Testing environmental, economic and social criteria in a co-creation process with stakeholders

An example model for European anchovy using shiny R package

Margarita Maria Rincon, Javier Ruiz and Marta Ballesteros

ICES CIEM

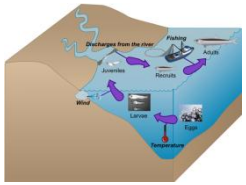
MareFrame

CENTRO TECNOLÓGICO DEL MAR
FUNDACIÓN CETMAR

ICMAN
Instituto de Ciencias Marinas de Andalucía

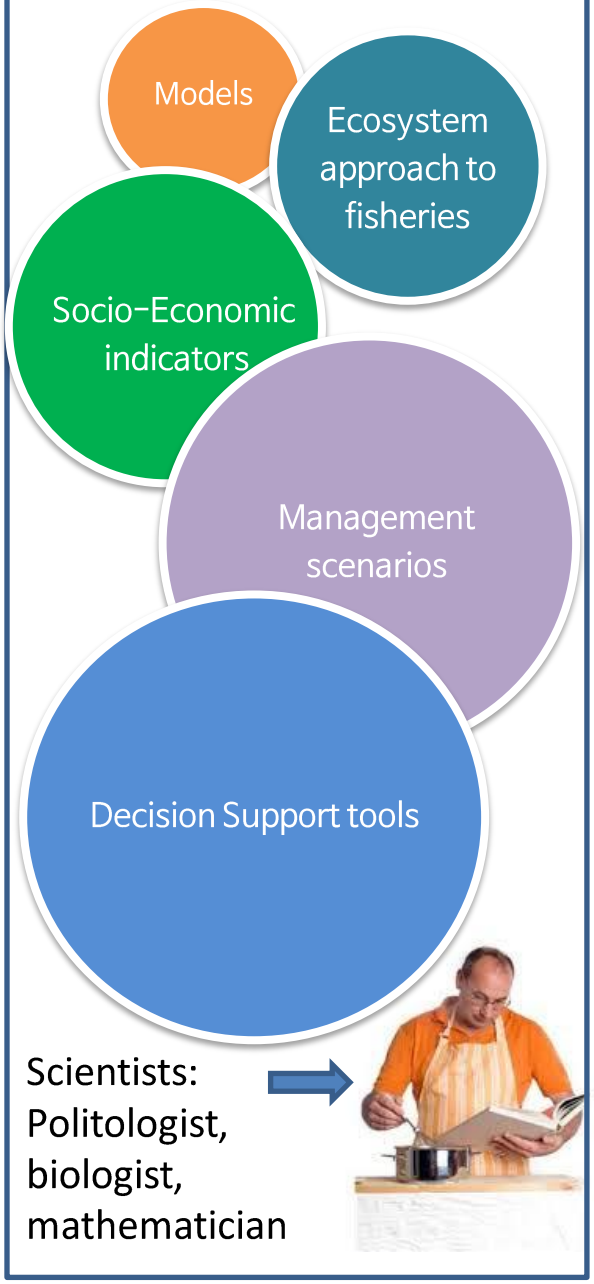
CSIC
Consejo Superior de Investigaciones Científicas

Ingredients



- **Relation between fish biology and the environment.**
- **Current Fishery's management situation**
- **What do stakeholders want?**

Preparation



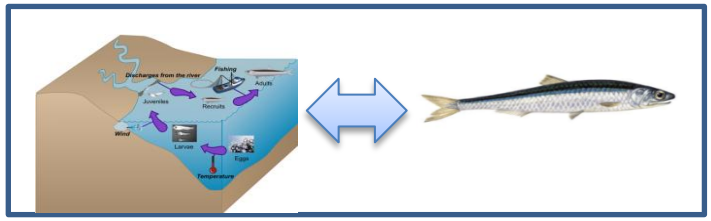
Presentation

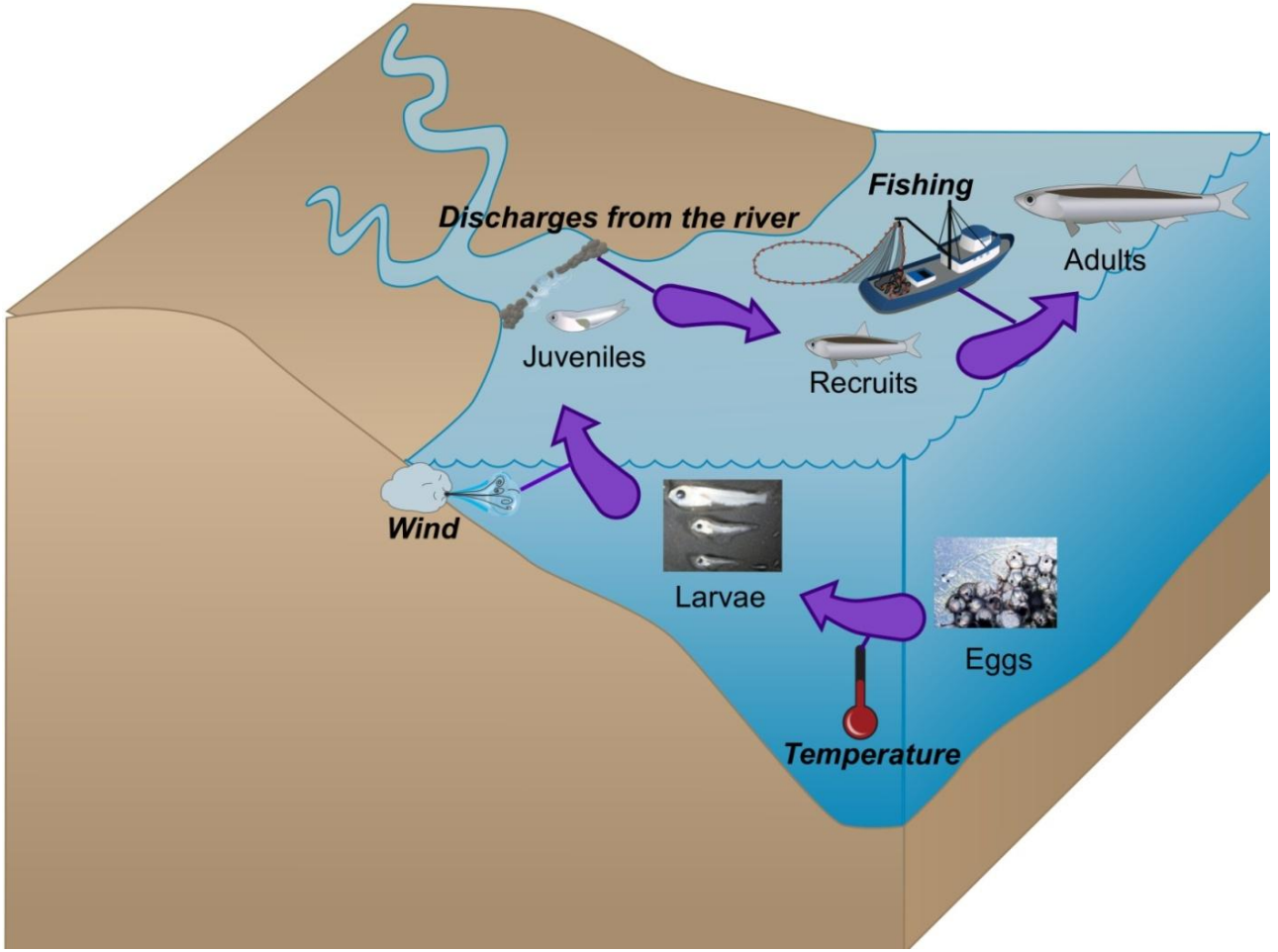
Scientists Stakeholders Scientists


Gulf of Cádiz

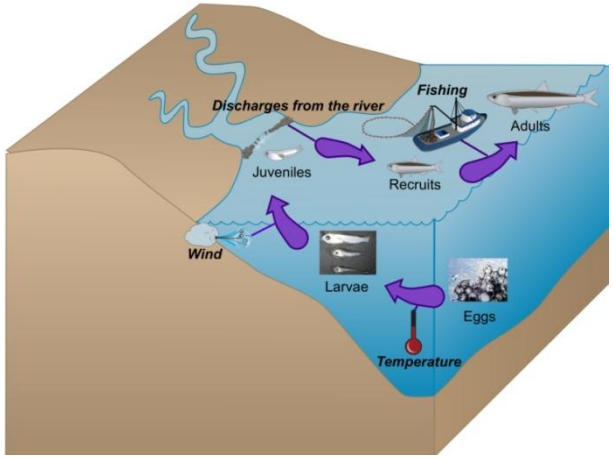
Ingredients

• Relation between fish biology and the environment

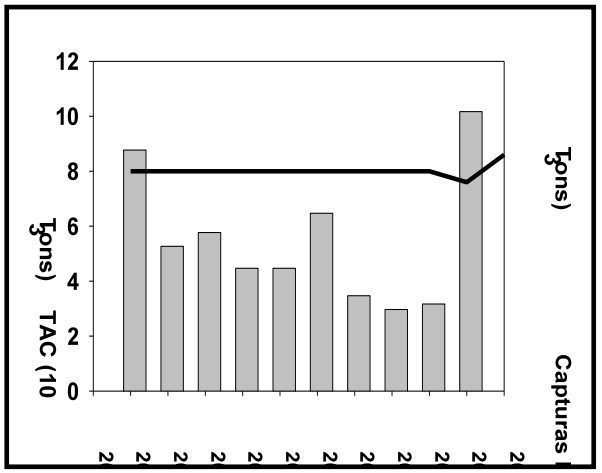




• Current fishery's management situation



Environmentally dependent life cycle



Regulation

= Social conflict


EL PAÍS SECCIONES

ANDALUCÍA

El repentino cierre del caladero del boquerón deja sin faena a 180 barcos

- El Gobierno se anticipa al fin de la cuota y prohíbe capturas en el golfo de Cádiz

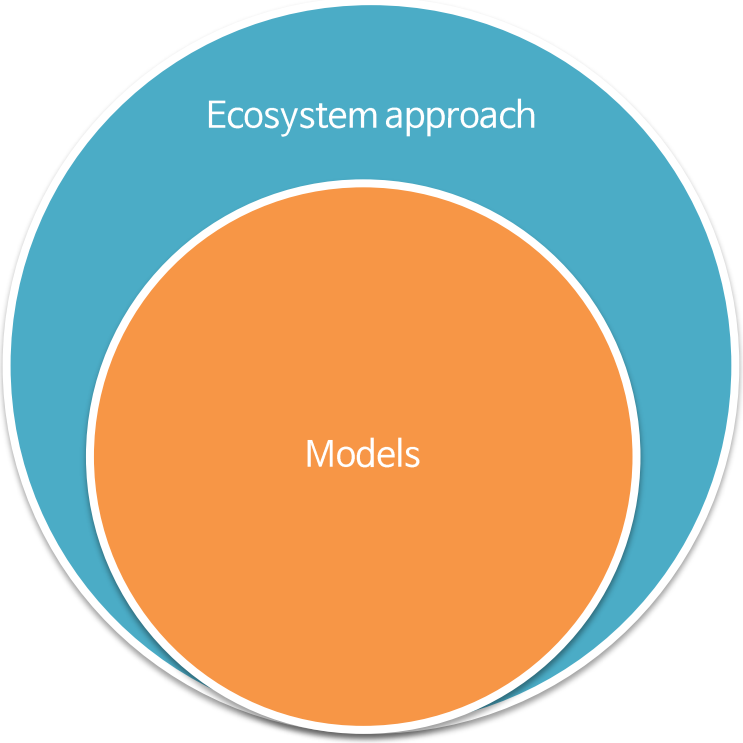
LIBERTAD PALOMA | Cádiz
15 AGO 2012 - 20:29 CET

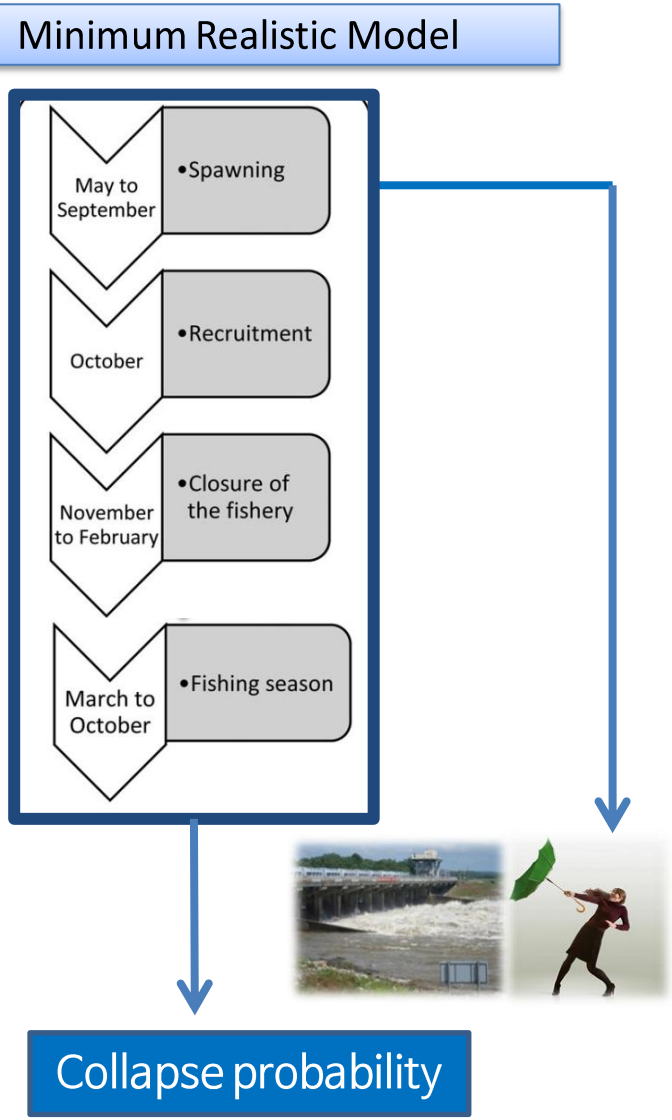
• What do stakeholders want

Preparation

Part I

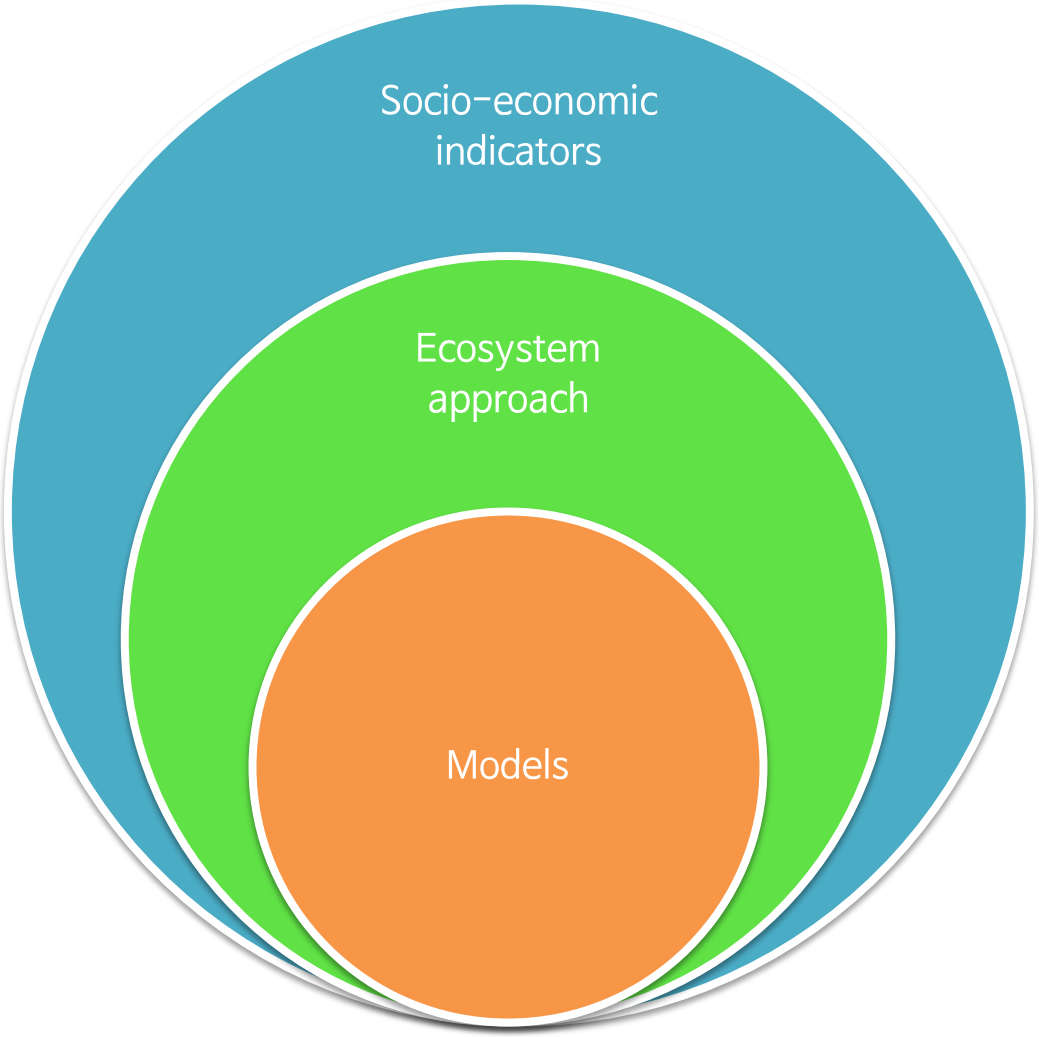
Choose a model and gently spice it with ecosystem approach





Part II

Include socio economic indicators to expand the previous mixture



Mean profit

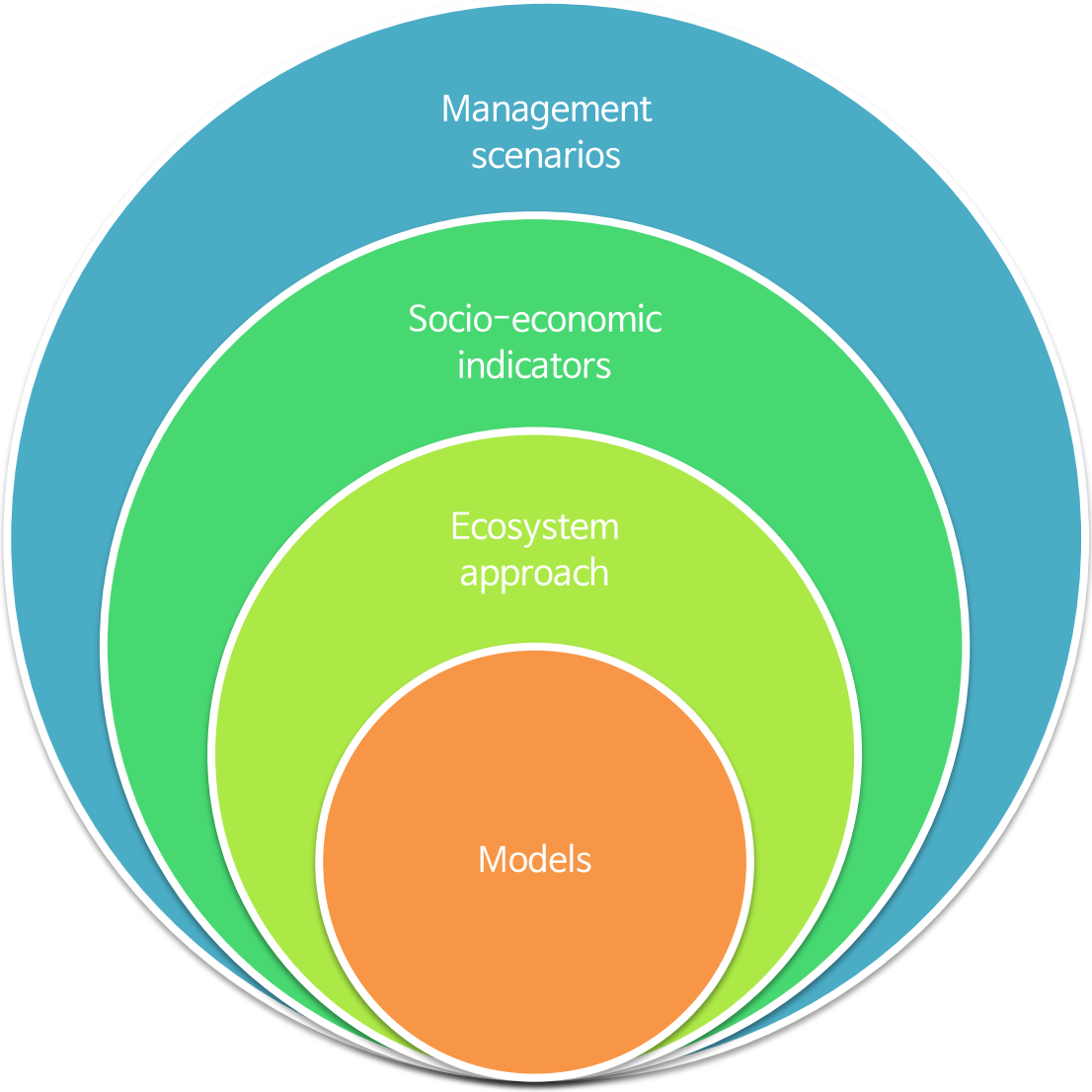
Profit variance

Workers at risk:
Workers at vessels with mo re than two years of losses

Insurance premium:
How much does it cost to insure the fishery?
Rincon et al. 2016

Part IV

Poured into different management scenarios molds



Fixed quota

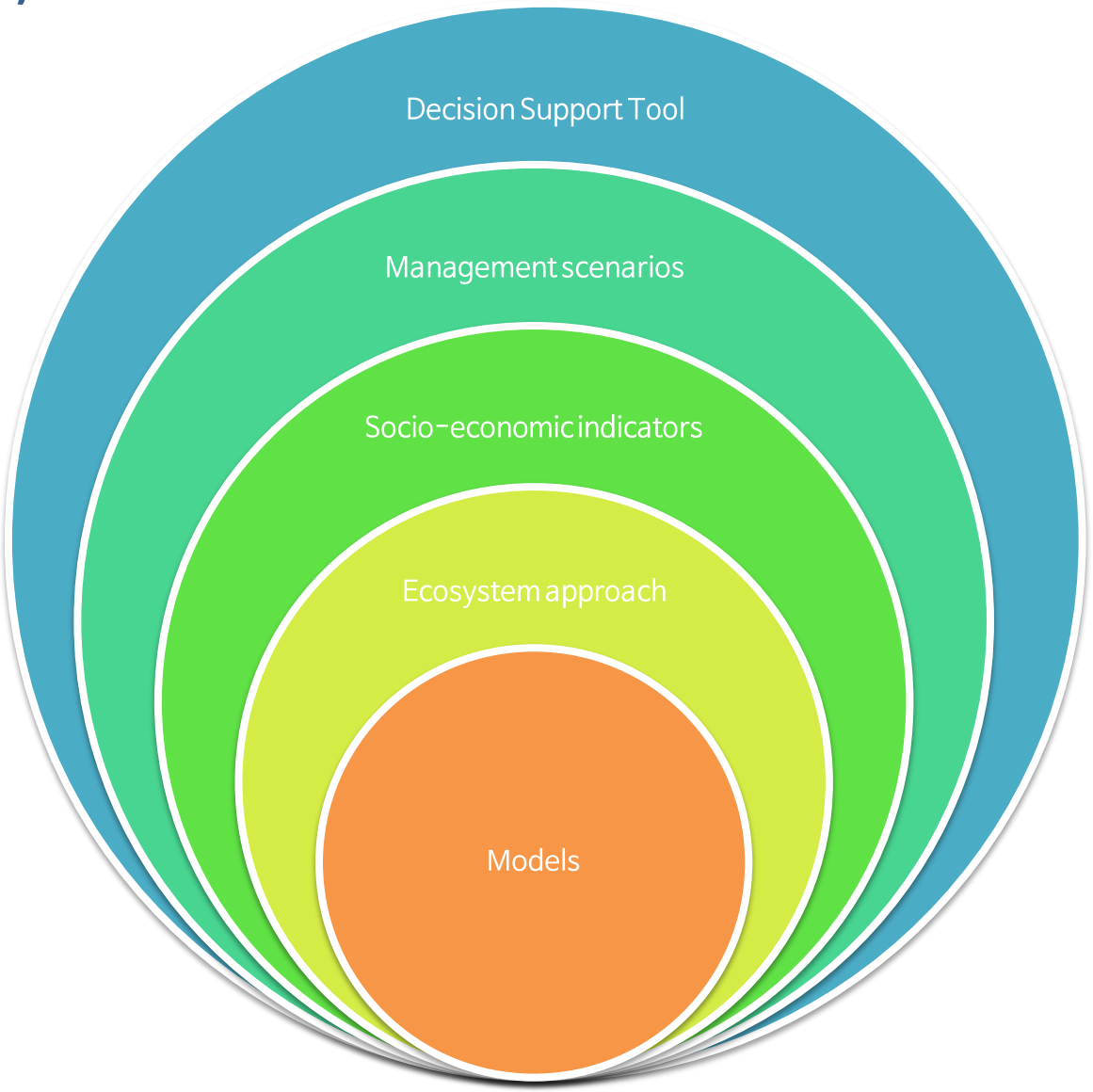
Environmentally-based adaptive quota

Fixed quota + insurance

Adaptive quota + insurance

Part V

Present your dish with a *creative* and accessible Decision Support Tool (DST)



Part V

Present your dish with a *creative* and *accessible* DST

http://mareframe.mapix.com/gulf-of-cadiz-modeloutput.html

Management Scenarios

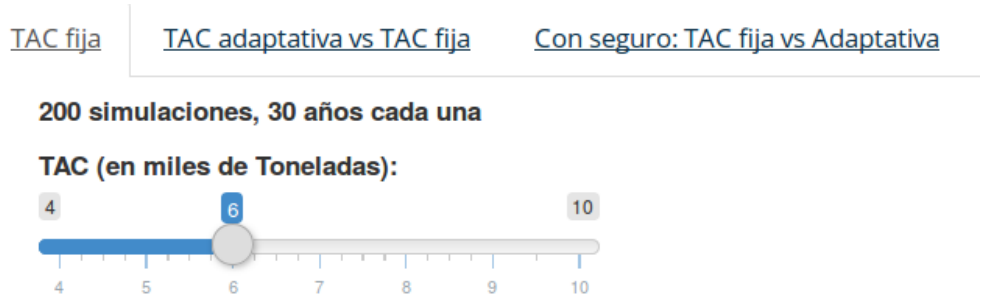
Options to be changed by stakeholders:
TAC (quota)
Insurance coverage %

Shiny
by RStudio
A web application framework for R
Turn your analyses into interactive web applications
No HTML, CSS, or JavaScript knowledge required

Part V

Present your dish with a *creative* and *accessible* DST

http://mareframe.mapix.com/gulf-of-cadiz-modeloutput.html



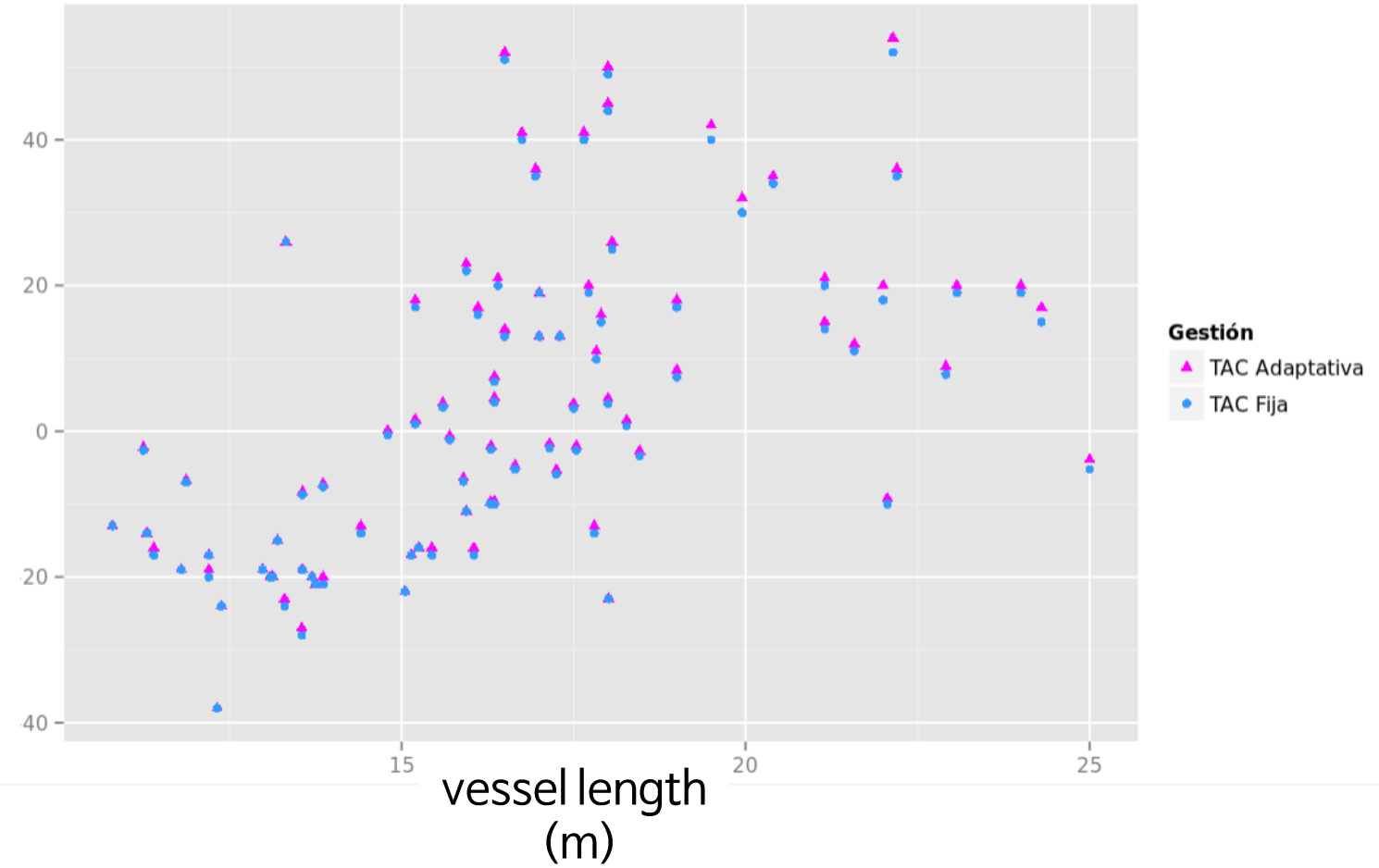
	Longitud barco (m)	Número de tripulantes	Ganancia media (Miles de euros)	Ganancia SD anual	Prob de 2 años seguidos de pérdidas (%)
1	22.00	12.00	18.00	18.00	48.00
2	22.06	12.00	-10.00	17.00	100.00
3	21.15	12.00	14.00	18.00	68.00
4	13.86	8.00	-7.60	6.00	100.00
5	16.50	9.00	51.00	17.00	4.00
6	13.86	8.00	-21.00	4.40	100.00

Part V

Present your dish with a *creative* and *accessible* DST

http://mareframe.mapix.com/gulf-of-cadiz-modeloutput.html

TAC fija | TAC adaptativa vs TAC fija | Con seguro: TAC fija vs Adaptativa



Part V

Present your plates with a *creative* and *simple* Decision Support Tool

http://mareframe.mapix.com/gulf-of-cadiz-modeloutput.html

TAC fija | TAC adaptativa vs TAC fija | Con seguro: TAC fija vs Adaptativa

200 simulaciones, 30 años cada una

TAC (en miles de Toneladas):

4 6 8

4 5 6 7 8

Nivel de cobertura del seguro (%):

70 80 100

70 75 80 85 90 95 100

Resultados generales TAC Adaptativa

	Probabilidad de colapso (entre 0 y 1)	Trabajadores en riesgo flota mediana (Total=221 tripulantes), número de tripulantes de barcos con prob. >50% de tener 2 años seguidos de pérdidas	Ganancia media anual de toda la flota (Miles de euros)	Ganancia sd	Prima media anual (Miles de euros)
1	0.66	67.00	462.55	835.05	1400.00

Resultados generales TAC Fija

1	0.66	79.00	409.28	869.65	1800.00

Presentation

MINISTERIO DE AGRICULTURA, ALIMENTACIÓN Y MEDIO AMBIENTE

Ministry of environment - Marine department

Fisheries administration

Economy Faculty, Huelva University

Doñana National park

Marine affairs, WWF Spain

NGO Marine Mammals

Cartulina azul= 5 puntos
Cartulina verde= 4 puntos
Cartulina amarilla= 3 puntos
Cartulina naranja=2 puntos
Cartulina roja= 1 punto

Sólo se puede utilizar la misma cartulina 1 vez.

To the stakeholders: Punctuate the level of importance of the following decision criteria from 1 to 5

Mean Benefit	Benefit variability	Number of Jobs at risk	Risk of collapse	Insurance Premium
18	20	31	38	9

To the stakeholders: Punctuate the level of importance of the following strategies (scenarios) from 1 to 5

Bussiness as u sual (B.A.U)	Adaptative quota (A.C)	B.A.U with ins urance	A.C with insurance
9	33	23	34

Stakeholders opinions

- It is a tool that can help to have a global view of socio- econ omic and biological components by putting them in a measu rable framework.

- Its application is useful to different levels of stakeholders in the fishery , from the European Commission to the fisheries sector agents.

- The work developed is a breakthrough and provides the ele ments to consider for decision- making by the competent authorities.

For the next dish presentation (stakeholders meetings)

- GADGET model implementation including the effect of the environ ment and other species (hake as predator)…working on comparison in different scenarios
- More indicators were included in the bio-economic model such as t he gross value added or full time employment.

Contents lists available at ScienceDirect

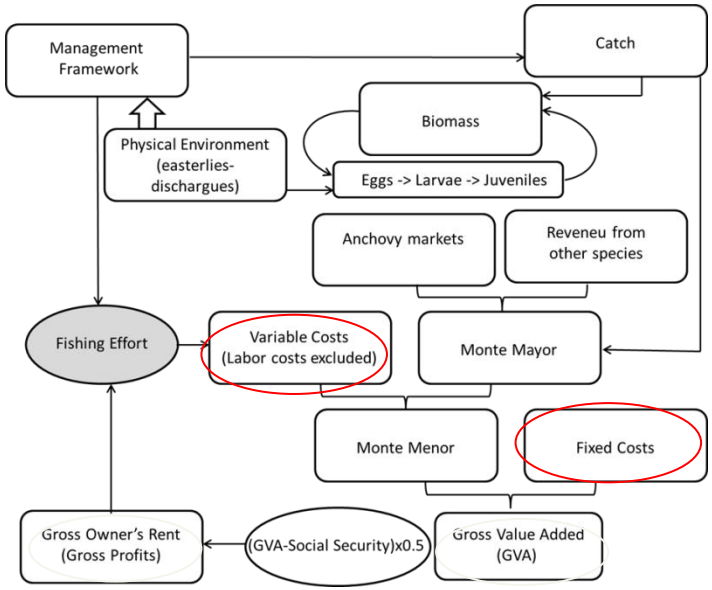
Marine Policy

journal homepage: www.elsevier.com/locate/marpol

Biological and economic vulnerabilities of fixed TACs in small pelagics: An analysis of the European anchovy (*Engraulis encrasicolus*) in the Gulf of Cádiz

Javier Ruiz[a,*], Margarita María Rincón[a], David Castilla[b], Fernando Ramos[c], Juan José García del Hoyo[b]

[a] *Instituto de Ciencias Marinas de Andalucía, Consejo Superior de Investigaciones Científicas ICMAN-CSIC, Department of Coastal Ecology and Management, 11510 Puerto Real, Cádiz, Spain*
[b] *Universidad de Huelva, Facultad de Ciencias Empresariales, Campus de La Merced, Plaza de la Merced 11, 21071 Huelva, Spain*
[c] *Instituto Español de Oceanografía, Centro Oceanográfico de Cádiz, Puerto pesquero, Muelle de Levante s/n, Apdo. 2609, 11006 Cádiz, Spain*



- To include sardine in management decisions

Thanks!

¡Gracias!

Dziekuje!

Corresponding author:
margarita.rincon@csic.es
Twitter: Margarita_RH

www.mareframe-fp7.org

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 613571