NAUTILUS COLLABORATION

Biosecurity

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MANAGING DIRECTOR- NAUTILUS COLLABORATION
CHAIR – GILL HEALTH INITIATIVE

- Managing director of Nautilus Collaboration
  - R&D Projects including diagnostics
  - Environmental compliance
  - Certification services
  - Health and biosecurity management

- History:
  - Production health management
  - R&D management
  - Investment/technical due diligence for investments
  - Start-up

- Impact:
  - Collaborative relationships are key for aquaculture to grow
  - Research institutes & service providers & industry
  - Dissemination of knowledge including experiences

ABOUT US | OUR TEAM AND PROJECTS

- Multi-species projects
- Projects are usually focused on:
  - Health management and biosecurity strategies
  - Fish health research
  - Fish welfare – humane slaughter & operationalising welfare
  - Development of diagnostic assays
  - Development of tools (e.g. power apps, shiny apps, proof of concept machine learning, production modelling)
  - Environmental management (farm-based)
  - Policy advice to help grow industry
  - Certification
  - Product quality
- Key:
  - We aren't just vets- we have a number of talented scientists working together
  - Molecular biology, environmental scientists, ecologists, mathematics, computational science and programming – coming together to **deliver solutions**

ONE
EARTH | WATER | HEALTH

Let’s get interactive

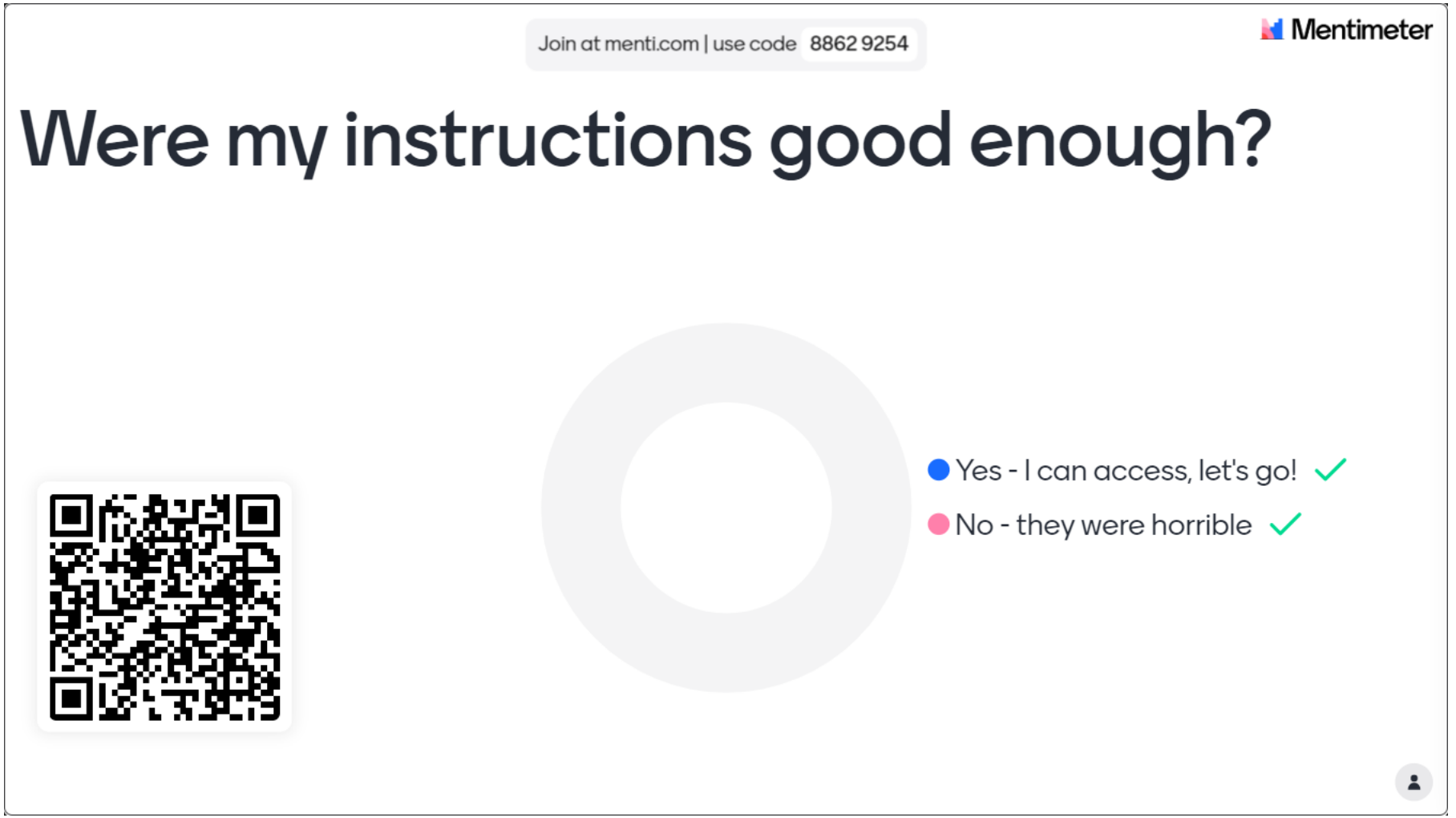
Mentimeter:

1. Scan the QR code on the presentation
2. This will direct you to a mentimeter website: https://www.menti.com/alhtx6syik6e

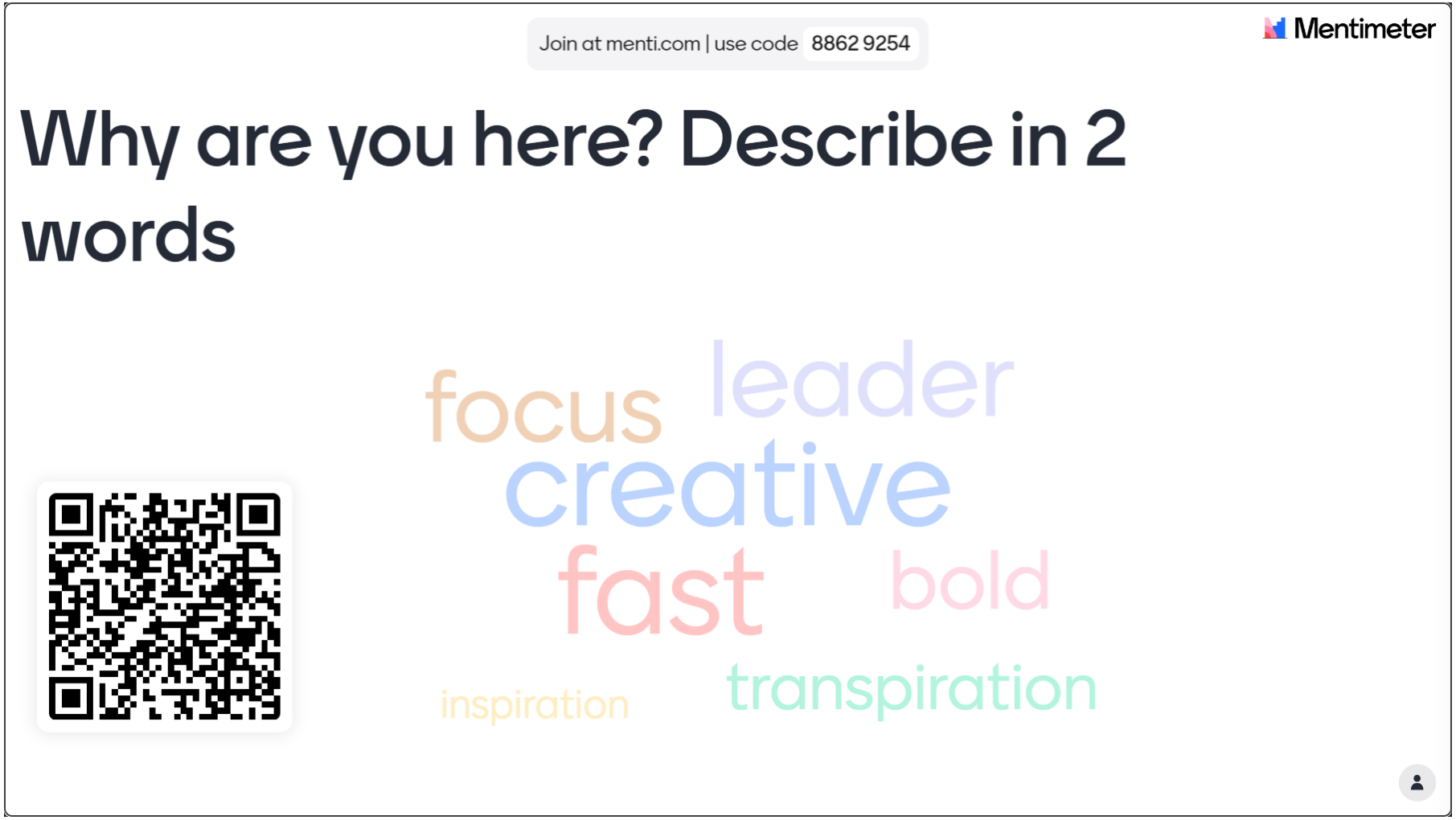
3. Access code if you are not directed: 88629264

Remember: Don’t skip ahead, we will use the QR code throughout the presentation. Once you answer, then keep the screen active in order to access the next question!

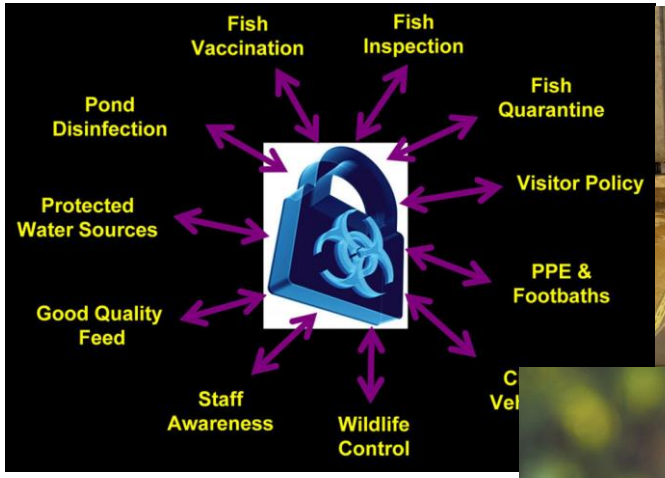
Give it a go!

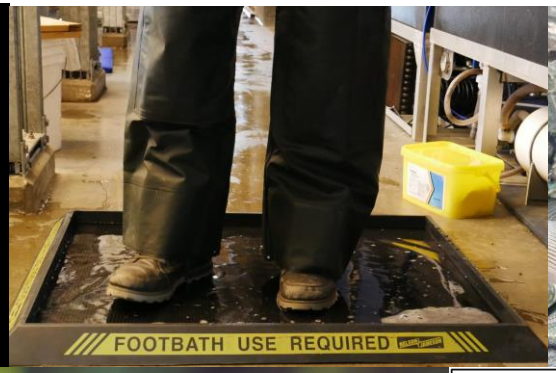

Join at menti.com | use code 8862 9254
Mentimeter
Were my instructions good enough?
Yes - I can access, let's go!
No - they were horrible

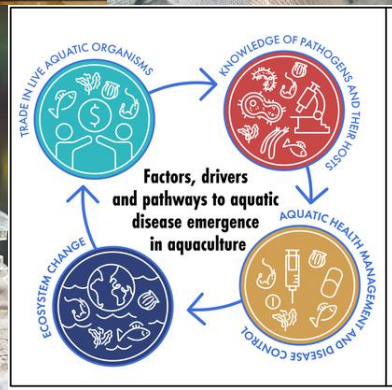
Let’s get interactive

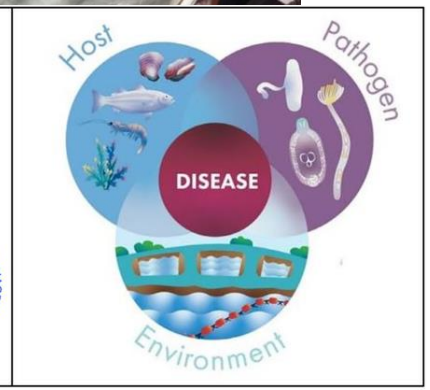


What is biosecurity?





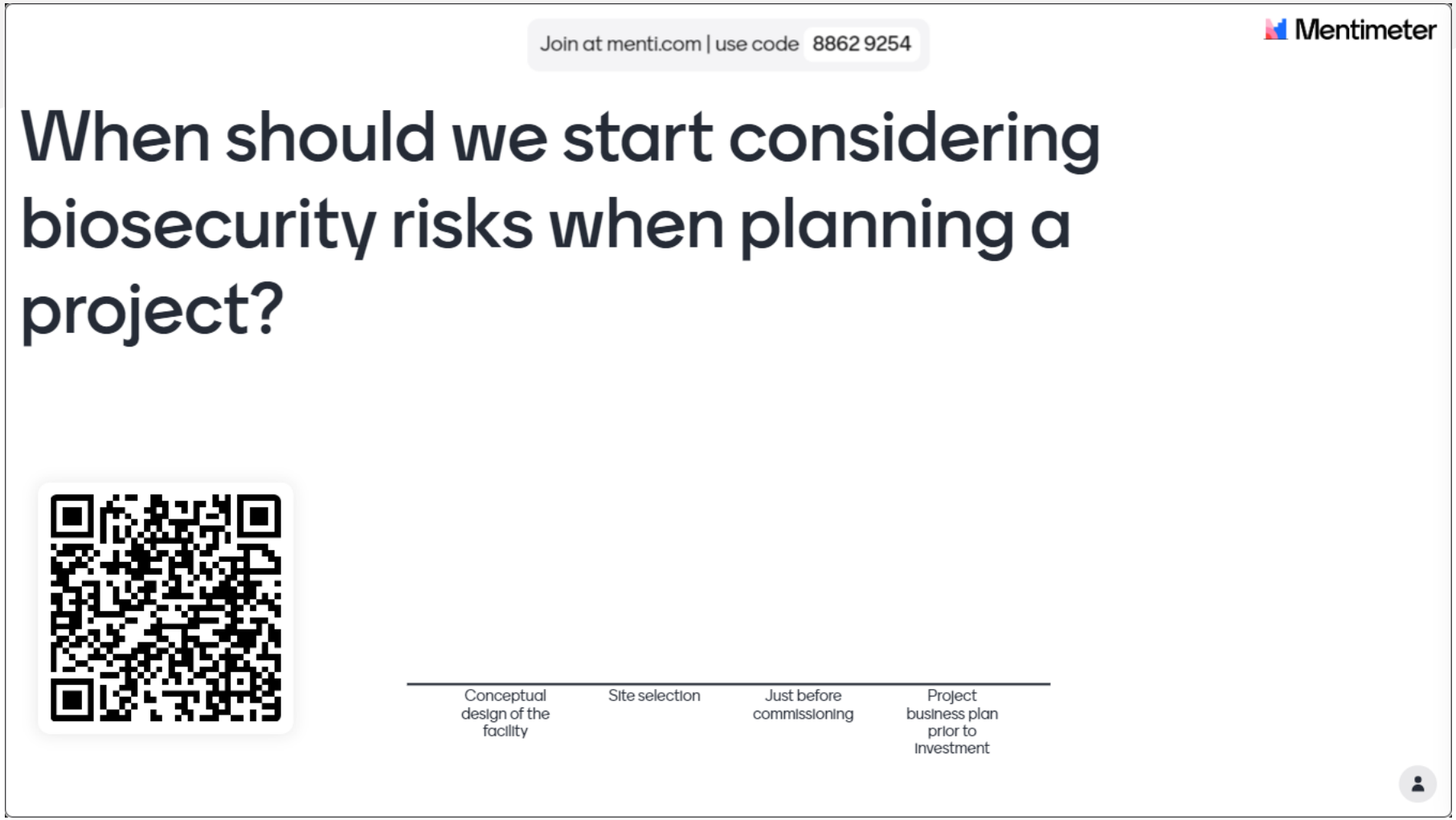




A **system** to support:

1. Prevent disease coming in
2. Reduce spread of disease (internally) including
3. Prevent disease exiting

Let’s get some perspective



Biosecurity in RAS

Biosecurity considerations in a **business plan**:

1. Define the extent of the **biosecurity risk** your business is willing to take – ZERO is not realistic
2. During the business planning phase consider:
    - In a disease outbreak situation, what % of biomass am I willing to put at risk
        - 2500 MT x 4 vs. 10000MT system
        - This will impact - $CAPEX/Kg and COP
    - How important is disease free stock?
    - Business continuity post-outbreak?
    - Stock insurance?
    - Does my biological plan support regular maintenance, hygiene and decontamination of the system?

Biosecurity in RAS

Basic principles for consideration:

1. Water
2. Animals (live, waste and product)
3. People
4. Equipment
5. Feed

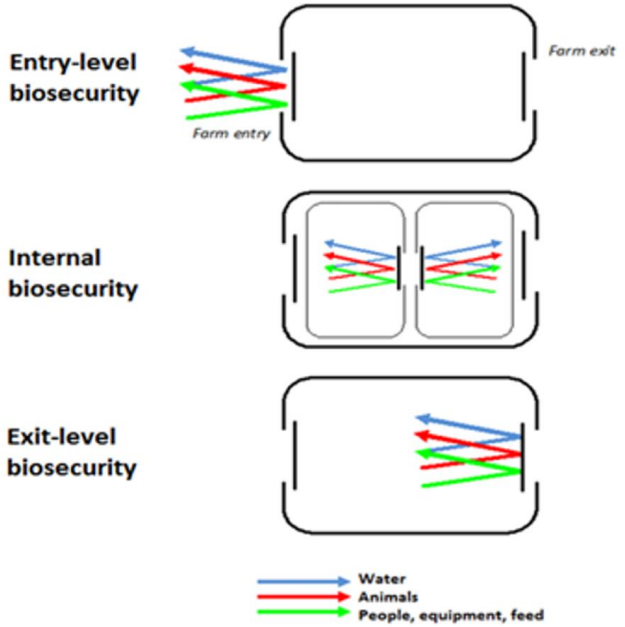


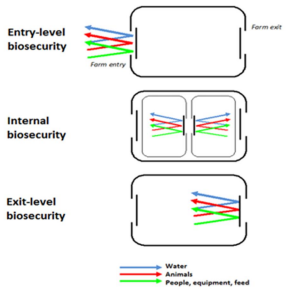
Figure 1. Different levels of farm biosecurity

Source: *K. Ellard, (2015). Disease recommendations to support aquatic animal health? Proceedings of the Third OIE Global Conference on Aquatic Animal Health, Session 4, 137-143.*

Biosecurity in RAS

Biosecurity considerations in **site selection:**

1. Who are my neighbours?
2. What is my water source? And what native fish species are there?
3. Are there other anthropogenic factors that can affect how fish respond to disease? E.g. neighbouring agriculture > run off
4. What are the importation limitations for seedstock? (county/country)
5. Policy – in country and in region – are there mechanisms for support during disease outbreak response/control or does this need to be built?
6. Staffing and skills – location will attract or detract employees?



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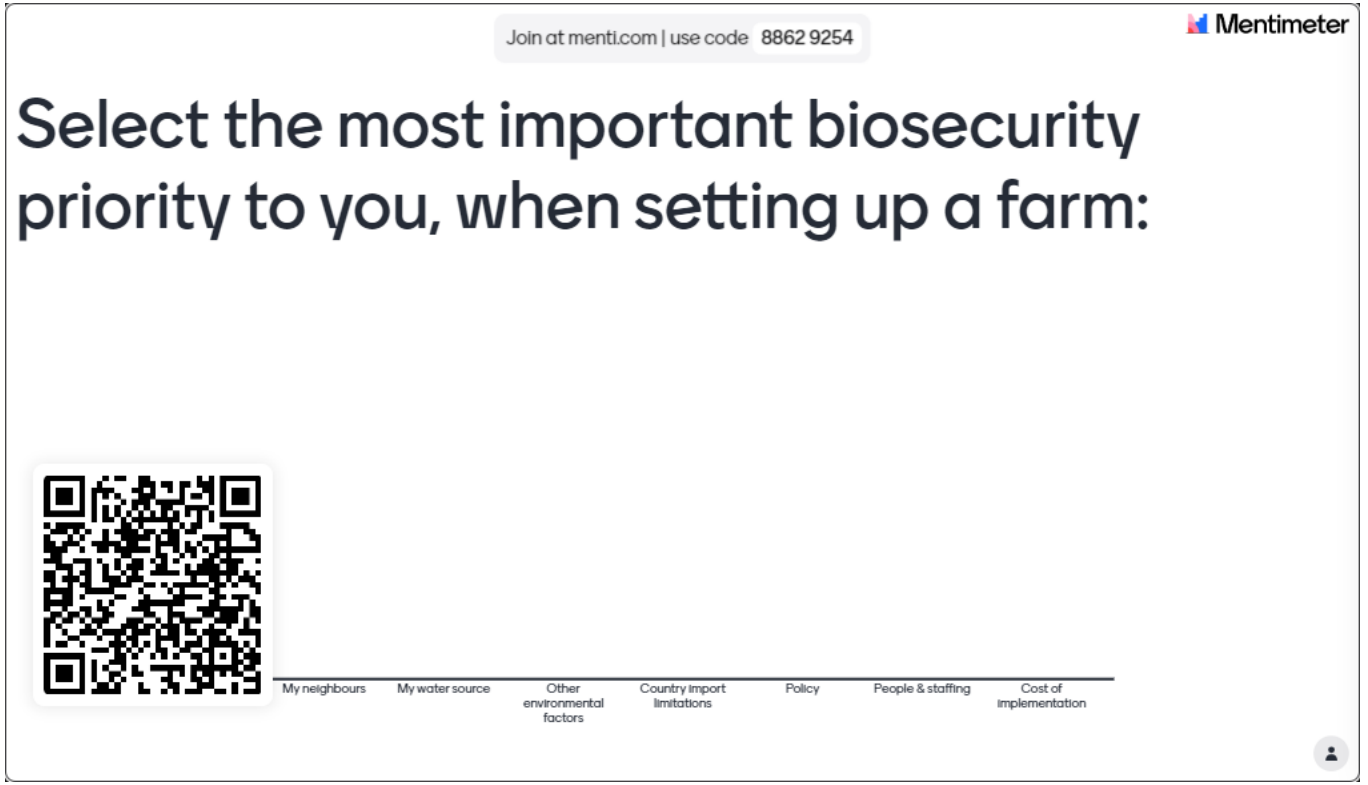
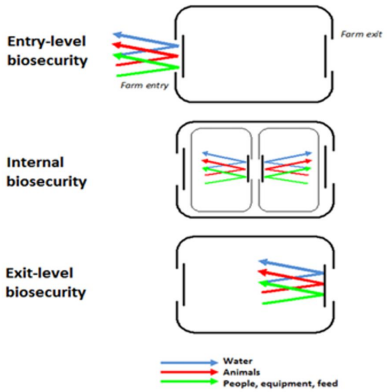


Biosecurity in RAS

What are your considerations for **conceptual design? – How do you break it down?**

Define: the unit of production e.g. quarantine, hatchery, grow-out

1. Entry level biosecurity: examples include
   - Water filtration and disinfection
   - Animals: Keeping pest-animals out (pests and pest-fish species), new stock
   - People – how can you design the facility for work flow and segregation? How restricted do you want access?
   - Equipment segregation or ability to decontaminate/disinfect
   - Type of feed and biosecurity risk (+ storage)



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Biosecurity in RAS

What are your considerations for **conceptual design? – How do you work it out?**

Let's talk: *Likelihood X Consequence*
Consequences should be meaningful to your business for the risk rating
Always work out residual risk ratings – and in the planning phase think of the management system required

Source of hazard	Type of Risk (Hazard)	Routes of transmission	Source of hazard	Risk management estimation	L	C	R	Risk management options evaluation	L	C	R	Evidence or documentation required (examples)
	Disease introduction	Stock Introduction	Import of wild brood stock, import of eggs, import of juveniles	Animals should only be introduced to the farm if they are of known health status and that status is of equal or better status than animals on the farm. In here enlist SOP's you already have related to prevent this hazard	4	4	16	• Obtain health status information and appropriate permits for brood stock before it enters the hatchery	2	4	8	Health certificates for fingerlings including pathology report.
								• PCR test for exotic or endemic diseases of concern				
								• Translocation approvals or permits must be obtained if required. Same applies for egg movements				State or national permits - soft copy including conditions for importation of stock.
								• Quarantine Area				Quarantine SOP: This should include details on quarantine protocols, staff responsibilities, and monitoring procedures. Stock sheets and records associated with quarantine system. Stock reception SOP and records for delivery day.
								Consider additional surface disinfection of eggs and/or live fish treatment (i.e., salt treatment)				SOP for disinfection of eggs and SOP for treatment of fish; records associated with it (Date, type of treatment, water parameters at the time of treatment).
								• Monitoring fish behavior				Behavioral Observation Logs: Maintain detailed logs that record observations of fish behavior. Include information such as swimming patterns, feeding behavior, social interactions, and any unusual or abnormal behaviors. These logs should be filled out regularly by trained personnel.
								• Monitoring fish Health				Passive surveillance protocols (cases inventory and necropsy logs).
								• Keep track of all stock movements onto, within or off your farm				SOP Stock movements, stock records (batch/family, stock reception and, all stock movements onto, within or off your farm. Team must be aware (emails) every time fish are moved.
		Cohabitation with ill and dead stock	Daily sick or dead animals (morbidity and mortality)	Precautions should be undertaken to prevent the within farm spread of pests, disease until such situations are resolved.	5	4	20	• Remove sick or dead animals from production units as soon as possible and disposed of in accordance with local regulations	3	4	12	SOP Mortality management. Logs for termination/elimination, mortalities numbers records. SOP Mortality removal, FHP Emergency response (morbidity removal).
								• Cleaning and disinfection				SOP Cleaning and disinfection (sanitary Filters, equipment, buckets for mortality removal). Daily weekly and monthly cleaning and disinfections logs.

Biosecurity in RAS

What are your considerations **just before commissioning?**

This is operationalising the plan:

1. How are you going to motivate people to think and act in the right way?
2. What management systems are there to support them?
3. Have you made it easy for them to get the information they need?
4. Have you made it easy for them to carry out tasks related to biosecurity?
5. Do they have the basic training and skill sets?
6. What happens when people raise biosecurity risks?

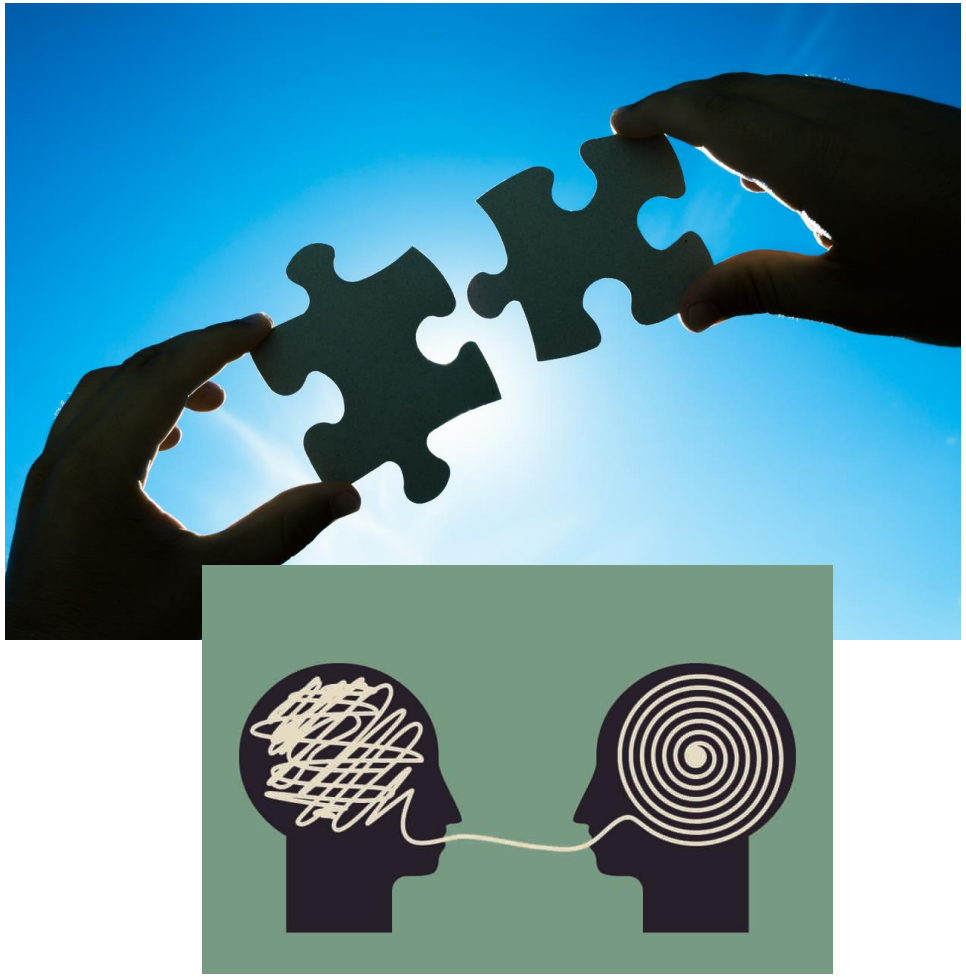
Government and policy

Both government agencies and industry:

- Have a drive to be responsible and more sustainable
- Want to support job-making
- Want to limit emissions and to protect the environment, while producing food and reducing food mileage
- Want to support response when there is a disease outbreak
- Want to support business continuity

Regulations and setting of license conditions:

1. Should be iterative and reviewed regularly – are the expectations realistic? How does it look in the real world?
2. Adaptive management actions have been shown to work
3. Should be set collaboratively



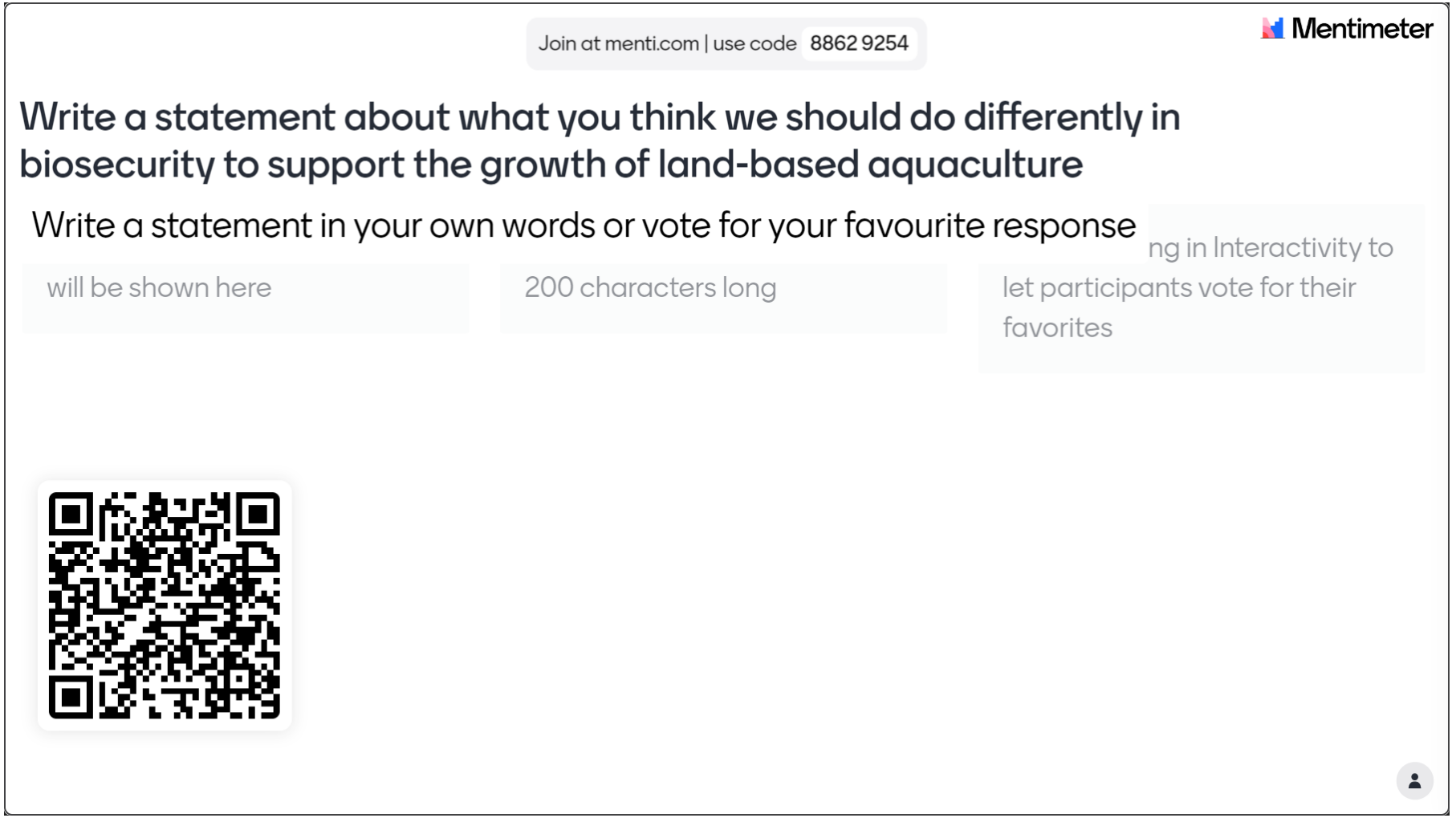
Where does the responsibility lie?

Carrots and sticks?

Effective:

- When leadership **buys into** biosecurity culture and makes the investment into training and improvements
- When leadership **listens to** biosecurity risks raised by staff members and are seen to reason and **take action** when necessary
- When we **openly talk** about biosecurity
- When there is autonomy or flexibility with coming up with **solutions** that fulfil the intent
- Less sticks more carrots where **proactivity** is rewarded
- **Workshops** with operational staff members when developing the biosecurity risk assessment
- Risk mitigation measures are **practical**
- When **context and relevance** are delivered
- When there is open dialogue between company leaders and policy makers

Your thoughts



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