ACCESS
ACADEMIC
COLLABORATION
CHILE
SWEDEN

Sustainable Aquatic Food Production Systems

Description

Aquaculture of animals and algae is of vital importance for global food production. Improved ecological, economic, and societal sustainability of this sector is necessary to safeguard life under water (SDG-14). Ample scientific data show that seafood consumption improves health and well-being, by providing high quality proteins, important fatty acids, vitamins, and trace elements (SDG3). Sustainable aquaculture is replacing and/or supplementing dwindling fisheries, contributing to sustainability of rural communities. Recirculating aquaculture systems (RAS) and aquaponics are being introduced into urban environments, improving sustainability of cities (SDG11). Aquaculture production systems, such as land-based RAS, generate fish manure, which is being recognized as innovative fertilizers for agriculture. Experiments show plant growth beyond those predicted from its nutrient, N-P-C, content. Further, side streams from aquaculture production are promising feed ingredients for terrestrial livestock (SDG15).

Sweden is an emerging aquaculture nation, where focus is placed on environmentally acceptable culture practices and sustainability issues. Expansion is based on species diversification, technical innovations of production systems and strive towards circular economy. The newly established, Formas funded, Blue Food – Centre for future seafood https://www.bluefood.se/in-english/, encompasses this vision. It includes the ACCESS universities: UGOT, KTH, SLU and UU, four research institutes and numerous industrial partners, ensuring a question driven and interdisciplinary approach, including academia-industrial supervision of PhD students.

In Chile, aquaculture is a highly successful and important food production sector. However, it was almost fully dependent on salmonid production in open marine systems. In 2009, a major research initiative was launched to reduce this dependency by diversifying Chilean aquaculture through the cultivation and commercialization of new native species with high economic potential. This is the CONICYT-funded Program for the Diversification of Chilean Aquaculture (PDACH) https://www.conicyt.cl/fondef/lineasde- programa/instrumentos-pasados/diversificacion-acuicola/ through which several ACCESS-linked Chilean universities have been funded in the past as well as currently. These major contrasts in past national strategies as well as similarities in current emphasis and future expansion of seafood production, will ensure that this joint research topic will be innovative and interdisciplinary, with great possibilities for early career ACCESS researchers to strengthen their scientific network and international collaborations.

The Swedish ACCESS partners are experienced in interdisciplinary approach to seafood production. The Swedish Mariculture Research Centre (SWEMARC) is a collaborative effort by biologists, oceanographers, social and legal scientists, and designers. The advanced PhD/postdoc SWEMARC-course "Transdisciplinary approaches to sustainable marine aquaculture" has been held 4 times over the last 6 years with international participation. Future repeats would be available

to young ACCESS researchers. The Blue Food Centre will be hosting PhD courses in the coming years, covering interdisciplinary aspects of aquatic food production.

The Chilean ACCESS partners have made notable progress in the implementation of farming technologies for marine species (CIMARQ), as well as the incorporation in recent years of an ecosystem approach to aquaculture. One educational output is a Master course “Aquaculture Biotechnology” which is given annually. In a complementary way, the Quintay Marine research Center (CIMARQ) will be hosting advanced courses associated with PhD programs of the Andres Bello University and Catholic University.

Expected outcomes

The contrasts in past national strategies between Chile and Sweden as well as similarities in current emphasis and future expansion of seafood production, will ensure that this joint research topic will be innovative and interdisciplinary, with great possibilities for early career ACCESS researchers to strengthen their scientific network and international collaborations.

Possible site-visits

In Santiago, a site visit is proposed to the CIMARQ marine biology research station at Quintay (https://cimarq.unab.cl), where research and development into species diversification of Chilean aquaculture is being conducted, including research on cusk eel and sea urchins. This is done in a participatory collaboration with artisan fishermen, to secure ecological, economic and social sustainability of local fisheries/aquaculture of local species in a rural community. The host is UNAB. Suggested date November 7th.

In Punta Arenas, site two visits are proposed. One will be to a large-scale salmon farm near PA and the other will be to Bahia Magdalena, a sheltered bay close by PA, a collection site of the kelp species Eisenia arborea, closely related to the Swedish Laminariales brown algae.

Details, timing and logistics for all site visits will be finalised in a later stage.

Planned activities

Workshop sessions with mix of presentations and round-table discussions + on-site visits

- Session 1 Introductions, current initiatives: Blue Food, SWEMARC, PDACH
- Session 2 Diversification, culture of local algae, crustaceans, shellfish, fish
- Session 3 Local feed ingredients, circular economy, participatory aquaculture
- Session 4 Integrated multitrophic culture systems, land-based recirculating systems
- Session 5 Blue food production and product development
- Session 6 Sustainability assessment of seafood value-chains
- Session 7 Break-out groups: Interdisciplinary research ideas. Joint discussion
- Session 8 Opportunities for PhDs and postdocs; advanced courses, research visits/exchange, funding

Contact details

Kristina Snuttan Sundell, University of Gothenburg, kristina.sundell@bioenv.gu.se
Juan Antonio Valdés, Universidad Andrés Bello, jvaldes@unab.cl