Resilience and Social Adaptation to Climate Change Impacts in Small-Scale Fisheries

Sebastián Villasante, Gonzalo Macho, Monalisa Silva, Priscila Lopes, Pablo Pita, Andrés Simón, José Carlos Mariño Balsa, Celia Olabarria, Elsa Vázquez and Nuria Calvo

USC
UNIVERSIDADE
DE SANTIAGO
DE COMPOSTELA

erc
European
Research
Council

FISHERIES MANAGEMENT IS CLIMATE ACTION
Science Symposium
Lisbon, 26 June 2022

What are *S-fisheries*?

S-fisheries sensu Lobo Orensanz et al. (2005)
- **Small Scale**
- **Sedentary resources**
- **Spatially Structured Metapop.**

S-fisheries in Galicia targeting ~45 species
- Bivalves (23): clams, cockle, oyster, scallops,…
- Crustacean (1): gooseneck barnacle
- Equinoderms (1): sea urchin
- Gastropods (4): limpet, periwinkles, bucinum
- Annelids (4): lugworm, ragworm,…
- Anemones (1)
- Algae (11)

Managed under

Territorial User Rights for Fishing (TURF)

granted to the local community - *Cofradía*

Field work

- Objective: to investigate climate change impacts on small-scale fisheries in Galicia (Spain)

- Women perceptions and attitudes towards
  - Biological, economic, social impacts on women and their households
  - Adaptive strategies
  - Future scenarios

- Questionnaire provided quantitative information (N=245)
  - Sites: Cambados (N=65), Campelo (N=125), Redondela (N=55)

- Field work: May-June 2019

Villasante et al (2022) Front. Mar. Sci.

Galician shellfisheries: the largest sector in Europe
## 8 thousands t/year I 75 million € laded value I 7,500 jobs (5,000 women)

TABLE 3 | Socioeconomic and fishery aspects of shellfisheries in three study areas in Galicia: Cambados, Campelo, and Redondela. N, number of fishers; μ, Mean; $\pm$, standard deviation. Main species landing = percentage of landing species (on foot + on boat).

Socioeconomic and shellfishery aspects	Fishing Guilds		
	Cambados (N=65)	Campelo (N=125)	Redondela (N=55)
Age (μ years)	51 ($\pm$8.3)	46 ($\pm$9.2)	48 ($\pm$8.8)
Schooling (μ years)	18 ($\pm$2.8)	14 ($\pm$2.6)	15 ($\pm$2.8)
Fishing experience (μ years)	15 ($\pm$10)	11 ($\pm$12.7)	15 ($\pm$14.6)
Number of people per household	3.4	3.5	3.5
Number of household members employed	1.3	1.6	2
Participation in shellfishery association (%)	20	2	17
Mortgage payment (%)	34	52	24
Social security benefits[a] (%)	41	50	52
Main species landing (%)	Manila clam (41)	Cockle (36)	Manila clam (40)
	Cockle (28)	Manila clam (26)	Cockle (35)
	Grooved carpet shell (18)	Pullet carpet shell (22)	Pullet carpet shell (18)
	Pullet carpet shell (12)	Grooved carpet shell (16)	Grooved carpet shell (8)

[a]Social security benefit was calculated on the basis of the average value of the total number of months during which fishers received public assistance during the last 10 years. For the three areas, the median value was around one month. Thus, we considered one month as key assistance to the fishers for this region.

Villasante et al (2022) Front. Mar. Sci. 04 May 2022

# Results: 50-75% of annual income dependent on shellfisheries
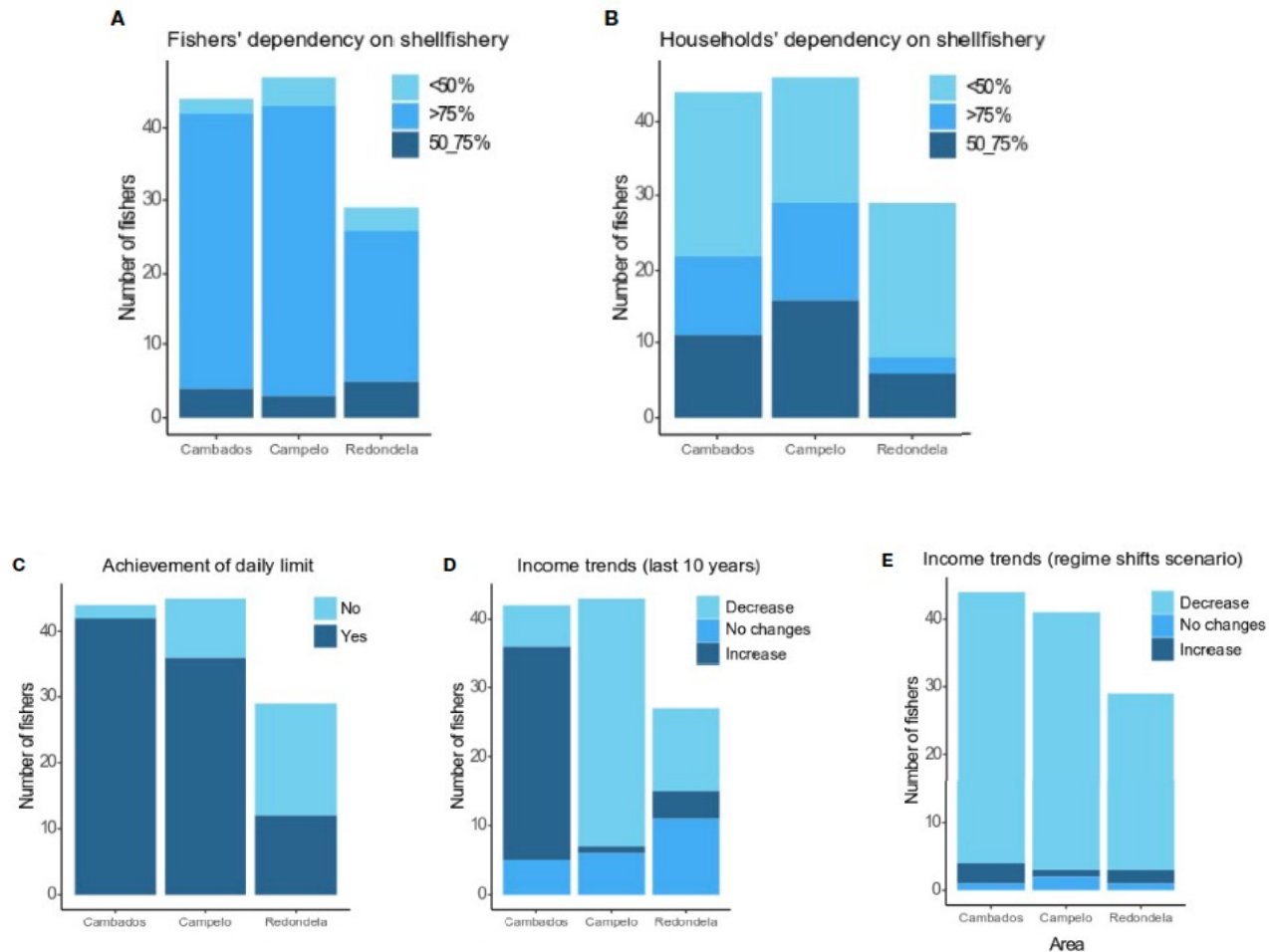
FIGURE 4 | Shellfishery dependency on **(A)** fishers and **(B)** households, and fishers' perceptions on **(C)** the capture of daily quota, **(D)** income trends (in the years), and **(E)** consideration of future climate change scenarios by area.

Villasante et al (2022) Front. Mar. Sci.

Results: Strong decrease of key abundance species and high vulnerability due to climate change

FIGURE 2 | Images of (A) women harvesting on foot in shellfish beds located in the Galician "rias", (B) the rake-like fishing gear called "raño", and (C) the most common shellfish species manila clam, cockle, grooved carpet shell, and pullet carpet shell.
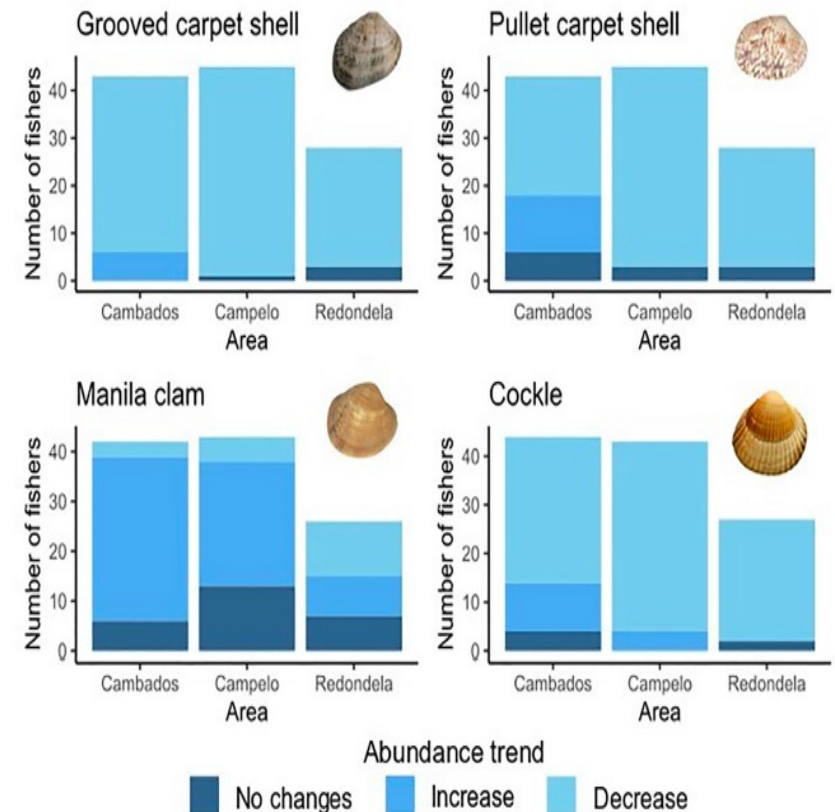
FIGURE 3 | Fishers' perceptions about the abundance of key commercial shellfish species.

Villasante et al (2022) Front. Mar. Sci.

Key conclusions

- Coastal communities highly dependent on shellfishing/artisanal fishing

- Fishers vulnerability decreases as other factors increase: (i) the size of households, (ii) long experience, and (iii) the public financial support

- Collectively, a higher involvement in fishers associations helps to better the adaptation

- Fishers adapted by reducing household expenses and complementing their income with other informal jobs to compensate for the economic losses

Thanks

sebastian.villasante@usc.es

@SebVillasante