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Intelligent Fish feeding through Integration of ENabling technologies and Circular principle

Grant Agreement (GA) No: 818036

D7.4 - Champions Report

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1.1	June 22, 2023	Dominique Durand	Final version after Champions' meeting
1.2	Aug 30, 2023	Tamas Bardocz	Added missing information

Disclaimer

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Contents

1 Champions and their role in iFishIENCi

Champions are strong leaders designated to ensure that their areas of responsibility (cross-cutting priorities) are fully addressed in an integrated manner within and across all Work Packages (WP), throughout the entire project. In iFishIENCi, **five champions** have monitored the progress of WPs and of the project as a whole, towards the expected impacts and based on the KPIs related to their area of responsibility.

The five champions and their areas of responsibility are the following:

Table 1. Champions and areas of responsibility

Areas of responsibility	Name	Partner
Policy	Marie Shrestha *mshrestha@ttz-bremerhaven.de*	TTZ
Innovation	Björgolfur Hávardsson *bjorgolfur@seafoodinnovation.no*	NCE
Valorisation and circularity	Catherine Boccadoro *cabo@norceresearch.no*	NORCE
International Cooperation	2018-2022 :Lola Rodriguez/Xavier Ponte Font (Leitat then NORCE) xavier.ponte@norceresearch.no, From 2022 : Dominique Durand (durand@covartec.eu)	LEITAT / NORCE/COVARTEC
Responsible Research and Innovation - RRI	Dorothy Dankel *dorothy.dankel@uib.no*	UiB

Their main role is:

- To ensure that their area of responsibility is fully addressed in an integrated manner within and across all WPs.
- To maximize the impact of the project.
- To work across all WPs ensuring that all findings, activities, etc. relevant to their domain of action would be valorised (independently of formal deliverables and of the WP timelines).
- To identify new opportunities for the project relevant to their domain.
- To bring in suggestions and ideas to the consortium to brainstorm around relevant matters in their domain.

2 Report per sector of action

2.1 Policy

2.1.1 Status of actions and achievements

	CONTRIBUTION TO EXPECTED IMPACTS (E.I) & IFISHIENCI REQUIREMENTS (IF EXPLICIT IN THE DOA)	ACTION TO BE TAKEN & PARTNERS RESPONSIBLE FOR THE ACTION	KPIS	STATUS
	CONTRIBUTE to POLICY MAKING			
1	Contribution to Expected Impacts (E.I): ***E.I.7****. Contribute to policymaking in research, innovation and technology*. & Overview of Research, Innovation and Technology Policy	Assess link with Green deal / Farm to Fork Strategy Team involved: Task4.6, WP6 leader, Innovation Champion, STM and iFIshIENCi coordinator		Along the iFishIENCi project, 3 complementary Reports on regulatory framework and requirements (D4.12, D4.13 and D4.14) contributed to Identification and assessment of Legal, responsible farming standards, certification schemes, Ethical, Environmental, and H&S Requirements.
2	Contribution to Expected Impacts (E.I): ***E.I.7****. Contribute to policymaking in research, innovation and technology*. &	1. Define which iFishIENCi content is relevant to policy-making 2. Identify the right timing to contribute to policy making and to address policy-makers	**KPI 1**. At least one conversation with DG MARE about possible contribution of iFishIENCi to upcoming campaign	**KPI 1 >> achieved** Following the Aquaculture Going Circular event organised by iFishIENCi in November 2021, and the publication of Policy Recommendations For a More Circular Aquaculture in February 2022, iFishIENCi was in contact with DG MARE. A2 - Blue

	Non-confidential results to be made available to EU: support informed decisions in policy making	3. Collection of results across the project 4. Prepare message (how to tell them?) / Policy briefs Team involved: WP5 leader, RRI champion, C&V champion, STM		Economy Sectors, Aquaculture and Maritime Spatial Planning: Birgit van Tongelen, Senior Expert Aquaculture to contribute to the toolbox to support the implementation of the Strategic guidelines for a more sustainable and competitive EU aquaculture before the creation of the EU Aquaculture Assistance Mechanism (AAM) in June 2022.
			KPI 2. At least one conversation with national aquaculture authorities about iFishIENCi results	**KPI 2 >> achieved** Presentation by VITAFORT of iFishIENCi work and results, including tasting of fishes) to Deputy Director of Department of Livestock and Fisheries – of the Laotian Agricultural Ministry and Vice Dean, Faculty of Fisheries, Head Department of Aquatic Environment and fish diseases, Vietnam National University of Agriculture in Vientiane (Laos) on 14-15.11.2022. Presentation of iFishIENCi Policy Recommendations For a More Circular Aquaculture at the XVIII Congreso Nacional de Acuicultura in Cadiz (Spain) on 22.11.2022 by LEITAT (https://www.seacongresos.org/files/libro-mano-congreso-cna-prueba-4.pdf). Meeting of AAR with politicians from District Dithmarschen/district assembly in

				Heide (Hotst/Germany) including Tour through AAR facilities on 14.03.2023.
			KPI 3. Two policy briefs to national and EU policy-makers	**KPI 3 >> achieved** Publication of Policy Recommendations For a More Circular Aquaculture in February 2022 Pending publication of policy brief on integration of Internet of Things (IoT) and Artificial Intelligence (AI) based solutions in aquaculture monitoring and feeding technology (publication foreseen for Sep-Oct 2023)
3	Contribution to Expected Impacts (E.I): ***E.I.7****. Contribute to policymaking in research, innovation and technology*. & Set new standards based on new products	1.To define how the KERs can become new standards for aquaculture Team involved: WP5 leader, RRI champion, C&V champion, Innovation Champion, STM	**KPI 4**. Contribute to at least one standard for aquaculture	**KPI 4 >> achieved** Evaluation of water turbidity level (NTU, FNU units) added as units in the UN-CEFACT Code List (EGM) Radio power strength in wireless transmissions (dBm, dBW) added as units in the UN-CEFACT Code List (EGM)

4	Contribution to Expected Impacts (E.I): Contribution to on-going implementation EU/international policies: Blue Growth, common fisheries policy, marine strategy framework directive, EU biodiversity, FOOD 2030, Atlantic Ocean Research Alliance,…	1. Support mapping of policy makers (T6.4) 2. Assess regulatory barriers 3. Tailor made messages (circularity, feed, iBoss) Team involved: WP4 leader, WP6 leader, RRI champion, C&V champion	**KPI 5.** Gaps and opportunities analysis to be included in Task 4.6 Definition for circularity, zero waste and sustainability concepts within aquaculture.	**KPI 5 >> achieved** Gaps and opportunities analysis described in D4.13 and D4.14
COLLABORATION WITH SISTER PROJECTS & BEYOND				
5	Contribution to Expected Impacts (E.I): **E.I.1.** Demonstrate that investment in sustainable aquaculture research and innovation leads to the creation of new value chains, markets, growth and jobs in coastal, offshore and landlocked areas; *E.I.3. Contribute to the creation of improved sustainable aquaculture systems and implement productive and resilient aquaculture practices that maintain healthy aquatic ecosystems and strengthen capacity for adaptation to climate change, by 2020 (UN*	**1.** To identify what could be done jointly with sister projects to address policy contribution. Team involved: WP4 Leader, C&V champion, WP6 Leader & RRI champion, communication manager	**KPI 6.** One joint meeting with sister projects to discuss about potential joint actions on policy contribution Harmonised dissemination activities with sister projects on the main aquaculture events.	**KPI 6 >> achieved** The iFishIENCI Policy Recommendations For a More Circular Aquaculture was endorsed by H2020 AquaIMPACT[1], H2020 AquaVitae[2], H2020 ASTRAL[3], H2020 FutureEUAqua[4], H2020 GAIN[5], H2020 IMPAQT[6], H2020 NewTechAqua[7]

	SDG 2); and *E.I.7. Contribute to policymaking in research, innovation and technology*.			
6	Contribution to Expected Impacts (E.I): **E.I.1**. Demonstrate that investment in sustainable aquaculture research and innovation leads to the creation of new value chains, markets, growth and jobs in coastal, offshore and landlocked areas & *E.I.7. Contribute to policymaking in research, innovation and technology*. & Link to WP6 & WP7	**1.** To identify other EU projects addressing circularity and smart aquaculture to look for potential links and building on. Team involved: WP4 Leader, C&V champion, Innovation Champion, STM	**KPI7.** Table with the identification of projects and links GAIN, iFishIENCi and IMPAQT implemented Horizon4Aquaculture, a three-day online event — 15th, 22nd and 29th June 2021.	**KPI 7 >> achieved** Apart from the H2020 sister and sister projects *(AquaIMPACT, AquaVitae, ASTRAL, FutureEUAqua, GAIN, IMPAQT and NewTechAqua)*, iFishIENCi was in contact with various organisations and persons: *Evagoras Isaias, IsaiaSEA.com, Cyprus; Mohammad Nadjib, INVENDO Akuakultur, Indonesia; Abderrahim Ouaach, Polydisciplinary Faculty of Larache, Abdelmalek Essaadi University, Morocco; Tamara Rubilar, CESIMAR-CCT CENPAT CONICET (Argentina); Koukaras Konstantinos, Centre for Research & Technology, Greece; Benoît Wuatelet, Blue Economy Team leader – SwitchMed, Department of Environment, United Nations Industrial Development Organization; Luis Poersch, Federal University of Rio Grande, Institute of Oceanography, Brazil)*, who endorsed the iFishIENCI Policy Recommendations For a More Circular Aquaculture.

[1] AquaIMPACT project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 818367.
[2] AquaVitae project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 818173.
[3] ASTRAL project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 863034.
[4] FutureEUAqua project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 817737.
[5] GAIN project project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 773330.
[6] IMPAQT project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 774109.
[7] NewTechAqua project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 862658

2.1.2 Lesson-learned

Policy Support as cross-cutting priority in iFishIENCi has been integrated within and across work packages throughout the entire project. This strategy enabled iFishIENCi to implement effective and efficient collaboration with sister projects & beyond and to contribute to Policy Making for aquaculture at European level.

2.1.3 Recommendations

As stated in the iFishIENCi Policy Recommendations For a More Circular Aquaculture, following recommendations aim to ensure regulators, officials, and the European Commission can support actions to make aquaculture more circular:

1. **Define Circularity in aquaculture**: common definition, quantifiable indicators to measure sustainability
2. **Define a common methodology to measure circularity in aquaculture**: circularity indicators, report of circularity indicators, display of circularity indicators in final products
3. **Improve circularity in aquaculture production** by:
    3. Increasing Circularity in Feed production: resource efficiency of production, circularity of ingredients, circularity of feeding, common KPIs, holistic approach of the whole value chain
    4. Valorise aquaculture wastes (effluent and sludge): aquaculture systems with high waste valorisation potential, mapping of waste flows, valorisation of waste streams
4. **Encourage sectorial and cross-sectorial co-governance**: review national legislations and EU regulation, cooperation between agriculture and aquaculture, co-creative and cross-sectorial research.

2.2 Innovation

2.2.1 Status of actions and achievements

	CONTRIBUTION TO EXPECTED IMPACTS (E.I) & IFISHIENCI REQUIREMENTS	ACTION TO BE TAKEN	KPIS & PROGRESS MADE	ACHIEVEMENTS
	INNOVATION INTELLIGENCE			
1	Contribution to Expected Impacts (E.I): E.I.7. Contribute to policymaking in research, innovation and technology. & Link to WP1, 2, 3, 5 & 7; & T. 5.5 IPR and Innovation management.	1. Monitoring of findings - Interactions with all relevant WP leaders regarding findings 2. Application - Map out how findings will be used (internal/external/productification) 3. Planning for IPR/marketing strategy Team involved: Relevant WP and Task leaders, Innovation Champion	**KPI 1**. Two annual productification meetings after M20 **KPI 2**. 4 IPR workshops during the project (3M, 20M, 30M, 40M)	**KPI 1>> achieved with modifications.** Implication of Advisory Board members, as well as co-creativity meeting with some Norwegian companies (Lerøy Seafood AS, Ovum AS, Eide Fjorbruk AS, Globefish AS) **KPI 2 >> achieved** **As per reporting for WP5:** D5.1 is approved. D5.2 has been submitted by M30 on April. 2021. Individual business cases are drafted and the exploitation plan methodology was defined in D5.3 by M30. (See iFishIENCi IPR Strategies 2023, 5.6 Exploitation/Strategy Plan Version 3 and iFishIENCi_D5.3 Comprehensive analysis about the Business enablers Partners' reviewed).
2	Contribution to Expected Impacts (E.I): E.I.2. Improve consumers' awareness, perceptions and acceptability of the European aquaculture products and methods. & Link to WP4, WP6 & T. 1.5.	1. To define and differentiate "circularity" and "zero waste". 2. To define “sustainable aquaculture”. 3. To start working on how we want to disseminate circularity / valorisation towards the	**KPI 3**. Definition for circularity, zero waste and sustainability concepts within aquaculture. **KPI 4**. At least one communication/dissemination action with industry media and good responsible journalists.	**KPI 3 >> achieved** See report from Circularity champion. **Contributions to relevant documents such as** Policy Recommendations for a More Circular Aquaculture and Report on regulatory framework and requirement.

		different target audiences. Team involved: WP4 leader, WP6 leader, RRI champion, Policy champion, C&V champion.	**KPI 5.** Link these definitions to the consumer awareness workshop Progress made by M23: 1. Draft of the methodology available on the sharepoint: parameters to be considered in both approaches, circularity and zero waste.	**KPI 4 >> achieved** Dedicated sessions in the context of two iFishIENCi events: "Aquaculture going circular" (Nov 2021), and "Project Final Event" (June 2023). **KPI 5 >> achieved** Several events for direct engagement with consumers were organised (see D6.7 for overview). Circularity and sustainability concepts in aquaculture were systematically introduced and discussed as part of these events. However a formal Consumer Awareness Workshop was not conducted during the project.
MARKETS (AQUA) - definitions and exploration				
3	Contribution to Expected Impacts (E.I): *E.I.1. Demonstrate that investment in sustainable aquaculture research and innovation leads to the creation of new value chains, markets, growth and jobs in coastal, offshore and landlocked areas.* & Link to T.5.3. Business models & business plans.	1. What markets are relevant for each category of findings (iBOSS, sensorics, feed raw materials) Criteria: Technology level of different markets, Technology level in specific country, Potential in market, Business models in market 2. Identify possible cooperation/competition Team involved: WP leaders, Innovation champion.	**KPI 6.** Market analysis - relevance/Size/which product is relevant	**KPI 6 >> achieved** Gaps and opportunities for market uptake of iFishIENCi innovation have been reported as part of D5.3 (Business enablers), accounting for analysis of the Regulatory framework (D4.14), Social acceptance (D4.2). Contributions to D5.6 Exploitation/Strategy Plan - Version 3
MARKETS OTHERS (AGRI) - definitions and exploration				
5	Contribution to Expected Impacts (E.I): *E.I.3. Contribute to the creation*	1. What other segments or markets are relevant for each	**KPI 7**. Interviews with AGRI stakeholders in the project plus	**KPI 7 >> achieved** Initial discussions with AGRI stakeholders

	of improved sustainable aquaculture systems and implement productive and resilient aquaculture practices that maintain healthy aquatic ecosystems and strengthen capacity for adaptation to climate change, by 2020 (UN SDG 2); and *E.I.7. Contribute to policymaking in research, innovation and technology* & Link to WP7 & WP6	category of findings (iBOSS, sensorics, feed raw materials) Criteria: Technology level of different markets, Technology level in specific country, Potential in market, Business models in market 2. Identify possible cooperation/competition Team involved: WP leaders, Innovation champion.	companies such as Cargill (both innovation as well as production intelligence)	showed little to no overlapping of interests on utilization of the concepts from the projects, except for VITAFORT.
6	<u>Contribution to Expected Impacts (E.I)</u>: *"Contributing to Bioeconomy Strategy, the Circular Economy Strategy, the BG Strategy, the CFP, the MSFD, the priorities defined in the EC Staff Working Document FOOD 2030, UN SDGs, the EU Biodiversity Strategy, the BLUEMED Initiative, the Atlantic Ocean Research Alliance and the BIOEAST Initiative" in relation to circularity & valorisation.* *&* *E.I.3. Contribute to the creation of improved sustainable aquaculture systems and implement productive and resilient aquaculture practices that maintain healthy aquatic ecosystems and strengthen capacity for adaptation to climate change, by 2020 (UN SDG 2)*; and E.I.7.	1. To assess in what way iFishIENCi can contribute to these policies in terms of circularity and valorisation & assess potential contribution to the Farm-to-Fork Strategy. 2. To assess what regulatory barriers we could encounter that could affect circularity within aquaculture (e.g., Limitations related to what we can include in the feed). <u>Team involved</u>: T1.5 leader and participants, policy champion. Possible contributions from WP4 leader.	**KPI 8**. Gaps and opportunities analysis & link to KPI 1 & 3 of this document.	**KPI 8 >> achieved** Valorisation of waste (sludge) from RAS and flow-through systems a fertilizer has been reviewed. But more focus has finally been given to other (non-aquaculture) valorisation routes for sludge (especially as feedstocks in various bio-based industry applications.

	Contribute to policymaking in research, innovation and technology. & Link to T.1.5 on Zero waste and valorisation.			
PRODUCTIFICATION - services and business model				
7	Contribution to Expected Impacts (E.I): E.I.3. Contribute to the creation of improved sustainable aquaculture systems and implement productive and resilient aquaculture practices that maintain healthy aquatic ecosystems and strengthen capacity for adaptation to climate change, by 2020 (UN SDG 2); and E.I.7. Contribute to policymaking in research, innovation and technology. & Link to WP7 & WP6	1. To identify what could be done jointly with sister projects to address circularity in aquaculture. 2. To identify other EU projects addressing circularity in aquaculture to look for potential links and building on. Team involved: WP4 leader, circularity & valorisation champion, RRI champion and WP6 leader.	**KPI 9.** To engage sister projects and other key H2020 in the joint communication to the EC on circularity. **KPI 10.** One joint meeting with sister projects to discuss about potential joint actions on circularity and valorisation. Progress until now: **1.** Preliminary identification of synergies in sister projects excel for collaboration. Specific meeting with sister projects to discuss this to be organized. **2.** Invitation sent to sister projects and other key H2020 projects to jointly work on the communication to be sent to the EC.	**KPI 9 >> achieved** Horizon4Aquaculture (Online, June 2021, with GAIN and IMPAQT H2020-projects); GAIN Summer school – ecological transition in Aquaculture (Aug.-Sept. 2021, together with sister projects ASTRAL, IMPAQT, NewTechAqua **KPI 10 >> achieved** Final iFishIENCi event in Bergen, June 2023

2.2.2 Lesson-learned

In general, H2020 projects in aquaculture and fisheries span to wide a field in relation to the funding available. That said, it is impressive from the standpoint of an Innovation Champion to see the diversity and quality of work done during the 4 years (+6 months covid extension) of the project.

On the role of an Innovation Champion. The perspective of an Innovation Champion in a project like this, is that of a bird. Maintaining the overview as well as peering forwards at the same time, maintaining the focus on research in a business perspective. This role is very demanding to anchor in a project of this duration and type, and is dependent of many external, and potentially limiting, factors.

Some of the most important factors that have impacted on my work are listed below, with remedial actions that were undertaken, or should be undertaken in future projects.

External factor one: Sence of urgency – concrete IPR strategy is something that is developed as research starts to turn out results, before that, such strategy is not viable before some concrete results materialize. For many researchers, the concept of productification is not a top-of-mind concept and that is understandable. For this type of projects of it is obviously a challenge that needs to be recognized and met with appropriate actions.

Remedial actions to meet this challenge started already during the 2019 meeting in Berlin with presentation of the challenges tied to IPR strategy and the consequent mapping of foreground. In hindsight, it would have been valuable to engage legal aid at an early stage, mapping out the legal requirements for IPR registration to instil a stronger understanding of process and a stronger sense of urgency for this aspect.

External factor two: Continuity. It is very demanding to have a good insight into the development processes in a project of this size. WP leaders may not always have a running total insight into all the innovations that are being developed in a WP, nor would any of several researchers always be up to speed. This made it challenging for me as Innovation Champion to keep up to speed with developments, both the level, as well as the possible impact.

Remedial action to meet this challenge was to establish a Product manager/Product owner for all the research processes. While this was a very strong move, this should have been established already during the kick off meeting. For future projects, this should be established as a part of the productification package.

External factor three: B**usiness mindset versus research mindset**. As mentioned above, many researchers do not focus on the business aspect of their work. While this is perfectly legitimate position it poses some real challenges if not met with remedial actions.

Remedial action to meet this challenge was the establishment of a Product manager/Product owner for all the research processes. It resolved as a consequence of remedial action to ensure continuity.

External factor four: Technological inertia is a well-known phenomenon, and one that the aquaculture industry in Europe displays, even if the reasons are different. In Norway, technical inertia is partly a consequence of salmonid aquaculture companies having partly been run as start-ups or early-stage companies developing the industry as they go, including the technological side. Now, as the industry has become more consolidated and professionalized the ask is for more innovation, but at a more mature stage. This is expressed by a more aloof attitude characterized with "...come back when the product is market ready". In TRL terms this means that the market engagement is moving from stage

4-6 to 7-9 to a large degree. It, thus, seems to be important to test the ideas on the fish farmers at a very early stage and, in that phase, harvest as much customer views as possible, for then to engage in concept and product development presenting solutions much closer to market than var previously accepted. This does not exclude testing underway but there is a stronger move towards more finalized product prior to implementation than earlier. Further, as was clearly underlined in a recent revision of the governmental work with fish health and welfare in the aquaculture industry by the Office of the Auditor General of Norway, much better documentation of impact of new technology on fish health and welfare is necessary.

In other parts of the world, the inertia can be a result of a completely different kind. Industrial maturation and infrastructure are less developed than in Northern Europe, and as a result it can be demanding to implement technologically advanced innovation. Challenges such as stable electricity, telecommunication (existence of or bandwidth), sensors (existence of, precision of, stability of). For new technology to have any impact, there must also be an organisation that can absorb findings or implement new ideas into their operations.

Remedial action for both of those is good knowledge to the market in question and discussions, over time, to align and prepare for future innovations. It is also important to find the right company to cooperate with, corporate personalities are different and will react differently to new technology, with some being more accepting and curious.

External factor five: Black swans. In this project, one of the black swans is obvious. Covid has impacted this project greatly and many of the deliverables have been unavoidably delayed. The work of the Innovation Champion is, by its very nature, not as prone to disturbance due to such challenges, as would one working in a research team, dependent on one's colleagues and critical equipment.

However, the impact was felt, and what with the pressure of fluid legal environment, change in working conditions, and in this case, huge workload as the employer was heavily involved in, first understanding the needs of the industry, then working with government agencies to develop and later, roll out mitigating efforts for the seafood industry, thus having to prioritize and shift focus for prolonged period. This has obviously impacted the continuity and quality of work tied to the role of Innovation Champion for that period.

Remedial action is really not applicable here. Agility, creativity and staying power is really the only remedy.

Internal factor one: Understanding the role. In spite of decades of experience in the aquaculture industry, I initially found it difficult to understand exactly what was expected of the role as an Innovation Champion, and how to engage the different development teams.

Internal factor two: Anchoring the role. Anchoring the role of Innovation Champion in all relevant work packages is something that should be treated with a sense of urgency. In my case, I found it, initially, quite difficult to make my role relevant.

Remedial action for Internal factors one and two for future projects would have been to present the role in a more comprehensive way during the kick off meeting (I was unavoidably detained from participating). Already there I lost some time in integrating into the project. This is a role that demands good personal relations to several key co/project staffers to integrate properly. The second personal meeting was almost a year later and there was some time lost in that initial integration. This was further complicated as described in External factor two: Continuity. This was finally resolved by establishing product managers\product owners and the communication lines became clear.

2.2.3 Recommendations

For future Innovation Champions, the external factors detailed above may have some value. As the role of Innovation Champion may not be completely clear to all participants, one must make sure that the project members are made familiar with this role from day one, and that this role should be a two-way street, where project members can use the Innovation Champion as an advisor during key decisions on direction or focus. There are several steps that should be taken, and in a certain sequence.

Developing the role of Innovation Champion

Step one: Introduction. Before the kick off meeting, engage with the project management as well as individual WP owners and develop clear ideas of the role and how one plans to use the capabilities of the Innovation Champion. This is bound to develop as the project develops but clear ideas at outset are important. And that leads to the next step – Anchoring the role.

Step two: Anchoring. Anchoring is very important in any role that is not integrated into the work packages where teams are focused on one or several development streams. With anchoring comes relevance and integration. Important aspects of this step are: (1) to understand how you as an Innovation Champion can benefit individual work streams (however always with a business-oriented eye) and (2) to see how different work packages can support each other, this may not always be obvious in the project planning, nor as the project proceeds. This is only achieved with efficient interaction with the work packages through product manager/product owner and by attending the WP meetings, this is also known as Interfacing.

Step three: Interfacing. To establish efficient interfacing with individual work packages or work streams within packages, one must establish a good cooperation with the appointed product manager/product owner as quickly as possible, preferably already during the kick-off. The role of product manager/product owner must be established already during kick off and the role needs to be occupied by one with keen understanding of both the scientific/technological development that is underway, as well as being able to understand the role of his/her product in a commercial context. This will be the person that interacts with the champions of all kinds. The interfacing can be achieved with efficient interaction with the work packages through product manager/product owner and by attending the WP meetings. This makes for easy and clear lines of communication and the all-important continuity.

Step four: Continuity and relevance. A project of long duration, as EU supported H2020 and Horizon Europa projects often can experience an issue with continuity. Project members come and go, WP's and workflows meet with challenges and can extend past anticipated deadline. Also, the role of an Innovation Champion can experience periods of less relevance in periods with little to focus on. There are several ways to meet this in a positive way, and it is about team feeling. One is to arrange "morning coffee" a chat where one can discuss challenges, frustrations or new findings or developments in other projects or in the relevant sector of the industry. Another aspect is always to join physical project meetings, there is little that replaces that face-to-face interaction, both to maintain relations but also to establish new relations and build rapport with as many as possible.

2.3 Circularity & Valorisation

2.3.1 Status of actions and achievements

	CONTRIBUTION TO EXPECTED IMPACTS (E.I) & IFISHIENCI REQUIREMENTS	ACTION TO BE TAKEN & PARTNERS RESPONSIBLE FOR THE ACTION	KPIS & PROGRESS MADE	STATUS
CIRCULARITY, ZERO WASTE AND VALORISATION CONCEPTS & COMMUNICATION WITH DIFFERENT TARGET GROUPS				
1	Contribution to Expected Impacts (E.I): *E.I.7. Contribute to policymaking in research, innovation and technology*. & Link to WP4 & T. 1.5 on zero waste. From the DoA "Public authorities are the third cornerstone to be engaged and will be recipients of guidelines for best practices in the circular economy".	1. To assess the theoretical framework existing for circularity. 2. To screen how circularity is assessed at EU level (biological elements / not products). 3. To talk to European Commission for joint way forward towards circularity in aquaculture. Team involved: WP4 leader, Policy champion, WP6 leader.	**KPI 1**. At least two interactions with European Commission in relation to circularity assessment in aquaculture, and on key input to be provided by iFishIENCi. **KPI 2**. Screening of circularity assessment for biological elements at EU level. **KPI 3**. Best practices and definitions for circular economy in aquaculture. Progress made by M23: 1. Study of methodologies for circularity assessment in EU. 2. Identification of best practices in EU from: https://ec.europa.eu/environment/integration/research/newsalert/pdf/sustainable_aquaculture_FB1	**KPI 1 >> partially achieved** One multiple interaction through the policy recommendation document, sent to many different divisions of EC. **KPI 2 >> achieved** Biological approaches were assessed in D4.5 investigating the update of the available indicators, such as MCI. **KPI 3 >> achieved** Included as recommendation in the policy recommendations document.

			1_en.pdf and https://webgate.ec.europa.eu/fpfis/cms/farnet2/news-events/events/closing-loop-circular-economy-fishing-and-aquaculture-areas_en 3. Preparation of document to be sent to EC on circularity in aquaculture via the open EU aquaculture consultation.	
2	Contribution to Expected Impacts (E.I): *E.I.2. Improve consumers' awareness, perceptions and acceptability of the European aquaculture products and methods.* & Link to WP4, WP6 & T. 1.5.	1. To define and differentiate "circularity" and "zero waste". 2. To define "sustainable aquaculture". 3. To start working on how we want to disseminate circularity / valorisation towards the different target audiences. Team involved: WP4 leader, WP6 leader, RRI champion, Policy champion	**KPI 4**. Definition for circularity, zero waste and sustainability concepts within aquaculture. **KPI 5**. At least one communication/dissemination action with industry media and good responsible journalists. **KPI 6.** Link these definitions to the consumer awareness workshop. Progress made by M23: **1.** Draft of the methodology available to the consortium: parameters to be considered in both approaches, circularity and zero waste.	**KPI4 >> achieved** Included as part of the policy recommendations document **KPI 5 >> achieved** Two dedicated sessions in the context of both events, Aquaculture going circular and Project Final Event **KPI 6 >> achieved** Several events for direct engagement with consumers were organised (see D6.7 for overview). Circularity and sustainability concepts in aquaculture were systematically introduced and discussed as part of these events.
CIRCULARITY LINKED TO EXPLOITATION (connecting environmental and economic gains)				

3	Contribution to Expected Impacts (E.I): *E.I.1. Demonstrate that investment in sustainable aquaculture research and innovation leads to the creation of new value chains, markets, growth and jobs in coastal, offshore and landlocked areas.* & Link to T.5.3. Business models & business plans.	1. To assess how to make these business models circular. Team involved: WP5 leader, WP4 leader, Innovation champion.	**KPI 7**. At least one meeting to assess how the circularity component will be addressed in the business models/cases. **KPI 8**. At least two business cases with circular business model.	**KPI 7 >> achieved** The exploitation of circularity assessment has been included in WP 5 deliverable as a new KER. Several meetings took place between WP1, 4 and 5 for defining and elaborating the recommendations, which are the basis for the Waste2Value product. **WP8 >> achieved** The circularity has been tested as new potential value-chains. Two business models have been considered: a circularity model restricted to the aquaculture sector (Production of fish feed from waste – in WP1 – D1.5), and an extended circularity model where sludge from RAS would be used as feedstocks in well-established bio-based industry processes. Both models were presented to relevant industrial actors at the occasion of the final iFishIENCi event in Bergen (June 2023).
4	Contribution to Expected Impacts (E.I): ***E.I.1****. Demonstrate that investment in sustainable aquaculture research and innovation leads to the creation of new value chains, markets, growth and jobs in coastal, offshore and landlocked areas.*	1. To assess exploitation potential & marketing opportunities for: a. How we can use “circularity” & potential for the fish farmers as a	**KPI 9**. Circularity attribute as part of the marketing / exploitation message for key iFishIENCi products.	**KP9 >> achieved** Circularity attributes of the project products have been extensively communicated though the messages from WP6

	& Linked to the exploitation potential.	marketing element. b. If a farm using i-FishIENCi products/technology (e.g. i-BOSS) could be categorised a more circular farm or a farm working towards zero waste (e.g. less feed lost). c. If a farm using i-FishIENCi feeds could be considered a more circular farm or a farm working towards zero waste. d. If the new feeds could use the term “circular” and become “circular feeds”. e. How do we show/sell “circularity” to fish farmers? to consumers? <u>Team involved</u>: WP5 leader, WP4 leader, Innovation champion, RRI champion and WP6 leader.			
COLLABORATION WITH SISTER PROJECTS & BEYOND					

5	Contribution to Expected Impacts (E.I): ***E.I.3****. Contribute to the creation of improved sustainable aquaculture systems and implement productive and resilient aquaculture practices that maintain healthy aquatic ecosystems and strengthen capacity for adaptation to climate change, by 2020 (UN SDG 2)*; and ***E.I.7****. Contribute to policymaking in research, innovation and technology*. & Link to WP7 & WP6	1. To identify what could be done jointly with sister projects to address circularity in aquaculture. 2. To identify other EU projects addressing circularity in aquaculture to look for potential links and building on. Team involved: WP4 leader, RRI champion and WP6 leader.	**KPI 10.** To engage sister projects and other key H2020 in the joint communication to the EC on circularity. **KPI 11.** One joint meeting with sister projects to discuss about potential joint actions on circularity and valorisation. **KPI 12.** Identification of projects/initiatives addressing circularity in aquaculture. Progress made by M23: **1.** Preliminary identification of synergies in sister projects excel for collaboration. Specific meeting with sister projects to discuss this to be organized. **2.** Invitation sent to sister projects and other key H2020 projects to jointly work on the communication on circularity to be sent to the EC.	**KPI 10 >> achieved** The policy recommendations document was co-created and endorsed by 7 H2020 projects. **KPI 11 >> achieved** Several meetings scheduled to identify common actions that were communicated finally through the “Aquaculture Going Circular” event **KPI 12 >> achieved**

6	Contribution to Expected Impacts (E.I): *"Contributing to Bioeconomy Strategy, the Circular Economy Strategy, the BG Strategy, the CFP, the MSFD, the priorities defined in the EC Staff Working Document FOOD 2030, UN SDGs, the EU Biodiversity Strategy, the BLUEMED Initiative, the Atlantic Ocean Research Alliance and the BIOEAST Initiative" in relation to circularity & valorisation.* & ***E.I.3**. Contribute to the creation of improved sustainable aquaculture systems and implement productive and resilient aquaculture practices that maintain healthy aquatic ecosystems and strengthen capacity for adaptation to climate change, by 2020 (UN SDG 2)*; and E.I.7. Contribute to policymaking in research, innovation, and technology. & Link to T.1.5 on Zero waste and valorisation.	1. To assess in what way iFishIENCi can contribute to these policies in terms of circularity and valorisation & assess potential contribution to the Farm-to-Fork Strategy. 2. To assess what regulatory barriers we could encounter that could affect circularity within aquaculture (E.g. Limitations related to what we can include in the feed). Team involved: T1.5 leader and participants, policy champion. Possible contributions from WP4 leader.	**KPI 13**. Gaps and opportunities analysis to be included in Task 4.6 & link to KPI 1 & 3 of this document. Progress made by M23: **1**. Communication with the EC on possible contribution to the strategic guidelines for the sustainable development of EU aquaculture.	**KPI 13 >> achieved** D4.12, 4.13 and 4.14 provide a comprehensive picture regarding gaps and opportunities

2.3.2 Lesson-learned

A common approach to address circularity in aquaculture was missing when iFishIENCi started. We activated the discussion and interaction with other projects and stakeholders regarding this issue. The many actions undertaken were materialized in a Policy Recommendations Document.

iFishIENCi also identified a clear gap of standards to provide evidence-based metrics to address circularity. Therefore, we developed an own methodology which allowed us to monitor the circular attributes of the project solutions. Finally, we defined a dedicated KER for the circularity methodology, and we have communicated and disseminated the circularity approach of iFishIENCi through conferences, trainings and materials.

2.3.3 Recommendations

Due to the wide variety of aquaculture systems, we recommend working on integrating the different particularities, in order to depict a comprehensive picture of the industry.

Feed is a key aspect that affects most of the aquaculture systems. iFishIENCi has tested and validated some opportunities to increase the circularity in the context of the project, identifying value-chains, not identified or investigated so far, especially in the industrial biotechnology realm. iFishIENCi findings will require further investigation and scaling-up for a robust assessment of the cost-benefits of these value-chains.

2.4 International Cooperation

2.4.1 Status of actions and achievements

	CONTRIBUTION TO EXPECTED IMPACTS (E.I) & IFISHIENCI REQUIREMENTS	ACTION TO BE TAKEN & PARTNERS RESPONSIBLE FOR THE ACTION	KPIS & PROGRESS MADE	STATUS
	CAPACITY BUILDING			
1	Contribution to Expected Impacts (E.I): **E.I. 6**. *Improve professional skills and competences of those working and being trained to work within the blue economy*. & 1) Training of professionals: 12 trainings for farmers on new feeding and monitoring technologies (2 per country). 5 PhDs & 10-15 MSc/BSc thesis by M48. Training courses will be tested within the consortium before being deployed in Europe and beyond. Link to KABIS project: KABIS will provide basis material for the internationalisation of training and capacity building to be conducted through iFishIENCi.	1. To identify fish farmers (international) who could potentially be interested in receiving training on new feeding and monitoring technologies & PhDs, MSc and BSc students. 2. To organise a mock training session within i-FishIENCi partners. 3. To assess and establish the link with KABIS project as a starting point to build on for the internationalisation of training. Team involved: SZIU, UIB, NORCE. To be linked to Task 6.6.	**KPI 1**. To engage fish farmers on training on new feeding and monitoring technologies in at least 1 non-European country. **KPI 2**. To deliver basis information on KABIS to be used within iFishIENCi. **KPI 3**. At least 1 training course to farmers on new feeding and monitoring technologies in at least 1 non-European country. Progress made by M23: **1.** Assessment of KABIS content initiated by NORCE & UiB. **2**. In contact with fish farmers in Laos as potential candidates for training activities.	**KPI1 >> achieved** As part of the LAO-HUNGARY-VIETNAM Freshwater Aquaculture Workshop, on the second day (15th November 2022) iFishIENCi results were presented on the demo site. 4-Apr-2023, Africa, Kisumu, Kenya: Stakeholder workshop on Argri/Aquaculture innovation iFishIENCi results were presented in FOODLAND H2020 project (https://foodland-africa.eu/) to partners from Kenya, Uganda, Tanzania **KPI2 >> not pursued** **D**evelopment and findings of

				the Norway-funded project KABIS has proven to not be relevant for iFishIENCi, after all. **KPI3 >> achieved** Fish farmers from Africa were encouraged to participate on online demonstration trainings of WP3 through the Sustainable Aquaculture Research Networks in Sub Saharan Africa (SARNISSA) network. There were 11 participants from various African countries on the "African Catfish in SmartRAS" an iFishIENCi Virtual Demo Event
2	Contribution to Expected Impacts (E.I): ***E.I. 6****. Improve professional skills and competences of those working and being trained to work within the blue economy.* & iFishIENCi RTOs and universities will incorporate significant parts of the developed technologies in their teaching activities, and design follow-	1. To identify the specific content to be incorporated within teaching activities. Team involved: SZIU, UIB. To be linked to Task 6.6 and D6.10.	**KPI 4.** Incorporation of content related to iFishIENCi developed technologies in 2 teaching activities/programs in MATE and UIB. Progress made by M23: Action not started yet.	**KPI 4 >> achieved** Development of the Hungarian Master Program on Aquaculture and fisheries (MATE). Incorporation of iFishIENCi results in specific lecture part of the Aquaculture Integrated Master at UiB, Norway.

	up research projects/initiatives at national and international level.			
CONSUMER'S AWARENESS, PERCEPTIONS AND ACCEPTABILITY				

3	Contribution to Expected Impacts (E.I): ***E.I. 2****. Improve consumers' awareness, perceptions and acceptability of the European aquaculture products and methods.* & At least 5 international outreach activities to increase public awareness (3 workshops + 2 papers for broad audience).	1. To select a) 3 potential locations for international awareness activities/workshops, b) relevant stakeholders in selected locations, c) content to be prepared and d) timing. 2. To identify the content and framework for 2 papers. Team involved: NORCE, UIB, International cooperation champion. To be linked to "Task 6.5. Engaging with consumers" and "Task 4.1. Social acceptance analysis".	**KPI 5**. To organise 3 international outreach workshops to increase public awareness. **KPI 6**. To organise 2 international outreach papers for broad audiences. Progress made by M23: Action not started yet.	**KPI 5 >> achieved** 21-Nov-2019, Kuala Lumpur, Malaysia 9th International Fisheries Symposium in Aquaculture Systems and Management and EURASTiP Capacity Building Foresight Workshop #3: iFishIENCi developments and training opportunities were discussed. Laotian-Vietnamese-Hungarian Forum, 14-15th Of November 2022, Vientiane: Trials and demonstration presentation in Laos and other iFishIENCi innovations by Vitafort 11th October 2022, Singapore, World Aquaculture Society conference: SmartRAS presentation. The iBOSS and Fish-Talk-To-Me was presented and discussed at the 23rd Annual Embedded Vision Workshop in Vancouver, Canada June 19, 2023; In particular the machine vision challenges and needs associated with behavioural analysis in

				different salmon production systems to enable robust edge control systems. **KPI 6 >> achieved** The Fish Site porta: Circularity policy recommendations of the project: https://thefishsite.com/articles/circular-aquaculture-a-fresh-approach-to-farming International AquaFeed Magazine: New iFishIENCi catfish feeds were explained, https://www.aquafeed.co.uk/a-more-sustainable-approach-to-feeding-catfish/
EXPLOITATION				
4	Contribution to Expected Impacts (E.I): ***E.I. 1****. Demonstrate that investment in sustainable aquaculture research and innovation leads to the creation of new value chains, markets, growth and jobs in coastal, offshore and landlocked areas.* & To generate a business plan to commercialize the project results and to penetrate iFishIENCI at European and International level in the aquaculture sector.	1. To analyse the results of the exploitation workshop that was done in Berlin and other relevant outcomes from exploitation related meetings to identify key countries of interest for international market penetration. Team involved: WP5 leader, NCE & Innovation champion. To be linked to D.5.6.	**KPI 7**. To identify at least 5 non European countries/markets of interest including key organisations to be approached and business potential. Progress made by M23: Currently initiating contacts with aquaculture organisations in Africa (Ghana, Nigeria, South Africa, Uganda), South America (Brazil, Argentina, Chile) and Asia (Laos, China).	**KPI 7 >> achieved** Contact established and dialogue ongoing with taken with **Asia** (Laos), **Africa**: Morocco (Royal centre for aquaculture), Tunisia (UTAP - Union Tunisienne pour l´agriculture et la pêche), South Africa, Uganda, Ghana. **South America**: Brazil (FUGR), Argentina (CONICET)
DISSEMINATION				

5	Every project partner will ensure that dissemination activities will be carried out nationally, and if applicable will contribute to dissemination internationally. Project results will be presented and discussed at international events.	1. To define at least 4 events of relevance for iFishIENCi at international level. 2. To define joint international collaboration with BG-04 sister and other relevant H2020 projects. Team involved: Project coordinator (ABT and NORCE), UIB, international cooperation champion.	**KPI 8**. To participate in at least 2 international events. **KPI 9.** To contact sister projects to jointly participate in at least 1 international event. **KPI 10**. To reach out to international Advisory Board members and other organisations providing support to iFishIENCi to assess potential collaboration in international events. Progress made by M23: Initial work done to participate in Word Aquaculture in Singapore in June 2020 (not possible due to COVID). Currently identifying key international events to be held in 2021 (also uncertain due to COVID). Currently assessing Laos as a possible first international location to organise an international event, work ongoing.	**KPI 8 >> achieved** IEEE AgriAqua´19- global IoT summit, Aarhus, Denmark); 9th International Fisheries Symposium (Kuala Lumpur, Malaysia, 18-21-September 2019); Global Forum for Innovations in Agriculture (Abu Dhabi, UAE, Nov 2022); Horizon 4Aquaculture (Oline, June 2021) **KPI 9 >> achieved** Horizon4Aquaculture (Online, June 2021, with GAIN and IMPAQT H2020-projects); GAIN Summer school – ecological transition in Aquaculture (Aug.-Sept. 2021, together with sister projects ASTRAL, IMPAQT, NewTechAqua **KPI 10 >> partly achieved** This action has not been conducted systematically but more opportunistically.

2.4.2 Lesson-learned

Developing an ambitious international cooperation plan (outside Europe) has been clearly challenging because of the Covid-19 crisis (2020-2022). The Covid has impacted on the one hand, the timeline for the development of iFishIENCi innovations, hence limiting the time available for international presentation of the products, when their productification was appropriately developed, and on the other hand, the interest for targeted international groups (aquaculture associations, aquaculture companies, etc..) towards innovations, as the focus was more on saving businesses set in jeopardy due to the crisis.

Less expected has been the consequence of increased awareness about climate change in society, leading to a change of habit, especially in term of travelling, from all partners and international targets. It has shown challenging presenting such complex innovations and concepts as developed in iFishIENCi through online meeting with potential stakeholders in Africa, South-east Asia, and South America.

However, iFishIENCi partners have conducted many dedicated actions within their international network, promoting especially their assets and Intellectual properties in iFishIENCi. All in all, the overall visibility of iFishIENCi and awareness about its innovations can be considered as satisfactory, despite the over-mentioned bottlenecks.

Europe is ready to take up iFishIENCi innovations as iBOSS, SMART-RAS and some aspect of circularity and zero-waste management. However, we see that technical innovation, such as iBOSS, may have a lot of competition in highly “digitized” national aquaculture sector, such as Norway. Although the iBOSS concept as an integrated steering system based on open standards seems to raise a lot of interest in some technology providers of big Norwegian Salmon farming companies.

The uptake of products such as Fish-Talk-to-Me, iBOOS and Smart-RAS may be more challenging in other part of the world where the digital revolution (Industry 4.0) has not developed yet. The strategic approach taken in iFishIENCi on promoting openness, flexibility and adaptability to the products therefore shows to be appropriate.

2.4.3 Recommendations

It is recommendable to conduct joint awareness actions on iFishIENCi products between partners as part of the exploitation plan beyond the end of the project, towards international stakeholders.

The various products and innovation should be presented as modules that can be adapted to specific context. For example, Fish-Talk-to-Me (FTTM) can encompass different sensor packages, matching the environmental challenges to be monitoring, the conditions of production and the budget available. FTTM should also be presented as a way of opening for the steering of different operation under production, as feeding control might not be one of the main focuses for many non-European fish-farmers.

The cloud-based data management in iBOSS is an asset in many countries as it may limit hardware investment and maintenance, which is a constraint in developing countries, for example.

The SMART-RAS product has a high commercial potential in many aquaculture places around the world, as RAS facilities will deploy broadly.

2.5 Responsible Research and Innovation – RRI

The iFishIENCi consortium applied the concept of "science with and for society" through a guiding framework of Responsible Research and Innovation (RRI). This framework considers the societal impact simultaneously in the making of new technologies and innovations. A logical and much used way of applying an RRI framework is through feedback loops. The flow of the main RRI feedback loop initiated by iFishIENCi project outreach was:

iFishIENCi technology → stakeholder reactions → iFishIENCi technology

In this flow, inputs and reactions from potential futures users of the technology was used as further input into the design and development of the different innovation products in iFishIENCi.

An example of this flow is from the Social Acceptance Analysis in Task 4.1 of the iFishIENCi project. "Sustainable Aquaculture" is a key concept for iBOSS, one of the main products in the iFishIENCi project. In Germany, Hungary and Norway, we asked different stakeholders what sustainability means to them and then cross-checked this with the product teams and managers of iFishIENCi products Waste2Value, iBOSS and Fish-Talk-to-me.

In addition, we practiced a type of reflexivity within our interdisciplinarity that we called "in-reach", a variant of the "outreach" feedback described above. Our in-reach approach was designed from the realization that our interdisciplinary, European-wide research and innovation team needed to speak the same "language" across discipline and experiences to make optimal sense of our combined expertise for innovation success. To do this, we needed to lower the bar for asking "dumb questions" and the RRI Champion functioned as a mediator and debate leader during Annual Meetings when Task updates were presented and discussed.

2.5.1 Status of actions and achievements

	CONTRIBUTION TO EXPECTED IMPACTS (DOA Table 1.1) & IFISHIENCI REQUIREMENTS	ACTION TO BE TAKEN & PARTNERS RESPONSIBLE FOR THE ACTION	KPIs & PROGRESS MADE	ACHIEVEMENTS
	Engaging with the society			
1	Compliance 7. Apply and critically observed an RRI platform that focuses on practices of "inreach" within the entire consortium and outreach to stakeholders and society	➢ Life cycle and sustainability assessment of the new products ➢ Improve consumers' awareness, perceptions and acceptability of the European aquaculture products and methods. Team involved: UiB, ABT, NORCE, TTZ, SZIU	**KPI 1**: Bi-annual RRI analysis of Science-Industry Reflexivity and Responsive Stakeholder Engagement Progress made by M23: First analysis ready for Annual Meeting 2020	**KPI 1 >> achieved** RRI was continually on the agenda of all Annual Meetings and Steering Group meetings. The RRI analyses were always made orally in plenary of these meetings to aid for mutual on-the-spot learning and reflection.
2	Compliance 8. Accompany the digital revolution by training the present operators in aquaculture and educating the next generation workers in the blue economy	➢ New academic courses on feeding and breeding ➢Trainings for farmers and other stakeholders ➢ Improve the professional skills and competences of those working and being trained to work within the blue economy. Team involved: UiB, ABT, NORCE, TTZ, SZIU	**KPI 2**: RRI awareness and implementation training in new aquaculture courses **KPI 3**: Report on stakeholder engagement and triple-loop feedbacks from science-industry-stakeholder interactions integrated in Deliverable 4.2	**KPI 2 >> achieved** The course developments benefited from the continuous RRI discussions in consortium and work package meetings. **KPI 3 >> achieved** Report in Deliverable 4.2 submitted.

3	Compliance 9. Engage with stakeholders, representing policy development, consumers and the aquaculture industrial sector, worldwide	➢ Encourage technology transfer ➢ Investigation of climate scenarios ➢ Contribute to policy-making in research, innovation and technology Team involved: UiB, ABT, NORCE, TTZ, MATE	**KPI 4**: RRI report on Responsiveness of the iFishIENCi innovations integrated in Deliverable 4.2: Social Acceptance Analysis	**KPI 4 >> achieved** Report in Deliverable 4.2 submitted.

2.5.2 Lessons-learned

RRI is about understanding how science and technology affect society and vice versa. The iFishIENCi-modes of RRI were “anticipation, reflexivity, engagement and responsiveness.” The practice of RRI is essentially based on building and observing human relationships. The Champion knew that the practice of RRI in iFishIENCi was ambitious and would be challenging, due to the interdisciplinary and culturally diverse European partners from both science in industry. But the COVID-19 pandemic made it extra challenging to do RRI essentially in the digital sphere through 24 months of meetings exclusively on Teams. The saving grace was the in-person kick-off meeting in Malta in December 2018 and the Aquaculture Europe Annual Meeting in October 2019. These two meetings allowed the RRI Champion and the Work Package leaders to develop positive working and personal relationships that made the big shift to digital meetings on Microsoft Teams more natural.

The RRI Champion witnessed a great deal of growth among the consortium regarding acknowledging and concretely working with stakeholder needs and expectations. For example, RRI was a brand-new concept to the consortium at the start, but RRI was a commonplace word in the vocabulary and methodological approach of all work packages by the end of the project.

2.5.3 Recommendations

Although the consortium is familiar and has now a track record for working with RRI in aquaculture, it does not seem feasible that RRI would be fully integrated in future projects without a dedicated RRI Champion. It would be a mistake to think that the various members of the iFishIENCi consortium can now do RRI on their own without expert guidance, since formal RRI training was not part of the iFishIENCi project. For future project proposals, social science and “science with and for society” expertise is recommended to use RRI as a guiding framework.

Another recommendation is that RRI should be an integrated part of masters and PhD training in future consortia. This would secure more RRI expertise within the aquaculture sector which would be very beneficial for future aquaculture product development.