Professionals experience transfer to practice:
Living Labs

WP3.4
Target audience (mark boxes with X as appropriate)

<table>
<thead>
<tr>
<th>AA Joint Secretariat</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Partnership</td>
<td>X</td>
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<tr>
<td>Associated partners</td>
<td>X</td>
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<tr>
<td>Media</td>
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<td>Public</td>
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Means of delivery (mark boxes with X as appropriate)

<table>
<thead>
<tr>
<th>E-mail</th>
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<tbody>
<tr>
<td>Website</td>
<td>X</td>
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<tr>
<td>Social media</td>
<td>X</td>
</tr>
</tbody>
</table>

Lead partner for deliverable: SAMS
Contributing partners: ISC, NUIG, CEVA, AGROCAMPU, ALGA+, CEVA, CTAQUA
Due date of deliverable: March 2020
Actual submission date: May 2020
## CONTENTS

1. **Introduction** .................................................................................................................. 4  
2. **NUIG (Ireland)** ............................................................................................................. 5  
   2.1 Introduction ..................................................................................................................... 5  
   2.2 Summary of the event ...................................................................................................... 5  
   2.3 Programme .................................................................................................................... 6  
   2.4 Photographs ................................................................................................................... 6  
3. **ISC (Ireland)** .................................................................................................................. 9  
   3.1 Introduction .................................................................................................................... 9  
   3.2 Participants and action description ................................................................................. 9  
   3.3 Photographs .................................................................................................................. 10  
4. **ALGA+ (Portugal)** ......................................................................................................... 12  
   4.1 Introduction .................................................................................................................... 12  
   4.2 Photographs .................................................................................................................. 13  
5. **IPMA (Portugal)** ............................................................................................................ 15  
   5.1 Introduction .................................................................................................................... 15  
   5.2 Programme .................................................................................................................... 15  
   5.3 Photographs .................................................................................................................. 16  
6. **CEVA + AGROCAMPUS (France)** ................................................................................ 19  
   6.1 Introduction .................................................................................................................... 19  
   6.2 Summary of the morning presentations ....................................................................... 20  
   6.3 Summary of the afternoon activities ............................................................................. 20  
7. **CTAQUA (Spain)** ........................................................................................................... 23  
   7.1 Introduction .................................................................................................................... 23  
   7.2 Programme .................................................................................................................... 25  
   7.3 Photographs .................................................................................................................. 26  
8. **WP3.4 Summary** .......................................................................................................... 28
1 Introduction

WP3.4 of the INTEGRATE project was a partner to WP3.3 in that participants and stakeholders of the project who were involved in workshops and other activities were to be invited to visit the living labs that were being set up by respective project partners. It was an ongoing aim of the project that as much practical information could be disseminated as possible from the work that was being carried out on these pilot actions. This action would allow a demonstration of the work that was being carried out on the pilot actions, while garnering practical feedback and thoughts on IMTA from the visitors. Ultimately this worked towards a goal of dissemination and open feedback about the systems and where IMTA generally was heading.

All partners other than SAMS were involved in this activity, and it is worth noting at this point that as SAMS were not hosting a pilot action as part of the project, there was no requirement to hold a visit under WP3.4. That said, SAMS routinely provides access to its experimental facilities (including its seaweed farm) to interested parties from government, academia and the industry.

The summary of requirements under the action is noted below;

<table>
<thead>
<tr>
<th>Action Nº 4</th>
<th>ACTION TITLE: Professionals experience transfer to practice: living labs</th>
<th>Start month</th>
<th>End month</th>
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<tbody>
<tr>
<td></td>
<td>Action description (500 characters)</td>
<td>January 2019</td>
<td>March 2020</td>
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<tr>
<td></td>
<td>Undertake several technical visits to IMTA facilities across different regions which will demonstrate current IMTA developments to a wider group of professionals, end-users and representatives of public bodies. This action would be related to pilot actions performed in WP4. These living labs will be organized across participant regions and addressed to stakeholders and industry. Findings will be presented and the discussion of IMTA best-practices can be shared.</td>
<td></td>
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<table>
<thead>
<tr>
<th>Deliverables</th>
<th>Outputs title: Eco-efficient IMTA practices and technologies: living labs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Outputs description (250 characters)</td>
</tr>
<tr>
<td></td>
<td>Living Labs will be developed in facilities where IMTA systems have been implemented. These living labs will be events to demonstrate benefits related to resource efficiency and environmentally sustainable new technologies that IMTA practices implies</td>
</tr>
<tr>
<td></td>
<td>Expected results title</td>
</tr>
<tr>
<td></td>
<td>Expected results description (250 characters)</td>
</tr>
<tr>
<td></td>
<td>Living labs will target to 200 attendees from across AA in order to demonstrate practical experiences of resource efficiency techniques in aquaculture, and begin to overcome barriers related to the possibility of undertaking a more sustainable sector</td>
</tr>
</tbody>
</table>

Each partner produced a short summary of attendees, and further information as to the format for their visit. This is noted below and a summary of the events is provided at the end.
2 NUIG (Ireland)

2.1 Introduction

On Friday 29th November 2019 NUIG held its Living Lab in Carna Research Station, Mweenish, Co. Galway. The aim was to introduce the recirculating IMTA systems, shown in the schematic below, to participants, and demonstrate their use as experimental units for fundamental IMTA research.

2.2 Summary of the event

- Students and staff from NUIG were welcomed to Carna Research Station and shown around the facility. This general introduction was followed by an introduction to the temperature-controlled lab in which the IMTA recirculating systems are located. Jessica Ratcliff gave a short introduction to project INTEGRATE and the thinking behind the design and implementation of the systems. Consideration of design features were discussed, along with the functioning of the system as a two species IMTA (fish and algae), with additional biofiltration using biobeads in a sump tank.
- Following the introductory talk was a Q&A session to address more specific questions regarding IMTA in general, and system set-up in particular.
- The afternoon session involved a practical run-through of maintenance techniques and readying one of the systems for the introduction of sponges, in order to perform a preliminary test of system suitability for sponge culture and give the participants some hands-on experience.
2.3 Programme

10.00  Welcome and tour of Carna aquaculture facilities.
10.30 – 12.00  Visit to the recirculating IMTA lab: Design and function of the systems
12.00 – 12.30  Coffee
12.30 – 1.30  Q & A
14.30 – 16.30  Establishing new species in the systems

2.4 Photographs

The group in Ryan Institute Carna’s reception
Explaining the functioning of the recirculating systems

The systems with the new species introduced
Sponges under the ‘fish tank’ outflow
3 ISC (Ireland)

3.1 Introduction

On the 4th March 2019 a Living lab action was carried out at the Lehenagh IMTA farm, Connemara, Co. Galway managed by the Marine Institute. A mix of different institutions took part on this morning action (see above).

In the project INTEGRATE the Irish Seaweed Consultancy is cultivating *Himanthalia elongata* at the farm. Other species are being cultivated alongside, such as: Salmon, lobsters and the seaweed species (*Alaria esculenta* and *Saccharina latissima*). The cultivation of HE is part of the work carried out in WP4/ pilot action 3: “Testing new eco-friendly technologies and high value seaweeds applied to IMTA” in the INTEGRATE project.

An oral introduction to seaweed cultivation was given to the participants, followed by the opportunity to measure length and weight of the seaweeds growing on the structures. An overview of the Integrate project was also presented.

3.2 Participants and action description

The participants to this action were from three different organisations.

1. Redrose Developments, **Seaweed company**
2. Lady’s Secondary School (Belmullet, Co Mayo), **transitional year students**
3. Van Hall Larenstein, University of Applied Sciences, Netherlands, **3rd level students**
4. Marine Institute, **Researchers from the MI**

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**Materials used and means of delivery**

Scales, meters, paper and pencils.
3.3 Photographs

Photo 1: Seaweeds growing on the farm.

Photo 2: Demonstration of the seaweed growth in some of the structures.
Acknowledgements: This research has been carried out with the support of the Marine Institute’s Aquaculture Research Section. Photos courtesy of Tom McDermott.
4 ALGA+ (Portugal)

4.1 Introduction

ALGA+ undertook the following activities on January 30, 2020 in Ílhavo:

Living Labs - ALGAplus, Bolho da Malhada.
Activity within the European project INTEGRATE "Integrated Multitrophic Aquaculture (IMTA): an innovative and sustainable solution for the Atlantic Region".

ALGAplus, the only company in Europe to do commercial production in a multitrophic system on land, invites you to get to know in a real context how the sustainable integration of macroalgae cultivation and fish production works.

With the participation of partners from Portugal, Spain, Ireland, France and the United Kingdom, INTEGRATE seeks to improve the eco-systemic aspects of integrated aquaculture, focusing on the synergies that result from the joint production of different aquaculture species, namely the bio mitigation process. At the same time it works to strengthen collaborative networks between the academic / scientific environment, companies and government organizations, in order to convert innovative sustainable aquaculture solutions into a reality from a technical, legal and administrative point of view. The project's objectives are also to communicate the principles and benefits of IMTA, the consolidation of sustainable products in the fisheries sector and to contribute to the fulfillment of the EU's regional objectives, which allow the efficient use of resources. In short, the promotion of green and blue aquaculture growth.

IMTA Aquaculture in Ílhavo, PT (ALGAplus) / Photo: ALGAplus
4.2 Photographs
Photo 1-3: Visitors to the open day, with interview being conducted at bottom
5 IPMA (Portugal)

5.1 Introduction

On 25 October 2019, IPMA organized an IMTA Practical Workshop on IMTA. The training course counted with the attendance of 7 producers and 30 mid-level Erasmus students and 8 of their teachers from Portugal, Spain, Italy and Greece at EPPO, Olhão.

5.2 Programme

**Trabalho Laboratorial ao Vivo**

**Experiência IMTA, Olhão, Portugal**

**Data:** 25 de Outubro de 2019

**Local:** Estação Piloto de Piscicultura de Olhão - EPPO

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:00 – 14:15</td>
<td>Recepção dos produtores participantes</td>
</tr>
<tr>
<td>14:15 – 14:30</td>
<td>Emília Cunha (IPMA) – Cultivo de ostras em tanques de produção de peixes</td>
</tr>
<tr>
<td>14:30 – 17:30*</td>
<td>Trabalho prático com Hugo Quental/Gabriela Oliveira (IPMA) no cultivo de ostras em tanques de produção de peixes</td>
</tr>
<tr>
<td>15:30 – 15:40*</td>
<td>Recepção dos alunos do Projeto Erasmus (agrupamento de escolas João de Deus. Faro)</td>
</tr>
<tr>
<td>15:40 – 16:00*</td>
<td>How to feed the world in a changing climate (palestra para a juventude)</td>
</tr>
<tr>
<td>16:00 – 17:30</td>
<td>Visita à EPPO e observação do trabalho prático a ser realizado para o cultivo de ostras em tanques de produção de peixes</td>
</tr>
</tbody>
</table>

* sessões paralelas
5.3 Photographs
Photo 1-5: Summary of the living lab visit
6 CEVA + AGROCAMPUS (France)

6.1 Introduction

Within the WP3, one of the capitalization actions, is the experience transfer to practice via living labs (3.4). This action undertakes several technical visits to IMTA facilities across different regions which will demonstrate current IMTA developments to a wider group of professionals, end-users and representatives of public bodies. This action would be related to pilot actions performed in WP4. These living labs have to be organised across participant regions and addressed to stakeholders and industry. Findings should be presented and the discussion of the IMTA best practices can be shared.

French partners AGROCAMPUS Ouest and CEVA organized one French Living Lab at the Agrocampus Ouest Marine Station located at Beg Meil, Brittany, France. This living lab took place on September 17, 2019 and gathered 20 people (government representatives, professional organizations, finfish and seaweed producers and processing industry)

Organisation Committee

Rémy Luthringer (Agrocampus Ouest)
Marie Lesueur (Agrocampus Ouest)
Hervé Le Bris (Agrocampus Ouest)
Bertrand Jacquemin (CEVA)

Schedule of the Living Lab

This one day event was organised with two periods (see Program)

In the morning from 9.30am to noon, different talks were presented;

- The organisation and aims of the living labs
- A reminder of what IMTA is
- The INTEGRATE project (organisation, objectives and expected issues)
- A short presentation of the different pilot actions of INTEGRATE

In the afternoon, from 2.00pm to 4.00pm, we presented more information about the practical approaches of IMTA.
6.2 Summary of the morning presentations

Welcome and presentations
Rémy Luthringer (Agrocampus Ouest) welcomed the attendees and introduced the event

What is IMTA?
Bertrand Jacquemin (CEVA) presented the different criteria and principles of the IMTA concept

Presentation of the INTEGRATE project
Marie Lesueur (Agrocampus Ouest) presented the INTEGRATE project: Funding, organisation, objectives and work plan. Marie then presented the main results from the WP6 action.

IMTA essays within the INTEGRATE project
Bertrand Jacquemin (CEVA) presented the different pilot actions of INTEGRATE WP4 and preliminary results of CEVA’s assays

6.3 Summary of the afternoon activities

Visit to the Marine Station
Rémy Luthringer (Agrocampus Ouest) presented the aquaculture platform at Beg Meil. We quickly discussed technical aspects, particularly regarding seawater circulation, water pumping and waste treatments. We then presented the different projects being undertaken at the laboratory, and finally the phytoplankton production process was introduced in order to explain the INTEGRATE pilot action.

Presentation of the Agrocampus Ouest’s Pilot Action
A presentation of the pilot action was made by Rémy Luthringer. First, the objective of the pilot action – demonstrate the trophic relationship in an oyster-sea cucumber-seaweed indoor system. Then the experimental design was presented as follows:

- Water circulation between the different compartments: setting up a food web between the different organisms
- Timing of samplings: duration and kinetics of the experiment
- Physical and chemical parameters analysed
- Presentation, interpretation and discussion of the results
Discussion about the technical options to integrate seaweeds in other traditional aquaculture systems

Bertrand Jacquemin (CEVA) presented the different techniques for seaweed cultivation in combination with other shellfish production. A discussion then took place with attendees about the opportunities for the shellfish and finfish sectors.

- Diversity of seaweeds (red, green, brown) – which to choose?
- Life cycle – the choice between sexual reproduction and fragmentation

There was a demonstration of miniaturized cultivation systems that can be used by shellfish growers. The idea was to show them that the tools/materials they already use can be used for growing algae, which implies a lower investment to develop this new production to their main activity.

- Kuralon and mussel ropes: *S. latissimi*
- Oyster pockets and mussel rope: *P. purpurea*

Finally, the activity – observation of the different stages of the seaweed life cycle (macroscopic sporophytes and microscopic phases)

- *S. latissima* Gametophytes and sporophytes
- *P. purpurea* conchoceli (fertile and vegetative) and young blades
<table>
<thead>
<tr>
<th>TIME</th>
<th>TITLE</th>
<th>SPEAKER</th>
</tr>
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<tbody>
<tr>
<td>09:30</td>
<td>Welcome / Coffee</td>
<td>Rémy LUTHRINGER (Agrocampus Ouest)</td>
</tr>
<tr>
<td>10:00</td>
<td>Introduction and schedule of the Living Lab</td>
<td>Bertrand JACQUEMIN (CEVA)</td>
</tr>
<tr>
<td>10:15</td>
<td>What is IMTA?</td>
<td>Hervé LE BRIS / Marie LESUEUR (Agrocampus Ouest)</td>
</tr>
<tr>
<td>10:30</td>
<td>Presentation of INTEGRATE</td>
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<tr>
<td>11:00</td>
<td>Coffee break</td>
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<tr>
<td>11:30</td>
<td>AMTI’s experiments within the INTEGRATE project</td>
<td>Bertrand JACQUEMIN (CEVA)</td>
</tr>
<tr>
<td>12:00</td>
<td>Lunch</td>
<td></td>
</tr>
<tr>
<td>14:00</td>
<td>WORKSHOPS</td>
<td></td>
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<tr>
<td></td>
<td>• Agrocampus Ouest’s pilot action: IMTA system combining oyster, sea cucumber and seaweed (30 min)</td>
<td>Rémy LUTHRINGER (Agrocampus Ouest)</td>
</tr>
<tr>
<td></td>
<td>• Visit of Agrocampus Ouest facilities (30 min)</td>
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<td></td>
<td>• Technical solutions to integrate seaweed cultivation in a traditional aquaculture system (1h)</td>
<td>Bertrand JACQUEMIN (CEVA)</td>
</tr>
</tbody>
</table>

Schedule of the Living lab visit
7 CTAQUA (Spain)

7.1 Introduction

CTAQUA organised their WP3 Thematic Workshop & Living Lab on Tuesday October 1st, 2019. In order to take advantage of the event to communicate the results of the INTEGRATE project to a wider public, we also invited representatives from local Andalusian and national Spanish media and hosted an “aperitivo with the media” as part of WP2 communication media activities.

Purpose of the communication action

The main aims of the event were the following:

1. To introduce eco-efficient innovative technology to aquaculture via professionals’ knowledge transfer: different invited experts from industry, academia, and public bodies presented how aquaculture can contribute to the circular economy through sustainable practices, such as integrated multi-trophic aquaculture (IMTA);

2. Professionals’ experience transfer to practice: technical field visit to the INTEGRATE Pilot Action 3 site in Puerto Real to demonstrate benefits related to resource efficiency and environmentally sustainable new technologies that IMTA practices imply;

3. Raise public awareness of IMTA benefits and enhance knowledge of IMTA among the aquaculture industry, academia, public bodies and the general public.

In general, the idea was to base the day on the INTEGRATE project but widen the reach by inviting experts from multiple disciplines and sectors, including other international projects related to the topic, in order to exchange knowledge and experiences about sustainable aquaculture practices and innovative technologies in this regard in general.

The programme began with the thematic workshop in the morning: following a few general presentations about INTEGRATE and about our pilot action by CTAQUA, Macarena Algarín, the owner of the “estero” (the aquaculture unit of the decommissioned salt facility), spoke about: IMTA in the southern Atlantic Region: advantages of its implementation - the history of the salt industry in this area and the benefits of converting it into sustainable aquaculture.
Subsequently, we had 2 working groups, which included 3 brief presentations from experts from different sectors and projects followed by discussions. The topics of the working groups were: 1. “Eco-efficient practices in aquaculture, potential synergies with the environment and its impact on the circular economy”; 2. Marine spatial planning: new opportunities for sustainable aquaculture”

Following the thematic workshop, we transferred to our Pilot Action site and carried out the living lab, i.e. technical field visit. We returned to CTAQUA for an aperitivo, including some of the products that a CTAQUA colleague is developing in other eco-efficient projects, transforming by-catch of fisheries into novel food products, for example. We also served fresh oysters from our Pilot Action!!

**Description of the materials used and means of delivery**

Each participant received a welcome pack, i.e. the INTEGRATE project folder with the printed material, including the programme of the day, the pilot action 3 leaflet, project factsheets (general and WP3 and WP4 since these were the most relevant to this event), and a satisfaction survey to be completed after the event.
### 7.2 Programme

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>9.00 – 9.30</td>
<td>Recepción de participantes</td>
</tr>
<tr>
<td>9.30 – 9.45</td>
<td><strong>Bienvenida.</strong> Juan Manuel García de Lomas (CTAQUA)**</td>
</tr>
<tr>
<td>9.45 – 10.00</td>
<td><strong>Presentación del Proyecto INTEGRATE sobre Acuicultura Multitrofica Integrada (IMTA). Explicación de dinámica del Living Lab.</strong> Mertha Dunbar y Erik Malta (CTAQUA)</td>
</tr>
<tr>
<td>10.00 – 10.15</td>
<td><strong>IMTA en la región suratlántica: ventajas de su implantación (CASO PRÁCTICO) - Macarena Algarín (Estero Natural)</strong></td>
</tr>
</tbody>
</table>
| 10.15 – 10.45| **GRUPO DE TRABAJO 1: Practicas ecoeficientes en acuicultura, sinergias potenciales con el medio ambiente y su efecto en la economía circular.** Juan Martín Bermúdez (SALARTE), Gonzalo Muñoz (UCA), Javier Leal (I note)  
**Moderadora: María de la Mar Álvarez (CTAQUA)** |
| 10.45 - 11.15| **Pausa café**                                                        |
| 11.15 – 11.45| **GRUPO DE TRABAJO 2: Planificación espacial marina: nuevas oportunidades para la acuicultura sostenible**  
Carmen Colelo (FEUGA), Laura Ribeiro (IPMA), Cristina Orden (PTEPA)  
**Moderadora: Myriam Retamero (CTAQUA)** |
| 12.00 – 14.00| **Living Lab**                                                        |
|              | Transferencia de experiencias IMTA en entornos productivos reales.  
Visita a la Acción Piloto de CTAQUA en el Estero Natural, Salina Belén, Puerto Real, donde se podrá comprobar de primera mano cómo funciona un sistema multitrofico en una instalación en tierra donde confluye el cultivo de doradas (Sardonida aurata), ostión (Megaperna gigas) y algas (Ulva spp. y Corallina spp.)  
**Desplazamiento facilitado por la organización del evento.** |
| 14.30 – 16.00| **Aperitivo en CTAQUA**                                               |
|              | Además del aperitivo ofrecido por Catering Sancho, se dará a degustar productos de estero cedidos por Estero Natural, Mar Cristal Maritum y Comercial Angulas de Trebujena. |
7.3 Photographs
Photo 1-3: Selected photos from the WP3.4 event
WP3.4 Summary

Each partner successfully delivered a living lab visit as required in the project documents, and there were a wide range of attendees at the event from local and national governments, industry as well as interested academics and students.

The aim in the feedback from this action was that, in describing the pilot actions they were involved in, each partner had the opportunity to build an informal discussion with interested parties about their experience of IMTA, as well as using it as an opportunity to get feedback from other professionals about their experience and thoughts, which appears to have happened in all the events.

It can be concluded that the series of living lab visits were successful in achieving the aims of the WP, which were to demonstrate the practical experiences of resource efficient techniques in aquaculture.

This work also parallels the work of WP3.3, where the eco-efficient workshops sought to disseminate where IMTA could assist the aquaculture sector in each country with its desire for improvements with capacity and ecologically beneficial techniques.