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Copernicus Evolution – Research for harmonised and
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1 Executive Summary

- This document is the first deliverable of CERTO WP8. Its objectives are to report on the progress of the first 6 months after the launch of the WP (Work Package) in April 2022.
- The period was spent designing the general guidelines for the demonstrations (user feedback questionnaire, demonstration report framework) and brainstorming with other WP leads to define processing requirements.

2 Introduction

WP8 is the CERTO demonstration work package, in which the CERTO products and indicators will be presented and exemplified to the CERTO users. Its objectives are to:

- test the products generated with the prototype system (WP7) and the indicators (WP6) in real-life situations,
- expose the products and indicators to service providers as input to their downstream applications, as well as to end users working directly with the Copernicus services,
- identify technical limitations and provide recommendations for further improvements concerning algorithm, products, and production,
- identify service limitations and provide recommendations for service improvements,
- promote the CERTO developments and prototype to potential long-term users,
- provide evidence for the Copernicus services entrusted entities on the value of the CERTO prototype for its incorporation into the Copernicus Services

The work is organised by running in parallel the Demonstration Case studies for each of the selected Case Study Sites. The first task (Task 8.1) is to agree on guidelines, which all case studies shall follow, to ensure that consistent synthesised results are provided at the end of the demonstrations. The Demonstration Case Study Report (D8.2), which will be provided at the end of the project, will be based on the individual Case Study reports and the operations reports (with processing being undertaken in WP7 Task 7.7), which will be internal deliverables and may be provided as an annex to the final report. The Demonstration Report will analyse and synthesise the individual case study reports and the operations report and lessons learnt will be concluded.

The present report summarises the activities of the first 6 months of WP8, which consisted of developing the common demonstrations guidelines (Task 8.1) before the start of the demonstrations at a later stage in 2023. The common guidelines shall give recommendations to each Case Study Site Lead on how to conduct the CERTO demonstrations with their users / stakeholders. The following chapters present the progress made on Processing Requirements, User Feedback, Case Study Consultations, and the Demonstration Case Study Report.

3 Guidelines for demonstrations with users

These are general guidelines, skewed more towards helping the Case Study Leads complete their individual Case Study reports, and as such helping in summarising all the feedback for the final report.

- Describe CERTO products and indicators
  - Based on the presentation material available
  - Do you have all the material you may need?
- Present products and indicators for your case study site
  - Left free to organise as you see fit, several meetings can also be envisaged.
- Gather feedback – online survey:
  - General satisfaction feedback
  - Detailed questionnaire
    - on the products and indicators
    - on the production

o User specific feedback (free to report as the Case Study Lead / the user wishes)

4 Processing and Products Requirements

This activity was undertaken in preparation for the demonstrations to guarantee that all the relevant products and indicators are provided to the Case Study Leads before starting the demonstrations. This is to ensure that no unnecessary back and forth with the users takes place before even starting the demonstrations. It was thus decided to ask all Case Study Leads to prepare a list of the products and indicators that are required for their site. This list will then be communicated to WP7 and WP6 under WP8 coordination. Thus, the processing of data and the generation of indicators can be done effectively.

The requirements are to ensure that each case study has the dataset(s) needed for the demonstrations. Ad hoc product generation is also possible but should be avoided. The requirements questionnaire was made available in an Excel Sheet during the summer to be filled by the end of this reporting period. This excel sheet was completed by each Case Study Site Lead based on their user requirements. The main topics covered are:

- Which sensor (Sentinel 2, Sentinel 3, or both),
- Which period (e.g., one-year, full archive, Near Real Time),
- Which indicator

Concerning the indicators, some additional information may be needed and / or generated prior to the indicator generation itself:

- For the maximum turbidity zone index: a shapefile of the study site, tide information and river runoff (if applicable).

- For the statistics for European Union reporting: a shapefile of the official water bodies. If none exist, one that makes sense can also be used.

- Does this information exist for your site? If not, would it be required (how can WP8 help)?

The processing requirements excel sheet was defined together with WP2, WP6 and WP7 leads and presented to all consortium partners during Progress Meeting 5 (PM5), at the end of June 2022. This ensured that all aspects of the CERTO products and indicators processing steps were suitably covered before processing starts (planned for late 2022).

The excel sheet (summarised in Table 1) was refined with inputs gathered during PM5 to provide information for each case study to:

- Assess the period of processed Sentinel 2 and 3 CERTO products
- Select which CERTO indicators are to be generated for case study region
- Inform on any additional information, such as seasonality of the regional statistics.

Table 1: Processing Requirements

Sensors	Parameter	Time range (start-end)	Additional Information	Comment here if needed
Sentinel-2	Chl-a / Turbidity	Write here the start and end date for the data you require	Processing period: 2016-2022	
Sentinel-3	Chl-a / Turbidity	Write here the start and end date for the data you require	Processing period: 2016-2022	
Products / Indicators	**Required**	**Aggregation Type**	**Additional Information to be provided**	**Comments**
Phenology indicator	Yes/No	N.A.	shapefile	
Maximum turbidity zone indicator	Yes/No	N.A.	tide information river runoff information shapefile	
Chl-a Statistics for EU WFD/MSFD	Yes/No	daily/monthly/ seasonally/ yearly/P90	if applicable, precise seasonality, also for P90	
Turbidity Statistics for EU WFD/MSFD	Yes/No	daily/monthly/ seasonally/ yearly/P90	if applicable, precise seasonality, also for P90	
Chl-a	Yes/No	daily/monthly/ seasonally/ yearly	if applicable, precise seasonality	
Turbidity	Yes/No	daily/monthly/ seasonally/ yearly	if applicable, precise seasonality	
SESVI (Social Ecological System Vulnerability Index)	Yes/No	N.A.		

Following PM5, each Case Study Lead was asked to fill this table for their study site. The results of these tables will be forwarded to WP7 for processing during Q4 of 2022 with WP6 to be consulted regarding indicator production.

5   User Feedback Questionnaire

During the first six months of WP8, a draft questionnaire was established as part of the demonstration guidelines. This questionnaire will be discussed, updated, and finalised during the individual Case Study Lead consultations (see Section 6) and before the start of the demonstrations. This questionnaire shall help to steer the user discussions and analyse the outputs of each demonstration. The questionnaire will be an online survey (such as **https://easy-feedback.com/**) and will include generic questions, as well as more specific ones related to the individual indicators.

5.1 Generic questions

These generic questions are to assess how the CERTO products and indicators were received overall by the end-users and shall be answered from 1 (low) to 5 (excellent):

1) How well did we understand your needs?
2) How well did we meet your expectations?
3) Were you satisfied with the delivery process?
4) Were you satisfied with the quality of communications with the CERTO partner?
5) How well did we respond to any issues or problems that you had with the products?
6) How have the products been of value for you?
7) How useful are the products presented to you (would you use them in your daily work)?

5.2 CERTO portal questions

On the CERTO data portal, https://engage.certo-project.org/data/, Water leaving reflectances, Optical Water Types, Chl-a, and Turbidity are made available for each Case Study Site for visualisation and timeseries plotting for point data and polygons. Depending on the user type, they may be given access to the CERTO data portal. If applicable, a set of questions have been drafted:

1) How do you rate the appearance of the CERTO data portal? (e.g., does it look good?)
2) The Portal is designed to be as self-explanatory as possible. How easy do you find it to understand the design of the Portal and access the information and data that you have interest in?
3) Do you find it necessary to receive training as introduction to the content and the applicability of the content of the Portal?
4) How would you prefer to be introduced to the Portal (training in use of the web site)?
    a. By short explanatories on the web site introducing the individual products
    b. By a downloadable manual which gives details on the assorted products
    c. By an introductory training course given by the service provider in your country
    d. Any combination of the suggestions above
5) Alternative suggestions on how to receive training

5.3 Indicator specific questions

This part of the questionnaire is still in early draft mode and will be completed with the help of WP6 and finalised during the Case Study Lead consultations. Some question ideas are listed below:

1) How do you rate the readability of the maps/figures?
2) How do you rate the spatial resolution?
3) How do you rate the temporal resolution?
4) Free text form

6 Case Study Lead Consultation

To prepare for successful demonstrations during 2023, it was decided to have dedicated Case Study consultations for each case study individually. These consultations will occur between October and December 2022 and will involve the Case Study Leads and WP8 lead, but also

the WP6 (indicator development), WP7 (processing) and WP3 (in situ) leads to coordinate activities as best as possible. The aim and framework of these consultations is part of the guidelines for successful demonstrations; these have been elaborated during this reporting period.

The goal of the consultations will be to:

- Understand the requirements for the material to be shown to users
  ⇒ this will ensure that the Case Study Leads know enough about the indicators to present them properly to their users and assess whether we need to translate a few slides for local users.
- Understand what will be required: products, indicator descriptions...
  ⇒ this is based on the processing requirements table which will be analysed during the consultation.
- Discuss the process of the demonstrations, along the guidelines
  ⇒ there are generic guidelines, and we may add specifications for each study site (emphasising with study leads what goes into Chapter 4 of the final report to guide the demonstrations).
- Discuss (and update) the user feedback questionnaire.

7 CERTO Demonstration Case Study Report

The CERTO Demonstration Case Study Report, the second and final deliverable for WP8, will be written after the demonstrations have ended and the individual reports have been provided. As such, it is a particularly important document since it will gather all results and analyses (user uptake of the CERTO products and indicators, user feedback, lessons learnt, and recommendations for the future). It was thus decided during this reporting period and as part of Task 8.1 to draft the Table of Contents (ToC), the framework of that document, to successfully drive the demonstrations and ensure we gather the relevant feedback from the demonstrations. This report should become a self-contained document; it is thus proposed to include at the beginning a concise overview of the products and production system.

The main body of the document will follow a classical study report:

- materials and methods (=demo case studies and our approach to gather feedback)

- results (=synthesis of feedback, recommendations for improvements)

- short conclusions

The individual Demo Case Study Reports may be attached as Annexes.

As of writing, the current ToC is presented in Figure 1. The ToC may evolve slightly until the final delivery, but the main content shall remain the same.

Figure 1: Table of Contents for D8.2