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ICT in Agriculture: The Case of Senekela in Mali

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Executive summary

This study presents detailed examples of how repeat Sénékéla users have changed their farming and marketing practices, and the reasons underpinning these changes. Data was collected through a series of semi structured interviews with repeat Sénékéla users. The findings of the case study serve to complement quantitative data about customer behavior change that was collected through a structured survey with 50 customers from a cross Mali.

While the phone survey aims at measuring the prevalence of reported behavior changes among repeat users of Sénékéla (in other words, the percentage of repeat users who report behavior change), this case study presents detailed examples that help to show the kinds of behavior changes that are occurring. The case study does not intend to provide evidence of the 'average' impact of Sénékéla on customer behavior, and its findings should be considered alongside the results of the Sénékéla midline phone survey. The main findings of the case study have been organized under two key themes; behavior change among repeat users of Sénékéla and factors influencing behaviour change.

Background

The Farmer Initiative Fund in partnership with other public and private sector agriculture organizations, encourages mobile communication service providers to use mobile communications to provide agricultural information and advisory services to the very poor smallholder farmers in developing countries.

In Mali, OrangeMali has launched “Sénékéla” as part of the mFarmer initiative to provide agricultural advisory services to farmers. Sénékéla will focus on Malian farmers engaged in millet, sorghum, maize, rice, onion, tomato, potato, okra, shallot, shea, cashew nut and sesame while farmers will also benefit from weather updates and market pricing information. Senekela service started in 2013 in the Sikasso region covering 12 markets for 16 crops; it will be extended to Koulikoro region in 2014 for the same number of markets and crops. To date Senekela receives more than 5000 calls from all the country.

Currently, the Sénékéla service sends out to its subscribers a total of 3 SMS per day on crop prices and weather. It does not have a provision for interaction as of yet and therefore the system has no feedback.

Helpline: there experts at the desk that customers call to have information on agriculture or related agriculture activities. If the experts have no response to a question, they refer to IER (Institut d’Economie Rurale) and 48 hours they provide the correct answer to the customer. The cost for calling the helpline is CFA 50 per minute.

In order for the project to reach out to many farmers in the country, OrangeMali has been working with the Rural Economy Institute (Institut d’Economie Rurale, IER) to ensure farmers receive relevant information.

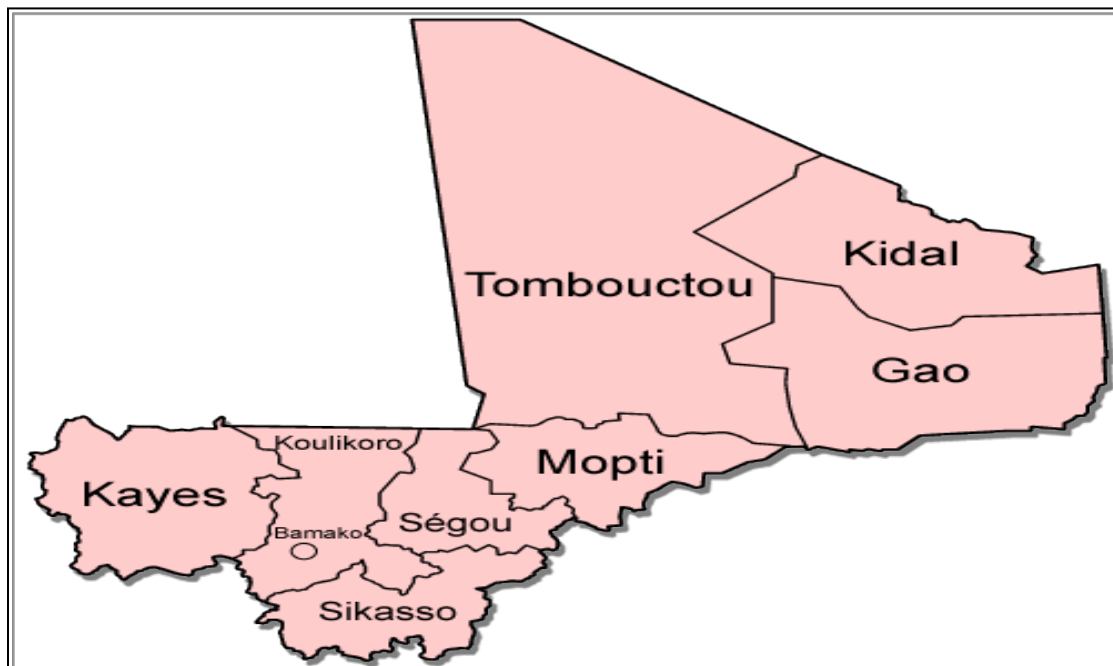


Figure 1: Map of Mali indicating the area where the interviews took place

Participant Profiles

The study succeeded in conducting valid one-on-one interviews with 22 interviewees. This section presents the profile of these participants.

▪ Total number of valid samples, number of male & female numbers

22 interviewees were composed of 19 men and 3 women. Very few women answered the phone which was made prior to the field study to have agreements to participate in the interviews, and those who did deny using Sénékéla themselves and said that others in their family used the service or male relatives who were absent. The following table presents the number and description of valid interviews.

Table 1: Description of Interviewees (Sex& Geographical clusters)

Cluster	Male	Female	Total
Koulikoro	6	0	6
Kati	7	0	7
Bougouni	5	3	8
Total			21

▪ Age groups

Interviewees are from different age groups. Half of the interviewees (50%) were ranged between 47 years and above, while only few of them (9%) are between 16-24 years. Farm activities involve family members at different age groups and the gender of the person could influence the type of activity in which he/she is involved. However, the vast majority of the interviewees are between ages 36 and above. The following graphics show the number of interviewees by age group and the corresponding percentage.

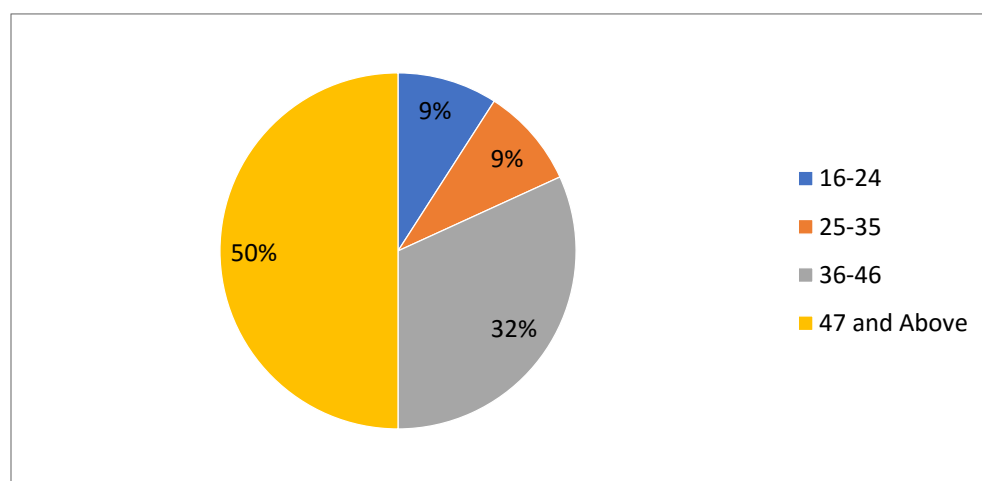


Figure 2

▪ Primary source of household income and occupation of interviewees

Households have several income sources; the primary source of income is dominated by agriculture (61%) followed evenly by trading (13%), formal salaried labour (13%) and other income sources (13%).

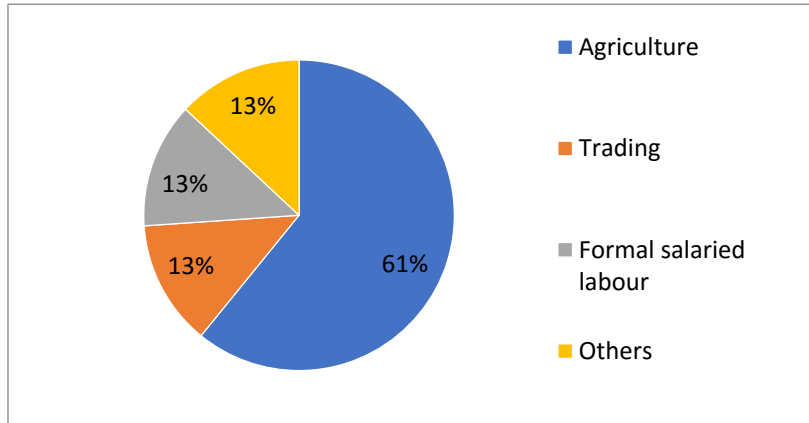


Figure 3

The majority of the interviewees are farmers (45%), traders (23%), formal salaried labour (14%) and others (18%). The following graphics show the proportions of household's primary source of income and interviewees occupations.

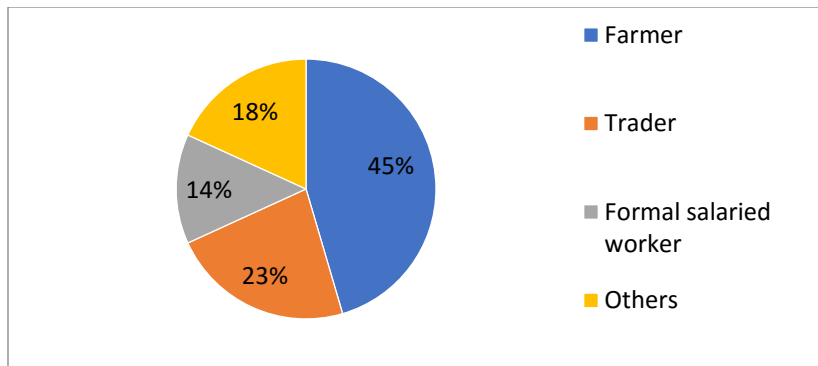


Figure 4

▪ **Farmers and land size**

As the previous figure (Figure) shows, most Malians have multiple numbers of side jobs. Regardless of the variety of an individual job portfolio, however, most of the interviewees (64%) recognize themselves as farmers. The following pies show the proportion of farmers in the sample and their land possession.

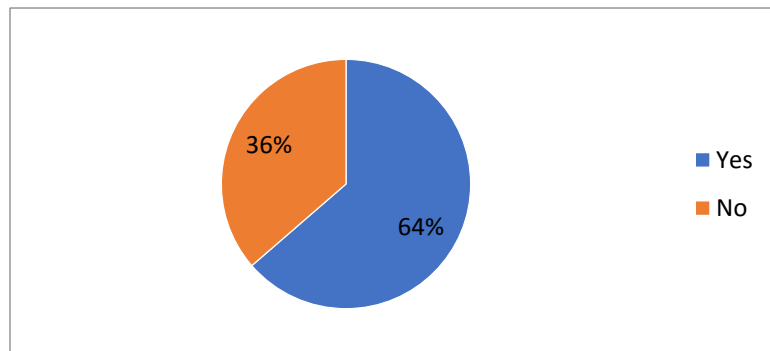


Figure 5

Farms varied widely in size from less than 2ha to more than 5ha and farmers kept a wide variety of crops the most common being seasonal vegetables, rice, millet, sorghum, maize and legumes. Almost all interviewees own animals (cattle, sheep, goat, donkey, horse and poultry).

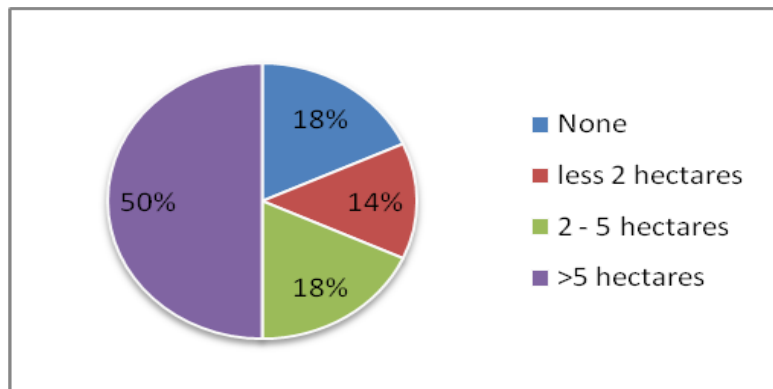


Figure 6

▪ Crop selling behaviour and education level of interviewees

The main objective of farming in the rural area is for subsistence. Most of the interviewees (72%) sell only the excess of their products. Those who sell all their harvest (7%) are vegetable or tree crop farmers.

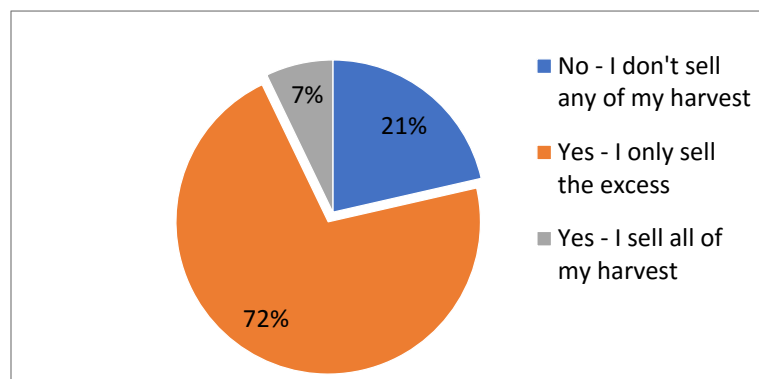


Figure 7

More than half of the interviewees (55%) have no formal education; 23% have reached the secondary level, 18% the primary level, while only 4% attended the tertiary level.

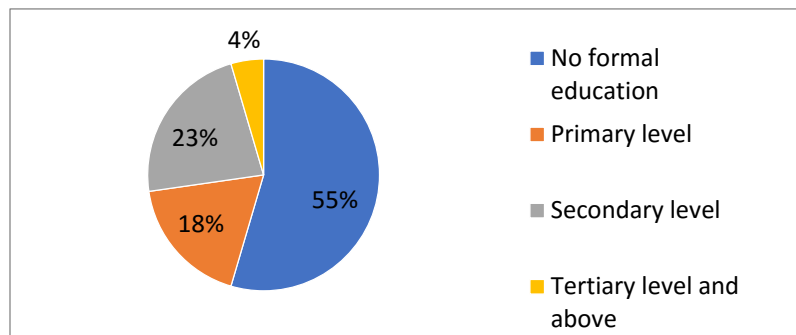


Figure 8

- Size of family / No of dependants on the interviewee

Family sizes are large in rural Mali with an average of 10 persons (RGPH, 2009); particularly for this study the majority of the interviewees live in families with more than 20 persons. In Mali, household or a family is constituted with extended family members who work on the same farm and consume the products together. This explains why most of the interviewees have high number of dependants. The case where the interviewee has no dependant is someone who migrated from his village of origin and settled in the Kati area.

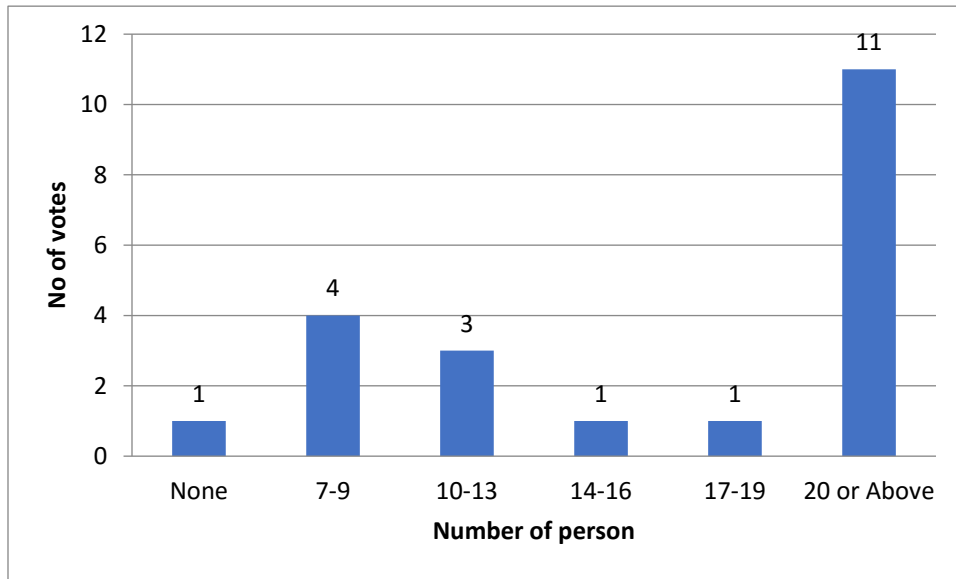


Figure 9

- Number of people coming to you for advice

Farmers share information in “farmer to farmer” way and the number of persons involved in this process varies according to their access to extension agent, TV, radio, NGO, etc. In the case of this study 32% of the interviewees stated that they give advice to more than 10 persons a month on agriculture; 23% they advise 6 to 10 persons a month and 23% they receive 1 to 5 persons per month for advice. Only 22% of the interviewees said that no one is coming to them for advice on agriculture.

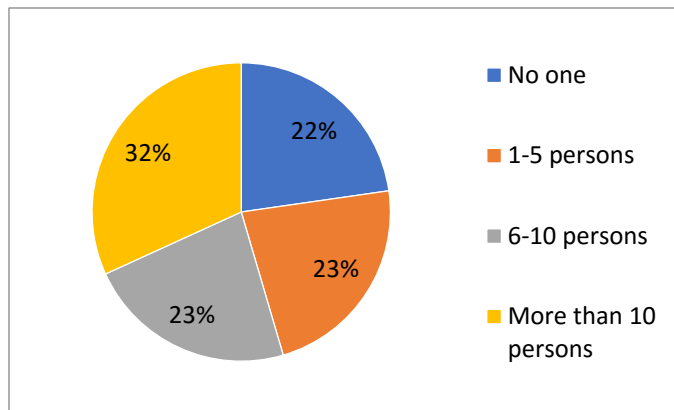


Figure 10

- Number and response range on the statement “I would prefer if my children did not end up working as farmers”

To the question, on the five scales (of 5: Strongly agree, 4: Somewhat agree, 3: Neither agree or disagree, 2: somewhat disagree, 1: Strongly disagree), on “how much do you agree on the statement: ‘I would prefer if my children did not end up working as farmers?’”, all interviewees strongly disagree with the statement. In rural Mali farming is the main activity of the population; it is unbelievable for them that one can live without farming. This explains why all interviewees strongly disagree with the statement.

- Number and response range on the statement “*There is no investment better than farming*”

To the question, on the five scales (of 5: Strongly agree, 4: Somewhat agree, 3: Neither agree or disagree, 2: somewhat disagree, 1: Strongly disagree), on “how much do you agree on the statement: ‘There is no investment better than farming?’”, all interviewees either strongly agreed or somewhat agreed with the statement. There is a saying that people use in Mali “the land does not lie”. This mind-set seems to influence the interviewees’ answers.

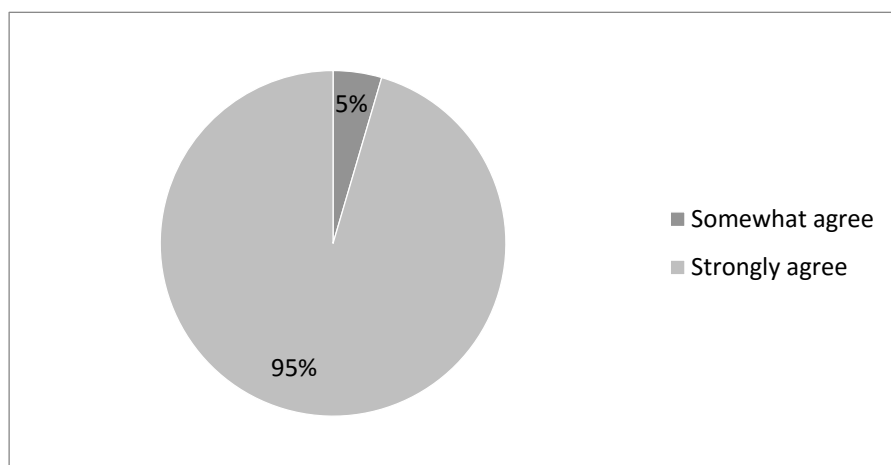


Figure 11

By going over this section it can be understood that men use more Senekela service than women and the majority of customers are people above 47 years. Most of customers are farmers with farm sizes superior to 2 ha. However, they sell only the excess of their production because the primary objective is subsistence farming. This could be related to their education level (55% of interviewees don't have formal education). Although the majority is illiterate, they exchange information among them. They all have a strong believe on “There is no investment better than farming’.

Use of Mobile

Through the interviews, the study revealed the participants’ mobile usage habits, such as agricultural information seeking, general activities, top up habits, and so forth. This section displays the findings around these mobile usages.

- General activities on your mobile phone

Cell phones are used for many activities. In this case study the primary usage of the phone is to call friends or family (42%); the second is to send or receive money (21%) and the third is talking for trade and business (19%). Users who are highly educated could use their cell phone for internet connection (4%). Some of the interviewees (10%) use their cell phone to listening music or to connect to radio stations. 4% of people expressed that they use their phone as a torch light or a calculator (these answers are categorised as “Others” in the below diagram).

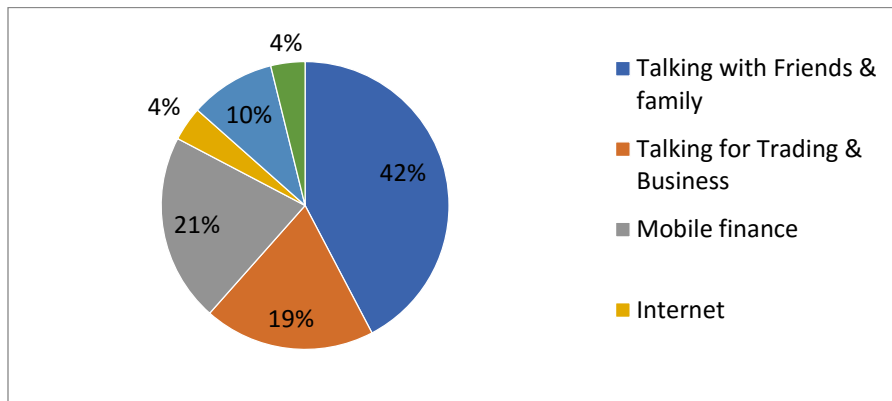


Figure 12: Usages of mobile phone

- Average top up volume in local currency

OrangeMali sells top-up cards ranging from FCFA1000 to FCFA25,000, but customers can have access to lower amounts through a private seller. In this study the interviewees top-up their cell phone with amounts ranging between FCFA200 and FCFA5000 with FCFA1000 being the amount they top-up most frequently.

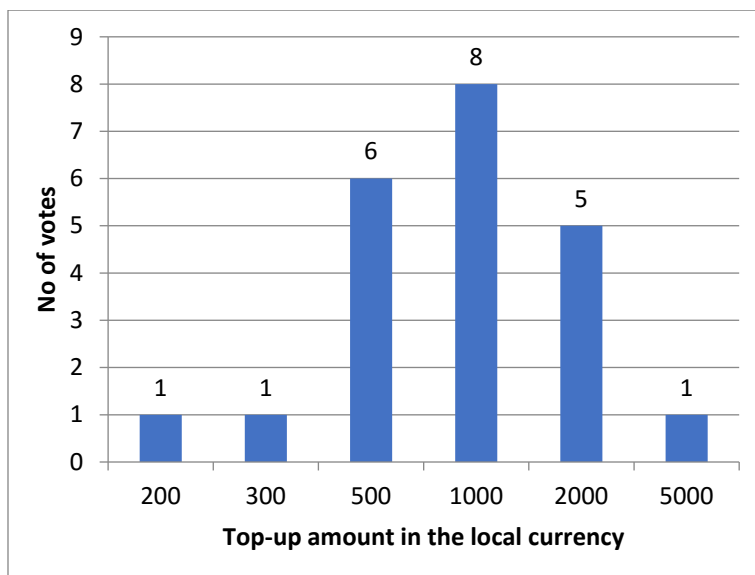


Figure 13: Top-up amounts

Intervals customers use to top-up their cell phones vary, but the most frequent is as soon as the credit runs out. However, several interviewees top-up their phone daily or weekly.

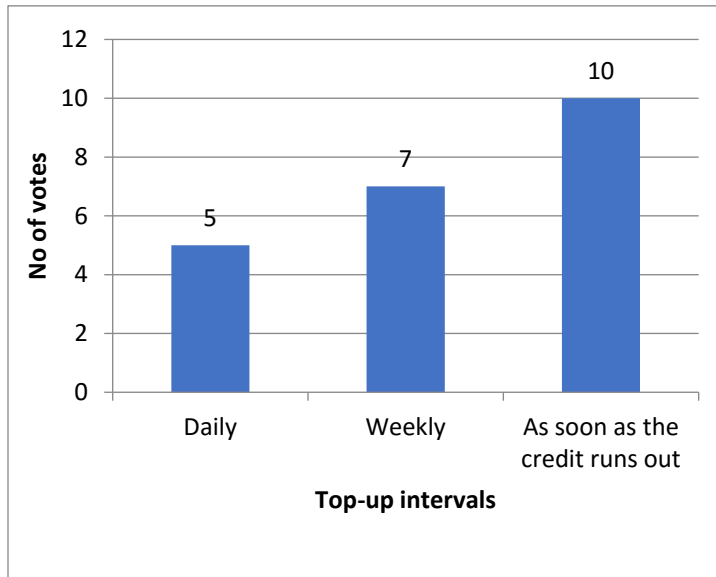


Figure 14: Top-up intervals

- Variety of SIM cards own by the interviewees & the most often used one to make calls
In Mali there are two cell phone companies: OrangeMali and Malitel. They cover the same areas or differ slightly. Many customers have both SIM cards; in this case study all interviewees have OrangeMali and among them 13 possess also Malitel.

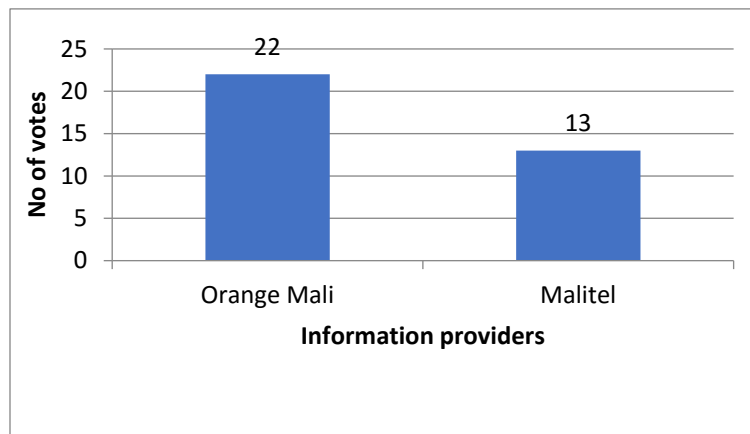


Figure 15: Variety of SIM cards owned by the Interviewees

The discussions with the interviewees pointed out that they use more their Orange SIM card than the Malitel one because Orange coverage is larger.

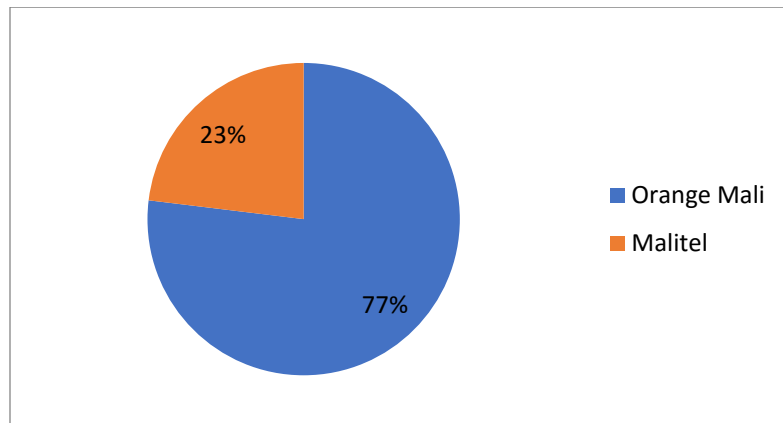


Figure 16: Most used SIM cards

Customers of Senekela use their cell phone for many purposes, but the most important one is to talk to friends and family, followed by mobile finance and then for trading and business as third. They top up their phone up to FCFA 5000 and low to FCFA 200, although the most frequent amount used is FCFA 1000. The frequency of top up is as soon as credit runs out and they possess mostly 2 SIM cards with dominance of OrangeMali. In short, xyz...

Results

Experience of S n k la repeat users

This section examines the reasons why repeat users decided to join S n k la, and overall how satisfied they are with their experience of the service so far. Customers' reasons for joining S n k la were explored in three aspects: how they originally came to learn about S n k la their motivations for joining the service the other sources of agricultural information they had access to at the time of joining S n k la and how they used and perceived these other sources.

Findings

How the users learnt about S n k la

- What served as a trigger to learn about S n k la
 - Up to 7 of customers learned about S n k la through the promotional SMS sent by OrangeMali.
 - Five respondents also reported learning about the service by agents in a meeting organized to promote S n k la, and others reported a wide variety of mediums, from fellow farmers, agricultural events to media advertisement.

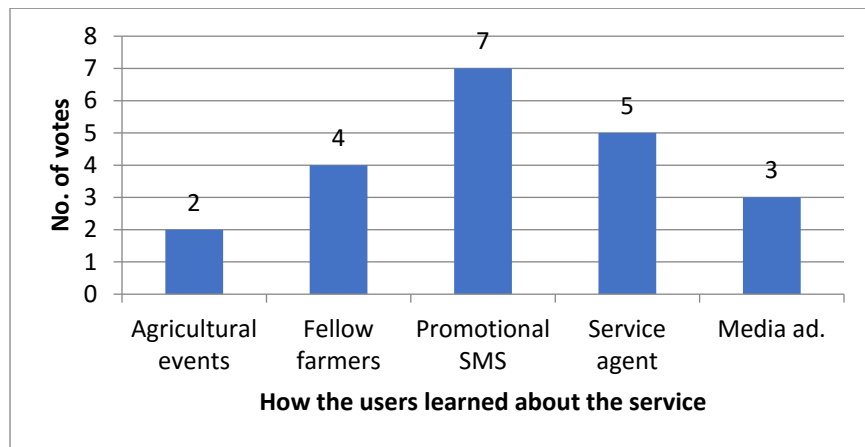


Figure 17: Different ways of how interviewees learnt about Sénékéla

In villages most of households don't have access to TV set or radio, therefore customers get information mainly through their fellow farmers, cell phones or extension agents. To reach more customers, OrangeMali organizes promotional SMS and information meetings in villages covered by the network to inform them about Sénékéla.

Motivation to join Sénékéla

Nine (9) votes were collected for joining Sénékéla by curiosity; 8 voices said for learning new farming practices, irrigation practices, cultivating new and profitable crops and raising improved livestock species (see graphic below). 6 voices said they joined Sénékéla to learn input use (including access and application); and 6 votes for having good market price information. Some interviewees (2) mentioned joining the service for getting information on livestock management (feeding, health). Only 1 interviewee reported he joined Sénékéla for choosing when to constitute crop stocks for latter sales.



Figure 18

A male farmer of age 59 He makes a living with 50 members of his family through farming, on about 35 ha of land and they raise livestock. They grow cereals and vegetables. He gets

information from the extension service, NGOs, fellow farmers. He said that he joined Sénékéla after a promotional meeting organized by OrangeMali in the village. Usually at this time of the year he faces problems with chicken (chicken pocks) and attacks of a pest in his pepper field. The chickens were dying and the pepper flowers were falling immature. He said “I look for solution with the traditional information system available in the village but no success; then I tried Sénékéla helpline and the instruction sprovided to me saved my chickens and my pepper production.”(Male, Farmer, age XX)

Pre-existing Orange users before Sénékéla started

- Sénékéla as changer of interviewees’ attitude to the network
Customers have been OrangeMali users before Sénékéla. In this study all the interviewees had an OrangeMali SIM card before joining Sénékéla. The OrangeMali network has existed several years before they started Sénékéla program.

Experience of sharing Sénékéla information with others

- Experience of sharing Sénékéla information with others
About 71% of interviewees have experienced sharing Sénékéla information with others. The remaining 29% reported they haven’t shared information because they don’t engage others in something they didn’t try. The following graphic shows the percentage of interviewees who experienced sharing Sénékéla information with others.
- Percentage of interviewees

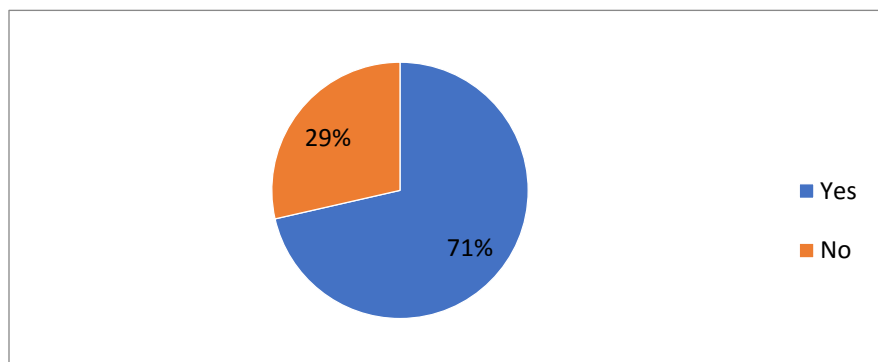


Figure 19: Experience of sharing information from Sénékéla with other farmers

Information mostly shared with others is reported in the following graphic. In fact, the majority of interviewees (7) stated they shared information on market prices; the second information shared is on inputs (3) for their access and usage; pest/disease control and soil management are evenly shared by interviewees. Only 1 reported that he shared information on tiling/seeding. Contents of “Others”.

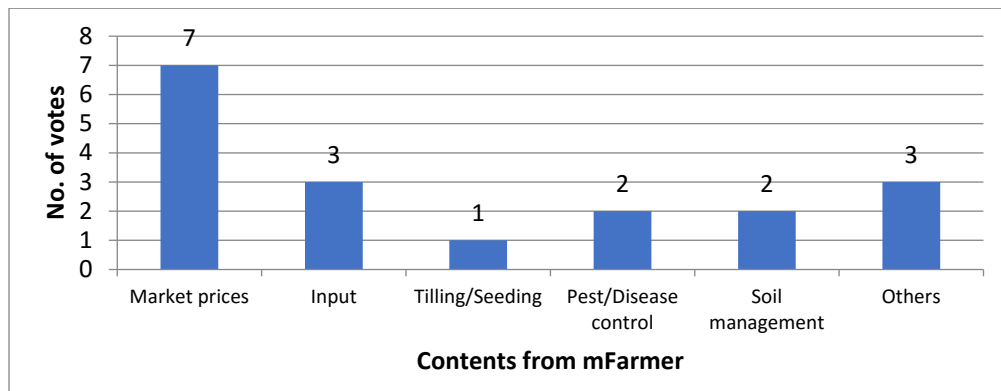


Figure 20: Shared contents from Sénékéla

Service fee of Sénékéla

Cost of Sénékéla

Customers call Sénékéla without knowing how much it costs. Many of the interviewees (81%) in this case study couldn't give a correct answer about the fees for calling Sénékéla, i.e. FCFA 50 per minute; only 19% were able to answer correctly (see graphic below).

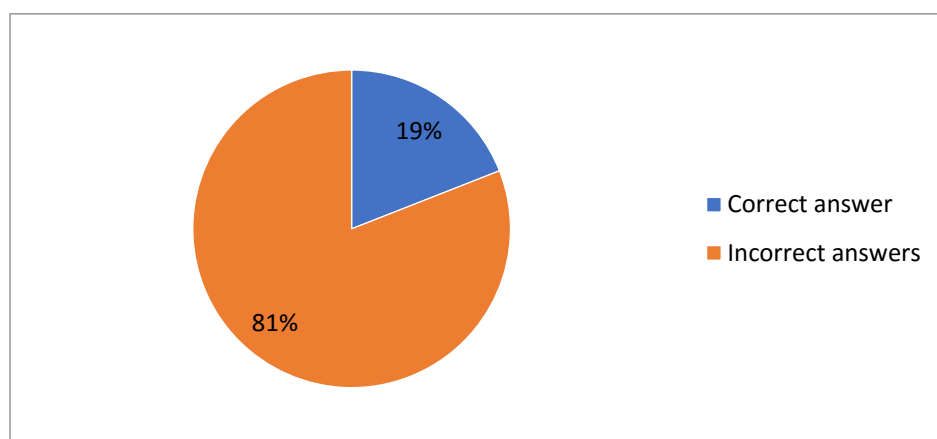


Figure 21: Interviewees who know correct Sénékéla service fee

Service fee -reasonable or unreasonable?

Service price: reasonable or not reasonable?

During the interviews we haven't encountered any customers who complains about the service fee. Although many don't know how much it is, they all stated that the service fee is reasonable, including the 4 people who know the correct service price.

Most appreciated information from Sénékéla

Sénékéla's most valuable content for the interviewees

Customers call Sénékéla helpline to seek information on farming or farming related issues. All the information are appreciated by Sénékéla customers, in this case study market prices

information, followed by pest and disease control and soil management are most appreciated information by interviewees. Components of "Others".

A male farmer of 54: For him the most valuable content provided by Senekela to me was about Pest/Disease control and mineral fertilizer application.

A male trader of 49 years old: Product prices on several markets were the most valuable content provided by Senekela.

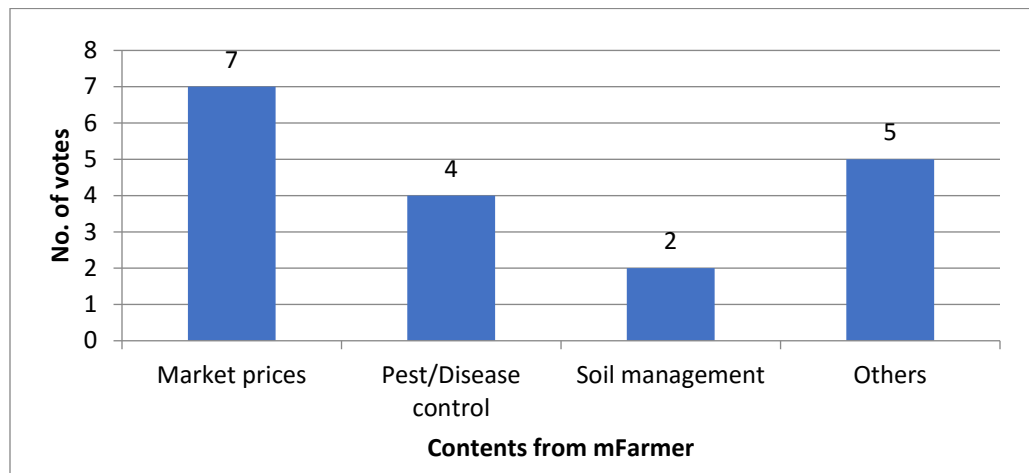


Figure 22: Appreciated Sénékéla contents by the Interviewees

Least appreciated information from Sénékéla

- Sénékéla’s least valuable content for the interviewees

During the interviews, customers have stated that they did not receive information which is least appreciated.

A male farmer of 52 age: There are not information provided by Senekela which at least valuable content is. However, it often difficult joins Senekela service.

Experience of recommending Sénékéla information with others

- Experience/reasons of recommending/not-recommending Sénékéla to anyone

Customers have the experience of recommending Sénékéla to others; in fact, 57% of the interviewees recommended the service to others.

- Percentage of participants for Yes & No

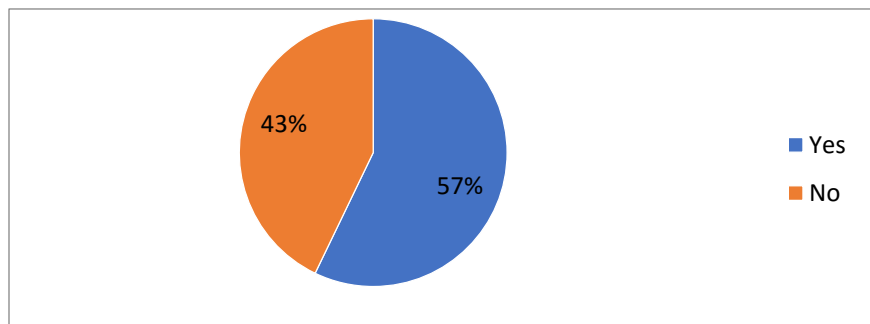


Figure 23

Figure: Experience of recommending Sénékéla service to others

They shared the information with others because they think it is valuable and other users can make profit by adopting it.

A male trader of 49 age: I recommended Senekela service to my colleagues which are generally traders. By this wished to give possibility for them to get better price of their product.

A male farmer of 59 age: The fact that information provided by Senekela has allowed me to treat my problems of chickens and pepper encouraged me to recommend Senekela to others. Testimony on why they shared info delivered by Sénékéla...

Reasons for why *NOT* shared info delivered by Sénékéla... Customers reported that they haven't shared the information they get from Senekela with others because they didn't apply it yet. To them it is not wise to advise someone on something that one doesn't know the outcome.

A male farmer of 54 age: He said not satisfied with Senekela services because it doesn't take in account his concerns which are training or funding opportunities. Because of that I did not recommended Senekela service to anyone.

Experience of demonstrating Sénékéla to others

- Experience/reasons of demonstrating /not-demonstrating Sénékéla to anyone

More than half of the interviewees have not demonstrate Sénékéla to others because they don't know how to (see graphic below).

- Percentage of participants for Yes & No

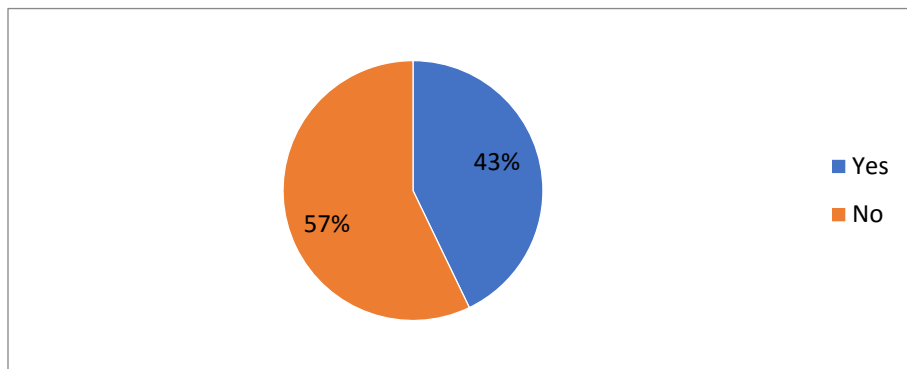


Figure 24: Experience on demonstrating how to use Sénékéla service to others

To demonstrate how to use Senekela, the customers should have a great comprehension of cell phone usage. Usually for calling illiterate customers have to refer to someone who can read and write. Since in the previous sections the proportion of customers with no formal education is 55% can explain the low rate of interviewees who have demonstrated Sénékéla to others.

Trustworthiness of Sénékéla information

- Degree of interviewees' trust towards Sénékéla as farming info source

Initially as Sénékéla is a new service compared to traditional information sources such as radio, TV, NGO and extension officers, customers distrust it. But since the first usage of the service

customers trust it better than the other information sources, and 90% of the interviewees assess that Sénékéla is more trustworthy than the traditional information sources. The following graphic shows the percentage of interviewees who trust Sénékéla compared to traditional information sources.

- Number and response range on the trustworthiness

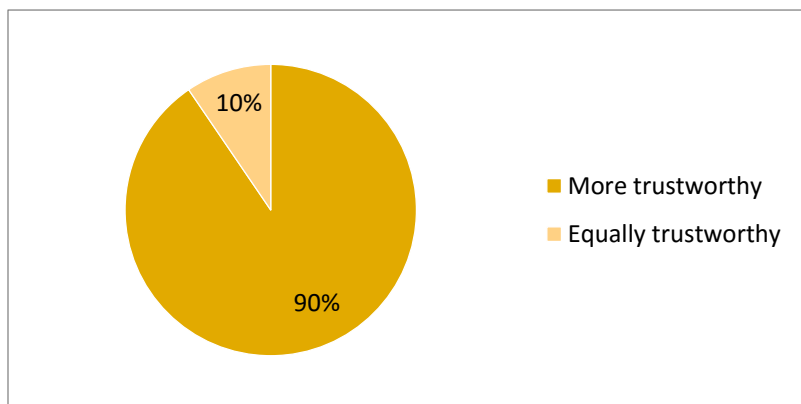


Figure 25

All interviewees reported that Senekela provide information on specific issues regarding the individual farm or business, not general information or proxy. The other sources such as radio or TV provide general information which may not be related to the problem that the customer is facing. Extension officers and fellow farmers provide information related to the area but to the specific farm.

Analysis

Based on the findings above, Sénékéla subscribers are the work force employed in farming or farming related activities. In fact, the vast majority of the interviewees are above of 36 ages. Most of Sénékéla users are farmers and the main source of income in their household is agriculture. Despite the relative importance of women in agricultural activities, they are not well represented in decision making; this can be seen that fact that the substantially larger number of men agreed and participated in the interview than women. Although, the land possession of the interviewees is mostly above 5 hectares, the majority of them sell only the excess of their production. This is explained by the production objective (food subsistence), the low productivity and the relative high number of persons in the family. Due to illiteracy, insufficient extension services, poverty; farmers have limited access to new information and apply hardly improved practices. The primary usage of their cell phone is to call and talk with friends and family; this explains partially why they top up their phone with little money and at irregular basis.

Users learned about the service through promotional events (by sending SMS to customers or by holding information meeting in villages). Information on Sénékéla passes on TV, but in the villages many people don't have a TV set in their households.

The primary reasons for wanting to join Sénékéla by repeat users are to have information on farming practices, products market prices and input access and usage. However, many people call Sénékéla for the first time by curiosity.

The service is appreciated by repeat users; in fact all interviewees trust the information coming from Sénékéla compared to traditional sources (radio, TV, extension agent). The information is shared with others (57%); and they think the cost of getting the information is reasonable.

Contribution to behaviour change among the Sénékéla users

This section presents the findings and analysis regarding the first research question, i.e. *“what contribution has Sénékéla made to behaviour change among the users?”*

Findings: Behaviour changes

Adoption of new practice(s) in last 1 year

- Percentage of users who adopted new practices in the last 12 months
More than half of interviewees (57%) reported they adopted new practices in the last 12 months (see graphic below).

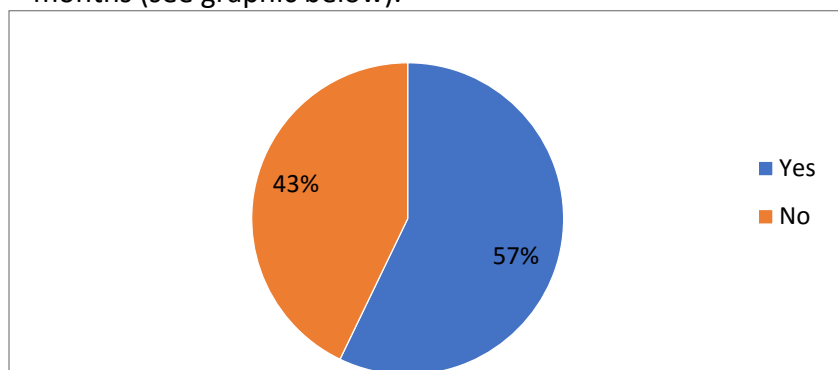


Figure 26: Interviewees who have adopted new practice in the last 1 year

The 43% who stated that they did not adopt any practices argued their saying with not enough time to apply.

Information sources for behavior changes

All the respondents who changed their agricultural practices in the last 12 months had access to one or other informal sources of information. These included Sénékéla, fellow farmers and extension agents. In fact, 9 of the interviewees reported that they value information from Sénékéla, 3 of the respondents mentioned fellow farmers and 1 customer said he gets information coming from extension agents (see graphic below).

Information providers who changed interviewees' behaviour

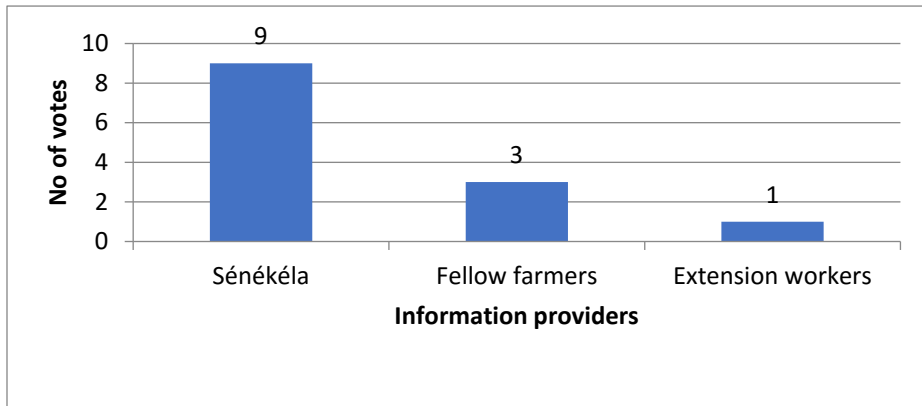


Figure 27

Respondents generally reported to be satisfied with the multiple sources of information available to them. Some interviewees mentioned that their local sources, such as fellow farmers, and extension workers provide information that is more locally relevant to them than what they found on other sources (TV and radio).

Behaviour changes led by Non-Sénékéla

On the above graphic, 4 votes have reported getting information from fellow farmers and extension agents which changed their behaviours.

21 different kinds of practices are reported to be adopted based on the information from non-Sénékéla providers. In fact, 24% of these practices were about changing the seed source, 19% were on how to fix market prices of their products, 19% were on the fertilizer usage, 14% were about pest/disease control, 10% were on increase in the crop area, 9% were on the change in the tilling/seeding practices and 5% were about harvest management (see graphic below).

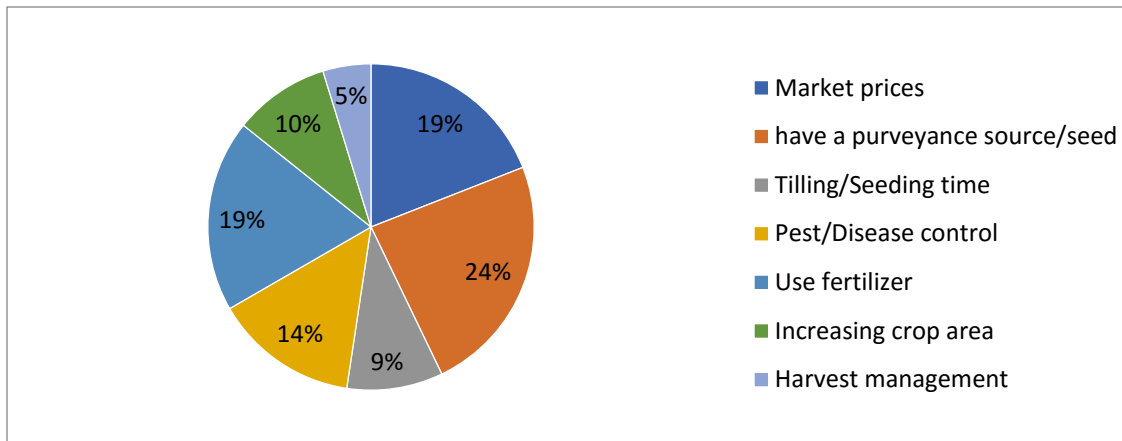


Figure 28: Changed practices by non-Sénékéla

Crops related to practices changes are mentioned in the following chart. Maize comes first because in the study area the primary staple crop is maize. Sesame is second because it's

replacing cotton as a cash crop and cowpea is a protein source and is harvested early, therefore serves for food security. Pepper (pimento) is a garden crop grown for cash. Crops!

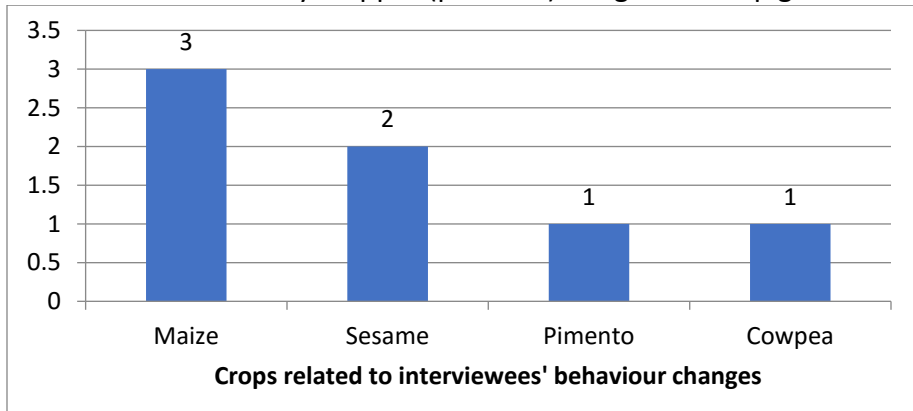


Figure 29

The majority (69%) of the interviewees still reported to have benefited from Sénékéla even though their current practices were led by non-Sénékéla (See graphic below).

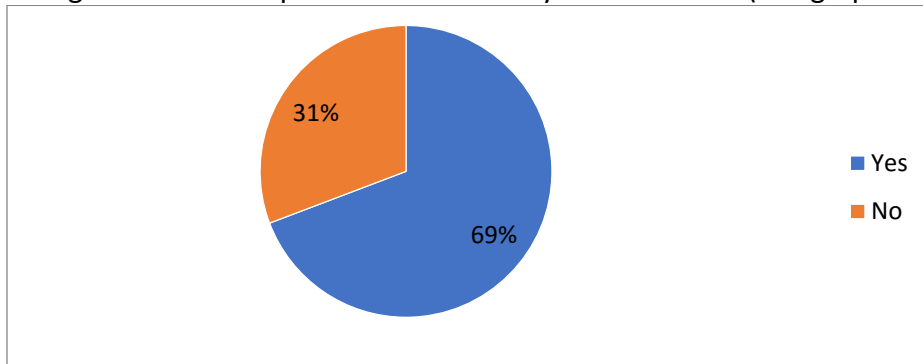


Figure 30: Benefits from non-Sénékéla sources by non-Sénékéla followers

Customers stated many benefits from Senekela usage. Primary benefit is yield increase followed by income increase as it could be seen on the graphic bellow. Components of the aforementioned benefits

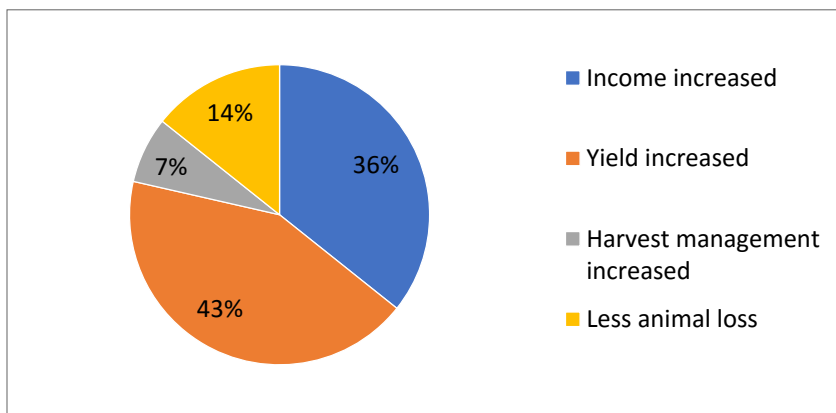


Figure 31

Behaviour changes led by Sénékéla

9 out of 12 interviewees (around 40% of all the interviewees and 75% of the interviewees who have adopted new practices) followed Sénékéla information for their changes.

The following graphic summarises the practices on which the interviewees have changed. In fact, 34% of the interviewees have changed their market pricing based on Sénékéla, 25% of them changed their pest/disease control, 17% changed the way they use fertilizer, 8% reported changing their crop area, 8% have changed their the way they manage their harvest and 8% changed their tilling/seeding practice.

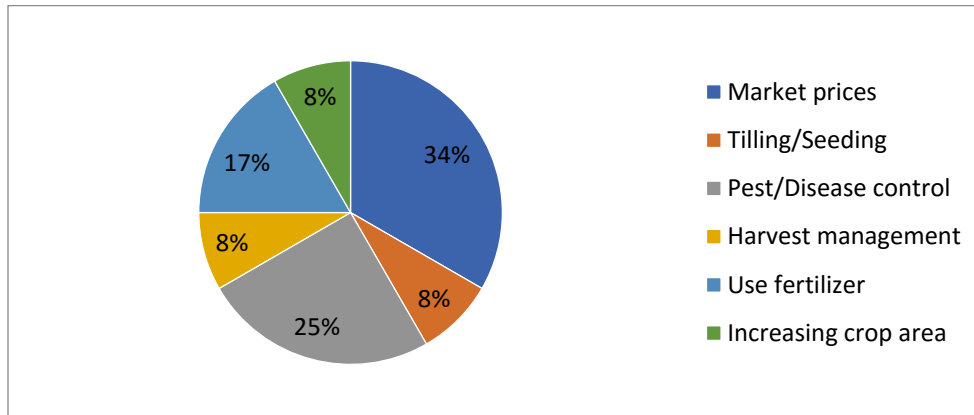


Figure 32

A male trader of 48 age (age X) he joined Sénékéla about two years ago to have access on crops prices in different markets. He said before joining Sénékéla he was getting prices information from middlemen who may divert market prices for their own interests and were not able to cover several markets at the same time. He said “With Sénékéla I get information for more than 12 markets and 16 major crops, this helps me decide when, where and how much to pay or to store.” (Sex, Occupation, age X)

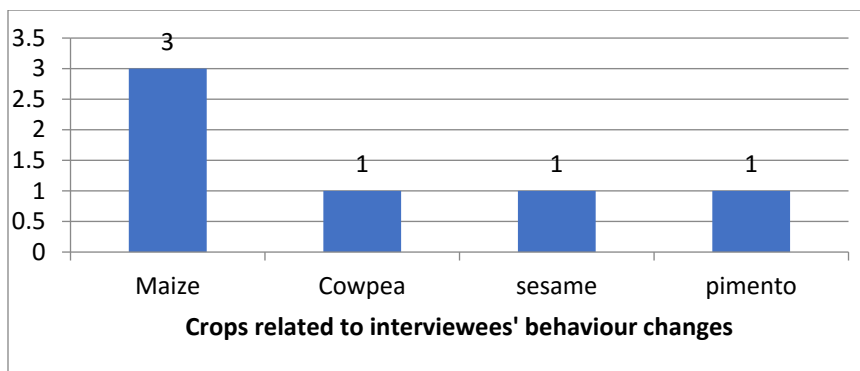


Figure 33: Crops

All interviewees reported to use the helpline as channel; because once they have the dial number, they can talk in local language to the expert; while for the SMS one should be literate or the majority doesn't how to write and read. This explains why all reported to use the helpline service as it could be seen in the graphic bellow.

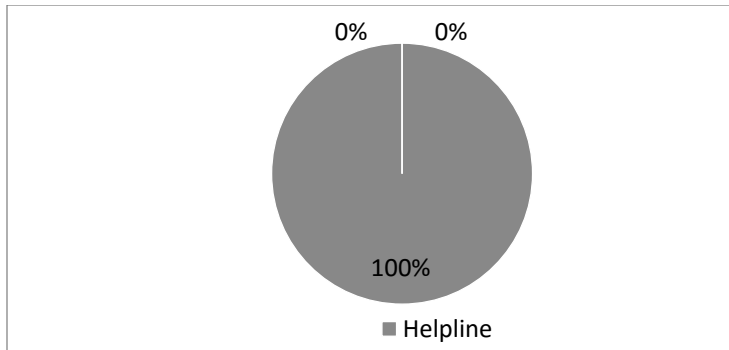


Figure 34

All customers who responded to this question (9) reported to benefit from Senekela information 100%.... The contents of the benefits are represented in the following graphic.

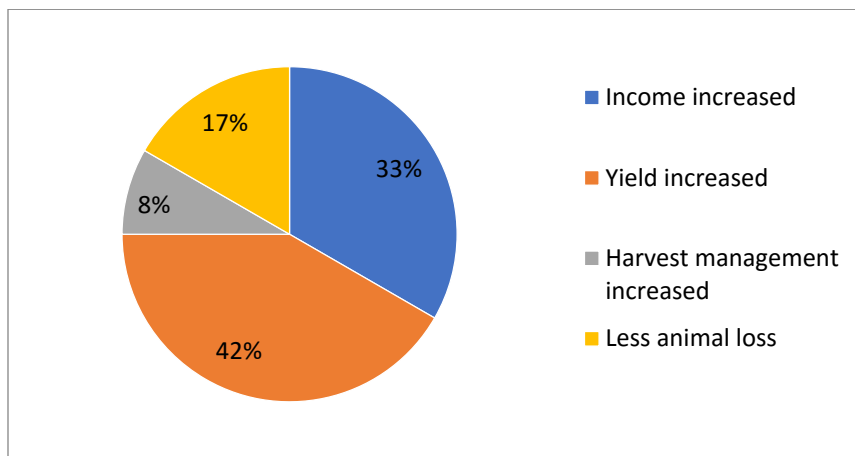


Figure 35: Contents of benefits: Sénékéla

Male farmer of 59 age: Before treatment provided by Sénékéla service, all of my production of pepper was attacked by diseases. I do not get anything from my pepper production. Now, I harvest a large part of my pepper production every morning and sell it to the market. During the period of harvest, I can earn FCFA3000 at least every day. My chickens have increased in number because of mortality reduction and I was able to sell many and increase income.

As described above, mobile phone operated by OrangeMali has become one of the important sources of farming and farming related information for interviewees. Among which, Sénékéla led 75% of its users who changed their practices in the last 12 months, and 40% of overall interviewees. All the respondents had access to one or other sources of information. These included fellow farmers, extension agents and other informal sources such as the agro-dealers, other farmers and village leaders.

13 out of 21 respondents in Koulikoro and Kati stated that they didn't have time to apply the instructions given by Sénékéla because the season was over when they get the information. However, some interviewees (2 in Koulikoro and 3 in Bougouni) reported having changes pertained to some new practices or techniques as mentioned in the above sections. These reports suggest that the helpline service can provide farmers with sufficient information to make changes on their farm.

Traders who are interviewed reported that they use the market price information to make decisions on when to buy and where to sell produces. Over 3 respondents reported checking the market prices regularly through Sénékéla. One respondent said that he used the market price information, especially about maize and cashew, to take decisions about selling his stock and he said that because of his awareness of the current market prices no one could cheat him. One respondent mentioned that in addition to checking market prices to sell his produce, he also checks where to buy provisions for household consumption in bulk quantities. Another respondent said by having the price information he decides about the area to allocate to which crop. Another respondent stated that market price information is very important for taking some measures in time to constitute crop stocks.

12 of the interviewed said they could already see benefits from the changes they made, in the form of increased yields, income increase, less animal death and harvest management. Further research would be needed to verify these reported benefits and the contribution of Sénékéla. Sénékéla completed two years in Sikasso region and one year in Koulikoro region for market information. The interview with the respondents revealed that most of the behavior change examples (especially those related to farm and crop management or prices) were cited from the villages of Koulikoro and Bougouni.

Therefore, most of the respondents gave examples from their pepper garden, poultry farm and crop markets. Based on the findings of the case study, the following section (Section 5-3) analyses some of the factors that support or impeded customers to apply the information and advice from Sénékéla in their business.

Factors in behaviour changes

This section presents the findings and analysis regarding the second research question, i.e. “what are the enabling/disabling factors of [Service name] for the users to change their behaviour?”

Findings-Internal factors to Sénékéla

Enabling factors

In fact, those who changed their agricultural practices based on the information from the Sénékéla helpline said that the information is credible or relevant (see graphic below).

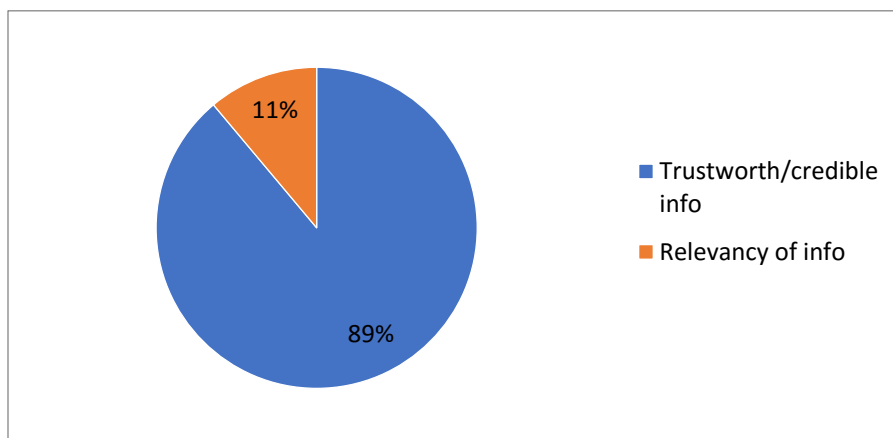


Figure 36: Enabling factors to adopt Sénékéla information

In addition to the customers' feedback on the quality of Sénékéla information, the issues with the content offered on Sénékéla can also boost the potential of the service to have an impact on customers' decision making and behaviour around how they manage their farm or business. The examples below show how active Sénékéla users turn to the service for advice, in search of help for fixing problems on their farm or to learn something new.

Male farmer of age. He grows maize and cowpea on 9ha of land, and he is also a blacksmith constructing agricultural equipment, metallic doors, etc. He turned to Sénékéla for help when he wanted to fertilize his maize crop which yield started to decline and how to control cowpea pests. "I talked to a fellow farmer to have information on Sénékéla after a meeting in the village and one day I decided to call the service to be advised on how to apply micro-dosage of fertilizer on maize and control insect on cowpea in the field. At the helpline service they advised me to put fertilizer close to the maize plant and not to throw it all over the field. For controlling the cowpea pest the service advised me not to use chemical pesticide. I tried to use the information as per my understanding. It helped me in reducing the amount of fertilizer and in controlling the pest to some extent. But, to eliminate the pests completely, I had to use a regular pesticide."

Male farmer of 59 age, is a farmer with 50 ha of land living with 50 members of his family "I had problems with chicken mortalities and pest attack on hot pepper in my garden. I called Sénékéla to get information on how to control these problems. Sénékéla recommended me a medicine to mix with motor oil for the chickens and a pesticide to spray 3 times a week for the pepper. I used the information from Sénékéla as recommended and got the problems solved."

Disabling factors

Most respondents did not encounter any difficulties in searching for information or connecting to the helpline to discuss their problems with the expert, but some customers (3) in Zantiébougou (Bougouni area) did encounter difficulties to connect to the helpline. One of them called 9 times Sénékéla helpline without any success. Technical issues acted as discouraging to Sénékéla use in this case. Another customer in Sido reported that the communication cut-off while engaged to get information with Sénékéla helpline and prevented her to properly understand the advice given. Added to these connectivity problems, many interviewees said that Sénékéla agents promised to send SMS for more interaction, but they never received the SMS.

Findings-External factors to Sénékéla

Enabling factors

The case study also explored how factors external to the service can influence customers' use of information and change their behaviour. The external factors explored are related to customers' profiles (e.g. poverty level, farm characteristics, gender, access to input and output markets, access to alternative information sources) and contextual factors.

Influence of customer profile

The case study found less evidence about the role played by these kinds of factors. When asked about why they decided to use particular advice or not, the Sénékéla customers interviewed

tended to explain their decisions in relation to their experience with the service and the information that they found.

The case study found few examples of how customers' profiles influenced their ability to apply information or advice from Sénékéla on their farms or business. Some of the findings support hypotheses about how the customers' profiles can influence frequency of their calls to Sénékéla, rather than how they use the information they get from the service.

Several respondents said that they are not using Sénékéla SMS service because they don't have any education (they can't read or write). In terms of gender, the majority of the customers interviewed were male: there were much fewer women who did receive the researcher's calls, but some denied using Sénékéla on their phones by saying that the calls were made by male relatives who were absent.

Traders are most likely to use the service due to the business and don't have to wait long to see the benefit. As reported by 2 farmers (one of 48 age and the other of 46 age), they said "we deal with many people who are not transparent, therefore with Sénékéla we can compare daily prices on several markets and make our decision."

Influence of contextual factors

The case study assumed that factors related to the context in which customers used Sénékéla could influence how they use the information and advice this included factors such availability of inputs, access to markets to sell produce, environmental conditions, and advice received from other sources, and social and cultural norms.

Although some customers said that they believed local, informal sources of information such as fellow farmers and community elders who provide more locally relevant advice on agriculture, the case study found no examples of whether and how access to alternative sources of information influenced the likelihood of customers to use advice from Sénékéla. However, the interviews found a strong demand for more information, such that even when farmers reported difficulties with using certain aspects of Sénékéla they use more the service compared to alternative sources of information.

Market access appeared to have some effect on how customers use market prices from Sénékéla. Some customers who had access to one single market in their area said that they prefer to sell/buy their produce in the village. This, because they know the market prices and they want to avoid hassles of packaging and transporting the produce to market. Respondents with access to a number of markets appear more likely to be interested in comparing prices in different markets and take decisions about selling their crops accordingly. If the differences are not significant, they sell their harvest in the nearest market. The market prices appear to be the most important for these respondents.

Disabling factors

Some customers who had access to one single market in their area said that they prefer to sell/buy their produce in the village. This, because they know the market prices and they want to avoid hassles of packaging and transporting the produce to market.

The rainfall hazard promotes behaviour change; in fact, several farmers reported changing their crop seed due to the length of the rainy season which is becoming shorter. Sometimes farmers trust more community elders for agricultural information than talking to someone on the phone.

With the government subsidizing fertilizer, many farmers apply chemical fertilizer on their crops and it has increased the quantity used by hectare. This also has pushed some farmers to grow crops that haven't grown before.

Analysis

This section attempts to identify the possible inferences by analysing the following three sub-questions (A-C) of the second thematic question as aforementioned in <Purpose> Section, i.e. "What are the factors that enable or constrain service users to change their behaviour in relation to farm management or marketing farm outputs, based on advice provided by mAgri services?"

Most of the respondents did not encounter any difficulties connecting to the helpline service to discuss their problem with the expert; however, some customers reported having encounter challenges to connect to the helpline. No interviewee has reported using the SMS service because of the illiteracy level of most customers. Customers should be able to find the information they are seeking by calling the helpline service or by navigating through SMS.

Sometimes understanding all instructions given by the expert through the phone is challenging for customers (how to apply fertilizer or spray chemicals or to control a pest on crops) because... A live demonstration could help learning even complicated practices. Many of the traders interviewed are happy with the market information because it is up to date and it is geographically relevant.

It is important when designing content to have complete information and easy to follow and the information should be relevant to the local context. Information must be practical, convincing, and up to date.

Most of the farmers who are interviewed are practicing agriculture for generations and have positive attitude toward farming, therefore they are curious to try new techniques. They haven't identified any negative aspects about the information they get from Sénégal. Interviewees who are traders are more likely to participate to the survey and propose ways to improve the service to better address their needs. A woman from Bougouni said that she has to call her children if she wants to get market prices information because she doesn't read. Literacy can impact the use of the service.

The rainfall hazard promotes behaviour change; in fact, several farmers reported changing their crop seed due to the length of the rainy season which is becoming shorter. Sometimes farmers trust more community elders for agricultural information than talking to someone on the phone. With the government subsidizing fertilizer, many farmers apply chemical fertilizer on their crops and it has increased the quantity used by hectare. This also has pushed some farmers to grow crops that haven't grown before.



Conclusion

This case study presents behaviour change from interviews with a small sample of Sénékéla customers, based on examples that illustrate the ways in which farmers are changing their behaviour, as well as the reasons why they have (or have not) changed their behaviour. This final section summarizes some of the main findings from the interviews.

Most of the repeat customers who were interviewed for the case study (almost 60%) said that they had used information or advice from Sénékéla on their farms in some way. This included changes to methods for controlling pests and disease, fertilizer use, market price information and timing farm activities based on weather forecasts.

This included a large proportion of customers (about 57%) who reported acting on advice received from Sénékéla. The information is sufficiently instructive for at least some customers to act on them. Most of the evidence collected on the reasons why customers changed their behaviour relates to factors internal to the Sénékéla service itself, the usability of the platform and the nature and quality of the content provided.