12th International Conference on Information and Communication Technologies in Agriculture, Food & Environment
30 September – 3 October, 2026
Kos Island, Greece

A Digital Seafood Sustainability Assistant: Integrating Public Data to Support Consumer Decisions

Yannis Marketakis · Alessandro Petrocelli · Maicol Battistini · Ezmiron Deniku · Sara Pittonet Gaiarin · Yannis Tzitzikas

FORTH INSTITUTE OF COMPUTER SCIENCE

UNIVERSITY OF CRETE

Trust-iT services

COMMpla Communication Platforms and Online Solutions

VeriFish

HAICTA 2026

Outline

Motivation and Challenge	2	1’
VeriFish Approach and Knowledge Base	3-7	4’
Indicators & Digital Sustainability Assistant	8-9	4’
Conclusions & Next steps	10	1’

Why is seafood sustainability difficult to assess?

Is this a sustainable seafood choice?



Nutrition & health
Is this fish a health and nutritious choice?

Stock & Fishery status
Is this fish stock overfished or sustainably managed?

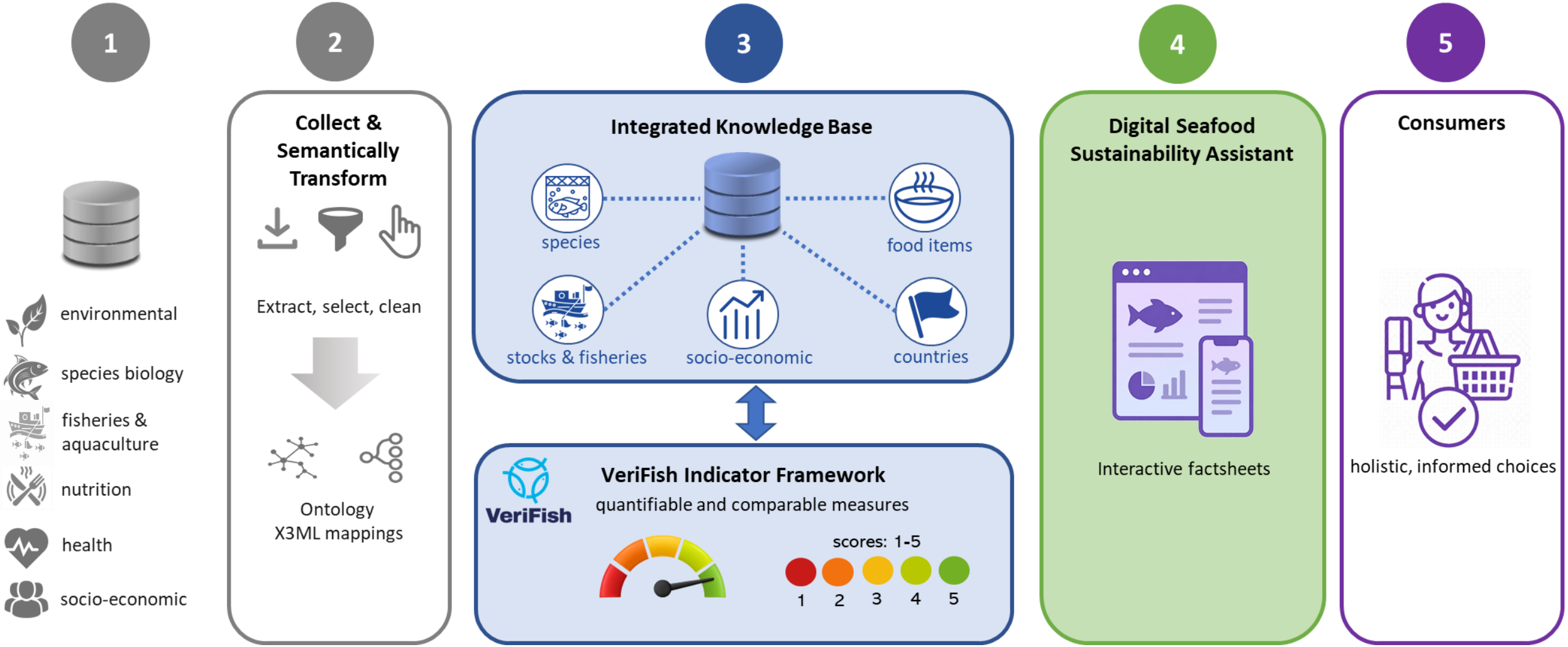
Environmental impact
What is the environmental impact for harvesting it?

Fishing/farming practices
Was this fish caught or farmed responsibly?

Provenance
Do I know where this fish comes from?

Socio-economic conditions
Were fair and safe working conditions respected?

From fragmented data to consumer information



Building the VeriFish Knowledge Base

Data Sources

FishBase

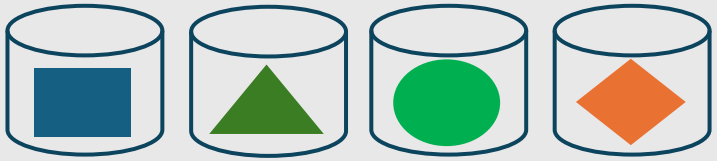
GBIF

EuroFIR
European Food Information Resource

Heterogeneous data

- Scope
- Structure
- Terminology
- Identifiers
- Access methods

Semantic Transformation



source schemas



MarineTLO-based ontology

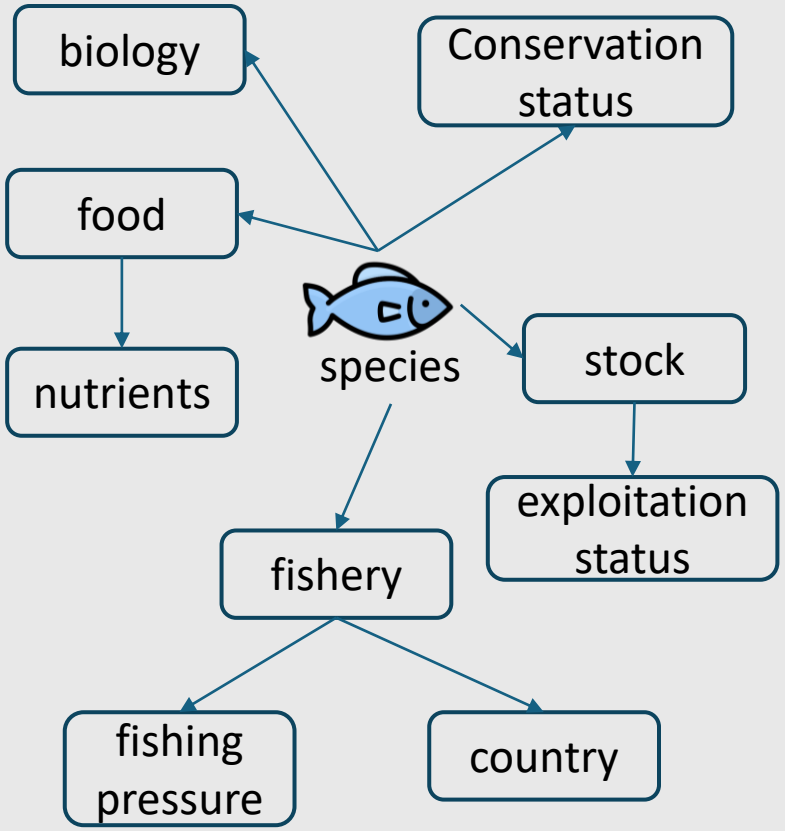


X3ML schema mappings



Semantically unified resources

Integrated Knowledge Base



What does the Knowledge Base contain?

22 public data sources

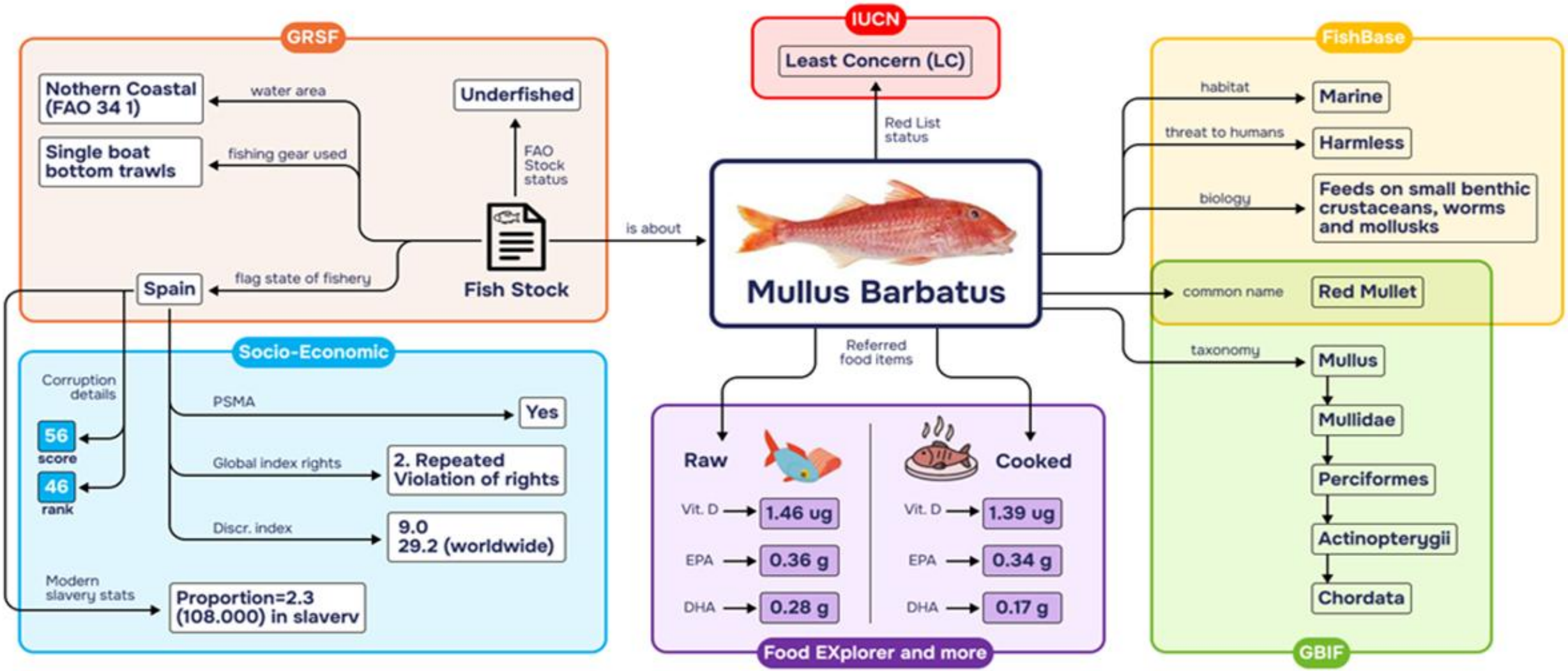
Environmental | Ecology | Fisheries | Aquaculture | Nutrition & Health | Socio-economic

13,582 species	**5,445** stocks	**17,509** fisheries
7,732 water areas	**9,331** nutrient values	**6,285** socio-economic values

<u>also includes:</u>
food items
nutritional attributes
aquaculture indicators,
fishing gears,
etc.

provenance *retained for every integrated source*

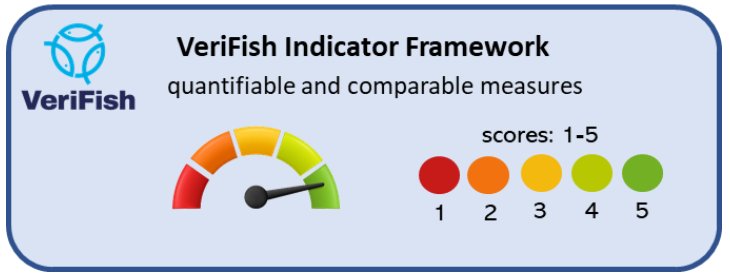
Connecting sustainability dimensions



From integrated data to understandable indicators

Integrated Knowledge Base

Stock: overfished
Fishing gear: Single bottom trawl
IUCN status: LC
Vit D: 1.46 ug
Protein: 22.75 g
FAO-UN PSMA: Yes (Spain)
ILO ratifications: C029, C087, C098, C100, C105, C111, C138, C155, C169, C182, C187, C188



Consumer Information

Environmental 3/5

Nutrition & Health 5/5

Socio-economic 4/5

VeriFish webApp: a digital seafood sustainability assistant

Striped red mullet, Surmullet, Red mullet

Mullus surmuletus



Biology

Learn about this species, including its description and habitat.

Adults occur on broken and rough grounds but also found over sand and soft bottoms at depths less than 100 from 5-60 m and from 305-409 m in the eastern Ionian Sea . Feed on benthic organisms such as shrimps and polychaetes, mollusks, and benthic fishes. Spawning occurs from May to July, eggs and larvae are pelagic . M frozen for steaming, pan-frying, broiling and baking . **Species conservation status**: Least Concern

Habitat

saltwater

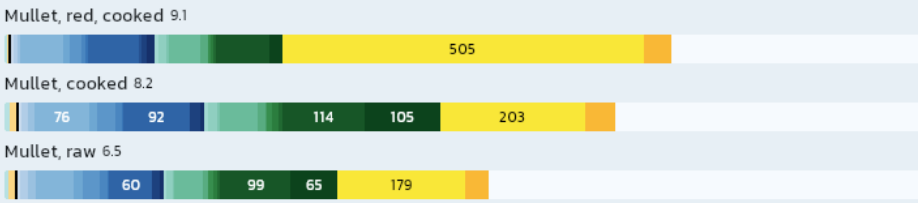
Nutritional facts

Explore the vital nutrients to better understand the dietary benefits of this species.

The Nutrient Density Score evaluates nutritional value based on beneficial and limiting nut serving (using EFSA Daily Reference Values).

Nutrient Relative to Daily Reference Values (DRVs)

Macronutrients Minerals Vitamins



Mullet, red, cooked | Mullet, cooked | Mullet, raw

Nutrient	Value	%DRV
Macronutrients		
Protein (g)	22.3	38%
Omega-3 (mg)	1264.5	>100%
Saturated Fat (g) (negative	0.7	4%
Minerals		
Iodine (µg)	26.5	18%
Selenium (µg)	52.0	74%
Copper (mg)	0.1	3%
Zinc (mg)	0.4	3%
Iron (mg)	0.4	3%
Manganese (mg)	0.0	1%
Magnesium (mg)	34.0	10%
Phosphorus (mg)	245.0	45%
Calcium (mg)	44.7	4%
Potassium (mg)	405.0	12%
Chloride (mg)	158.3	5%
Sodium (g) (negative	0.1	5%
Vitamins		
Vitamin E (mg)	1.3	11%
Vitamin D (µg)	1.1	7%
Vitamin C (mg)	3.2	3%

Spain

4.16 / 5 (Low Risk)

Details – Indicators

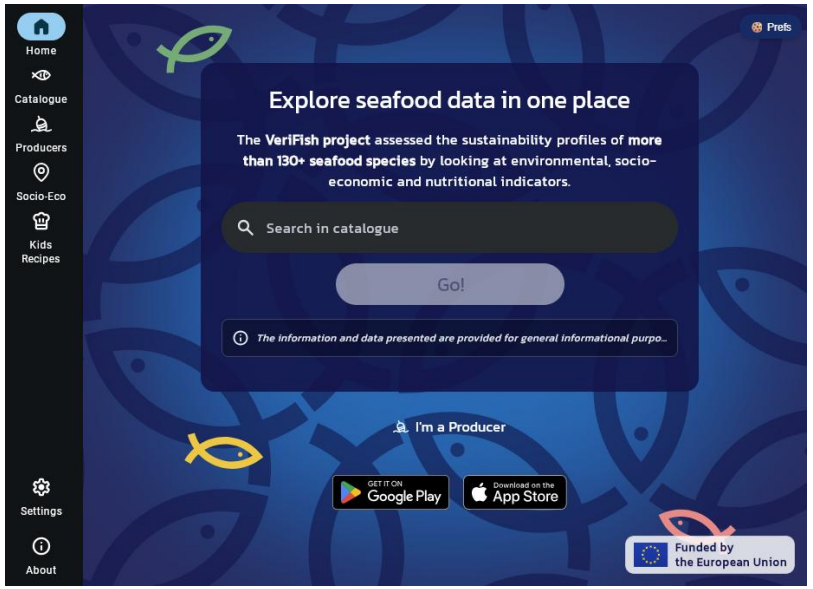
Access to Healthcare	3 / 5
Child Labour Prevention	5 / 5
Respect for Indigenous Peoples	3 / 5

Sector Comparison

	Capture fisheries	Aquaculture
Forced Labour Prevention	5 / 5	5 / 5
Health & Safety	5 / 5	3 / 5
Anti-Discrimination	5 / 5	5 / 5
Freedom of Association	5 / 5	5 / 5

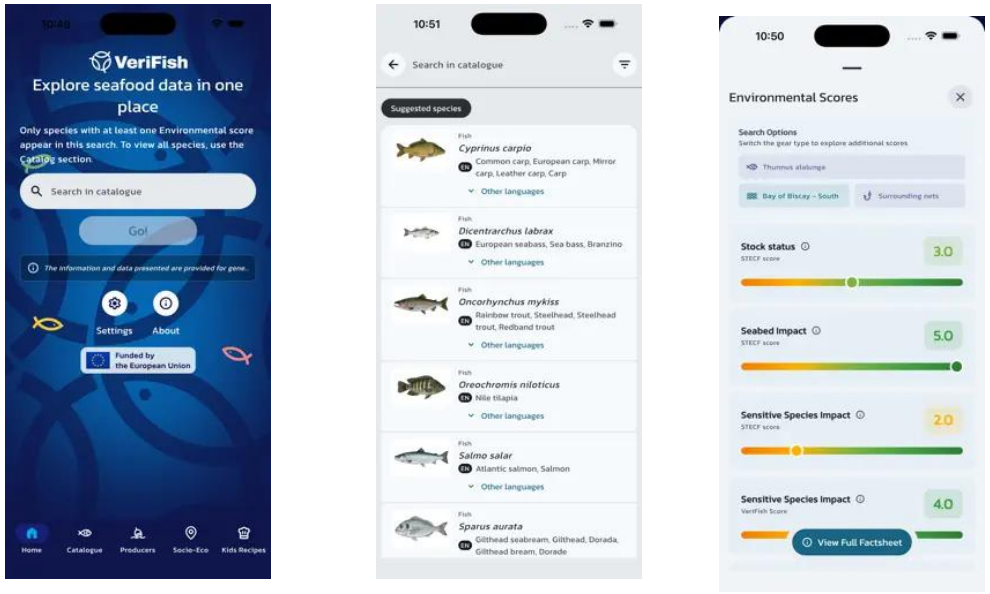
VeriFish web application

Web Application



https://app.verifish.info/

Mobile application



App Store

Google Play

Conclusions & next steps

Conclusions

- Integrated sustainability evidence across multiple domains
- Traceable & reproducible semantic integration
  - Also supporting the evolution of the knowledge base
- Consumer-friendly access through interactive factsheets
  - Using a web and mobile application

What's next?

- Expand data sources and indicators
- Improve factsheet explanations
- Evaluate usability, interpretation and content

Supported by

VeriFish

European Commission

GA number: 101156426
(HORIZON-MISS-2023-OCEAN-01-10)

Thank you!

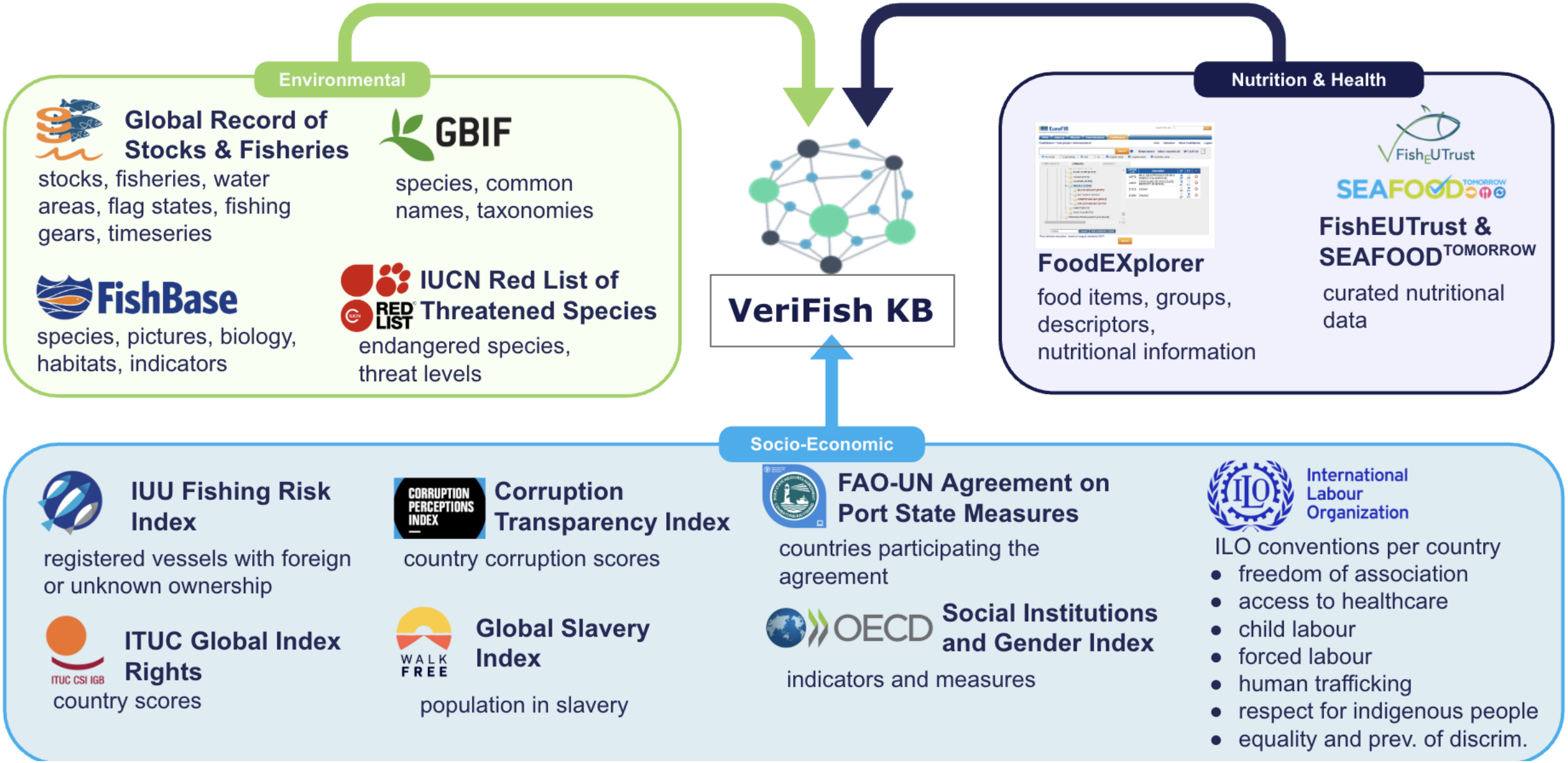


Explore VeriFish

VeriFish

https://app.verifish.info/

Any questions?


Environmental
Global Record of Stocks & Fisheries
stocks, fisheries, water areas, flag states, fishing gears, timeseries
GBIF
species, common names, taxonomies
FishBase
species, pictures, biology, habitats, indicators
IUCN Red List of Threatened Species
endangered species, threat levels
VeriFish KB
Nutrition & Health
FoodEXplorer
food items, groups, descriptors, nutritional information
FishEUTrust
SEAFOOD TOMORROW
FishEUTrust & SEAFOOD TOMORROW
curated nutritional data
Socio-Economic
IUU Fishing Risk Index
registered vessels with foreign or unknown ownership
Corruption Transparency Index
country corruption scores
FAO-UN Agreement on Port State Measures
countries participating the agreement
International Labour Organization
ILO conventions per country
freedom of association
access to healthcare
child labour
forced labour
human trafficking
respect for indigenous people
equality and prev. of discrim.
ITUC Global Index Rights
country scores
Global Slavery Index
population in slavery
OECD
Social Institutions and Gender Index
indicators and measures