Session Biosphere: April 12th 11.30 hrs

1s4 Towards circular marine food production | Sustainable mariculture

TRANSLATING CIRCULAR ECONOMY PRINCIPLES TO AQUACULTURE

CHARY K 1), VAN RIEL AJ 12), FILGUEIRA R 3), WILFART A 4), SOUHIL H 4), MUSCAT A 5), VERDEGEM M 1), DE BOER I 2), WIEGERTJES G 1)

1) Aquaculture and Fisheries group, Department of Animal Sciences, Wageningen University and Research, Wageningen, The Netherlands.

2) Animal Production Systems Group, Wageningen University and Research, Wageningen, The Netherlands

3) Marine Affairs Program, Dalhousie University, Halifax, Nova Scotia, Canada

4) UMR SAS, INRAE, Institut Agro, Rennes, France

5) Policy officer joint programming networks, Corporate Strategy and Accounts, Wageningen University and Research, The Netherlands

---

A circular economy (CE) is perceived as a way to reduce the environmental pressure of human activities including (blue)food production. In general, CE and its principles are still underexplored in aquaculture, although its fundamentals (i.e., the reuse, recycling, recovering nutrients, and energy) have already been largely applied. A recent study presented a set of 5 principles applicable to food and non-food systems to guide biomass use towards a circular bioeconomy (Muscat et al., 2021): safeguarding and regenerating the health of our agroecosystems; avoiding non-essential products and the waste of essential ones; prioritizing biomass streams for basic human needs; utilizing and recycling by-products of agroecosystems; and using renewable energy while minimizing overall energy use. Most of the examples provided by the authors were based on terrestrial production systems, i.e., agriculture and livestock. These food production systems have similarities but also important differences with aquaculture systems and their products. Among others, aquaculture can be practiced in various aquaecosystems (sea, earthen ponds, rivers, mangroves, paddy field), and with diverse technologies from low tech and low inputs systems (extensive earthen ponds, longlines) to high tech systems and energy demanding systems (e.g., recirculated systems). The cultivated species in aquaculture include organisms from five different trophic levels (including carnivorous species), which can have very different impacts on feed/food competition, but also differ in terms of contribution to food security globally. Moreover, each type of species and system produces its own set of waste and by-products (e.g., feces, uneaten feed, excretion, trimmings, shells, etc.) for which reuse, and recycle opportunities are

already existing or need to be found. The main objective of this study is to apply and translate the 5 principles developed by Muscat et al. (2021) to the field of aquaculture by linking to the relevant branches of the aquaculture literature and highlighting current gaps.

Keywords: Aquaculture, Circular economy principles, Environmental sustainability