Deliverable D2.1

Specifications for the prototype of the Regional Fisheries Information System (RFIS)
&
Inventory of data and metadata retained by the project

Abstract

The diversity of West African Fisheries Information Systems (IS), their weak capacity of communication and their difficult access constitute obstacles to data exchanges on the fleets and shared resources at the regional level. To contribute to correct these problems, the Istam project proposes to design and develop a regional IS prototype based on an idea of federation of national systems. The present document describes the purpose of this prototype, the target beneficiaries, the types of information supported by the device, the functionalities of the prototype and its constraints. A list of selected data sets that will be included in this prototype in the framework of the case studies is also presented.

Specifications for the prototype of the de Regional Fisheries Information System (RFIS)

1. Context

ISTAM participating countries (Morocco, Mauritania, Senegal and Guinea, France, Spain, Portugal, Norway) exploit together a certain number of fisheries resources occuring in national or international waters of West Africa. The monitoring and management of fisheries in this region is mostly based on scientific advices elaborated by researchers of national fisheries research centres or by recognized experts. These advices are elaborated on the basis of observations, data, information and available documents on this issue. Access, in the form and in good time, to these various information sources constitutes an important quality factor of these advices and is linked to the efficiency of information systems in place.

It is recognized that the current organisation of fisheries information systems (IS) in West Africa poses a certain number of general problems:

- When available, the information often remains **difficult to access.**
- **The back up and the security** of data and information are not always guaranteed especially because of a chronic lack of means within some research institutions or technical services in charge of data collection and information management.
- The diversity of means displayed for data and information management in countries (national IS) is significant. It poses a **communication problem** because it is at the same time difficult to know the protocols having governed the data collection and the first information processing. Besides, the structures of the data are different from one another.
- The heterogeneity of national IS, their low capacity of communication and their difficult access constitute **obstacles to data exchanges** on the fleets and shared resources at the regional level.

To contribute to correct these problems, the Istam project proposes to design and develop a regional IS prototype based on an idea of federation of national systems. The present document describes the purpose of this prototype, the target beneficiaries, the types of information supported by the device, the functionalities of the prototype and its constraints. A list of data sets that will be included in this prototype in the framework of the case studies is presented in annex.

1. Purpose

The purpose of the RFIS is to enable availability of data, information and tools necessary for the production of quality scientific advices useful for fisheries management.

Within the Istam project, the RFIS prototype is placed between the WP1 relative to data collection, the WP3 concerning information analysis, and the WP5 relative to dissemination.
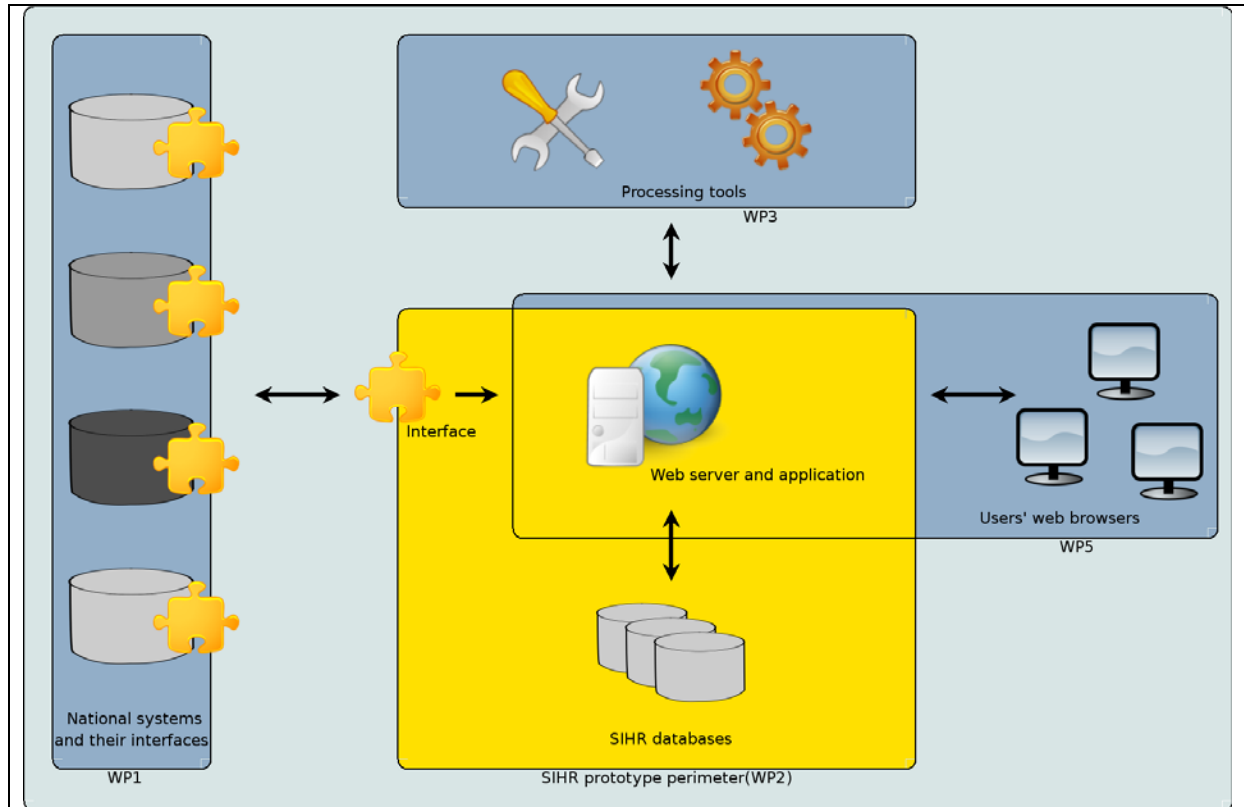

Fig 1. Positioning of the RFIS prototype in the chain of information processing

2. Beneficiaries

The range of the potential beneficiaries of the RFIS is very broad:
- Researchers
- Managers
- Professionals
- International organisations
- Non-governmental organisations
- Development partners
- Large public

As a consequence the RFIS will have to meet the expectations of each type of user as much as it can be done.

3. List of the types of information used in the IS

The RFIS will have to manage different kind of information. They are:

- **Raw data.** Data directly resulting from the collection on the field. These data are not or very little processed (example: weight per species in the features of experimental trawls, number of fishing units out at a given period of time …).
- **Statistics.** Data compiled or calculated from the raw data described above via methods, models. This category includes fisheries statistics.
- **Indicator.** An indicator is an instrument which gives information in a synthetic way on a given phenomenon. It is often a statistic equipped with a quality communication recognized in a consensual way (example: catches per fishery, fishing effort).
- **Description of model.** The scientific advice is the combinaison of data resulting from reality (observations) and of representations (of the models) allowing a historical or prospective analysis of these data. These types of representation must be described and preserved.
- **Document.** This includes various types of documents: survey forms, contracts, gray literature, articles in scientific journals, books …
- **Bibliography.** Lists of references that enable to identify a document without ambiguity (see above).
- **Meta information.** Any information being used to describe some another. Meta-information is useful to the indexing and to the search of information, as well as their exchanges between systems.
- **Reference system.** They are particular information (example: scientific nomenclature of species, nomenclature of nationalities …). They constitute the spine of the information system. They are equivalent to reference and they therefore have certain stability. If they can be modified, the modification must be carefully thought-out, controlled and specific (for this reason one talks about reference data administration).

4. Functionalities of the prototype

Within the framework of the selected case studies, the RFIS prototype will have to be able to provide the following functions:

- **Acquire.** Acquisition relates to the recovery of the data (raw and/or aggregated data) from existing devices. This includes StatBase and TrawlBase[1,] as well as national information systems. To date, these national systems are heterogeneous on the technical level. Therefore, in the framework of this prototype, it is not realistic to think of interfacing the systems. We shall base on case studies.

- **Archive.** The RFIS will behave like an interface going to recover the required data in the national systems directly. However, it will also give the possibility to optionally archive a certain number of information which would have better their place in the RFIS. This one must thus be seen like an interface of provision of data, having an optional faculty of archiving.

- **Make available.** Accessibility means the implementation of devices that guarantee an easy and efficient search and consultation of information mentioned above. It is necessary to well differentiate the three types of information which are concerned with the provision of data:

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[1]StatBase and TrawlBase have been developped in the framework of the SIAP project (Chavance et al., 2004)
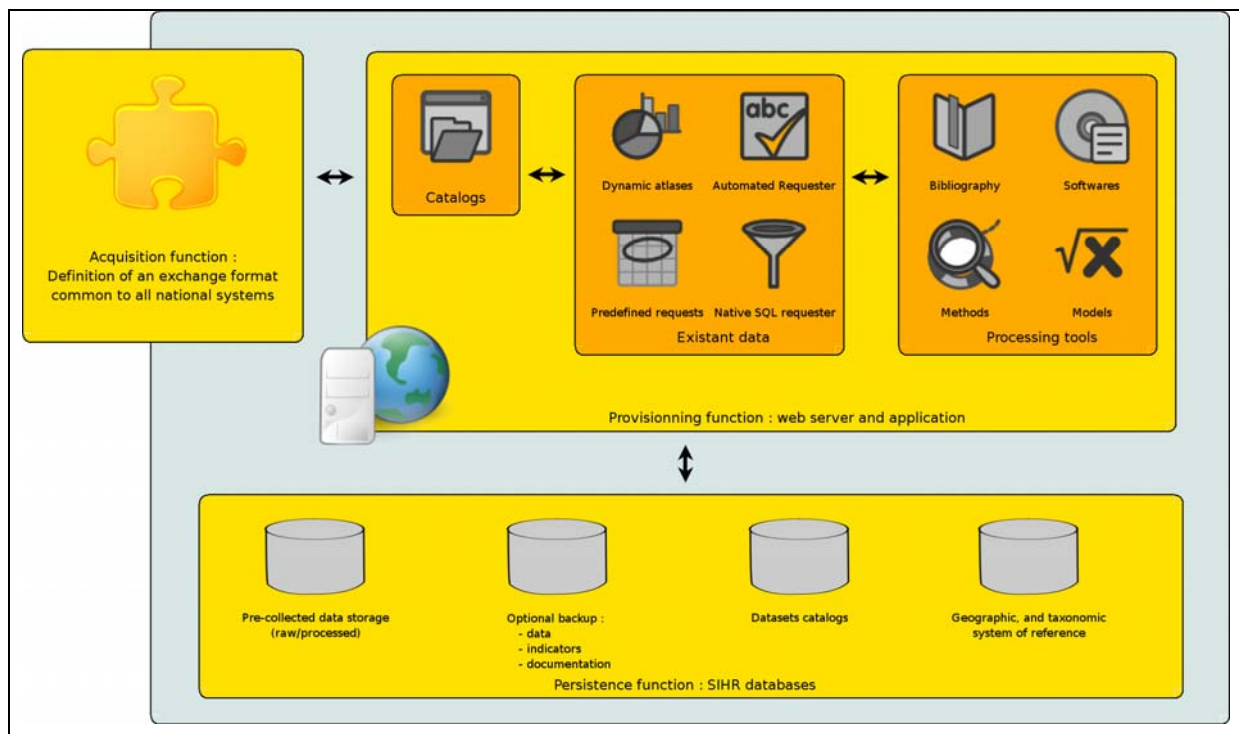
Fig 2: Framework of the Regional Fisheries Information System prototype

o The provision of catalogues of meta-information on all the information available through the network of systems. Regarding data sets, one can imagine that this catalogue concerns the data sets that could be disseminated as well as those with limited accesses.

o The provision of existing information and data. This will potentially result in functions of *data mining*. The system will thus give access to several modes of consultation of this type of information (classified by descending order of accessibility):

   ▪ Online atlas[2]

   ▪ Predefined requests

   ▪ Automated Requestor

   ▪ Native SQL Requestor

o The provision of processing and analysis tools (such as models, software…), enabling the biologist to generate his own data and scientific advices. These tools will have to appear in the form of an independent tool box.

The visibility of the information system is also a prerequisite to accessibility. Within this framework it will be necessary to take care of the connection with the large windows on the evaluation of the resources such as for example the information sites Firms or *FIGIS* of the FAO

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[2] An online atlas is here a device that would allow the dynamic representation (maps but also diagrams) of existing data within the network.

- **Ensure compatibility** of the information. National systems are also heterogeneous on the functional level. For example, two systems do not necessarily use the same method to geographically reference a fishing area. The same heterogeneity exists as regards the taxonomic reference systems. It will thus be necessary to set up if possible, within the RFIS, a system of reference systems that can as much as possible adapt to all cases, and enabling changes of nomenclature.

- **Produce and make indicators available.** From a data processing view, there are two types of indicators: those which are the result of complex procedures, and those which are simpler (of simple requests of aggregation for example). Insofar as the procedures are identified by the WP3, these simple indicators are implemented by the WP2.

- **Contribute to the traceability** of the scientific advice construction process by documenting (meta-information) data with the tools, the models, and the information used for their development. We seek to ensure the visibility of the process of scientific advice construction.

- **Manage the access rights** according to the profiles of the public. The panel of users being very broad, it is important to be able to filter the available information according to its profile. For instance, it seems relevant to give access to aggregated information and indicators to the large public, but not necessarily to fine data, which could be used inappropriately. In addition one will have to meet the requirements of data confidentiality. The table below specifies the modes of access and the visibility of data according to the profiles:

	Access	Researchers	Managers	Professionals	Inter. Org., NGOs and develop. partners	Large public
Information	**Raw data**	x			X	
	Aggregated data	x	X	x	X	x
	Indicators	x	X	x	X	x
	Models	x	X	x	X	x
	Bibliography	x	X	x	X	x
Access tools	**Cataloguess**	x	X	x	X	x
	Online atlas	x	X	x	X	x
	Predefined requests	x	X	x	X	x
	Automated requestor	x	X			
	Native SQL requestor	x				

Expected functions per type of user

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5. Constraints

The achievement of the RFIS prototype is subject to a set of constraints:

- The sphere of activity of the prototype will be limited on the one hand to the States member of Istam and on the other hand to the selected case studies.
- It will have to be accessible on the Internet and will necessarily have a Web application as a frontage.
- The use of tools and Open Source means will be as much as possible supported
- Once operational, the ownership of the tool by the Istam partners will be taken care of.
- The RFIS prototype will have to aim at seeking interoperability with the existing national systems within the limit of the too strong technological and organisational differences.
- With the concern of interoperability with other systems downstream, the prototype will have to conform to international standards of information (such as Dublin Core, AiDA, AgMES).
- The prototype will have to be compatible with possible integration within a broader information system (SRFC, FIGIS, …)

Annex: Data sets

N°	1	2	3	4	5
Zone	Mauritania	Mauritania	Morocco	Senegal	Guinea
Identifier	MRSURV1	MRSURV2	MASURVCeph	SNSURV	GNSURV
Title	Scientific surveys (Cephalopods)	Scientific Surveys (demersal species)	Scientific surveys (Cephalopods)	Scientific surveys	Scientific Surveys (demersal species)
Source	Surveys	Surveys	Surveys	Survey	Surveys
Scale	National	National	Southern region	National	National
Nature	Catch per station	Catch per station	Catch per station	Catch per station	Catch per station
Type	Raw data	Raw Data	Raw data	Raw data	Raw Data
Agency responsible for the monitoring system	Ministery in charge of fisheries	Ministery in charge of	INRH	Ministery in charge of	Ministery in charge of
Agency collecting data	Imrop	IMROP	INRH	CRODT	CNSHB - Centre National des
Time coverage	2000-2005	1982-2000	1984-2003	1970-2000	1985-1995
Time resolution	year	Variable : 1-4/year	2 surveys/year	Variable : 1-4 /year	Variable : 1-5/year
Spatial coverage	Continental shelf of Mauritania	Mauritanian EEZ	Continental shelf of Morocco (21-26°N; 20 -120 m)	Senegalese EEZ	Guinean EZZ
Spatial resolution	One observation per nautical mi squares	sampling station	12- 20 sq. naut. mil	sampling station	sampling station
Contact Person	I. Cheikh		A. Faraj	Djiga Thiao	Ibrahima Diallo
Exploitation System	Windows	Windows	Windows	Windows	Windows
Format	Excel files	Access	Access	Access	Access
Availability	Project	Project	Project and problematic	Project	Project

Theme (Coordinator)	Problematic	1	2	3	4	5
1 Stock identity (N. Bez)	1.1 Sets of statistics/indicators	■		■		
	1.2 How to combine data to estimate a shared stock (WP1-2)					
2 Extrapolation LF (E. Chassot)	2.1 Linear models to evaluate and select main effects (season, area, etc) on LF for post stratification and then extrapolation		■			
3 Age/length (E. Chassot)	3.1 Fitting method					
4 Data poor (D. Gascuel)	4.1 Corrected VPA		■			■
	4.2 Catch Survey Analysis					
	4.3 Dyn.Model vs equilibrium					
5 Models for short living species (D. Jouffre)	5.1 Depletion models					
	5.2 Monthly VPA					
	5.3 Short term prediction					
6. Environmental Models (J. Castro)	6.1 Multi oscillatory system approach					
	6.2 Env. variability in prod.mod		■			
7. Abundance indices (A. Faraj)	7.1 Surveys	■		■	■	
	7.2 CPUE					
	7.3 Combinaison	■		■		
8. Ecosystem indicators (D. Jouffre)	8.1 Indicators test		■			■
9. Joint dynamic models (fishery model) (F. Laloë)	9.1 Typology of metier				■	
	9.2 Sampling strata (effort,capture)					
	9.3 List of fleet					

N°	6	7	8	9	10	11	12
Zone	Morocco, Mauritania, Spain	Morocco	Morocco	Guinea	Guinea	Mauritania	Mauritania
Identifier	*ESCATCH*	*MACATCH1*	*MACATCH2*	*GNCATCHpa*	*GNCATCHpi*	*MRCATCHpa*	*MRCATCHpi*
Title	Catch statistics (Octopus)	Catch and effort statistics of cephalopods moroccan fisheries	Catch and effort statistics	Guinean small scale fisheries statistics	Guinean industrial fisheries statistics	Mauritanian small scale fisheries statistics	Mauritanian industrial fisheries statistics
Source	Logboooks	Declarations	Declarations	Collectors	Collectors	Collectors	Logbooks
Scale	regional	regional	National	National	National	National	National
Nature	Catch per operation	Production and effort	Production and effort	Production and effort	Production and effort	Production and effort	Production and effort
Type	Raw data	Agregated data	Agregated data	Agregated data	Agregated data	Agregated data	Agregated data
Agency responsible for the monitoring system	Ministery in charge of fisheries	Département des Pêches Maritimes	?	Ministery in charge of	Ministery in charge of	Ministery in charge of fisheries	Ministery in charge of fisheries
Agency collecting data	IEO	Département des Pêches Maritimes	INRH	CNSHB - Centre National des	CNSHB - Centre National des	IMROP	IMROP
Time coverage	2000-2005	1978-2005		1989-2000	1995-2001	1990-2000	1969-1989
Time resolution	month	year	month	Month	Month	month	Month/year
Spatial coverage	Fishing place	Continental shelf of Morocco (21-26°N; 20 -120 m)	Mauritanian EEZ	Guinean EZZ	Guinean EZZ	Mauritanian EEZ	Mauritanian EEZ
Spatial resolution	Statistical square	Landing place		Statistical zone of landings	Landing place		ZEE
Contact Person	E. Balguerias	A. Faraj		Ibrahima Diallo	Ibrahima Diallo		
Exploitation System	Windows	Windows		Windows	Windows	Windows	Windows
Format	Excel files	Excel files		xls	xls	xls	xls
Availability	Project	Project and problematic	Project	Public	Public	Project	Project

Theme (Coordinator)	Problematic							
1 Stock identity (N. Bez)	1.1 Sets of statistics/indicators	██						
	1.2 How to combine data to estimate a shared stock (WP1-2)							
2 Extrapolation LF (E. Chassot)	2.1 Linear models to evaluate and select main effects (season, area, etc) on LF for post stratification and then extrapolation				██	██	██	██
3 Age/length (E. Chassot)	3.1 Fitting method							
4 Data poor (D. Gascuel)	4.1 Corrected VPA				██	██		
	4.2 Catch Survey Analysis							
	4.3 Dyn.Model vs equilibrium							
5 Models for short living species (D. Jouffre)	5.1 Depletion models							
	5.2 Monthly VPA							
	5.3 Short term prediction							
6. Environmental Models (J. Castro)	6.1 Multi oscillatory system approach							
	6.2 Env. variability in prod.mod							██
7. Abundance indices (A. Faraj)	7.1 Surveys							
	7.2 CPUE		██					
	7.3 Combinaison							
8. Ecosystem indicators (D. Jouffre)	8.1 Indicators test				██	██	██	
9. Joint dynamic models (fishery model) (F. Laloë)	9.1 Typology of metier							
	9.2 Sampling strata (effort,capture)			██				
	9.3 List of fleet							

N°	13	14	15	16	17	18
Zone	Senegal	Senegal	Senegal	Senegal	Guinea	Morocco
Identifier	*SNCATCHpa1*	*SNCATCHpa2*	*SNCATCHpi*	*SNCATCHpi2*	*GNCATCH2*	*MACATCH2*
Title	Senegalese small scale fisheries statistics (CRODT)	Senegalese small scale fisheries statistics (DOPM)	Senegalese industrial fisheries statistics (CRODT)	Senegalese industrial fisheries statistics (DOPM)	Catch statistics	Catch statistics
Source	Collectors	Collectors	Observers	Declaration	Collectors	?
Scale	National	National	National	National	National	National
Nature	Production and effort	Production and effort	Production and effort	Production and effort	Production	Production
Type	Agregated data	Agregated data	Agregated data	Agregated data	Raw Data	Raw Data
Agency responsible for the monitoring system	Ministery in charge of fisheries	Ministery in charge of	Ministery in charge of fisheries	Ministery in charge of	Ministery in charge of	?
Agency collecting data	CRODT	DPOM	CRODT	DPOM	CNSHB	INRH
Time coverage	1974-1999	1954-2002	1971-1998	1974-2000		
Time resolution	month	month	month	month	operation (trip)	operation (trip)
Spatial coverage	Senegalese EEZ	Senegalese EEZ	Senegalese EEZ	Senegalese EEZ	Guinean EZZ	Mauritanian EEZ
Spatial resolution	Statistical zone of landing	Statistical zone of landing	Statistical zone at sea	ZEE		
Contact Person	Djiga Thiao	Djiga Thiao	Djiga Thiao	Djiga Thiao		
Exploitation System	Windows	Windows	Windows	Windows		
Format	xls	xls	xls	xls		
Availability	Project	Project	Project	Project	Project	Project

Theme (Coordinator)	Problematic						
1 Stock identity (N. Bez)	1.1 Sets of statistics/indicators						
	1.2 How to combine data to estimate a shared stock (WP1-2)						
2 Extrapolation LF (E. Chassot)	2.1 Linear models to evaluate and select main effects (season, area, etc) on LF for post stratification and then extrapolation						
3 Age/length (E. Chassot)	3.1 Fitting method						
4 Data poor (D. Gascuel)	4.1 Corrected VPA						
	4.2 Catch Survey Analysis						
	4.3 Dyn.Model vs equilibrium						
5 Models for short living species (D. Jouffre)	5.1 Depletion models						
	5.2 Monthly VPA						
	5.3 Short term prediction						
6. Environmental Models (J. Castro)	6.1 Multi oscillatory system approach						
	6.2 Env. variability in prod.mod						
7. Abundance indices (A. Faraj)	7.1 Surveys						
	7.2 CPUE						
	7.3 Combinaison						
8. Ecosystem indicators (D. Jouffre)	8.1 Indicators test						
9. Joint dynamic models (fishery model) (F. Laloë)	9.1 Typology of metier						
	9.2 Sampling strata (effort,capture)						
	9.3 List of fleet						

N°	19	20	21	22	23
Zone	Morocco, Mauritania, Senegal	Guinea	Mauritania	Senegal	Mauritania
Identifier	*ESLShake*	*GNLSbobo*	*MRLSsard*	*SNLSoctopus*	*ENV*
Title	Lenght Structure in spanish industrial fishery for Hake	Lenght structure in small sacle fishery for P. elongatus	Lenght Structure in small scale fishery for Sardinella	Commercial categories	Environnemental data ?
Source	Sampling	Sampling	Sampling	Collectors	
Scale	sub regional	national	national	National	
Nature	Numbers, Weigth by length	Numbers, Weigth by length	Numbers, Weigth by length	Numbers, Weigth by length	
Type	Agregated data	Agregated data	Agregated data	Agregated data	Agregated data
Agency responsible for the monitoring system	IEO	CNSHB	Imrop	CRODT	?
Agency collecting data	IEO	CNSHB	Imrop	CRODT	?
Time coverage				1996-2000	
Time resolution				month	
Spatial coverage				EEZ Senegal	
Spatial resolution				EEZ Senegal	
Contact Person	E. Balguerias	A. Sidibe	M. Taleb/Beyah	D. Jouffre & M. Thiaw	
Exploitation System				Windows	
Format				xls	
Availability	Project and problematic	Project and problematic	Project and problematic	Project	

Theme (Coordinator)	Problematic					
1 Stock identity (N. Bez)	1.1 Sets of statistics/indicators					
	1.2 How to combine data to estimate a shared stock (WP1-2)					
2 Extrapolation LF (E. Chassot)	2.1 Linear models to evaluate and select main effects (season, area, etc) on LF for post stratification and then extrapolation	■	■	■		
3 Age/length (E. Chassot)	3.1 Fitting method	■	■	■		
4 Data poor (D. Gascuel)	4.1 Corrected VPA	■	■	■		
	4.2 Catch Survey Analysis					
	4.3 Dyn.Model vs equilibrium					
5 Models for short living species (D. Jouffre)	5.1 Depletion models					
	5.2 Monthly VPA				■	
	5.3 Short term prediction				■	
6. Environmental Models (J. Castro)	6.1 Multi oscillatory system approach					■
	6.2 Env. variability in prod.mod					
7. Abundance indices (A. Faraj)	7.1 Surveys					
	7.2 CPUE					
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