



IMPROVING THE LIVES OF MEN AND WOMEN IN THE SENEGALESE ARTISANAL FISHERY VALUE CHAIN

Assessment of Wireless Solutions for Fisheries in Senegal (WISE)



— This report was co-authored by MANAUS and FHI360 —



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Executive Summary

A glimpse into the WISE Program

The fishing industry plays a meaningful role in Senegalese society. It represents 3% of the country's gross domestic product (GDP) and employs 17% of its working population. Fishing is also a critical industry for food security, as it constitutes 43% of the population's animal protein intake and 90% of the fish available in the country is caught and processed by artisanal fishermen and fish processors. Yet, lack of access to timely fish prices at wholesale markets, scant knowledge of processing techniques best practices, limited access to financial services, and exposure to higher health risks and poor hygiene at processing sites all hamper the economic growth of these artisanal entrepreneurs.

WISE developed a comprehensive approach to improve artisanal fishing, including the generation and dissemination of safety practices, price data collection and efficient sharing systems, and access to finance. To deliver these products, WISE developed a mobile application—the WISE App—that offers daily information on fish market prices, weather forecast, navigation resources, microfinance and health insurance calculators, and information on fishing and fish processing best practices, among other features. The inception of WISE is the result of a close collaboration among Qualcomm® Wireless Reach™, FHI 360, Intermondes, Senegal's Ministry of Digital Economy and Telecommunications, the Ministry of Fishery and Maritime Economy, the Food Security Commission, and small-scale fishermen and fish processors cooperatives.



WISE is one of more than 100 programs incubated by Qualcomm Wireless Reach, an initiative designed to demonstrate how wireless technologies can close socioeconomic gaps worldwide.

The Wireless Solutions for Fisheries in Senegal (WISE) program was launched in 2014 to use technology to improve fish catch and processing practices in the country's artisanal fish industry. The program aims to make the practice of fishermen and fish processors, who are predominantly women, safer and more efficient, impacting the income and lives of those in the sector.




By 2025, Senegal's digital strategy (Digital Senegal 2025) aims to increase the contribution of digital technology to the country's GDP by 10% and create 35,000 direct jobs. Fishing is one of the sectors prioritized by the strategy. WISE also contributes to the Sustainable Development Goal 1 of ending poverty in the country. As of January 2022, WISE has benefited 6,485 fishermen and fish processors.

Given these results, the national government recognizes WISE's alignment with many of the country's development strategies. To ensure sustainability, WISE planned for its eventual institutionalization within the Senegalese government. With input from government officials and WISE beneficiaries, an Institutionalization Framework was developed to guide the transition of WISE to the national government. Under this framework, the Ministry of Fisheries and Maritime Economy will lead the new program, supported by the National Agency for Civil Aviation and Meteorology, the Food Security Commission, and the National Information Technology Agency.


This report, co-authored by MANAUS and FHI360, documents the development and implementation of WISE, along with an assessment of program results to date. The design of the assessment methodology, data analysis, and explanation of program results was led by MANAUS with data collection assistance from FHI360 and Intermondes. Specifically for the assessment, 205 fishermen and fish processors were surveyed, 12 program stakeholders interviewed, and 36 fish processors and fishermen participated in six group discussions.




Celebrating WISE's Success

 **WISE reduces critical information gaps and supports core national development goals in Senegal.**

Before WISE, there was no tool or program in the country to track and disseminate fishing market and safety information. Interviewed stakeholders believe that reducing this information asymmetry helps public agencies advance relevant national development objectives related to food security and technology use.

 **WISE helps increase the volume and quality of fish production, leading to higher incomes.**


Nearly all surveyed fishermen and fish processors use WISE to decide whether, when, and where to sell their production. Because of WISE, they report they buy and sell their stock at more competitive prices, achieve higher production quality, are safer as a result of planning fishing activities based on weather or ocean conditions, and have an improved understanding of market trends and prices. Fish processors and fishermen report that their annual income increased by an average of US\$300-US\$400 as a result of using WISE. This is a meaningful income increase considering Senegal's GDP per capita of US\$1,472 (2020 est.) and the country's minimum wage of US\$94 per month (2019 est.)

 **The market information portal and the weather forecast section are the most used features of the WISE App.**

Fish processors also frequently use the best practices media packages on fish processing health and hygiene, whereas fishermen often access the state of the ocean forecast to decide when and where to go fishing.

 **WISE has expands access to credit for women fish processors.**

Nearly half of surveyed fish processors have received a microcredit through WISE. For a third of these women, the WISE program afforded them their first ever loan. Women find that the microcredit is useful to support their activities (e.g., buy business supplies), but also hope for larger loans that better meet their financial needs.

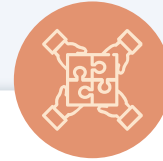
 **Some stakeholders believe WISE contributes to changing gender dynamics in the sector.**

Before WISE, there was a clear gender distribution in the workforce: fishing was for men and fish processing for women. After WISE, stakeholders state that more women began purchasing boats and renting them out for fish catching. They also began to hire men to work in fish processing. They credit this shift to women's empowerment brought about by the WISE microcredit.

Taking Stock of Lessons Learned



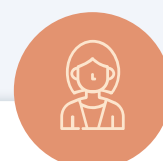
Increased government engagement and leadership are needed to ensure program continuation. Implementers should continue to work on details of the operational and budgetary management of the program to maintain program implementation and quality.



Public-private partnerships can develop and scale digital solutions that accelerate economic growth and competitiveness. These partnerships can maximize program benefits by leveraging partners' unique expertise, specialized assets and processes, and access to core audiences.



Digital technology alone cannot address socioeconomic challenges. Other interventions are needed to improve artisanal fishing in Senegal. By engaging more players in the space (i.e., economic interest groups and relevant government bodies) additional activities, like trainings and end-user support, can be delivered and existing barriers further removed (i.e., lack of internet access).



Supporting the equitable participation of women translates to more and deeper impacts. Removing obstacles to women's access to business financing enables their fuller economic participation and strengthens the overall fishing sector. Implementers should expand seed capital aimed at women and continue to ensure the credit is affordable.



Continuous end-user engagement and expanding the number of users can improve program relevance and quality. Seeking regular feedback from WISE users helps ensure the program continues to meet their needs. Implementers are encouraged to expand the program to more fish landing and processing sites, therefore impacting more men and women in the industry and further connecting WISE users to the national fish market.



With the forthcoming transition of Qualcomm's support for WISE to the Senegalese government, fish processors and fishermen are concerned about the program's continuity. Many fear the program's quality will suffer if managed by the government. Others are concerned about costs to access WISE, as internet use and in-app communication among WISE is currently free and does not affect users' phone credit





THE WIRELESS SOLUTIONS FOR FISHERIES IN SENEGAL (WISE) PROGRAM

Background

Artisanal Fisheries in Senegal

Fishing is an important economic sector and source of employment in Senegal. The sector represents 3% of the country's gross domestic product (GDP) and directly employs 17% of its working population. Fishing also contributes to Senegal's food security, representing 43% of the country's animal protein intake. Senegal is also a fish exporting country, selling an average of US\$340 million of fish and fishery products annually.^{1,2}

In contrast to large-scale commercial fishing, artisanal fisheries are an important source of self-subsistence production. Traditional fisheries involve fishing households (rather than companies), use smaller vessels, have access to less capital, and are therefore more vulnerable to external shocks, such as, bad weather or a drop in market prices. Artisanal fisheries are also less wasteful and less stressful on local fish ecosystems than industrial fishing.

Artisanal fishermen in Senegal catch approximately 90% of the fish captured in the country and sell it to small-scale fish traders and processors, who are predominantly women. Although women represent 30% of the fishing sector's workforce, less than 5% participate in fishery governing bodies.^{3,4} Women in the sector also face important barriers to access credit to improve and expand their businesses. These gaps around governance participation and financial inclusion primarily respond to prevailing social norms on gender roles.^{6,7}

Over the years, overfishing and changing weather patterns related to climate change have adversely impacted the competitiveness of the fishing sector, affecting the livelihood of the women and men who work in the industry.⁸ Information asymmetries around the state of the ocean, where and when to fish, and prices to sell and buy contribute to the low competitiveness of the sector and pose additional challenges for environmental sustainability.

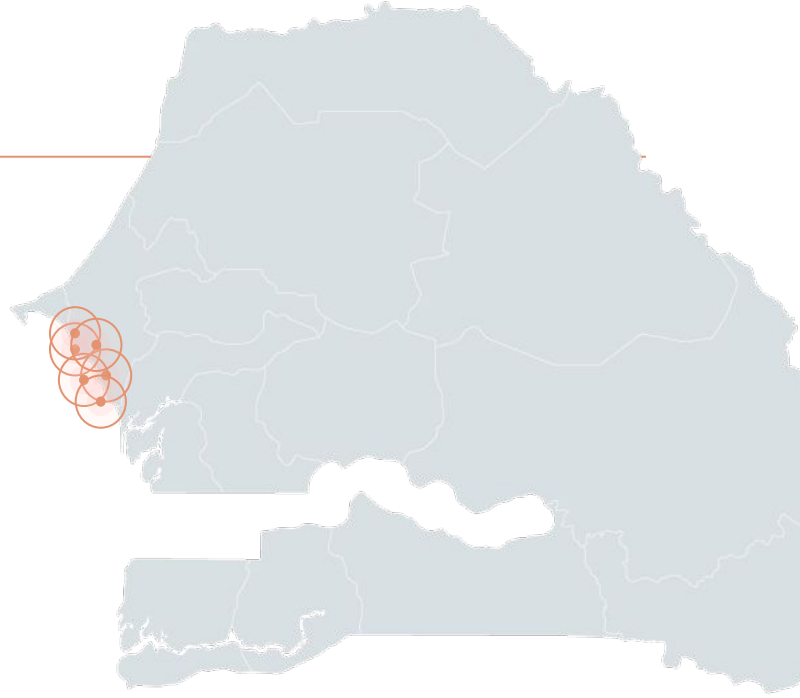
It is within this context that WISE, funded by Qualcomm Wireless Reach and implemented by FHI 360, aims to use advanced wireless technologies to increase fish catch, improve processing practices, and expand market access among fishermen and fish processors.



WISE Approach |

Overview

The WISE Program was launched in 2014 to improve the competitiveness of Senegal's fishing sector. Using advanced wireless technologies, the program aims to enhance the income and livelihood of artisanal fishermen and fish processors, support sustainable fishing practices, and improve the safety and security of fishermen while in the ocean.^{11, 12}



WISE is made possible through the close collaboration of Qualcomm Wireless Reach, FHI 360, Intermondes, Senegal's Ministry of Digital Economy and Telecommunications, the Ministry of Fishery and Maritime Economy, the Food Security Commission, and wireless network operator Free.¹³

WISE also focuses on developing a close collaboration and constantly engaging with Economic Interest Groups (EIGs), specifically fishermen and fish processor cooperatives, to be the primary hub for the implementation of the program. These cooperatives serve as vehicles to reach fishermen and fish processors and onboard them onto the WISE program. The program has been implemented in Senegal's major artisanal fish landing and processing sites: Mbour, Mballing, Joal, Joal-Khelkom, Dakar-Hann, and Pencum-Senegal. It was first rolled out in Mbour (fish landing) and Mballing (fish processing). After 18 months of testing and fine-tuning, the program was implemented in Joal (fish landing) and Joal-Khelkom (fish processing). With another 18 months of experience, WISE expanded its reach to Pencum-Senegal (fish landing) and Dakar-Hann (fish processing)¹⁴. Over 200 EIGs, comprising more than 6,000 fishermen and fish processors, are engaged through the WISE program.¹⁵

The WISE approach includes activities around data gathering and sharing, knowledge product dissemination, access to capital, and digital solutions. **The next section provides a description of each of the program elements.**



WISE Approach | Program Elements

Market Data Collection

Working closely with Senegal’s Food Security Commission (CSA), WISE developed an electronic market data collection system, hosted by Senegal’s Information Technology Agency (ADiE), to gather and report information on fresh and processed fish. The program also trains CSA data collectors to record critical market information, such as price and quantities, to make those available to fishermen and fish processors, which enables them to make better business decisions and access a fair price for their production. These market data collection activities are fully integrated into CSA’s Market Information System (SIM) and processes, an information transfer and calibration process not available prior to the implementation of WISE.¹⁶

Information Generation & Dissemination

Leveraging the information collected through the WISE electronic market system, CSA generates monthly bulletins featuring market prices and volume by type of fish for both fresh and processed fish. In addition, WISE produces media packages—including videos, audios, and e-books—on best practices for fishing safety and security and fish processing health and hygiene.

The media packages are optimized for low internet bandwidth environments. WISE uses the EIGs as entry points for maximum end-user reach by training EIG representatives who then share information and solutions with non-trained EIG members, serving as the information hub for knowledge dissemination and capacity building.^{17,18}

Access to Capital

WISE provided 6 million CFA francs (US\$10,300) in seed capital to local microfinance institutions (MFIs) to create a more affordable microcredit option for women fish processors. The funding improves the interest rate women receive on their business group loans. This capital seed will stay with the MFIs after the end of the grant from Qualcomm, in the form of a revolving fund (which further grows through members’ contributions), so that women entrepreneurs continue to benefit from a larger pool of affordable financing.¹⁹



Qualcomm

Qualcomm is a leading wireless technology developer. Its portfolio includes products for processors, modems, radio-frequency systems, and products based on end-user application.³² As part of its Wireless Reach initiative, Qualcomm finances innovative projects that demonstrate the viable use of wireless technologies to close socioeconomic gaps.³³ The company provided grants and wireless technology for the program.³⁴

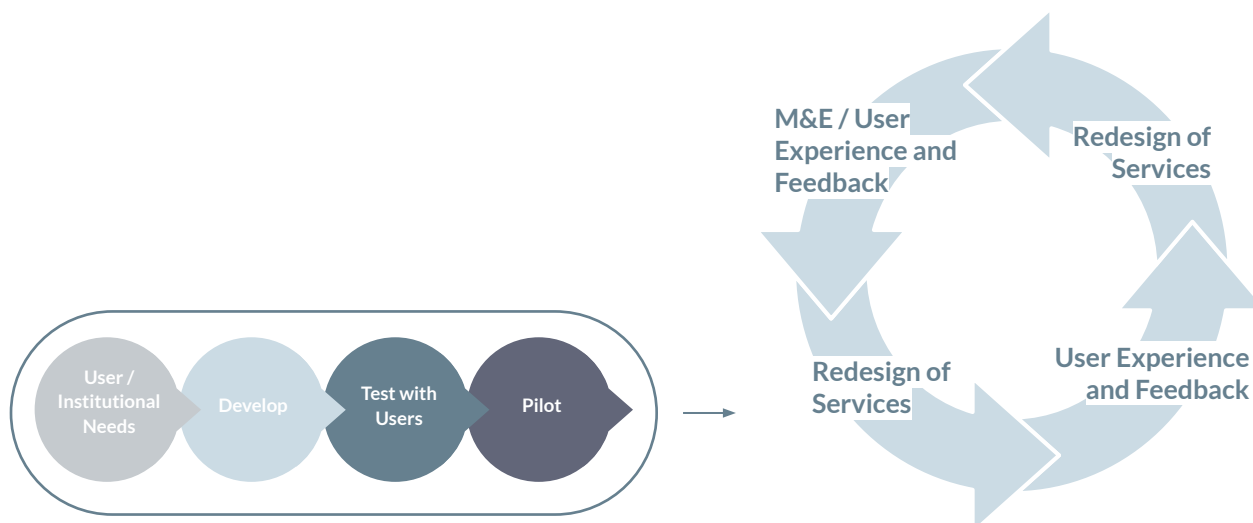
FHI 360

FHI 360 is an international nonprofit organization focused on improving the health and well-being of people around the world.³⁵ For WISE, FHI 360’s Digital Development team was the primary implementing partner and responsible for the design and management of the program, including developing technology solutions.³⁶

WISE Mobile App

The development of the mobile application started with a series of stakeholder engagements to understand user and institutional needs (Figure 1). Based on that input, FHI 360 and Qualcomm Wireless Reach developed an application prototype and tested it with end-users. This process took approximately three to four months. FHI 360 then ran a larger pilot of the application and conducted iterative feedback touchpoints with users to redesign functionalities as needed.²⁰

Figure 1. WISE Mobile App Development Process



The WISE App contains 12 functionalities to help the daily business activities of fishermen and fish processors, such as daily market prices, weather forecast, and information on best fishing and fish processing practices. The application also includes safety features, such as Global Positioning System (GPS) navigation tools and SOS message capabilities in case of an emergency. It also includes financial and health tools, such as calculators to estimate loan payments and insurance premiums. Figure 2 describes these functionalities in more detail.²¹ In addition to the application, three focal points from Intermondes provide ongoing end-user support at the landing and processing sites.²²



Intermondes

Intermondes is a nonprofit and non-governmental organization (NGO) dedicated to overcoming poverty and its drivers in Senegal.⁴² For WISE, Intermondes was responsible for documenting best practices, gathering microfinance information, training data collectors, and providing end-user support.⁴³

Figure 2. Main Functionalities of the WISE Mobile App



Market Information

Up-to-date market prices of fresh and processed fish by site and type of fish



Weather Forecast

Daily and weekly weather forecast, including humidity and average, minimum, and maximum temperature



Ocean State Forecast

Daily data on wave heights, wind direction and speed, and visibility



Emergency Contacts

Enables users to access critical contacts based on location, e.g., coast guard



My Routes

Allows users to save fishing zones for easy navigation to fishing spots



Messages

Enables communication and exchange of information with other users



Ministry of Digital Economy and Telecommunications (MENT)

MENT is responsible for developing the digital and telecommunications environment in Senegal. To this end, the ministry promotes access to digital networks among all citizens and the use of digital technology to accelerate economic growth and competitiveness in the country.³⁸ MENT helped facilitate the operationalization of the WISE information system and ensured that WISE's approaches complied with the Digital Senegal Strategy 2025.³⁹



Food Security Commission (CSA)

Housed at the Ministry of Community Development, Social and Territorial Equity, CSA supports the government of Senegal in the fight against food insecurity, poverty reduction, and the eradication of hunger and malnutrition.⁴⁰ For this project, CSA was responsible for gathering fish market information and hosting the WISE program's server to facilitate the exchange of fish market information.⁴¹

Figure 2. Main Functionalities of the WISE Mobile App



GPS

Navigation tools with geofencing capability, including restricted fishing area maps and international water borders



SOS

Predefined messages, including user's latitude and longitude, that users can send to the coast guard or other contacts in case of emergency



Health Insurance Calculator

Estimates health insurance premiums for an individual or all family members



Microfinance

Estimates loan monthly payments and users can add reminders on upcoming loan payments



Mobile Money

Full integration with Free's e-wallet services (Free Money)



Media

Videos, audios, and e-books on best practices for fishing safety and security and fish processing health and hygiene

Ministry of Fisheries and Maritime Economy (MPEM)



MPEM is the government body dedicated to preparing and implementing policies for the development and maintenance of fisheries, fish farming, port infrastructure, and maritime transport.³⁷ As part of the WISE program, MPEM provided GPS coordinates that define restricted areas from fishing to support sustainable fishing in the country. The GPS coordinates were used to geo-fence these restricted areas in the WISE mobile app (once geo-fenced, the app alerts fishermen when they are close to the area restricted from fishing).

Free



Free, formerly known as Tigo, is a telecommunications company and mobile network operator (MNO) that provides a wide range of mobile services, including e-wallet.⁴⁴ For the WISE program, Free provided discounted mobile devices and connectivity plans for program beneficiaries.⁴⁵ It is important to note that while the program was launched in close collaboration with Free, WISE is MNO-agnostic and can be deployed through any mobile service provider.⁴⁶

WISE Training

The program provides a two-day training to a select number of EIG representatives on the use of the application. The trainings follow a train-the-trainer model so that trained EIG representatives can disseminate knowledge among other members. The training covers basic information on the use of smartphones, as some beneficiaries had never used a smartphone before, and explains the functionalities of the application.²³ Trained fishermen and fish processors receive smartphones so they can use the application.²⁴ As of January 2022, WISE has trained 200 EIG representatives, who then reached 6,485 end-users. The program also donated 283 smartphones.²⁵

The program also provides training to CSA data collectors on how to gather and report critical information for the proper functioning of the WISE App. This training covered how to: access the WISE electronic system; upload market and weather information, add contact information and location data; submit SOS data and checklists; add media content; and verify danger zones uploaded by users.²⁶ As of January 2022 WISE has trained 18 CSA data collectors.²⁷

In addition, the program provided training on microfinance so that beneficiaries, particularly women fish processors, were in a better position to access affordable microcredits for their businesses. This training covered information on how to establish a microcredit management committee among women fish processors, setting clear roles and responsibilities for members of the committee, and determining the composition of the committees. A total of 100 women fish processors received the microfinance training.²⁸

WISE developed an electronic market information system, hosted by Senegal's Information Technology Agency (ADiE) on behalf of the government's CSA to collect and transfer fish market data in real time.

The program developed a comprehensive approach to improving artisanal fishing. This approach consists of various information generation and dissemination activities, including training data collectors to gather fish market information using mobile devices, generating and disseminating bulletins on fish market data among end-users, and developing low-cost videos on fishing and fish processing best practices.²⁹

As part of this approach, WISE also developed a digital solution—the WISE App—to provide end-users with daily information on weather forecast, the state of the ocean (e.g., wave heights, visibility, and wind speed), market prices, and navigation resources, such as a GPS.³⁰ In addition, WISE provided seed capital for local microfinance institutions (MFIs) to offer affordable microcredit to women fish processors.³¹ These program components are explained in further detail later in the report.



WISE Reach

As of January 2022, WISE has directly benefited 6,486 fishermen and fish processors. Of these, 4,595 (71%) were male beneficiaries and 1,891 (29%) were female beneficiaries. In addition, the program indirectly supported 206 intermediary beneficiaries (i.e., EIG members not initially trained by WISE). By supporting these direct and intermediary beneficiaries, WISE helps improve the economic activities of five fishery associations.⁴⁷ WISE App users spend an average of 69 minutes per session using the mobile application, having totaled 118,825 screen views and 10,686 GPS activations.⁴⁸



4,595
Fishermen



1,891
Fish Processors



206
Intermediaries



10,686
GPS Activations



118,825
Screen Views



69
Minutes per Session



WISE Transition

To ensure the sustainability of program activities and benefits, WISE works closely with the Senegalese government and has planned for its eventual institutionalization within the country's government from the onset. In March 2021, FHI 360 carried out an assessment to identify (i) government agencies that could feasibly take over the management of WISE, (ii) favorable and unfavorable factors that could hinder the institutionalization process, and (iii) resources needed to ensure a successful transition. The assessment gathered inputs from multiple stakeholders, including government representatives and WISE beneficiaries.⁴⁹

An Institutionalization Framework was developed based on the findings of the assessment, which outlines the following transition steps:

- **The Ministry of Fisheries and Maritime Economy should be WISE's main institutional anchor:** All consulted stakeholders agree that the MPEM is the best institution to house and lead WISE, as it is legally mandated to oversee and support the fishing sector and has permanent supervisory staff.
- **Other agencies should serve as support for MPEM:** MPEM will be assisted by other national government agencies with relevant expertise, including:
 - **National Agency for Civil Aviation and Meteorology (ANACIM)** will be responsible for providing daily meteorological information.
 - **CSA IT Unit** will collect and analyze the weather and market data, as well as publish and update monthly bulletins on the collected information.
 - **ADiE** will host the CSA servers and ensure connectivity and data protection.

These national entities have the institutional mission and legislative power to enable the necessary resources and policies to develop Senegal's fishing sector and ensure the country's food security. The objectives of WISE are aligned with Senegal's digital strategy, Digital Senegal 2025, which aims to make the digital economy an important driver of development and prioritizes fishing as a key sector. As such, the Institutionalization Framework calls for the MPEM to embed WISE in its annual budget, with additional program expense lines to be included in the budgets of ANACIM, CSA, and ADiE.⁴⁹

A Steering Committee (COPIL WISE) is to be established to facilitate a smooth transition of the program into government control. This committee will include key government agencies—MPEM, CSA, and ADiE—as well as groups of fishermen, fish processors, wholesalers, and traders, and relevant NGOs, such as FHI 360 and Intermondes. Although WISE will be available through any telecommunications provider, Free will also be part of the COPIL given its experience as an implementing partner of the program.⁵⁰

The Institutionalization Framework is currently under government review and the program transition is to be completed by the end of 2022.



ASSESSMENT METHODOLOGY & RESULTS

Purpose & Objectives of External Assessment

The external assessment of results carried out by MANAUS aims to document the WISE approach, described above and co-authored with FHI 360, and its results to date. The assessment sought to identify key lessons learned and recommendations for improvement. Following the Organization for Economic Co-operation and Development's (OECD) evaluation criteria, evaluators looked to have a comprehensive understanding of the relevance, achievements, and sustainability of WISE, as perceived by key stakeholders.

Assessment Methods

The assessment combined quantitative and qualitative research elements to arrive at key findings and recommendations. Quantitative elements included an end-line opinion survey and existing monitoring data, whereas qualitative elements involved a document review, stakeholder interviews, and focus group discussions with beneficiaries.

- **Desk Review:** This entailed a thorough revision of a wide range of documents, including brochures and PowerPoint presentations on the design of the program, application and portal manuals, prior monitoring and impact reports, CSA bulletins, and quarterly monitoring reports.
- **Opinion Survey:** Evaluators adjusted an opinion survey developed by FHI 360 to understand the perceptions of fishermen and fish processors of the benefits and challenges of using the WISE application. A total of 205 beneficiaries were surveyed as part of this assessment: 74 active fishermen, 94 fish processors, and other 35 stakeholders, including fishmongers and former fishermen.
- **Focus Group Discussions:** These discussions aimed to complement the findings of the survey by gathering more in-depth information on the opinion of beneficiaries about WISE. The discussion protocols included questions on specific features of the WISE App, as well as on the program transition to the government. A total of six focus groups were carried out: three with female fish processors and three with fishermen.



- **Stakeholder Interviews:** Evaluators interviewed 12 stakeholders to gain additional insight into the development and implementation of the program, as well as key achievements, lessons learned, and opportunities for improvement. Stakeholders included representatives from Qualcomm, FHI 360, Intermondes, government officials, and representatives of fishing and fish processing associations. Annex 1 includes a list of interviewed stakeholders.

Data Analysis & Quality Control

The information collected through primary and secondary sources was systematically analyzed to arrive at findings. Data from opinion surveys was analyzed by calculating descriptive statistics. Researchers recorded thorough notes from interviews with key informants and focus group discussions to complement the survey data analysis. All qualitative and quantitative data was cross-referenced to validate findings. Where sample sizes allowed, the research team tested statistical differences in responses across sub-groups (e.g., fishermen versus fish processors).

All inferences around program results made in this report are based on the research methods described above. Given the timeline of the WISE program and the absence of a control group, assessment results are largely based on the opinion of stakeholders and should not be interpreted as causal attributions of the program.



Assessment Results

WISE reduces critical information gaps and supports core national development goals in Senegal.

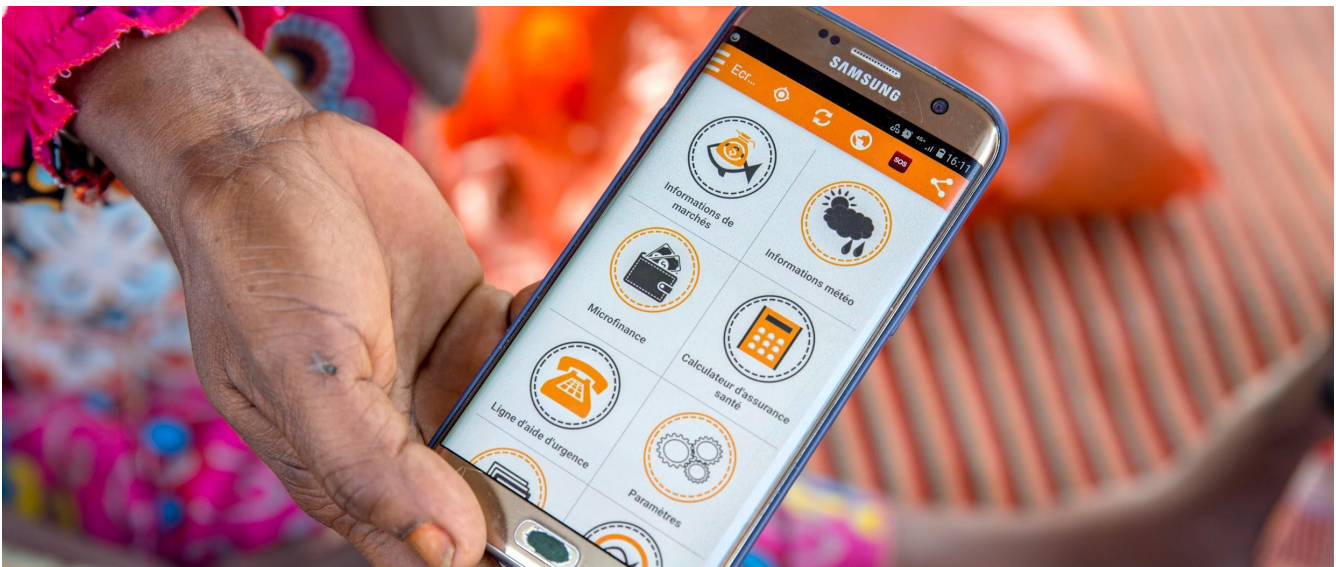
Before WISE, there was no tool or program in the country to track and disseminate market information on fishing and fish processing. Similarly, although government agencies collected meteorological data, fishermen and fish processors did not have easy access to the information. The data collected and shared through WISE has been an impactful contribution to both the national government and program beneficiaries. Interviewed stakeholders agree the reduction in information asymmetry helps public agencies better plan and design key economic strategies, as well as advance relevant national development objectives related to food security, digitalization, and technology use. Stakeholders believe the greatest impacts of WISE are expanded market knowledge, increased fish production, improved quality of processed fish, and increased safety for the fishermen.



“The application (...) gives us information we did not have before. When other cities have fish and there is no fish here in Joal, we can know the price of the fish there; there is no long negotiation and disagreement between us.” | **Fish processor**



“We can program where to fish. There is also more safety; we know when it’s supposed to rain. It facilitated our work a lot. Even when I have to sell fish, you get the information on pricing in different areas.” | **Fisherman**



WISE helps beneficiaries increase the volume and quality of their production, leading to higher incomes.

Nearly all surveyed fish processors (99%) and fishermen (96%) use the WISE App to decide what type of fish to catch/sell, as well as when and where to sell their production. For fish processors, the top business benefits of using WISE are buying and selling their processed fish at more competitive prices and improving the quality of their production. For fishermen, better planning fishing activities based on weather or ocean conditions and better understanding market trends and prices are the most important benefits of the program. Fish processors and fishermen report increasing their annual income by an average of XOF 235,400 (US\$400) and XOF 176,923 (US\$300), respectively, as a result of using WISE. This is an important income increase when considering Senegal's minimum wage is US\$94 per month (2019 est.).^{51,52} Paying for their children's education, buying business supplies, and covering healthcare expenses are the main areas where beneficiaries spend the additional income.

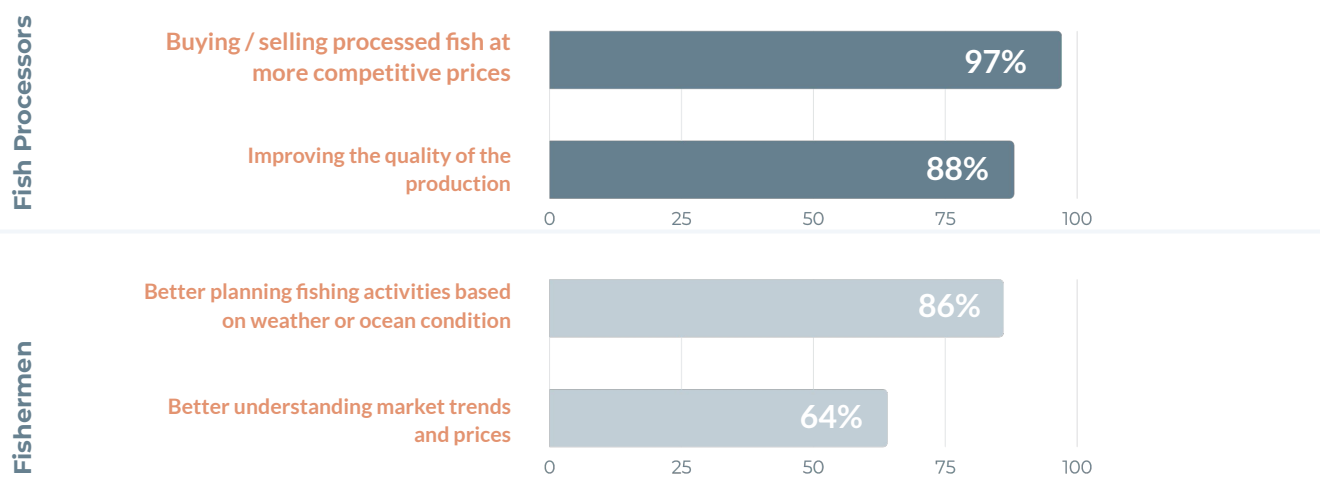


"Before we used to just wake up and go to the sea, and sometimes the bad weather will find you while you're there. It used to worry our families. [The WISE App] facilitated a lot of things because we can check the weather now." | **Fisherman**



"I can know where to sell. For example, I went fishing today and caught some Yaboy. [Through WISE] I can see that the box costs 6000 in Mbour and 7000 in Joal. I can see where it is more beneficial for me [to sell]." | **Fisherman**

Figure 3. Top Business Benefits of Using the WISE App
(% of survey respondents)



While most fish processors and fishermen use mobile money for personal transactions, fish processors are more likely to use it for their business.

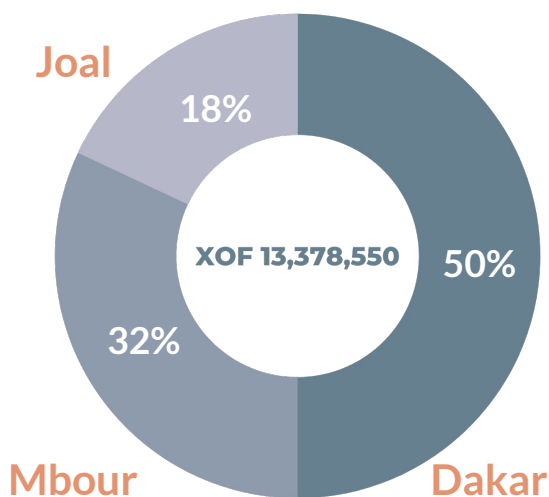
As mobile money is widely used in Senegal, the program integrates this functionality into the WISE App to stimulate the use of e-money in business activities and facilitate business growth. Almost all surveyed fish processors (99%) and over three-quarters of fishermen (78%) use mobile money, primarily to send and receive remittances to/from family and friends. About two-thirds of fish processors use mobile money to receive and make payments for their business, whereas less than half of fishermen receive or make e-payments. Most surveyed beneficiaries use Wave (75%) for e-money transactions, followed by Orange (66%) and Free (39%).

WISE expanded access to credit among women fish processors.

As of November 2021, the outstanding WISE microcredit portfolio was XOF 13.4 million (US\$23,000). Through WISE, beneficiaries have contributed XOF 7.4 million in savings (US\$12,700).⁵³ Nearly half of fish processors surveyed, the primary beneficiaries of the program’s microfinance component, have taken a microcredit through WISE. For a third of them, the WISE loan was the first time they have accessed a credit. While fish processors believe the microcredit is useful to support their business activities, they also think the size of the loan is not sufficient to meet their financial needs (89% of those with an active WISE loan).

Some interviewed stakeholders believe WISE contributes to changing gender dynamics in the sector. Before WISE, there was a clear gender distribution in the workforce, with men dedicated to fishing and women to fish processing. After WISE, stakeholders observe that more women are purchasing boats to rent out for fishing and hiring men to work on fish processing. They accredit this social shift to the empowerment of women fish processors through the WISE microcredit.

Figure 4. Microfinance Funds by Cluster, as of November 2021



“[WISE microcredit] is better because the interest rates are more affordable. Through a credit union, it can go to 20%, which is hard for us, instead of 5% [with WISE]. Also, the repayment period is okay for us and [we] decide it [by] ourselves. It is not like going to the bank.” | **Fish processor**



“[WISE] was [also] working with the women, which is a great thing. We were hoping to get some funding [i.e., WISE microcredits], but we did not see it. Both men and women should have gotten funds. We saw that it was only given to the women.” | **Fisherman**

The most used features of the WISE App are the market information and the weather forecast.

Beneficiaries use the information on fish market prices the most, with important differences between fish processors (87%) and fishermen (53%). Interviewed stakeholders also identify the market price feature as one of the most valuable, explaining that it allows beneficiaries to make informed decisions about their business. Beneficiaries rank the weather forecast as the second most used WISE feature, with similar opinions between fish processors (35%) and fishermen (27%). The third most used feature is the best practices media packages among fish processors (51%) and the state of the ocean forecast among fishermen (32%).



“If the [WISE] application tells you that it will rain and it will be windy, (...) you know you will not get any [fish] so you can plan accordingly.”

| Fish processor

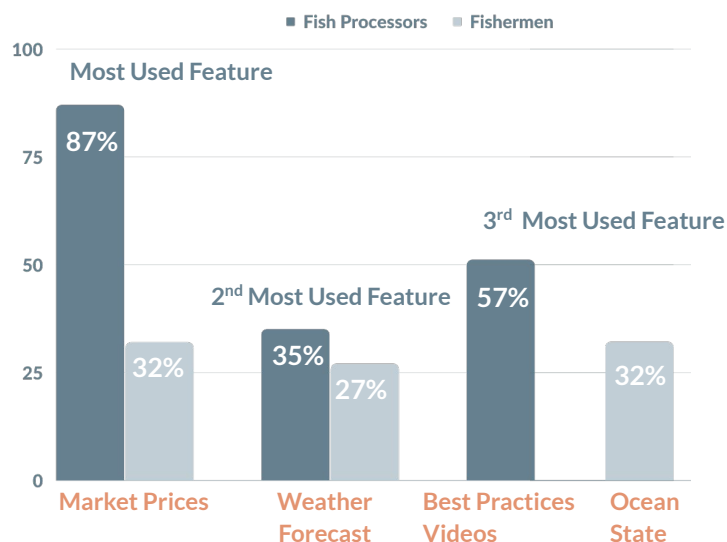


“[WISE] allows us to know the price of fish in every city; before we had to call every time. Now, before arriving on dry land, I know the price.”

| Fish processor

The least used features among surveyed fish processors and fishermen are the microfinance tool (14% and 22%, respectively) and the health insurance calculator (18% and 29%). Yet, those who use the calculators report feeling more knowledgeable and empowered to negotiate loans or insurance premiums. For instance, a fish processor in Mballing commented: “WISE allowed us to calculate the different [microcredit] installments and the percentages [i.e., interest rates]. We were able to talk to different banks about microcredits. (...) Ever since the WISE project, we are not scared anymore (...) because it opened our minds [about] financing.”

Figure 5. Most Used WISE Mobile App Features



Beneficiaries sometimes experience challenges accessing the WISE App content.

The most common challenges include that some features are not available offline (48% of respondents said this was an issue), the fact that information is only accessible in French and English (41% of those surveyed identified this as a problem), and technical issues with the application (e.g. the app does not open or closes suddenly) (31% of those surveyed were affected by this). Regarding language, most surveyed beneficiaries prefer communicating in Wolof (90%) than French (3%). While most fish processors (96%) and fishermen (71%) use the WISE videos, audios, and e-books to inform their processing and fishing practices, some indicate their internet connection is not strong enough to access the content, particularly the videos, even though the size of the videos are optimized for low bandwidth environments.

Beneficiaries are concerned about the transfer of WISE to the government.

Fish processors and fishermen fear the program's quality will suffer. Some commented "In my opinion, whenever the government gets involved in a community-based project, it ruins it (...) because the government politicizes it. We will not be able to say what we think anymore." Others are concerned about costs, as internet use and communication through the WISE App is currently free and does not affect users' phone credit. A beneficiary commented "We had a meeting in Dakar with the [government] people in charge of telecommunication, and they asked us are you able to pay or no. You know right now we are able to [use WISE] without paying. The government said that they are ready to take on the project under the condition that we pay; they cannot give it for free anymore." Most fish processors and fishermen recommend that the government keep them included in the implementation and management of WISE.



"Whenever the government gets involved, there are problems. If the government takes on the project, they should invest in it, put their money, and raise awareness."

| Fisherman



"If government takes on the project, they need to include others. We ask to be involved, to be part of the decision makers. Where there is transparency, there is no problem."

| Fish processor





LESSONS LEARNED & RECOMMENDATIONS

Lessons Learned & Recommendations



Early government engagement and leadership is needed to ensure program sustainability.

While establishing and coordinating a coalition involving pertinent government bodies proved time-consuming and challenging, securing early buy-in and participation from national fishery and digital economy authorities has contributed to the successful implementation of WISE. Project implementers invested considerable time and resources to ensure this was a government-led coalition from the onset of the program to increase the success of the institutionalization process. As the program transitions from Qualcomm Wireless Reach and FHI 360 to the Senegalese government, authorities are encouraged to continue working closely on the operational and budgetary management of the program. This will facilitate the implementation of WISE while maintaining program quality.



Public-private partnerships are a powerful mechanism to develop and scale digital solutions that accelerate economic growth and competitiveness.

Collaboration among public- and private-sector entities help maximize the benefits of WISE by leveraging partners' unique expertise, assets and processes, and access to core audiences. Examples of this are Qualcomm's digital technology capabilities, Free's extensive mobile network, Intermondes' data collection expertise, MPEM and MENT's systems and policy development capacity, and EIGs' reach to target beneficiaries. The combination of these competitive advantages was catalytic for the success of the program. Implementers are encouraged to continue to leverage public-private partnerships as they implement WISE.



Digital technology alone cannot address socioeconomic challenges and needs to be complemented with additional interventions.

Successful program implementation requires the establishment of clearly defined processes that enable the effective use of the technology. These processes include engaging the right players (i.e., EIGs and relevant government bodies), providing data collection and technology literacy training, ensuring regular end-user support, and enabling internet access. Implementing these complementary activities through economic groups that represent a large number of fishermen and fish processors eases implementation challenges and increases program uptake. Removing barriers related to fear of technology via training and user support is a pre-condition to access the program. Ensuring internet connectivity is also a pre-condition for beneficiaries to take advantage of the WISE App. Engaging multiple telecommunication providers in the delivery of the program could help in this area.



Supporting the equitable participation of women leads to greater program and sector impacts.

Removing obstacles to women's access to business financing enables their full economic participation in the fishing sector and ultimately strengthens the overall industry. As WISE transitions to the national government, implementers are advised to increase the capital available for women fish processors so they can access affordable credit.



Continuous stakeholder engagement, particularly of end-users, and inclusion of all fish landing and processing sites ensures program relevance and quality.

In addition to involving key institutional actors in the management of the program, seeking regular feedback from WISE users guarantees the program continues to meet their needs and characteristics. This enables trust and a space for learning and improvement, all critical to program uptake, quality, and sustainability. Implementers are also encouraged to make the WISE App available in Wolof and expand the program to other fish landing and processing sites not currently benefiting from WISE.

By 2025, Senegal's digital strategy (Digital Senegal 2025) aims to increase the contribution of digital technology to the country's GDP by 10% and create 35,000 direct jobs—making the digital economy an important driver of development. Fishing is one of the sectors prioritized by Senegal's strategy. WISE is not only aligned to the country's plans for the technology sector, it also contributes to the Sustainable Development Goal 1 of ending poverty in Senegal. With the program's results to date, the Ministry of Digital Economy and Telecommunications and other government agencies recognize WISE's alignment with many of the country's development strategies and have supported its implementation.

It is now time for the Senegalese government, in collaboration with the private sector, to expand WISE. When taken to scale, WISE will provide services and resources to 52,000 artisanal fishermen and 20,000 women fish processors throughout the country. Expansion of WISE also means expanding the use of mobile money services and expanding affordable loans for entrepreneurs in the fishery industry. Scaling WISE's reach improves data collection on the country's fish market, an important contributor to food security. The digital transformation of the artisanal fishery sector can also bolster the country's fish exports. Above all, the expansion of WISE can raise the income of thousands of Senegalese men and women, impacting their lives and their families.



Appendix

Annex 1: Interviewed Stakeholders

- Babou Sarr, Technical Advisor, Ministry of Digital Economy and Telecommunications
- Maye Faye, IT Services, Ministry of Fisheries and Maritime Economy
- Maty Diop Diouf, IT Director, Food Security Commission
- Mouhamadou Ndiaye, SIM Coordinator, Food Security Commission
- Emanuel Andrade, B2B Manager, Free
- Diaba Diop, General Secretary, National Federation of Women Processors and Micro-fishmongers of Senegal (FENATRAMS)
- Berhane Gebru, Director of Programs, FHI 360
- Mariama Mane, Operations Support, FHI 360
- Pape Kamara, Technical Monitor, Intermondes
- Erica Ciaraldi, Staff Analyst, Government Affairs, Wireless Reach, Qualcomm
- Elizabeth Migwalla, Vice President, Government Affairs Africa, Qualcomm



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