Marine Stewardship Council

Projet : Improved fisheries data and ecosystem information for small pelagics

Paper logbook data entry report

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I. Context

The most exhaustive data on the activity of inshore and offshore fishing boats are those declared in fishing logbooks. In fact, every boat operating in the Mauritanian EEZ is required by law to submit a fishing log to the Mauritanian Coast Guard at the end of each trip. This document records data relating to the boat's activity during a given tide. Each record provides information on daily catches by species or group of species (in kg), daily fishing effort (in trawling hours), vessel code, nationality and general characteristics (engine power, length, beam, tonnage, hold weight), period (day, year) and sector of activity. The new fishing log sheet takes into account the need for research in terms of catches per trawl, information on trawl positions, and so on.

The Coast Guard forwards a hard copy to IMROP for entry and archiving in its databases.

IMROP has recently developed an application to capture and archive this data for scientific purposes. To catch historical fishing log data, support was provided under the MSC-funded "Improving fisheries data and ecosystem information for small pelagics" program.

This activity made it possible to:

- Update the computer application

- Train data entry agents on the developed application

- Ensure data entry for the 2019-2023 period.

We present below the progress of all the components of this activity.

II. Computerized data entry application

The computer application was developed on :

- DBMS :MySQL: a relational database server (client-server). Used as the central database.
- Java (JEE): programming language (Java Enterprise Edition)
- Struts: development framework

Recovered data is entered by concession, and each concession can group together several tides and therefore several boats. The functional dependency network of the database is shown below.

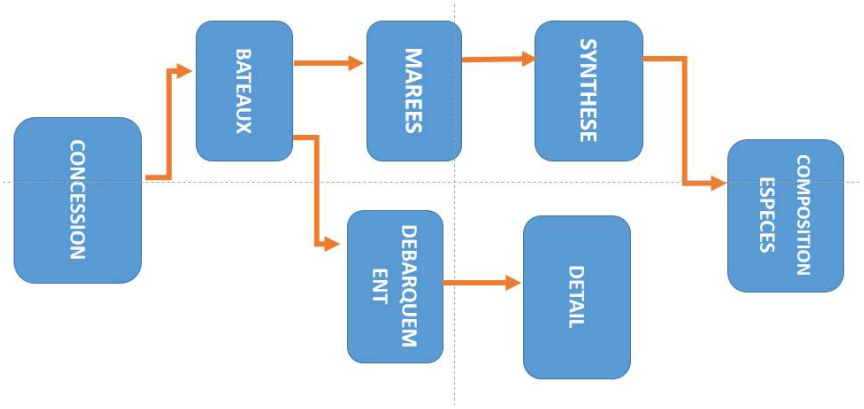


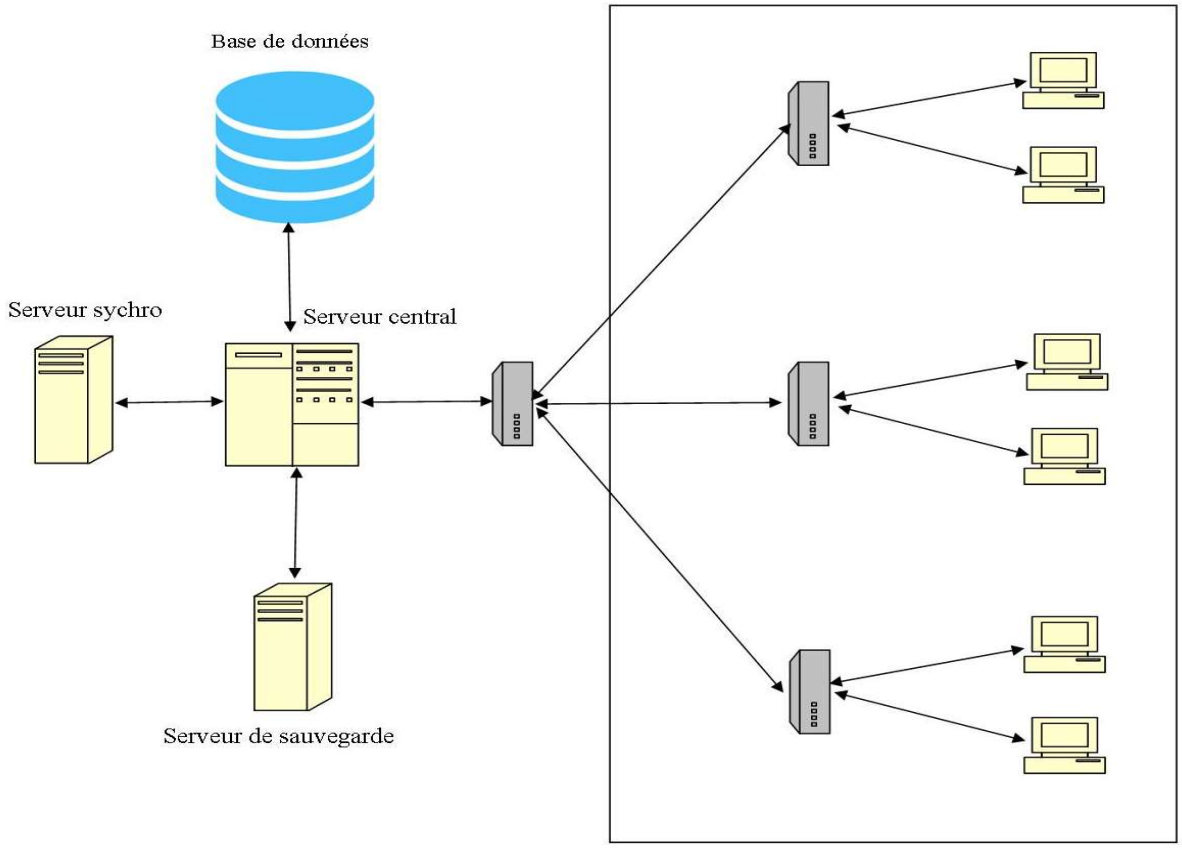
Figure 1 : Database functional dependency network

The application's general menu is presented by highlighting the concession type. It should be noted that concession types are defined on the basis of fishing types and resource categories as determined in the decree implementing the Fishing Code Act. They are identified in the management and development plans as operational management units, which can then adapt them in line with changes in knowledge of resources and fishing practices.

It provides information on the type of concession, with several items of information such as: concession contract reference, which constitutes a primary key, segment and license type, concession validity, license information (quotas, etc.).

In addition, the architecture of the system developed enables data to be accessed and entered via a multi-user, multi-platform application. This application is installed on a server connected to the client workstations by an Ethernet network.

To facilitate access to the various modules, a specific menu is presented on all pages, making it easier to navigate between the different parts of the module.



The application involves several modules (Table 1).

Table 1 : Types of modules developed.

Modules	Specifications
Register (repository)	Plants, vessels, licenses, concessions, species, references tables
Journal de pêche (marée + détails)	Modulaire et paramétrable
Fishing log (tide + details)	Modular and configurable
Query engine	Implementation of a set of queries enabling data export to Excel or csv format

Figure 2 : Architecture du systéme

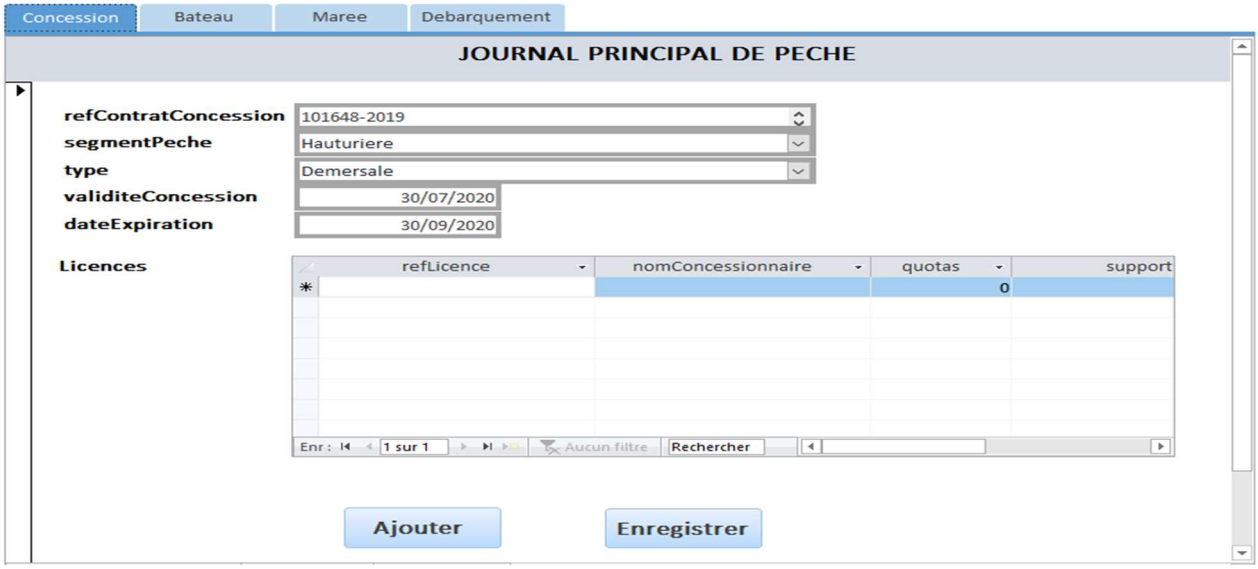


Figure 3 : Main journal general menu

The types of concessions, the target species and right holders, and the authorized fishing gear are set out in Table 1, which forms an integral part of this order.

Table 2: Types of fishing, resource categories, types of concessions, target species and rights supports.

Type of fishing	Resource categories	Types of Concessions	Target species	Type of rights holder	Fishing gear
Coastal fishing	1.Cephalopods	Coastal fishing Cephalopods	Octopus, Squid and Cuttlefish	Individual quota	Pots, traps and trammel nets and jigs.
	2. Crustaceans (shrimp, green lobster) and pink lobster Inshore	fishing for crustaceans	Langostino, Tiger Green lobster, Pink lobster	Individual quota	Gillnets, trammel nets and traps
	3. Demersal fish	Inshore fishing Demersal	fish Hake, thiof Sea bream Sole Skate Sharks Mullets	Individual quota	gillnets, trammel nets and traps
	4.1Pelagic fish Coastal	fishing Pelagic fish	Sardines, Sardinella,	Individual quota	

			Anchovies, Horse mackerel, Scabbardfish		
Deep-sea fishing	Small pelagics	Deep-sea fishing	Sardines, Sardinella, anchovies, scabbardfish, Horse mackerel, Mackerel	Individual quota	Trawls and seines
	Tuna	Deep-sea tuna	fishing Tuna and small tuna	Individual quota	Lines and seines
	Cephalopods	Offshore cephalopod fishing	Octopus, cuttlefish and squid	Individual quota	Trawls
	Inshore shrimp (Langostinos)	Offshore fishing of inshore	shrimp Langostinos	Individual quota	quota Trawls
	Deepwater shrimp (Gambas)	Deepwater shrimp fishing	Gambas	Individual quota	Trawls
	7. Merlus	Pêche hauturière merlutière		Individual quota	Lignes et chaluts, filets
	8. Poissons démersaux profonds autres que le merlu	Pêche hauturière poissons démersaux profonds	Dentés, Rascasses Saint pierre Brotules Raies Requins (liste à compléter)	Individual quota	Lignes et chaluts, filets
	9. Poissons démersaux côtiers	Pêche hauturière poisson démersaux côtiers	Merou, thiof Dorades Soles Raie Requins (liste à compléter)	Individual quota	Lignes et filets
	10. Langouste rose	Pêche hauturière à la langouste rose	Langouste rose (araignées de mer et Cigales)	Quota Individuel	Filets et casier
	11. Crabe profond	Pêche hauturière aux	Crabes profonds	Quota Individuel	Filets et casier

		crabes profonds	(araignées de mer et Cigales)		

An input interface for each boat has been developed to provide information on the concession reference in which the boat operates, the radio call sign, the boat's name, information on

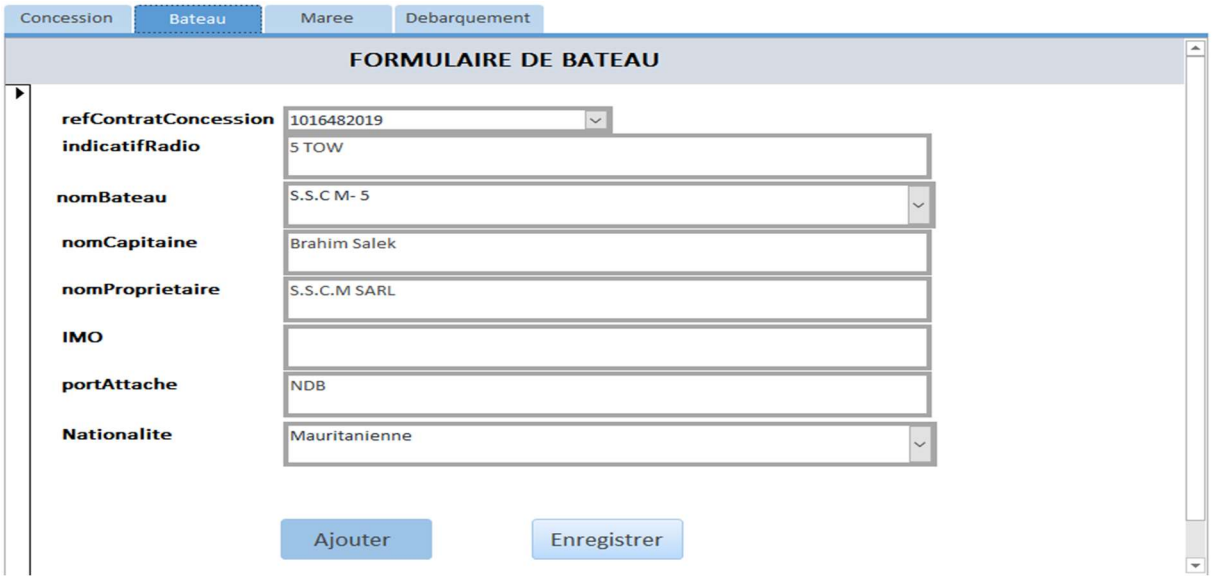


Figure 4 : Formulaire bateau

Each boat works during a cruise identified by a start and end date. All information on fishing activity is entered in this section. This includes geographical positions, quantity of species aught, etc.

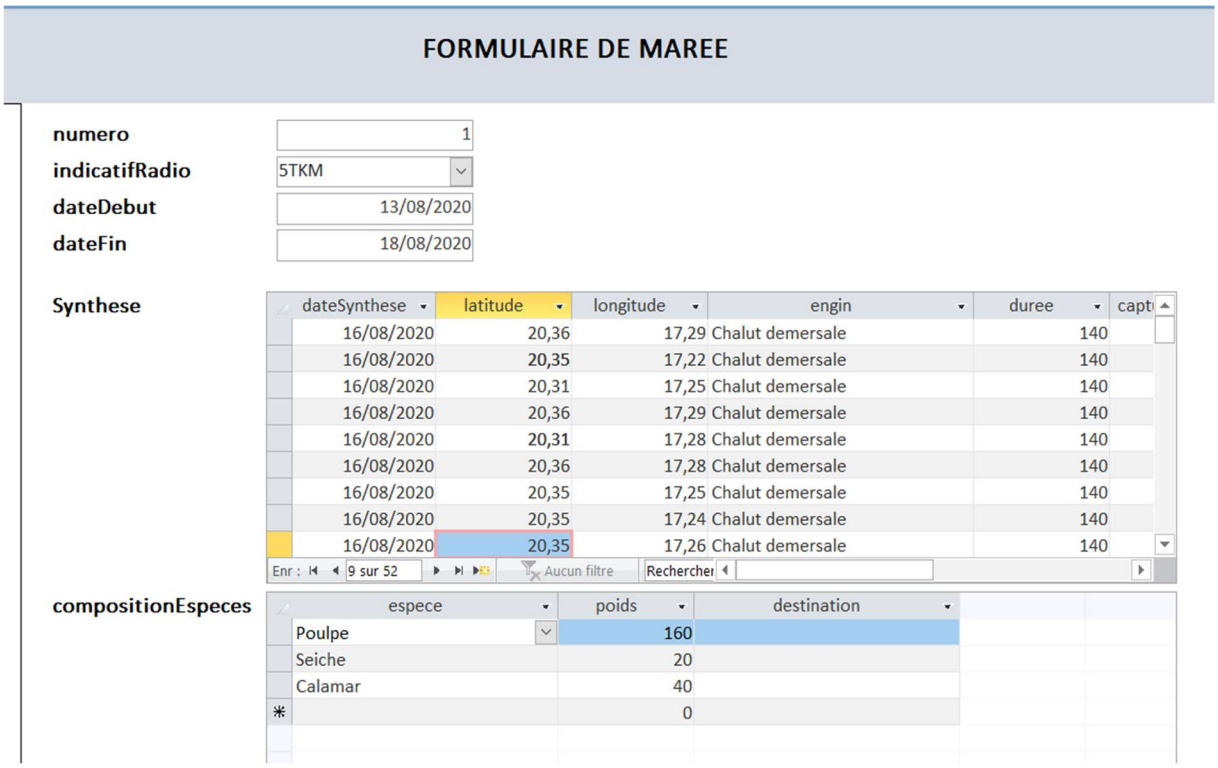


Figure 5 : application of cruise

What's new in this application is the inclusion of the fishing log annex, which has never been entered before. In fact, the fishing log is made specifically for research purposes.

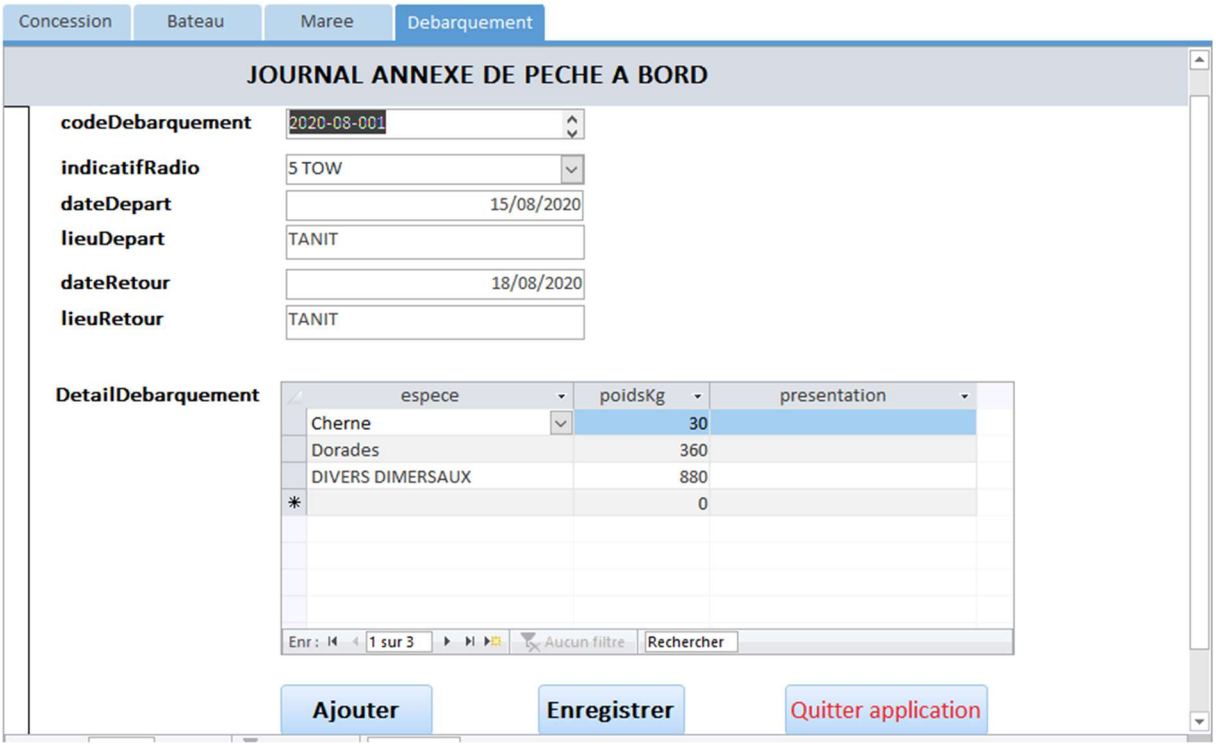


Figure 6 : Annex logbook

After developing the input masks for the various fishing log modules, we developed data extraction queries.

Tableau 3 : Extract from Summary of catches per tide

refContratConcession	dateDepart	dateRetour	espece	poidsKg
30011201	13/08/2020	18/08/2020	Poulpe	5260
30011201	13/08/2020	18/08/2020	Seiche	360
30011201	13/08/2020	18/08/2020	Calamar	1700
30011201	13/08/2020	18/08/2020	Soles	20
20201243	30/07/2020	07/08/2020	PALOMET.	8280
20191016	02/08/2020	04/08/2020	Divero mc	160
20191016	15/08/2020	18/08/2020	Cherne	30
20191016	15/08/2020	18/08/2020	Dorades	360
20191016	15/08/2020	18/08/2020	Autres po	880
20201243	20/08/2020	26/08/2020	PALOMET.	18160
20201017	02/09/2020	09/09/2020	Poulpe	2000

Tableau 4: Extract from the summary of catches by species and gear

engin	captureTota	espece	poids
Chalut dem	140	Poulpe	120
Chalut demers	160	Poulpe	80
Chalut demers	160	Poulpe	160
Chalut demers	180	Poulpe	100
Chalut demers	180	Poulpe	140
Chalut demers	180	Poulpe	180
Chalut demers	200	Poulpe	140
Chalut demers	200	Poulpe	160
Chalut demers	220	Poulpe	140
Chalut demers	220	Poulpe	160
Chalut demers	220	Poulpe	180
Chalut demers	240	Poulpe	140
Chalut demers	240	Poulpe	160
Chalut demers	260	Poulpe	160
Chalut demers	280	Poulpe	200
Chalut demers	420	Poulpe	160

III. Training modules for data entry agents

Data entry operators and supervisory staff (listed below) were introduced to the new fishing log data management application. The training took place as follows:

- Presentation of the application's modules, with fairly detailed explanations of the content of each heading of the fishing log form, to help trainees get to grips with the application.
- Practical work on prepared datasets. Training participants were divided into pairs and by PC to optimize learning and ensure rapid familiarization with the application.
- Explanations and corrections of stuttering related to input errors (numerical data entered in a text field, time or date entry errors, etc.) are provided each time the problem arises.

IV. A few comments on the application:

✓ During the practical sessions, a number of comments were made on the data entry and management application with a view to improving it:

✓ The "duration of the operation", which the data entry operator is asked to convert into minutes each time. It has been suggested to leave the duration in hours as entered in the logbook. The data entry operator must reproduce the contents of the fishing log sheet verbatim in the database, and not make calculations which may be a source of bias.

✓ the "fishing gear" field is filled in the fishing log with either the gear name or the gear code, whereas the application only provides the gear name

as a reference. If the code is filled in, it is not possible to enter the fishing gear. This is why it was suggested to add the "gear code" field.

- ✓ to enter the "license number" field, the data entry operator has to check the existence of the license and the boat in the reference file each time. The search should have been automatic. This option, in addition to delaying data entry, is considered very restrictive. It was suggested to automate the search for the license or concession number and the boat name.

V. Input data

The completion of this activity enabled fishing log data to be entered from January 2019 to December 2023. The number of entries made in the database is shown in Table 5.

Table 4: Summary of the number of fishing log records entered

Year	Number of records entered		Quantity fished in tonnes	
	Inshore fishing Boating	Offshore fishing	Inshore fishing Boating	Offshore fishing
2019	22173	167508	436883	630889
2020	27332	288703	517475	440196
2021	33760	315739	353804	318626
2022	36287	310000	343099	297252
2023	25362	259052	109602	393336

VI. Conclusion

This data entry activity, financed by the project "Amélioration des données sur la pêche et des informations sur les écosystèmes pour les petits pélagiques" (Improvement of fisheries data and ecosystem information for small pelagics), has enabled us to develop an application for the administration and entry of fishing log data that had been stored at IMROP for several years without being used. The application is easy to master for database managers and data entry agents.

Queries to extract data on catches by boat, gear, license, geographical position, etc. are carried out.

In conclusion, since the main objectives set at the outset of the project have been achieved, we can say that the whole operation has been a success.
A centralized, dynamic and scalable information system, integrating all data from different sources, has been set up and installed within IMROP to manage, process and enhance all data on the environment, fishery resources and stock exploitation.
This system is connected to the fisheries resource management system and to the centralized system.