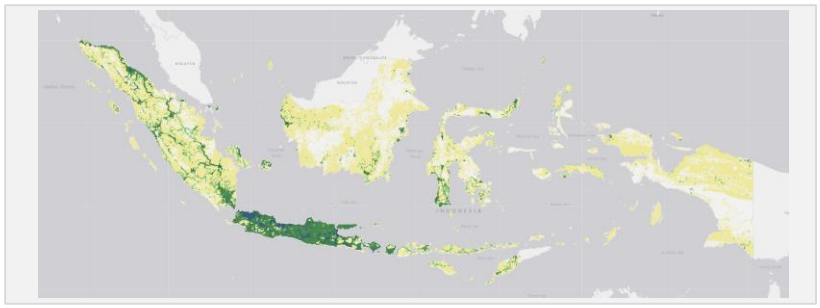
E.g., BANGLADESH
Very densely populated (including in the rural frontiers)

E.g., TANZANIA
Relatively low population density across geographic segments

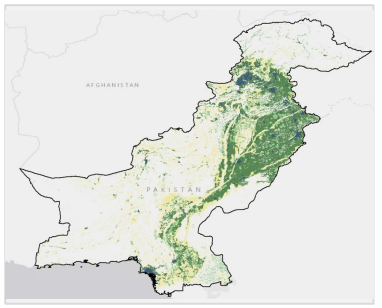
Share & density of population living in rural frontier



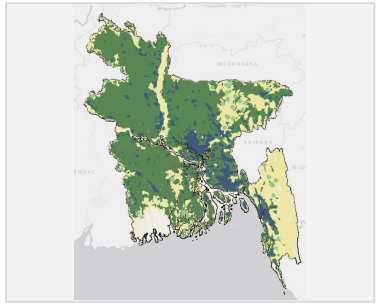
18% of pop. in frontier, with **100** **pop./km²** density



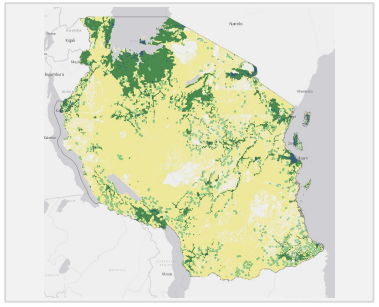
11% of pop. in frontier, with **30** **pop./km²** density



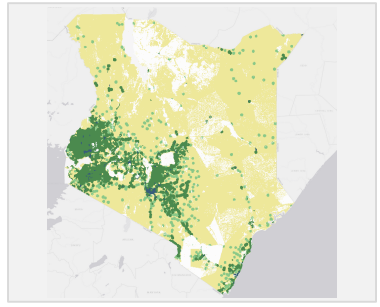
9% of pop. in frontier, with **120** **pop./km²** density



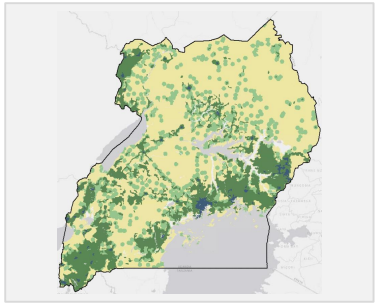
9% of pop. in frontier, with **310** **pop./km²** density



23% of pop. in frontier, with **20** **pop./km²** density



17% of pop. in frontier, with **20** **pop./km²** density



18% of pop. in frontier, with **60** **pop./km²** density

Note: oases defined as concentrations of economic activity within a rural frontier area; number of oases determined by commercial point of interest analysis (some data limitations exist) Source: Landscan – population; World Bank and UN DESA – urban/rural breakdown; UN DESA, government definitions, and BCG Geospatial analysis for rural segmentation

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Backup: Geospatial segment definitions align with external published statistics

BCG geographic segment definitions validated by World Bank estimates, country-level census reports

Urbanicity (% of population in urban area) by methodology	India	Indonesia	Pakistan	Bangladesh	Tanzania	Kenya	Uganda
BCG geospatial analysis	33%	53%	38%	39%	30%	27%	20%
World Bank estimates	34%	55%	37%	36%	33%	27%	23%
Country Bureau of Statistics	32%	50%	37%	35%	30%	31%	21%

Sources: Landscan, BCG geospatial analysis, 2018 Revision of World Urbanization prospects (UN and World Bank, 2018), World Bank urban population estimates (World Bank, 2018), 2016 Tanzania in figures (Tanzania Bureau of Statistics, 2017), Analytical report on urbanization (Kenya National Bureau of Statistics, 2012), 2017-2018 projected population (Pakistan bureau of Statistics, 2017), Statistical abstract (Uganda Bureau of Statistics, 2018), The number and distribution of population (Indonesia Bureau of Statistics, 2010), Population projections for India and States 2001-2026 (Census of India, 2001), Statistical pocket book Bangladesh 2016 (Bangladesh Bureau of Statistics, 2017)

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Backup: Country-context was considered in urbanicity segmentation by varying population density thresholds and definitions for rural oases

Definitions set to achieve rural-urban breakdown aligned with World Bank and national census population breakdowns, government definitions of urbanicity, and representation of oases as areas of commercial activity in the rural frontier

	 India	 Indonesia	 Pakistan	 Bangladesh	 Tanzania	 Kenya	 Uganda
Urban (>X population/km^2):	1500	1000	1000	1250	350	1000	700
Per-urban / dense rural lower bound (>X population/km^2):	400	200	200	500	60	200	200
Rural oases based on points of interest (POI)	2.5km radius surrounding 3+ non-financial commercial POIs that are within 0.5km of each other	5km radius surrounding 1 commercial POI	Due to data limitations, included all available POIs (not just commercial)	5km radius surrounding 1 commercial POI	5km radius surrounding 1 commercial POI	5km radius surrounding 1 commercial POI	5km radius surrounding 1 commercial POI

Note: Commercial point of interest defined as financial, fuel, medical, or commercial point of interest
Sources: Landscan; 2018 Revision of World Urbanization prospects (UN and World Bank, 2018); Esri POI; OSM POI; BCG geospatial analysis

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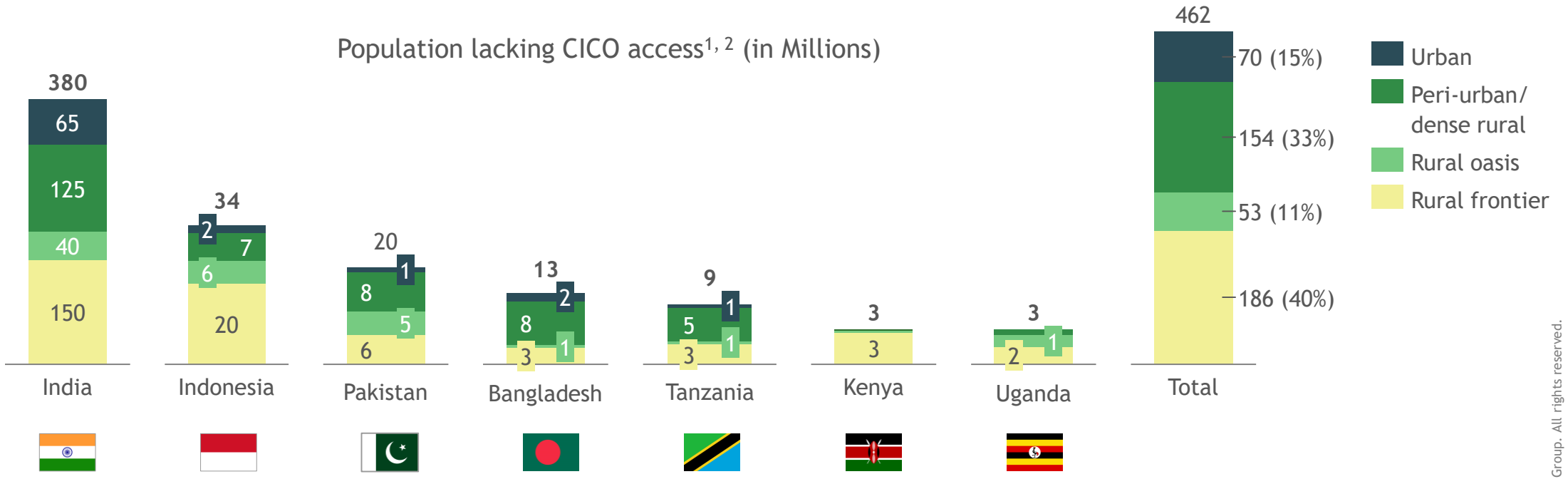
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Today, ~465M people lack CICO access across 7 research countries; with vast majority located in rural areas



	India	Indonesia	Pakistan	Bangladesh	Tanzania	Kenya	Uganda
% of total pop that lacks CICO access	30%[2]	13%	10%	8%	16%	7%	7%
% total pop in frontier who lacks access	65%	67%	31%	21%	25%	36%	22%

While biggest gap located in rural frontier, still opportunity for progress in dense rural areas

IN, PK, BG, TZ: pop lacking CICO access is as significant in **peri-urban/ dense rural areas** as it is in the frontier

IND, KY, UG: majority of gap located in **the frontier**

1. Defined as population located more than 5km from a CICO point (bank branch, ATM, agent, etc.) based on Fraym Financial Inclusion Insights survey; 2. For India, the definition of access was revised to "access to a CICO point within 1km in urban areas and access to a CICO point within 2.5 kms in rural areas" – based on local stakeholders' input. Data sources: **India:** Esri bank and ATM POI data, IPPB outlets data, BCs and CSCs data web scraped from IBA BC registry, and individual SLBCs and banks websites, includes 630K+ CICO points geo-mapped across all states; **Bangladesh**: FSP financial map; **Indonesia**: Web scraped locations of BNI, BTPN, Mandiri, BCA agents; BRI agents not included due to data availability; **All**: Landscan – population; Fraym CICO layer based on FII consumer survey data; Esri bank and ATM POI; FSP financial map; BCG analysis

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Opportunity for country-specific CICO expansion strategies to target areas with greatest need

% of geographic segment lacking CICO access within 5km[1, 2]

	India[2]	Indonesia[3]	Pakistan	Bangladesh[4]	Tanzania	Kenya	Uganda
Pop lacking coverage (M)	380	34	20	13	9	3	3
% of total pop.	30%	13%	10%	8%	16%	7%	7%
% of geo segment:							
Urban	15%	1%	2%	2%	3%	<0.1%	1%
Peri-urban/ dense rural	25%	9%	10%	10%	22%	1%	2%
Rural oasis	33%	35%	21%	29%	15%	7%	14%
Rural frontier	65%	67%	31%	21%	25%	36%	22%

1. Defined as population located >5km from CICO (bank branch, ATM, agent, per Fraym' financial access data layer unless otherwise noted); 2. For India, the definition of access was revised to "access to a CICO point within 1km in urban areas and access to a CICO point within 2.5 kms in rural areas" – based on local stakeholders' input; 3. Esri bank and ATM POI and agent coverage based on webscraped locations of BNI, BTPN, Mandiri, BCA agents; BRI agents not included due to data availability; 4. insight2impact FSP map 2014
Source: Landscan – population; Fraym 2017 financial access data layer; Esri bank and ATM POI; insight2impact FSP map 2014; BCG analysis

OBSERVATIONS

Asian countries have achieved significant coverage in urban areas, but still have not addressed all oasis and dense rural opportunities

Size of gap in India largely driven by total population size in rural areas

Indonesia's coverage gap particularly concentrated in the frontier

Tanzania has coverage gaps in all rural segments; 'low hanging fruit' opportunities to expand to places where agents likely to be viable (peri-urban/dense rural, oases)

Kenya and Uganda have achieved significant progress on access in urban, dense rural, and oases areas, but needs remain in the rural frontier

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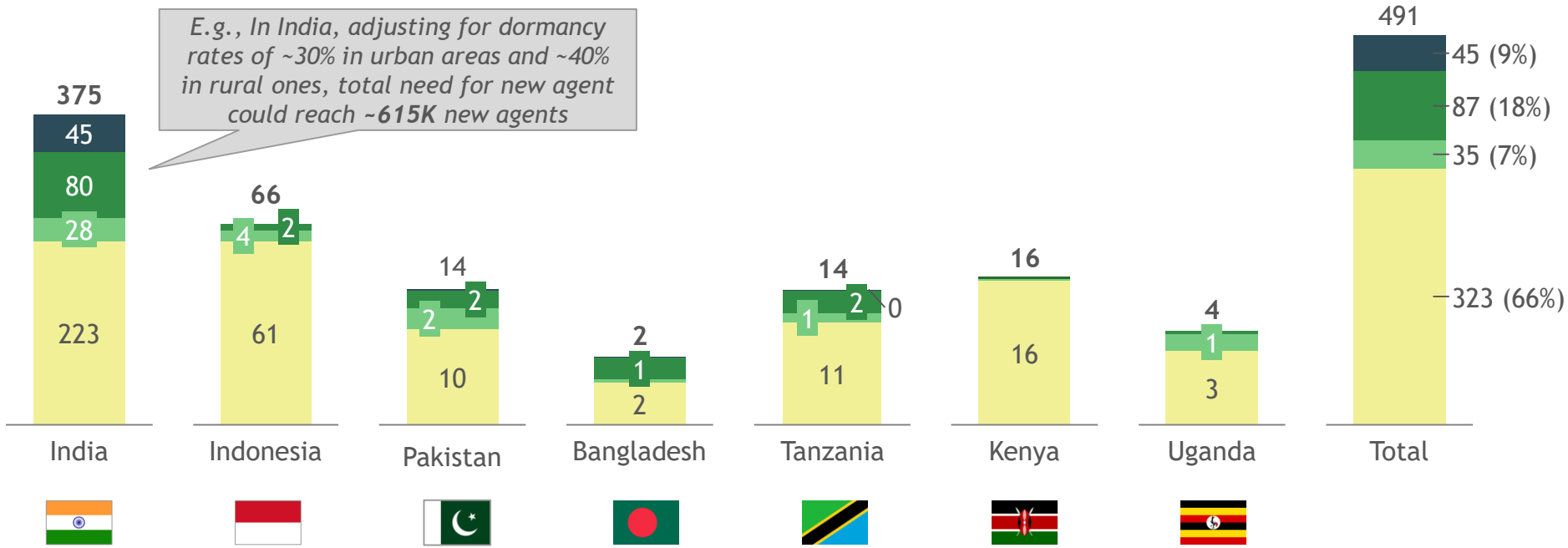
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

~500K new active agents needed to deliver universal CICO access across focus countries; 90% in rural areas

Many new agents unlikely to be economically viable on their own

Number of new agents in thousands (under 5km scenario[1])

*E.g., In India, adjusting for dormancy rates of ~30% in urban areas and ~40% in rural ones, total need for new agent could reach **~615K** new agents*



	India	Indonesia	Pakistan	Bangladesh	Tanzania	Kenya	Uganda
Population/agent (in rural frontier)	670	500	900	3,900	600	300	900
vs. min pop. for agent economic viability	1,100	200	1,400	1,800	1,000	500	400

Indonesia, Bangladesh, Uganda: agents likely to 'catch' sufficient local populations (as pre-condition to viability)

India, Tanzania, Kenya: unlikely to be the case due to low densities in rural areas

1. For India specifically, the definition of access was revised to "access to a CICO point within 1km in urban areas and access to a CICO point within 2.5 kms in rural areas" - based on local stakeholders' input.
Data sources: **India**: Esri bank and ATM POI data, IPPB outlets data, BCs and CSCs data web scrapped from IBA BC registry, and individual SLBCs and banks websites, includes 630K+ CICO points geo-mapped across all states; **Bangladesh:** I2I/ FSP maps; **Indonesia**: Agent coverage based on web scraped locations of BNI, BTPN, Mandiri, BCA agents; BRI not included due to data availability. **All**: Landscan - population; Fraym CICO layer; Esri bank and ATM POI; I2I/ FSP maps; BCG analysis

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Backup: Detailed segment-specific assumptions for new agent allocation

Segment	Assumptions		
Urban[1]	Not included in scope of CICO expansion if <1% of population lack access to CICO		
Peri-Urban/Dense Rural[1]	Agent location optimization to deliver CICO access within 5km all underserved population[2]		
Rural Oasis[1]	Agent location optimization to deliver CICO access within 5km all underserved population[2]		
	5km scenario: Addressable population living within 5km of agent (even if living in frontier)	10km scenario: Addressable population living within 10km of agent (even if living in frontier)	20km scenario: Addressable population living within 20km of agent (even if living in frontier)
Rural Frontier	5km scenario: Agent location optimization to deliver CICO access within 5km all underserved population	10km scenario: Agent location optimization to deliver CICO access within 10km all underserved population	20km scenario: Agent location optimization to deliver CICO access within 10km all underserved population

1. Assume population living in this segment considers >5km too far for CICO access, therefore need an agent within 5km for population living in those segments to have CICO access;
2. Underserved populations are those located >5km from financial services

Note: For India specifically, the definition of access was revised to "access to a CICO point within 1km in urban areas and within 2.5 kms in rural areas" – based on local stakeholders' input.

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Backup: Across most countries, 5km seems to be most appropriate rural CICO catchment area due to consumer travel preferences and behavior

	 India	 Indonesia	 Pakistan	 Bangladesh	 Tanzania	 Kenya	 Uganda
Target rural CICO catchment area	1km in urban; 2.5kms in rural	5km	5km	5km	5km	5km	10km
Rationale	See details on next page - Definitions of target access for India were based on local stakeholders inputs	**5km is the max median distance** travelled on a daily basis 20km is max distance traveled for less frequent causes	Rural individual travel is **mostly focused within the village** due to lack of vehicle ownership **5km is max typical distance** for health related travel episodes	Only **39% of rural population own bicycles** Vast majority of rural residents currently **travel <5km for financial services**	Rural secondary school children walk an average of **~2.7km to get to school** In 85% of regions, **average travel is <5km for firewood**	**~5km is typical distance** traveled for weekly market trips **~5.7 km is median distance traveled by lowest income** quintile for fertilizer market	**Daily trips** usually limited to within 5km **12.5km is a typical distance** for weekly trips

Note: If travel time rather than distance is reported, assumed a travel time of 5km/hour; 2. Some studies lack detail on primary mode of transport for the population of interest.
Sources: GIZ, Improving access to financial services in Indonesia (World Bank, 2010), Rural Transport and Health – A Pakistan Perspective (NED University of Engineering and Technology, 2019), The Reality of getting from point a to point b in rural Kenya (2016), Tanzania Household Budget Survey Main Report (HBS, 2012), Study on energy for cooking in developing countries (OECD, 2006), Market access and child labour (Muhumuza, 2012), Rural transport and livelihoods in Uganda (Naiga, 2015), Challenging pathways to safe water access in rural Uganda: From supply to demand-driven water governance (International Journal of the Commons, 2015)

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Backup: For India, 1km in urban and 2.5kms in rural defined as access targets – based on stakeholder input, average village sizes and willingness-to-travel data

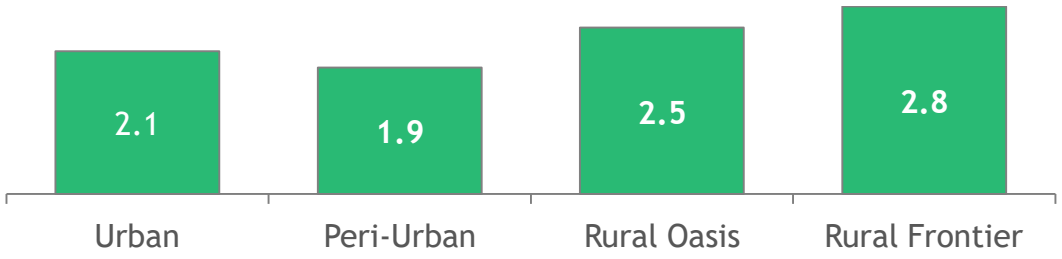
Financial service providers recommend access targets of 1km for urban and 2.5km in rural

> **1km should be appropriate for urban**, as that's how far away other financial service points are usually located – *Finclusion org*

> **2 to 3 km radius** is what people are willing to travel in rural areas – *Fintech software company*

Average village size by urbanicity segment in India validates 2.5km threshold for rural areas

Average village 'radius' in India (kms)



Willingness-to-travel benchmarks also inform values for access targets in urban & rural areas

CICO proximities in urban areas

On average, there is a bank branch every **1.5km** in urban areas[1]

Post offices in urban areas on average serve a **1.32km** radius[2]

Statistics on rural travel

2km	99% of population located within 2km of primary schools
3km	Max radius covered by a postman to deliver mail
2-10km	average distance travelled to work (by foot for distance < 5km)

1. Calculated using the total number of bank branches in urban and metropolitan areas (RBI), and dividing it by the total urban area (km^2), (2019 BCG Urbanicity segmentation); 2. Calculated using the total number of post offices in urban areas (India Department of Posts, Annual Report), and dividing it by the total urban area (km^2), (2019 BCG Urbanicity segmentation); **Sources:** NASA Sedac village data (2001); BCG Gamma analysis (Jan-Feb 2020); Local Financial Service Provider interviews (Jan 2020)

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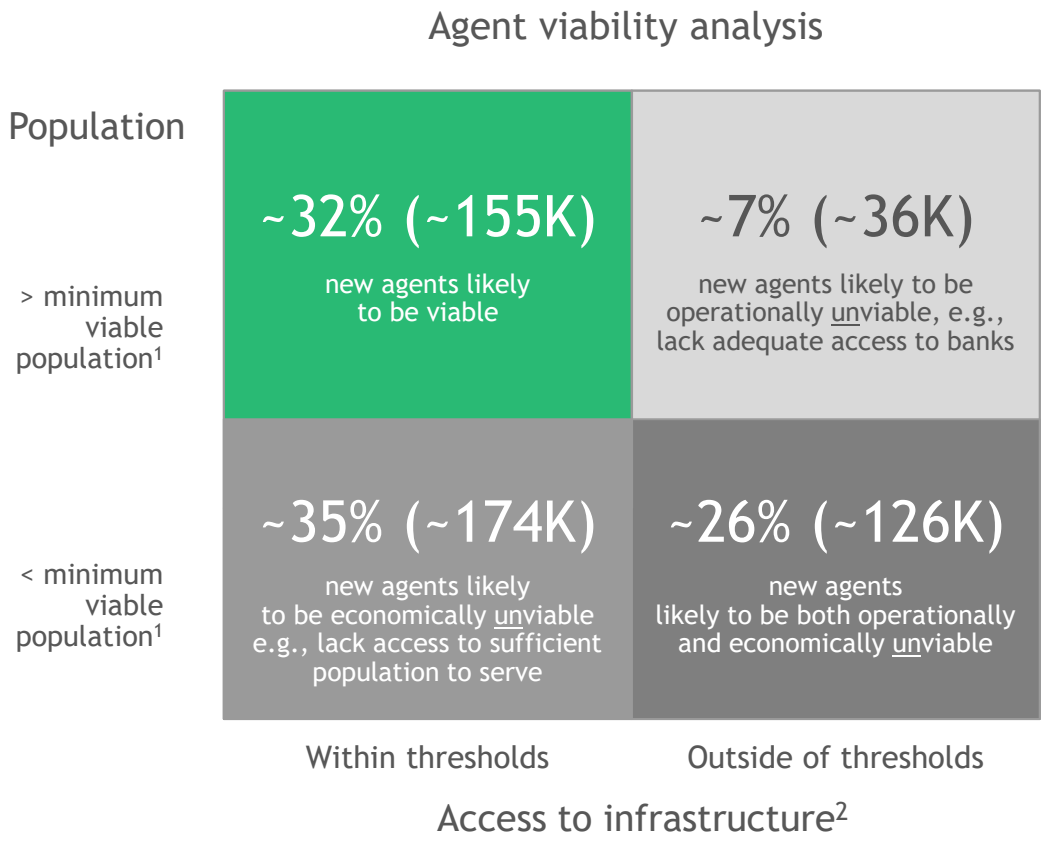
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Due to variety of challenges, ~2/3 of new agents needed likely to be unviable (economically and/or operationally)



About 1/3 of all new agents are likely to be both economically and operationally viable

About 1/3 (35%) of new agents are likely to be economically unviable and require supply-side incentives (e.g., subsidy)

- Population in local catchment area is less than the minimum required for a non-dedicated DFS agent to achieve sufficient profitability[1]

The last 1/3 of new agents is likely to be operationally unviable and would likely need infrastructure investments and/ or operating model innovation

- Agent is located more than 20km from a bank, which significantly limits liquidity management capabilities
- Distance from bank branch typically observed as the 'binding constraint' for operational viability (as compared to mobile connectivity or access to roads)

1. Minimum viable (desired) population defined by country based on desired transaction levels to achieve target profitability (based on BCG CICO Economics study in markets, 2018) - incorporates field research on CICO business economics and commission structure for a non-dedicated DFS agent as well as assumptions on proportion of adult DFS users within the country. 2. Access to infrastructure "within thresholds" defined as access to a bank branch within 20kms; access to a cell tower within 30 kms; and access to a road within 5kms
Source: Landscan 2017; Esri Point of Interest; Helix Agent Network Accelerator Surveys; BCG CICO Economics Study

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Backup: Methodology to estimate viability thresholds for non-dedicated DFS agent

Defined as minimum income, revenue, transaction volume, and local population required for economic viability

Per agent	Definitions and inputs	Estimates for a non-dedicated agent in India
Minimum income (profit) required	**For non-dedicated agents, viability defined as achieving sufficient profitability (net income) to make the business "worthwhile" to sustain over time** • Considers agent breakeven point (based on field research) + opportunity cost of working capital + time/effort required for liquidity management	Target profit per month: 4,500 INR (urban); 2,250 INR (rural) Based on field research and local stakeholders' inputs
Minimum revenue required	**Minimum revenue that allows agents to cover operating costs and achieve minimum profitability (net income) target** • Target revenue calculated as target net income minus projected agent costs (fixed and variable) based on country-specific economic analysis	Target revenue per month: 9,000 INR (urban); 4,500 INR (rural) Reflects ~50% average gross profit margin for non-dedicated agent based on 2018 field research
Minimum transaction volume required	**Minimum transaction volume required to achieve target revenue** • Calculated based on average revenue per transaction observed in each country • Implies minimum viable consumer demand in terms of monthly and daily volume per agent	Target transaction volume per month: 750 txns/ month (urban & rural) Reflects 12 INR revenue/ txn in urban; and 6 INR revenue/ txn in rural based on 2017 ANA Helix data
Minimum local population required	**Size of local population required for agent to achieve sufficient customer demand (transaction volume and meet minimum viable revenue targets.** • Defines local addressable market as number of adults who are active DFS customers (per Finclusion, Findex statistics) • Considers average transactions per month per customer	Target minimum population per agent: 1,100 (urban); 1,500 (rural) Assumes 66% adults in pop, 40% of active DFS/ CICO users, and 2.5 txns/ user/ month (urban) and 2 txns/ user/ month (rural)

Source: BCG 2018 and 2019 study of agent economics, World Bank, Finclusion, Findex, IFC/MasterCard Foundation, Helix Institute/MicroSave, Local stakeholders and financial service providers input in India; BCG analysis

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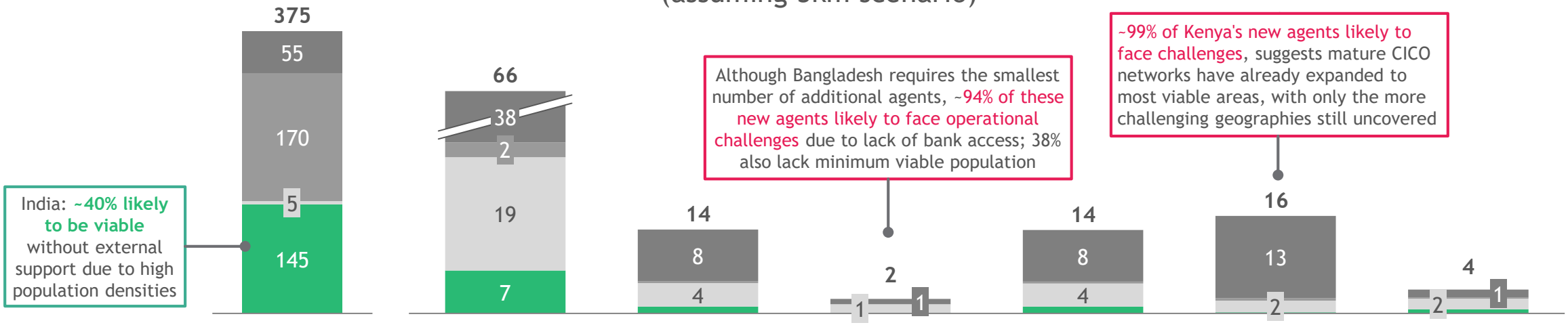
Backup: Share of unviable agents varies by country, driven by local population size/ density and existing infrastructure in the frontier

Number of agents per viability category (in thousands) (assuming 5km scenario)[1]



% of new agents	India	Indonesia	Pakistan	Bangladesh	Tanzania	Kenya	Uganda
Unviable	15%	58%	62%	37%	62%	85%	34%
Op viable but Econ unviable	45%	4%	2%	0%	2%	3%	4%
Econ viable but Op unviable	<1%	28%	28%	57%	28%	12%	44%
Viable	**40%**	**10%**	**8%**	**5%**	**8%**	**1%**	**18%**

Note: Economic viability evaluated based on population in agent's local catchment area exceeding minimum viable threshold. Minimum viable population threshold observed based on business economics and commission structure for a non-dedicated DFS agent as well as proportion of adult DFS users within the country. Operational viability determined based on distance to bank. 20km from bank determined as the threshold of inadequate access. Source: Landscan 2017; Esri Point of Interest; Helix Agent Network Accelerator Surveys; BCG CICO Economics Study

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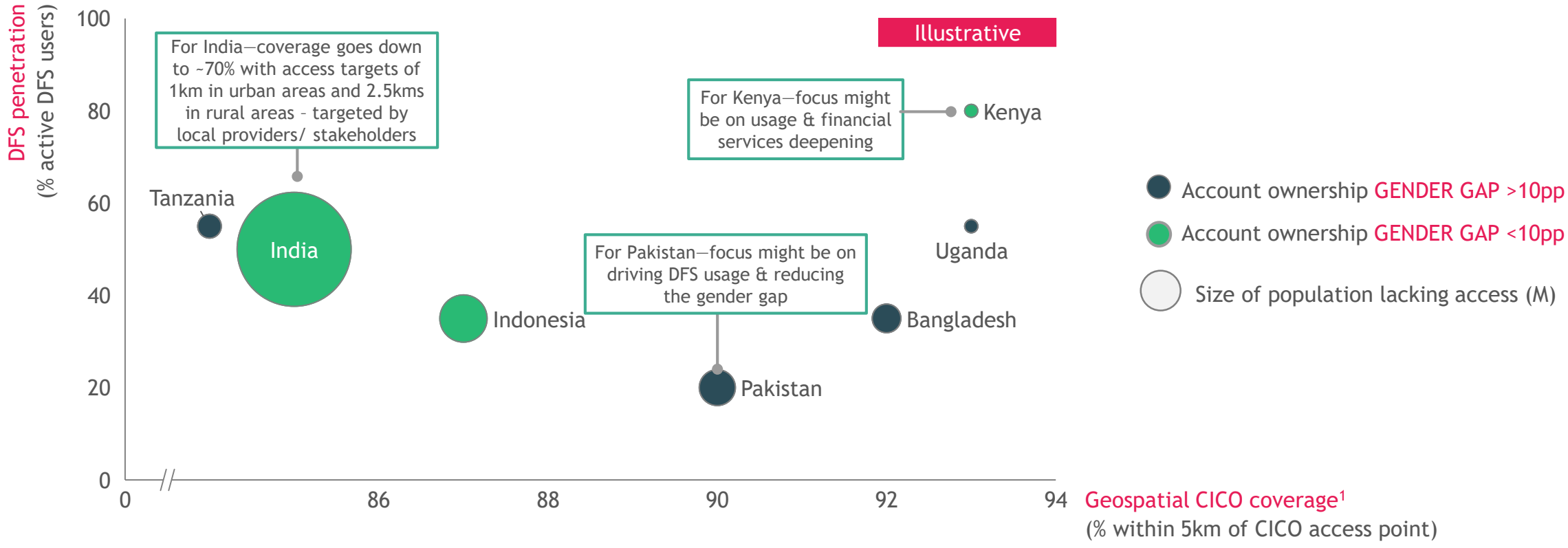
Country-specific CICO investment strategies will need to consider range of dimensions in addition to physical coverage

Some countries may aim to expand basic access; others to improve DFS quality, usage, equity, and deepening



Note: CICO coverage statistic reflects BCG Geospatial analysis of population access to bank, ATM, or agent. DFS penetration estimate informed by Findex and Finclusion statistics (% made or received digital payment in the last year, % sent or received domestic remittances using an account, % active bank user, registered mobile money user or OTC user).
Source: BCG geospatial analysis; 2017 Finclusion country reports (Finclusion, 2017); Global Findex report 2017 (World Bank, 2017)

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After having sized the CICO coverage gap, path forward will be to analyze underlying root causes for gap in country and explore potential interventions

Role of CICO in financial inclusion

Why is CICO important for financial inclusion?

What defines a successful CICO agent network?

Sizing the CICO access challenge

What is the size of the CICO coverage gap in key markets?

Exploring potential interventions for CICO expansion

What are challenges/ root causes to CICO expansion today?

What are potential interventions to catalyze CICO expansion?

Path forward

Path forward for country application

What does the path forward look like?

How can we think about developing market-specific CICO strategies?

What roles should key stakeholders play?

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Country Deep-Dives

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India

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In India, geospatial analysis was conducted at two levels - **Access target** and **Village-level** - to generate practical insights for discussions on the ground

Two different methodologies were used…

Access target methodology

CICO access is defined by people being within a certain distance from a CICO point: 1km in urban/ 2.5km in rural

- Populations outside the access targets are considered lacking "geographic access"
- This method might potentially underestimate new agent need as it does not take into consideration the fact that people often require services within their own village

Village level methodology

CICO access is defined by each village having at least one CICO point located within its borders

- Villages without a CICO point are considered lacking "geographic access"
- This method might potentially overestimate new agent need as some villages are very close to others and might not each require their own CICO point

…to investigate 4 key areas

1. **Urbanicity:** Size of population living in rural frontier and small rural villages
2. **CICO network coverage and capacity:** Number of CICO points today and size of coverage & capacity gaps
3. **New agent need:** Number of new CICO agents needed to provide access to uncovered and underserved populations
4. **Viability:** Number of new agents that are economically and operationally viable, vs. unviable and requiring support

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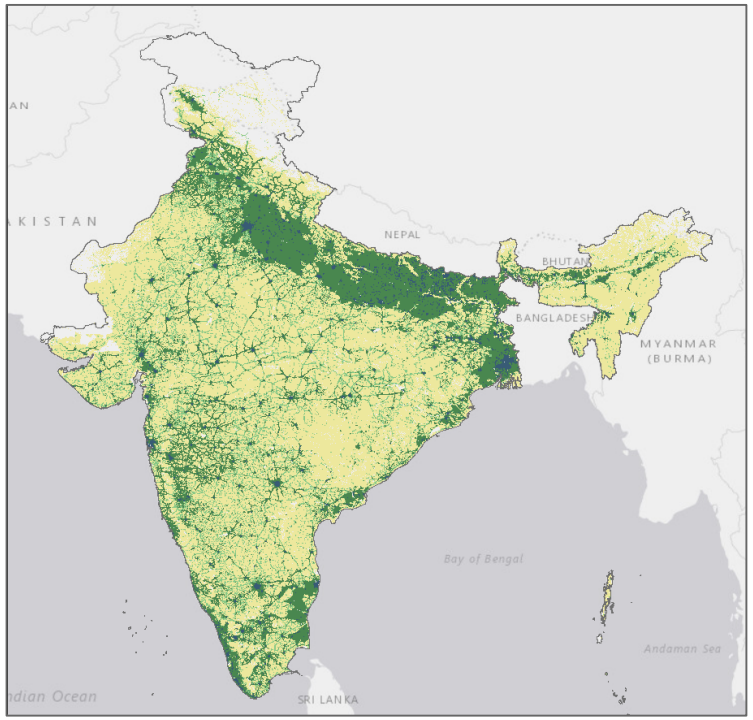
Today, **865M** people in India (~70% of pop) lives in 'rural areas'

Of these, **250M+** (20% of pop) live in 420,000 small villages with < 2,000 population

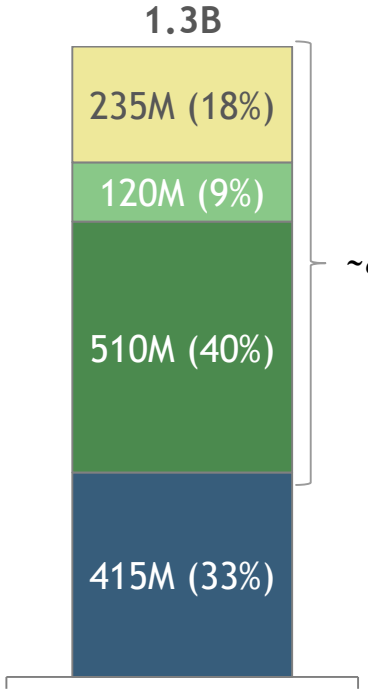
Population of India



Segments

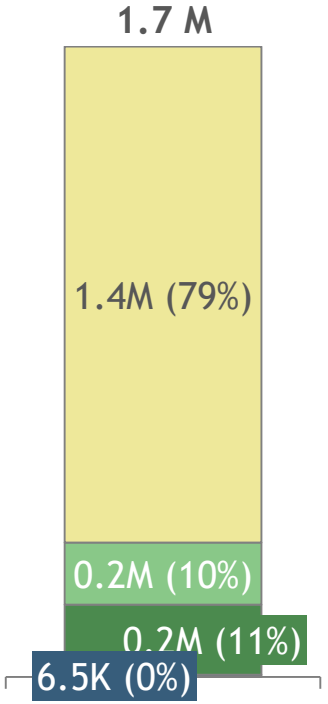
- Urban
- Peri-urban/ Dense rural
- Rural oases
- Rural frontiers

Population by segment

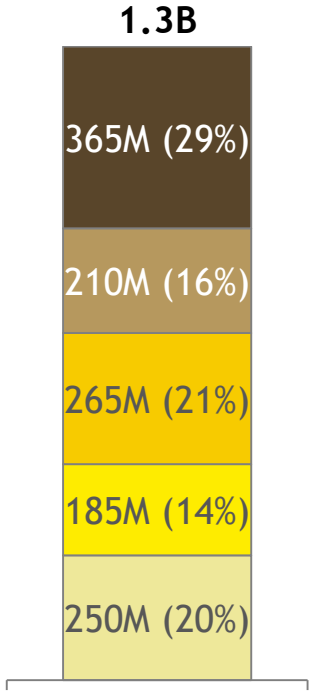


~865M

Area by segment (km2)



Population by village size



Total villages

- 550K
- 5K
- 15K
- 45K
- 65K
- 420K

Village size (pop.): < 2k | 2k-4k | 4k-10k | 10k-25k | > 25k

Sources: 2017 Landscan population, NASA Sedac village data (2001); BCG Gamma analysis (Jan-Feb 2020)

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Out of 1.5M-2M CICO points estimated in the country, only 55% located in 'rural areas' where most people live, which suggests under-coverage

Lack of external consensus required bottoms-up approach to estimate total CICO points

Unique & active CICO points	Urban	Rural	Total
IPPB outlets	14K-15K	125K-140K	**140K-155K**
Traditional bank BCs	215K-300K	220K-320K	**435K-620K**
Payment bank agents[4]	330K-485K	90K-140K	**420K-625K**
Common Service Centers	-	185K-240K	**185K-240K**
Subtotal	**560K-800K**	**620K-840K**	**1.2M-1.6M**
Bank branches	55K-60K[1]	85K-95K[2]	**140K-155K**
ATMs (on-site & off-site)[3]	105K-115K[1]	80K-90K[2]	**185K-205K**
Total	**720K-975K** *(45%)*	**785K-1.0M** *(55%)*	**1.5M-2.0M**

Number of CICO points/ 100,000 people

175-235 in urban areas

90-120 in rural areas

120 - 160 across India

1. Includes metropolitan + urban as classified by RBI; 2. Includes semi-urban + rural as classified by RBI; 3. Calculated using RBI data on % off-site vs. on-site ATMs per bank, and total ATMs split by urbanicity segment; off-site ATMs were used for lower bound, total ATMs for upper bound; 4. 75% urban and 25% rural split applied to total payments banks based on govt. regulation and provider input (the number of BCs reported by IPPB (200K), FINO (125K), PayTM (500K), Airtel (500K), and Jio (10K) – totaling to ~990K agents). **Sources:** Providers/ BMGF interviews, BCG analysis

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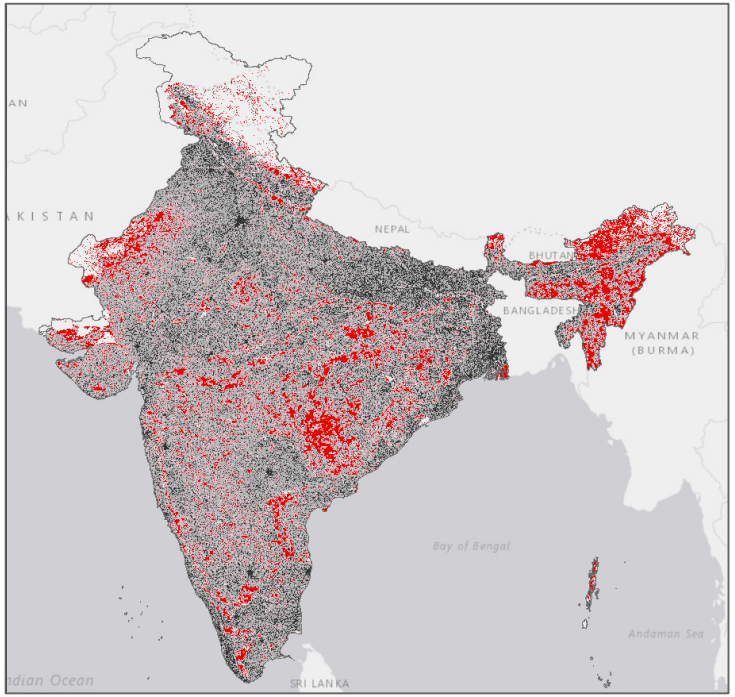
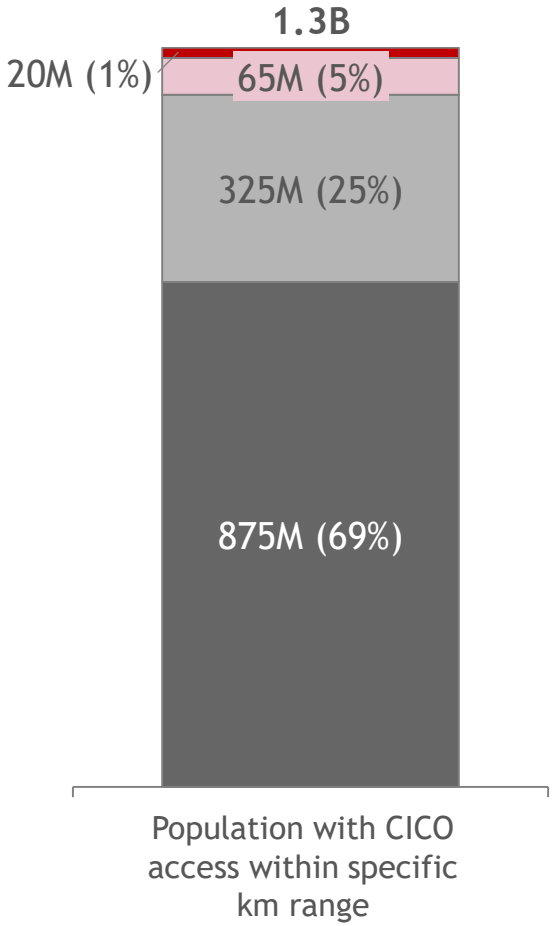
While ~99% of the population has 'geographic access' to CICO within 5kms…

IPPB outlets, BCs, and CSCs provide significant 'geographic access' in rural areas due to existing networks

Geographic access to CICO



Distance to nearest CICO point



Population with CICO access within specific km range

Sources: 2017 Landscan population, NASA Sedac village data (2001); BCG Gamma analysis (Jan-Feb 2020)

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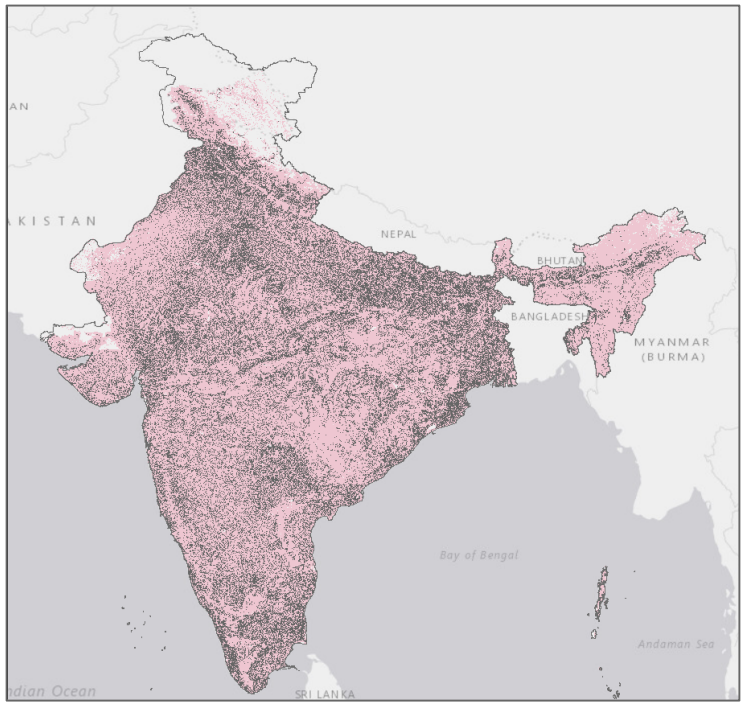
… **380M** people (30% of the pop) lack access within aspirational access targets (1km in urban, 2.5km in rural), with **80%+** of the gap located in rural areas

Access thresholds for urban and rural areas were derived from provider input and average village size in India

Geographic access to CICO



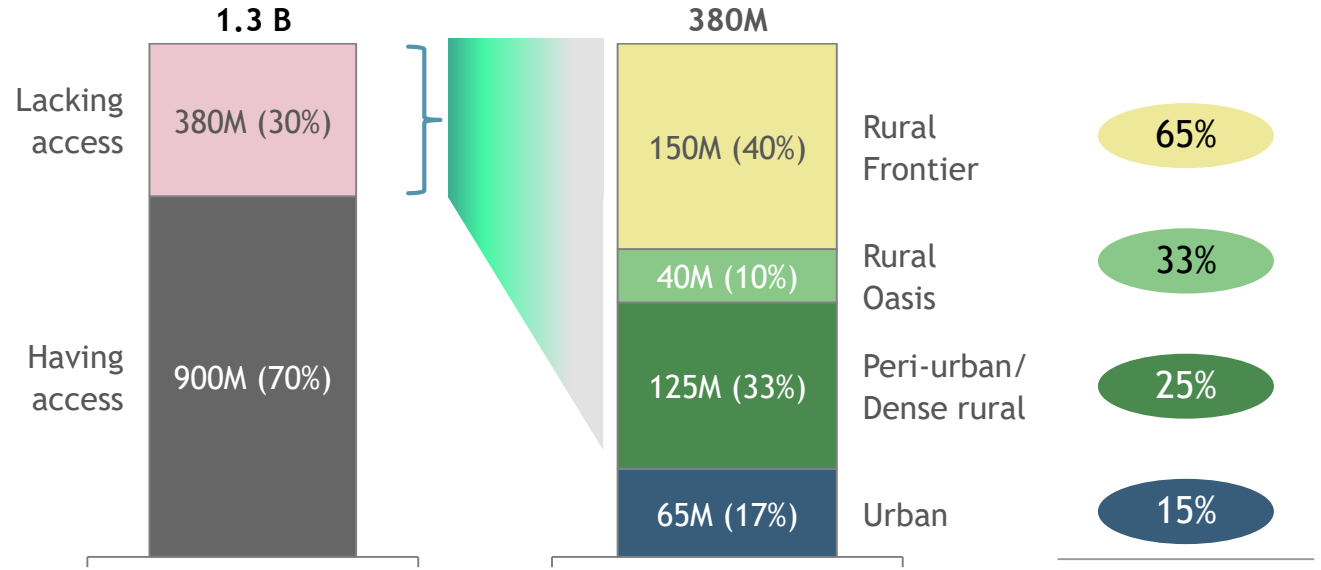
Coverage

- Pop having 'geographic access' within 1km in urban/ 2.5kms in rural
- Pop lacking 'geographic access' within 1km in urban/ 2.5kms in rural

~380M people lack 'geographic access' within access targets

80%+ of these people live in rural areas (incl. 40% in frontiers)

65% of people living in the rural frontier lack access



Sources: 2017 Landscan population, NASA Sedac village data (2001); BCG Gamma analysis (Jan-Feb 2020)

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In particular, access gap is largest in smallest villages: **80%** of the population living in villages with < 2,000 population (or **200M** people) don't have CICO access

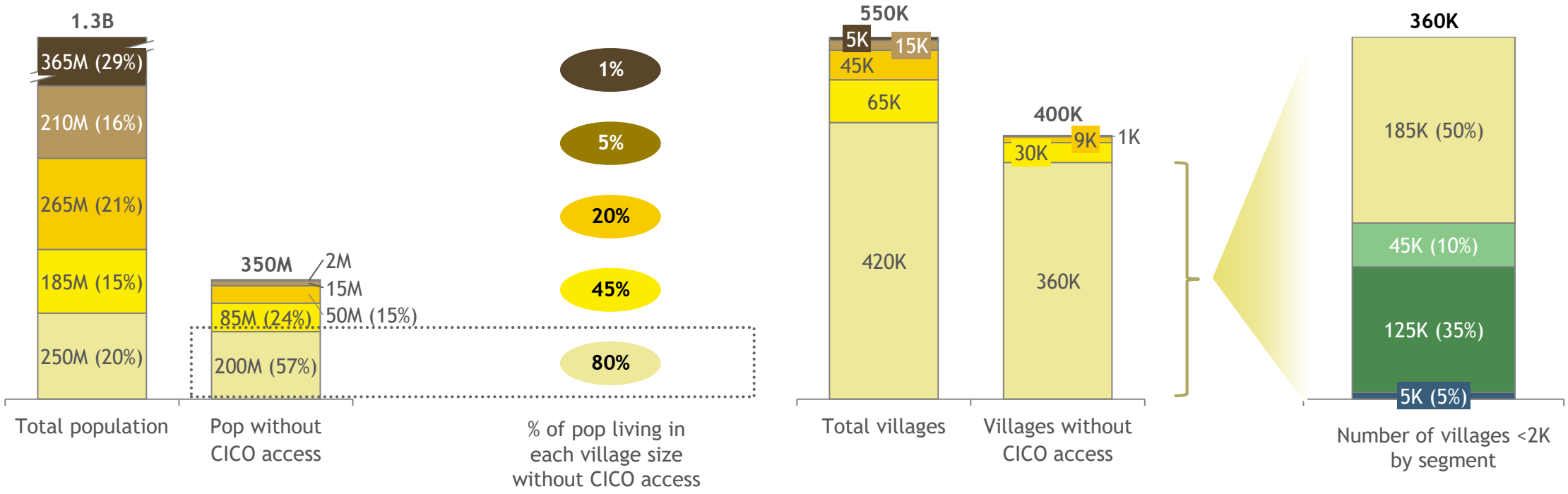
Village methodology is consistent with how providers approach their agent placement strategy

200M people living in villages with < 2K pop lack CICO access

This corresponds to **80%** of the population living in these villages

Which translates to **360K** villages, or **90%** of the villages lacking access

Of which, almost **~1/2** (185K) are located in the rural frontier



Village size (pop.): < 2k | 2k-4k | 4k-10k | 10k-25k | > 25k

Segment: Urban | Peri-urban | Rural oasis | Rural frontier

Sources: 2017 Landscan population, NASA Sedac village data (2001); BCG Gamma analysis (Jan-Feb 2020)

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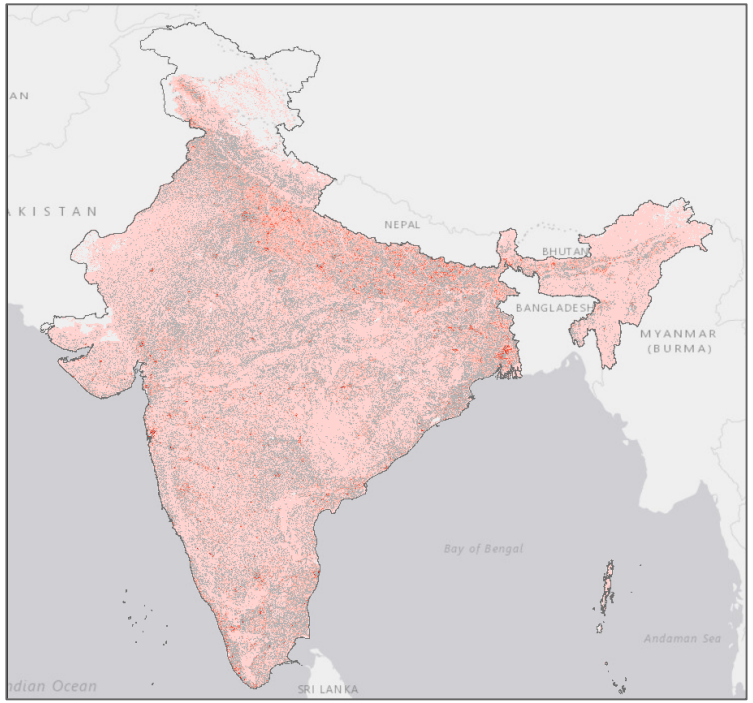
In addition, there are **60M** people, who have 'geographic access' but live in areas with insufficient agent capacity and are 'underserved'

Map of underserved population

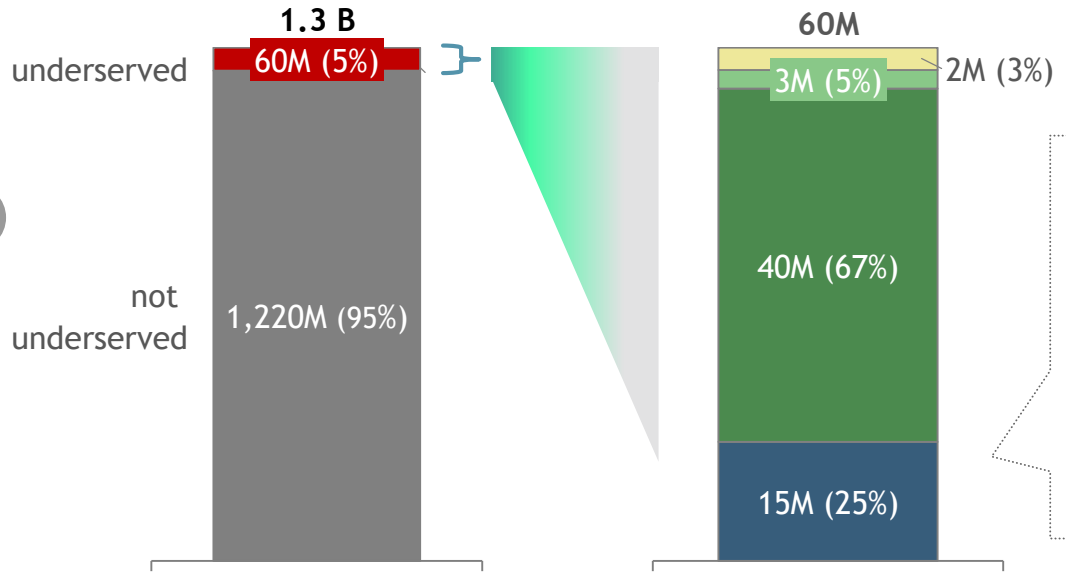


Underserved population per km²

- 0 ppl
- 1-250
- 251-1,000
- 1,001-2,500
- 2,501-7,500
- 7,501-20,000
- 20,001-95,328

~60M people lack access to sufficient CICO capacity

55M of these people live in denser areas (urban & peri-urban)



Majority of underserved population is in denser areas: ***higher DFS/ CICO penetration leads to higher demand***

Sources: 2017 Landscan population, NASA Sedac village data (2001); BCG Gamma analysis (Jan-Feb 2020)

- Urban
- Peri-urban
- Rural oasis
- Rural frontier

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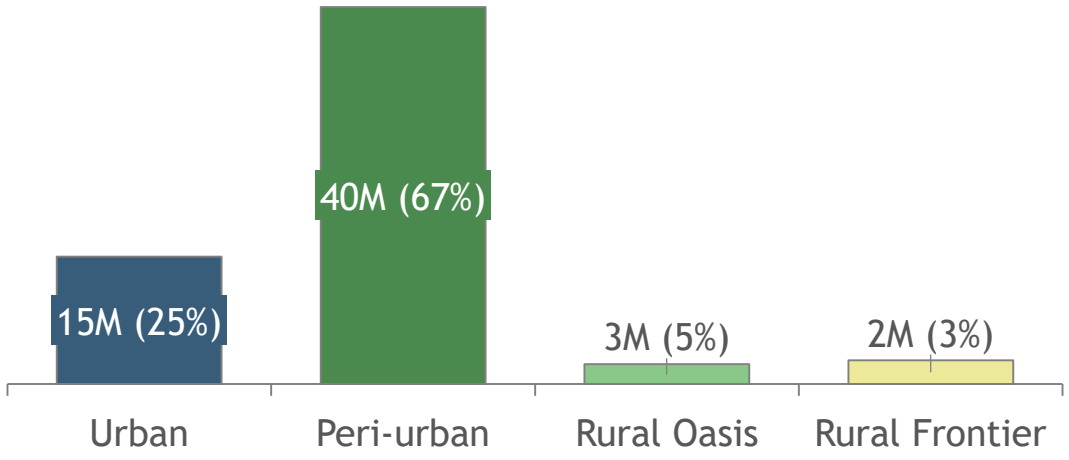
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Backup | Geo-analysis & global benchmarks suggest CICO capacity gap in India

Geo-analysis suggests ~60M people lack access to sufficient CICO capacity especially in dense areas



Most of the underserved population exists in higher population density areas, due to higher demand there

These are the same regions that most providers target (highly economically viable); thus adjusting for full universe of CICO points (including those not geo-mapped) may decrease total underserved population estimate

Global benchmarks on agent density validate that a CICO capacity gap likely exists in India

	CICO point/ 100K pop[1]	Total pop./ CICO point	Active agent/ 100k pop.
Kenya	600	165	140
Tanzania	490	205	120
Uganda	320	310	85
Pakistan	285	350	30
India	110[2]	915	55[3]

The average CICO point in India serves 2-5x more people than other comparable countries

This indicates that these CICO points are **likely saturated** and that there **exists an underserved population**, even after accounting for the full universe of CICO points

1. Figures calculated from FRAYM layer created during 2019 geo-analysis effort; 2. Takes lower bound of estimated CICO points in universe; 3. Takes the lower bound of the estimated active traditional bank BCs and payments bank agents; **Sources**: 2017 Helix Agents Count Report; 2018 BCG FRAYM layer from 2019 geo-analysis effort

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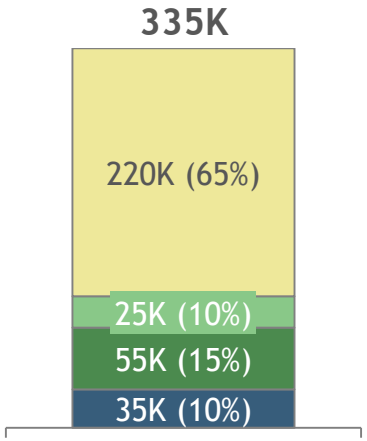
To get India to universal access, **375K** new active agents will be needed

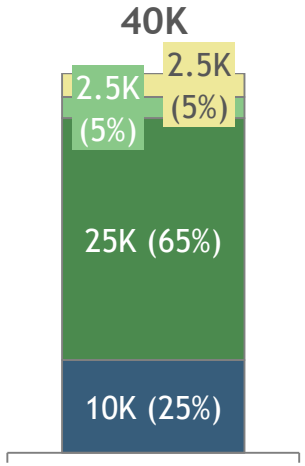
This translates into 615K total new agents after accounting for expected dormancy

335K new agents to provide 'geographic access' to population lacking access



335K new agents to provide geographic access to all within 1km in urban/ 2.5km in rural, with **~2/3** of new agents needed in the rural frontier

40K new agents to add service capacity and serve the 'underserved' population



40K new agents to increase capacity and meet unmet demand, with **88%** of these needed in urban and peri-urban areas

Assuming that new BCs/ agents in India will likely experience dormancy rates of ~30% in urban areas and 40% in rural areas, closer to ~615K new agents will be needed in reality to provide universal CICO access

Segment: Urban | Peri-urban | Rural oasis | Rural frontier

Sources: 2017 Landscan population, NASA Sedac village data (2001), Providers/ expert; BCG Gamma analysis (Jan-Feb 2020)

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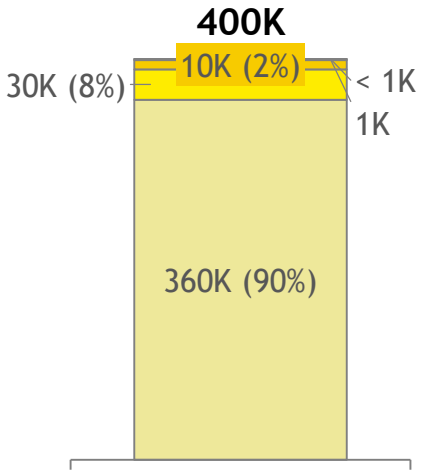
Village level

Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Aiming for access in each village would require 55K more agents, for total of 430K

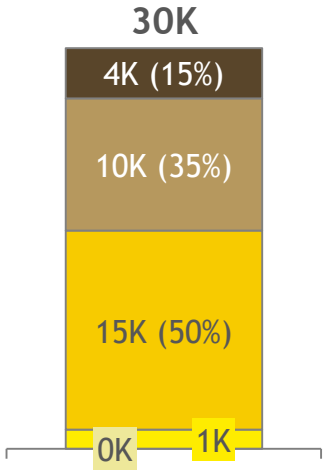
This translates into 715K total new agents after accounting for expected dormancy

400K new agents to provide geographic access within each village lacking access



400K new agents to provide access with 1 agent per village in all villages lacking access, of which **90%** of new agents needed in villages with < 2,000 population

30K new agents to add service capacity and serve the 'underserved' population



30K new agents needed to increase capacity to meet demand, of which **95%+** are needed in villages with >4,000 population

Assuming that new BCs/ agents in India will likely experience dormancy rates of ~30% in urban areas and 40% in rural areas, closer to **~715K** new agents will be needed in reality to provide universal CICO access

Village size (pop.): < 2k | 2k-4k | 4k-10k | 10k-25k | > 25k

Sources: 2017 Landscan population, NASA Sedac village data (2001), Providers/ expert; BCG Gamma analysis (Jan-Feb 2020)

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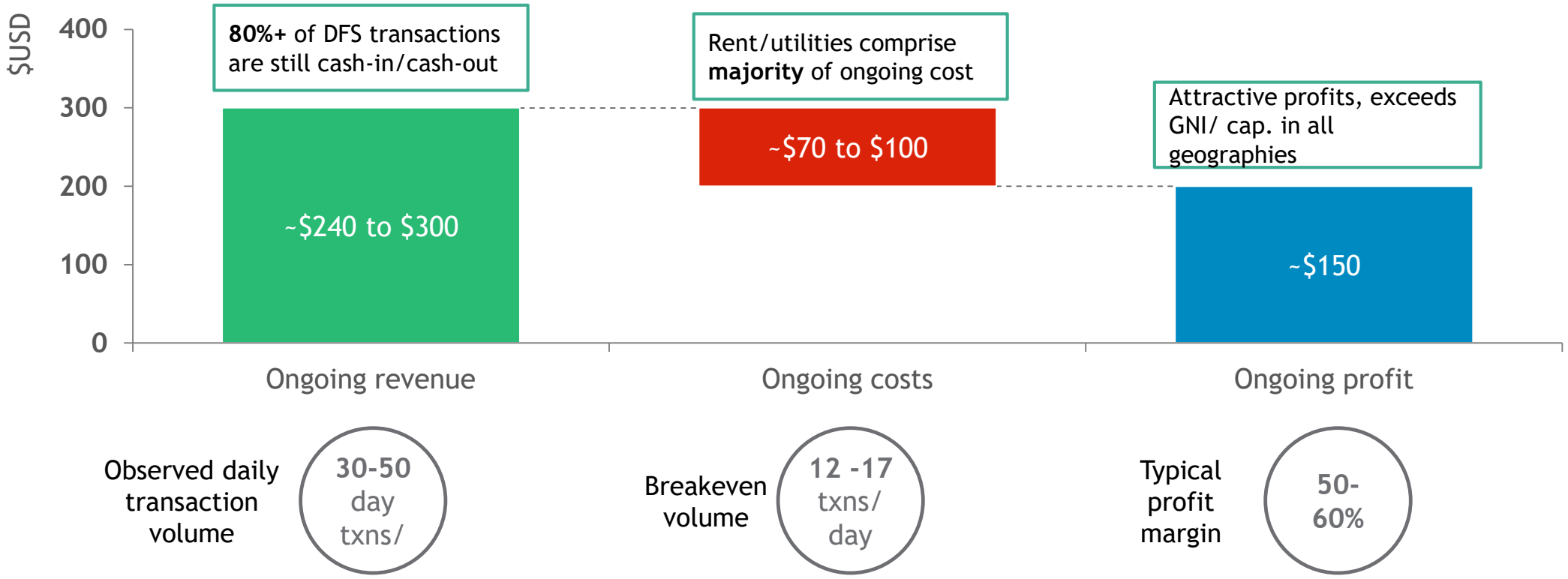
Looking at viability, research shows that CICO/ DFS economics can be attractive

An agent who conducts ~30-50 transactions per day can earn upwards of $150 per month in profit

Agent monthly economics

(Averages from 2018 research across: Bangladesh, India, Kenya, Tanzania)



Note: values reflect range across full agent sample (dedicated and non-dedicated). Observed daily transaction volume and associated revenues reflect 1st and 3rd quartile ranges. Range of costs reflects average of dedicated and non-dedicated agents. Breakeven volumes are calculated and assume average agent commission of $0.20 per transaction.
Source: BCG DFS Agent Interview Study, 2018

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However, significant variations exist across areas: While agents in urban to 'rural' oases can be profitable, 'rural frontier' agents typically struggle to breakeven

Both economic and operational challenges to viability are typically greater in rural – esp. frontier – areas

Economic

Demand constraints: Significantly lower txn volumes (lower pop density, limited DFS use cases, lower usage) will limit top line for agents & providers

Startup costs: High upfront capital requirements may limit supply of potential agents; high cost for agent recruitment & onboarding creates disincentives for providers

Liquidity management: Increased cost and complexity of liquidity management a significant risk to individual agent viability and network stability

Operational

Distance to bank branches, roads, and cells towers: Distances to key infrastructures may increase costs and complexity of rebalancing; pose some physical security threats; and limit agents' ability to successfully complete txns

Key metrics reveal that rural frontier agents typically expected to be unviable

Global averages for non-dedicated agents

	Urban + Peri-urban	Rural "Oasis"	Rural "Frontier"
Expected txns/ day	30-50	~30	5-10
Revenue/ month (USD)	150-250	75-80	13-25
Agent capex (excl. capitalization) (USD)	~600	~450	~300
Agent opex/ month (USD)	~80	~50	~30
Time to recover capex (after ramp up period)	~4 months	~4 months	> 3.5 years

Source: 2018 BCG Agent field research across 4 markets; ANA Helix India report, 2017; 2017 Global MasterCard Report; BCG analysis

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Beyond break-even, agents desire higher level of transactions to make DFS business "worth" their time and investment raising the requirement for viability

In India, while **5-10 txns/ day** could be achieved for agents **to break-even** (although already hard rural frontiers esp. in villages < 2,000 population),

This would be unlikely to meet **agents' desire for 20-25 daily transactions** (or 2K-2.5K INR monthly profit) to make the "business worthwhile" and maintain activity

Assumption: 2.5-3 INR profit/ txn based on providers input and ANA Helix (2017)

DFS business seems **not "worthwhile"** to agents who get below 10-20 daily transactions

Country	Avg. daily txns "unsatisfied" agents	Avg. daily transactions all agents
Bangladesh	7.5	52
India	**18**	**34**
Kenya	19	65
Tanzania	16	39

For non-dedicated agents in sample:

- **Avg. 47% of income comes from DFS business**

Agents with low transaction volumes likely to discontinue operations, due to low earnings

> *"If DFS was the only business I would be anxious but my retail shops keeps my hope"*
> *Agent at ~10 daily txn*

> *"Planning to discontinue DFS business at the end of the year; Low ROI compared to my Boutique business"*
> *Agent at ~13 daily txn*

> *"Thinking of shutting down the business if there is not a significant change is earning"*
> *Agent at ~9 daily txn*

Source: 2018 BCG Agent field research across 4 markets; ANA Helix India report, 2017; 2017 Global MasterCard Report; India Provider interviews (Jan 2020); BCG analysis

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In geo-analysis, defined and modelled 4 components of 'viability' based on agent field research and local providers' inputs

	Dimension	Viability requirement	Comment
Economic	**Population in catchment area** • Size of population within access target (1km urban/ 2.5km rural) compared to min. population needed for viability[1]	**Urban: 1,100 ppl/ agent** **Rural: 1,500 ppl/ agent** *Based on desired # of txns/ day*	• Target populations to generate 25 daily txns per agent (min. 'desired' levels) • Will translate into ~5K INR monthly profit in urban and ~2.5K monthly profit in rural areas
Opera-tional	**Access to roads** • Distance to any type of road plays a role in the size of the agent's customer base and their distance to banks	**Within 5kms of agent**	• Direct road access is a proxy for higher customer base and reduced distance/ easier access to banks and rebalancing points
	Access to bank branches • Distance to bank branches is a factor in agent ability to manage liquidity costs and operating business hours	**Within 20kms of agent**	• Estimated that 20kms to a bank branch is reasonable proximity for agents to rebalance (assuming travel by motorcycle or bike)
	Access to cell towers • Distance to cell towers is a determinant of agent mobile connectivity and successful digital transactions	**Within 30 kms of agent**	• >30km is threshold at which connectivity will falter in most countries, based on GSM technical limitations (Global System for Mobile Communication (GSM) report)

1. Economic viability evaluated based on minimum desired number of daily transactions (and resulting population per agent), determined from 2018 agent field research across countries; Provider interviews and global benchmarks. **Sources:** BCG Gamma analysis (Jan-Feb 2020)

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Access target

Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Of the total **375K** new agents estimated, **60%** (230K) will likely face challenges constraints that discourage them from starting/ continuing CICO activity

Expected new agent viability
(based on 'desired' level of txns)

Population	Within thresholds	Outside thresholds
> minimum viable population[1]	**~40% (145K)** new agents likely to be viable	**<1% (5K)** new agents likely to be operationally unviable
< minimum viable population[1]	**~45% (170K)** new agents likely to be economically unviable	**~15% (55K)** new agents likely to be operationally & economically unviable

Access to infrastructure

40% of new agents (145K) likely to be both economically and operationally viable

45% of new agents (170K) likely to be operationally viable but economically unviable and thus require incentives to compensate for insufficient population in catchment area to achieve desired level of txns and profitability[2]

15% of new agents (60K) likely to be operationally unviable and require operating model innovation, infrastructure investments & cost subsidies

- Agents located more than 20km from a bank branch, 30km from a cell tower, and/ or 5km from a road will be operationally challenged to sustain DFS/ CICO activity

1. Minimum viable (desired) population is 1,100 in urban areas and 1,500 in rural areas; 2. Economic viability evaluated based on minimum 'desired' number of daily transactions of 20-25 txns/ day (and resulting population per agent), determined from 2018 agent field research across countries; **Sources:** Landscan 2017; Esri Point of Interest; BCG CICO Economics Study (2018-2019); BCG Gamma analysis (Jan-Feb 2020)

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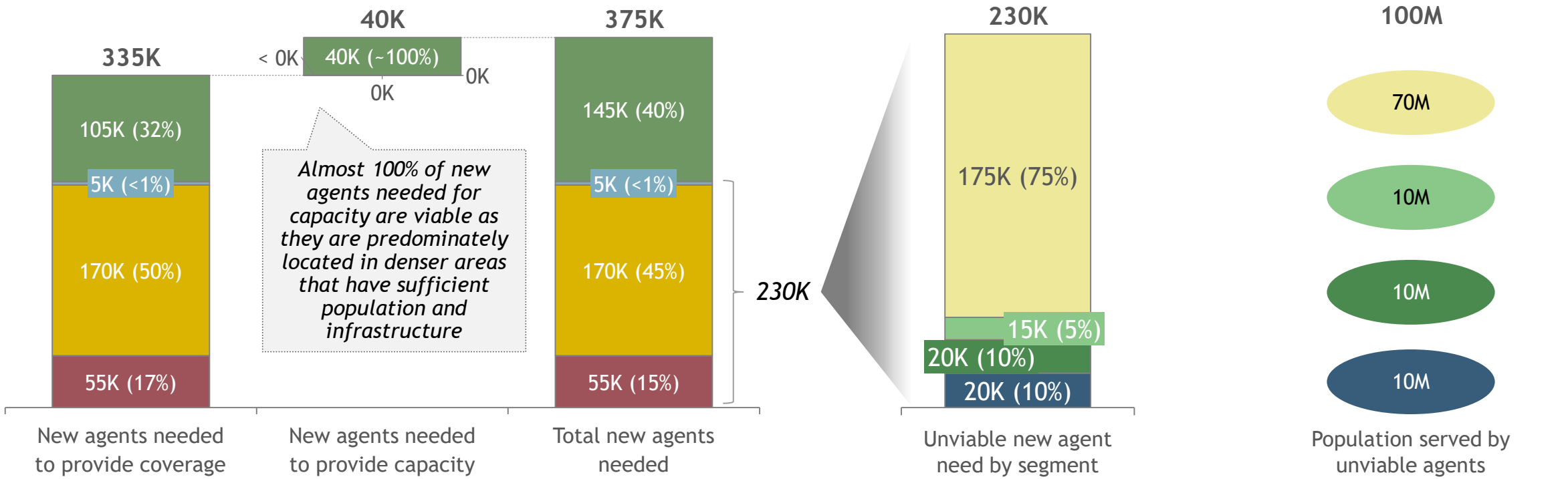
In absence of support/ intervention, unviability of **60%** of new agents would potentially leave **~100M** people without CICO access, with majority of gap in rural

Of 375K new agents needed, **~230K** (60%) likely to be unviable

With a majority located in rural areas

Potentially leaving **100M** people without coverage, in absence of support/ intervention



1. Economic viability evaluated based on minimum desired number of daily transactions (and resulting population per agent), determined from 2018 agent field research across countries

Sources: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study (2018-2019); BCG Gamma analysis (Jan-Feb 2020)

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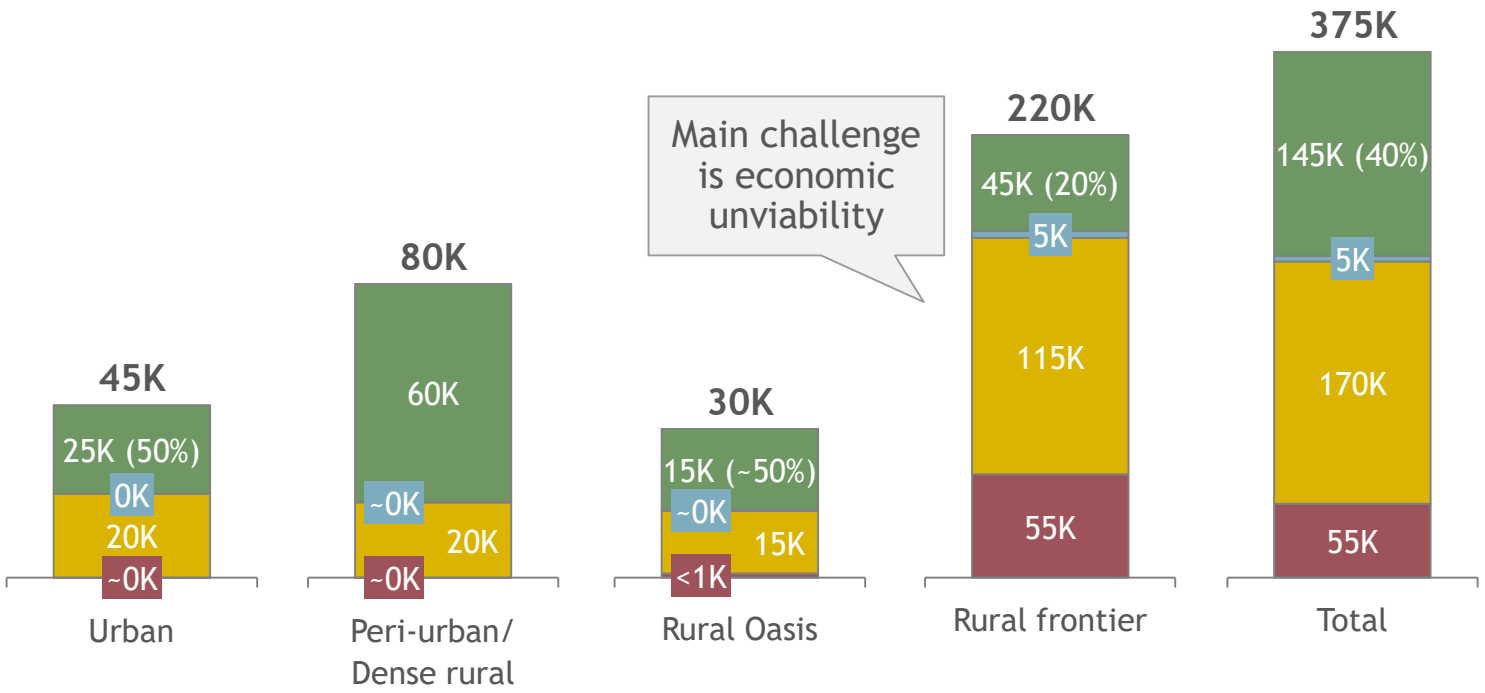
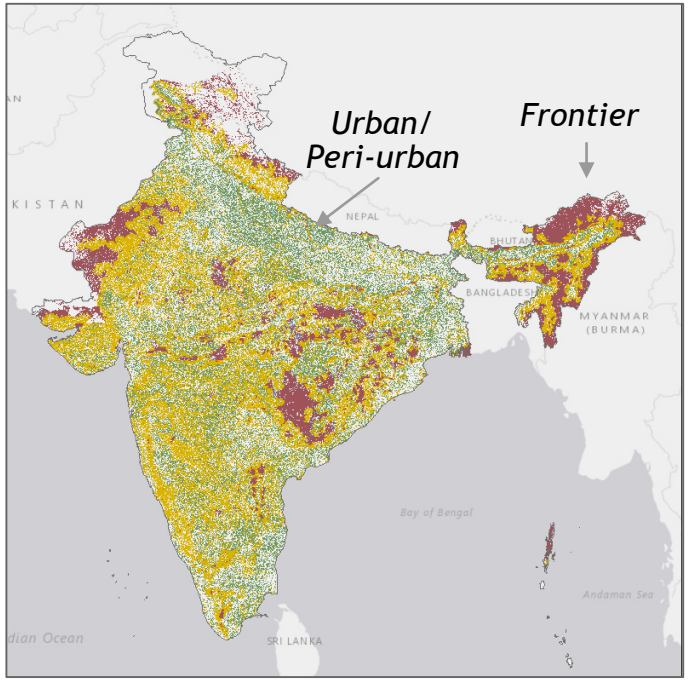
Backup | While most new agents are needed in the rural frontier, this is also where most agents **(3 out of 4)** would be unviable and require external support

Number of agents by per viability category[1]



Geographic distribution of agents by viability



1. Economic viability evaluated based on minimum desired number of daily transactions (and resulting population per agent), determined from 2018 agent field research across countries

Sources: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study (2018-2019); BCG Gamma analysis (Jan-Feb 2020)

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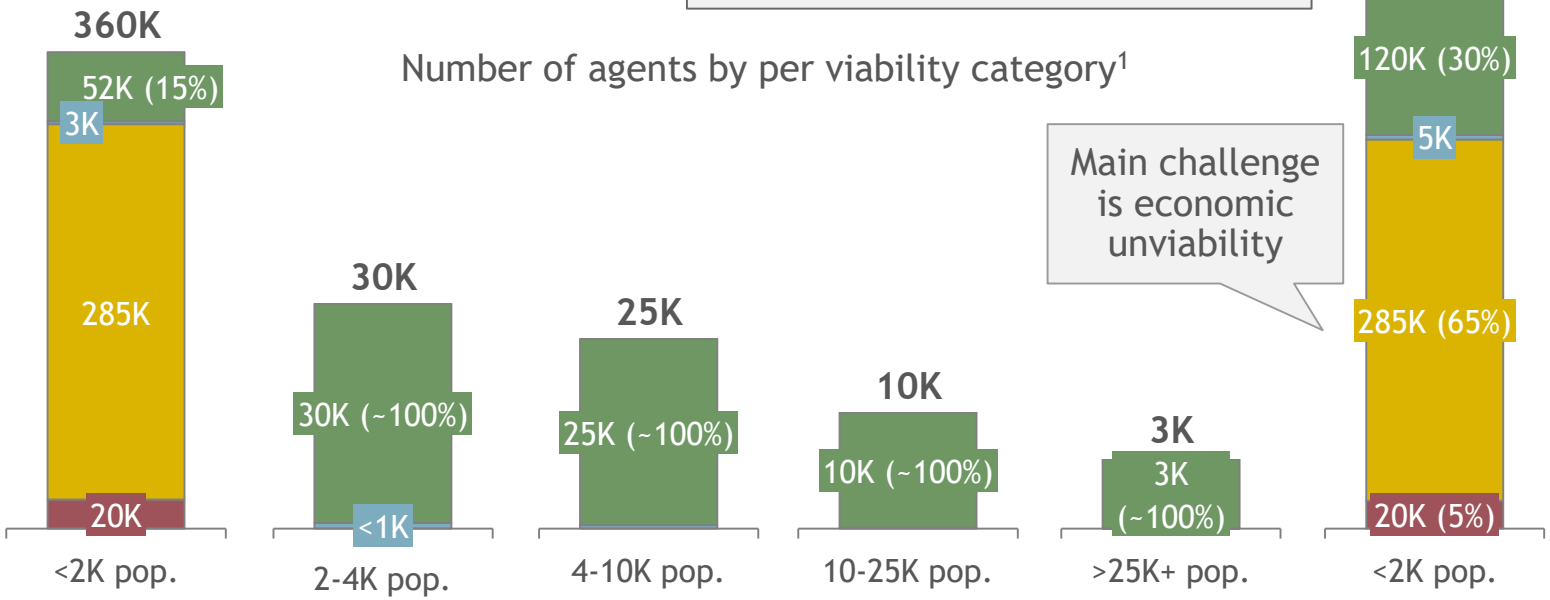
Backup | While most new agents are needed in villages with <2K population, this is also where almost all agents would be unviable and require external support

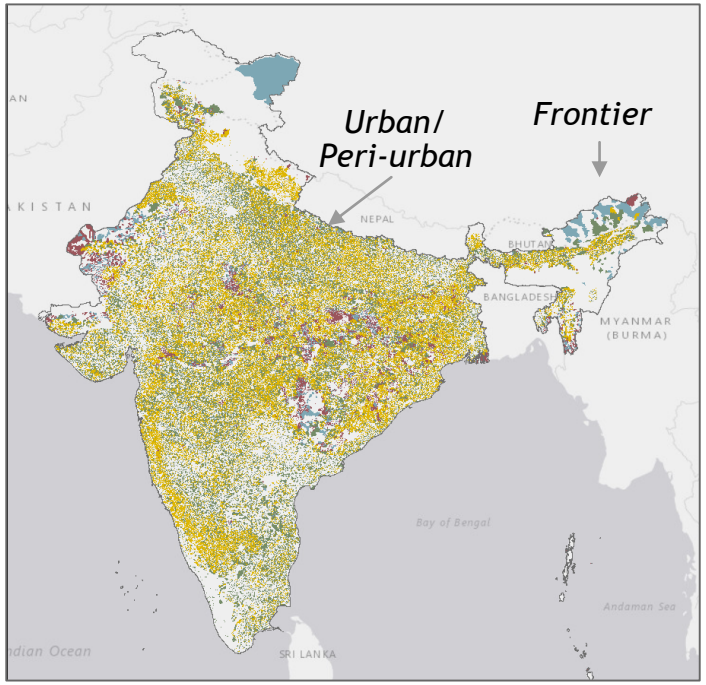
New agent need (greater in village vs. access target methodology) as villages could be closer together than 1km/2.5km access targets

Number of agents by per viability category[1]



Main challenge is economic unviability

Geographic distribution of agents by viability



Viability:
- Economically & operationally viable
- Economically unviable, operationally viable
- Economically viable, operationally unviable
- Economically & operationally unviable

1. Economic viability evaluated based on minimum desired number of daily transactions (and resulting population per agent), determined from 2018 agent field research across countries

Sources: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study (2018-2019); BCG Gamma analysis (Jan-Feb 2020)

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Backup | While economic unviability accounts for most (~95%) of unviability, lack of access to bank branches is main driver of operational unviability

Economic unviability accounts for most (~95%) of unviability

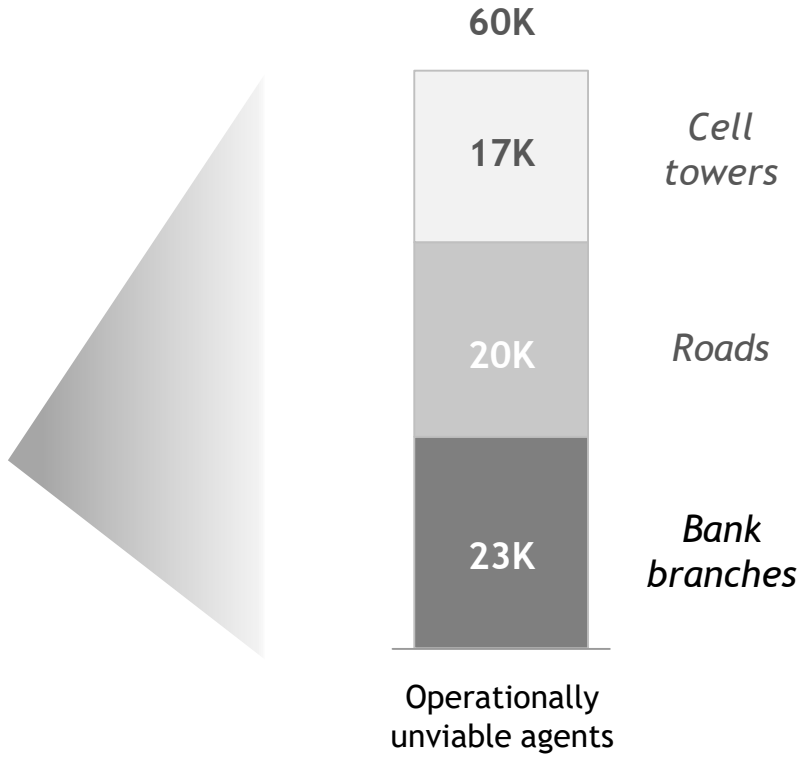
Amongst operational drivers, access to bank branches is main challenge

Drivers of unviability

225K new agents are economically unviable

55K new agents are economically & operationally unviable

5K new agents are operationally unviable only



Economic viability evaluated based on minimum desired number of daily transactions (and resulting population per agent), determined from 2018 agent field research across countries
Sources: BCG Gamma analysis (Jan-Feb 2020)

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Indonesia

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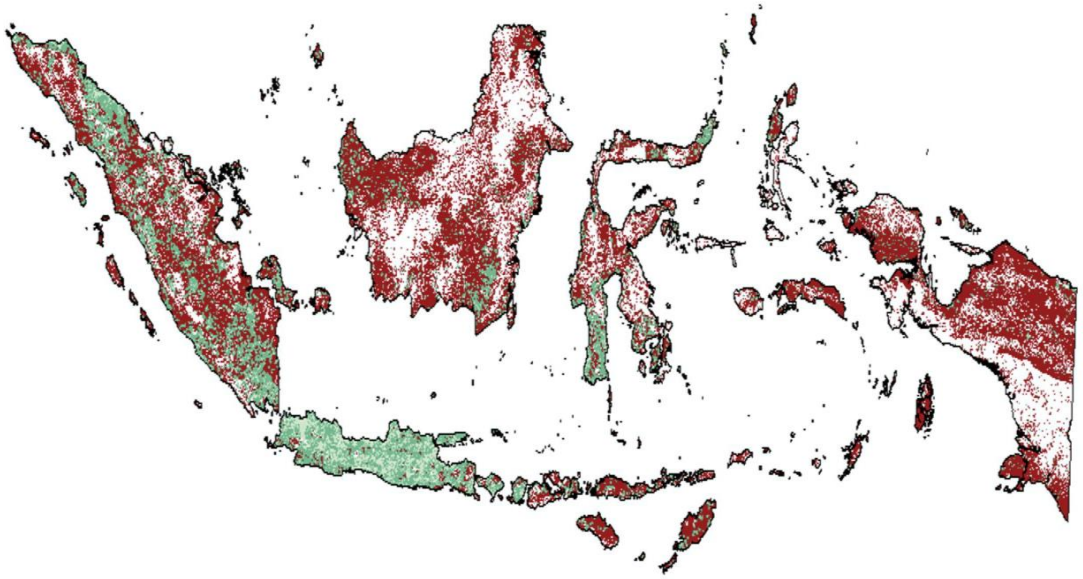
Indonesia at a glance

In Indonesia, ~34M people (or 13% of the population) lack CICO access, suggesting need of ~66K new agents spread across 1M km^2

Financial services access by segment



Distance from financial services:
- <1 km
- 1-5 km
- >5km

Agents placed in areas with populations >5km from FS access

	Pop lacking access (M)[1] …	… covering land mass of (km^2)	Agents needed to provide 5km access
Urban	~2	~600	0
Peri-urban/ dense rural	~7	~22,000	~2,000
Rural oasis	~5	~54,000	~3,700
Rural frontier	~20	~939,000	~60,600
Total	~34	~1,016,000	~66,300

Totals (rounded)

~34M people lacking access…

…covering ~1M Km^2…

…needing ~66K new agents

CICO coverage in Java relatively dense; lack of access especially acute in Kalimantan and East Indonesia & Papua

Indonesia requires ~66K additional CICO agents, of which the vast majority of new agents will be located in rural frontiers outside of Java (in Sumatra, Kalimantan, and numerous remote frontier islands)

1: Reported numbers for population lacking access are rounded to nearest 0.5M, and the total is calculated before rounding.

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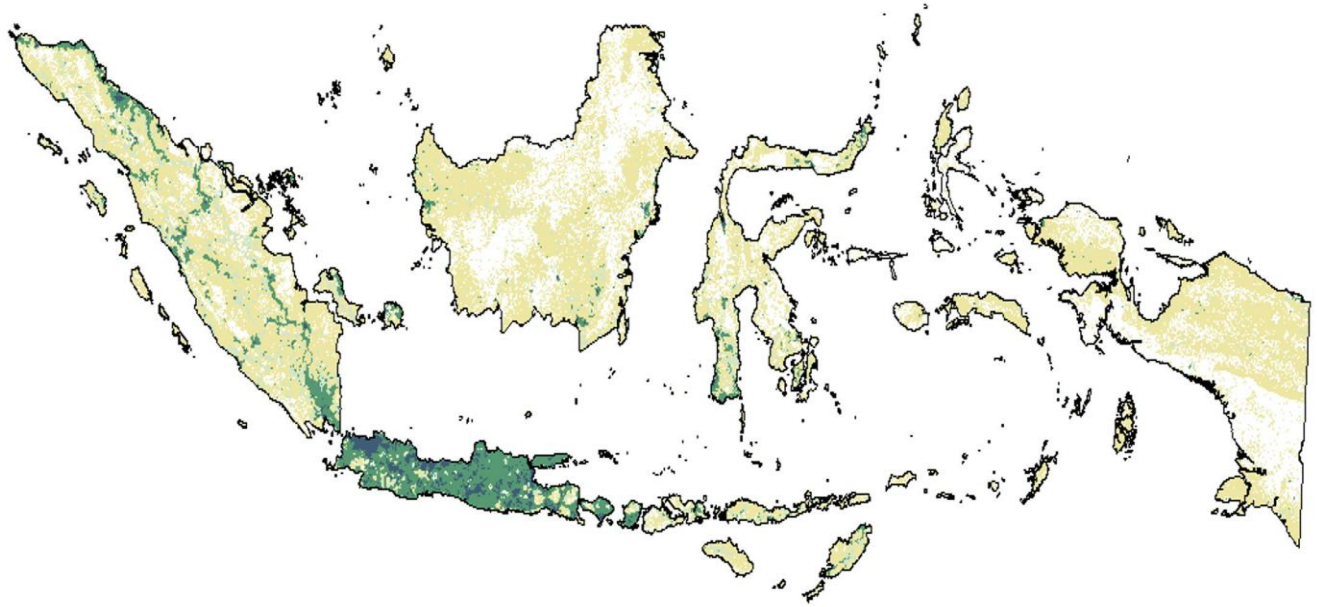
53% of Indonesia population lives in urban areas, 47% in rural areas

Of ~120M rural population: ~75M live in peri-urban/dense rural, ~15M in rural “oases”, ~30M in rural "frontiers"

Indonesia: Population distribution



Geography	Population (M)	Share (%)
Urban	137.9	53%
Peri-Urban/ Dense Rural	74.8	29%
Rural Oasis	15.5	6%
Rural Frontier	29.6	11%
Total	**257.7**	**100%**

Observations

- Urban/rural population estimates align with other published urbanicity statistics (e.g., World Bank)
- Population analysis is based on 2017 Landscan data; total population sizes may differ slightly from census reports

Note: Rural oases were identified by access to commercial activity derived from open source point of interest (POI) data; this POI data tends to lack completeness in more rural regions due to the nature of data collection
Source: Landscan 2017, OpenStreetMap roads

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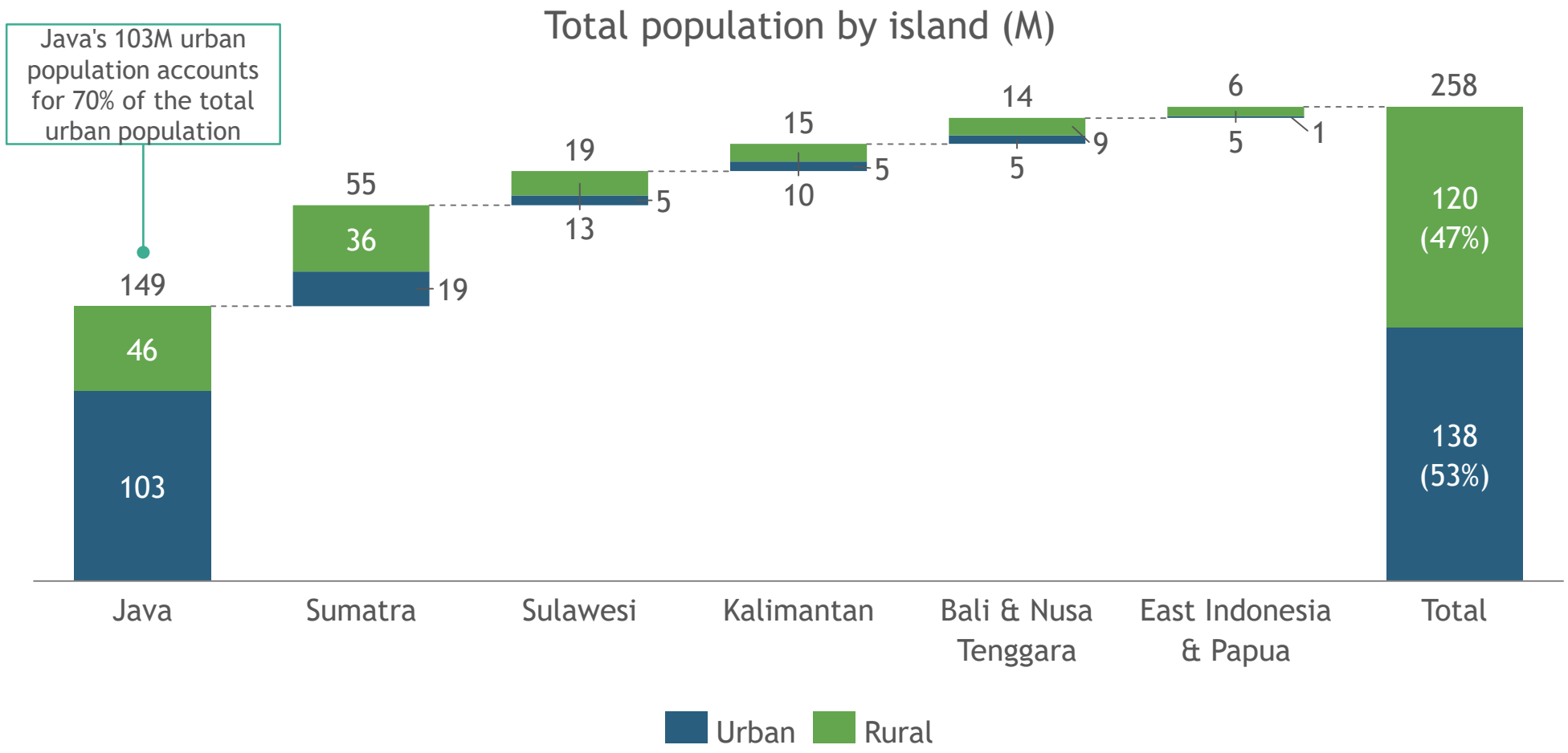
Detail by island: Majority of Indonesian population lives on Java and Sumatra, including a large share of the rural population



Source: Landscan 2017 population; Esri Point of Interest; OpenStreetMap roads; OpenCellID cell towers; Ministry of Energy and Mineral Resources (2017), "Country Report Electricity Sector in Indonesia"

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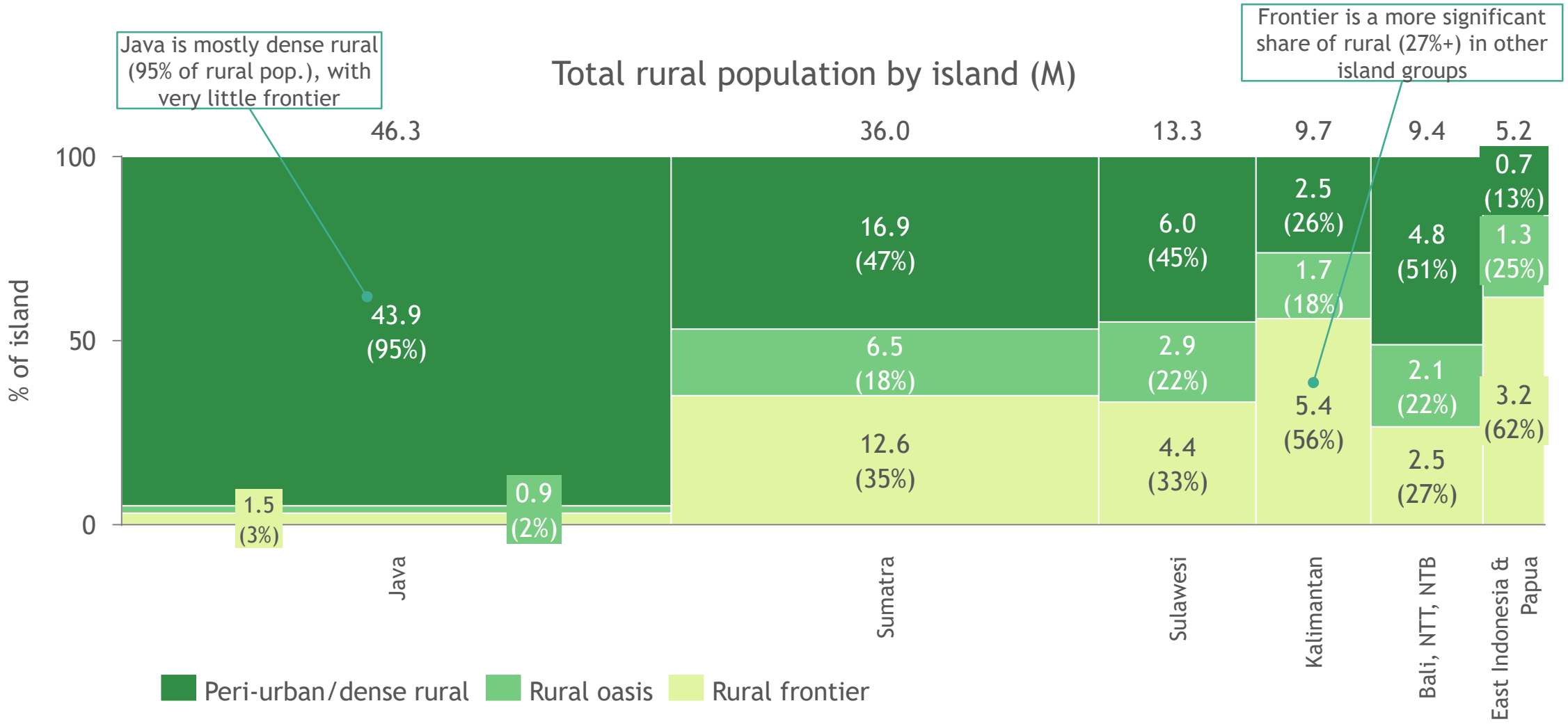
Detail by island: However, the segmentation of the rural population varies significantly by island



Source: Landscan 2017 population; Esri Point of Interest; OpenStreetMap roads; OpenCellID cell towers; Ministry of Energy and Mineral Resources (2017), "Country Report Electricity Sector in Indonesia"

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Characteristics of Indonesian geographic segments

Rural frontier is large and very sparsely populated, with significant gaps in critical infrastructure

		Urban	Peri-urban/ Dense rural	Rural oasis	Rural frontier	Total
Population	Total population (M)	138M	75M	16M	30M	258M
	Total area (km^2)[1]	39,000	198,000	124,400	1,156,300	1,517,800
	Average density (pop./km^2)	3,530	380	120	30	170
Connectivity	Ave distance to road (km)	0.7 km	1.7 km	2.6 km	16 km	12.6 km
	Median distance to road (km)	0.4 km	1 km	1.7 km	9.1 km	5.5 km
Commercial activity	Ave number of points of interest/location with POI	~1700	~240	~20	0[2]	~630
Access/distance from infrastructure[3]	>5km from national, regional, or major local road	0.1M (0%)	2.8M (4%)	1.5M (10%)	16M (54%)	20.4M (8%)
	>5km from bank branch	12.1M (9%)	37.9M (51%)	11.5M (74%)	29.6M (100%)	91.1M (35%)
	>5km from cell tower	0.2M (0%)	2.7M (4%)	2.7M (18%)	15.9M (54%)	21.5M (8%)
	>5km from major power line	See footnote for detail [4]				

1. Total estimate of land mass area excludes uninhabited areas; estimate likely slightly lower than published figures which include bodies of water, etc. 2. By definition, rural frontier locations lack access to a commercial point of interest (POI). 3 Summarized as total population and % of the geographic segment that is located >5km from each type of critical infrastructure; 4. Data not available on World Bank's Electricity Transmission Network.91% of households have electricity nationally, with electrification by province by ranging between 80-99%.Exceptions include Papua (48%), NTT (59%), Kalteng (73%), Sultra (75%) (Ministry of Energy and Mineral Resources).
Source: Landscan 2017 population; Esri Point of Interest; OpenStreetMap roads; OpenCellID cell towers; Ministry of Energy and Mineral Resources (2017), "Country Report Electricity Sector in Indonesia"

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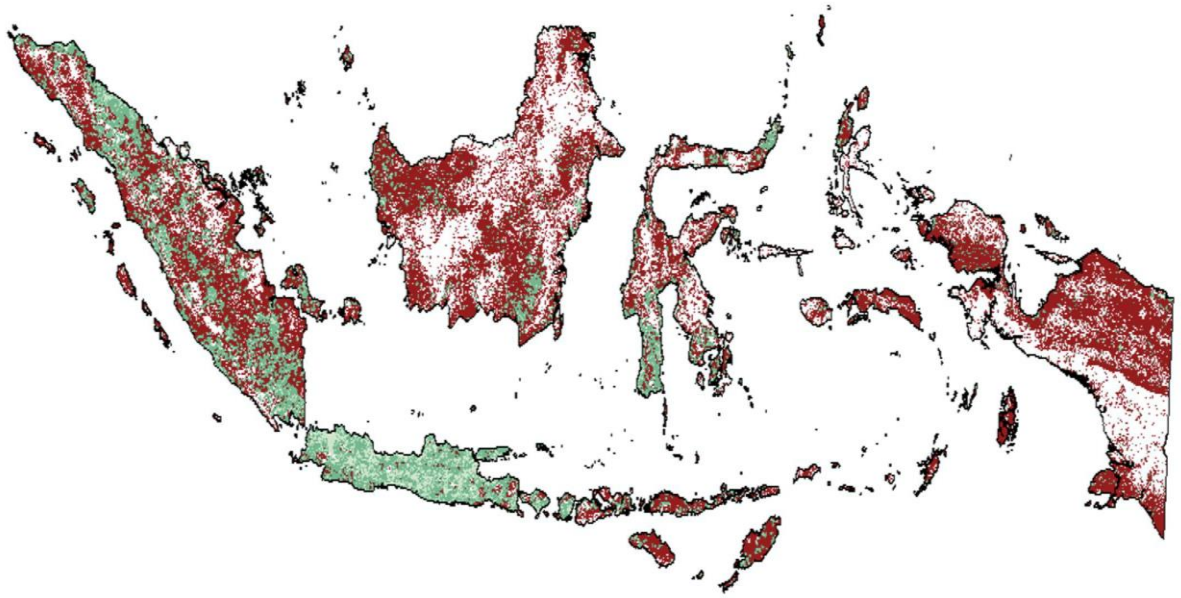
~34M people in Indonesia report lack of CICO services within 5km of their home; majority (~20M) live in rural frontier

Map of financial services access shows dense coverage in Java, relatively high coverage in Sumatra & Sulawesi



Distance from financial services:

- <1 km
- 1-5 km
- >5km — Population lacking CICO access

Frontier areas lack the most coverage while most people living in urban areas have coverage

Population at different distances from financial services
(Millions, % of segment)

	<1km	1-5km	>5km	Total
Urban	108.5 (79%)	27.6 (20%)	1.8 (1%)	137.9
Peri-Urban/ Dense Rural	23.6 (32%)	44.2 (59%)	6.9 (9%)	74.7
Rural Oasis	2.9 (19%)	7.1 (46%)	5.5 (35%)	15.5
Rural Frontier	0.8 (3%)	9.0 (31%)	19.7 (67%)	29.5
Total	**135.9**	**87.9**	**34.0**	**257.8**
% of population	**53%**	**34%**	**13%**	

9% of 2016 FII respondents reported having CICO >5km from home (and 6% did not know) vs. BCG's estimate of 13%, based on geospatial mapping of CICO points

Source: Landscan 2017; CICO layer – Esri bank and ATM POI and agent coverage based on webscraped locations of BNI, BTPN, Mandiri, BCA agents; BRI agents not included due to data availability; BCG Analysis; Intermedia FII survey wave 3 2016

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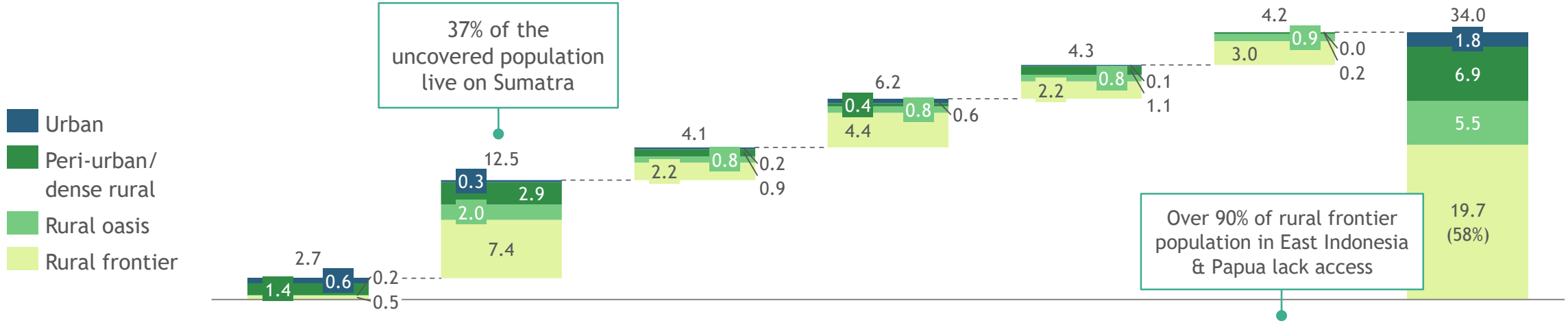
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Detail by island: Of the 34M lacking CICO access, >12M live on Sumatra; lack of access especially acute in East Indonesia and Papua

Total population lacking CICO access by island (M)



% of segment lacking CICO access	Java	Sumatra	Sulawesi	Kalimantan	Bali and Nusa Tenggara	East Indonesia and Papua	Total
Urban	1%	1%	4%	12%	3%	0%	1%
Peri-urban/ dense rural	3%	17%	15%	21%	23%	33%	9%
Rural oasis	16%	30%	28%	53%	39%	71%	35%
Rural frontier	32%	59%	51%	81%	85%	96%	67%
Total	**2%**	**23%**	**23%**	**46%**	**30%**	**69%**	**13%**

Source: Landscan 2017; CICO layer – Esri bank and ATM POI and agent coverage based on webscraped locations of BNI, BTPN, Mandiri, BCA agents; BRI agents not included due to data availability; BCG Analysis

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Geospatial allocation suggests ~66K new agents required for universal coverage

~60.6K new agents in rural frontier, ~3.7K new agents in rural oases and ~2K new agents in peri-urban/dense rural

Majority of new agents (~61k) are required in frontier

	5km	10km	20km
Urban[1]	NA	NA	NA
Peri-Urban/ Dense Rural[2]	~2,000	~2,000 (fixed at 5km scenario)	~2,000 (fixed at 5km scenario)
Rural Oasis[2]	~3,700	~3,700 (fixed at 5km scenario)	~3,700 (fixed at 5km scenario)
Rural Frontier	~60,600 (~90% of new agents)	~20,500 (~80% of new agents)	~6,200 (~50% of new agents)
Total	**~66,300**	**~26,200**	**~11,900**

Increase in agent coverage suggests 6% increase over current laku pandai presence

- ~66K new agents needed for all Indonesians to have CICO access within 5km
- Increase in agent coverage represents a ~4% increase over current bank-led (laku pandai) agents and a <3% increase across all DFS agents[3]
- Vast majority of new agents (91% in 5km scenario) will be located in rural frontiers
- Literature review suggests high variability in max distance travelled in rural Indonesia based on mode of transport and on vs. off-Java

1. Urban areas not included in scope of CICO expansion sizing given 99% of population has access to CICO within 5km today; 2. Peri-urban/dense rural and rural oasis agent location optimization fixed to deliver CICO access within 5km all underserved population; Definition of lack of CICO access reflects population located >5km from a bank branch, ATM, agent; 3. There are ~1.5M bank-led and non-bank-led agents (~1M branchless banking agents, ~200K LKD gents, and additional >3M e-commerce agents offering some DFS)
Source: CICO layer – Esri bank and ATM POI and agent coverage based on webscraped locations of BNI, BTPN, Mandiri, BCA agents; BRI agents not included due to data availability; BCG geospatial analysis

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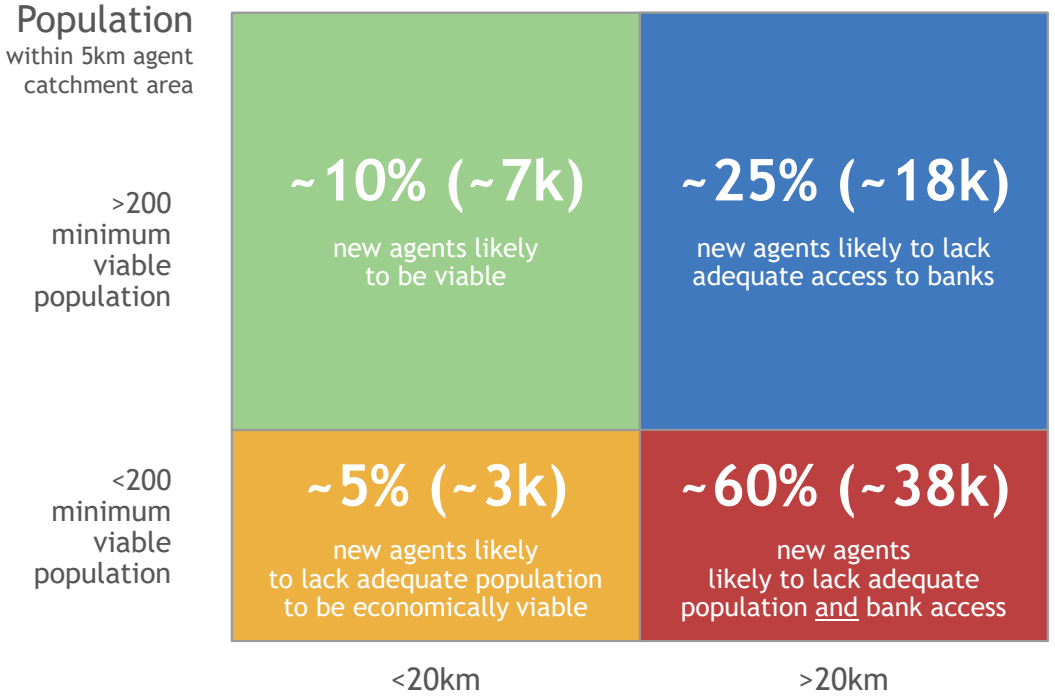
~90% of all new agents likely to face economic or operational viability challenges and require external support

Expected new agent viability (5km scenario)



Observations

Only ~10% of all new agents likely to be both economically and operationally viable

Economically unviable agents likely to require supply-side incentives (e.g., subsidy)

- Population in local catchment area is less than the minimum required for a non-dedicated DFS agent to achieve sufficient profitability[1]

Operationally unviable agents suggest need for infrastructure investments and/or operating model innovation

- Agent is located more than 20km from a bank, which significantly limits liquidity management capabilities
- Note: Distance from bank branch assigned as a 'binding constraint' for operational viability given typically 'worst' infrastructure statistic for frontier agents (as compared to mobile connectivity or access to roads)

1. Economic viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent as well as proportion of adult DFS users expected within an agent's 5km catchment area

Source: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study

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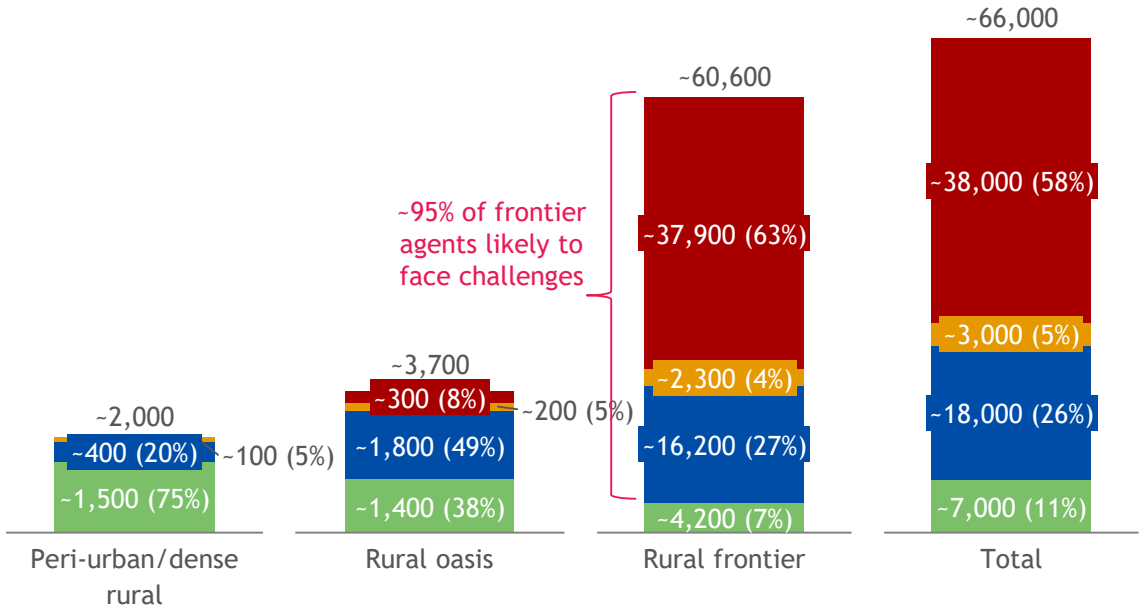
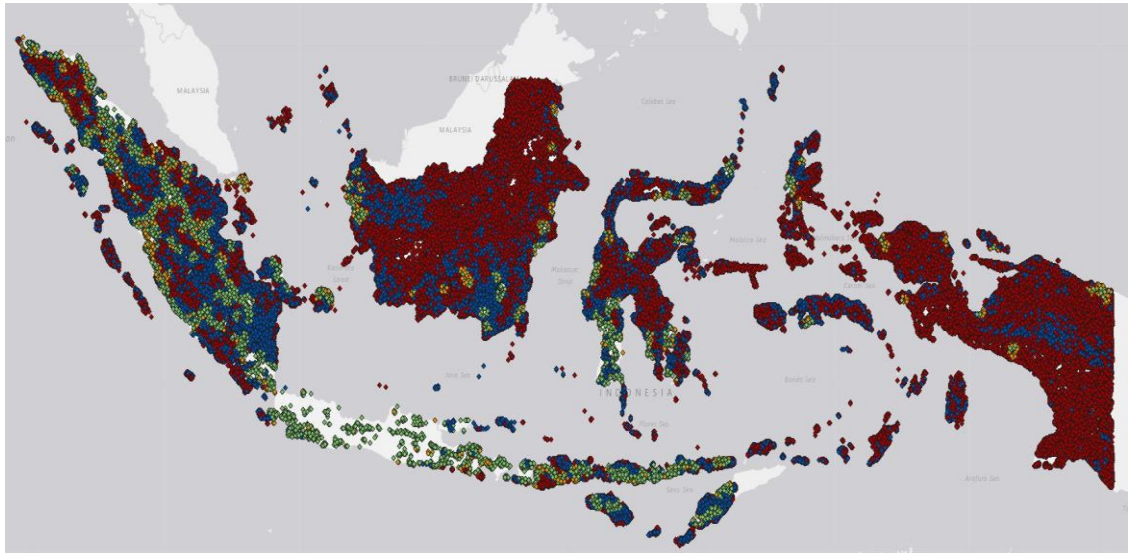
Detail: In the frontier, ~95% of new agents are likely to face economic and/or operational challenges under the 5km scenario

Number of agents by per viability category[1]



Geographic distribution of agents by viability[1]



Note: Likelihood of viability is based on analysis of local population (latent demand) and infrastructure availability

- Unviable, both Economically and Operationally
- Economically Unviable, Operationally Viable
- Operationally Unviable, Economically Viable
- Viable, both Economically and Operationally

1. Economic viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent as well as proportion of adult DFS users expected within an agent's 5km catchment area

Source: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study

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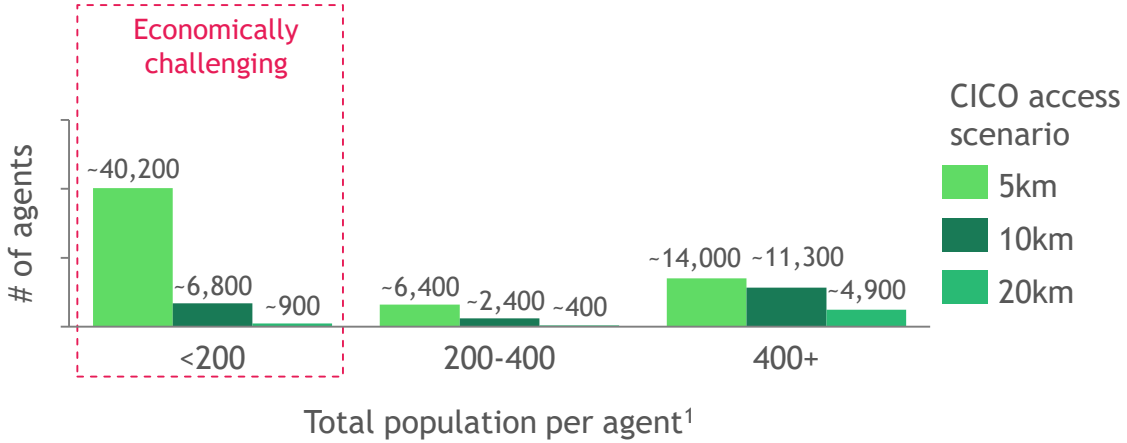
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Detail: ~40K new frontier agents likely to need support for economic viability

A higher number of new frontier agents (~54K) lack access to bank branches, likely require liquidity management support

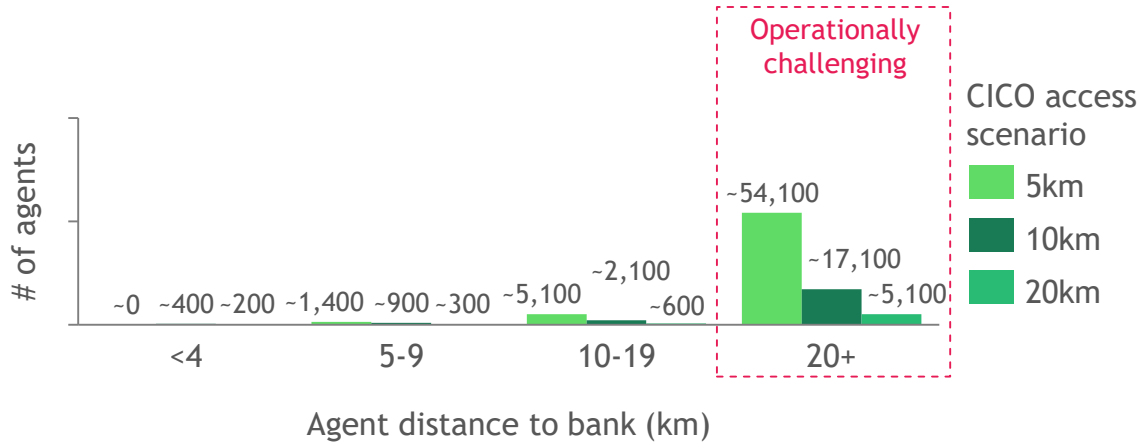
Distribution of rural frontier agents by local population within Xkm



Total population per agent[1]

- Agent viability threshold estimated as minimum of ~200 population per agent
  - Low population threshold due to low overhead costs associated with DFS business, as DFS augments pre-existing businesses
- Under 5km scenario, ~40K agents (~66%) in the rural frontier are likely to be economically unviable

Distribution of rural frontier agents by distance to nearest bank



Agent distance to bank (km)

- Large number of new agents likely to lack access to critical enabling infrastructure
- Under the 5km scenario, ~54K agents (~90%) in the rural frontier are >20km from nearest bank and would benefit from liquidity management support (note: ~45% are located >20km from nearest cell tower)

1. Defined as local population within agent catchment area

Note: viability evaluated based on extrapolated economics for a non-dedicated DFS agent in Uganda. Median agent which makes 4 daily transactions (Helix) would make ~$11 monthly profit (BCG Indonesia CICO study). Minimum viable population size per agent calculated reflects size of addressable market: ~68% of population are adults (CIA World Factbook), of which ~35% actively use financial services (est. based on Findex/Finclusion) at 2.5 transactions per month.

Source: Landscan 2017; Esri Point of Interest; OpenStreetMap roads, cell towers, banks; Helix (2018), "Agent Network Accelerator Research: Indonesia Country Report 2017".

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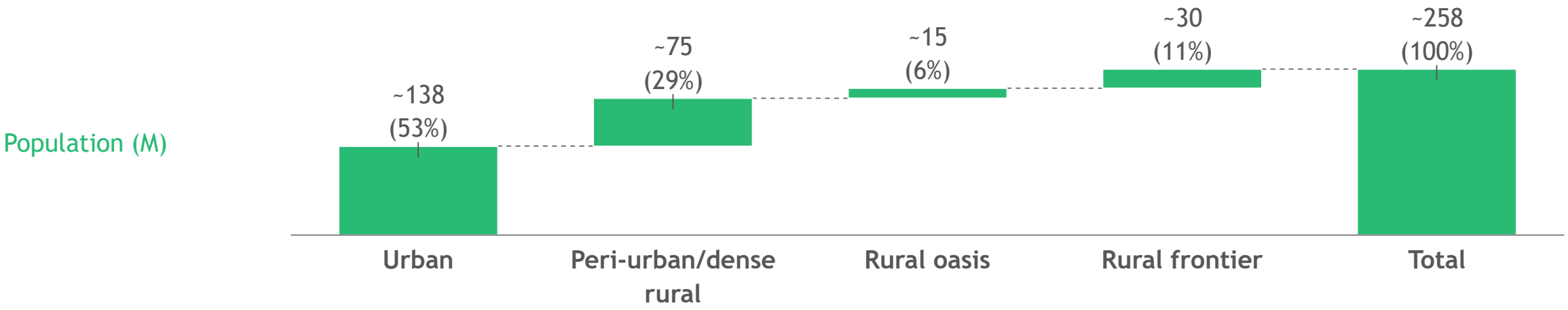
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Recap: Indonesia population distribution, CICO coverage, & new agent viability



5km scenario[2]

	Urban	Peri-urban/dense rural	Rural oasis	Rural frontier	Total
% without CICO coverage[1]	1%	9%	35%	67%	13%
Population without CICO coverage (M)[1]	~2 M	~7 M	~5 M	~20 M	~34 M
# new agents required[2]	N/A	~2,000	~3,700	~60,600	~66,300
# of new agents economically unviable[3]	N/A	~100	~500	~40,200	~40,800
% of new agents economically unviable[3]	N/A	~5%	~15%	~65%	~60%

1. Defined as population located >5km from CICO (bank branch, ATM, agent); 2. Agent placement modelled for populations to have access within 5km, 10km, or 20km. 5km displayed as conservative estimate across countries; 3. BCG analysis based on estimated minimum viable population per agent.
Source: Landscan 2017; CICO layer – Esri bank and ATM POI data and webscraped locations of BNI, BTPN, Mandiri, BCA agents. BRI agents not included due to data availability; BCG Analysis

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Pakistan

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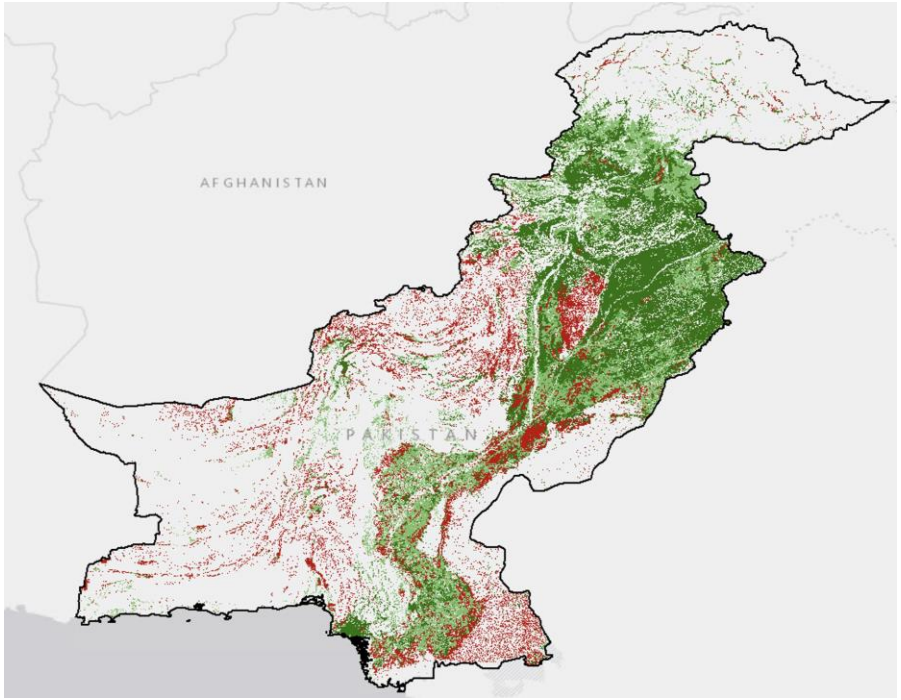
Pakistan at a glance

In Pakistan, ~20M people (or 10% of the population) lack CICO access, suggesting need of ~14K new agents spread across ~103K km^2

Financial services access by segment



Distance from financial services:

<1 km | 1-5 km | >5km

Agents placed in areas with populations >5km from FS access

	Pop lacking access (M)[1] …	… covering land mass of (km^2)	Agents needed to provide 5km access
Urban	~1.5	~600	~100
Peri-urban/ dense rural	~8	~17,300	~1,800
Rural oasis	~5	~18,600	~2,100
Rural frontier	~5.5	~66,400	~9,700
Total	~20	~102,900	~13,700

Totals (rounded)

~20M people lacking access…

…covering ~103K km^2…

…needing ~14K new agents

Pakistan's new agent need (~14K) is small vs. size of total underserved population (~20M) due to the geographic concentration of need of the dense rural population

New agent placements primarily in rural areas, specifically in the rural frontier (~70% of new agents), to cover geographic spread of populations lacking access

1: Reported numbers for population lacking access are rounded to nearest 0.5M, and the total is calculated before rounding.

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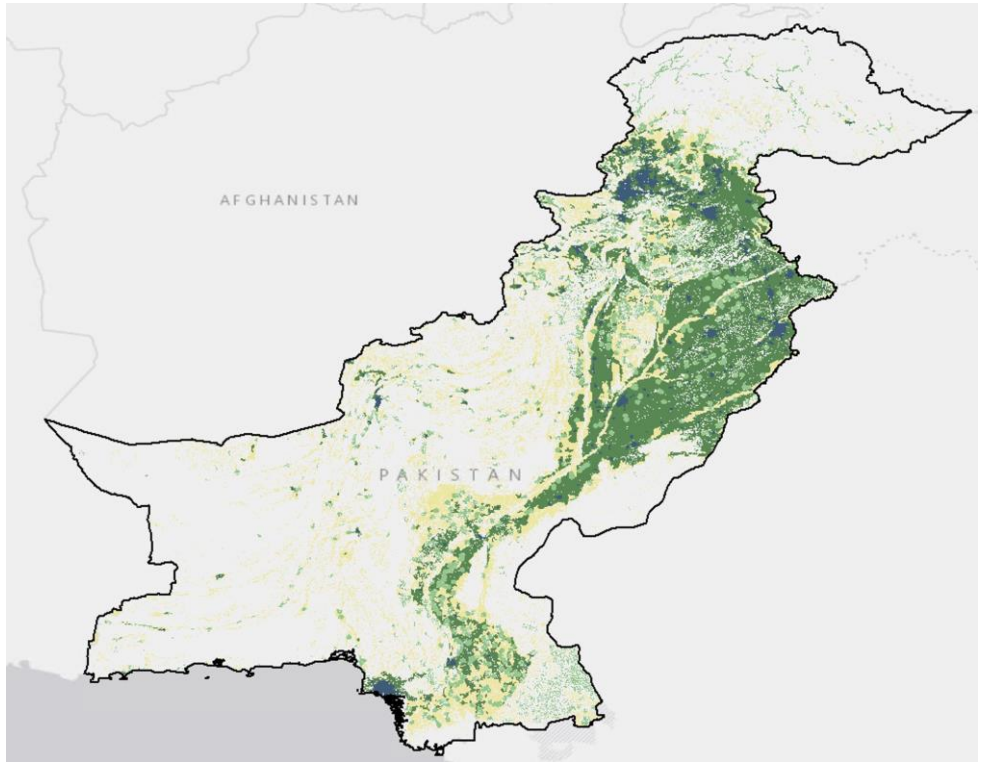
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

38% of Pakistan's population lives in urban areas, 62% in rural

Of 127M rural population: 86M live in peri-urban/dense rural, 23M in rural “oases”, 18M in rural "frontiers"

Pakistan: Population distribution



Geography	Population (M)	Share (%)
Urban	78.0	38%
Peri-Urban/ Dense Rural	85.6	42%
Rural Oasis	23.1	11%
Rural Frontier	18.2	9%
Total	204.8	100%

Observations

- Urban/rural population estimates align with other published urbanicity statistics (e.g., World Bank)
- Population analysis is based on 2017 Landscan data; total population sizes may differ slightly from census reports

Note: Rural oases were identified based on population density, size, and commercial activity derived from open source point of interest (POI) data; this POI data tends to lack completeness in more rural regions due to the nature of data collection
Source: Landscan 2017, OpenStreetMap roads

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Detail: Characteristics of Pakistan geographic segments

Geographies vary significantly based on population statistics, connectivity via roads, commercial activity, and access to infrastructure

		Urban	Peri-urban/ Dense rural	Rural oasis	Rural frontier	Total
Population	Total population (M)	78.0M	85.6M	23.1M	18.2M	204.8M
	Total area (km^2)[1]	16,700	174,200	71,200	154,100	416,200
	Average density (pop./km^2)	4,670	490	320	120	490
Connectivity	Ave distance to road (km)	0.6 km	1.6 km	2.4 km	7.8 km	4 km
	Median distance to road (km)	0.4 km	1.2 km	1.5 km	5.4 km	1.9 km
Commercial activity	Ave number of points of interest/location with POI	153	24	5	0[2]	31
Access/distance from infrastructure[3]	>5km from national, regional, or major local road	<0.1M (<0.1%)	2.3M (3%)	1.6M (7%)	10.4M (57%)	14.3M (7%)
	>5km from bank branch	1.7M (2%)	17.2M (20%)	5.1M (22%)	6.9M (38%)	30.8M (15%)
	>5km from cell tower	0.6M (1%)	15.9M (19%)	7.9M (34%)	12.1M (67%)	36.5M (18%)
	>5km from major power line	20.9M (27%)	81M (95%)	21.2M (92%)	18.2M (100%)	141.3M (69%)

1. Total estimate of land mass area excludes uninhabited areas; estimate likely slightly lower than published figures which include bodies of water, etc. 2. By definition, rural frontier locations lack access to a point of interest (POI). 3 Summarized as total population and % of the geographic segment that is located >5km from each type of critical infrastructure
Source: Landscan 2017 population; OSM Point of Interest; OpenStreetMap roads; OpenCellID cell towers; Energy Transmission Network powergrid

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Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

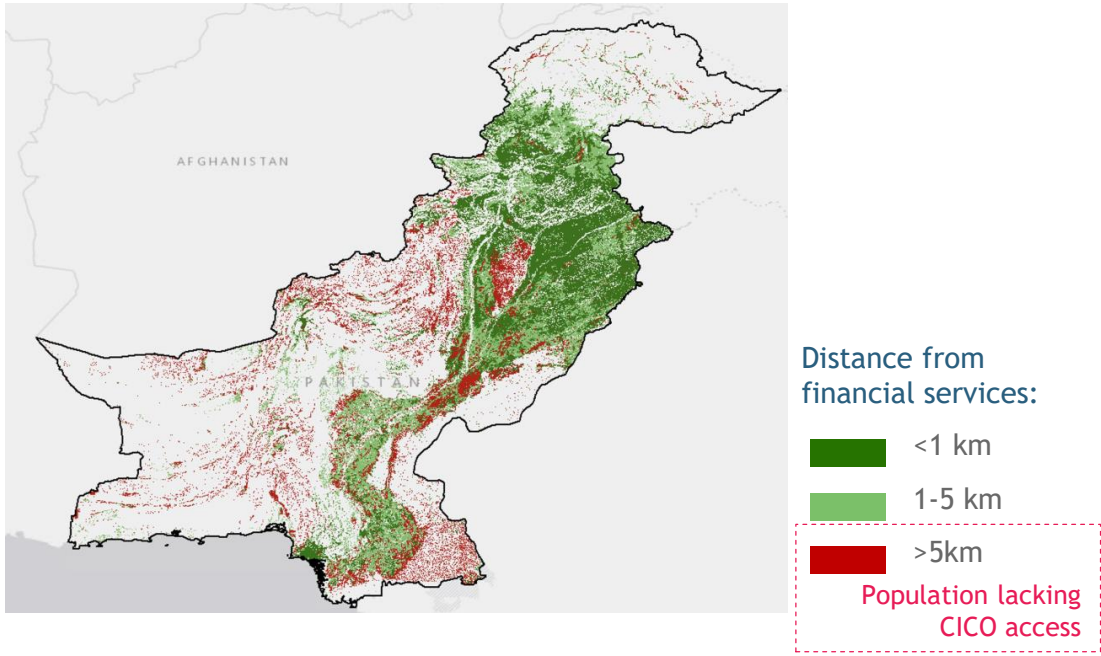
~20M people in Pakistan report lack of financial services within 5km of their home; majority (~8M) live in peri-urban/dense rural

Population distance from financial services (in Millions and % of segment)

	<1km	1-5km	>5km	Total
Urban	7.5 (10%)	69 (89%)	1.5 (2%)	78.0
Peri-Urban/ Dense Rural	26.8 (31%)	50.6 (59%)	8.2 (10%)	85.6
Rural Oasis	7.1 (31%)	11.2 (48%)	4.8 (21%)	23.1
Rural Frontier	7.5 (41%)	5 (28%)	5.7 (31%)	18.2
Total	48.9	135.8	20.1	204.8
% of population	24%	66%	10%	100%

7% of FII respondents reported having CICO >5km from home vs. BCG's estimate of 10%, based on geospatial modelling of FII responses. Slight differences could be due to data cleaning (8% FII respondents did not know distance to CICO) and geospatial spread of respondents

Pakistan: Financial services access by segment



Observations

- 10% of total population (20.1M) reports lack of access to CICO (>5km from bank, ATM or agent)

Note: CICO access data derived from Financial Inclusion Insights survey, 2017, based on probabilities assigned to each distance band of <1km, 1-5km, and >5km.
Source: Fraym 2017 financial access data layer; FII Pakistan 2017 Annual Survey

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Geospatial location allocation suggests up to ~13,700 new agents required

~9,700 new agents in rural frontier, ~2,100 new agents in rural oases and ~1,800 new agents in peri-urban/dense rural

Estimated new agents required by scenario

	5km	10km	20km
Urban[1]	~100	~100 (fixed at 5km scenario)	~100 (fixed at 5km scenario)
Peri-Urban/ Dense Rural[2]	~1,800	~1,800 (fixed at 5km scenario)	~1,800 (fixed at 5km scenario)
Rural Oasis[2]	~2,100	~2,100 (fixed at 5km scenario)	~2,100 (fixed at 5km scenario)
Rural Frontier	~9,700 (~70% of new agents)	~3,800 (~50% of new agents)	~1,400 (~25% of new agents)
Total	**~13,700**	**~7,800**	**~5,400**

Observations

- ~13,700 new agents are needed to provide CICO access within 5km to all populations, representing an 8% increase in total agent population[3]
- New agent need is concentrated in rural areas, specifically in the rural frontier (~70% of new agents)
- Total agent need is small vs. size of total underserved populations (~20M) due to geographic concentration of CICO gap, especially in the dense rural areas
- While the geographic area of the rural frontier is vast, ~50% of the land mass is uninhabited; and areas in rural frontier that are inhabited are more densely populated compared to other countries

1. Urban areas included in scope of CICO expansion sizing given <99% of population has access to CICO within 5km today; 2. Peri-urban/dense rural and rural oasis agent location optimization fixed to deliver CICO access within 5km all underserved population; Definition of lack of CICO access reflects FII financial access survey response (population located >5km from a bank branch, ATM, agent); 3. IMF Financial Access Survey 2018 estimates ~177K active mobile money outlets in 2018.
Source: IMF Financial Access Survey; Fraym 2017 financial access data layer; BCG geospatial analysis

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Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

~92% of all new agents likely to face economic or operational viability challenges and require external support

Expected new agent viability (5km scenario)

Observations

Only ~8% of all new agents likely to be both economically and operationally viable

Economically unviable agents likely to require supply-side incentives (e.g., subsidy)

- Population in local catchment area is less than the minimum required for a non-dedicated DFS agent to achieve sufficient profitability[1]

Operationally unviable agents suggest need for infrastructure investments and/or operating model innovation

- Agent is located more than 20km from a bank, which significantly limits liquidity management capabilities
- Note: Distance from bank branch assigned as a 'binding constraint' for operational viability given typically 'worst' infrastructure statistic for frontier agents (as compared to mobile connectivity or access to roads)

1. Economic viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent as well as proportion of adult DFS users expected within an agent's 5km catchment area

Source: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study

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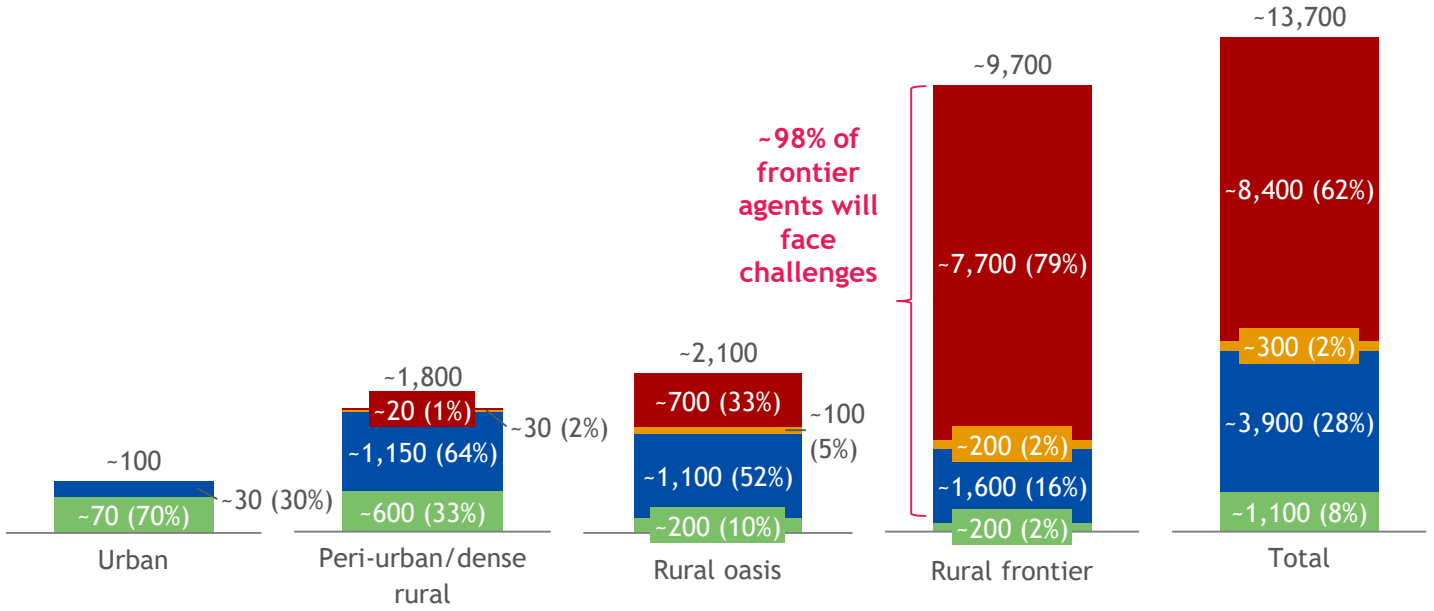
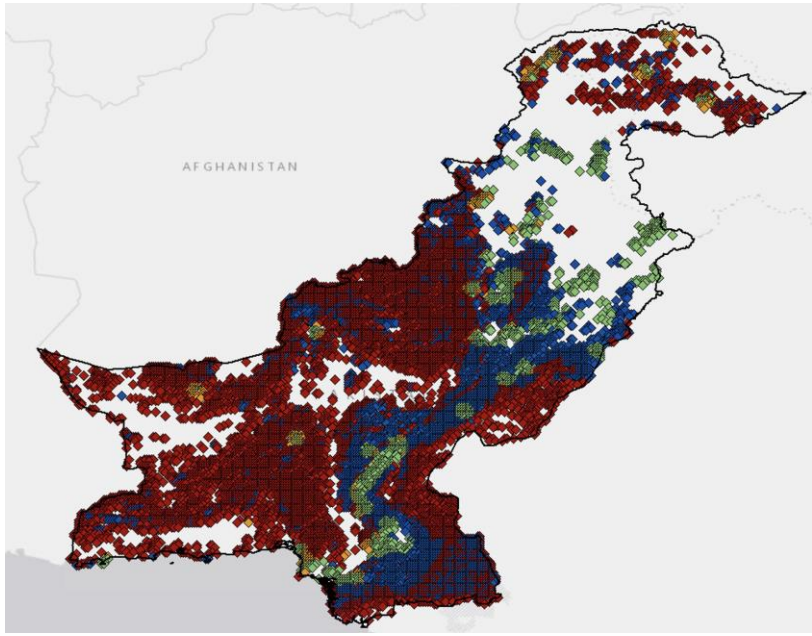
Detail: In the frontier, 98% of new agents are likely to face economic and/or operational challenges under the 5km agent allocation scenario

Number of agents by per viability category[1]



Geographic distribution of agents by viability[1]



Note: Likelihood of viability is based on analysis of local population (latent demand) and infrastructure availability

- Unviable, both Economically and Operationally
- Operationally Unviable, Economically Viable
- Economically Unviable, Operationally Viable
- Viable, both Economically and Operationally

1. Economic viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent as well as proportion of adult DFS users expected within an agent's 5km catchment area

Source: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study

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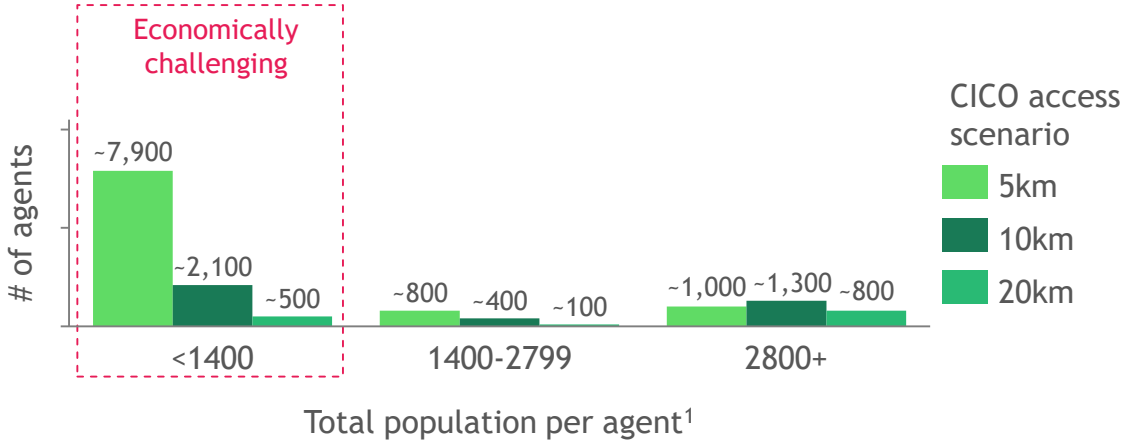
Detail: ~7,900 new frontier agents likely to need support for economic viability

A higher number of new frontier agents (~9,300) lack access to bank branches, likely require liquidity management support

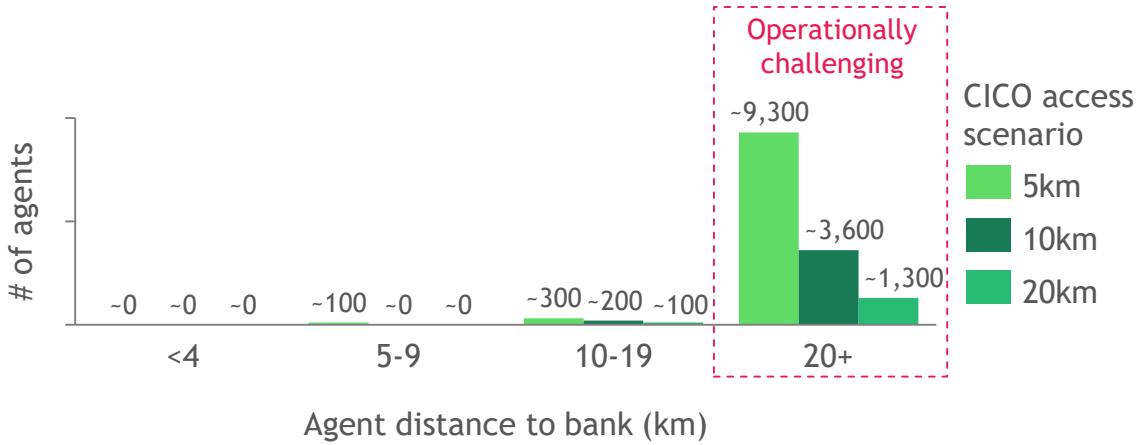
Distribution of rural frontier agents by local population within Xkm



Total population per agent[1]

- Pakistan agent viability threshold estimated as minimum of ~1400 population per agent[2]
- Under 5km scenario, ~7,900 agents (~80%) in the rural frontier are economically unviable
- Under the 10km scenario, ~2,100 agents (~55%) in the rural frontier are economically unviable

Distribution of rural frontier agents by distance to nearest bank



Agent distance to bank (km)

- Large number of new agents lack access to critical enabling infrastructure
- Under the 5km scenario, ~9,300 agents (~96%) in the rural frontier are >20km from nearest bank; ~55% are located >20km from nearest cell tower
- Under 10km scenario, ~3,600 frontier agents (~95%) lack access to bank branches and would benefit from liquidity management support

1. Defined as local population within agent catchment area. 2. Viability evaluated based on extrapolated economics for a non-dedicated DFS agent in Pakistan. Median agent makes $43 monthly profit from 15 daily transactions. Minimum viable population size per agent calculated reflects size of addressable market: ~65% of population are adults (CIA World Factbook), of which ~20% actively use financial services (est. based on Findex/Finclusion) at 2.5 transactions per month (fixed assumption).
Source: Landscan 2017; Esri Point of Interest; OpenStreetMap roads, cell towers, banks; Helix (2017), "Agent Network Accelerator Research: Pakistan Country Report 2017".

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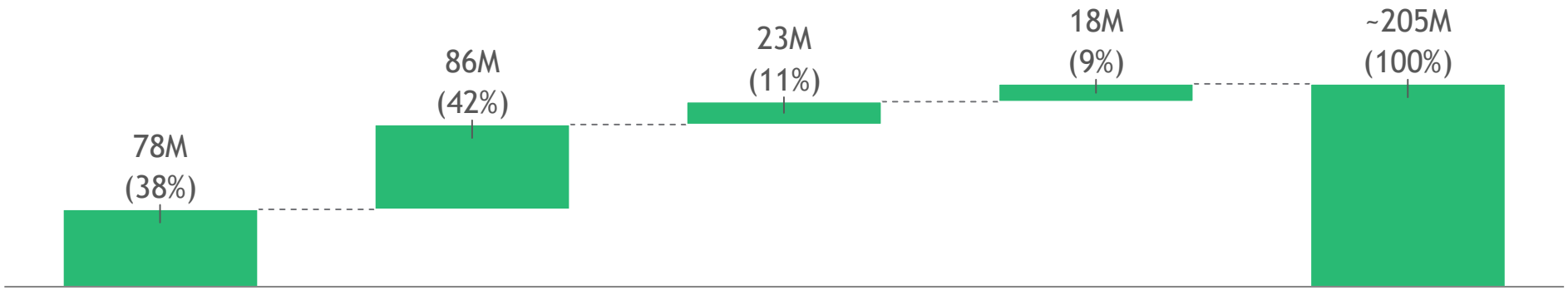
Recap: Pakistan population distribution, CICO coverage, and new agent viability



5km scenario[2]

	Urban	Peri-urban/dense rural	Rural oasis	Rural frontier	Total
% without CICO coverage[1]	2%	10%	21%	31%	10%
Population without CICO coverage (M)[1]	~1.5 M	~8 M	~5 M	~5.5 M	~20 M
# new agents required[2]	~100	~1,800	~2,100	~9,700	~13,700
# of new agents economically unviable[3]	0	~750	~1,380	~8,770	~10,900
% of new agents economically unviable[3]	0%	~40%	~66%	~90%	~80%

1. Defined as population located >5km from CICO (bank branch, ATM, agent, per FII financial access survey response); 2. Agent placement modelled for populations to have access within 5km, 10km, or 20km. 5km displayed as conservative estimate across countries; 3. BCG analysis based on estimated minimum viable population per agent.
Source: Landscan 2017; Fraym 2017 financial access data layer; BCG Analysis

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Bangladesh

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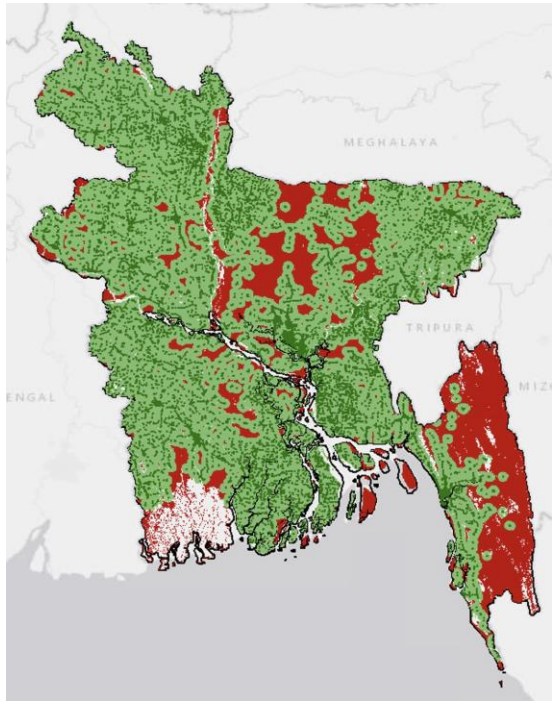
Bangladesh at a glance

In Bangladesh, ~13M people (or 8% of the population) lack CICO access, suggesting need of ~2.4K new agents spread across ~32K km^2

Financial services access by segment



Distance from financial services:

<1 km | 1-5 km | >5km

Agents placed in areas with populations >5km from FS access

	Pop lacking access (M)[1] …	… covering land mass of (km^2)	Agents needed to provide 5km access
Urban	~1.5	~700	~30
Peri-urban/ dense rural	~7.5	~9,200	~800
Rural oasis	~0.5	~1,400	~100
Rural frontier	~3	~21,000	~1,500
Total	~12.5	~32,300	~2,400

Totals (rounded)

~13M people lacking access…

…covering ~32K km^2…

…needing ~2.4K new agents

Bangladesh has the lowest new agent need (~2.4K new agents), due to concentration of underserved population (~13M) in a very small geographic area

Agent need focused in the Chittagong province: While there is lack of CICO access in south Khulna, there are also limited people living in the area since it is a national park so fewer agents are needed

1. Reported numbers for population lacking access are rounded to nearest 0.5M, and the total is calculated before rounding

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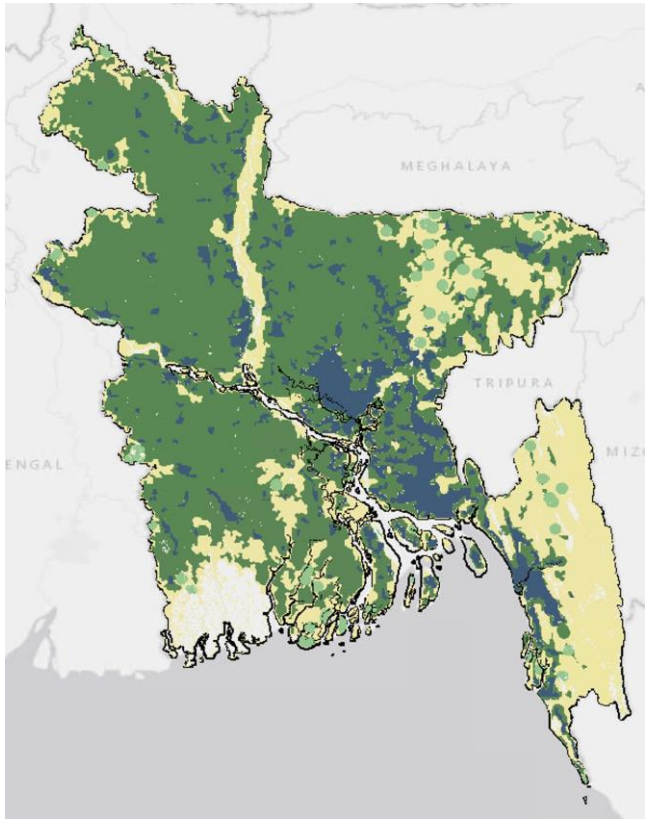
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

39% of Bangladesh's population lives in urban areas, 61% in rural

Of 96M rural population: 80M live in peri-urban/dense rural, 2M in rural “oases”, 15M in rural "frontiers"

Bangladesh: population distribution



Geography	Population (M)	Share (%)
Urban	60.5	39%
Peri-Urban/ Dense Rural	79.6	51%
Rural Oasis	1.8	1%
Rural Frontier	14.6	9%
Total	**156.5**	**100%**

Observations

- Urban/rural population estimates align with other published urbanicity statistics (e.g., World Bank)
- Population analysis is based on 2017 Landscan data; total population sizes may differ slightly from census reports

Note: Rural oases were identified based on population density, size, and commercial activity derived from open source point of interest (POI) data; this POI data tends to lack completeness in more rural regions due to the nature of data collection
Source: Landscan 2017, OpenStreetMap roads

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Detail: Characteristics of Bangladesh geographic segments

Geographies vary significantly based on population statistics, connectivity via roads, commercial activity, and access to infrastructure

		Urban	Peri-urban/ Dense rural	Rural oasis	Rural frontier	Total
Population	Total population (M)	60.5M	79.6M	1.8M	14.6M	156.5M
	Total area (km^2)[1]	17,900	94,700	4,300	47,100	164,000
	Average density (pop./km^2)	3,370	840	430	310	950
Connectivity	Ave distance to road (km)	1.1 km	1.7 km	2.9 km	5.4 km	2.7 km
	Median distance to road (km)	0.8 km	1.3 km	2.6 km	4.1 km	1.7 km
Commercial activity	Ave number of points of interest/location with POI	6,846	166	1	0[2]	4,649
Access/distance from infrastructure[3]	>5km from national, regional, or major local road	<0.1M (<0.1%)	1.8M (2%)	0.3M (16%)	6.6M (45%)	8.7M (6%)
	>5km from bank branch	38.4M (63%)	78.6M (99%)	1.8M (100%)	14.6M (100%)	133.4M (85%)
	>5km from cell tower	1.4M (2%)	12.4M (16%)	0.8M (45%)	4.3M (30%)	18.9M (12%)
	>5km from major power line	Data not available				

1. Total estimate of land mass area excludes uninhabited areas; estimate likely slightly lower than published figures which include bodies of water, etc. 2. By definition, rural frontier locations lack access to a commercial point of interest (POI). 3 Summarized as total population and % of the geographic segment that is located >5km from each type of critical infrastructure

Source: Landscan 2017 population; Esri Point of Interest; OpenStreetMap roads; OpenCellID cell towers; Energy Transmission Network powergrid

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~12.5M people in Bangladesh (8%) lack access to financial services within 5km of their home

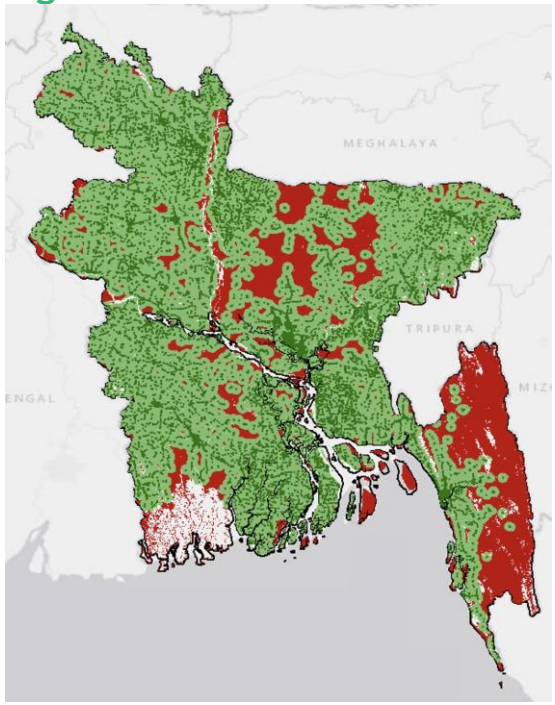
Majority (7.6M) of this population lives in peri-urban/dense rural areas

Population distance from financial services (in Millions and % of segment)

	<1km	1-5km	>5km	Total
Urban	41.3 (68%)	17.8 (29%)	1.4 (2%)	60.5
Peri-Urban/ Dense Rural	23.1 (29%)	48.9 (61%)	7.6 (10%)	79.6
Rural Oasis	0.4 (22%)	0.9 (49%)	0.5 (29%)	1.8
Rural Frontier	3.2 (22%)	8.4 (58%)	3 (21%)	14.6
Total	68	76.1	12.5	156.6
% of population	43%	49%	8%	100%

2% of FII 2018 respondents reported having CICO >5km from home vs. BCG's estimate of 8%, based on geospatial analysis of 2013-2014 FSP Map for Bangladesh. Differences likely due to agent network growth over time, esp. in dense rural areas

Bangladesh: Financial services access by segment



Observations

- 8% of total population (12.5M) appears to lack access to CICO (>5km from bank, ATM or agent)

Note: CICO access data derived from insight2impact FSP map 2014.
Source: insight2impact FSP map 2014; FII Bangladesh Wave 6 Annual report 2018; USAID (2015), "Mobile financial services in Bangladesh".

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Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Geospatial location allocation suggests up to ~2,400 new agents required

~1,500 new agents in rural frontier, ~100 new agents in rural oases and ~800 new agents in peri-urban/dense rural

Estimated new agents required by scenario

	5km	10km	20km
Urban[1]	~30	~30	~30
Peri-Urban/ Dense Rural[2]	~800	~800 (fixed at 5km scenario)	~800 (fixed at 5km scenario)
Rural Oasis[2]	~100	~100 (fixed at 5km scenario)	~100 (fixed at 5km scenario)
Rural Frontier	~1,500 (~60% of new agents)	~500 (~35% of new agents)	~200 (~20% of new agents)
Total	**~2,400**	**~1,400**	**~1,100**

Observations

- ~2,400 new agents are needed to provide CICO access within 5km to all populations, representing a 0.5% increase in agents[3]
- New agent need is concentrated in rural areas, specifically in the rural frontier (~60% of new agents) and the peri-urban/ dense rural areas (~30% new agents)
- Agent placements are concentrated in Chittagong province
  - While there is a geographically large lack of CICO access in south Khulna, there are limited people living in the area since it is a national park so fewer agents are needed

1. Urban area included in scope of CICO expansion sizing given <99% of population has access to CICO within 5km today; 2. Peri-urban/dense rural and rural oasis agent location optimization fixed to deliver CICO access within 5km all underserved population; Definition of lack of CICO access reflects FII financial access survey response (population located >5km from a bank branch, ATM, agent); 3. IMF Financial Access Survey 2018 reports estimates that there are ~481K active mobile money agent outlets as of December 2017.
Source: IMF Financial Access Survey; FSP financial map; BCG geospatial analysis

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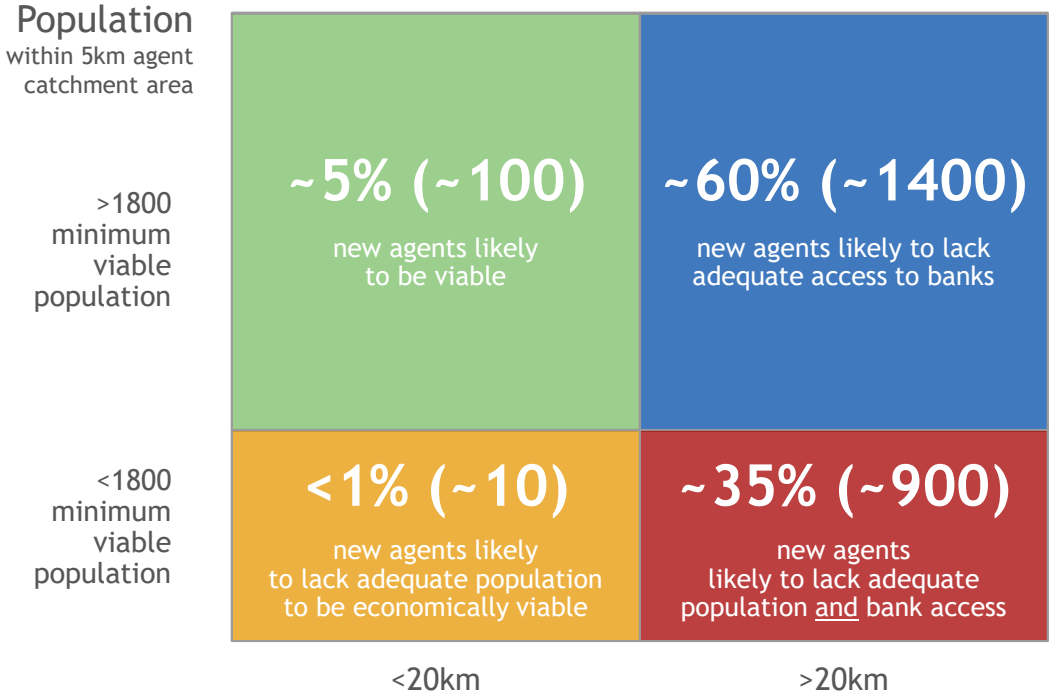
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Up to ~95% of new agents likely to face economic or operational viability challenges and require external support

Expected new agent viability (5km scenario)



Observations

Only ~5% of all new agents likely to be both economically and operationally viable

Economically unviable agents likely to require supply-side incentives (e.g., subsidy)

- Population in local catchment area is less than the minimum required for a non-dedicated DFS agent to achieve sufficient profitability[1]

Operationally unviable agents suggest need for infrastructure investments and/or operating model innovation

- Agent is located more than 20km from a bank, which significantly limits liquidity management capabilities
- Note: Distance from bank branch assigned as a 'binding constraint' for operational viability given typically 'worst' infrastructure statistic for frontier agents (as compared to mobile connectivity or access to roads)

1. Economic viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent as well as proportion of adult DFS users expected within an agent's 5km catchment area

Source: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study

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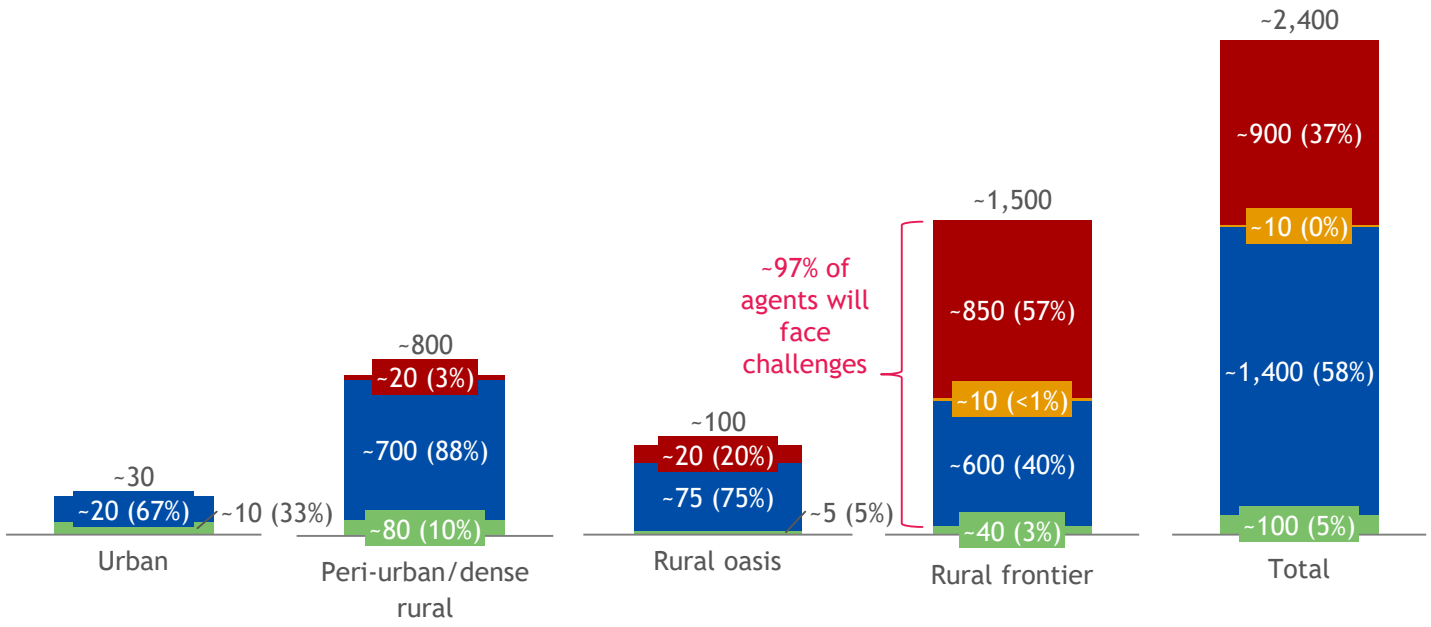
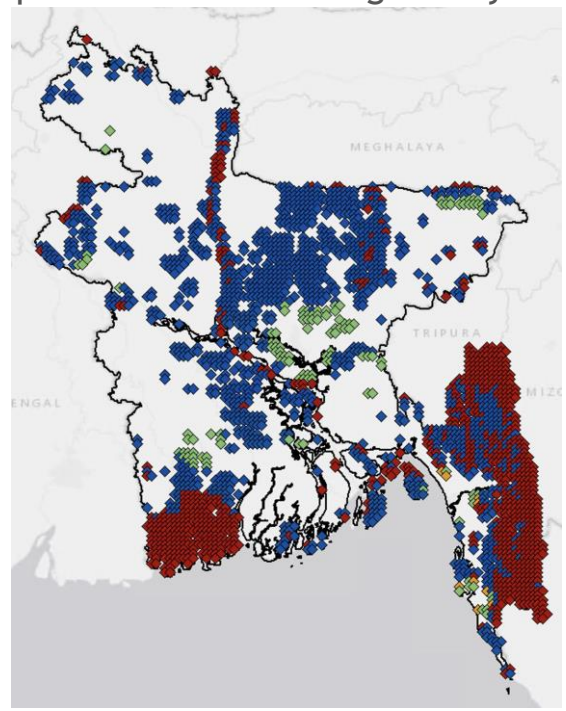
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Detail: In the frontier, ~97% of new agents are likely to face economic and/or operational challenges under the 5km scenario

Number of agents by per viability category[1]



Geographic distribution of agents by viability[1]



Note: Likelihood of viability is based on analysis of local population (latent demand) and infrastructure availability

- Unviable, both Economically and Operationally
- Operationally Unviable, Economically Viable
- Economically Unviable, Operationally Viable
- Viable, both Economically and Operationally

1. Economic viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent as well as proportion of adult DFS users expected within an agent's 5km catchment area

Source: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study

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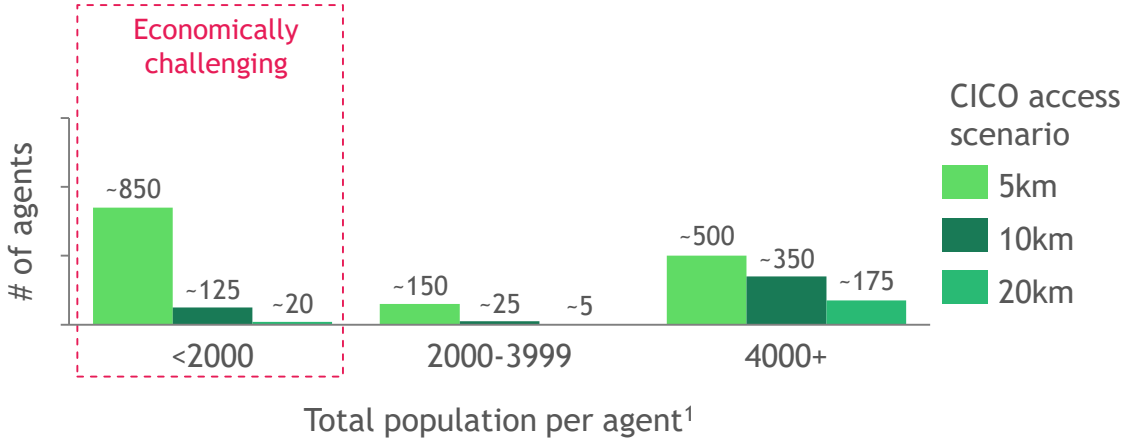
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Detail: ~850 new frontier agents likely to need support for economic viability

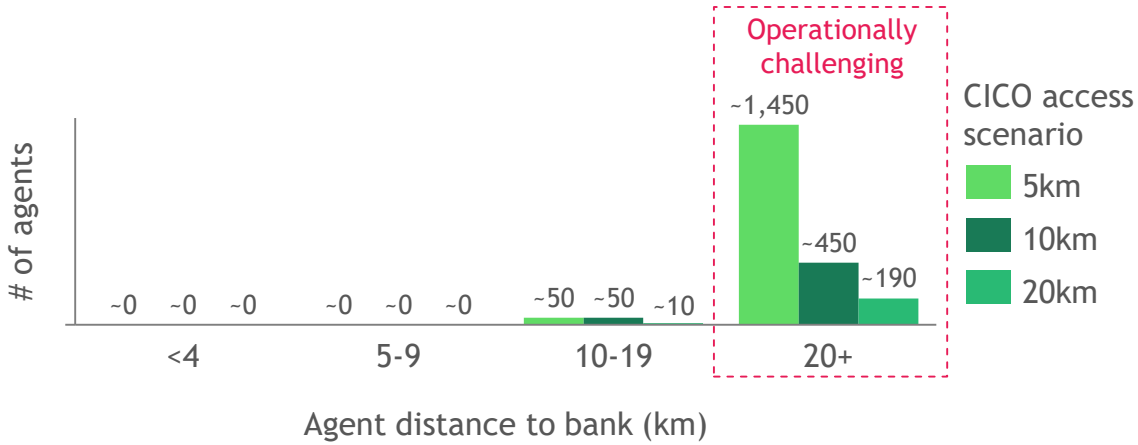
Almost all new frontier agents (~1,450) lack access to bank branches and likely require liquidity management support

Distribution of rural frontier agents by local population within Xkm



- Bangladesh agent viability threshold estimated as minimum of ~1800 population per agent[2]
- Under 5km scenario, ~850 agents (~60%) in the rural frontier are economically unviable
- Under the 10km scenario, only ~125 agents (~25%) in the rural frontier are economically unviable

Distribution of rural frontier agents by distance to nearest bank



- Large number of new agents lack access to critical enabling infrastructure
- Under the 5km scenario, almost all agents (~97%) in the rural frontier are >20km from nearest bank; ~15% are located >20km from nearest cell tower
- Under 10km scenario, ~450 frontier agents (~95%) lack access to bank branches and would benefit from liquidity management support

1. Defined as local population within agent catchment area. 2. Note: viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent in Bangladesh
Source: Landscan 2017; Esri Point of Interest; OpenStreetMap roads, cell towers, banks; BCG CICO Economics Study

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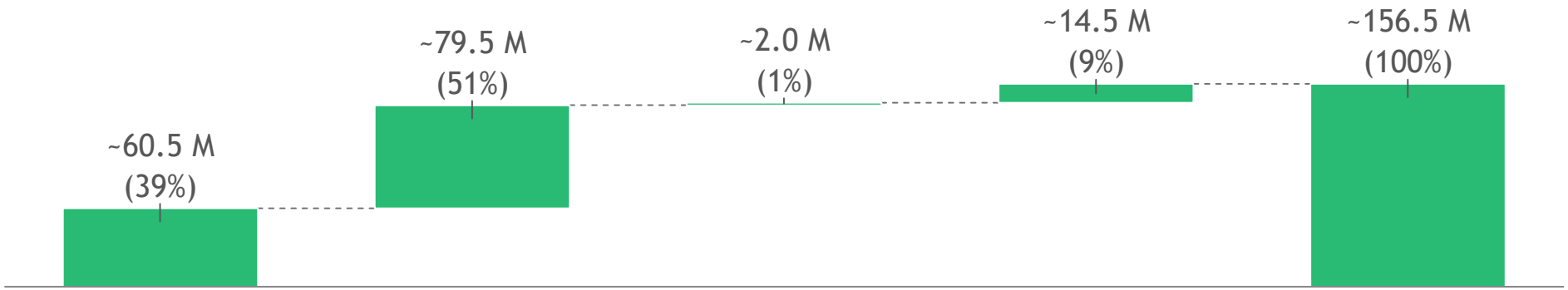
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Recap: Bangladesh population distribution, CICO coverage, & new agent viability



5km scenario[2]	Urban	Peri-urban/dense rural	Rural oasis	Rural frontier	Total
% without CICO coverage[1]	2%	10%	29%	21%	8%
Population without CICO coverage (M)[1]	~1.5 M	~7.5 M	~0.5 M	~3 M	~12.5 M
# new agents required[2]	~30	~800	~100	~1,500	~2,400
# of new agents economically unviable[3]	0	~20	~30	~850	~900
% of new agents economically unviable[3]	0%	~1%	~20%	~55%	~40%

1. Defined as population located >5km from CICO (bank branch, ATM, agent, per insight2impact FSP map 2014); 2. Agent placement modelled for populations to have access within 5km, 10km, or 20km. 5km displayed as conservative estimate across countries; 3. BCG analysis based on estimated minimum viable population per agent.
Source: Landscan 2017; insight2impact FSP map 2014; BCG Analysis

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Tanzania

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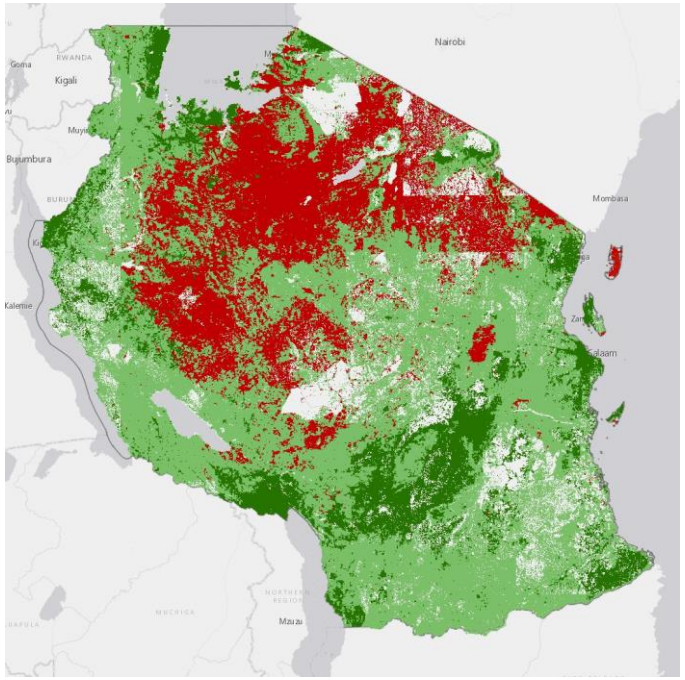
Tanzania at a glance

In Tanzania, ~9M people (or 16% of the population) lack CICO access, suggesting need of ~14K new agents spread across ~220K km^2

Financial services access by segment



Distance from financial services:

Agents placed in areas with populations >5km from FS access

	Pop lacking access (M)[1] …	… covering land mass of (km^2)	Agents needed to provide 5km access
Urban	~0.5	~700	~100
Peri-urban/ dense rural	~5	~41,800	~2,400
Rural oasis	~0.5	~12,500	~900
Rural frontier	~3	~164,600	~10,500
Total	~9	~219,600	~13,900

Totals (rounded)

Tanzania requires ~14K new agents, with majority (~10.5K) located in large sparsely populated frontier

Agent need concentrated in the central and northern areas such as Tabora, Shinyanga, Arushua, and Manyara

1: Reported numbers for population lacking access are rounded to nearest 0.5M, and the total is calculated before rounding.

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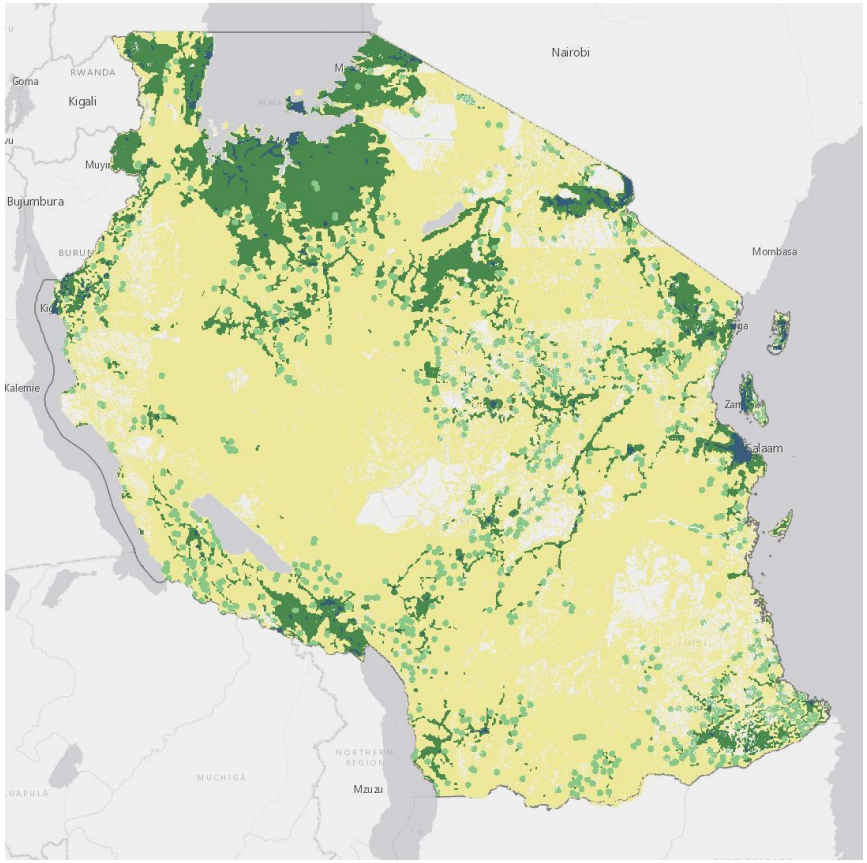
30% of Tanzania population lives in urban areas, 70% in rural

Of 38M rural population: 22M live in peri-urban/dense rural, 4M in rural “oases”, 12M in rural "frontiers"

Tanzania: Population distribution



Geography	Population (M)	Share (%)
Urban	16.2	30%
Peri-Urban/ Dense Rural	21.7	40%
Rural Oasis	3.9	7%
Rural Frontier	12.1	23%
Total	53.9	100%

Observations

- Urban/rural population estimates align with other published urbanicity statistics (e.g., World Bank)
- Population analysis is based on 2017 Landscan data; total population sizes may differ slightly from census reports

Note: Rural oases were identified based on population density, size, and commercial activity derived from open source point of interest (POI) data; this POI data tends to lack completeness in more rural regions due to the nature of data collection
Source: Landscan 2017, OpenStreetMap roads

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Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Detail: Characteristics of Tanzania geographic segments

Geographies vary significantly based on population statistics, connectivity via roads, commercial activity, and access to infrastructure

		Urban	Peri-urban/ Dense rural	Rural oasis	Rural frontier	Total
Population	Total population (M)	16.2M	21.7M	3.9M	12.1M	53.9M
	Total area (km^2)[1]	10,400	153,900	81,100	651,800	897,200
	Average density (pop./km^2)	1,560	140	50	20	60
Connectivity	Ave distance to road (km)	1 km	1.9 km	3.6 km	17.3 km	13.2 km
	Median distance to road (km)	0.7 km	1.5 km	2.4 km	10.7 km	6.5 km
Commercial activity	Ave number of points of interest/location with POI	380	18	3	0[2]	92
Access/distance from infrastructure[3]	>5km from national, regional, or major local road	<0.1M (<0.1%)	0.7M (3%)	0.8M (22%)	8.4M (69%)	10M (18%)
	>5km from bank branch	7.2M (45%)	21.4M (98%)	3.8M (97%)	12.1M (100%)	44.4M (82%)
	>5km from cell tower	2.2M (13%)	15.2M (70%)	3.1M (79%)	10.6M (88%)	31M (58%)
	>5km from major power line	6.7M (41%)	16.5M (76%)	3.4M (86%)	10.9M (91%)	37.5M (70%)

1. Total estimate of land mass area excludes uninhabited areas; estimate likely slightly lower than published figures which include bodies of water, etc. 2. By definition, rural frontier locations lack access to a commercial point of interest (POI). 3 Summarized as total population and % of the geographic segment that is located >5km from each type of critical infrastructure

Source: Landscan 2017 population; Esri Point of Interest; OpenStreetMap roads; OpenCellID cell towers; Energy Transmission Grid Network powergrid

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Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

9M people (16%) in Tanzania report lack of financial services within 5km of their home; majority (8M) live in peri-urban/rural dense and rural frontier

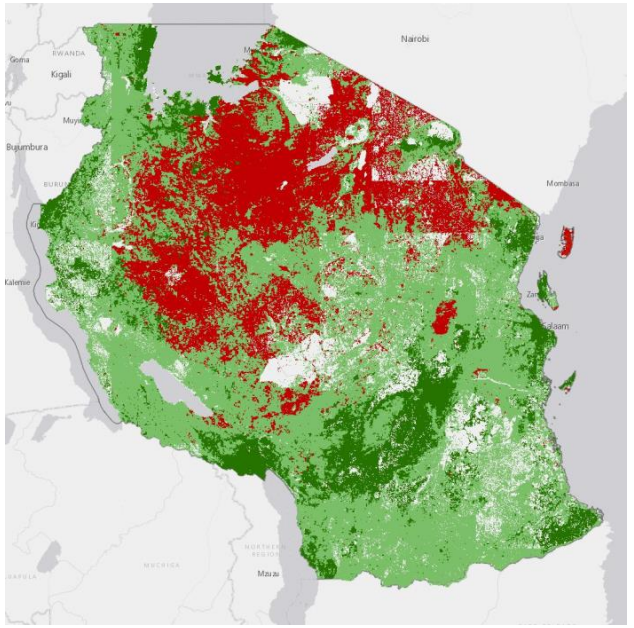
Population distance from financial services (in Millions and % of segment)

	<1km	1-5km	>5km	Total
Urban	15.0 (93%)	0.7 (4%)	0.5 (3%)	16.2
Peri-Urban/ Dense Rural	8.8 (41%)	8.1 (37%)	4.8 (22%)	21.7
Rural Oasis	1.1 (29%)	2.2 (56%)	0.6 (15%)	3.9
Rural Frontier	1.8 (15%)	7.2 (60%)	3.0 (25%)	12.0
Total	26.8	18.2	8.9	53.9
% of population	50%	34%	16%	100%

74% of FII respondents reported having CICO access within 5km vs. BCG's estimate of 84%. Differences could be due to data cleaning (18% of FII respondents did not know distance to CICO) and geospatial spread of respondents

Access figures align with external sources: FinScope estimates 14% lack CICO within 5km nationally

Tanzania: Financial services access by segment



Map aligns well with access by province reported through FinScope

Distance from financial services:
- <1 km
- 1-5 km
- >5km

Population lacking CICO access

Observations

- Tanzania has coverage gaps in all rural segments; 'low hanging fruit' opportunities to expand to places where agents likely to be viable (peri-urban/dense rural, oases)
- Areas with <5km CICO access generally coincide with areas identified for rural electrification expansion and viable for private sector energy investment[1]
- Areas with >5km CICO access tend to have lower rural electricity connection and targeted for public sector energy investment[1]

1. World Resources Institute, Mapping Energy Access: Tanzania based on 2012 Census and 2016 Tanzania Energy Access Situation Report
Note: CICO access data derived from Financial Inclusion Insights survey, 2017, based on probabilities assigned to each distance band of <1km, 1-5km, and >5km.
Source: Fraym 2017 financial access data layer; FinScope Tanzania 2017; Financial Inclusion Insights Tanzania Wave 5 2017 Report

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Geospatial location allocation suggests up to ~14K new agents required

~10,500 new agents in rural frontier, ~900 new agents in rural oases and ~2,400 new agents in peri-urban/dense rural

Estimated new agents required by scenario

	5km	10km	20km
Urban[1]	~100	~100 (fixed at 5km scenario)	~100 (fixed at 5km scenario)
Peri-Urban/ Dense Rural[2]	~2,400	~2,400 (fixed at 5km scenario)	~2,400 (fixed at 5km scenario)
Rural Oasis[2]	~900	~900 (fixed at 5km scenario)	~900 (fixed at 5km scenario)
Rural Frontier	~10,500 (~75% of new agents)	~3,800 (~55% of new agents)	~1,300 (~30% of new agents)
Total	**~13,900**	**~7,200**	**~4,700**

Observations

- ~14K agents are needed to provide CICO access within 5km to all populations, representing a 3% increase in number of agents[3]
- New agent need is concentrated in the rural frontier (~75% of all new agents in 5km scenario) due to the uncovered population being spread across a large land mass in the frontier
- Rural agent placements are concentrated in the center of the country (e.g. Tabora, Shinyanga, Manyara)
- Agent placements for urban areas concentrated on Pemba Island

1. Urban areas included because <99% of population has access to CICO within 5km today; 2. Peri-urban/dense rural and rural oasis agent location optimization fixed to deliver CICO access within 5km all underserved population; Definition of lack of CICO access reflects FII financial access survey response (population located >5km from a bank branch, ATM, agent); 3. Central Bank of Tanzania estimates ~432K agents as of 2018. May include both active and inactive agents.
Source: Bank of Tanzania (2018) Annual Report; Fraym 2017 financial access data layer; BCG geospatial analysis

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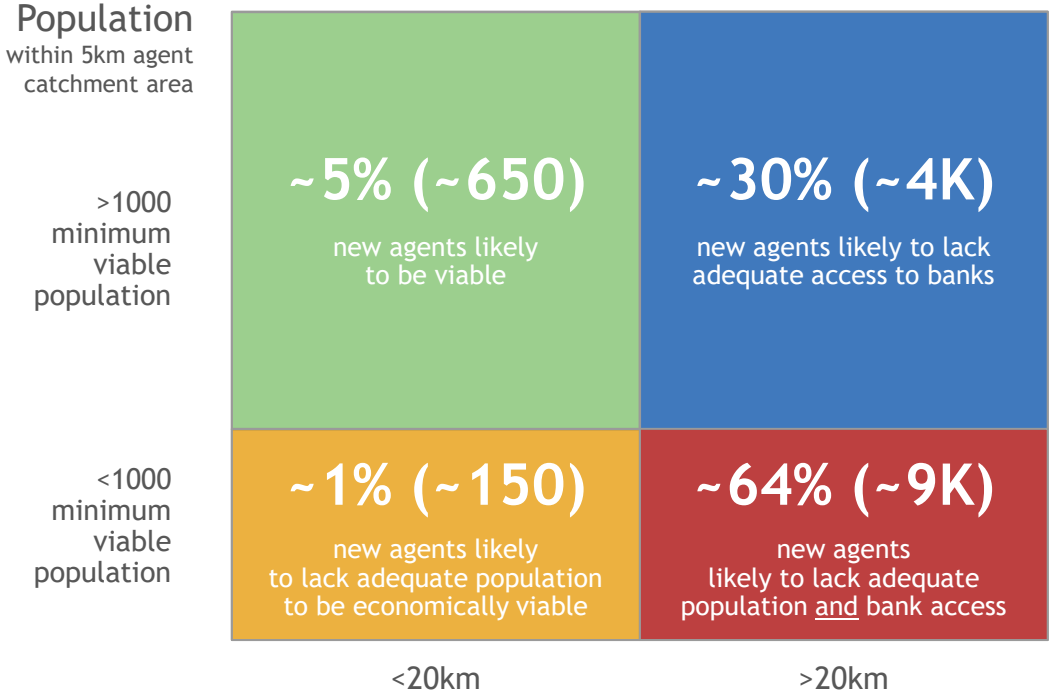
~95% of new agents likely to face economic or operational viability challenges and require external support

Expected new agent viability (5km scenario)



Observations

Only ~5% of all new agents likely to be both economically and operationally viable

Economically unviable agents likely to require supply-side incentives (e.g., subsidy)

- Population in local catchment area is less than the minimum required for a non-dedicated DFS agent to achieve sufficient profitability[1]

Operationally unviable agents suggest need for infrastructure investments and/or operating model innovation

- Agent is located more than 20km from a bank, which significantly limits liquidity management capabilities
- Note: Distance from bank branch assigned as a 'binding constraint' for operational viability given typically 'worst' infrastructure statistic for frontier agents (as compared to mobile connectivity or access to roads)

1. Economic viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent as well as proportion of adult DFS users expected within an agent's 5km catchment area

Source: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study

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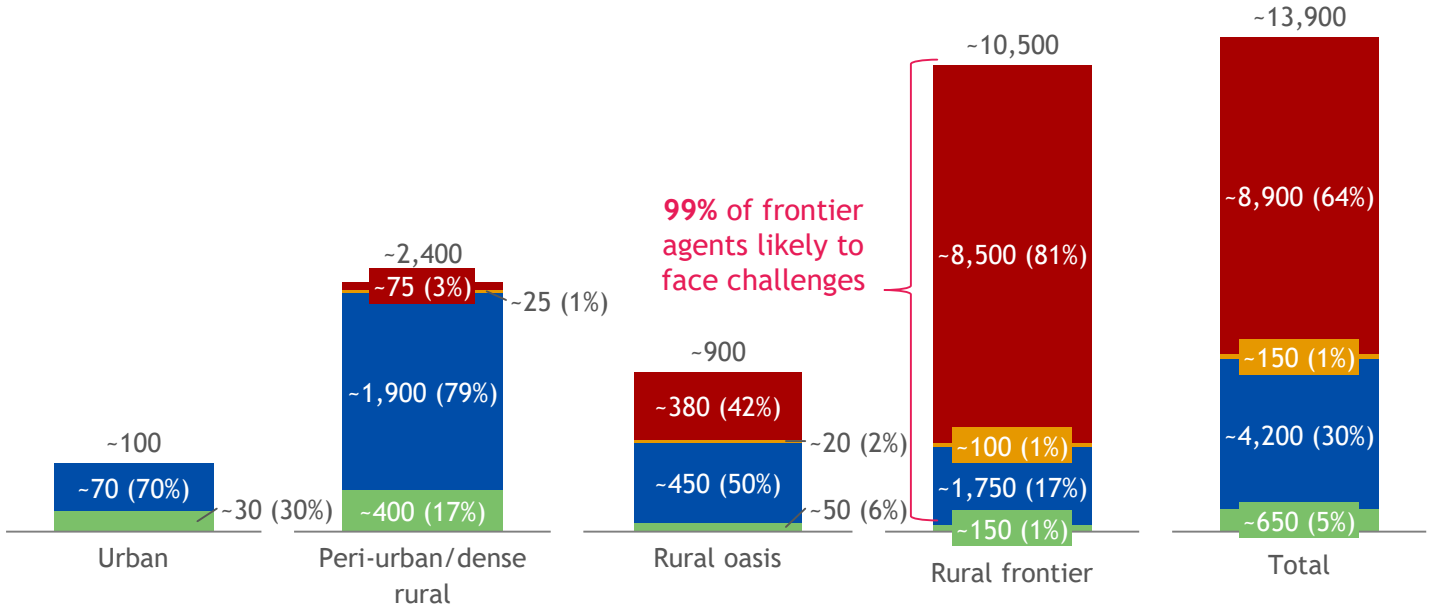
Detail: In the frontier, 99% of new agents are likely to face economic and/or operational challenges under the 5km scenario

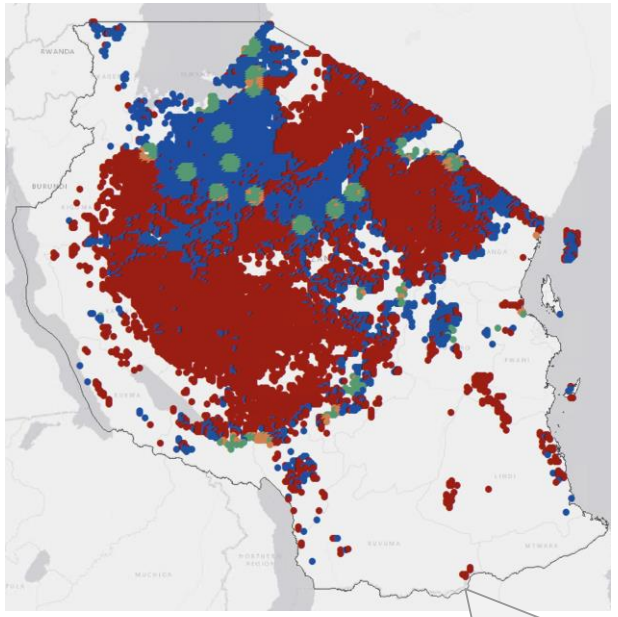
Number of agents by per viability category[1]



Note: Likelihood of viability is based on analysis of local population (latent demand) and infrastructure availability

- Unviable, both Economically and Operationally
- Operationally unviable but Economically viable
- Economically unviable but Operationally viable
- Viable

Geographic distribution of agents by viability[1]



Southern Tanzania has relatively good CICO coverage and does not need many new agents; new agents required in this area tend to be very remote "last mile" agents

1. Economic viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent as well as proportion of adult DFS users expected within an agent's 5km catchment area

Source: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study

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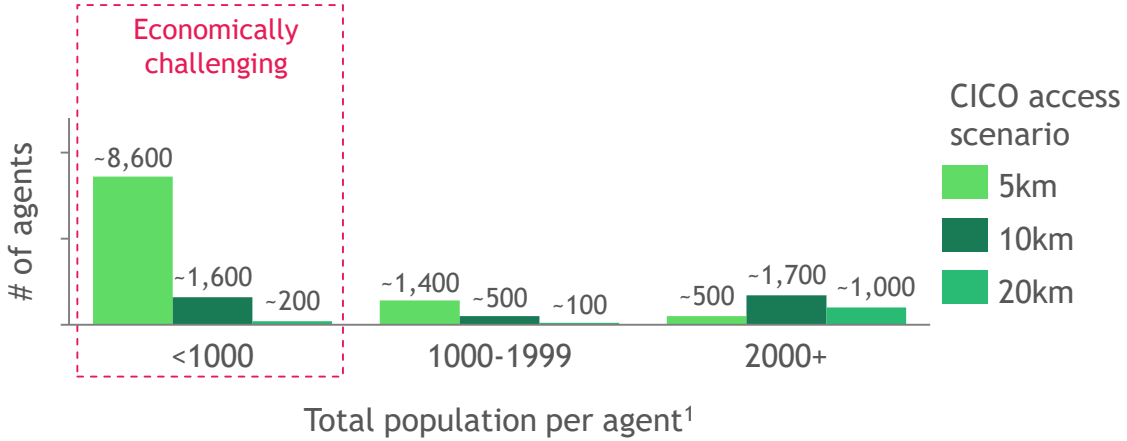
Detail: ~8,600 new frontier agents likely to need support for economic viability

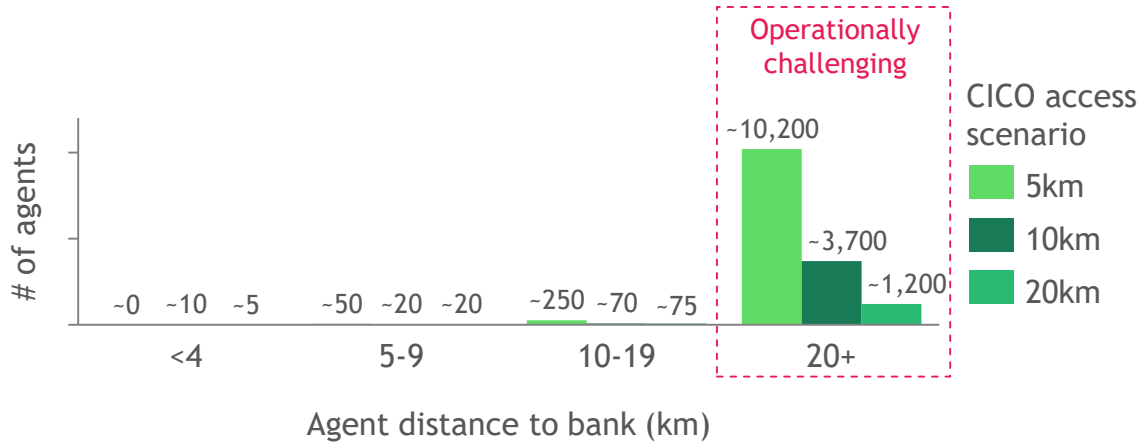
A higher number of new agents (~10,200) lack access to bank branches, will likely require liquidity management support

Distribution of rural frontier agents by local population within Xkm



- Tanzania agent viability threshold estimated as minimum of ~1000 population per agent[2]
- Under 5km scenario, ~8,600 agents (~80%) in the rural frontier are economically unviable
- Under the 10km scenario, only ~1,600 agents (~40%) in the rural frontier are economically unviable

Distribution of rural frontier agents by distance to nearest bank



- Large number of new agents lack access to critical enabling infrastructure
- Under the 5km scenario, ~10K agents (~98%) in the rural frontier are >20km from nearest bank; ~65% are located >20km from nearest cell tower
- Under 10km scenario, ~3,700 frontier agents (~96%) lack access to bank branches and would benefit from liquidity management support

1. Defined as local population within agent catchment area. 2. Note: viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent in Tanzania

Source: Landscan 2017; Esri Point of Interest; OpenStreetMap roads, cell towers, banks; BCG CICO Economics Study

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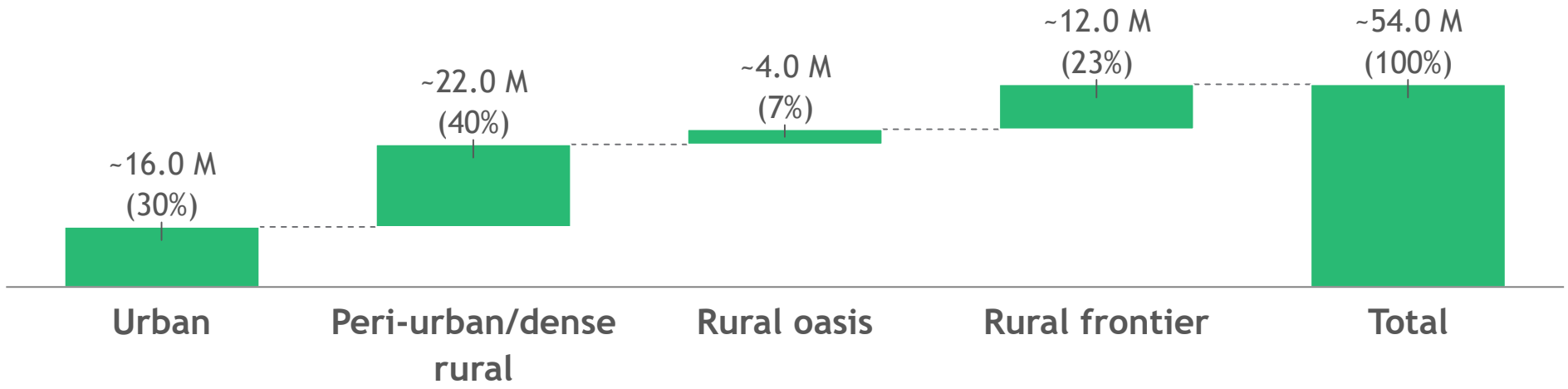
Recap: Tanzania population distribution, CICO coverage, & new agent viability



5km scenario[2]

	Urban	Peri-urban/dense rural	Rural oasis	Rural frontier	Total
% without CICO coverage[1]	3%	22%	15%	25%	16%
Population without CICO coverage (M)[1]	~0.5 M	~5 M	~0.5 M	~3 M	~9 M
# new agents required[2]	~100	~2,400	~900	~10,500	~13,900
# of new agents economically unviable[3]	0	~80	~380	~8,550	~9,010
% of new agents economically unviable[3]	0%	~5%	~45%	~80%	~65%

1. Defined as population located >5km from CICO (bank branch, ATM, agent, per FII financial access survey response); 2. Agent placement modelled for populations to have access within 5km, 10km, or 20km. 5km displayed as conservative estimate across countries; 3. BCG analysis based on estimated minimum viable population per agent.
Note: population and population without CICO access rounded to nearest 0.5M.
Source: Landscan 2017; Fraym 2017 financial access data layer; BCG Analysis

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Kenya

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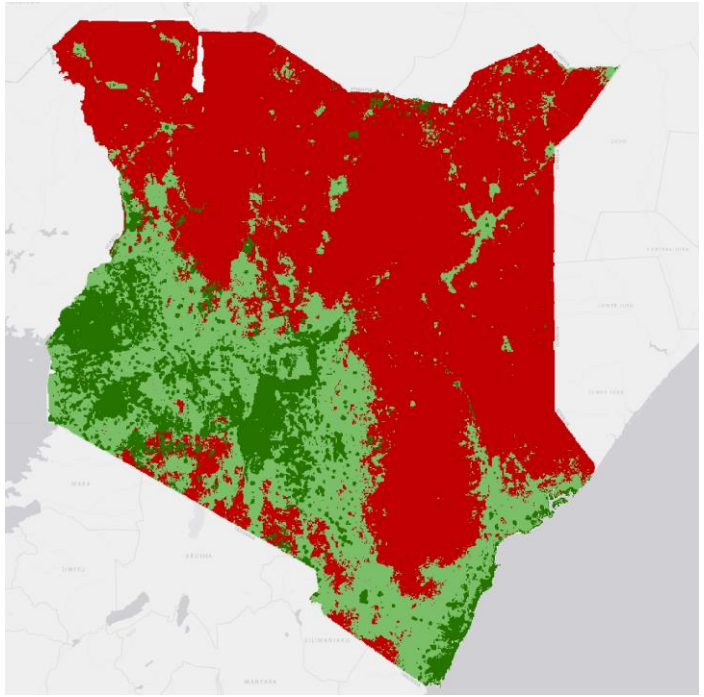
Kenya at a glance

In Kenya, ~3.5M people (or 7% of the population) lack CICO access, suggesting need of ~16K new agents spread across ~320K km^2

Financial services access by segment



Distance from financial services:

<1 km | 1-5 km | >5km

Agents placed in areas with populations >5km from FS access

	Pop lacking access (M)[1] …	… covering land mass of (km^2)	Agents needed to provide 5km access
Urban	~0	~0	~0
Peri-urban/ dense rural	~0	~1,800	~200
Rural oasis	~0	~4,600	~100
Rural frontier	~3	~313,400	~15,500
Total	~3.5	~319,800	~15,800

Totals (rounded)

~3.5M people lacking access…

…covering ~320K km^2…

…needing ~16K new agents

Kenya requires ~16K new agents, with vast majority (~15.5K) located in the large sparsely populated frontier

Agent need spread out in the north and western part of Kenya

1: Reported numbers for population lacking access are rounded to nearest 0.5M, and the total is calculated before rounding.
Note: 6% of FII respondents reported having CICO >5km from home vs. BCG's estimate of 7%, based on geospatial modelling of FII responses. Slight differences could be due to data cleaning (4% FII respondents did not know distance to CICO) and geospatial spread of respondents

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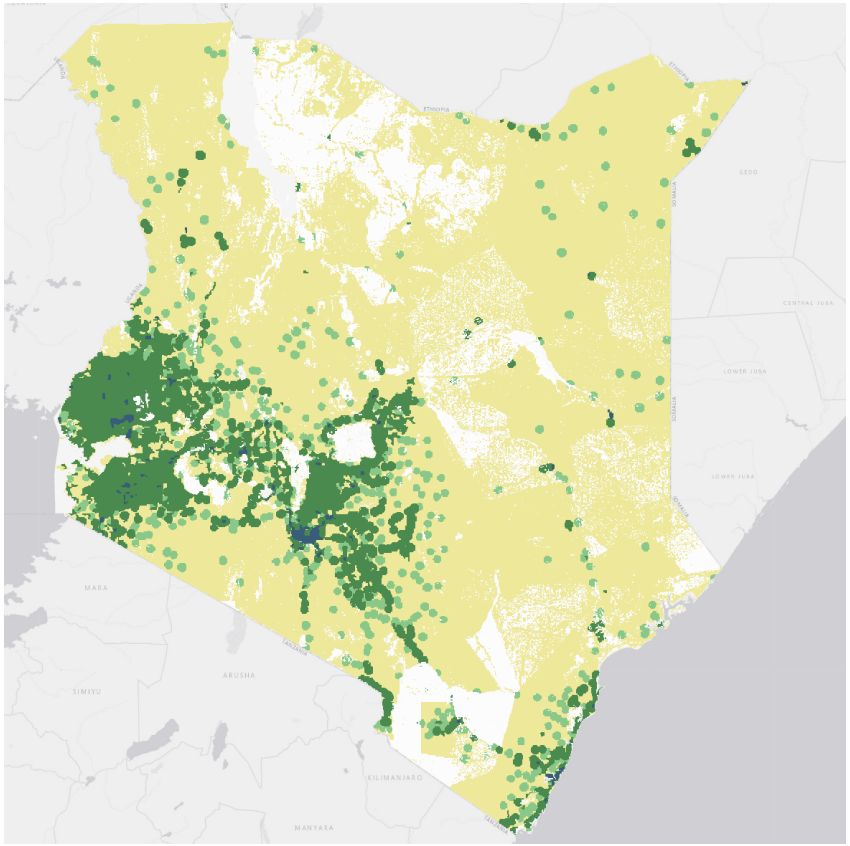
27% in urban of Kenya's population lives in urban areas, 73% in rural

Of 35M rural population: 24M live in peri-urban/dense rural, 3M in rural “oases”, 8M in rural "frontiers"

Kenya: Population distribution



Geography	Population *(M)*	Share *(%)*
Urban	12.7	27%
Peri-Urban/ Dense Rural	23.9	50%
Rural Oasis	2.8	6%
Rural Frontier	8.2	17%
Total	47.6	100%

Observations

- Urban/rural population estimates align with other published urbanicity statistics (e.g., World Bank)
- Population analysis is based on 2017 Landscan data; total population sizes may differ slightly from census reports

Note: Rural oases were identified based on population density, size, and commercial activity derived from open source point of interest (POI) data; this POI data tends to lack completeness in more rural regions due to the nature of data collection

Source: Landscan 2017, OpenStreetMap roads

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Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Detail: Characteristics of Kenya geographic segments

Geographies vary significantly based on population statistics, connectivity via roads, commercial activity, and access to infrastructure

		Urban	Peri-urban/ Dense rural	Rural oasis	Rural frontier	Total
Population	Total population (M)	12.7M	23.9M	2.8M	8.2M	47.6M
	Total area (km^2)[1]	2,700	72,300	36,900	434,700	546,600
	Average density (pop./km^2)	4,700	330	75	20	85
Connectivity	Ave distance to road (km)	0.9 km	2.0 km	4.3 km	16.8 km	13.9km
	Median distance to road (km)	0.6 km	1.4 km	2.3 km	10.6 km	7.2 km
Commercial activity	Ave number of points of interest/location with POI	~1500	~500	~3.5	0[2]	~300
Access/distance from infrastructure[3]	>5km from national, regional, or major local road	0 (0%)	1M (4%)	1M (29%)	5M (57%)	6M (13%)
	>5km from bank branch	1M (7%)	16M (69%)	3M (93%)	8M (98%)	28M (59%)
	>5km from cell tower	0.1 (1%)	2M (8%)	1M (39%)	6M (71%)	9M (19%)
	>5km from major power line	4M (32%)	15M (64%)	2M (85%)	8M (92%)	29M (62%)

1. Total estimate of land mass area excludes uninhabited areas; estimate likely slightly lower than published figures which include bodies of water, etc. 2. By definition, rural frontier locations lack access to a commercial point of interest (POI). 3 Summarized as total population and % of the geographic segment that is located >5km from each type of critical infrastructure

Source: Landscan 2017 population; Esri Point of Interest; OpenStreetMap roads; OpenCellID cell towers; Energy Transmission Network powergrid

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Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

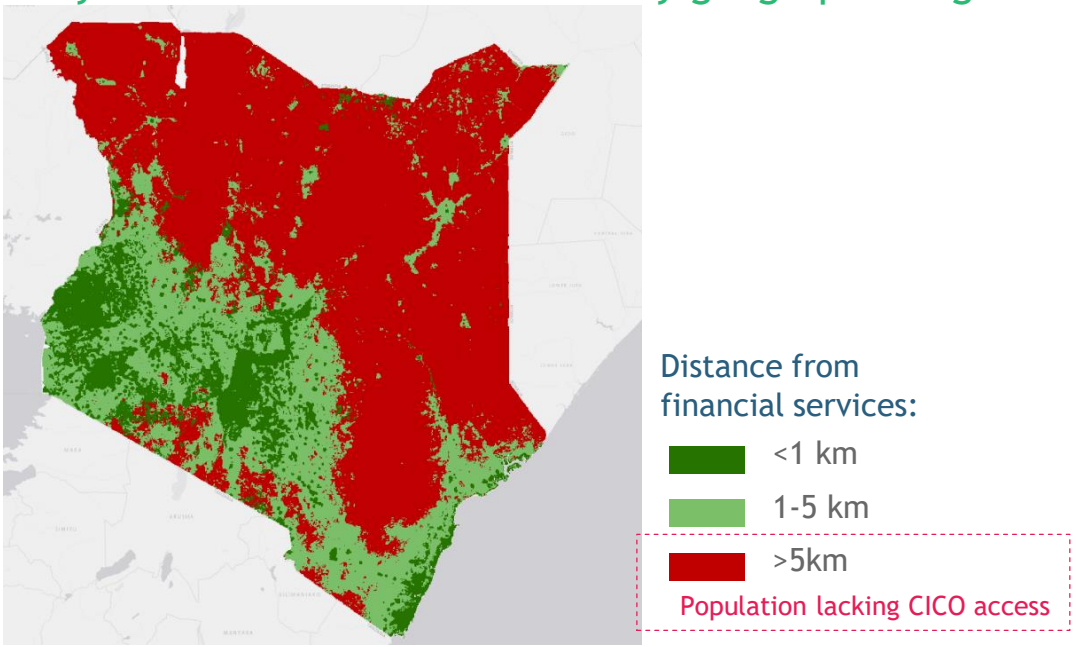
~3.5M people in Kenya report lack of financial services within 5km of their home; vast majority (~3M) live in rural frontier

Population distance from financial services (in Millions and % of segment)

	< 1km	1-5km	>5km	Total
Urban	12.5 (98%)	0.2 (2%)	0 (0%)	12.7
Peri-Urban/ Dense Rural	19.6 (82%)	4.2 (17%)	0.1 (1%)	23.9
Rural Oasis	1.1 (41%)	1.5 (52%)	0.2 (7%)	2.8
Rural Frontier	1.4 (17%)	3.9 (47%)	2.9 (36%)	8.2
Total	34.6	9.7	3.3	47.6
% of population	73%	20%	7%	100%

6% of FII respondents reported having CICO >5km from home vs. BCG's estimate of 7%, based on geospatial modelling of FII responses. Slight differences could be due to data cleaning (4% FII respondents did not know distance to CICO) and geospatial spread of respondents

Kenya: Financial services access by geographic region



Observations

- 7% of total Kenyan population (3.3M) reports lack of access to CICO (>5km from bank, ATM or agent)
- Of those lacking critical CICO access: 2.9M reside in rural frontiers, 0.2M in rural oases, 0.1M in peri-urban/dense rural

Note: CICO access data derived from Financial Inclusion Insights survey, 2017, based on probabilities assigned to each distance band of <1km, 1-5km, and >5km.
Source: Fraym 2017 financial access data layer; FII Kenya Wave 5 annual survey 2017

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Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Geospatial allocation suggests up to ~16,000 new agents required in rural areas

~15,500 new agents in rural frontier, ~100 new agents in rural oases and ~200 new agents in peri-urban/dense rural

Estimated new agents required by scenario

	5km	10km	20km
Urban[1]	NA	NA	NA
Peri-Urban/ Dense Rural[2]	~200	~200 (fixed at 5km scenario	~200 (fixed at 5km scenario
Rural Oasis[3]	~100	~100 (fixed at 5km scenario	~100 (fixed at 5km scenario
Rural Frontier	~15,500 (~98% of new agents)	~4,400 (~94% of new agents)	~1200 (~80% of new agents)
Total	**~15,800**	**~4,700**	**~1,500**

Observations

- Under 5km scenario, ~15,800 new agents represents 8% increase in total agent population[4]
- New agent need in rural frontier determined based on target to provide CICO access within 5km of all underserved populations
- Alternate scenarios may require fewer new agents: for example, if increase agent proximity threshold to 10km, only ~4,400 frontier agents needed to achieve target coverage; reflects higher consumer willingness to travel, or employment of a roving agent model)

1. Urban areas not included in scope of CICO expansion sizing given 99.9% of population has access to CICO within 5km today; 2. Peri-urban/dense rural agent location optimization fixed to deliver CICO access within 5km all underserved population; 3. Small oasis ($25km^2$) to require 1 agent if ≥25% lacks access to CICO within 5km; Large oases (>$25km^2$) to require multiple agents per oasis; determined based on location optimization to deliver CICO access within 5km all underserved population. Definition of lack of CICO access reflects FII financial access survey response (population located >5km from a bank branch, ATM, agent). Small oasis to require an agent if ≥25% lacks access to CICO within 5km. 4. Communications Authority of Kenya statistics of 198,000 total agents in Dec 2017. May include both active and inactive agents.

Source: Communications Authority of Kenya; Fraym 2017 financial access data layer; BCG geospatial analysis

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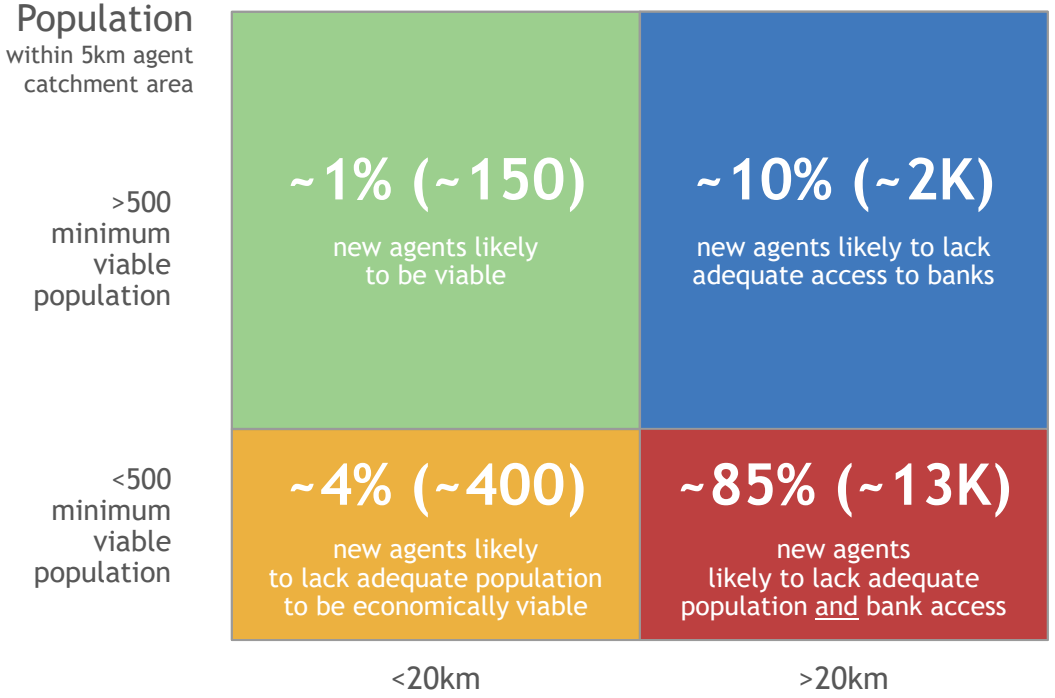
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

~99% of new agents likely to face economic or operational viability challenges and require external support

Expected new agent viability (5km scenario)



Observations

Only ~1% of all new agents likely to be both economically and operationally viable

Economically unviable agents likely to require supply-side incentives (e.g., subsidy)

- Population in local catchment area is less than the minimum required for a non-dedicated DFS agent to achieve sufficient profitability[1]

Operationally unviable agents suggest need for infrastructure investments and/or operating model innovation

- Agent is located more than 20km from a bank, which significantly limits liquidity management capabilities
- Note: Distance from bank branch assigned as a 'binding constraint' for operational viability given typically 'worst' infrastructure statistic for frontier agents (as compared to mobile connectivity or access to roads)

1. Economic viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent as well as proportion of adult DFS users expected within an agent's 5km catchment area

Source: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study

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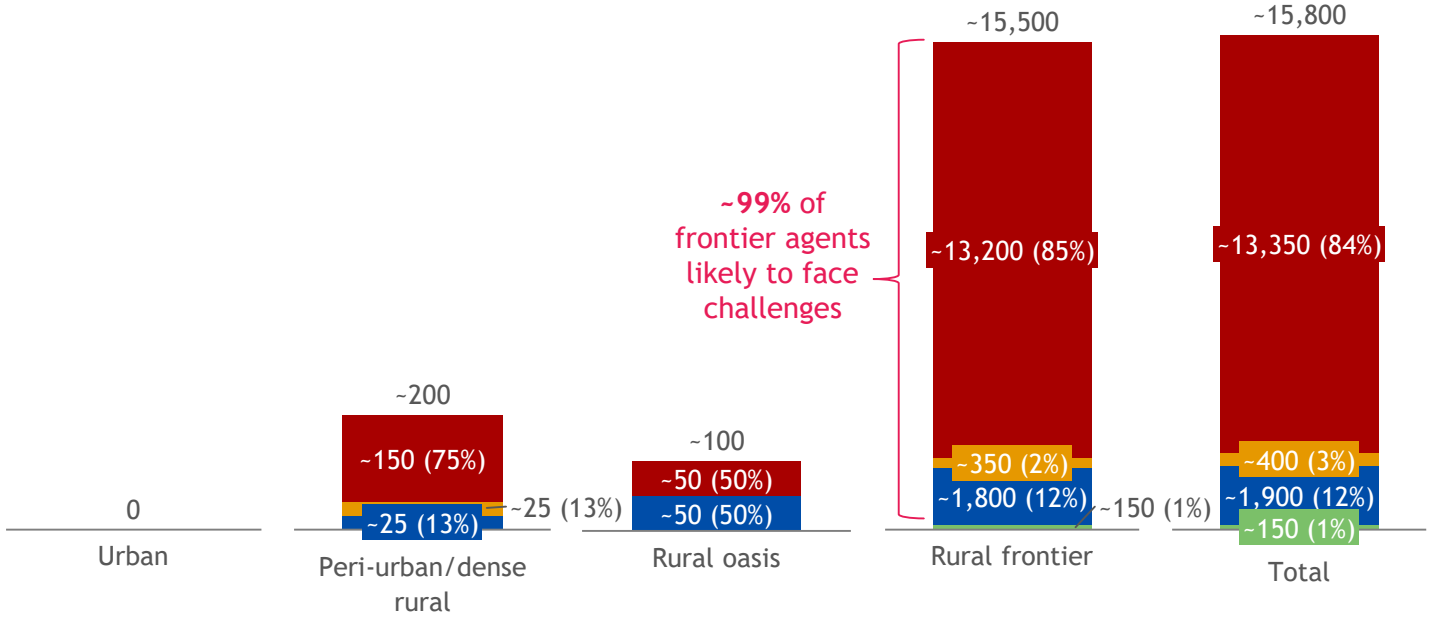
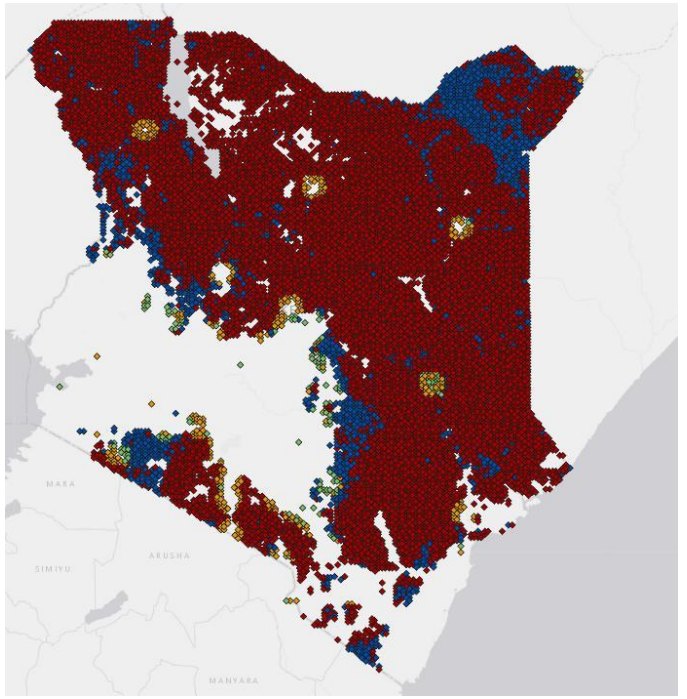
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Detail: In the frontier, 99% of new agents are likely to face economic and/or operational challenges under the 5km scenario

Number of agents by per viability category[1]



Geographic distribution of agents by viability[1]



Note: Likelihood of viability is based on analysis of local population (latent demand) and infrastructure availability

- Unviable, both Economically and Operationally
- Operationally Unviable, Economically Viable
- Economically Unviable, Operationally Viable
- Viable, both Economically and Operationally

1. Economic viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent as well as proportion of adult DFS users expected within an agent's 5km catchment area

Source: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study

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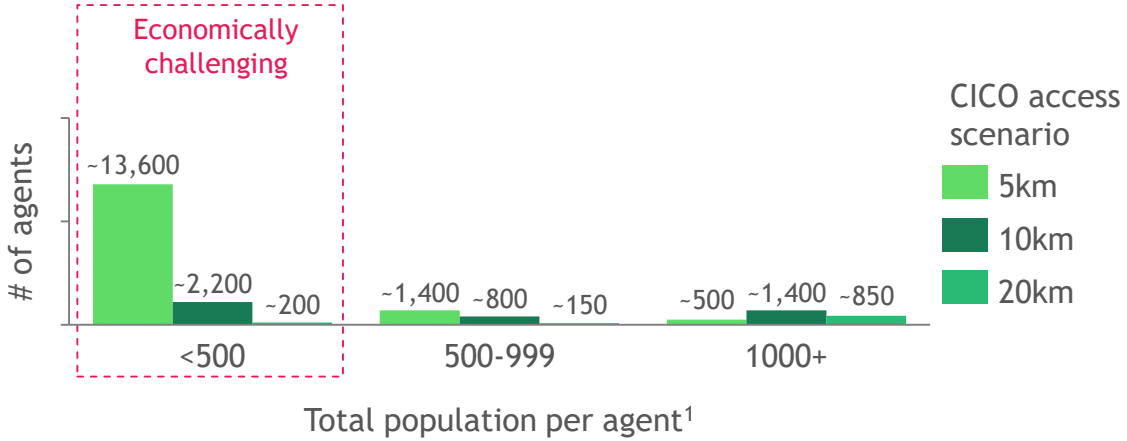
Detail: ~13,600 new frontier agents likely to need support for economic viability

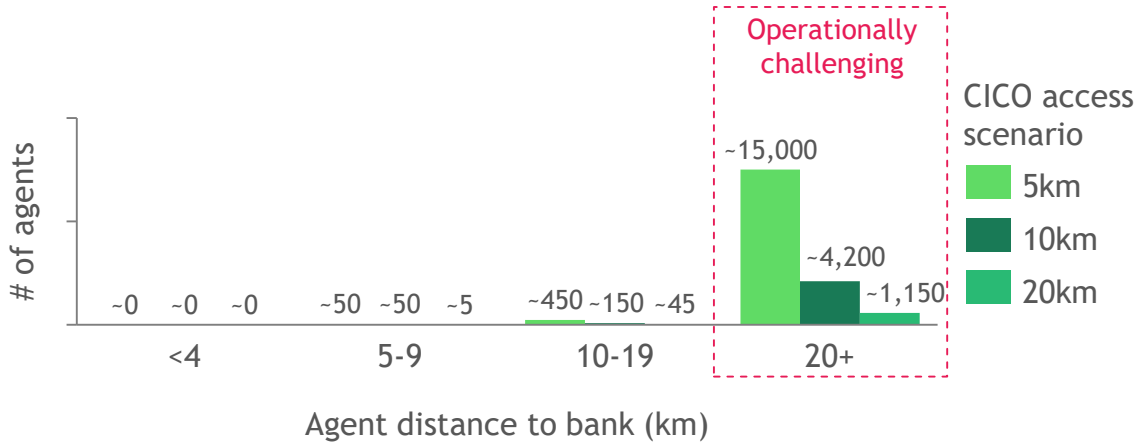
A higher number of new frontier agents (~15K) lack access to bank branches, likely require liquidity management support

Distribution of rural frontier agents by local population within Xkm



- Per 2018 CICO economics study, Kenya agent viability defined as minimum of ~500 population per agent based on observed economics and commission structure
- Under 5km scenario, ~13,600 new agents (~87%) in the rural frontier are likely to be economically unviable
- Under the 10km scenario (e.g. roving agent model), only ~2,200 agents (~50%) in the rural frontier are economically unviable

Distribution of rural frontier agents by distance to nearest bank



- Vast majority of new agents lack access to critical enabling infrastructure
- Under the 5km scenario, ~15,000 agents (~97%) in the rural frontier are >20km from nearest bank
  - ~70% are also located >20km from nearest cell tower
- Under 10km scenario, ~4,200 new agents (~95%) lack access to a bank branch and would benefit from liquidity management support

Note: viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent in Kenya
1. Defined as local population within agent catchment area
Source: Landscan 2017; Esri Point of Interest; OpenStreetMap roads, cell towers, banks, BCG 2018 CICO Economics Study

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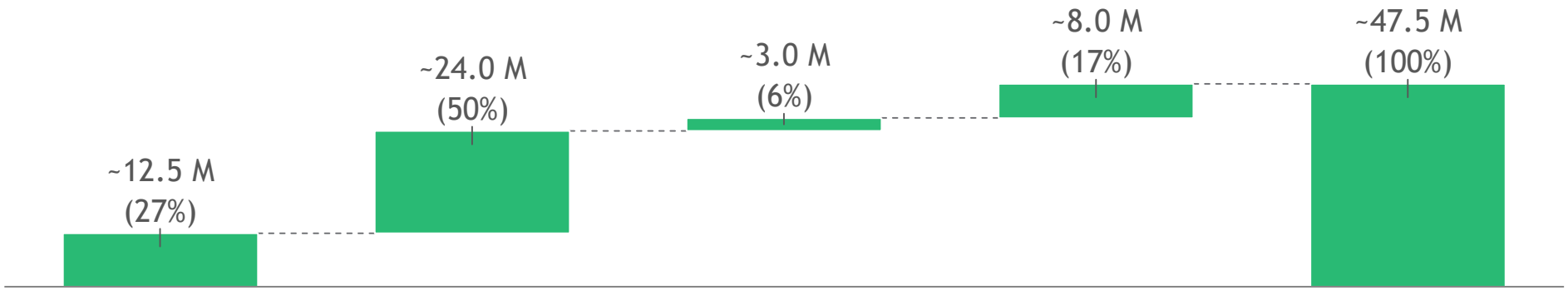
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Recap: Kenya population distribution, CICO coverage, and new agent viability



5km scenario[2]	Urban	Peri-urban/dense rural	Rural oasis	Rural frontier	Total
% without CICO coverage[1]	<0.1%	0.5%	7%	36%	7%[4]
Population without CICO coverage (M)[1]	<0.1 M	~0.1 M	~0.2 M	~3 M	~3.5 M
# new agents required[2]	NA	~200	~100	~15,500	~15,800
# of new agents economically unviable[3]	NA	~175	~50	~13,600	~13,800
% of new agents economically unviable[3]	NA	~85%	~50%	~90%	~90%

1. Defined as population located >5km from CICO (bank branch, ATM, agent, per FII financial access survey response); 2. Agent placement modelled for populations to have access within 5km, 10km, or 20km. 5km displayed as conservative estimate across countries; 3. BCG analysis based on estimated minimum viable population per agent; 4. 6% of FII respondents reported having CICO >5km from home vs. BCG's estimate of 7%, based on geospatial modelling of FII responses. Slight differences could be due to data cleaning (4% FII respondents did not know distance to CICO) and geospatial spread of respondents
Source: Landscan 2017; Fraym 2017 financial access data layer; BCG Analysis

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Uganda

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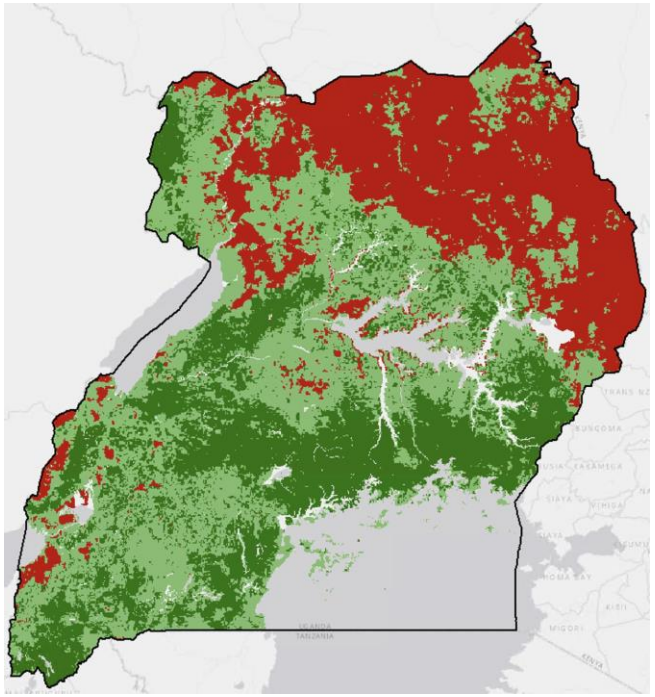
Uganda at a glance

In Uganda, ~3M people (or 7% of the population) lack CICO access, suggesting need of ~4K new agents spread across ~55K km^2

Financial services access by segment



Distance from financial services:

<1 km | 1-5 km | >5km

Agents placed in areas with populations >5km from FS access

	Pop lacking access (M)[1] …	… covering land mass of (km^2)	Agents needed to provide 5km access
Urban	~0	~0	0
Peri-urban/ dense rural	~0.5	~1,000	~150
Rural oasis	~1	~9,100	~700
Rural frontier	~1.5	~45,000	~3,150
Total	~3	~55,100	~4,000

Totals (rounded)

~3M people lacking access…

…covering ~55K km^2…

…needing ~4K new agents

Uganda has one of the lowest needs, requiring ~4K new agents mostly in the rural frontier

Agent need concentrated in Northern Region of Uganda

1: Reported numbers for population lacking access are rounded to nearest 0.5M, and the total is calculated before rounding.
Note: 4% of FII respondents reported having CICO >5km from home vs. BCG's estimate of 7%, based on geospatial modelling of FII responses. Slight differences could be due to data cleaning (6% FII respondents did not know distance to CICO) and geospatial spread of respondents (FII Uganda Wave 5 annual survey report 2017)

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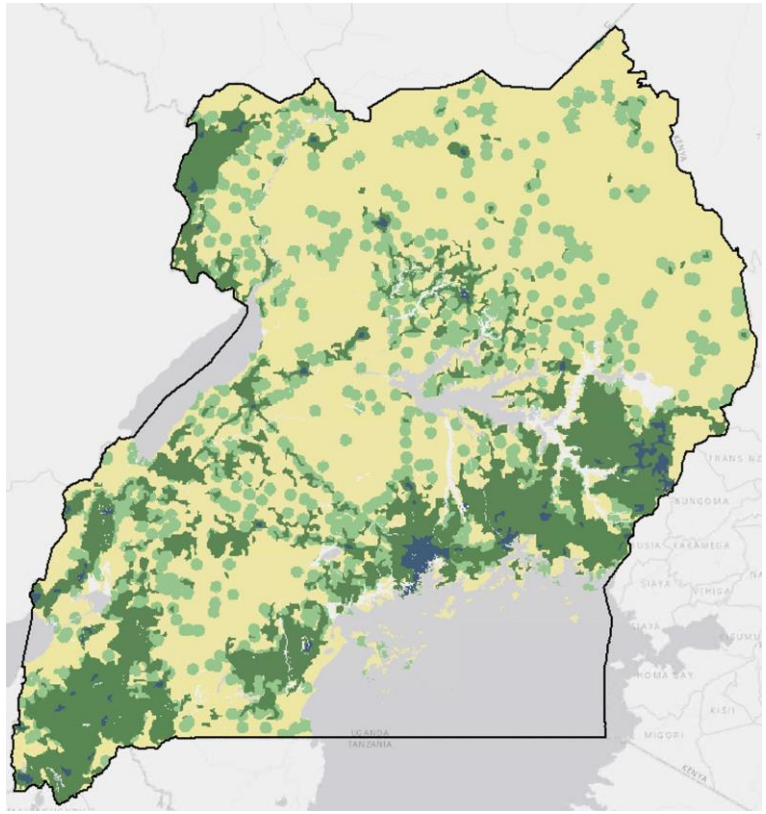
20% of Uganda's population lives in urban areas, 80% in rural

Of ~31.5M rural population: ~19M live in peri-urban/dense rural, ~5.5M in rural "oases", ~7M in rural "frontiers"

Uganda: Population distribution



Geography	Population (M)	Share (%)
Urban	8.1	20%
Peri-Urban/ Dense Rural	19.2	49%
Rural Oasis	5.3	13%
Rural Frontier	6.9	18%
Total	**39.6**	**100%**

Observations

- Urban/rural population estimates align with other published urbanicity statistics (e.g., World Bank)
- Population analysis is based on 2017 Landscan data; total population sizes may differ slightly from census reports

Note: Rural oases were identified based on population density, size, and commercial activity derived from open source point of interest (POI) data; this POI data tends to lack completeness in more rural regions due to the nature of data collection
Source: Landscan 2017, OpenStreetMap roads

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Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Detail: Characteristics of Uganda geographic segments

Geographies vary significantly based on population statistics, connectivity via roads, commercial activity, and access to infrastructure

		Urban	Peri-urban/ Dense rural	Rural oasis	Rural frontier	Total
Population	Total population (M)	8.1M	19.2M	5.3M	6.9M	39.6M
	Total area (km^2)[1]	3,000	53,000	44,500	109,100	209,700
	Average density (pop./km^2)	2,680	360	120	60	190
Connectivity	Ave distance to road (km)	0.6 km	1.2 km	1.8 km	4.1 km	2.8 km
	Median distance to road (km)	0.4 km	0.9 km	1.4 km	2.8 km	1.7 km
Commercial activity	Ave number of points of interest/location with POI	~340	~20	~3	0[2]	~60
Access/distance from infrastructure[3]	>5km from national, regional, or major local road	0M (0%)	0.1M (0%)	0.3M (6%)	1.4M (20%)	1.8M (5%)
	>5km from bank branch	1.7M (20%)	17.2M (89%)	5.1M (95%)	6.9M (100%)	30.8M (78%)
	>5km from cell tower	0.4M (5%)	8.8M (46%)	3M (56%)	5.1M (73%)	17.2M (44%)
	>5km from major power line	0M (0%)	3M (16%)	2M (38%)	4M (57%)	9.1M (23%)

1. Total estimate of land mass area excludes uninhabited areas; estimate likely slightly lower than published figures which include bodies of water, etc. 2. By definition, rural frontier locations lack access to a commercial point of interest (POI). 3 Summarized as total population and % of the geographic segment that is located >5km from each type of critical infrastructure

Source: Landscan 2017 population; Esri Point of Interest; OpenStreetMap roads; OpenCellID cell towers; Energy Transmission Network powergrid

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Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

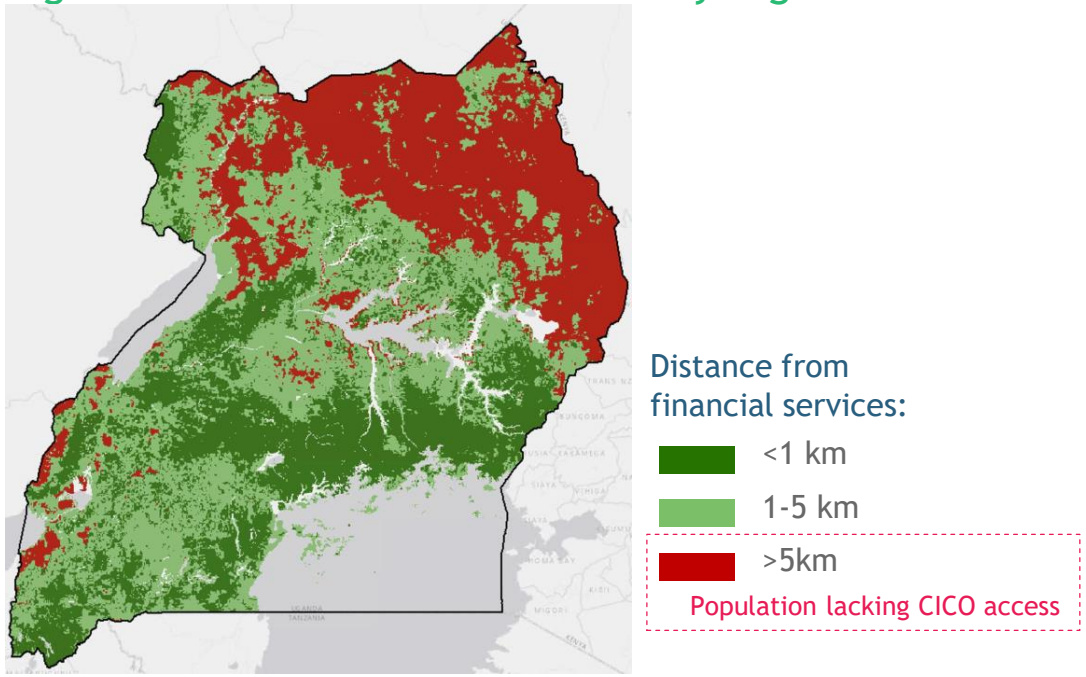
~3M people in Uganda report lack of financial services within 5km of their home; majority (1.5M) live in rural frontier

Population distance from financial services (in Millions and % of segment)

	<1km	1-5km	>5km	Total
Urban	7.7 (94%)	0.4 (5%)	0 (1%)	8.1
Peri-Urban/ Dense Rural	12.9 (67%)	6 (31%)	0.4 (2%)	19.3
Rural Oasis	2.1 (40%)	2.4 (46%)	0.8 (14%)	5.3
Rural Frontier	2.1 (31%)	3.3 (47%)	1.5 (22%)	6.9
Total	24.8	12.1	2.8	39.7
% of population	63%	30%	7%	100%

4% of FII respondents reported having CICO >5km from home vs. BCG's estimate of 7%, based on geospatial modelling of FII responses. Slight differences could be due to data cleaning (6% FII respondents did not know distance to CICO) and geospatial spread of respondents

Uganda: Financial services access by segment



Observations

- Similar to Kenya, 7% of total Ugandan population (2.8M) reports lack of access to CICO (>5km from bank, ATM or agent)
  - Of those lacking critical CICO access: 1.5M reside in rural frontiers (less than Kenya), 0.8M in rural oases, 0.4M in peri-urban/dense rural

Note: CICO access data derived from Financial Inclusion Insights survey, 2017, based on probabilities assigned to each distance band of <1km, 1-5km, and >5km.
Source: Fraym 2017 financial access data layer; Landscan; FII Uganda Wave 5 annual survey report 2017

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Geospatial location allocation suggests up to ~4,000 new agents required

~3,150 new agents in rural frontier, ~700 new agents in rural oases and ~150 new agents in peri-urban/dense rural

Estimated new agents required by scenario

	5km	10km	20km
Urban[1]	NA	NA	NA
Peri-Urban/ Dense Rural[2]	~150	~150 (fixed at 5km scenario)	~150 (fixed at 5km scenario)
Rural Oasis[2]	~700	~700 (fixed at 5km scenario)	~700 (fixed at 5km scenario)
Rural Frontier	~3,150 (~80% of new agents)	~1,150 (~60% of new agents)	~400 (~30% of new agents)
Total	**~4,000**	**~2,000**	**~1,250**

Observations

- Scenarios show different willingness of population in the rural frontier to travel to access CICO services: the higher willingness to travel, the fewer agents required to cover CICO gap
- Literature review suggests that in rural Uganda, 5km is the max median distance travelled on a daily basis and up to 20km for less frequent travel; for weekly travel, 10km scenario seems most reasonable
- The 5km agent allocation scenario is most conservative: ~4,000 new agents represents 2.5% increase in total agent population[3]
- New frontier agents account for vast majority (80%) of total new agents in the 5km scenario, while new rural oases agents are a significant portion in the 10km and 20km scenarios

1. Urban areas not included in scope of CICO expansion sizing given 99% of population has access to CICO within 5km today; 2. Peri-urban/dense rural and rural oasis agent location optimization fixed to deliver CICO access within 5km all underserved population; Definition of lack of CICO access reflects FII financial access survey response (population located >5km from a bank branch, ATM, agent); 3. Uganda Communications Commission estimates ~160K agents as of December 2017. May include both active and inactive agents.
Source: Uganda Communications Commission; Fraym 2017 financial access data layer; BCG geospatial analysis

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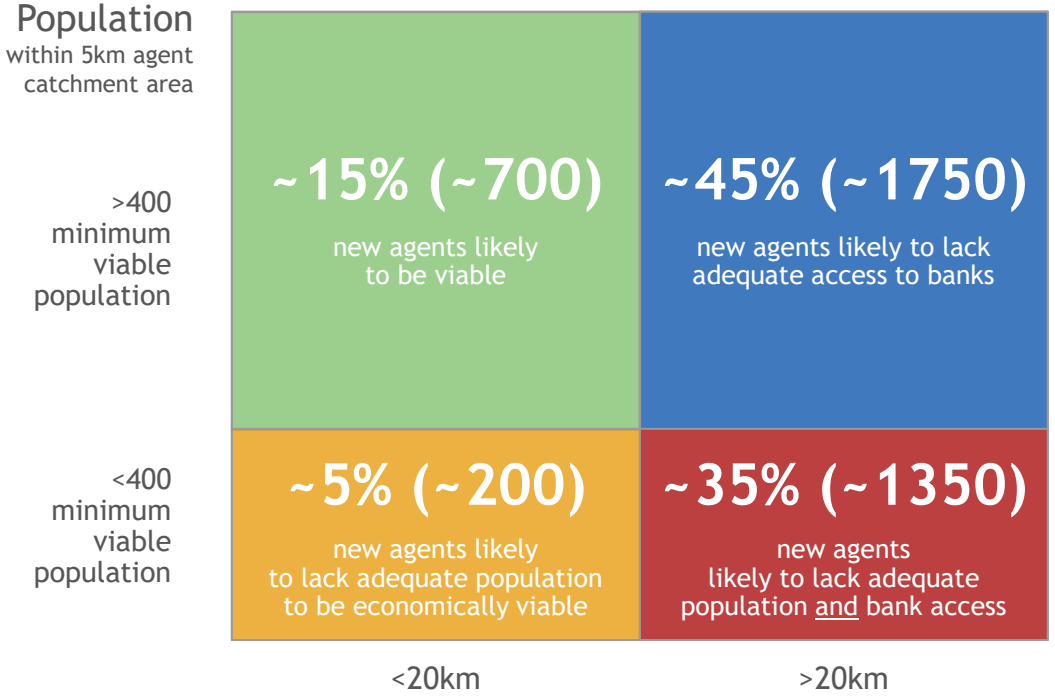
~85% of new agents likely to face economic or operational viability challenges and require external support

Expected new agent viability (5km scenario)



Observations

Only ~15% of all new agents likely to be both economically and operationally viable

Economically unviable agents likely to require supply-side incentives (e.g., subsidy)

- Population in local catchment area is less than the minimum required for a non-dedicated DFS agent to achieve sufficient profitability[1]

Operationally unviable agents suggest need for infrastructure investments and/or operating model innovation

- Agent is located more than 20km from a bank, which significantly limits liquidity management capabilities
- Note: Distance from bank branch assigned as a 'binding constraint' for operational viability given typically 'worst' infrastructure statistic for frontier agents (as compared to mobile connectivity or access to roads)

1. Economic viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent as well as proportion of adult DFS users expected within an agent's 5km catchment area

Source: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study

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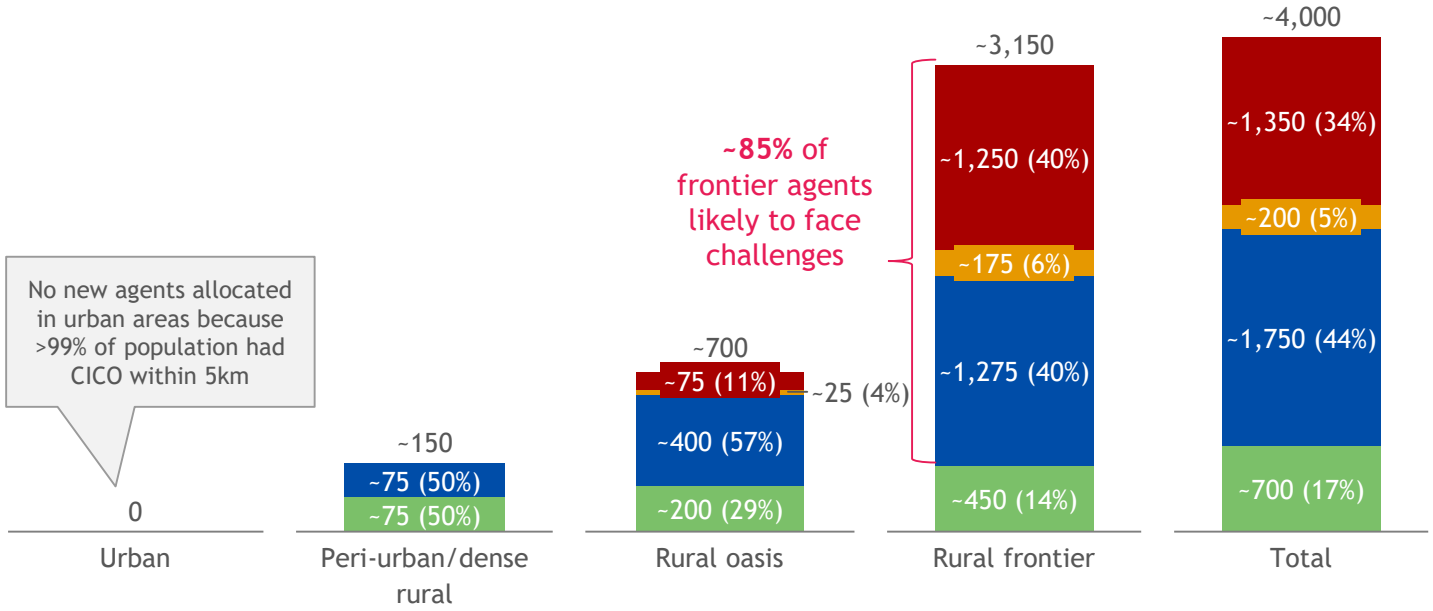
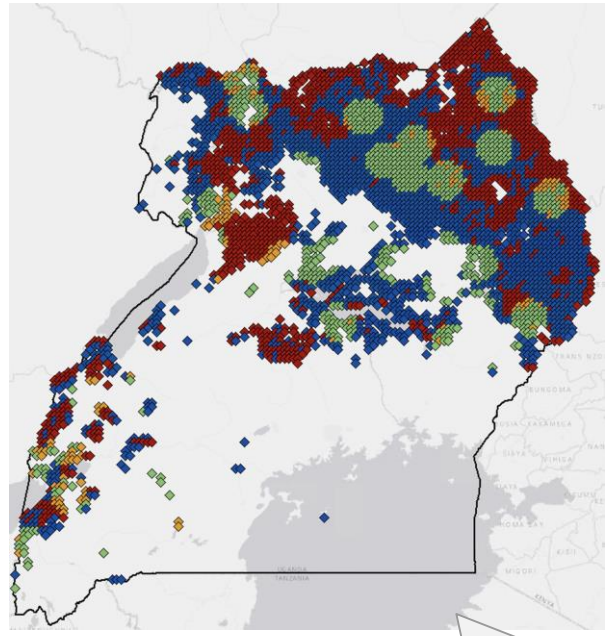
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Detail: In the frontier, ~85% of new agents are likely to face economic and/or operational challenges under the 5km scenario

Number of agents by per viability category[1]



Geographic distribution of agents by viability[1]



Agent need concentrated in the northeastern part of Uganda; Southern Uganda has relatively good CICO coverage and does not need many new agent

Note: Likelihood of viability is based on analysis of local population (latent demand) and infrastructure availability

- Unviable, both Economically and Operationally
- Operationally Unviable, Economically Viable
- Economically Unviable, Operationally Viable
- Viable, both Economically and Operationally

1. Economic viability evaluated based on observed business economics and commission structure for a non-dedicated DFS agent as well as proportion of adult DFS users expected within an agent's 5km catchment area

Source: Landscan 2017; Esri Point of Interest; BCG CICO Economics Study

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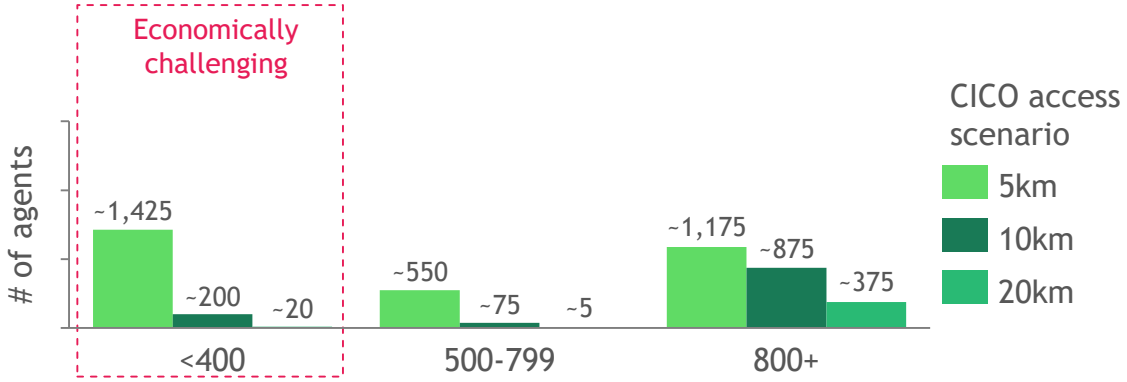
Results from this work reflect high-level analysis to size the global CICO coverage challenge; additional more granular analysis is required for country-specific solution design or policy recommendations

Detail: ~1,425 new frontier agents likely to need support for economic viability

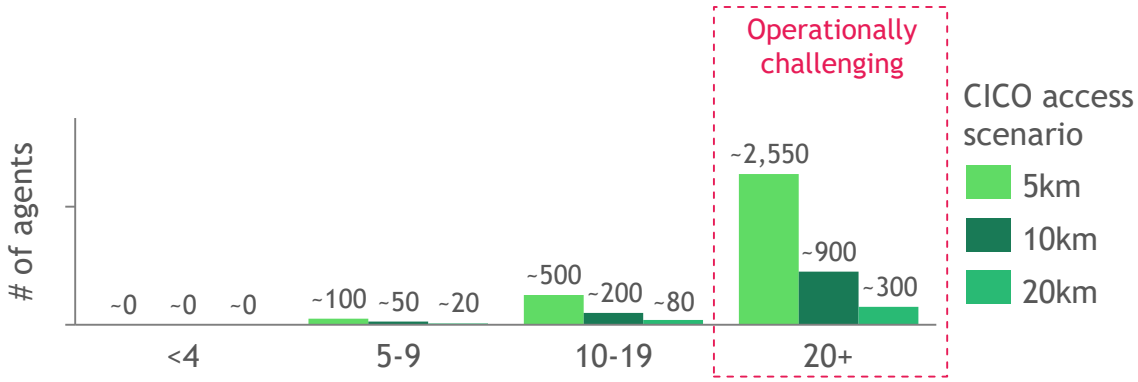
A higher number of new agents (~2,550) lack access to bank branches and likely require liquidity management support

Distribution of rural frontier agents by local population within Xkm



- Agent viability threshold estimated as minimum of ~400 population per agent[2]
- Under 5km scenario, ~1425 agents (~45%) in the rural frontier are economically unviable
- Under the 10km scenario, more reflective of willingness to travel, only ~200 agents (~20%) in the rural frontier are economically unviable

Distribution of rural frontier agents by distance to nearest bank



- Large number of new agents lack access to critical enabling infrastructure
- Under the 5km scenario, ~2,550 agents (~80%) in the rural frontier are >20km from nearest bank; ~30% are located >20km from nearest cell tower (less than Kenya)
- Under 10km scenario, ~900 frontier agents (~78%) lack access to bank branches and would benefit from liquidity management support

1. Defined as local population within agent catchment area. 2. Viability evaluated based on extrapolated economics for a non-dedicated DFS agent in Uganda. Median agent makes $75 monthly profit from 30 daily transactions. Assuming that a viable non-dedicated DFS agent earns 50% of avg. GNI per capita (i.e. $25 monthly), this implies ~10 daily transactions. Minimum viable population size per agent calculated reflects size of addressable market: ~50% of population are adults (CIA World Factbook), of which ~55% actively use financial services (est. based on Findex/Finclusion) at 2.5 transactions per month (fixed assumption)
Source: Landscan 2017; Esri Point of Interest; OpenStreetMap roads, cell towers, banks; Helix (2016), "Agent Network Accelerator Survey: Uganda Country Report 2015".

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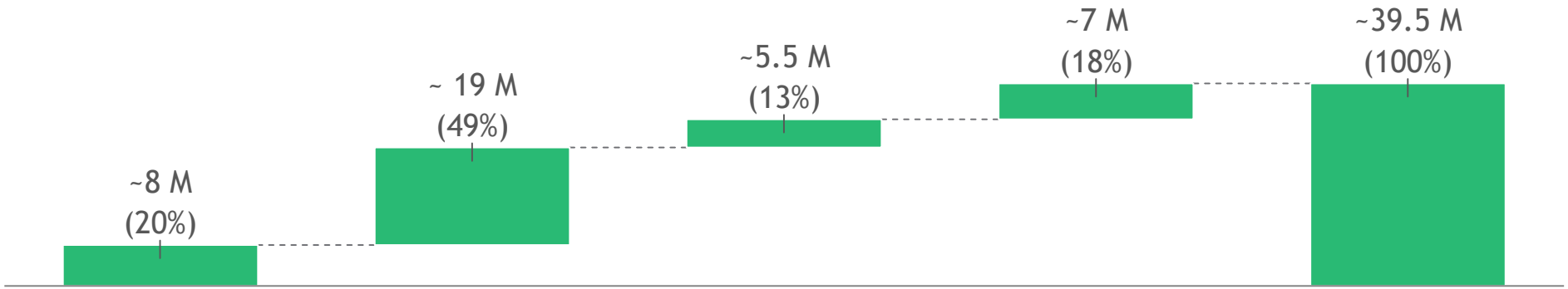
Recap: Uganda population distribution, CICO coverage, and new agent viability



5km scenario[2]

	Urban	Peri-urban/dense rural	Rural oasis	Rural frontier	Total
% without CICO coverage[1]	0.6%	2%	14%	22%	7%[4]
Population without CICO coverage (M)[1]	<0.1 M	~0.5 M	~1 M	~1.5 M	~3 M
# new agents required[2]	NA	~150	~700	~3,150	~4,000
# of new agents economically unviable[3]	NA	0	~90	~1,400	~1,500
% of new agents economically unviable[3]	NA	0%	~10%	~45%	~40%

1. Defined as population located >5km from CICO (bank branch, ATM, agent, per FII financial access survey response); 2. Agent placement modelled for populations to have access within 5km, 10km, or 20km. 5km displayed as conservative estimate across countries; 3. BCG analysis based on estimated minimum viable population per agent; 4% of FII respondents reported having CICO >5km from home vs. BCG's estimate of 7%, based on geospatial modelling of FII responses. Slight differences could be due to data cleaning (6% FII respondents did not know distance to CICO) and geospatial spread of respondents
Source: Landscan 2017; Fraym 2017 financial access data layer; BCG Analysis

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