SEBASTIEN

Smarter liv**E**stock **B**reeding through **A**dvanced **S**ervices **T**ailoring **I**nnovative and multi-sourc**E** data to users' **N**eeds

Second Semester Activity Report

July – December 2022

Co-financed by the Connecting Europe Facility of the European Union

Agreement No. INEA/CEF/ICT/A2020/2373580

European Commission Health and Digital Executive Agency (HaDEA) **Connecting Europe Facility**	**Interim report**

1. INFORMATION ON THE ACTION

Grant Agreement Nº	INEA/CEF/ICT/A2020/2373580
Action Title (Art. 1 of G.A.)	SEBASTIEN
Action number (Art. 1 of the G.A.)	2020-IT-IA-0234

Author of the report

Name	Paola Nassisi, Alessandro D'Anca, Laura Conte, Antonio Aloisio
Position	COORDINATOR
Coordinator's Legal Name	FONDAZIONE CMCC – CENTRO EURO-MEDITERRANEO SUI CAMBIAMENTI CLIMATICI
Telephone Nº	+3908321902411
E-mail	paola.nassisi@cmcc.it

2. IMPLEMENTATION OF THE ACTION[1]

2.1. Overall completion of the Action

Planned Start/End date[2]		Actual Start/End date		Completion[3]
Jan 2022	Jun 2024	Jan 2022	Jun 2024	35%

2.2. Completion per activity/work package

Activity 1	Title[4]	Planned Start/End date[3]		Actual Start/End date		Completion
	Project Coordination and Management	M1	M30	M1	M30	40%
Milestone no	Title[3]	Planned date[3]		Actual date		Reached (Y/N)
2	Second progress report	M12		M12		Y

Activity 2	Title[3]	Planned Start/End date[3]		Actual Start/End date		Completion
	Outlining geospatial to livestock data gathering, processing and integration steps	M1	M18	M1	M18	66%
Milestone no	Title[3]	Planned date[3]		Actual date		Reached (Y/N)
3	Report on data sources	M11				

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[1] For Interim report: please describe the completion of the action until the end of the reporting period as specified in the Grant Agreement.

[2] As specified in Art. 2.2 of the Grant Agreement.

[3] The completion of the Action and of each activity/work package should be indicated as a percentage.

[4] As specified in the Grant Agreement.

Activity 3	Title[3]	Planned Start/End date[3]		Actual Start/End date		Completion
	Data platform for livestock management	M6	M27	M6	M27	10%
Milestone no	**Title[3]**	**Planned date[3]**		**Actual date**		**Reached (Y/N)**
No milestones expected						

Activity 4	Title[3]	Planned Start/End date[3]		Actual Start/End date		Completion
	Stakeholders involvement: from co-design to co-evaluation	M1	M30	M1	M30	30%
Milestone no	**Title[3]**	**Planned date[3]**		**Actual date**		**Reached (Y/N)**
No milestones expected						

Activity 5	Title[3]	Planned Start/End date[3]		Actual Start/End date		Completion
	Outreach and sustainability	M1	M30	M1	M30	40%
Milestone no	**Title[3]**	**Planned date[3]**		**Actual date**		**Reached (Y/N)**
No milestones expected						

Activity 6	Title[3]	Planned Start/End date[3]		Actual Start/End date		Completion
	Open Data and Services Exploitation Portal for the livestock sector	M1	M30	M1	M30	30%

Milestone no	Title[3]	Planned date[3]	Actual date	Reached (Y/N)
14	Open data policy report	M12	M15	N

2.3. Description of the implementation of the Action, including the actual status at the end of the Action (or of the reporting period) and possible deviations from the planned activities, and, if applicable, compliance with any relevant specific provisions as indicated in the Annex I of the GA

Activity 1 - Project coordination and management

Task 1.1: *Management of the Action (M1-M30)*
Task 1.2: *Financial Management (M1-M30)*

Description of activities

Main outputs achieved (as per GA and milestones):

- Second progress report

In addition, the following activities have been performed:
- Planning and coordination of monthly Activity Leaders meetings
- Planning and organization of the Project Management Board meetings (conference calls)
- Coordination of technical and scientific activities
- Monitoring of financial aspects of the Action with a particular focus on the correct management of budget transfer between partners UNITUS and NEATEC for the development of the project website
- Started the organization of the midterm General Assembly at CMCC Headquarters

Milestones:
- no. 2 - Progress report

Deliverables:
- None

Lead partner: CMCC
Other contributing partners: All

Activity 2 - Outlining geospatial to livestock data gathering, processing and integration steps

Task 2.1: Review and pre-selection of indicators/indices (M1-M3)
Task 2.2: Identify existing data sources and ways for access and extraction (M4-M9)
Task 2.3: Designing of new project-customized variables (M1-M6)
Task 2.4: Planning data elaboration and integration steps (M7-M18)

Description of activities

Main outputs achieved (as per GA and milestones):

- List of suitable data sources and of newly acquired data

- Brief report on the data sources identified to be used in Sebastien services

In addition, the following activities have been performed:
- Literature review to identify the most suitable data sources and indices for the Sebastien services.
- Improving and developing pipelines, using Machine Learning (ML), Artificial Intelligence (AI) and HPC system, to be used in the Sebastien services.
- Testing ML/AI models and indices, applied to big data analyses, to be used in the Sebastien services. Comparison with classical statistical methods.
- Research on IoT animal and environmental sensors. Developing a new version of IoT animal sensor. Developing an improved version in terms of battery management and GNSS signal from both software and hardware point of view. Designing the sensor to measure animal heartbeat and temperature through optical technologies. Ordering components for the air quality monitoring system.
- Developing IoT data collection server.
- Active participation in services definition. Interaction with others Activities to develop the four services envisaged in Activity 6.

Milestones:
- no. 3 - Report on data sources

Deliverables:
- D2.2 *List of suitable data sources and of newly acquired data*

Lead partner: UNITUS

Other contributing partners: AIA, UCSC, CMCC, NATURE4.0, CINECA

Activity 3 - Data platform for livestock management

Task 3.1: *Livestock sector and environmental data gathering (M6-M15)*
Task 3.2: *Data access layer (M10-M21)*
Task 3.3: *Database of environmental, vegetation and physiological conditions' indicators/indices (M13-M27)*

Description of activities

Main outputs achieved (as per GA and milestones):

- No main outputs expected for the second semester

In addition, the following activities have been performed:

- Meetings and telcos for the definition of the architecture related to the Sebastien data lake.
- The activity has started drafting the architecture according to the service requirements defined in Activity 6 and the datasets and indicators identified in Activity 2 (i.e., Deliverable 2.1 "List of indicators/indices to be proposed to stakeholders" and Deliverable 2.2 "List of suitable data sources and of newly acquired data"). On the basis of the HIGHLANDER platform, the first draft of the architecture has identified the main components: API, Catalog, MetaDB, Backend, Data Sources and Adapter/Drivers/Connectors. Extensions to the Highlander platform have been identified in order to deal with heterogeneous data sources (data portals, IoT streams, cloud storage backends, etc.). In particular, a new MetaDB component will be introduced in the architecture, new drivers/adapters for different data sources and extensions to the API.

Milestones:

- *None*

Deliverables:

- *None*

Lead partner: CMCC
Other contributing partners: CINECA, NATURE4.0, UCSC, UNITUS, AIA

Activity 4 - Stakeholders involvement: from co-design to co-evaluation

Task 4.1: *Stakeholders' engagement (M1-M30)*
Task 4.2: *Tailoring data, indicators and tools (M7-M23)*
Task 4.3: *Evaluating the services with stakeholders (M19-M30)*

Description of activities

Main outputs achieved (as per GA and milestones):

- No main outputs expected for the second semester

In addition, the following activities have been performed:

- *Ad hoc* interactions with the stakeholders were sought to gain insights on the input and output of each service, according to their needs and expectations.
- Meetings with the activities involved in developing services 2 and 3 to identify elements to submit to stakeholders. Scheduling of meetings and activities regarding services 1 and 4. During these meetings, the input and output proposed by the stakeholders were further discussed with the services development teams.
- Planning and drafting of the first online meeting with all the stakeholders to review the current progress of the four services.

Milestones:

- *None*

Deliverables:

- *None*

Lead partner: UCSC
Other contributing partners: UNITUS, CMCC, AIA

Activity 5 - Outreach and sustainability

Task 5.1: *Communication and Dissemination (M1-M30)*
Task 5.2: *Lessons learned: toward services sustainability and upscaling (M19-M30)*

Description of activities

Main outputs achieved (as per GA and milestones):

- Project video teaser

In addition, the following activities have been performed:

- Coordination of the Outreach Team and planning of periodic meetings
- Monitoring of project outputs (events, articles, workshops, etc.) for dissemination purposes
- Outreach Team Meeting (both in presence and online) about the project video teaser, held on July 5th at CMCC Headquarters in Lecce
- Updating the project website (publishing news, creating a page on IoT sensors)
- Updating and management of social channels
- Activities for the video teaser production:
  - preparation of all assets
  - recording of the speaker voice for the video
  - creation of the 2D animatic and contextual creation of blender files with the assets ready for each scene
  - transformation of the animatic into the final version of the video.

Milestones:

- *None*

Deliverables:

- D5.2 *Project video teaser*

Lead partner: UNITUS
Other contributing partners: All

Activity 6 - Open Data and Services Exploitation Portal for the livestock sector

Task 6.1: *Open Data Policy (M1-M12)*
Task 6.2: *Open Data Catalogue (M1-M30)*
Task 6.3: *Open Data and Services Exploitation Portal (M13-M27)*
Task 6.4: *Visualization and dissemination tools (M13-M27)*

Description of activities

Main outputs achieved (as per GA and milestones):

- First version of the specification documents for the services

- Draft of Milestone MS14 "Open Data Policy report".

- Draft of Deliverable D6.1 "Compiled descriptive catalogue of background and foreground data expected and suitable for the Open Portal".

In addition, the following activities have been performed:

- Periodic meetings for functional analysis, definition of services and recognition of datasets necessary for the services organized by CINECA with the participation of CMCC, UNITUS, AIA, and UCSC.

- As a result of the analysis of services conducted during the telcos, the first version of the specification documents was produced, one for each of the 4 services. Additional work required to complete specification of services.

- Start of the UI/UX design activity of the web tools for Service 2 (Intensive farming risk management under climate extremes) and Service 3 (Extensive farming management and feed availability).

Milestones:

- *no. 14 - Open data policy report (postponed to March 2023)*

Deliverables:

- *D6.1 - Compiled descriptive catalogue of background and foreground data expected and suitable for the Open Portal*

Due to some delay in the definition of Service 4, the delivery of MS14 "Open Data Policy report" and consequently of D6.1 "Compiled descriptive catalogue of background and foreground data expected and suitable for the Open Portal" has been postponed until M15 (March 2023).

Lead partner: CINECA

Other contributing partners: CMCC, UNITUS, AIA, UCSC, NATURE4.0, NEATEC

2.4. Conclusions on results of the Action, including the impact of the possible deviation on 1) the objectives of the action, 2) the completion of the planned activities and 3) the cost-breakdown

In general, the Action is regularly progressing without any significant deviations affecting the objectives, planned activities or cost-breakdown.

All tasks are on time and all milestones have been properly delivered, except for Milestone 14 and *Deliverable 6.1 - Compiled descriptive catalogue of background and foreground data expected and suitable for the Open Portal* due to some delays in the final definition of services.

In fact, there have been some issues in collecting source data for Service 4 related to animal diseases and parasites and, since the Open Data policy is strictly related to the output products of the services, the milestone deadline has been postponed <u>by 3 months (M15)</u> in order to solve this issue.

3. VISIBILITY OF UNION FUNDING

What measures have been taken to publicize the Action, including EU funding (GA II.7.1)?

During the second semester UNITUS published the article "In vitro evaluation of immunomodulatory activities of goat milk Extracellular Vesicles (mEVs) in a model of gut inflammation" (https://doi.org/10.1016/j.rvsc.2022.09.021) whose research was funded also by Sebastien.

In October, the SEBASTIEN project was promoted by AIA at the following events in conjunction with the dissemination of the LEO project:

- Teramo, 15th October, One Health Award – "LEO project: Italian livestock heritage in a single digital platform for the ONE HEALTH objective"
- Montichiari (BS), 21st October, 94th edition FAZI– At the ANAFIBJ technical conference "SENSORS AND DAIRY COW SELECTION", the work: "NEW SENSORS: tools and technologies for a state-of-the-art milking control service" was presented, with the aim of showcasing the new technologies to be used for milking control and the new parameters defined by the LEO project
- Montichiari (BS), 22nd October, 94th edition FAZI – During the final ALL4ONE conference, 'Data Utilisation – Livestock Environment Opendata' was presented, showcasing examples of the practical use of OPEN DATA

On December 22nd, CMCC and UNITUS attended the joint HIGHLANDER-SEBASTIEN-AGRITECH webinar on human and animal wellbeing.

The Action, the funding Agency, and the EU logo have been promoted throughout the various activities carried out also in the second semester of the project, including the official website of the Action and partners' websites, leaflet, various project templates and communication tools.

4. OTHER SOURCES OF EUROPEAN UNION FUNDS

If applicable, provide information about other sources of EU funds (CEF, ERDF, Cohesion Fund, H2020, TEN, EEPR, EIPA, etc.) used for the action (including previous or subsequent phases not covered by the Grant Agreement).

Not applicable.

5. COMPLIANCE WITH EU LEGISLATION

Where relevant, provide information on the compliance with EU legislation regarding other matters (notably public procurement, competition, regulatory matters, etc…).

During the second semester, there haven't been any relevant compliance matters to report.

6. COMPLIANCE WITH CORE PLATFORM AND POLICY OBJECTIVES

Information on the compliance with the core service, including conformity with relevant technical specifications and alignment with the policy objectives of the Digital Service Infrastructure (as specified in the relevant CEF Telecom Work Programme).

No activities related to compliance have been carried out yet.

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