

# THE RELATION BETWEEN EU REGULATIONS ON ORGANIC AQUACULTURE AND KNOWLEDGE ON FISH PRODUCTION SYSTEMS

Giuseppe Lembo (COISPA), Alfred Jokumsen (DTU), Bjørn-Steinar Sæther, Chris Noble, Hanne Marie Nielsen (NOFIMA), Zdeněk Adámek (USB), and Wout Abbink (Wageningen UR)

EAS, Edinburgh, 2016



LIVESTOCK RESEARCH  
WAGENINGEN UR



rAqua



# Presentation in fram of OrAqua (EU-FP7)

- Vision: Economic growth of the organic aquaculture sector in Europe, supported by science based regulations in line with the organic principles and consumer confidence.
  
- Mission: suggestions for improvements of the future regulatory framework for organic aquaculture in Europe
  - Scientific knowledge on organic and conventional aquaculture production issues,
  - consumer perceptions, socio-economics and institutional frameworks related
  - MCDA and stakeholder input

# OrAqua Consortium

- multidisciplinary consortium including universities, aquaculture research institutes, research groups in social science, a fish farmer organisation, a fish farmer and two organic certification/control bodies
- Nofima (Asa Espmark), DTU (Alfred Jokumsen), Ifremer (Jean Paul Blancheton), COISPA (Pino Lembo), SLU (Magnus Ljung), Wageningen UR (Wout Abbink),
- iZSve, USB, Debio, ICROFS, API, Culmares, ICEA

# OrAqua - Review

- Reviewing existing knowledge on aquaculture, related to organic production, covering:
  - 1) nutrition and feeding,
  - 2) health and welfare, veterinary treatments and biosecurity,
  - 3) **production systems**,
  - 4) environmental impact.
- Full review already available via [Wout.Abbink@wur.nl](mailto:Wout.Abbink@wur.nl)
- Several presentations about different aspects of the OrAqua project today, e.g. feed, shellfish



# Several aspects are important when considering production systems

- 1) The type of production system, 2) the species group, 3) the function for which the system is intended.
- 
- This results a variety of topics that are covered in the review :
  - 1) breeding, 2) hatchery and nursery, 3) Phyto- and zooplankton culture, 4) mussel and oyster culture, 5) seaweed culture, 6) **land-based and cage systems**, 7) recirculation aquaculture systems (RAS), and 8) integrated multi-trophic aquaculture (IMTA).



# Commission Regulation (EC) 834/2007 Recital 1 on organic production

- *“Organic [aquaculture] production is an overall system of **farm management** and food production that combines **best environmental practices**, a high level of biodiversity, the preservation of **natural resources**, the application of high **animal welfare** standards and a production method in line with the preference of certain **consumers** for products produced using **natural substances and processes**....”*
- This text includes key aspects  
modern view of aquaculture



# (EC) No 710/2009 and Reg. EC 889/2008 art 25f on production systems

- *'Organic aquaculture animal production should ensure that **species-specific needs** of animals are met. In this regard husbandry practices, management systems and **containment systems** should satisfy the welfare needs of animals. Provisions on the **appropriate construction** of cages and net pens at sea as well as for rearing systems on land should be made...'*
- *'The **design and construction** of aquatic containment systems shall provide flow rates and physiochemical parameters that safeguard the animals' health and welfare and provide for their behavioural needs.'*



# 834/2007 Art 11 on general farm production rules

- A holding *may be split up* into clearly separated units or aquaculture production sites which are not all managed under organic production.
- The *same species* may be involved, provided that there is adequate separation between the production sites



# 710/2009 Art 25g on specific rules for aquatic containment systems

- *Closed recirculation aquaculture animal production facilities are prohibited, with the exception of hatcheries and nurseries or for the production of species used for organic feed organisms.*



# RAS have several advantages

- Low water consumption
- Recycling of water
- Stable farming conditions/water quality
- Low environmental impact
- Prevents ingress of pathogens
- Prevents escapes
- Recycling/collection of waste nutrients (fertilizer)
- Easy to disinfect/clean



# but is not in line with organic principles

- significant input of external energy,
- high stocking densities (for economic reasons),
- advanced waste water treatment devices,
- use of UV radiation and pure oxygen,
- disconnection of the aquaculture production from the external natural aquatic environment.



# Flow-through, traditional farms

- Original flow-through farms are already quasi-organic:
  - The water is taken in via a damming of the water course, passes through the farm by gravity, or by only minor use of pump energy.
  - Water treatment is used for mechanical (micro-sieves, settling ponds) and biological filtration.

Photo by Alfred Jokumsen



LIVESTOCK RESEARCH  
WAGENINGEN UR



# Flow-through

- Due to the limitations of water resources, national regulations sometimes allow for limited use of new water.
- Re-use of water could be a solution, in line with the principles of organic production
  - extensive recirculation (70% re-use) in out-door systems.

Photo by Alfred Jokumsen



LIVESTOCK RESEARCH  
WAGENINGEN UR



# Re-use of water, an alternative for RAS

- This combines some advantages of both flow-through systems and RAS, without compromising organic principles.
- Instead of being discharged, the water is pumped back to the inlet and re-used after passing waste water treatment devices
  - natural-filter beds,
  - settlement ponds,
  - mechanical or biological filters,
  - and/or using seaweeds and/or bivalves and algae



# 710/2009 Art 25b and Reg. EC 889/2008 art 25g on general farm production rules

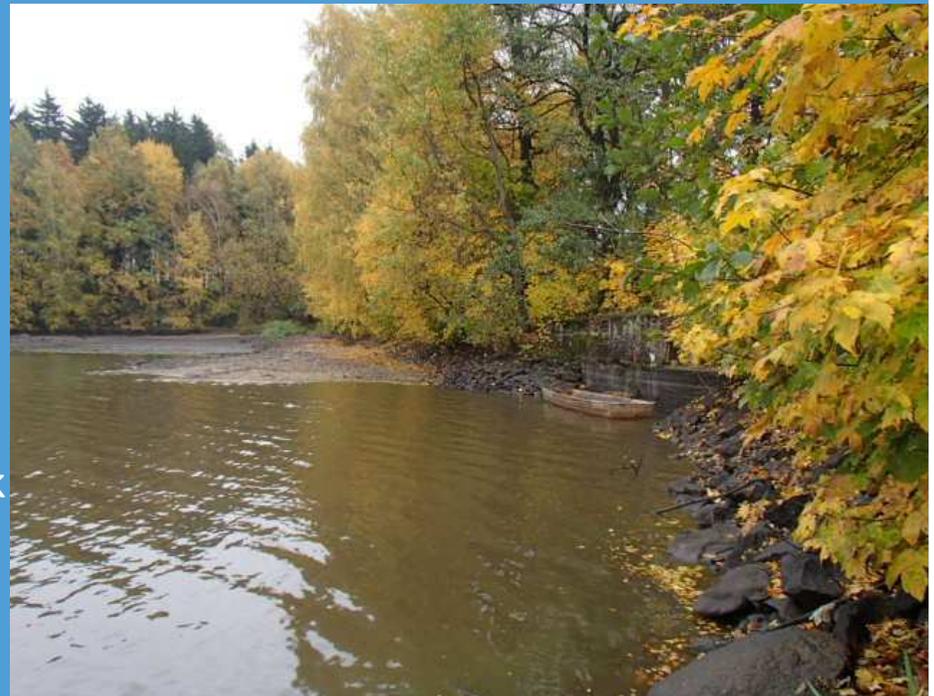
- *Rearing units on land shall meet the following conditions: (a) for flow-through systems it shall be possible to monitor and control the flow rate and water quality of both in-flowing and out-flowing water; ...*
- *For aquaculture animal production in fish ponds, tanks or raceways, farms shall be equipped with either **natural-filter beds, settlement ponds, biological filters or mechanical filters** to collect waste nutrients or use seaweeds and/or animals (bivalves and algae) which contribute to improving the quality of the effluent. **Effluent monitoring** shall be carried out at regular intervals where appropriate.*



# Pond culture (focus on carp)

- Carp pond aquaculture also is already quasi-organic.
  - Adaptations in stocking density and fertilization limits are needed,
  - maintenance of a viable aquatic and surrounding terrestrial ecosystem,
  - management to protect fish health and welfare

Haslauer teich (Austria)  
organic carp farming,  
photo by Zdeněk Adámek



LIVESTOCK RESEARCH  
WAGENINGEN UR



# Pond culture (focus on carp) future research issues

- Regular and steady organic feed (cereals) supply.
- The necessity of avoidance of hormonal preparations for induced carp spawning
  - Pituitary glands, which are used for these purposes, can also be of organic origin.
  - Current organic does not allow this exception.



# Pond culture: 834/2007 Art 5 on specific principles applicable to farming

- *(n) the maintenance of the biodiversity of natural aquatic ecosystems, the continuing health of the **aquatic environment** and the quality of surrounding aquatic and **terrestrial ecosystems** in aquaculture production*

Bruneiteich, Austria  
Organic carp farming,  
photo by Zdeněk Adámek



LIVESTOCK RESEARCH  
WAGENINGEN UR



# Cage culture

- Prevailing production system for salmonid production.
  - relatively low investment costs,
  - low energy costs,
  - utilise environmental resources
  - efficient area use,
  - Relatively low carbon footprint

photo by Asa Epsmark



# 710/2009 Art 25g on specific rules for aquatic containment systems

- *3. Containment systems at sea shall:*
  - (a) be **located** where water flow, depth and water-body exchange rates are adequate to minimize the impact on the seabed and the surrounding water body;
  - (b) shall have suitable cage design, construction and maintenance with regard to their **exposure** to the operating environment.



# Cage culture - biofouling

- affect water quality within the rearing system by limiting water flow via occlusion of the net,
  - act as a vector for transfer of disease,
  - lead to cage loading and structural problems; component damage, material fatigue, security and overall integrity of the farming unit.
- 
- Use of chemicals (bis tributyltin oxide - TBTO) banned since it works as an endocrine disruptor.
  - Today most nets are impregnated with Cu.
  - In addition the farmers change and clean nets occasionally,



# 710/2009 Art 25p Specific rules for molluscs:

- *'Biofouling organisms shall be removed by physical means or by hand and where appropriate returned to the sea away from shellfish farms. Shellfish may be treated once during the production cycle with a lime solution to control competing fouling organisms.'*
- No mention of fish cage biofouling in regulation

photo by Asa Epsmark



LIVESTOCK RESEARCH  
WAGENINGEN UR



# Cage culture – conventional regulations

- Conventional regulations can form a robust and sound operational basis for organic cage aquaculture facilities.
  - NS-9410 Environmental monitoring of benthic impact from marine fish farms
  - NS-9415 requirements for the physical design of the installation and the associated documentation.

# Cage culture – conventional regulations

- NS9410 (and other regulations) have developed together with the development of cage types and the facilities, resulting in a significant decrease in feed spill.
- Conventional farming is well regulated when it comes to environment, welfare, escapees, etc. and much of these regulations can act as robust basis for organic regulations.
- → when regulating organic aquaculture there is no need to re-invent the wheel.

# 710/2009 recital 24

- *Organic aquaculture is a relatively new field of organic production compared to organic agriculture. Given consumers' growing interest in organic aquaculture products further growth in the conversion of aquaculture units to organic production is likely. This will soon lead to increased experience and technical knowledge. Moreover, planned research is expected to result in new knowledge in particular on containment systems, the need of non-organic feed ingredients, or stocking densities for certain species. New knowledge and technical development, which would lead to an improvement in organic aquaculture, should be reflected in the production rules. **Therefore provision should be made to review the present legislation with a view to modifying it where appropriate.***





This work has been funded under the EU seventh Framework Programme by the OrAqua project N°613547: European Organic Aquaculture – Science based recommendations for further development of the EU regulatory framework and to underpin future growth in the sector.