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FPCUP Action 2021-2-47: Report on the second cycle of interaction with national users.

In France, the second cycle of interaction with stakeholders focused specifically on the aquaculture sector, building on the previous year's engagement with coastal and marine users. The survey was distributed to a targeted group of professionals and institutions involved in aquaculture production, research, and environmental monitoring. A total of seven responses were collected, representing a balanced mix of research institutions, private sector actors, public agencies, and local authorities.

Compared to the first cycle, which was dominated by research-oriented profiles, this second round revealed a broader operational representation. Aquaculture producers, engineers, and environmental managers were more prominently involved, reflecting a growing interest in the practical applications of Earth observation data for aquaculture management. This shift in user profile suggests a transition from exploratory research use cases to more applied, production-oriented needs.

The use of Copernicus services in aquaculture remains uneven. While most respondents are aware of the programme, only a subset actively uses its data. Among those who do, satellite imagery is the most commonly cited source, with in situ and modelled products used less frequently. This contrasts with the first cycle, where modelled time series of winds, waves, and currents were widely used in coastal dynamics studies. In aquaculture, the emphasis is more on environmental monitoring and site-specific indicators such as water quality, salinity, and temperature.

Several challenges persist in the adoption of Copernicus data. Users report difficulties related to the complexity and format of the data, as well as a lack of adapted visualization tools. These issues echo those identified in the previous cycle, particularly the resolution gap in coastal zones. However, aquaculture users also highlight a lack of human resources and technical capacity, suggesting that capacity building and training may be as critical as technical improvements.

In terms of resolution needs, respondents expressed a preference for spatial resolutions between 5 and 250 meters, suitable for farm-scale monitoring. Temporal resolution requirements vary depending on the parameter, ranging from daily to monthly. These preferences align with the findings from the first cycle, where high-resolution and frequent data were also prioritized. However, aquaculture users place greater emphasis on biogeochemical parameters and water quality indicators, rather than physical dynamics alone.

The most cited applications for Copernicus services in aquaculture include water quality monitoring, environmental impact assessment, infrastructure planning, and stock monitoring. These use cases are consistent with those identified in the coastal domain but are more operationally grounded, reflecting the production-oriented nature of aquaculture.

Awareness of the digital twin concept remains limited among aquaculture stakeholders. Most respondents are unfamiliar with the term, and those who are aware of it express uncertainty about its added value. Nevertheless, some see potential in environmental simulation and production optimization. This topic was not explicitly addressed in the first cycle, indicating a new area for awareness-raising and innovation.

In conclusion, the second cycle of interaction highlights the need to broaden user support through tailored training and tools, enhance the usability and resolution of Copernicus products, and promote operational use cases in aquaculture. Raising awareness of emerging concepts such as digital twins may also help unlock new opportunities for innovation in the sector.