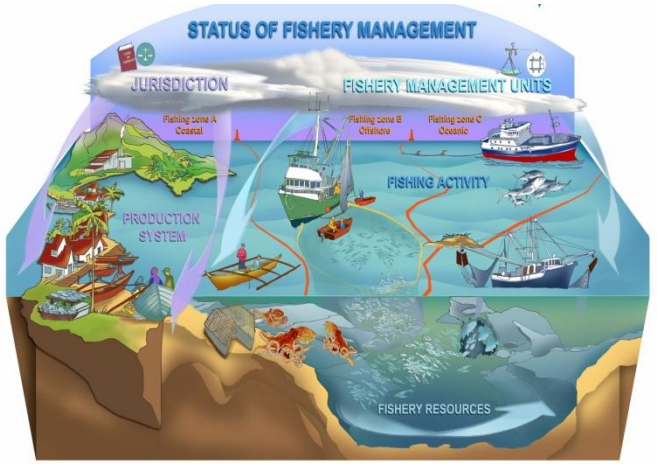
FIRMS FIRMS FSC8/2013/4b

New horizons for a FIRMS distributed data base - the South Western Indian Ocean Regional Information system example (SWIOFC's Smartfish-iMarine project)

http://firms.fao.org/firms

1. SmartFish project background
2. Needs and options for a RIS
3. Challenges and Perspectives



Yann Laurent
FAO Fisheries and Aquaculture Department

SmartFish project Background

- SmartFish: EU funded project to strengthen national and regional fishery/aquaculture policy and strategy frameworks
  - Support participating countries to fulfill international commitment towards responsible fisheries and to improve food security

- SmartFish Result 1: "Enhance Regional and National Fisheries and Aquaculture Strategies and Policies"
  - Component 1M3 aims to "improve knowledge and information in support to fisheries management processes "

- Information and data already available in existing systems (WIOFish, StatBase and FIRMS)
  - Access to these scattered information and data should be facilitated through a non intrusive Regional Information System

SWI available information and data

- Information and Data on South West Indian Fisheries are available in 3 existing Information Systems:
  - **WIOFish**: a regional knowledge base on West Indian Ocean Fisheries (http://wiofish.bluebox.co.za/)
  - **FIRMS**: an international knowledge base including resources from West Indian Ocean (http://firms.fao.org)
  - **StatBase**: a statistical database containing fishery statistics provided by West Indian Ocean countries (http://41.206.61.142:8080/statbase_3/)

WIOFish and StatBase contain information and data provided directly by the national fisheries authorities through data upload workshops

FIRMS gathers information directly from regional institutions

Requirements for a Regional IS

- Need to build and benefit from existing activities to publish information and data on SWIO Fisheries:
  - Avoid duplication of processes
  - Avoid duplication of information / data sources
- Need to integrate information/data form existing information systems to
  - Provide easier access to information and data scattered in different IS
  - Provide tailored access to existing information and data depending on the needs and profiles of the end-user (can be a fishery expert or general public etc…)
- Need to harmonize and enrich contents from one system to another
  - Facilitate information sharing (FIRMS, WIOFish and StatBase are 3 complementary systems that could benefit one from another):

Options for Regional IS

- A simple portal organizing existing data:
  - access comprehensive knowledge
- A standard centralized information system
- An semantic web-based information system:
  - articulated on an ontology backbone

What is an ontology?

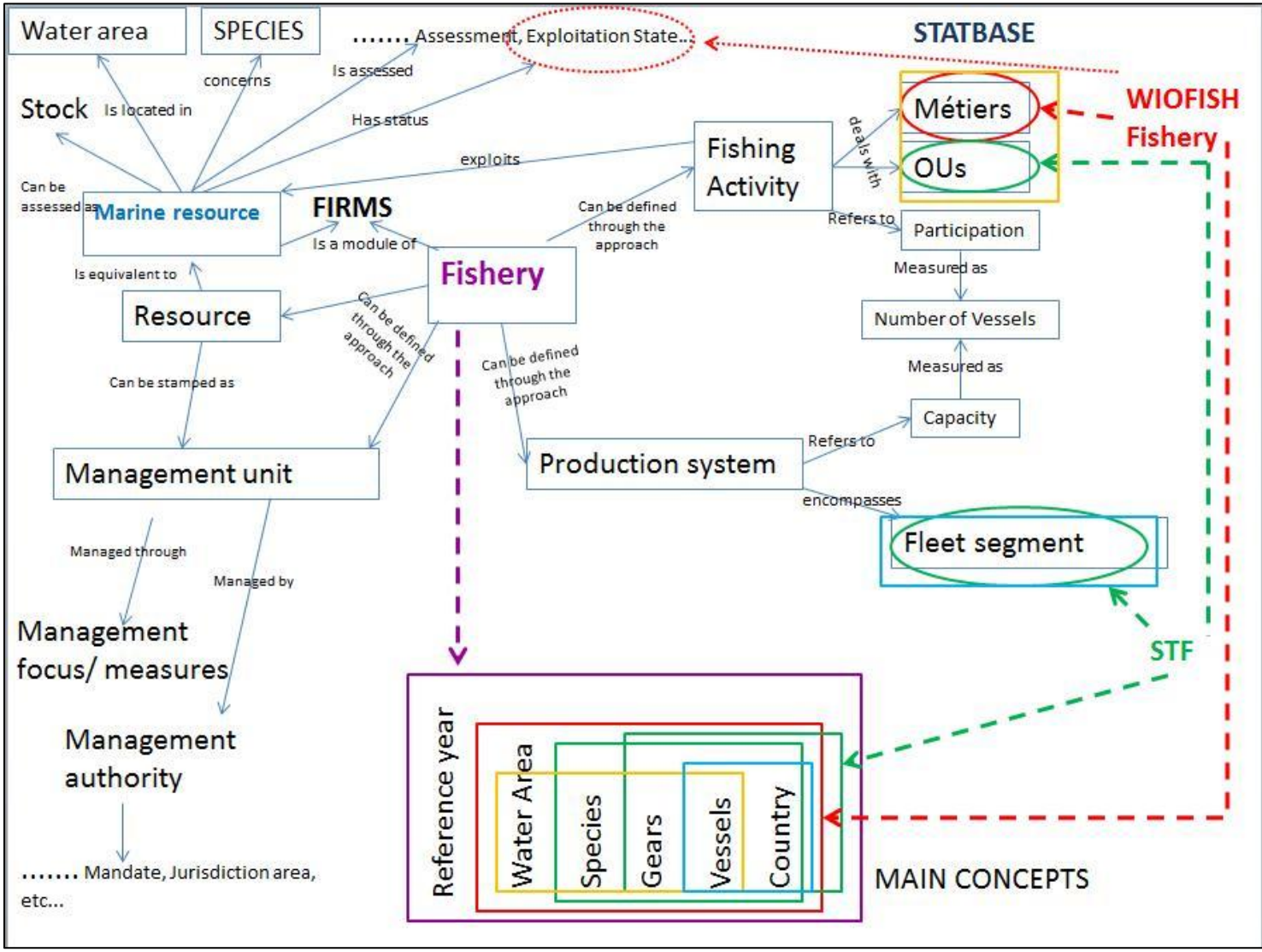
- It is the description of
  - a **domain** (its main concepts like species, gear, management plan, management measure etc.. for a fishery domain) and
  - their **relationships** (a species *is caught by* a gear, a management measure *forbids the use of* a gear, etc…)

- Relationships can be found between concepts of different systems: work done for SmartFish

What is an ontology?

The 3 fisheries Information Systems concepts and their relationships have been analyzed and summarized

(SmartFish Harmonization Workshop, June 2012)



What can be built on an ontology?

- Mapping concepts between systems allows
  - To easy share information
  - To create gateways between systems
  - To harmonize information

- Tools using these ontologies to enrich websites contents:
  - Search engine with suggested results (FLOD/iMarine)
  - Enrich web pages contents (iMarine)
  - Build automatic fact sheets

Road map to SWIO Regional IS (1/2)

- Solution retained: a combined portal and ontology based search engine (*recommended by the SWIOFC working party on Statistics in July 2012*)
  - Whatever option: need to create a data structure and definition for SmartFish (an ontology) and define the relationships between this ontology and the FIRMS, WIOFish and StatBase ones;
  - Organize the information to be more accessible to any end-user profiles = create a portal
  - From this ontology, use existing web-semantics tools or create new ones to index and search for the information / data available in the various systems to feed the portal = no need for complex data exchanges

➔ the key to success is the knowledge of systems concepts and definitions, and their mappings

Road map to SWIO Regional IS (2/2)

- Demo of prototype 2 (portal implementing the search engine) in FIRMS SC 8
- Validation by SWIO partners of the prototype
  - Including sustainability considerations
- Ultimately the generation of automatic fact sheets

Application to FIRMS: Towards a distributed knowledge base of partners' reports

- SmartFish opens a new horizon for system interoperability:
  - new technologies developed under iMarine (FLOD/iMarine, OpenSDMX) are being tested/validated in the Fisheries context;
  - FI has a leadership in FAO on these activities but strong signals tell that FAO's corporate levels are going to follow same directions;
  - different kind of expertise required: Ontology expert (FAO) interacts with data managers (FIRMS partners domain experts);
    - FIRMS already builds ontologies, but these are not systematically organized (see examples in the next 3 slides)
  - Applies when the partner institution publishes its S&T reports on its own (through DB, webpages, or PDFs)

- The SmartFish prototype might provide some inspiration to FIRMS regarding how to address target audience

Concept Mapping within FIRMS

- This mapping work has already been done with some FIRMS partners
  - NAFO

NAFO State and Trend Mapping Table

Stock Abundance status		**Exploitation Rate** status	
FIRMS Descriptors	**NAFO '*Descriptors*'**	**FIRMS Descriptors**	**NAFO Descriptors**
Pre-exploitation biomass or high abundance	B >> Bbuf	No or low fishing mortality	F < Fbuf
Intermediate abundance	B > Bbuf	Moderate fishing mortality	Fbuf ≤ F ≤ Flim
Low abundance	Blim ≤ B ≤ Bbuf	Moderate fishing mortality	F > Flim
Depleted	B < Blim	High fishing mortality	
Uncertain/Not assessed		Uncertain/Not assessed	

Concept Mapping within FIRMS

- This mapping work has already been done with some FIRMS partners
  - ICES

ICES-FIRMS State and Trend Mapping Table (Updated September 2012)

Stock Abundance status				
FIRMS Descriptors	**ICES Descriptors**			
	MSY	**PA**	**MP**	**Qualitative**
Pre-exploitation biomass or high abundance	(high) above trigger	Full reproductive capacity (very high)	(high) above target/limit/trigger	
Intermediate abundance	At trigger or above trigger	Full reproductive capacity SSB ≥ Bpa	At or above target/limit/trigger	
Low abundance	Below trigger	Increased risk Blim < B < Bpa	Below target/limit/trigger	
Depleted	(much) below trigger	Reduced reproductive capacity SSB < Blim	(much) below target/limit/trigger	
Uncertain/Not assessed	Undefined OR Unknown No reference point ; Stock status unknown	Undefined OR Unknown No reference point ; Stock status unknown	N/A	

ICES State and Trend Mapping Table (Updated January 2010)

Stock Abundance status		**Exploitation Rate** status	
FIRMS Descriptors	**ICES Descriptors**	**FIRMS Descriptors**	**ICES Descriptors**
Pre-exploitation biomass or high abundance	N/A	No or low fishing mortality	N/A
Intermediate abundance	Full reproductive capacity	Moderate fishing mortality	Harvested sustainably
Low abundance	Increased risk[1]	Moderate fishing mortality	Increased risk[2]
Depleted	Reduced reproductive capacity[3]	High fishing mortality	Harvested unsustainably
Uncertain/Not assessed	Undefined OR Unknown[4]	Uncertain/Not assessed	Undefined OR Unknown

Concept Mapping within FIRMS

- This mapping work has already been done with some FIRMS partners
  - GFCM versus FIRMS Marine resource reports
    - Mapping of word document (consistently built with the same data structure) and FIRMS model

GFCM template	FIRMS template
Fisheries	Exploitation
¤	Assessment
Data and parameters	→ Data
Assessment method	→ Assessment models
Model performance	→ → Results
Results	→ → Results
Diagnose of Stock status	→ Overall assessment results
¤	Biological state and trends
Advices and recommendations:	Scientific advice
¤	→ for management consideration
Discussion	¤

Benefits for FIRMS partners, and minimum requirements

- Reduces reporting burden and enables broad interoperability:
  - Partner publishes its reports according to its own reporting template once.
  - This unique source of information can feed / enrich several other information systems.
  - The system for data sharing is non intrusive : the protocol minimizes the need for physical data exchange

- Minimum requirements: Standards, and harmonization
  - Needs for all actors of the network to respect standards / consistent templates ➔ system interoperability is stable and reliable.
  - New data publication:
    - Minimum reporting to FIRMS through Excel template
    - need to provide on a yearly basis any changes/addition to the existing ontology related data content (data versioning)