THEME 4 SOCIETAL RELEVANCE AND UNDERSTANDING

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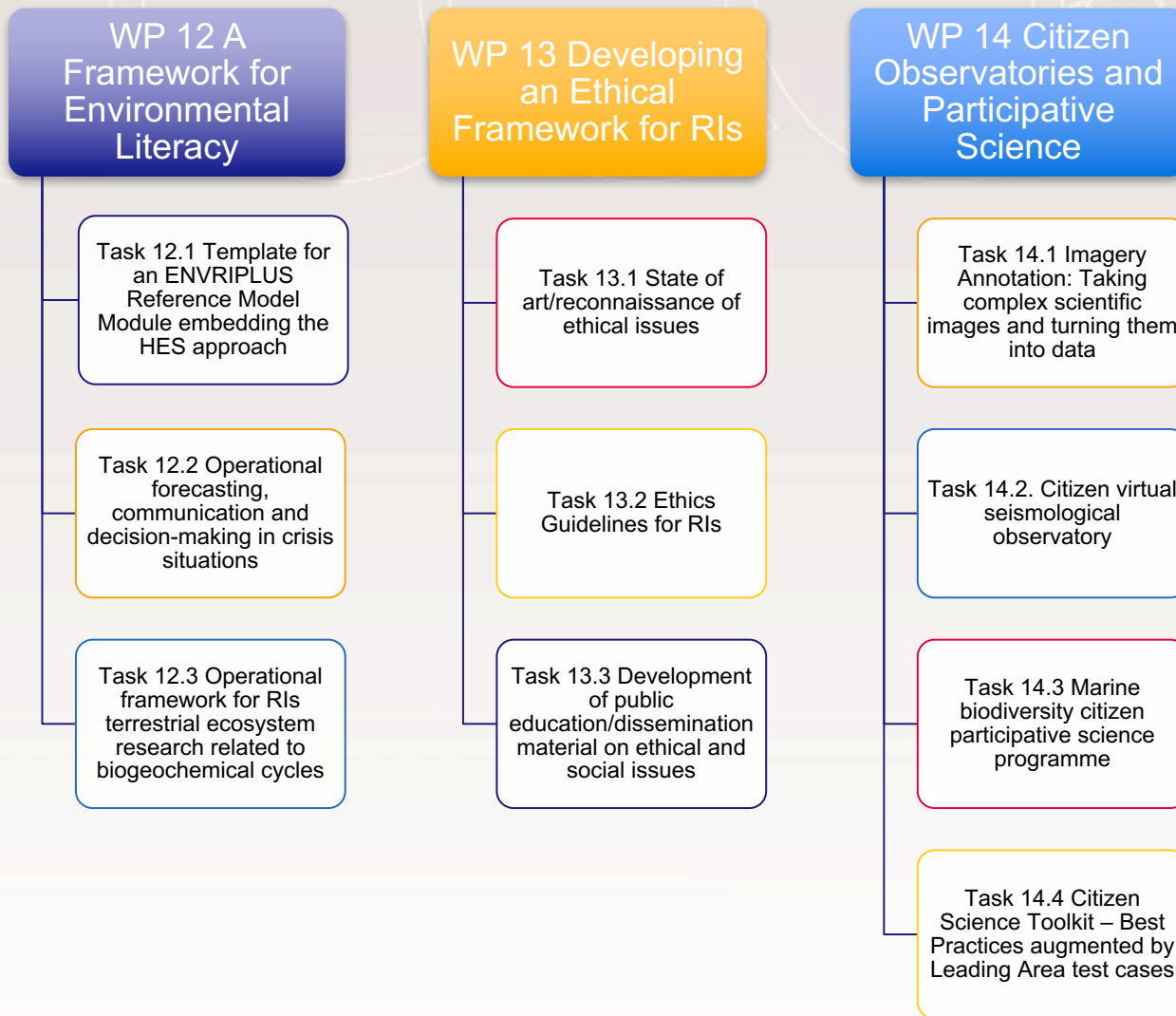
MOTIVATION

- As societies constantly have to adapt to environmental challenges, data from environmental Research Infrastructures play an important role in **societal decision processes**. This requires a specific culture of translating the data into an interdisciplinary understanding of human-environmental systems (HES) and is called 'environmental literacy'.

- Theme 4 will develop **environmental literacy** and train environmental Research Infrastructures to participate in trans-disciplinary analyses and decision-making processes.

- It will help to develop a common voice for environmental Research Infrastructures, and **address common ethical problems** such as data integrity and responsibility for communication of environmental knowledge.

- Finally, it will value and strengthen participation of citizens in environmental science. Participative science is a win-win activity between environmental Research Infrastructures and the public. It **raises awareness** of citizens and also **provides valuable data** in monitoring change in the natural world. Furthermore, citizens' connection with the scientific community not only ensures **trust** in the data provided by environmental Research Infrastructures but by contributing to that data, citizens are **empowered** by becoming involved in the scientific process.

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WORK PACKAGES OVERVIEW

WP 12 A Framework for Environmental Literacy

- Task 12.1 Template for an ENVRIPLUS Reference Model Module embedding the HES approach
- Task 12.2 Operational forecasting, communication and decision-making in crisis situations
- Task 12.3 Operational framework for RIs terrestrial ecosystem research related to biogeochemical cycles

WP 13 Developing an Ethical Framework for RIs

- Task 13.1 State of art/reconnaissance of ethical issues
- Task 13.2 Ethics Guidelines for RIs
- Task 13.3 Development of public education/dissemination material on ethical and social issues

WP 14 Citizen Observatories and Participative Science

- Task 14.1 Imagery Annotation: Taking complex scientific images and turning them into data
- Task 14.2. Citizen virtual seismological observatory
- Task 14.3 Marine biodiversity citizen participative science programme
- Task 14.4 Citizen Science Toolkit – Best Practices augmented by Leading Area test cases

WP 12   A FRAMEWORK FOR ENVIRONMENTAL LITERACY

➤ Overall Goal

Translate 'Environmental Literacy' into a tool that enables Environmental RIs to assess in a standardized manner their role and impact with regard to societal grand challenges

➤ Tasks

12.1   *Template for a ENVRIPLUS Reference Model Module embedding the HES approach (EAA$_{LTER}$, UHEL$_{ICOS}$, IFREMER$_{EXP}$, ETH$_{EPOS}$)*

12.2   *Operational forecasting, communication and decision-making in crisis situations (ETH$_{EPOS}$)*

12.3   *Operational framework for RIs terrestrial ecosystem research related to biogeochemical cycles* (UHEL$_{ICOS}$, EAA$_{LTER}$, INRA$_{ANAEE}$)

➤ Overview – very promising development despite delays. Potential for significant impact of this WP demonstrated by engaged discussions / interest during past ENVRI weeks

WP 12 12.1 TEMPLATE FOR AN ENVRIPLUS REFERENCE MODEL MODULE EMBEDDING THE HES APPROACH

- **Overview**

  - Work started successfully during initial phase of the project (see on-time milestone 15) - *Grand Challenges Systems analyzed; checklist & questionnaire for RIs prepared and published; economic process review started.*

  - some delays encountered during year 2 - *slow feedback on Grand Challenges questionnaire; initial draft framework for testing by 12.2 and 12.3 delayed; initial discussions on RM module nevertheless started*

- **Outlook**

  - *initial feedback on Grand Challenges Assessment (by tasks 12.2 and 12.3) will support shaping the RM module implementation. Direct connection @ EAA with Theme 2 – WP5 for RM design & integration will allow successful completion by M36.*

WP 12   12.2   *OPERATIONAL FORECASTING, COMMUNICATION AND DECISION-MAKING IN CRISIS SITUATIONS*

◖ Overview

- ◖ Work started successfully during initial phase of the project - *Best practice review for Seismology / operational earthquake forecasting undertaken; initial discussions on inclusion of other hazards*

- ◖ some delays encountered during year 2 - *main responsible staff @ ETH left in August 2016, some reorganization of task required*

◖ Outlook

- ◖ *ETH internal re-organization of task under way. Based on initial work, task will be completed by M32 with delivery of best practices white paper.*

WP 12   12.3   *OPERATIONAL FRAMEWORK FOR RIS TERRESTRIAL ECOSYSTEM RESEARCH RELATED TO BIOGEOCHEMICAL CYCLES*

◖ Overview

- ◖ Work started successfully during initial phase of the project - *Initial Workshop with relevant RIs conducted; National roadmap analysis under-taken; coordination among RIs initiated (ICOS, ANAEE, eLTER, NEON (U.S.), TERENO (D))*

- ◖ some delays encountered during year 2 - *alignment to timelines of other projects & initiatives (EU, global) and necessary consideration of natl. roadmaps currently under development led to overall delay*

◖ Outlook

- ◖ *After analysis and agreement on basic theories and concepts, analysis of national roadmaps and collection of site inventory is close to completion. Case Study white paper will be completed by M27.*

WP 12 DELIVERABLES AND MILESTONES

No.	Title	Deadline	Status
D12.1	Report describing the relation between challenges of human systems and environmental information generated in RIs as documented module of the ENVRI^plus Reference Model updated based on the experiences from Tasks 33 and 34	M27 – moved to M36	Delayed – on track with new delivery date
D12.2	White paper on general guidelines, recommendations, and best practices for communication and decision making under uncertainty for environmental hazards and natural disasters	M24 – moved to M32	Delayed – on track with new delivery date
D12.3	White paper on further integration of RIs related to terrestrial ecosystem research including recommendations on co-locating research sites on national and international level	M15 – moved to M27	Delayed – on track with new delivery date

No.	Title	Deadline	Status
MS15	Work on Reference Model embedding HES approach started successfully [report]	M12	Delivered on time

WP12 OVERALL STATUS

Successes

good start, positive engagement of collaborators and community, recognized impact potential

Issues and corrective actions

slow response on questionnaire (12.1); coordination with project-external activities (12.3); resource allocation (12.2): Review and adjust timeline

Plans for the next period

deliver as planned: finalize case studies 12.2 and 12.3, implement RM module (12.1).

WP13 DEVELOPING AN ETHICAL FRAMEWORK FOR RIS

Goals:

- **increase awareness** of both the scientists and the public on the importance of ethical aspects in Earth sciences;
- establish a **shared ethical reference framework**, to be adopted by RIs governing bodies, including management guidelines for Ethical Boards in RIs;
- increase awareness of RIs management, operators and individual scientists of their **social role** in conducting **research activities**;
- assess the **ethical and social aspects** related to the results achieved and deliverables released **within the project** .

Tasks

- 13.1 State of art/reconnaissance of ethical issues
- 13.2 Ethics Guidelines for RIs
- 13.3 Development of public education/dissemination material on ethical and social issues

Overview of the situation

Activities planned in the task 13.1 have been successfully completed, in order to respect the deadlines. In particular, the ethical survey through an ad hoc questionnaire has been concluded and the results have been included in the deliverable 13.1. The activities planned in the tasks 13.2 and 13.3 are in progress.

WP 13 DELIVERABLES AND MILESTONES

No.	Title	Due date	Status
D 13.1	**Questionnaire and assessment report**	**30 April 2017**	**DONE**
iMi 13.2.2	Draft of the label template	29 Dec 2017	**in progress**
MS 13.2	Ethical Consensus guidelines report plan	30 April 2018	-
D 13.2	**Ethical label template**	**30 April 2018**	-
D 13.3	**Ethics Guidelines for RIs**	**30 Nov. 2018**	-
iMi 13.3.1	Transferring to the website	28 Dec. 2018	-
D 13.4	**Contents for Websites, social media appearance, printed matter on ethical & societal issues for general Public**	**30 April 2019**	-

WP13 OVERALL STATUS

Successes

The results emerged from the ethical survey (task 13.1) are very interesting. Their analysis has highlighted important aspects that will be taken into consideration for the next steps of the WP13. In particular, they will be useful to identify key points that must be included in the ethical guidelines.

Issues and corrective actions

No corrective action was necessary. The activities took place without any particular problems. What was planned at the beginning has been perfectly accomplished.

Plans for the next period

Based on these results, the definition of Ethical Guidelines for RIs as well as the development of an ethical label template and finally the development of associated outreach materials, which are the remaining tasks of WP13, will be facilitated and their results will be of greater use for the scientific community.

WP14 CITIZEN OBSERVATORIES AND PARTICIPATIVE SCIENCE

- A necessary component of environmental Research Infrastructures is and will increasingly become **participative or "citizen" science**. This is for two key reasons: 1) it raises **societal awareness and engagement about environmental change** and 2) provides **data that is otherwise logistically inaccessible** for monitoring change on our planet. This work package develops and summarizes resources for environmental Research Infrastructures to engage with the public in citizen science, an area providing innovative solutions for data or sample collection, management, processing, curation, annotation, and deposition.
  - Task 14.1. Imagery Annotation: Taking complex scientific images and turning them into data
  - Task 14.2. Citizen virtual seismological observatory
  - Task 14.3. Marine biodiversity citizen participative science programme
  - Task 14.4. RI Citizen Science Toolkit – Best Practices augmented by Leading Area test cases
- Overview of situation:
  - Deliverables have been completed and future work is on track.

WP14 – TASK 14.1 IMAGE ANNOTATION

Annotation tool

◖ A first version finalized version of the tool was officially launched at the national scale (deepseaspy.ifremer.fr) through a national press release (March 2017)

◖ The game has now 630 participants and 340 actively annotating. More than 11,000 images have been annotated since official launch.

Communication actions

◖ A computer terminal was installed at the Oceanopolis aquarium

◖ Collaborations with schools in Britanny

◖ Public presentations: 'Association du musée du sable', 15 March 2017, Sables d'Olonne; 'Immersion Science', 28 March 2017, Ile Tudy, France; UTL Quimper, 6 April 2017

◖ The communication plan has been finalized

Collaborations with international programs

◖ EMSO France

◖ Ocean Networks Canada

◖ ENVRI Community

Perspectives

◖ Application of the tool to a wider community and other types of images

TASK 14.1 DEEP SEA SPY, LAUNCHED MARCH 2017

- A program to automatically extract pictures from videos

- An online gamified image annotation tool: deepseaspy.ifremer.fr

- A data model to export data to the Ifremer DataBase (Sismer): applicable to any other image annotation tools

- General public project website: wwz.ifremer.fr/deepseaspy

- General public conferences, museum exhibition, conception of educational tools, collaboration with scholars and associations

- The game has now 630 participants and 340 actively annotating. More than 11,000 images have been annotated since official launch in March 2017.

- Open source, applicable to any image analysis.

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TASK 14.2 CITIZEN VIRTUAL SEISMOLOGICAL OBSERVATORY

◖ Production of a report (Deliverable 14.3) end of December 2016

◖ Collaboration with US QCN and/or Boinc uncertain as their support has been cut. Alternative - > Raspberryshake

  ◖ Purchased a Raspberryshake (RPI) sensor, installed it (near Paris) and recorded several earthquakes worldwide since January.

  ◖ More than 200 RPI's are currently online. They show very promising performance, even to record regional and remote earthquakes when they were dedicated to local seismicity in the first place. Data is in standard seismic format, so can be directly compared to traditional seismic data.

  ◖ The Raspberryshake community is composed of non-expert people but who are active and keen on sharing their experience. We plan to develop a web platform inspired from our platform for QCN data, to help the user to check which earthquakes his sensor has recorded.

  ◖ Analysis of the relative roles of RasberryShake (citizen sensor) and LastQuake (citizen observer) communities

◖ Collaboration with colleagues from Taiwan made important progress toward the development of a platform for general public inspired from their competition game currently adapted to 10-12 year old children. We tested it and provided them some feedback.

TASK 14.3. MARINE BIODIVERSITY CITIZEN PARTICIPATIVE SCIENCE PROGRAMME

Developments

- D14.5 Test version of a EMBRC citizen observatory system submitted

- In consultation with H2020 'Sea Change' project, will develop an app to support the Crab Watch initiative and use as an additional demonstration method of data collection. The Crab Watch app (IOS and Android compatible) is being developed by Naturelocator in the UK using the Coreo system and will provide an additional platform, which can be demonstrated to scientists during training workshops.

- 4-5 Training workshops from summer 2017 to autumn 2018, online training resources and tutorials will be developed and shared alongside course content and materials.

  - e.g. 22nd September 2016, Marine Biological Association Plymouth training workshop. 'Use of Indicia and Drupal to develop recording pages' led by John Van-Breeda (http://www.biodiverseit.co.uk/).

Communications

- Developments discussed with EMBRC and Lifewatch partners.

- ASSEMBLE+ is now in negotiation phase and will kick off on 1. Oct, products of this task will be shared through them

- Programme of training and events will be publicised Autumn 2016.

- ENVRI training platform developed in WP15 to deliver training and make resources (D14.8) available.

Significant Results

- D14.5 used in research on endangered species (submitted J. Biogeogr., data set https://doi.org/10.14284/293.)

Deviations, reasons for deviations, and corrective actions

- We decided to use the iRecord system because there is a long-term sustainability plan. However, some system development and customization is required, so another related system is also being used for prototype development.

- We will use both systems in the training program. The additional development of a Crab Watch app connected to the Sea Change project will provide a greater range of demonstrable resources during training workshops and the use of Coreo will provide another possible option for those looking to develop their own data collation systems.

WP 14 DELIVERABLES

No.	Title	Deadline	Status
D14.1	Prototype of a web-based annotation tool for user testing.	15	Submitted
D14.2	Report describing image annotation results	30	On track
D14.3	Report on development and implementation of a citizen seismology sensor observatory and education platform	30	Submitted
D14.4	Guidelines for developing citizen sensor observatories and education platform	36	On track
D14.5	Test version of a EMBRC citizen observatory system	18	Submitted
D14.6	Review of existing Citizen Science tools	12	Submitted
D14.7	Citizen observation training program, training delivery and evaluation, and impact assessment report	36	On track
D14.8	Collection Training sessions/presentations	44	On track
D14.9	Summary report of WP14	48	On track

WP14 OVERALL STATUS

Successes

All current deliverables are submitted, and are being circulated more broadly among the RI's and the ENVRI Community. Upcoming deliverables are on track. Tasks 14.1, 14.2, and 14.3 have all produced online products which are now in beta testing.

All products are applicable across RI's, and are being developed with international collaboration.

Issues and corrective actions

D14.6 required a delayed submission date due to conflicts with other deliverables and schedules, however this did not impact the overall timeline of the WP.

Plans for the next period

Further dissemination and testing of products from Tasks 14.1, 14.2, and 14.3 across different RI communities, and resultant deliverable reports. Further dissemination and discussion of the Citizen Science Toolkit (Task 14.4) among all RI's.

THEME 4 HIGHLIGHT ETHICS REPORT…