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Introduction

One of the work packages of ISTAM aimed to propose a functional prototype of subregional information system on fisheries. This work has been achieved in concerted dialogue with partners (Morocco, Mauritania and Guinea) and led to the deliverable D2.3¹. The present document results from this experience and also capitalizes on past experiences. It aims to make some recommendations that seem to us useful to respect to produce a coherent national information system for all the potential users (researchers, stakeholders, NGOs ...). We shall also try to replace these recommendations in a subregional context and explore several scenarii about the role of the Sub Regional Fisheries Commission (SRFC). We shall not develop technological aspects in this document as they are already included in the prototype itself. We shall more develop on organisational aspects (how to improve a subregional information system).

1. National level

We first consider that to build in an efficient way a subregional information system, at least homogeneous, consolidated and integrated systems at the national level must exist.

1.1. Context

Most of time, one of the barriers to create coherent information systems is the fact that data are considered as personal. The scientist in charge of data collection has often done it with a personal objective, often within the framework of a specific question (for example for a thesis or a publication). The result is often a lack of global view of the data collection and its objectives relating to the general and public interest. Thus, due to a rapid turn-over of the scientists in charge of a specific monitoring system, there is a risk of dispersion of the data. In the current context, there is a demand regarding the models in long series and most homogeneous possible used by researchers, as well as the multiplicity of the transversal approaches (ecosystem approach in particular). Therefore, the data must above all be at the disposal of the institute which collects and manages it and not of the researcher who needs it for his work. All the data have to be usable for all the scientists of the research center because they are used in different ways. They also have to be considered as a common good.

One other effect of a personal use of the data is the lack of meta data and more generally on a qualitative point of view of the data. Indeed, there is no need to qualify the data (or the change made in it) if you are the only user. The question of the meta data becomes more important when different persons share the same data on a long period. When meta-data are used to qualify information there is a better appreciation of the database. We can keep and capitalize knowledge of the data.

The information contained in the data bases has a certain value since people want to access it. The lack of global approach on data collection and the lack of clear data policy on the use and dissemination of data within the research centers generally involve a recurring restriction of access to information. It is frequent that data producers do not particularly seek to support the dissemination and/or valorization of it.

Finally one of the consequences of the problems described above is the multiplicity of the sources of information, each one reconstituting series which it considers the best for its case study without documenting the processing and corrections that it applies. This multiplicity of sources of

¹ Prototype (functional) of the subregional information system. Annotated tools and case studies

information (fine data bases) results in a vast diversity of data sets, not necessarily compatible. This situation weakens and can call into question the quality of the scientific productions.

1.2. General recommendations

A quality step requires, on the one hand, centralizing the data (to secure and capitalize) and on the other hand, the provisions of services around these data such as:

- Data could be easily documented;
- Safeguard of the data
- On line atlases which allow the valorization of information
- Predefined queries which make data easily shared.

The succes of such a project will lead to the adhesion of the regular users of the data (the scientists).

Scientist and database managers need to collaborate. They both have to be in charge of the management of the project in a concerted way.

Another key of the success will be the reactivity. The time between the beginning of the project and the demonstration of the first advantage of it have to be short enough to guarantee an efficient collaboration between the various actors.

1.3. Steps

First of all it is necessary to set up a formal steering committee which will be used as formal place of dialogue between the differents actors involved in the database and knowledge managment evolution. Then we need to undertake an inventory of all the monitoring systems and data produced. This step will allow us to define priorities in the integration of the data. We can then elaborate a chronogram of the project with some deliverables at the end of each step. The deliverable could be the end of the integration of a database and/or the set up of all the services developed on this data (on line atlas, predefined query, expert query, meta data ...). Attention will have to be paid on the fact that integration of a set of data has to be finalized with the installation of services and the demonstration to the users.

1.4. Centralization for improved data

Once the data are centralized, we have to develop all the tools to validate and valorize them. It's an essential step to identify the official data source and to identify also where the mistake should be corrected. Here can begin the real work on the data which could be classically carried out in 2 phases. First we have to detect and correct such errors related to the collection procedure (such as typing errors). Then we need to transform a sampled data to an extrapolated data, nearer to the "truth". The two procedures of correction are not realy made one after the other but each time a mistake is detected by a user we can change the database. It's an iterative procedure that should be framed by a restricted and reactive steering committee that can make a judgement on such not trivial errors on the data.

2. Subregional level

2.1. Context

We can mention 3 principal reasons why an intervention at a subregional level is interesting. The first reason is scientific and takes into account the fact that there are shared stocks of fish where a national assessment is not really efficient. For a long time the classical stock assessments were carried out on a national basis whereas fishes and fishermen are mobile and are not very sensitive to the EEZ. Today it is agreed that regional analyses are more relevant on a certain number of stock and ecosystems. For this reason one of the roles of a subregional level should be to take into account the interoperability of the information systems (common referential, pass from a nomenclature to another...).

The second reason is of political nature because the fishing States (or the European Union for example), prefer to negotiate fishing agreements on a sub regional level. Already, the SRFC has a mandate to support the Member States for the negotiation of fishing agreements with the European Union. This sub regional political level must be accompanied with the capacity to integrate information on the state of fisheries and the regulations at the sub regional level and to improve scientific advices.

The third reason is that in recent years some of the national research centers have suddenly lost their data. This should be due to a lack of support by the Ministry in charge of the research center or to a problem of national crisis (civil war or other). In this particular context a subregional level should be a place to safeguard data and knowledge of a national level temporarily deficient. The subregional level should facilitate the data availability for stock or fisheries assessment. The flexibility necessary to the national systems should also be maintained so that they can meet specific needs (attempt of co-management systems for example which would modify the standard procedures) or react to technological and structural developments of the monitoring systems while maintaining interoperability with the sub regional system.

2.2. Framework for the subregional level

We would like here to propose three ways to imagine the role of the subregional level in a subregional information system on the fisheries and how it coordinates with the national level. The three proposed scenarii presented are the more integrative solutions to the more federative one. The scenarii are not exclusive and we will then present a solution which takes into account part of all of them.

Scenario n°1: A regional integrative information system

In this first scenario, the subregional level is the place where all the data produced by the national level are put together in the same database. The national level is only considered as a data provider and the regional system has his own structure that could be completely different from the national one. It disseminates new time series issued from the sum of all the regional data. It could induce a real disconnection between the two systems. In a second time the regional level could try to impulse a harmonization of the national monitoring systems to reduce the problems of data transfer resulting from heterogeneous systems towards an integrating system which forces homogeneity of data or their interoperability. It could also be in charge of a certain number of responsibilities in the data acquisition (management of a regional observer body).

This top down approach is easier to set up in a short term but in long term the risk of confusion between the national and regional level should generate an opposition rather than a real

partnership essential to get the adhesion of the national users.

Scenario n°2: A federative information system

We can also imagine the national level as a federative one. This level would create and disseminate meta-data on the national level and add knowledge on it. The information managed by the subregional level would consist of the most up to date possible inventories of data and means to access it (URL / contacts). The sub regional information system would be seen as a network with a central node which describes the data available on each national node.

This organisation is a network of database where the metadata catalog is set up by the regional level. The main objective of it is to inventory the fishing monitoring systems, the data collected and the way to access it. The network would have to be very reactive and the role of the regional level would be to promote the meta data catalog.

Scenario n° 3: An organizer for the national level

A third scenario would set up the sub regional level as an organizer of skills and technologies used at a national level to try to make them interoperable. The objective of this networking would be to promote sharing of experience between the various partners, to propose common training courses. The objectives of this networking would be:

- 1- To organize a subregional dynamics about the fisheries information system.
- 2- To support the development of homogeneous skills on information systems in the subregion.
- 3- To promote the recommendations of this present document.
- 4- To promote the sharing of skills and technologies within the subregion.
- 5- To be a focal point to obtain funding
- 6- To be aware of the need of the users, of new information and technologies to integrate and disseminate and finally to ensure training of partners on these technologies

Technical recommendations:

In order to ensure the control of the tools used and the fact that they could be disseminated in all the national research centers, the regional level should promote open-source software in the development of information systems. This also avoids costs problems and allows to take into account the operating system of the national platforms.

2.3. Subregional level role

As mentioned at the beginning of this document, these three scenarii are not exclusive and the ideal proposition would be a mix of each scenario. In an ideal framework, the subregional level should integrate all the national data (scenario1). This would ensure the safeguard of it vis-a-vis the risks of the national organizations and the fact it could be easier to carry out transnational stock or fisheries assessment. But the centralisation of the data at the sub regional level is not possible without the adhesion of the data provider who only is able to bring an expertise on the quality of the provided data. It is thus necessary to set up a real partnership with the national level and that will be able only if the data managers work together on problems at the national and regional level. The regional level should first establish its legitimacy to be the organizer of the network. This legitimacy is issued from the knowledge of the problems that the national level has to solve. The person who will be in charge of this project should part of the pool of database manager and not at the top of it.

To describe the step, first the subregional level should organize a pool of national skills in fisheries information system management (Scenario3) and try to harmonize the skills around community

technologies which promote the harmonization of the database management and finally the interoperability of it (scenario 2).

Then, once the partnership is established, the sub regional will be able to propose the creation of a sub regional database while continuing organizing and federate the national teams (scenario 1).

CONCLUSION

A centralization of the data at a regional level seems to be in the long term a real guarantee of the coherence of the fisheries information system at the sub regional level. But this should not be done without a real partnership between the national and the regional levels. It is the reason why a first step of such a project should be to establish a network of collaboration around the regional level in order to constitute a federation of homogeneous information systems, before being able to consider integration. This sub regional level must first gain its legitimacy with becoming an actor of fisheries information systems to be the project implementing body. To carry out this project, it will be necessary that States and financial partners find the financial and human means to support a subregional structure to begin the development of the present recommendations. Finally we recommend the use of open source software which allows to control each part of the system and will make it possible to more easily develop interoperability between the national, regional or different (FAO for example) information systems.