

Optimizing agent network distribution

A geospatial mapping study in rural India

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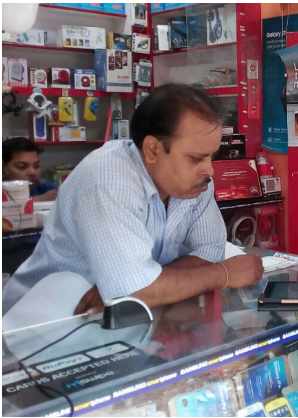
About MicroSave Consulting

MicroSave Consulting (MSC) is a boutique consulting firm that has, for 20 years, pushed the world towards meaningful financial, social, and economic inclusion. We are a globally trusted, yet locally based organization that offers high-quality, practical market-led solutions to accelerate financial, economic, and social inclusion in the digital age.

With about 190 staff of different nationalities and varied expertise, MSC is proud to be working in over 50 developing countries. We have offices in Bangladesh, India, Indonesia, Kenya, Philippines, Senegal, Singapore, Vietnam, Uganda, and the United Kingdom.

We work with participants in financial, economic, and social ecosystems to achieve sustainable performance improvements and unlock enduring value. Our clients include governments, donors, private sector corporations, and local businesses. We can help you seize the digital opportunity, address the mass market, and future-proof your operations.

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Executive summary



Banking agents (referred to as “business correspondents” in India) are the key drivers of financial inclusion in low- and middle-income countries. Yet the presence of these agents is not uniform across the geography of these countries—with rural areas, in particular, lacking physical access in close proximity. There is [growing evidence](#) that the number of agents currently deployed by providers fails to fulfill every customer’s need. In India, one of the unique enabling policies developed by Reserve Bank of India (RBI) is the [Sub-Service Area \(SSA\) approach](#). Within the SSA approach, at least one interoperable Business Correspondent (BC agent) needs to serve each village with a population above 1,000.

Yet MSC’s [earlier work](#) suggests that many Indians have never used agents to access financial services, especially in areas with good banking infrastructure, where people prefer to go to bank branches or ATMs when they travel to markets. MSC conducted a study to understand how newer technologies of data collection can be used to identify the geographical distribution of the agents and identify unserved or underserved areas. This report summarizes a geospatial mapping exercise that MSC conducted to identify underserved areas in two blocks of India. Annexure II of this document provides a detailed methodology. The insights from the study provide recommendations to improve access to financial services.

The key takeaways from the study are as follows:

1

The agents are not distributed uniformly across the study blocks. In Kursakatta, the agents are distributed uniformly. However, the agents in the other block at Navapur are clustered around major landmarks (marketplaces or population-dense areas).

2

As a result, about 52% of the rural population lives more than five kilometers from their nearest BC agent or bank branch.

3

Through geospatial-modeling exercises, we identified 52 alternate service delivery points that, if converted as BC agents, could bring all the villages within a two-kilometer radius of a financial service point.

4

We also discussed an agent segmentation concept to ensure agent viability and reduce agent churn. Introducing segmentation in the geospatial model resulted in the optimization of the agent network with fewer agents required to serve the target population.



Background



India's agency banking model is unique among developing countries, in terms of the number of players, the range of agent network management models, the role and guidance of the government and the regulator, and the products and services that agents offer. In this context, the [Agent Network Accelerator \(ANA\)](#) research program conducted by MicroSave Consulting (MSC) was a critical study to understand the nature and performance of India's agent networks.

The ANA research was the largest project of its kind on agent networks in the world that covers 11 countries in Asia and Africa. MSC's latest report on the ANA research in India highlights that India's story of financial inclusion has shifted from account opening to account usage over the past two years (2015 to 2017). This change arose from bold policy announcements from the government, robust technological innovations in the payments systems, and the ubiquity of Aadhaar—see [India's enabling triangle for financial inclusion](#).

The [proximity of agents to customers](#) is one of the key factors that affect the uptake of financial services, and in the process, affects financial inclusion efforts. MSC has been supporting NITI Aayog to improve the state of financial inclusion in 27 of the [Aspirational Districts](#) of India. We identified issues with agent networks, including the presence of agents, the financial viability of agents, and agent locations not matching with the sub-service area (SSA) approach. We needed a better understanding of the gap in agent numbers and agent optimization to address these issues.

This study would:

01

Identify and map all financial access points, other service points, and villages in the selected geographies;

02

Identify unserved and under-served areas in the block for financial services; and

03

Provide recommendations to improve access to financial services.

Use of access points by customers varies across blocks



Navapur

The Navapur block is located in Nandurbar district of the state of Maharashtra. In this block, bank branches are the channel of choice for conducting financial transactions. All the customers we interviewed indicated that they access financial services through bank branches. At the bank branches, cash-out transactions are most frequent followed by cash-in transactions. ATMs are the second-most used access point with one in five customers reported using it. At ATMs, cash-out is the most frequent transaction followed by balance inquiry. Only a handful of customers use agents to do their financial transactions.

Kursakatta

Kursakatta block is located in Araria district of the state of Bihar. Here, agents are the most preferred channel to conduct financial transactions, with 60% of the customers reporting that they use agents. A majority of the customers visited a single agent regularly. Only a few of them reported that they use more than one agent. ATMs are the second most used access point for financial services, followed by bank branches.

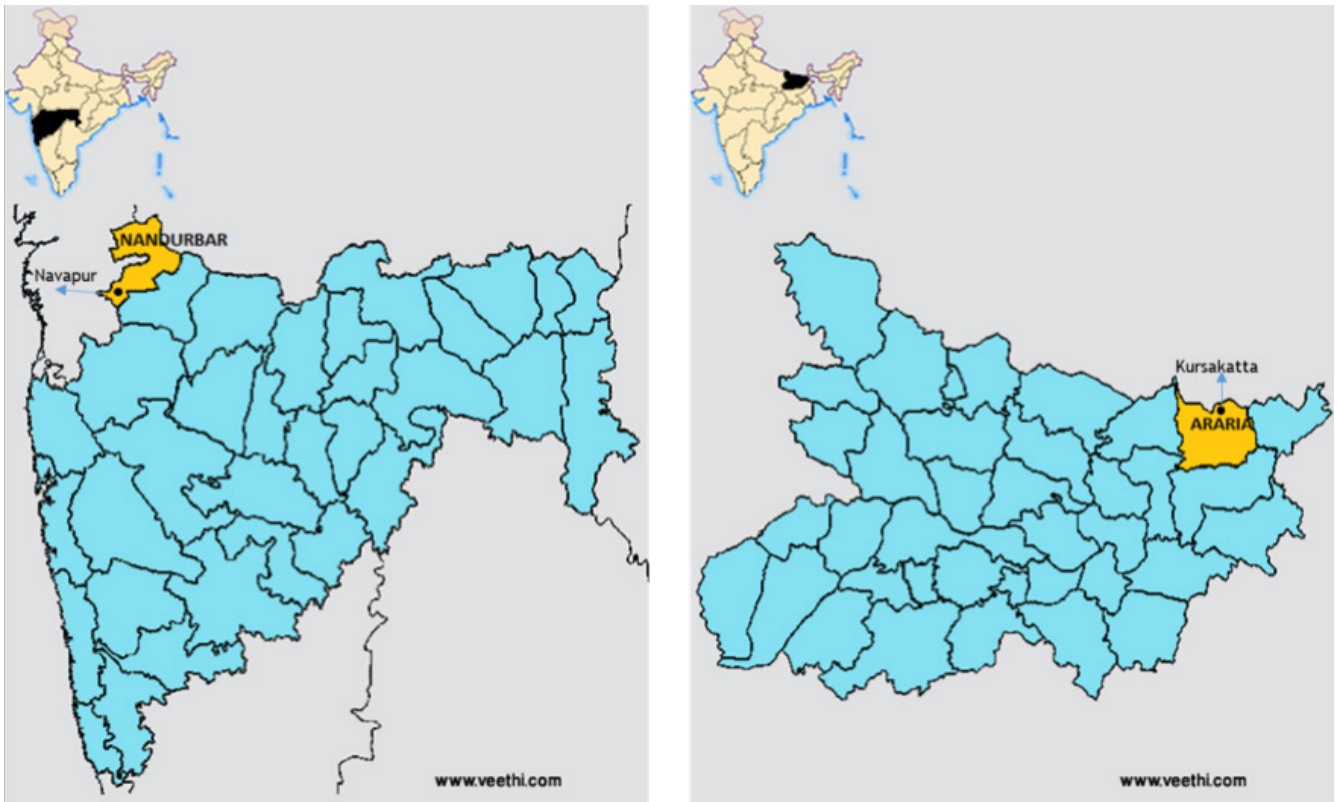


Figure 1: Location of the study blocks



Geographical distribution of agents is uniform in Kursakatta but a concern in Navapur



Navapur

There are a total of eight bank branches, 12 ATMs, and nine BC agents in the block. The BC agents are located close to the bank branches and ATMs—in Navapur and Chinchapada where many of the financial access points are located.

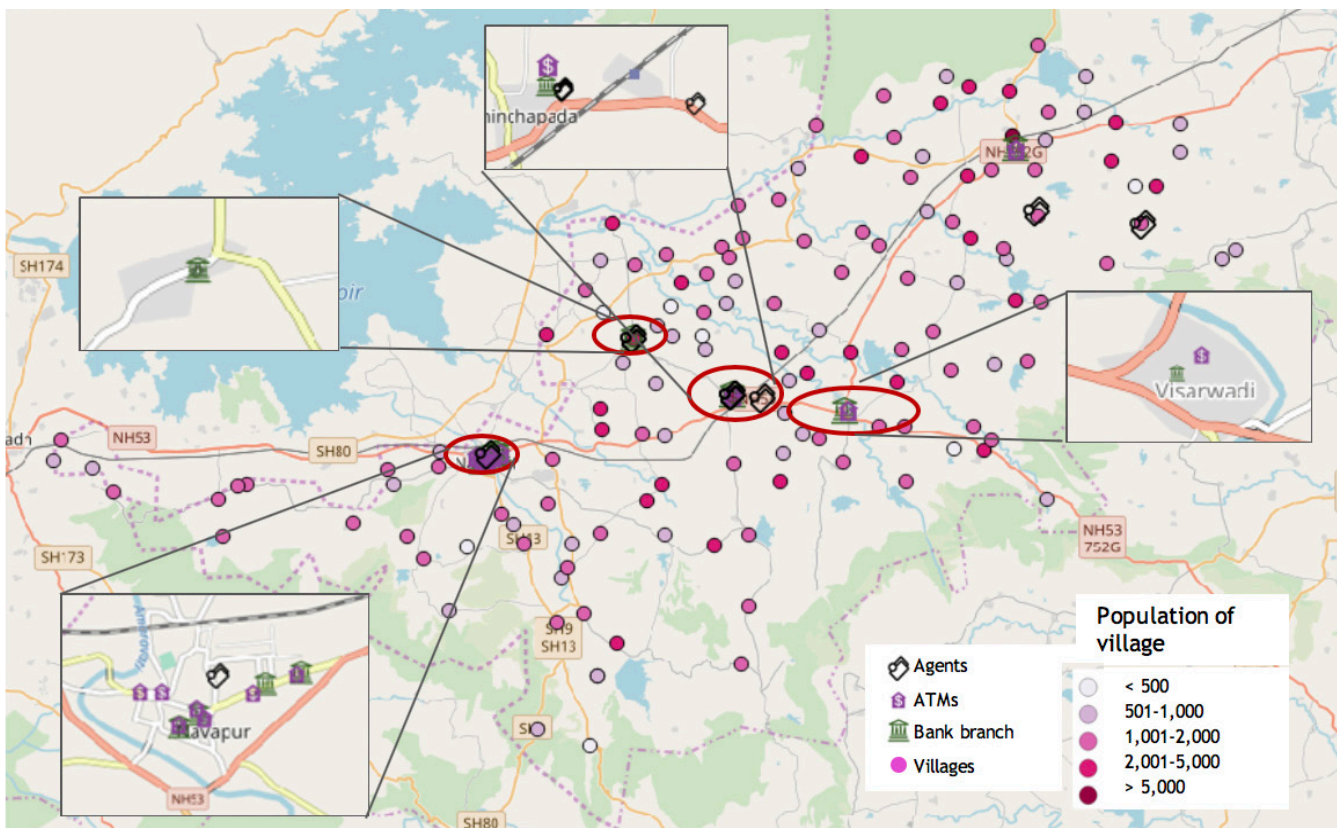
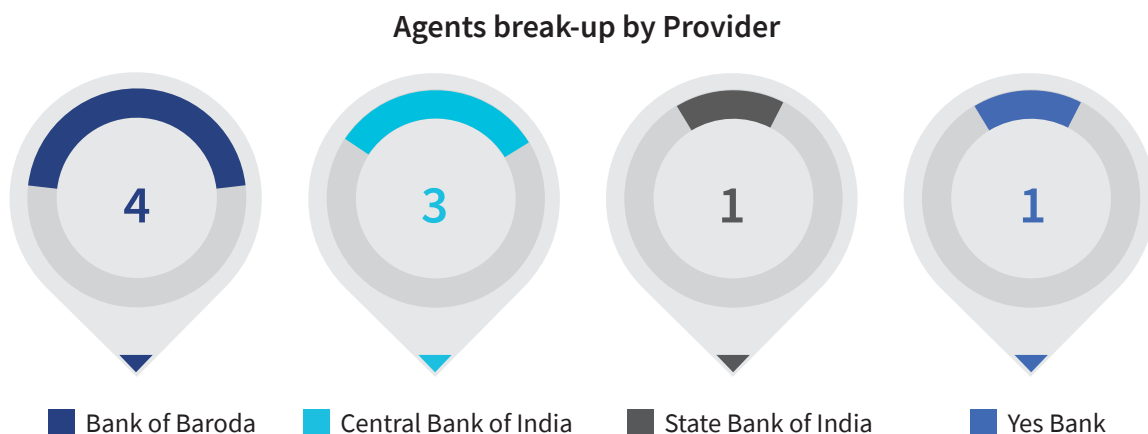
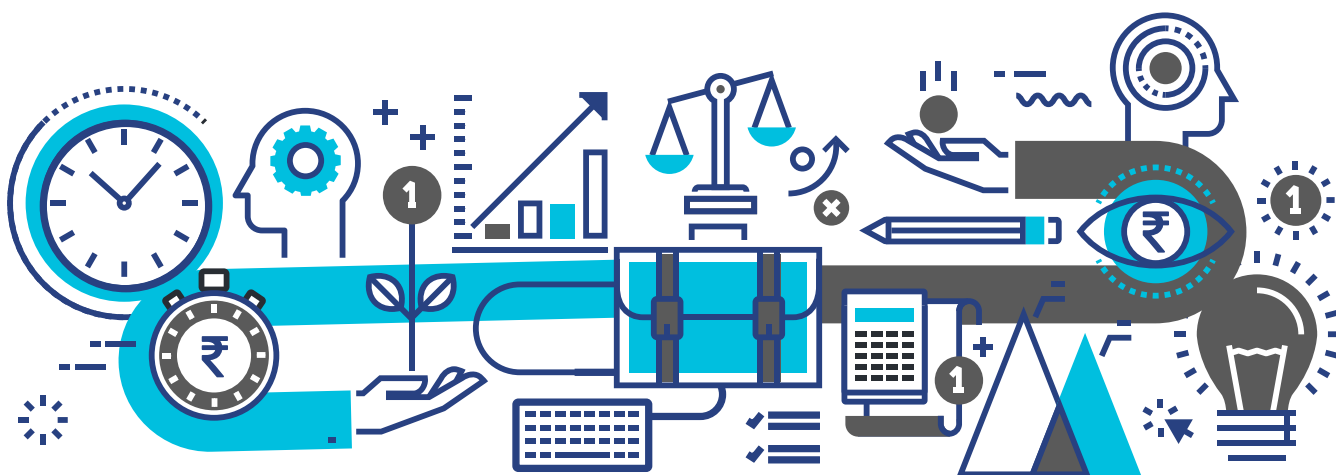


Figure 2: Financial access points of Navapur block

The break-up of the agents by providers is as follows:



Six of the agents are dedicated, which means their only business is agency banking. Most agents—all except one—provide all major services like CICO, account opening, remittance, enrollments for PMJSBY, PMJJBY, and APY schemes, among others. Two agents each for Bank of Baroda and Central Bank of India work from the bank branch itself instead of the SSA allotted to them. The bank branches are plagued by severe power cuts that may extend to over six hours on a typical working day, and use these agents to conduct transactions for customers visiting the bank branch. All agents are male. The agents perform an average of 32 transactions per day. All of them reported that they make profits from the agency banking business.



Kursakatta

There are two bank branches, three ATMs, one MFI office¹, and 35 BC agents in the block. The BC agents are spread uniformly across the length and breadth of the block. However, other financial service points, like bank branches, ATMs, and MFI offices are concentrated in the two villages that have populations above 5,000. Interestingly, both villages have five financial service points within a radius of 0.5 km from the village center.

Out of the 35 BC agents in the block, 34 are male and only one is female. Most of the agents are dedicated (30 males and 1 female). State Bank of India has the maximum number of agents in the block (at 19 agents), closely followed by Uttar Bihar Gramin Bank (at 15 agents). The agents perform an average of 30 transactions per day. All of them reported making a profit from the agency banking business.

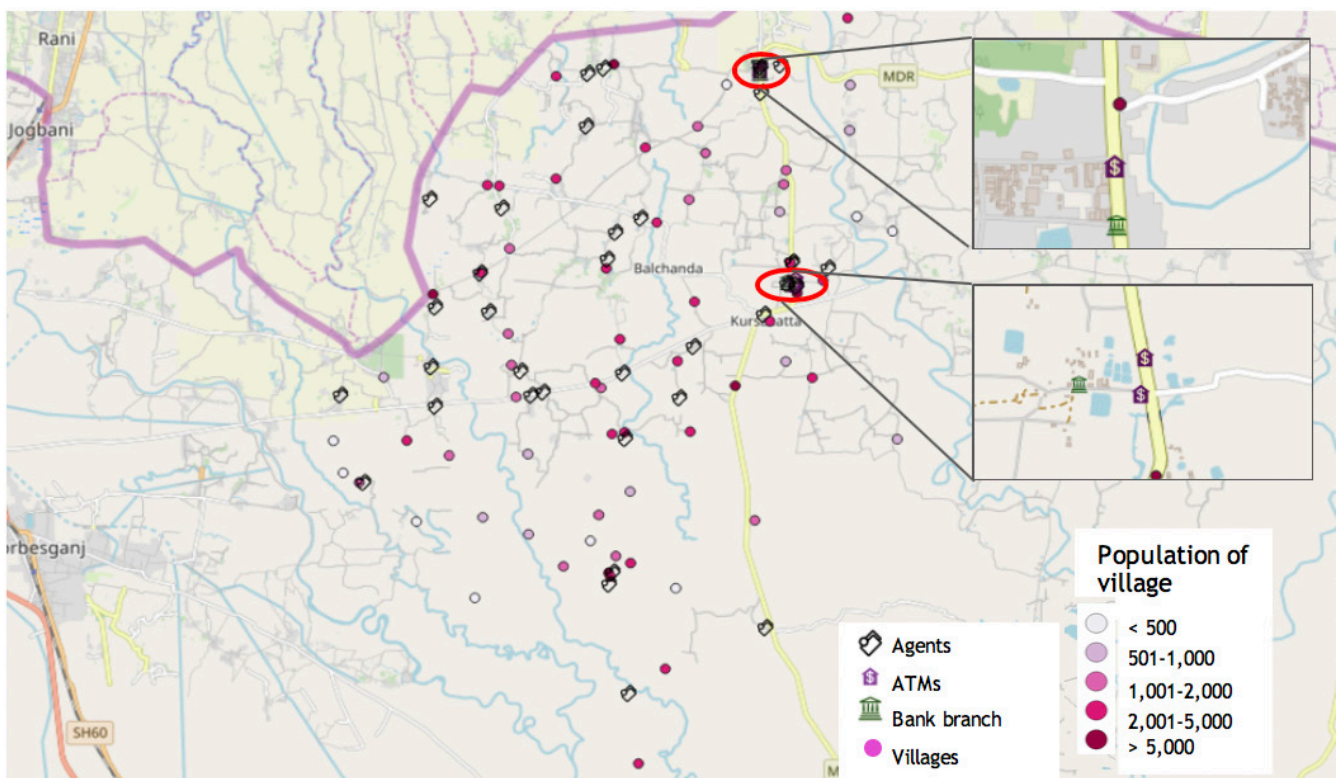


Figure 3: Financial access points of Kursakatta block

¹Jagran Kalyan MFI

Proximity analysis suggests large unserved or underserved areas in Navapur



The distance and time taken to reach the agent location are considered as important factors that affect access and thus usage. A closer proximity of agents to customers increases the number of transactions. CGAP’s work in Tanzania [establishes](#) that a customer is twice as likely to be an active DFS user if they live within a five-kilometer radius of the agent. Since there is no globally established benchmark for the proximity of agents, we conducted a proximity analysis to identify how many villages fall within one and five kms of the agent locations and bank branches.

Navapur

Navapur block has 155 villages. The population distribution among the villages is as follows:

In Navapur block, only a very few villages fall within one-km radius of an agent outlet. This shows that agents are currently not located in areas where they should be under the [SSA approach](#). Many villages do not even fall within the five-km radius of any agent. Twenty villages with a population of over 2,000 do not have an agent present within a five-km radius.

Population	Number of Villages
Less than 1,000	47
1,000-2,000	80
Greater than 2,000	28
Total	155

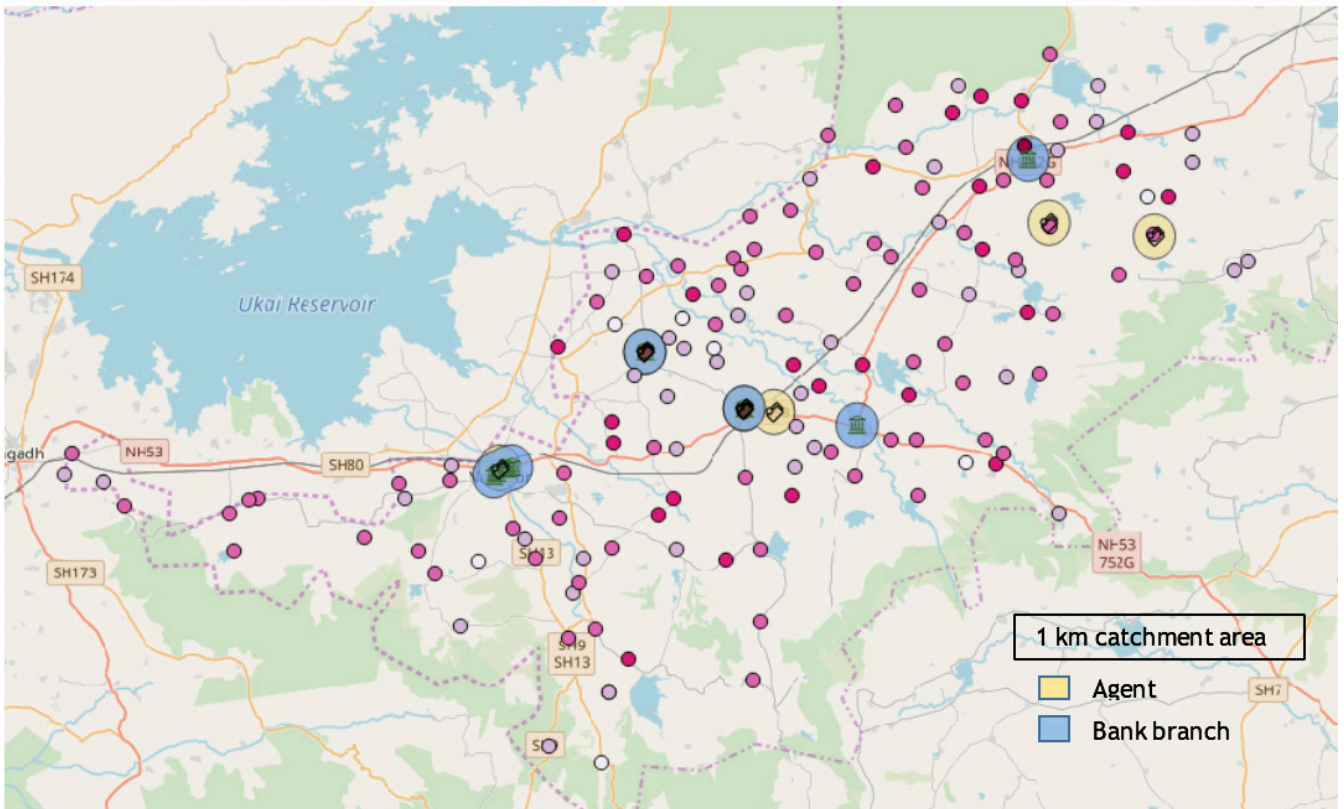


Figure 4: Villages within one km of financial access points

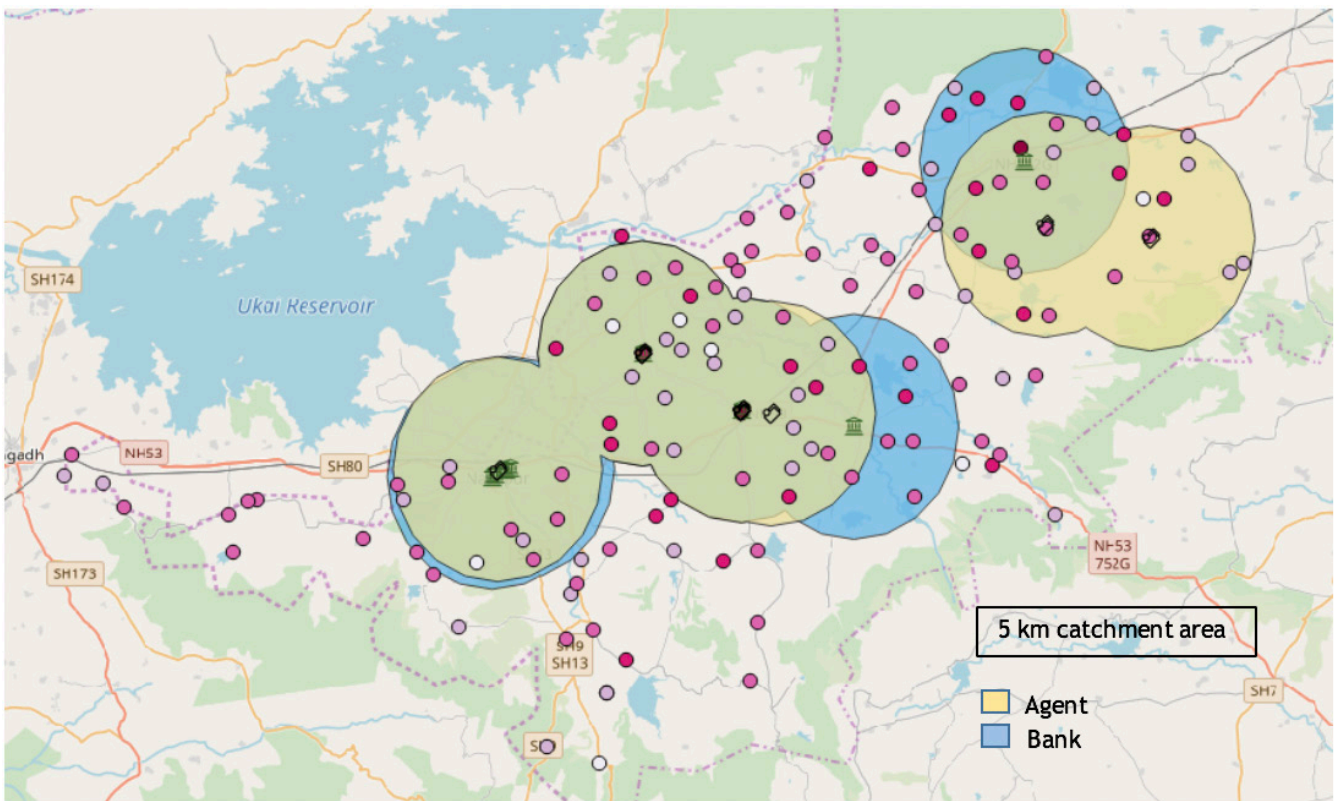


Figure 5: Villages within five km of financial access points

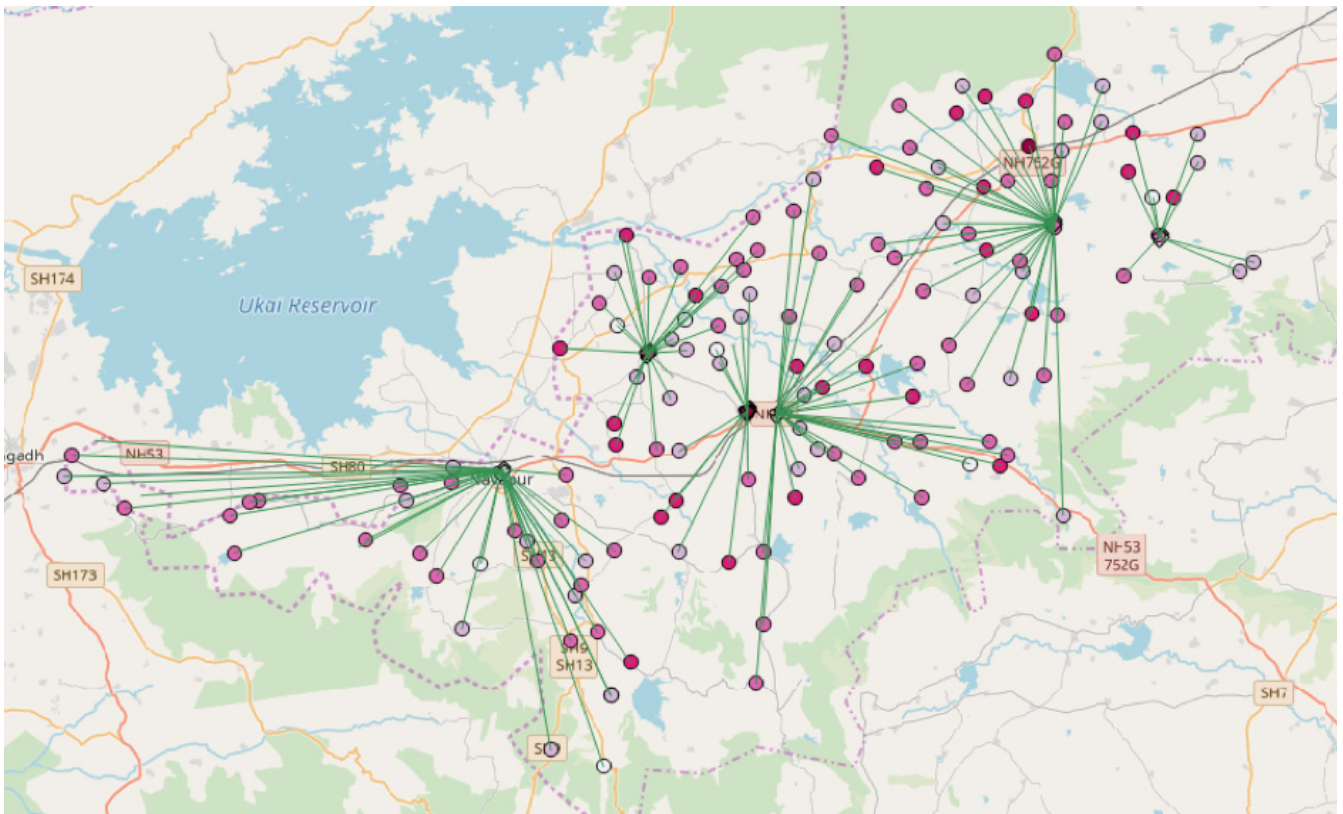


Figure 6: Mapping Villages to their nearest access points

Out of 155 villages in Navapur, only 86 fall within five kms of an agent or a bank branch. We created a hub-and-spoke model to map each village to its nearest agent.

A total of 111,546 people or 30% of the total population of the block and 52% of the rural population of the block live more five kms from their nearest agent. Villages located in the western part of the block are the farthest from the nearest agent locations. However, owing to their close proximity to the neighboring state of Gujarat, a proportion of the local population go to neighboring blocks of Gujarat to conduct financial transactions instead of using outlets in their district.

Kursakatta

We found that almost half of the villages (32 out of 66) are within one km from their nearest agent point. Furthermore, there are only six villages that are more than two kms from their nearest agent. Given the large spread of agents in the block, it is not surprising that the maximum distance for a particular village from its nearest agent point is 4.5km.

The reasons behind the concentration and poor spread of agents in Navapur and the more balance spread in Kursakatta are population density and number of migrants. Kursakatta block has a population density of 694 per sq.km, while Navapur, which has a dominant tribal population, has a population density of 260 per sq.km. Araria, the district within which the Kursakatta block is situated has one of the high rates of labor migration in the country. This results in high volumes of remittance inflows, many of which are withdrawn at agent outlets.

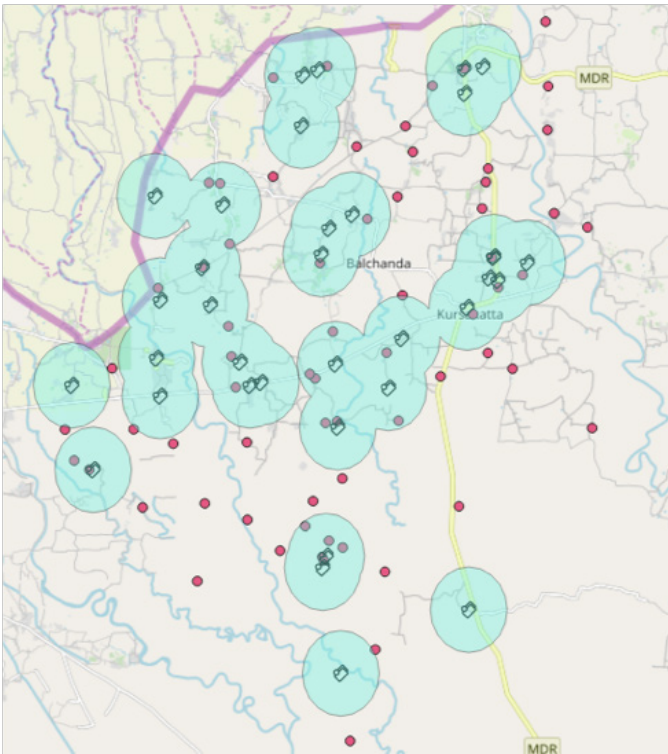


Figure 7: Villages within one km of agents

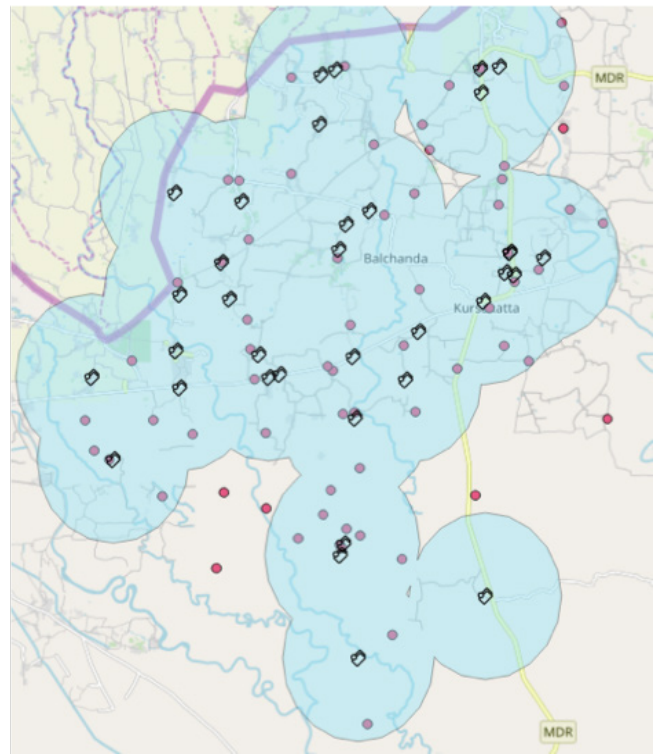


Figure 8: Villages within two kms of agents





Identifying alternative access points as agents

In this section, we present our insights on alternate potential access points in Navapur block. The Kursakatta block already has adequate coverage by BC agents.

The objective of this exercise is to understand who could be potential agents to serve the unserved populations. For this purpose, we collected information and coordinates for other access points that deliver other community services in the villages. We then mapped all such service delivery points to understand the prospective resources available in the block.

The typologies of other service delivery points are as follows:

Common Service Centers (CSCs)



Access points under Ministry of Electronics and Information Technology for delivery of essential public utility services, social welfare schemes, healthcare, financial, education and agriculture services, apart from a host of B2C services to citizens in rural and remote areas of the country.

Post offices:



Outlets of the Department of Posts offering mail related services and act as India Post Payments Bank branches.

Fertilizer shops:



Retail shops supplying agricultural inputs like fertilizers, pesticides, seeds, and small agricultural equipment to farmers.

Grocery shops



Retail shops selling food and other household utility products.

Mobile recharge shops:



Retail shops offering mobile recharge, mobile repair services or selling mobile phones and mobile phone accessories.

Public Distribution System (PDS) shops:



Fair price shops under the Ministry of Consumer Affairs, Food, and Public Distribution that supply rations at a subsidized price to poor households.

Women Self Help Groups:



Groups of 10-20 local women that promote small savings and other economic or non-economic activities among the group members.

To improve the accessibility of the 69 villages currently located beyond five kms of agent points, we mapped the other service delivery points to the excluded villages and identified specific points that are best suited to serve the villages. While ranking other service points that could be potentially considered for agents, CSCs emerged as the most feasible option. Some of the CSC centers have started offering [agency banking services](#) in the states of [Madhya Pradesh, Jharkhand, and Jammu & Kashmir](#).

The Government of India released a [notification](#) in June, 2018 that all CSCs across the country will become business correspondents. Most of the grocery shops in the villages are set up in temporary makeshift structures and are hence not suitable to become an agent point. Mobile recharge shops and fertilizer shops are few and far between. Post offices have their own postal savings accounts and they cannot offer [government insurance schemes \(PMJJBY and PMSBY\) and the pension scheme \(APY\)](#) that are offered under Jan Dhan accounts. Hence, they are not considered as an option. PDS shops usually remain open only for 3-4 days a month when the distribution happens. For a major part of the month, the PDS staff pursue other occupations, such as farming or other ventures or do not work.

The criteria used to rank the alternative service points are as follows:

Service points	CSC	PDS shops	Post offices	Grocery shops	Fertilizer shops	Mobile recharge shops
Infrastructure	Most CSCs have a proper office setup	Most PDS shops are run at home	They have a proper office setup	Most shops have a temporary setup in rural areas	They have a proper shop setup	They have a proper shop setup
Availability of PoS	About half of the CSCs have PoS machines	All of them have PoS machines	All of them have PoS machines	Very few have PoS machines	Most of them have PoS machines	A few of them use PoS machines
Computer usage	All CSCs use computer/laptop	Very few PDS shop staff have used a laptop	All post offices have a laptop	Very few people have used a laptop	Most shops use laptops	Most shops use laptops
Smartphone usage	All CSC owner use smartphones	Few of the staff use smartphones	Many staff use smartphones	Few people use smartphones	Many owners and staff use smartphones	All use smartphones

Since there is no global standard for distance, we considered two kms as an acceptable distance a rural customer would be willing to travel to access financial services. For villages that do not fall within two kms of an agent location, we identified CSC centers that lie in close proximity to these villages. From our analysis, we found that 32 out of the total 62 CSCs could be considered for agency business (see Figure 9).

We considered PDS shops as a second option since they are located in the center of villages and PDS owners would be willing to work as agents as they get additional work to keep their shops open throughout the month. The PDS shopkeepers in the study areas reported that they usually stay at home when the PDS shop is closed. They do some minor household and agricultural work when required. They are willing to take up the work as banking agents as they can generate some additional income from the same shop location—but this will depend on the level of transaction activity. We conducted the same analysis for PDS shops and found out that 14 out of 117 PDS shops can be considered for agency business.

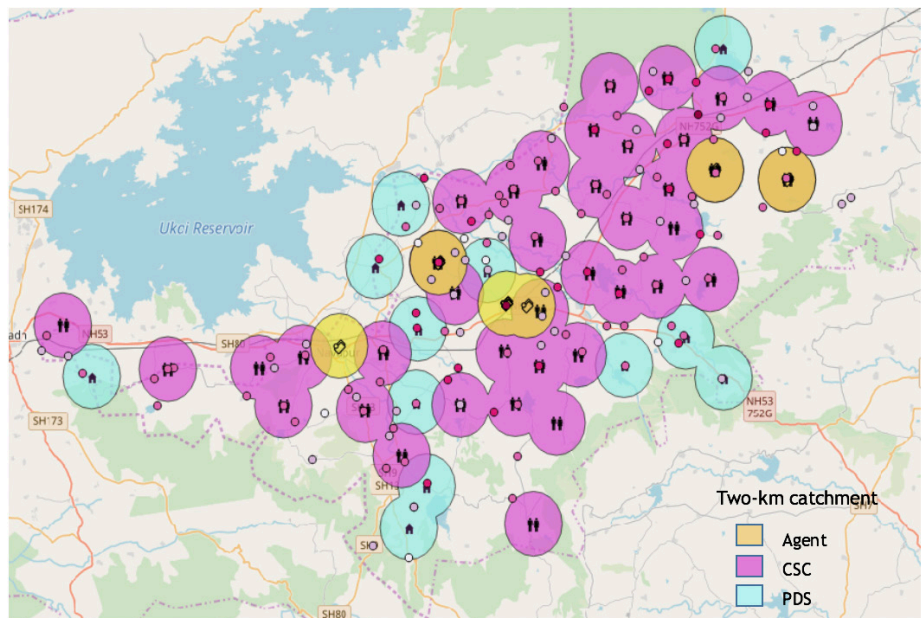


Figure 9: Identifying potential agents

A new strategy to ensure agent viability is needed to ensure network optimization



Even though the above recommendations for potential agents could possibly solve the issue of proximity, the issue of agent viability and dropout remains unaddressed. Our [State of the Agent Network, India 2017](#) report suggests that one in three agents in India make losses from the agency banking business.

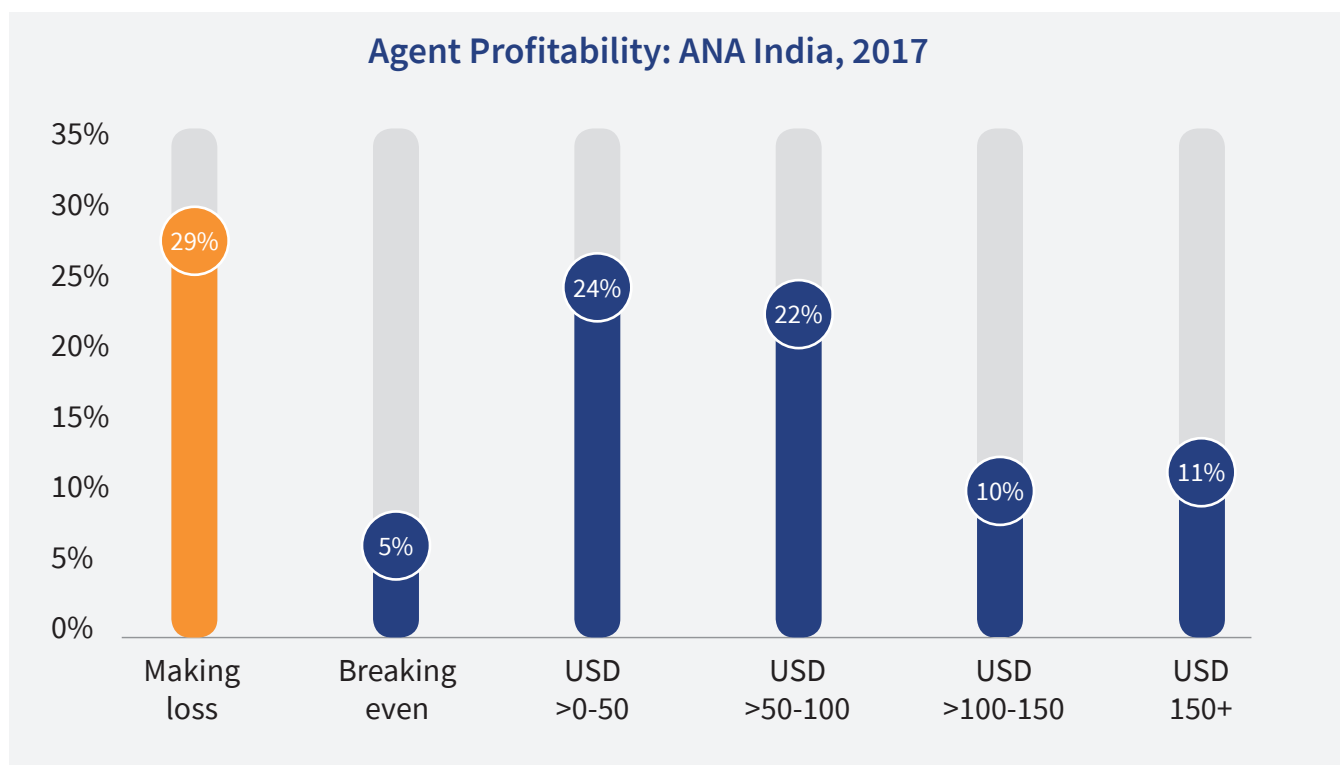


Figure 10: Profitability of agents

For several years now, MSC has advocated [differentiated agent outlets](#). This approach propagates the categorization of BC agents into the following:

- | | |
|---|---|
| <p>1. Relatively sophisticated sales agents who can be exclusive and dedicated—These agents would be responsible for selling products, onboarding customers, and conducting larger value transactions;</p> | <p>2. Basic service agents who can be usually non-exclusive and non-dedicated—These agents would conduct typically smaller cash-in and cash-out (CICO) transactions.</p> |
|---|---|

Non-dedicated agents are more likely to break-even or make profits compared to dedicated agents. The [ANA India 2017 report](#) indicates that 36% of dedicated agents make losses compared to just 21% of non-dedicated agents. This is because of the high operating expenses of dedicated agents across all geographies.

The service agents can run with low operating expenses, as they will need minimal space and solely a biometric device and smartphone to perform CICO transactions. These agents would conduct financial transactions as a marginal, add-on, business to complement their existing enterprises—for example, small grocery store and CSC, among others. This would ensure that these agents, particularly in rural areas, are viable.

Finally, agent segmentation could also lead to financial inclusion for women by bridging the gender gap in the access to digital financial services and its use. [The Financial Inclusion Insights Wave IV India report](#) shows a significant gender gap in terms of access to formal financial services. As of June, 2017, 33% of women had active bank accounts as compared to 47% of men. Our study on gender dynamics in agent banking highlights that the social status of rural women often limits their ability to travel beyond a certain distance from the village. With service agents serving customers within a much closer proximity, women will be able to access financial services in areas where distance and hence their mobility is a barrier. The concept of agent segmentation needs to be tested in the field to develop a standard framework for the selection and segmentation of agents in rural areas.

Navapur

We attempted to apply the concept discussed so far and identify potential sales and service agents for the Navapur, block based on the geographical information collected during the study. Since service agents are envisaged to conduct typical CICO transactions, we considered they should be at a distance of two kms from the customers and serve a population of up to 5,000. During one of their weekly or fortnightly travels to the marketplace, customers can perform infrequent transactions, such as account opening, insurance and pension enrolments, and premium payments. Hence, sales agents are placed within a five-km radius for each village and serve a population of up to 20,000.

We created polygon grids in QGIS of 10x10kms to identify sales agents and 4x4kms to identify service agents. We mapped existing BC agents alongside potential agents of CSC and PDS in these grids. The 10x10kms grid (See Figure 9) gave us an estimation that 14 sales agents should be placed in the block, based on the population level in each grid. If the population in a 10x10 grid is more than 20,000, then we placed two sales agents there. We have not considered placing sales agents in grids where there are less than five villages. These 14 sales agents can also act as a rebalancing point for the remaining service agents.

Using a similar approach, we estimated that 35 service agents are required based on the 4x4 km grid. As in the case of 10X10 grid, we placed two service agents in grids that had a population greater than 5,000. We did not consider placing service agents in the 4x4 grids where sales agents are already present—and had a population of under 5,000.

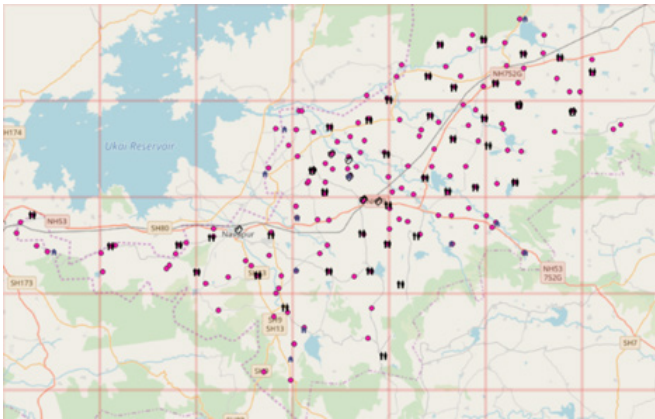


Figure 11: 10 x 10 km grid

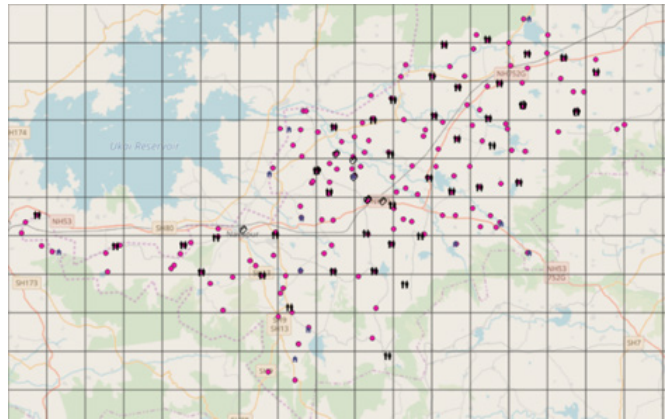


Figure 12: 4 x 4 km grid

According to our segmentation approach, there should be 49 agents in Navapur block (currently there are nine agents). These agents need to be redistributed into 14 sales and 35 service agents based on the agent segmentation concept

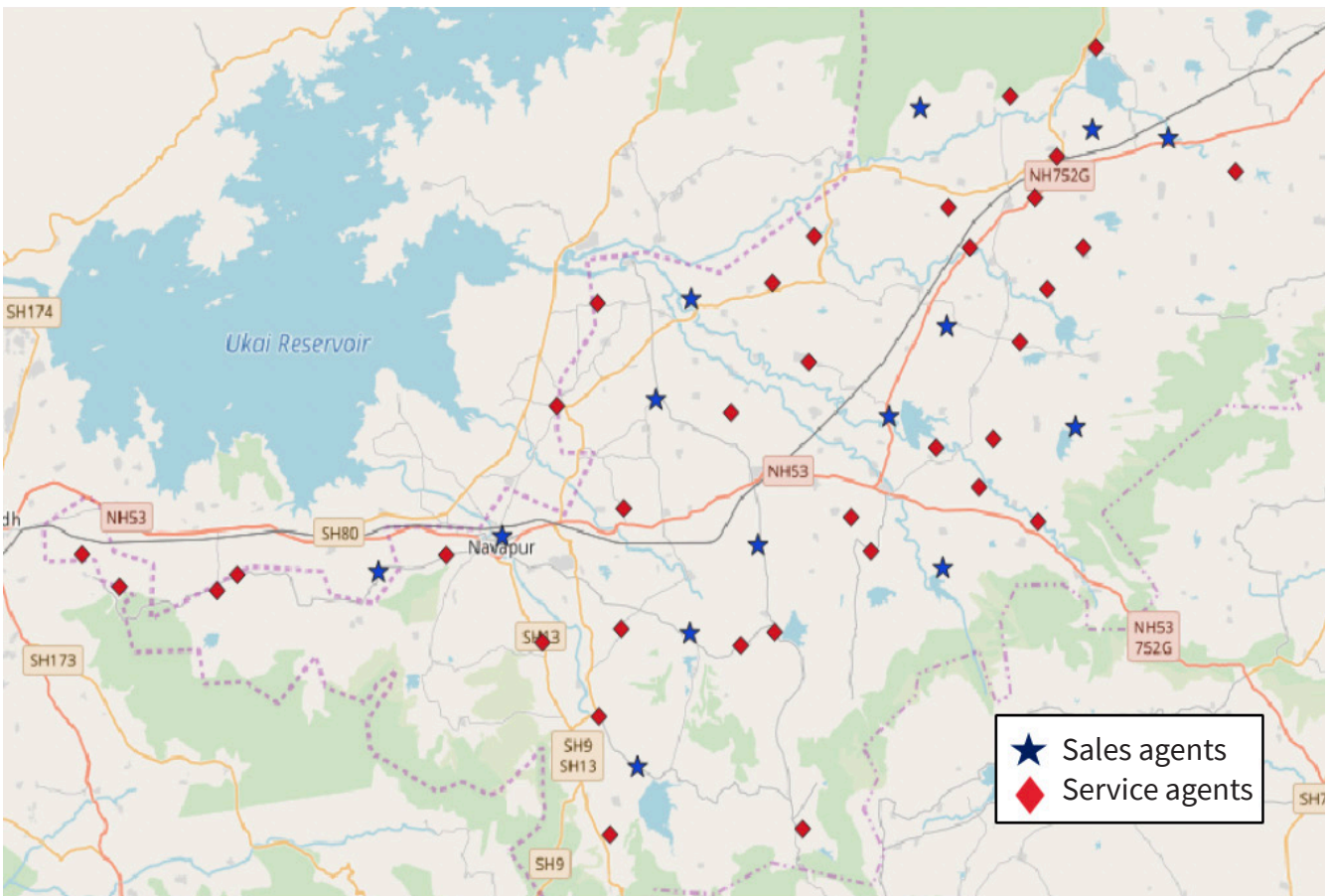


Figure 13: Placement of sales and service agents in Navapur block

Kursakatta:

Even though the agents are located in close proximity of customers in Kursakutta block, the issue of agent viability and dropout remains unaddressed. Using the same criteria as applied in Navapur block, we created a 10x10 km grid and a 4x4 km grid. We estimated there should be a total of nine sales agents and 15 service agents in the block.

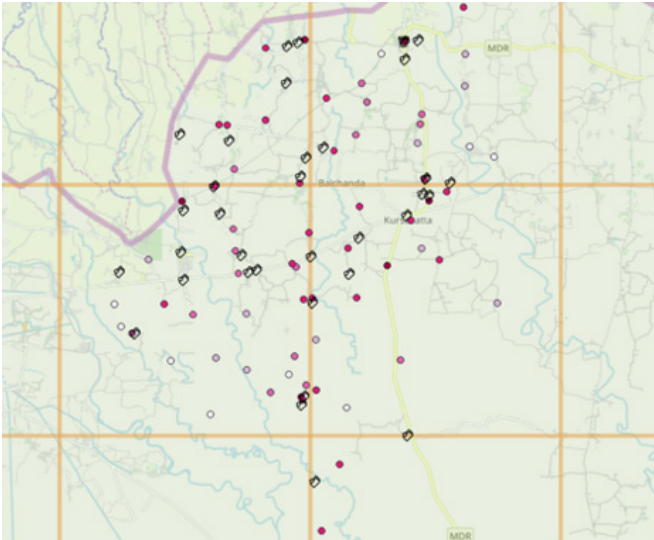


Figure 14: 10X10 grid (Kursakatta)

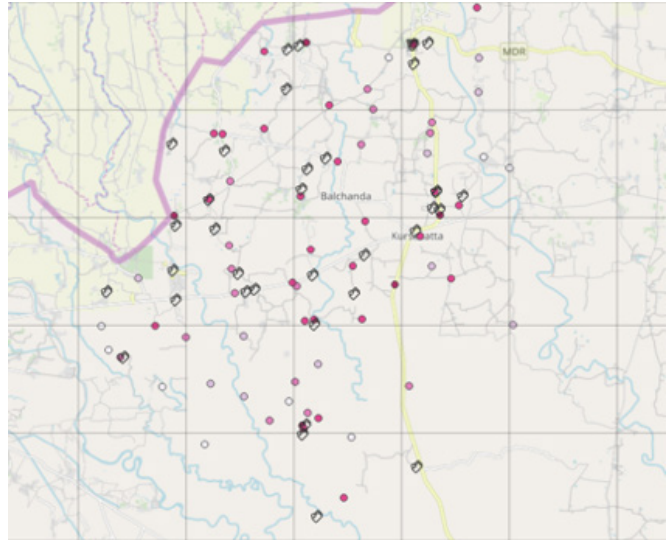


Figure 15: 4X4 grid (Kursakatta)

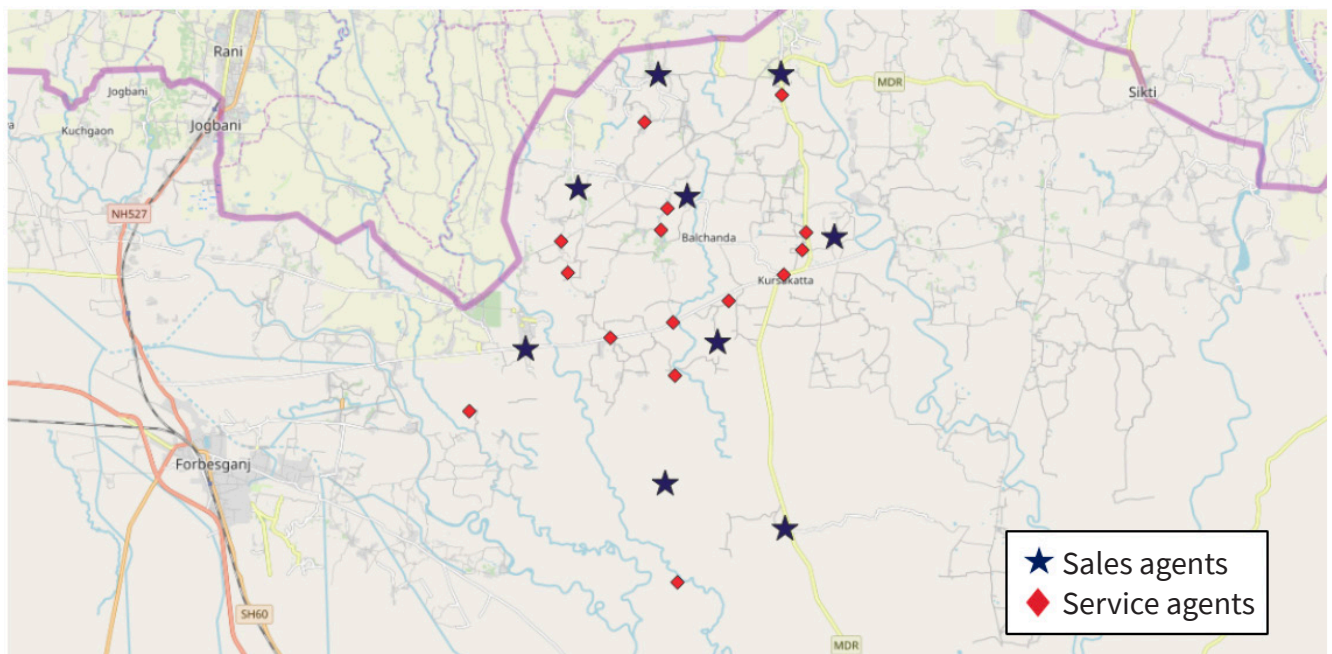


Figure 16: Sales and Service Agents



Conclusion

The factors responsible to develop sustainable agent networks are varied. Location is a key factor and perhaps the starting point. The strategy for the location of agents cannot be applied uniformly across geography. It needs to be determined after considering the local context of population, population density, the current distribution of agents, availability of other service points, among other factors. This is where data-driven insights using smart technologies can help serve providers. Through our study, we were able to establish how agent segmentation can address the challenge of ensuring access to financial services. While doing so, we also took into account the challenges associated with agent viability.

Financial sector regulators of India have taken many progressive steps to promote financial inclusion, including the sub-service area (SSA) approach. The SSA approach is supposed to address the proximity issue by placing BC agents closer to the villages. Yet proximity is only one of the many factors that influence access to financial services. The policymakers should develop a comprehensive framework that includes data on all factors that would help us determine the agent location and distribution. The regulators can develop a real-time model based on the study to identify underserved areas and provide suggestions for the location of agents. The data on active agents and their locations, types, and volumes of transactions conducted by them are readily available with the regulators.

Annexure I— Profile of study blocks



Navapur

Nandurbar district in Maharashtra came into existence in 1998 after bifurcating from Dhule district. Nandurbar's headquarter is located at Nandurbar city. The district is bounded to the south and southeast by Dhule district, to the west and north by the state of Gujarat, and to the north and northeast by the state of Madhya Pradesh. The River Narmada defines the northern boundary of the district. Nandurbar district is a tribal district with over 65% of the total population composed of Scheduled Tribes. It has six blocks and has a forest cover over 20% of its total land area.

Navapur is a block in Nandurbar district of Maharashtra with its headquarters in Navapur town. The block is located 58km from the district headquarters (Nandurbar town). Navapur is bound by the state of Gujarat in the north and west, Sakri district in the south, and Nandurbar block in the east. Navapur has a primarily rural setup with 155 villages and 2 towns, with over 85% of the total population staying in rural areas. The block also has a significant tribal population, with over 85% of residents classified as Scheduled Tribes by the government. The block has a population density of 260 per sq. km., which is much lower than the state average of 365 per sq. km.

The table below provides some key demographic attributes of the [district](#) and [block](#).

Indicator	Nandurbar district	Navapur block
Population	1,648,295	367,443
Sex ratio	978	1,010
Area (in sq. km.)	5,955	1030
Population density (per sq. km.)	277	260
Literacy rate (in percentage)	53.53	53.54

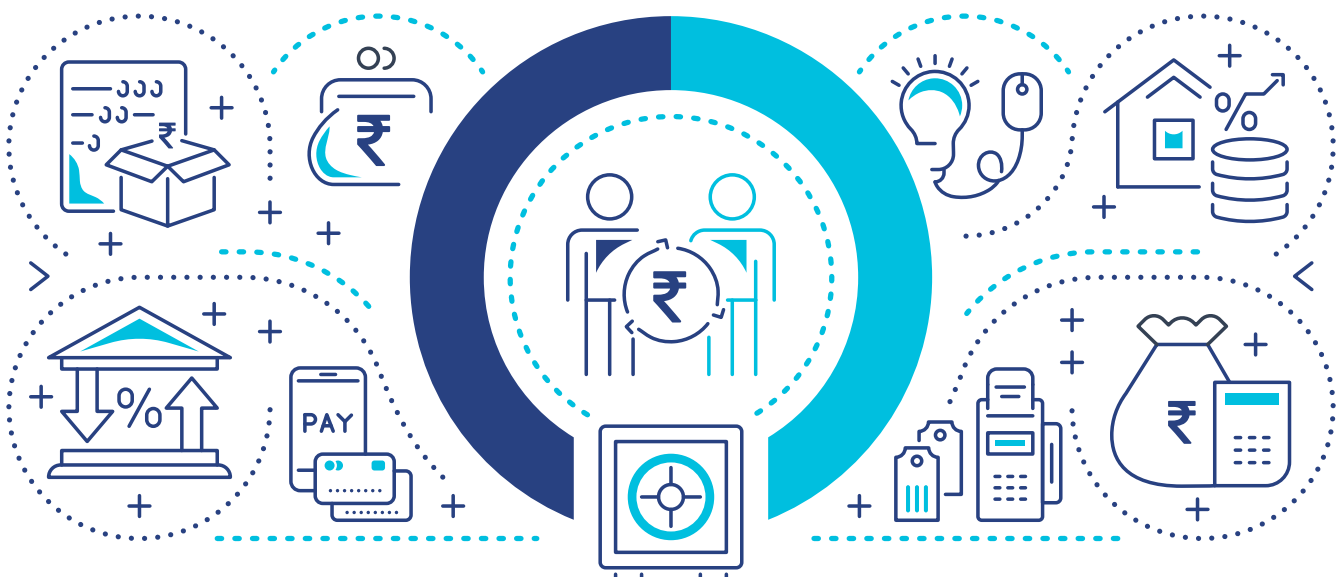
Kursakatta

Araria district in Bihar came into existence from the division of Purnia district in 1990. The district border is surrounded by Nepal in the north, Purnia in the south, Kishanganj in the east, and Supaul and Madhepura in the west. Araria is administratively divided into two subdivisions, which are composed of 9 blocks. The district is blessed with fertile land and agriculture is the major economic activity. Over 64% of the total district area is classified as cultivable land.

Kursakatta is a block in Araria with its headquarters in Kursakatta town. The block is located 28km towards the north from the district headquarters at Araria and 281km west from the state capital Patna. Kursakatta is bound by Sikty block in the east, Forbesganj in the west, Araria block in the south, and Palasi block in the east. The international border of Nepal lines the block's northern end. The block has a completely rural setup, comprising 69 villages with no towns. The block has a population density of 694 per sq. km., much lower than the district average of 993 per sq. km. and almost 40% lower than the state average of 1,106 per sq. km.

The table below provides some key demographic attributes of the [district](#) and [block](#).

Indicator	Araria	Kursakatta
Population	2,811,569	149,231
Sex ratio	921	913
Area (in sq. km.)	2,830	214.91
Population density (per sq. km.)	993	694
Literacy rate (in %)	42.53	45.68



Annexure II— Methodology



We adopted a cross-sectional approach to understanding the financial access points available for rural people to access financial services. The study focused on collecting quantitative data on the preferences, availability, and use of financial services from the target population. The study also collected GSP coordinates for spatial analysis. We selected two blocks for the study. Blocks are administrative units that are a level below the districts and are equivalent to sub-district.

Study Area

The two blocks chosen for this study were Navapur in Nandurbar district, Maharashtra and Kursakatta in Araria district, Bihar. Our research team chose the blocks on the following parameters:

1. Both blocks are currently under the aspirational districts program of NITI Aayog, implying that there are significant financially underserved populations in the targeted geographies.
2. We wanted to include blocks that have a different profile. Navapur has a large percentage of tribal population. In fact, Scheduled Tribes comprise the majority of the population of the block—and has a much lower population density than its district or state. Kursakatta, on the other hand, is located in the most densely populated state of the country, with the population density of the block being over 1.75 times the national average.

Research steps

Stages of the study were as follows:

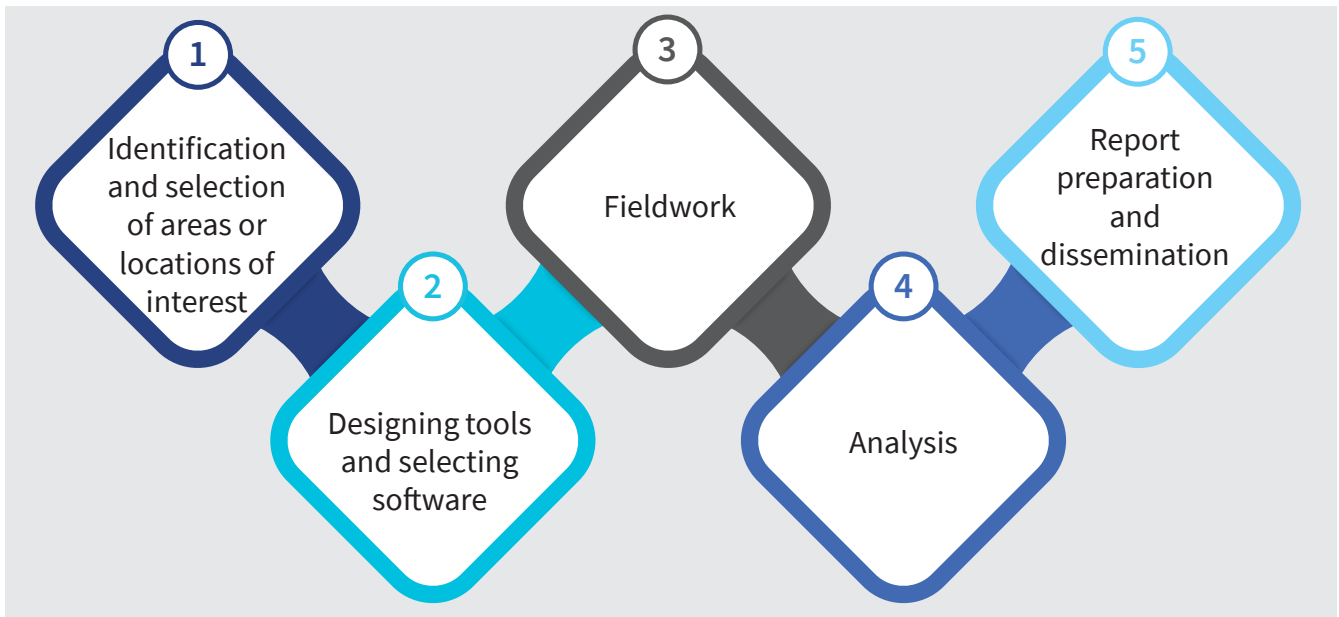


Figure 17: Research steps

Identification and selection of the sample for the study

Existing financial service providers are imperative to determine the current spread of financial services available among the rural population, and were hence included in the locations of interest. However, several other government service outlets that could be used to fill the current gap in access to financial services were also added to the list. Furthermore, private businesses or other organizations that have a significant spread or presence at the village-level, and hence could be used due to their vast coverage, were also included. Locations such as schools, health centers, and marketplaces that serve as a focal point for the village population were also considered due to the high footfall at these locations. The geographical center of the village has also been mapped to understand the proximity of the village population to the various points mentioned above.

The table below shows a list of the points included according to the criteria mentioned above.

Current access points	Government service points	Other organizations or business outlets	Other locations of interest
<ul style="list-style-type: none"> • Bank branch • ATM center • BC agent • Post office • PACS • MFI 	<ul style="list-style-type: none"> • Panchayat • Primary health center • PDS shop • CSC center 	<ul style="list-style-type: none"> • SHG • Fertilizer shops • Mobile recharge shops • Kirana stores 	<ul style="list-style-type: none"> • Villages • Marketplace • Weekly <i>haat</i>

Designing tools and selecting the software

We used the [ODK Collect](#) app to capture the geographical location of DFS agents, banking customers, and village members whose work results in potentially the influx of a large percentage of the village population, that is, PDS shops, fertilizer shops, mobile recharge shops, *kirana* stores, PACS, MFIs, and CSCs. Each of these stakeholders also had a questionnaire designed specifically for them to help us understand the current skill level, nature of services provided, and the volume of customers encountered. The questionnaire for customers helped us identify key demand-side trends and requirements.

We used the [GPS Essentials](#) app to capture the geographical location of current financial service points (banks, ATMs, post offices), government service outlets (*panchayat* offices, PHCs), SHG meeting points, and other locations that form as common focal points for the local village population, such as marketplaces and weekly *haats*. The points collected through this app painted a picture of the current financial landscape as well as the proximity of other services or locations that a majority of village residents generally access.

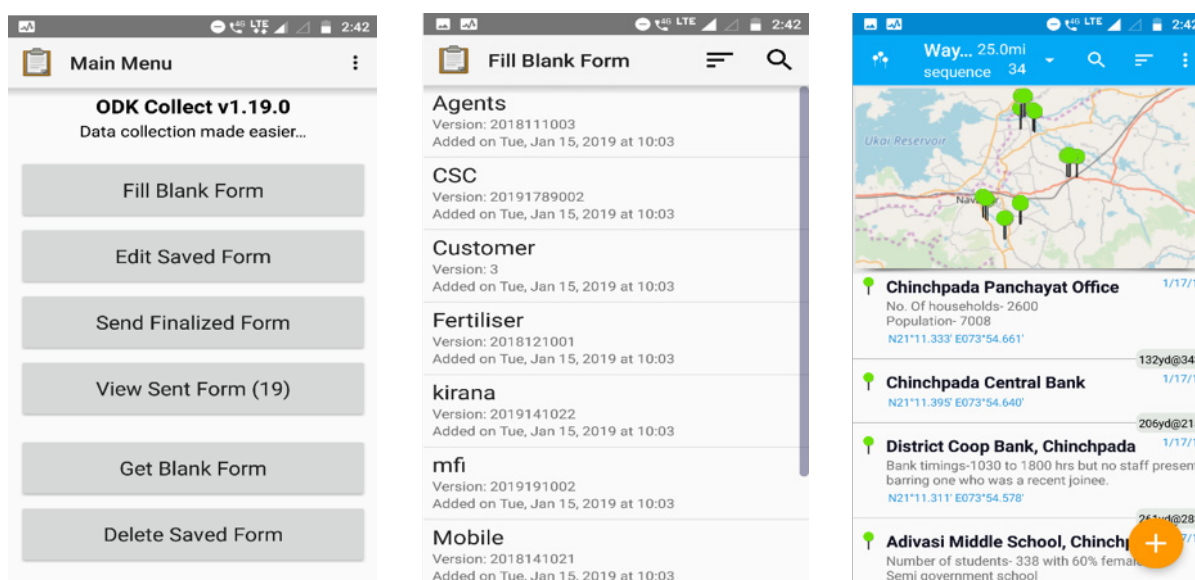


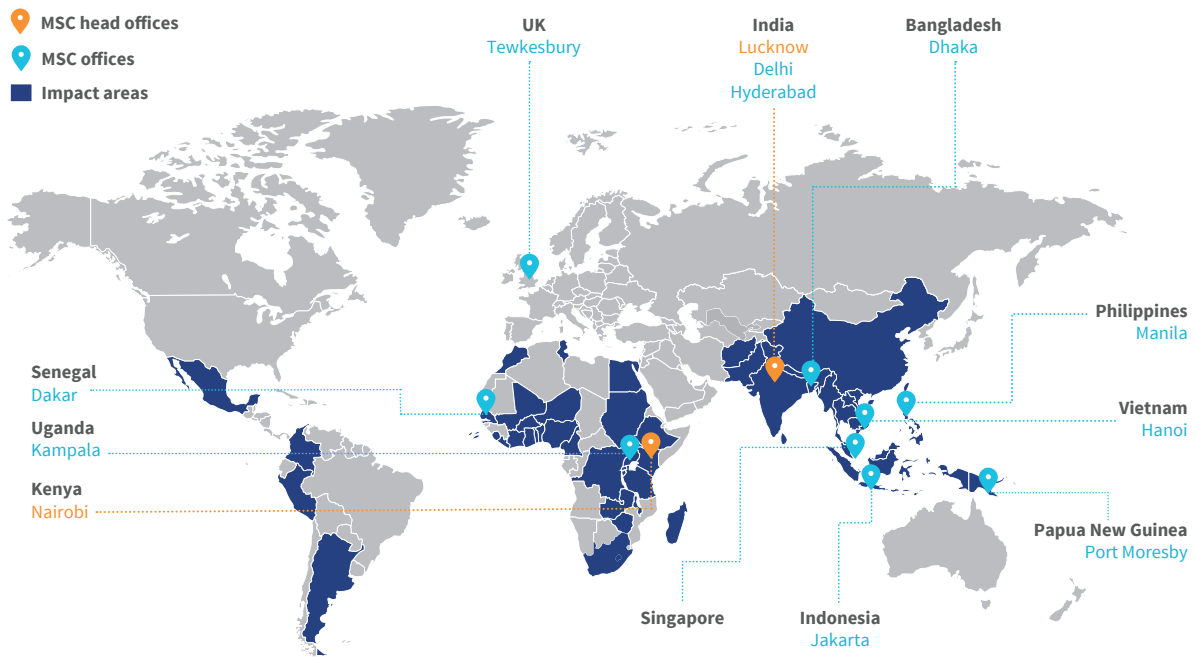
Figure 18: Tools used for data collection

Fieldwork

Data collection was carried out in the respective blocks by MSC staff members. They approached each village in their respective blocks and covered the points as discussed above, along with capturing the GPS coordinates for each site. The fieldwork was conducted during the months of January and February, 2019.

Analysis

We used QGIS 3.4.4, an open source GIS analytics software for mapping and analysis. We used proximity analytics tools, buffering techniques, and QGIS cloud plugin to generate insights and interactive maps from the data. The collected points were then plotted in QGIS 3.4.4. Descriptive analysis was carried out using SPSS on the data collected through the ODK Collect app. We used proximity analytics tools, buffering techniques, and the QGIS cloud plugin to generate insights and interactive maps from the GPS coordinates.



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