Workshop

World Café PiE-BC3

Date: 7th July 2023
Place: Plentzia, PiE-UPV/EHU



One Health Observatory Lighthouse Project
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1. Participants

PiE, UPV-EHU:

- 5 participants **Cell Biology and Toxicology**. Histopathology, Contaminated soils, Endocrinology
- 3 participants **Analytical Chemistry**. Emerging pollutants, Advanced instrumental analysis
- 3 participants **Microbiology**. Microbial ecology, Marine microbiology
- 1 participant **Atmospheric Modelling**. Meteorology
- 1 participant **Biochemistry.** Structural biology
- 1 participant **Engineering.** Modelling
- 1 participant **Marine Biology.** Modelling
- 1 participant **Sustainable Economy**

BC3:

- 6 participants
    - **Environmental Engineering, Climate Change**
    - **Environmental Economy**
    - **Ecologist**
    - **Sustainability Landscape Analysis**
    - **"One Health" approach**
    - **Marine Biology**

2. Brief context of the projects

Blue Adapt and HOBE are two projects focused on the influence of environmental factors (e.g., climate change, environmental pollution…) on coastal pathogens, and the consequences they have on health under the One Health perspective. For both projects, the Bay of Plentzia represents an ideal case study where interactions between society and coastal ecosystems can be investigated integratively. Creating a *One Health Observatory Lighthouse* is planned under a Living Lab, where key agents can meet and discuss to promote engagement and knowledge co-creation. This Living Lab will be located in the Plentzia Marine Station (PiE), between the beaches of Gorliz and Plentzia.

Both projects include participating in two Basque research centres, BC3 and PiE-UPV/EHU, where researchers from diverse disciplines (social and natural sciences) develop their work. Many PiE-UPV/EHU researchers already conduct investigations in the Marine Station, where they collect and process physical, chemical, and biological data. Therefore, they are important stakeholders with valuable knowledge. BC3 researchers integrate environmental, socioeconomic, and ethical dimensions of climate change and will contribute by bringing the holistic approach of One Health to the project.

The creation of a Pilot One Health Living Lab is described in the WP6 of HOBE (*Pilot One Health Living Lab: Stakeholder engagement and knowledge co-production*) and includes the following tasks:

- (6.1) Cognitive mapping for knowledge co-production: Integrating perceptions and knowledge of experts and of stakeholders
- (6.2) Design of the Pilot One Health Living Lab
- (6.3) Integration of disciplines

In the context of this work package, as well as an introductory activity, a World Café was developed to get to know the researchers involved in both projects.

3. Description of the activity: The World Café

This activity is one of the initial contacts between the researchers of the two centres. An informal format was chosen to create a relaxed atmosphere where researchers could get together, introduce themselves, and exchange different perceptions on related topics to the project. To do so, a World Café activity was developed, adapting the guidelines of The World Café Community Foundation (www.theworldcafe.com).

"A World Café is an easy-to-use method for creating a living network of collaborative dialogue around questions that matter in service to real work."

The seven principles of a World Café were followed:

1. Set the context

The activity took place at PiE Marine Station and was framed within the Blue Adapt and HOBE projects. One of the final objectives was the creation of the Living Lab.

2. Create a hospitable space

One of the classrooms at PiE Marine Station was cleared for the activity. Six tables with 4 chairs each were distributed around the space. A3 paper cardstock, post-its and felt pens could be found on the tables. On one side of the room, a table was set up with coffee, tea, water, and snacks, and on the other, an image of a cosy cup of coffee was projected. During most of the activity, pleasant background music was played.

3. Explore questions that matter

Before the activity, the organisers met to discuss possible questions that would reflect the main issues of the projects. After a brainstorming session, 4 follow-up questions were defined.

4. Encourage everyone's contribution

Organisers also participated in the activity, and when sitting around the tables, they were not only sharing their perspectives, but also encouraging others to participate and slightly moderating the discussion.

5. Connect diverse perspectives

By randomly moving and changing places after each question, participants interacted with different groups of people, not sticking to the same perspectives and discussions.

6. Listen together for patterns and insights

7. Share collective discoveries

Because no specific output product was expected to be obtained, the last phase of the Café was devoted to sharing personal thoughts and impressions after the collective experience.

The dynamic was designed to be relaxed and not too demanding for the participants. Six tables were distributed in the space, with four chairs and the materials to write down ideas and concepts. Annex I show the agenda of the activity, with the duration of each part and the names of the persons responsible. Researchers convened at PiE Marine Station at 9:30 am without being told which activity they would participate in. They were welcomed with a short introduction and the main rules of the activity. Additionally, they were given a piece of paper indicating their route around the tables, which had previously been randomly determined. Coffee, tea, and food allowed them to help themselves at any point during the activity. Four rounds of questions were described, with a 30-minute break between each two questions. Participants were given a total of 20 minutes for each question: five to present themselves and

their work and 15 to discuss the questions. Paper, post-its and felt pens were available to write keywords and ideas. The questions that were asked are the following:

1) **What are the main health risks/pressures/threats currently on the Basque Coast?**
2) **The strongest impacts will be experienced by…?**
3) **Are there any strategies to monitor/control/mitigate these problems? Are there barriers? Are there opportunities? Who would be responsible for these strategies?**
4) **How to improve interaction and communication between scientists?**

After the discussion of each question, participants changed tables and started the discussion of the next question with different people. The posters were collected and hung in one of the walls for exhibition. During the coffee break or after the last round of questions, researchers could come closer and read the different answers from the different tables side by side. To close the activity all researchers got together and collectively shared their experience of this World Café.

4. Results

Many of the researchers invited to participate in this activity got involved in the dynamic and actively participated in the discussions. Conversations were more fluid in smaller groups (3 participants) than in bigger groups (5 or 6). The topic addressed, closely related to the projects, and the structure of the questions asked, allowed for the exchange of diverse points of view.

To summarise the discussions that took place for each question, word clouds were built with the ideas that were written down on the post-its and the paper cardstock. In each cloud, the words that came up with more frequency are represented with a bigger size (Fig. 5-8)

Q1. What are the main health risks/pressures/threats currently on the Basque Coast?



Figure 5. Word cloud for question 1. Size decreases as frequency is lower. The colour code represents the same frequency as the word.

In the discussion of the risks, pressures or threats that influenced health in the Basque Country, "*change*" was the concept that came up most frequently (Fig. 5). When used, it referred to global change, climate change, alteration of environmental parameters and processes such as water runoff, extreme weather events, and hydrological resources. It also referred to a higher presence of invasive species, changes in the organisms' metabolism, and a consequent alteration of the composition and diversity of the ecosystems. The "*change*" was discussed in environmental and biological domains and was often called the socio-economic system. Many of the participants argued that changes in human activities would have an ultimate effect on health and the healthcare system. An excessive increase in "*tourism*" was given as an example, as well as increased use, and therefore discharge into the environment, of animal and human pharmaceuticals, antibiotics, disinfectants, pesticides, plastics and trash in general. The general idea was that changes in today's socio-ecological system can drastically affect animal, human and ecosystem health.

"*Water*" was also a frequent concept since it was brought up as a resource and as an element interconnecting the socio-ecological system on the Basque coast. On one hand, water is an essential good for any living being, and therefore, its state (quality and quantity) determines the system's health. On the other hand, after its use, water returns to the environment as wastewater or follows its course as run-off water after having passed through farms and agricultural fields. The state of this water may have degraded, so Wastewater Treatment Plants (WWTP) must be continuously improved with technological advances to prevent it from posing a health risk.

Another word that appeared frequently was "*pathogen*", understood as an agent that causes disease and impairs health. Examples such as the virus *Vibrio*, the bacteria *Escherichia coli*, or algae responsible for harmful blooms (HAB) on the Basque coast were given. Additionally, the change in the distribution of these pathogens, their increased presence in summer on bathing waters, and the possibility of pathogens transfer between species, were also discussed.

Q2. The strongest impacts will be experienced by...?



Figure 6. Word cloud for question 2. Size decreases as frequency is lower. Colour code represents the same frequency of the word.

When discussing who or what in the Basque coast will experience the strongest negative impacts on their health, many of the participants could differentiate three compartments: humans, biota and environment (see Annex III). In the human group, the focus was on those people or sectors of society that are most *vulnerable*, such as people immunocompromised, with allergies or other non-communicable *diseases*, and also the fraction of the population represented by children and elderly. In these vulnerable sectors, there can also be included people who are more exposed to the risk/pressures/threats, which would mainly be those frequenting the Basque coast: beach users, seafood consumers, fishermen... and those that would be receiving and treating ill people, as medical and veterinary staff. Regarding the non-humans, the focus was on animals, although plants, algae and other microorganisms were also mentioned. As with humans, the emphasis was made on those considered vulnerable, such as autochthonous or endemic species. Most of the participants agreed that biodiversity would be highly impacted due to the species loss, and some mentioned the role of the food chain and the consequences of its alteration for all levels of organisms.

Finally, in the environmental compartment, participants distinguished between the natural environment and the human-made environment (e.g., economy, infrastructures, buildings..., etc.). The focus was mainly on the "beach" area and the functioning of the natural ecosystem; however, impacts on natural resources (e.g., livestock, crops..., etc.) and the consequences on the economy were also discussed. Directly or indirectly through health care, it was also mentioned that hospital centres and the whole health care system would be affected.

Some of the participants also mentioned the existence of positive impacts related to the increase of awareness, the availability of more funding, more research, and more knowledge. In

tandem with this, it was also discussed that negative health impacts would eventually contribute to the passing of new laws and the creation of business partnerships to mitigate these impacts.

Q3. Are there any strategies to monitor/control/mitigate these problems? Are there barriers? Are there opportunities? Who would be responsible for these strategies?



Figure 7. Word cloud for question 3. Size decreases as frequency is lower. Colour code represents the same frequency of the word.

After the previous discussions, the participants approached the third question with "*water*" as one of the central elements, which is reflected in the word cloud (Fig. 7). Assuming that water is closely related to health, the importance of "*indicators*" that define a good water quality status was discussed, including biological, chemical, hydro-morphological and ecological characteristics. Therefore, the role of "*WWTPs*" in monitoring, controlling and mitigating was specially highlighted. The design and implementation of regulations at multiple scales (EU, Spain, Basque Country, regions and communities) was also discussed.

Main barriers are a lack of long-term perspective, lack of general strategies, and the opposition of political and economic interests. However, identified opportunities were an increase in education and awareness, more social justice, transformative changes in society and community building. Many of the participants agreed that generating "*awareness*" within different sectors of society was of great importance in order to establish new strategies for the future, change the current patterns of consumption, resource exploitation and lifestyles.

Q4. How to improve interaction and communication between scientists?



Figure 8. Word cloud for question 4. Size decreases as frequency is lower. The colour code represents the same frequency as the word.

The fourth and last question addressed how interaction and communication between scientists could be improved. Many agreed that knowledge transfer was essential but that the strategies for doing so could be transformed and improved.

"*Interdisciplinarity*" in research centres (like PiE or BC3) and in projects (like BlueAdapt or HOBE) was given importance when understanding complex concepts, such as One Health. Meetings and conversations in small groups based on safe spaces and ethical values (respect, compromise…) came up in different discussions as a way to improve communication. Another strategy suggested was open science and creating shared databases with easy-to-interpret information and the unification of terminology, limiting technical terms within the discipline and fomenting a common language outward.

Without forgetting the need for science production and the importance of incentives (publications, vouchers for participation…), many participants also valued the creation of informal spaces. In those, a distended atmosphere allows the exchange and the opportunity to learn from new ideas and gives space for different points of view, including topics that would otherwise never be addressed in the scientific domain but which can be of great value (art, culture…).

5. Conclusions

After the last round of discussions, all participants were gathered and invited to share their experience conducting the activity. Attendees had not been previously informed about the type of activity in which they would participate. Therefore, it was a surprise when they arrived. Someone said that they started the activity reluctant to see its usefulness, and some of them

were expecting to leave sooner (indeed, some of them did during the coffee break), however, those who stayed agreed that by the end, they had changed their minds and were satisfied with the result. As someone commented, the relaxed and rather informal atmosphere was a pleasant novelty that allowed them to enjoy the activity, where they could discuss their own point of view with peers and project colleagues, something that in another type of activity would have felt less fluid. A suggestion was that participation in the activity should be incentivised by some form of reward, e.g., a voucher for participation or the production of a result in the form of a publication.

6. Annexes

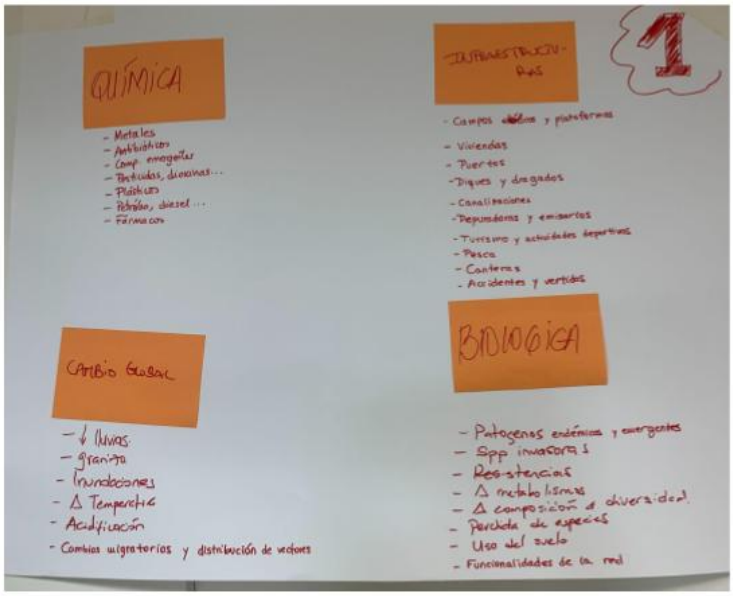
Annex I. Agenda of the World Café

TIME	DURATION	ACTIVITY: WORLD CAFÉ	RESPONSIBLE	OBSERVATIONS
9:00 – 9:30		WELCOME		
9:30 – 9:50	20′	**Introduction** 1. Objectives of the World Café. a. Who we are, where we work and what we do. b. Networking 2. Explain the route of the World Café a. Phases: 5 minutes to know each other. 5 Questions for all, 5 Tables, 15 mins per question. b. Rules: ➢ We are here to listen, not to answer. ➢ Plane mode or turn off your mobile phones. ➢ The distribution of people at each table and each round is random. 3. Explain the **Living Lab** beyond the two projects BlueAdapt / HOBE	HOST: Nestor Create a hospitable environment	PRINCIPLES 1. Clarify the Context 2. Create Hospitable Space 3. Explore Questions that Matter 4. Encourage Everyone's Contribution 5. Connect Diverse Perspectives 6. Listen together for Patterns and Insights 7. Share Collective Discoveries
9:50 – 10:10 2′ 10:12 – 10:32	5′ 15′ 5′ 15′	**Development of the activity** 5 tables / 4-5 people per table 5′ to presentations 15′ to discuss the question **1st Round** Who we are, where we work and what we do. 1st question: What are the main health risks/pressures/threats currently on the Basque Coast? *Change of table* **2nd Round** Who we are, where we work and what we do. 2nd question: The strongest impacts will be experienced by …?	ALL PARTICIPANTS selected persons will play the role of invisible moderators at each table.	MATERIALS 6 tables with chairs Poster papers Post-its Felt pens Mask tape Catering

10:32 – 11:00	30′	BREAK		
11:30 – 11:50 2′ 10:34 – 10:54	5′ 15′ 5′ 15′	*Change of table* **3rd Round** Who we are, where we work and what we do. 3rd question: Are there any strategies to monitor/control/mitigate these problems? Are there barriers? Are there opportunities? Who would be responsible for these strategies? *Change of table* **4th Round** Who we are, where we work and what we do. 4th question: How to improve interaction and communication between scientists?	ALL PARTICIPANTS	
11:00 – 11:30	30′	Exhibition of the posters of the round tables and networking	ALL PARTICIPANTS	
11:30 – 12:00	30′	Share Collective Discoveries - Personal experience in this World Café - Read the questions/comments on the parking lot - Does anyone know the answer? Closure	HOST: Nestor	

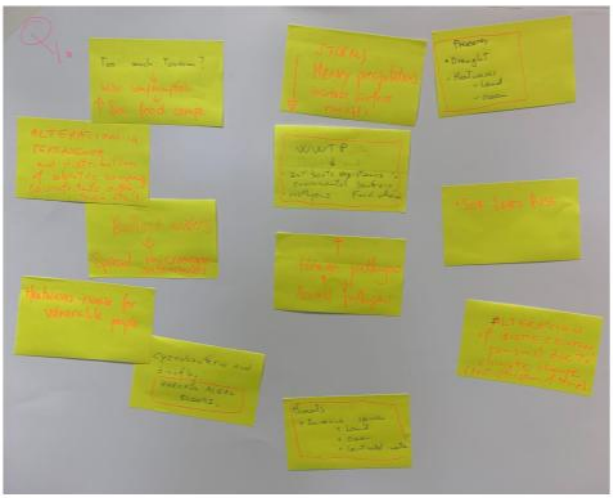
Annex II. Posters from the 1st question: What are the main health risks/pressures/threats currently on the Basque Coast?

Q1: Goup A



- Química
  - Metales
  - Antibióticos
  - Contaminantes emergentes
  - Pesticidas, dioxinas…
  - Plásticos
  - Petróleo, diesel…
  - Fármacos
- Infraestructuras
  - Campos eólicos y plataformas
  - Viviendas
  - Puertos
  - Diques y dragados
  - Canalizaciones
  - Depuradoras y emisarios
  - Turismo y actividades deportivas
  - Pesca
  - Canteras
  - Accidentes y vertidos
- Cambio Global
  - Menos lluvias
  - granizo
  - Inundaciones
  - Cambio de temperatura
  - acidificación
  - Cambios migratorios y distribución de vectores
- Biología
  - Patógenos endémicos y emergentes
  - Spp invasoras
  - Resistencias
  - Cambio en metabolismo
  - Cambio en composición y diversidad
  - Pérdida de especies
  - Uso del suelo
  - Funcionalidades de la red

Q1:Group B



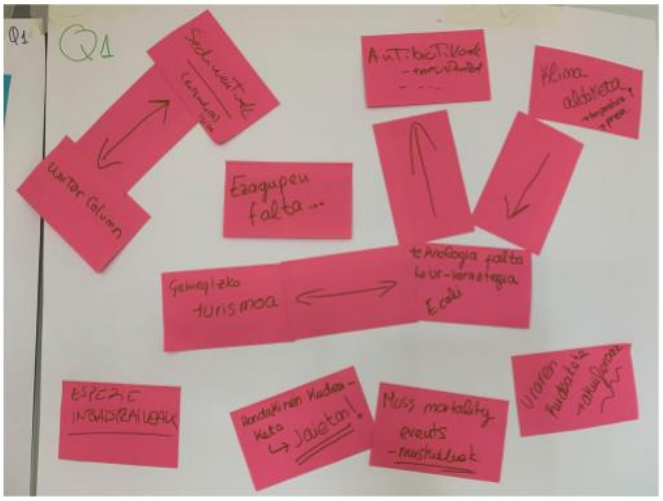
- Too much tourism?
  - Water consumption
  - Increased seafood consumption
- Alteration in permanence and distribution of abiotic components (disinfectants, antibiotics, trash, etc.)
- Ballast waters → spread of microorganisms, contaminants
- Heatwaves → worst for vulnerable people
- Cyanobacteria and dinoflagellates → Harmful algal blooms
- Storms, heavy precipitation → increase of surface runoffs
- WWTP
  - antibiotic resistance in environmental bacteria → food chain
  - pathogens
- Human pathogens <–> animal pathogens
- Invasive species
  - land
  - ocean
  - continental waters
- Pressures
  - Drought
  - heatwaves
    - land
    - ocean
- Sea level rise
- Alteration of biome (microorganisms) due to climate change (fast alteration of temp.)

Q1: Group C



- Agricultural activities
  - Animal hormones going to the water system
  - Pesticiedes
- Wastewater hospital
- Tourism
  - Plastic litter + additives of plastic
    - interaction/vector for other organisms/chemicals
    - microparticles
  - Personal Care Products (PCPs)
- Vibrio + Algae (blooms), toxines
- Climate change
- Spread of pathogens - poison
  - uncontrolled-unknown toxic-compounds
- Toxic metal industry → persistence of chemicals

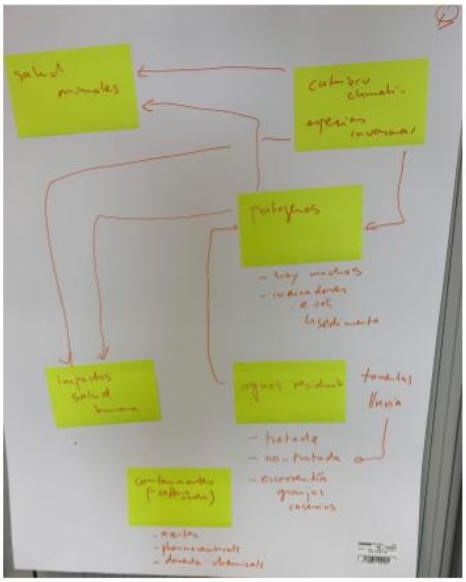
Q1: Group D



Está en vasco

- Falta de conocimiento…
- Turismo excesivo → falta de tecnología → en las depuradoras de agua (E. coli)
  - Antibióticos
    - resistencias
    - …
- Cambio climático → falta de tecnología en depuradoras de agua
  - temperatura sube
  - precipitaciones
- Especies invasoras
- Gestión de residuos
  - Fiestas
- Mass mortality events
  - moluscos
- Gestión del agua → acuíferos

Q1: Group E



- Cambio climático: especies invasoras
- Patógenos → hay muchos, indicadores, E. coli, sedimento
- Salud animales
- impactos salud humana
- Aguas residuales
  - tratada o no-tratada
  - escorrentías granjas, caseríos
- Contaminantes
  - cafeína
  - aceites
  - farmacéuticos
  - químicos domésticos

Q1: Group F



- Estrés hídrico
  - Ganadería
  - Alimentación
  - Price effect (electricidad…)
- Salud mental
  - uso antidepresivos
- Behaviour
  - increase in the use of beaches
    - mayor uso de playa sin horario de socorrismo
      - cambio en las corrientes marinas (conocimiento)
      - ahogamientos debido a mayor número de usuarios
    - uso de cremas → impacto salud de
      - agua
      - humanos
      - organismos marinos
  - gathering →más movilidad y transporte
    - más coches
  - restaurant/tourism
    - uso de embarcaciones → motores
      - estrés ruido marino
  - consumo de agua/electricidad/residuos
- Socio-economic
  - citizens and administration → costs (parking…)
  - Resource use
  - effects on elderly
  - Health care collapse
- Socio-economic
  - interacción entre locales y visitantes
  - ambulatorio frente a muchas más personas
  - efectos asimétricos por segmento de población → ageing, pathology, children…
- Basuras → gestión
  - pollution
    - cremas
    - antibióticos y medicamentos
      - human + veterinarios
    - residuos
    - escorrentía
- Human health
  - verano contaminación
    - coliformes → baño
  - alimentación → seafood
  - picor ojos
  - heatwaves
- Cambio climático
  - temperatura
  - volatilidad → cambios bruscos
  - flooding y WWTP → coliformes
- Human/animal interface
  - perros and pets
  - crowding

Annex III. Posters from the 2nd question: The strongest impacts will be experienced by...?

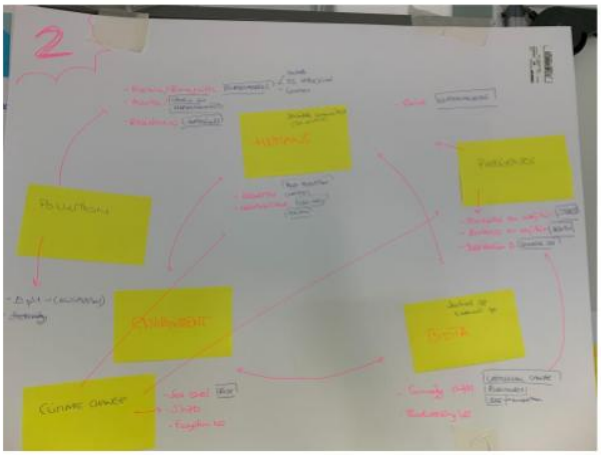
Q2: Group A



Positive impacts
- More funding, more research, more understanding
  - more knowledge, more technology
- Increase of awareness

Negative impacts
- decrease of biodiversity
- Coastal zone management → beach closures
- Use of resources, financial, environmental
- protection of animals or humans
  - new types of houses, protection of area, shelters
  - diferentes vulnerabilidades en la población, animal y humana
  - aparición de nuevas enfermedades, changes of % for known diseases
  - food chain alterations → impact on all organism health
- shopping habits
  - air conditioning (people would go to big infrastructures for the AC)
- Economy +/-
  - electricity consumption
  - business partnerships
- Legislation +/-

Q2: Group B

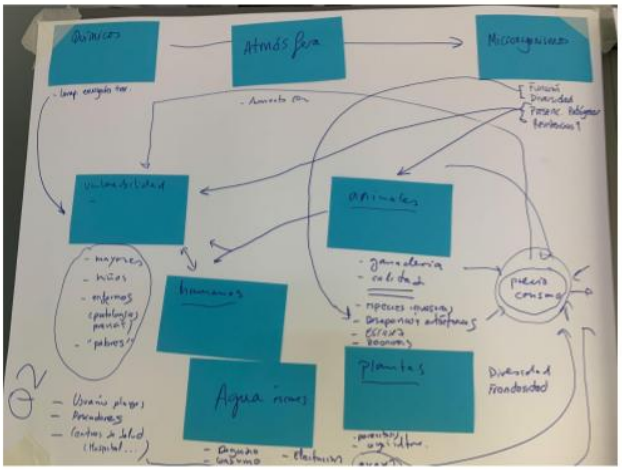


Environment
- Climate change
  - sea level rise
  - shifts
  - Ecosystem loss
- Pollution
  - Change in pH → Acidification
  - Bioaccumulation/Biomagnification → enfermedades
    - cáncer
    - disruptores endocrinos
    - comportamiento
  - Basuras
    - Cambio en uso
    - Enfermedades
  - Resistencias
    - ineficiencia

Humans → comunidades sensibles (poor countries…)
- Resources and Habitabilidad
  - food production
  - water
  - usos suelo
  - turismo

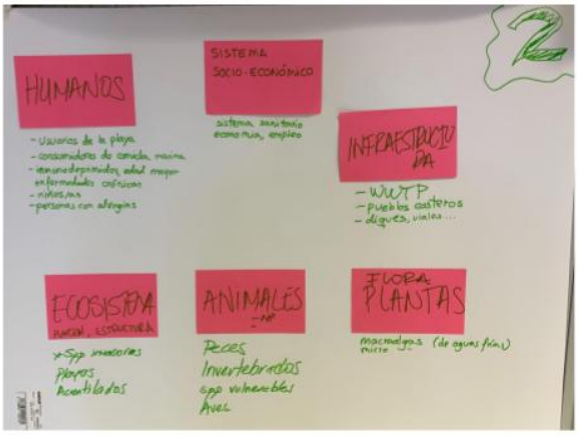
Biota → sentinel spp, endemic spp.
- Community shifts
  - latitudinal change
  - phenology
  - size → composition
- Biodiversity loss
- Pathogens
  - parásitos y bacterias en mejillón → stress, death
  - distribución → invasive species
  - vibrio → enfermedades

Q2: Group C



- Químicos
  - componentes emergentes tóxicos
- Atmósfera
- Microorganismos
  - función y diversidad
  - presencia y aumento de las resistencias
- Animales
  - Ganadería → calidad → precio y consumo
  - especies invasoras
  - desaparición de autóctonas → precio y consumo
  - escasez
  - zoonosis
- Plantas
  - Diversidad y frondosidad
  - parásitos
  - agricultura
- Humanos
  - Quien?
    - Usuarios playas, pescadores, centros de salud, hospitales
  - Agua → escasez
    - Regadío
    - Consumo
    - Electricidad
  - Vulnerabilidad
    - mayores
    - niños
    - enfermos → patologías previas
    - “pobres”

Q2: Group D



- Humanos
  - Usuarios de la playa
  - Consumidores de comida marina
  - Inmunodeprimidos, edad mayor, enfermedades crónicas
  - Niños/as
  - Personas con alergias
- Sistema socio-económico
  - Sistema sanitario
  - Economía y empleo
- Infraestructuras
  - WWTP
  - pueblos costeros
  - diques, viales…
- Ecosistema → funcion y estructura
  - a causa de Spp invasoras
  - playas
  - acantilados
- Animales
  - peces
  - invertebrados
  - spp vulnerables
  - Aves
- Flora
  - Plantas
  - macro y microalgas (de aguas frías…)

Q2: Group E



Humans → heatwaves, EVA(?), allergies, air pollution…

- People using beaches, occupational
- Psychological aspects
  - using mobile phones
  - entrapped by technology: Chat GTP
- Groups at risk →
  - children
  - elderly
  - chronic diseases, immunocompromised
- Social level
  - income, education
  - lifestyle → poor diet
  - human displacement → mental health
  - syndrome of the continent (isolation)
  - Mental stress and lifestyle
- Exposure to
  - toxics
  - pathogens (pandemics)

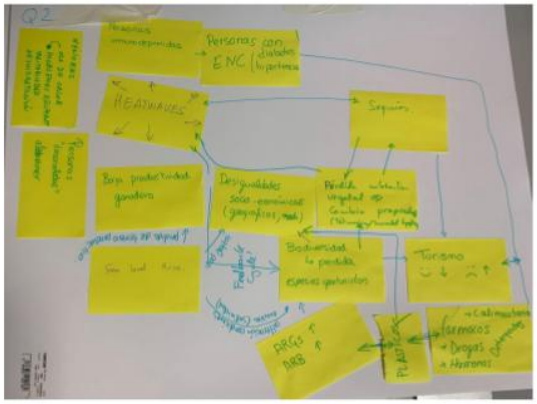
Biota

- Affected aquatic animals → economy loss
- Mortality
- immunocompromised

Ecosystems → Flood, wildfires, droughts

- Increase in invasive species
- Biodiversity loss
- Mass mortality events

Q2: Group F



Heatwaves

- baja productividad ganadera
  - pérdida de terreno productivo → sea level rise
- "personas desorientadas" → alzheimer
- personas inmunodeprimidas
  - Personas con ENC (diabetes, hipertensión…)
- menores
  - problemas respiratorios
- desigualdades socioeconómicas (geográficas)
  - más afectadas por Sea level rise
- sequías

Sea level rise

- alteración de la productividad
- alteración de las condiciones ambientales → salinidad

Biodiversidad

- Feedback cycle con heatwaves
  - pérdida de cubierta vegetal → cambio en las propiedades térmicas y de humedad
- Pérdida de biodiversidad
- especies oportunistas

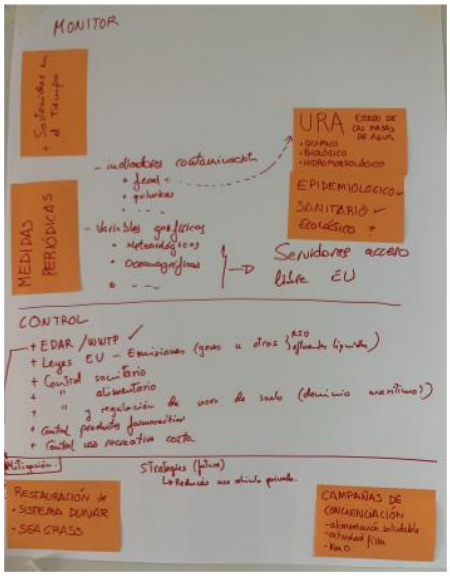
Plásticos

- Aumento de: ARGs y ARB
- Associados a
  - fármacos
  - drogas
  - hormonas
  - detergentes
  - contaminantes alimentarios

Alteraciones también al turismo

Annex IV. Posters from the 3rd question: Are there any strategies to monitor/control/mitigate these problems? Are there barriers? Are there opportunities? Who would be responsible for these strategies?

Q3: Group A



MONITOR
Medidas periódicas + sostenidas en el tiempo
- Indicadores de contaminación
  - Aguas fecales
  - químicos
  - …
- Variables geofísicas → en servidores de acceso libre EU
  - meteorológicas
  - oceanográficas
  - …

URA → estado de las masas de agua
- Químico
- Biológico
- Hidromorfológico

Monitoreo
- Epidemiológico: si
- Sanitario: si
- Ecológico: ?

CONTROL
- EDAR/WWTP
- Leyes EU - Emisiones (gases y otros, RSO, residuos sólidos?, efluentes líquidos)
- Control
  - Sanitario
  - alimentario
  - y regulación de usos del suelo (y en el dominio marítimo?)
- Control de productos farmacéuticos
- control del uso recreativo de la costa

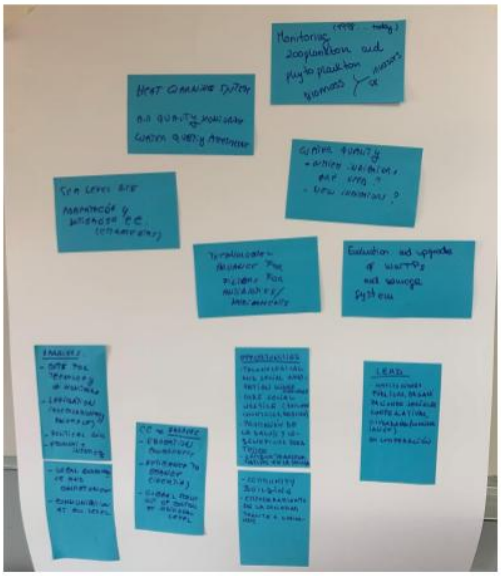
MITIGACIÓN
- EDAR/WWTP
- Restauración de
  - sistema dunar
  - seagrass
- Estrategias para el futuro
  - reducir el uso del vehículo privado
- Campañas de concienciación
  - alimentación saludable
  - actividad física
  - km zero

Q3: Group B



- Science-policy-governance interaction → living lab
- Root causes
- Reduce CO2 emissions
- Falta de visión a largo plazo
- No hay estrategias generales
- Sectorial, fragmentación estructural
- Normativas etc..
- Ver otras realidades, **cultura**, literacy
- Educación, concienciación → los padres, las familias… quien?
- Comunicación
- Participación ciudadana
- Food control
- Decrease pH for prevention

Q3: Group C



- Heat warning system
- Sea level rise → adaptación y mitigación EU (estrategias)
- Air quality monitoring, water quality monitoring
    - Which indicators are used?
    - New indicators?
- Technological advances for filters for antibiotics/medicaments
- Evaluation and upgrade of WWTPs and sewage systems
- Monitoring (1998…today) → zooplankton and phytoplankton
    - Biomass
    - Spp. invasoras

Barriers

- costs for technology and monitoring
- legislation (precautionary principle)
- political will
- economic interest
- local governance and competence
- communication at all levels
- education and awareness
- resistance to change (inertia)
- global source out of control at individual level

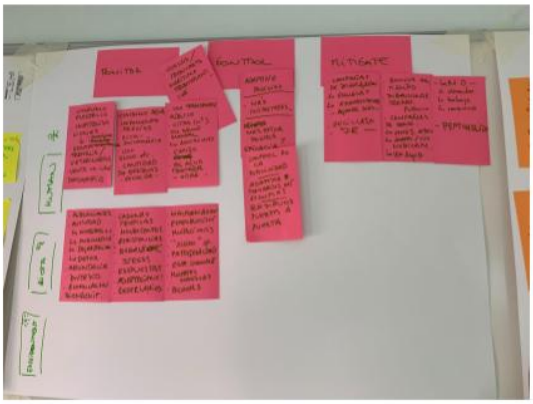
Opportunities

- Technological and social innovation → science, knowledge
- More social justice (between countries, regions)
- promoción de la salud y co-beneficios para todos/as
- cambios transformativos en la sociedad
- Community building
- empoderamiento de la sociedad frente a gobiernos

Lead

- Instituciones públicas, organizaciones sociales, cooperativas, ciudadanos (concienciación) en cooperación

Q3: Group D



MONITOR

Human

- consumo eléctrico
- hospitalizaciones
    - cancerígenos
    - estrogénicos
    - comportamiento
- venta farmacia/veterinarios
- venta on-line
- demografía
- consumo agua
- incremento precios
- nivel socioeconómico
- uso GLOVO (?) etc.
- cantidad de residuos, recogida
- vuelos/transporte público
- citas (nº) en salud mental → asociaciones
- censo
- volumen de agua tratada en el EDAR
- Vuelos/transporte, marítimo, transatlánticos

Biota

- Poblaciones
- Actividad → metabólica, enzimática, degradación, detox
- Abundancia y Diversidad
- Acumulación, biomagnificación
- Cadenas tróficas
- Movimientos
- Resistencias
- Respuestas → behavioral, stress, adaptaciones
- Reservorios
- Malformaciones, mutaciones
- Reproducción
- Alien Spp
- Patogenicidad
- Respuesta inmune
- muertes masivas
- blooms

CONTROL

- Adapting policies
- Más inspectores (Ministerio de Ambiente???)
- Más ética política y eficacia
- Control de la publicidad
- Adaptar temarios en escuelas
- Residuos puerta a puerta

MITIGACIÓN

- Campañas de divulgación → escuelas, ayuntamientos
- Agenda 2030
- Reciclaje → 7R
- bancos de tiempo
- Subvencionar transporte público
- Campañas de sensibilización
    - envejecimiento activo
    - ahorro/uso medicamentos
    - uso del agua
- Km 0
    - alimentación
    - trabajo
    - consumo
- Peatonalización

Q3: Group E



- Espacios transdisciplinares
- Modelos
- Métodos
- Bio-monitoring programmes
- Long-term series
- Biomarking

Indicadores transdisciplinares sintéticos → Comunicación/puentes

- Biología
- Socioeconomía
- Humanos
  - Agricultura
  - pesca
  - turismo
  - actividades deportivas (?)
- no-humanos
- determinantes de salud
- contribuciones de la naturaleza a la gente
- veterinaria
- química

Sistemas socioecológicos dinámicos y complejos

Q3: Group F



Money ($)
Monitoring programs → based on

- Biota
  - Sentinel species
  - Biodiversity index
  - metabolism
- Ecosystem-based methods
  - pollutants
  - physicochemical variables
  - Resistance (antibiotics)
- Guidelines (ICES)

Bioremediation
Control

- Adapted infrastructures to control different stressors
- legislation, regulatory bans (e.g. TBT, CFS…)

Who?

- Construir una red a diferentes niveles → organización
  - ciudadanos
  - científicos-multidisciplinares
  - gobiernos
- Scientists, community activists, families, government (local, regional, international…)
- Science and knowledge based decisions

Barriers → balance between ecosystem health and economical interests

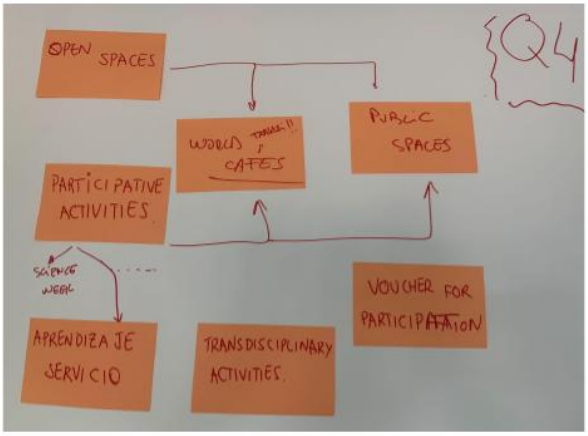
Opportunities → more work for the researchers

Total lack of organization to face disasters that can lead to isolation or lack of resources

Modelos predictivos

Annex V: Posters from the 4th question: How to improve interaction and communication between scientists?

Q4: Group A



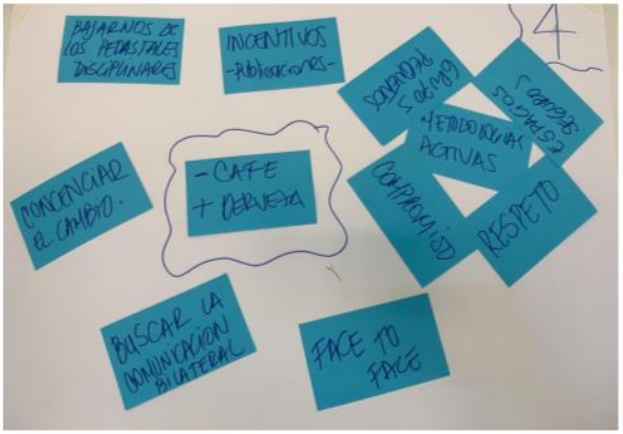
- Open spaces
  - World Cafés (Txakoli!!)
  - Public spaces
- Participative activities
  - Science week
  - …
- Aprendizaje/Servicio
- Transdisciplinarity activities
- Voucher for participation

Q4: Group B



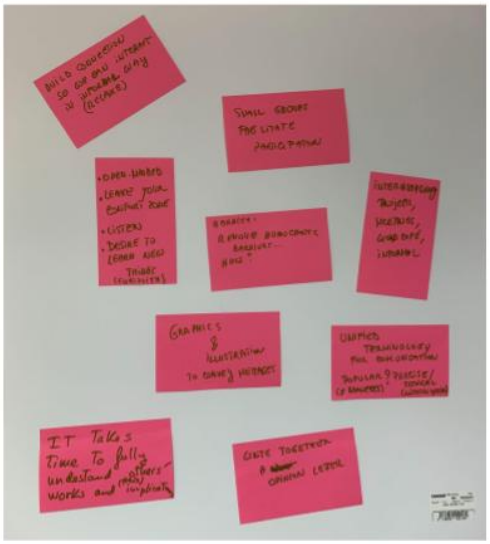
- Proyectos transdisciplinares
  - HOBE + Blue Adapt
- Transferencia de resultados a nivel local → Lab meetings
  - Estrategias específicas (PROCESO)
  - Tejer redes y colaboraciones
  - Incluir ≠ visiones
  - interacción
  - charlas multidisciplinares para fomentar transdisciplinaridad
  - evitar tecnicismos
  - véndeme tu póster… ≠ formatos
  - graphical abstracts
- Escoger lenguaje y términos **comunes**
- Talleres
  - apoyo en el análisis de datos
  - adaptación y evolución
  - nuevas visiones
  - ejercicios didácticos
  - programas
- Publicidad
  - redes sociales
  - financiación-grupos
- Bases de datos compartidas
  - información fácilmente interpretable
  - datos generados desde ámbitos que de otra manera sería difícil conseguir

Q4: Group C



- Bajarnos de los pedestales disciplinares
- Incentivos → publicaciones
- Metodologías activas
  - Respeto
  - Compromiso
  - Espacios seguros
  - Grupos pequeños
- Face to Face
- Concienciar el cambio
- Buscar la comunicación bilateral
- -Café/+Cerveza

Q4: Group D



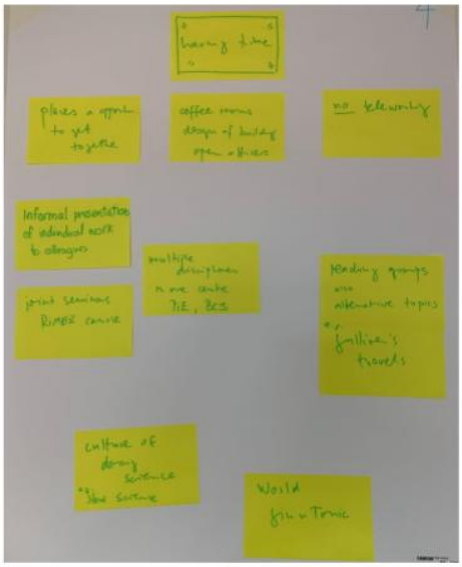
- Build connection so we can interact in informal way (relax)
  - open minded
  - leave your comfort zone
  - listen
  - desire to learn new things → curiosity
- Small groups to facilitate participation
- Interdisciplinary projects, meetings, world café, informal
- Barrier → remove bureaucratic barriers… how?
- Graphics and illustrations to convey messages
- Unified terminology for communication
  - Popular? (≠branches)
  - precise/technical (within discipline)
- It takes time to fully understand others' work and its implications
- Write together opinion letter

Q4: Group E



- Intra-project
- Out of here
  - conferences
  - articles
  - workshops
  - interdisciplinar symposium
  - applied science → stakeholders, industry
  - social networks, media → implication, commitment
- what is needed
  - Meetings
  - interactive meetings
  - databases
    - needs/ideas
    - techniques, logistics, results
  - news/updates
  - channels of communication
- Challenges
  - comunicación entre disciplinas
  - trasladar el conocimiento
  - ego → dinámicas de poder
  - jerarquías
  - competitividad
  - productividad
  - funding
- Ideas
  - Discriminación "positiva" de interdisciplinas
  - open science
  - Egela Pi con detalles:
    - personas
    - técnicas
    - estudios relacionados
    - foros
    - creación de espacios de integración informal/intergeneracional
    - long-term strategies

Q4: Group F



- **Having time**
- Spaces
  - Places and opportunities to get together
  - coffee rooms, design of the building, open offices
  - **no** teleworking
- Multiple disciplines in one center → PiE, BC3
- informal presentations of individual work to colleagues
- Joint seminars, RIMER course
- Reading groups,
  - Also alternative topics → gulliver's travels
- Culture of doing science → e.g. slow science
- World Gin n Tonic