

DigiFish Phase 2: Transforming fish landing sites into intelligent spaces

DigiFish Fase 2: Transformar los lugares de desembarco de peces en espacios inteligentes

DigiFish Phase 2 : Transformer les sites de débarquement de poissons en espaces intelligents

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EXTENDED ABSTRACT

Embracing digital technologies is no longer a luxury but a necessity for sustainable and thriving small-scale fisheries. However, data scarcity hampers effective management and decision-making (Gill et al. 2019). Conventional fisheries data collection systems are often laborious, relying on manual data recording and analysis. Furthermore, the process of moving and processing data from the point of collection into management decision-making is often slow or non-existent (Bradley et al. 2019). The current state of digital innovations within the Caribbean's fisheries sector is considered "low", with fishers in the region mainly relying on basic digital solutions and services such as voice calls, WhatsApp messaging and Microsoft Word and Excel for data collection and storage (The Commonwealth 2023). Despite the low uptake of digital technology in Caribbean fisheries, there are some important solutions and services in early developmental stages, with pilots currently being undertaken (The Commonwealth 2023). Fishers have also shown interest in using digital technology with the use of apps such as the Fisheries Early Warning and Emergency Response (FEWER).

Efforts to build out an innovative fishery monitoring and traceability programme in the Caribbean have also begun. In 2022, Project DigiFish was successfully piloted through collaboration with the Barbados National Union of Fisherfolk Organisations (BARNUFO), the Barbados Environmental Conservation Trust (BECT) and Pelagic Data Systems (PDS). In this pilot, 30 PDS vessel monitoring system (VMS) devices were installed on small-scale vessels in Barbados to illustrate how fishing effort changes through space and time. Incorporating these systems and data-driven approaches into fisheries management can help to create a more holistic, evidence-based, and sustainable approach to balancing the diverse societal and environmental objectives. Building upon the accomplishments of the Pilot, Phase 2, a joint venture between Blue Shell Productions, Remora Fishing Traceability and Mr. Fish Inc., brings a wave of exciting advancements. In this phase, the goal is to address the fragmentation of seafood value chains and promote traceability by transforming landing sites into intelligent spaces. Phase 2, launched in Barbados, aims to install 40 VMS aboard longline fishing vessels, procure two Remora Smart Scales for tuna species and use traceability as a tool to open and access premium seafood markets. In this abstract, we provide an overview of Phase 2, present lessons learned, and offer recommendations for scaling up this initiative across the Caribbean.

Phase 2 employed a participatory action approach to support its successful implementation. In the early stages of project development, activities included conducting literature reviews and engaging fisherfolk and landing site personnel to sensitize them on aspects related to transparency, traceability, and commercialization. Discussions with collaborators under the themes of traceability, monitoring, marine spatial planning (MSP) and statistical analysis were also conducted. During this project development stage, compliance with national, regional and international regulations to be included within the management and visualization platform were also identified. The team also conducted a thorough analysis of the existing infrastructure at the Bridgetown Fisheries Complex where the smart scales are to be installed. In the second stage, activities related to the implementation of electronic and digital information capture were carried out. So far 6 Remora VMS were installed aboard longline vessels operating from the Bridgetown Fisheries Complex. The Remora device is a self-energy generating device that collects high resolution data to support the creation of data algorithms adapted to the local context. The Remora smart scale prototype has been developed, pending installation. The smart scale has been designed to take pictures of every tuna, and through image processing and artificial intelligence analyze the weight and size (length) of the fish. The temperature and grade of the fish can also be manually inputted using a touch screen monitor. A traceability tag will be generated for every tuna that passes through the smart scale that will encompass the weight and dimensions of the fish, the fisher, the boat and the fishing path through a correlation with the VMS. The data intelligence and visualization platform will compile the data collected to determine catch location, calculate fishing effort, analyze landings and begin the traceability certification process.

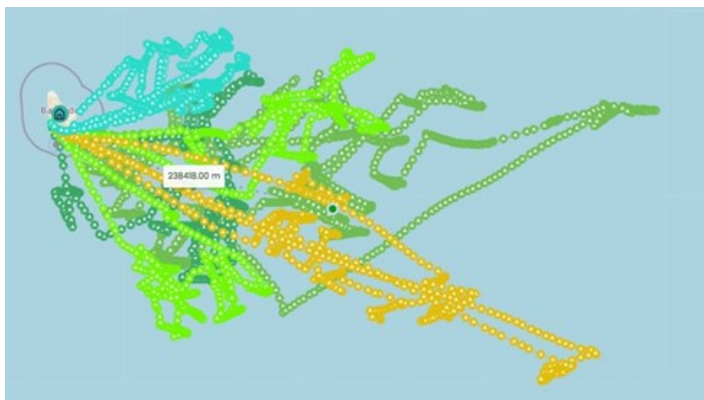


Figure 1. Visualisation of the distribution of trips of the longline vessels .



Figure 2. Visualisation of the cluster analysis indicating areas of potential fishing activity .

The 6 VMS have been effectively gathering experimental data. During this reporting period, there were 9 completed trips, and a total of 54 days' worth of data was collected. The distance travelled per boat ranged from 1500 - 4000km and the trip time per boat ranged from 300-790km. The furthest range recorded was 481.1km. Figure 1 shows the distribution, range and areas of possible fishing activities of the longline vessels logged from 07 July, 2023 to August 23, 2023. Analyzing patterns in vessel speed over specific spatial and temporal intervals can reveal potential fishing behaviours. The VMS have effectively captured patterns of speed reduction, halting, and subsequent resumption of movement. A cluster analysis was also conducted which shows the densities of geolocation points associated with fishing activity (Figure 2). These clusters offer insights into specific regions or fishing grounds commonly frequented by longline vessels during their operations. It is anticipated that 4 additional devices will be installed aboard longline vessels before year end.

The Project has already yielded tangible benefits for the fishing industry. Thanks to this advanced digital technology, Barbadian fishers now possess the means to navigate waters more efficiently and securely. This technology has the potential to provide insights into prime fishing spots and effective techniques, allowing them to 'fish smarter' and target areas of possibly more profitable catches while reducing fuel consumption. Barbados

Fisheries Division also stands to gain from access to real-time data to monitor and analyse fleet behaviour, compliance monitoring and to support MSP. Beyond MSP, the data can be used to calculate catch per unit effort (CPUE), assist with Fish Aggregating Devices (FAD) monitoring and support sea turtle conservation. Following successful implementation of the full suite of technologies, DigiFish will aim to start commercialization of the hardware and software through the development of revenue-generation models that would allow for sustenance of the initiative. Project DigiFish will also implement strategies to involve young individuals, designed to inspire and educate the next generation of marine conservationists and tech innovators.

KEYWORDS: Digital technologies, vessel tracking systems, traceability, smart scale, blue economy

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