Development of Offshore Aquaculture in Europe

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More that 30% of Ireland's farmed salmon production comes from Class 3 offshore sites. In northern Europe, Irish salmon farmers have pioneered finfish production in these sites, with a wave height of 1 – 2 m and moderate exposure to the full rigors of the North Atlantic Ocean's winter weather. The experience, gathered over 30 years of operating in this harsh environment, has led to developments in cage design, feeding technology, and husbandry practice. More recently, offshore cage farming has developed in the Mediterranean, where the culture of sea bass, sea bream, and bluefin tuna occurs in offshore sites in a number of countries.

Key issues in terms of wear and tear on equipment, the loss of feeding days, with consequent loss of production and workdays due to bad weather and the increased costs of operating offshore were documented in the presentation. These issues were set in the context of the benefits in terms of environmental stability, greater carrying capacities, and the perception of better fish rearing conditions.

The offshore environment has potential for increased biomass productivity with fewer user conflicts. Finding solutions to balance the difficulties of increased capital costs and other operating challenges is the key to ensuring that the offshore environment is utilized as a productive aquaculture zone in a sustainable fashion.

The further development of offshore aquaculture in Ireland, and worldwide, is conditional on the development of equipment and methodologies designed specifically for the offshore environment. European initiatives to promote the development of appropriate offshore technologies and systems include post-doctoral studies on offshore technologies, establishment of the International Council for Offshore Aquaculture Development (ICOAD), and promotion of the Offshore Aquaculture through a Technology Platform (OATP).

A post-doctoral programme on the development of offshore aquaculture technologies is funded by the Marine Institute (Galway, Ireland). The initial findings of these studies is that there is substantial development interest in new cage types capable of withstanding forces of waves and wind in the offshore environment. Trials are currently underway for many of these. The current focus of attention is on auxiliary systems used in offshore aquaculture in high energy sites. These include sensor systems, feeding systems, control systems, communications systems, and cleaning systems.

Ireland has recognized the opportunity that offshore aquaculture presents and has taken a course of action to identify and investigate potential offshore sites. This action was also a key recommendation of the 2004 Farming the Deep Blue Conference held in Limerick. These short-listed sites will be ready-to-go and investment is to be sought for their development. Key to

this activity is also the requirement to be able to tap into international experts, be they in cage manufacture, wave dynamics, or international finance. To further this aspiration and another key recommendation that international alliances be built to forward this aim, the ICOAD is registered in Ireland with a permanent Secretariat drawn from the Irish membership. The intention is to seek membership for ICOAD in a global context and then look to generate alliances which can form regional nodes. ICOAD can serve as an international focal point for the development of offshore aquaculture and will aim to seek to accelerate and galvanize the process through coordination and the provision of information exchange, communication, and collaboration.

ICOAD exists as an internationally based council comprising individuals, companies, and institutions with an interest in developing offshore aquaculture. Its mission statement reads as follows:

> ICOAD will promote and facilitate, through all means possible, the development of suitable technologies and methodologies for successful aquaculture operations in the offshore zone. The ultimate aim is the creation of a major offshore aquaculture industry, which produces a significant proportion of the total world fish requirements in an economically and environmentally sound manner.

Drawn initially from experts brought together during the Farming the Deep Blue Conference, ICOAD is open to anybody or any organization interested in the Council's purpose. ICOAD is established as a center of expertise and is proposed to act as a funding facilitator in an information sharing environment. It is participant centered and will allow partnership, collaboration, cooperation, and synergy between participants. It is envisaged that seven regional executive committees will oversee global activity, while an international executive committee drawn from the regional executive will provide steerage to the regional committees. ICOAD sub-structures, communities of practice, and access levels will be determined as the Council evolves.

The objective of the Offshore Aquaculture through a Technology Platform (OATP) is, "To investigate the opportunity and usefulness for the aquaculture industry of promoting offshore aquaculture through a technological platform." The general methodology of the approach is to form a consortium of service providers, manufacturers, aquaculture practitioners with offshore experience, research and development organizations and agencies from the sector that will pool the available knowledge and experience by the most efficient and practical methods available. The goal is to ensure that the stated objective above is addressed accurately, comprehensively, and efficiently. This will be achieved by:

- A survey by way of a bespoke questionnaire, administered by direct interview. The survey is to cover all members of the consortium and additional stakeholders in the E.U./ European Free Trade Association (EFTA) region.
- Informal seminars in key regions to identify key areas for future discussions.
- An interim report for circulation in advance of international workshop.
- International Workshop over two days for partners and stakeholders.
- A final report, with recommendations and a roadmap of the way forward. The report is to reflect the proceedings of the workshop and the views of the partners on the functions of a technology platform in achieving the goals set out above.

The main objective of this proposal is to investigate the opportunity and the usefulness for the aquaculture industry of promoting offshore aquaculture through a technology platform. In the course of carrying out a thorough evaluation, the project will achieve a number of clearly defined goals, which will of themselves have a measurable impact beyond the achievement of the stated objective of the project. These impacts will include the following:

- Develop a widely based consensus on Research and Technological Development and Innovation (RDTI) priorities in the Offshore Aquaculture sector. This will inform strategic planning at various levels including E.U. National and corporate. Feedback will be efficient, thorough, and immediate through the gateway of the participants and partners in the project.
- Raise the overall investment in the offshore aquaculture development sector (in terms of E.U., Member States, private funding, and venture capital) by showing a common vision of the potential and the intermediate steps required to achieve it.
- Strengthen networks and encourage the development of clusters and centers of excellence. In particular, the facilitation of cluster development between public and private organizations and across disciplines in this sector, which is very much in an early development phase and is as yet quite fragmented in nature, will be of critical benefit to realizing future potential.
- Identify, and objectively catalogue, areas of current strengths and weakness, and gap areas where there is a lack of capability or expertise within the European Research Area.
- Assist at a regional level in identifying and addressing challenges and in particular opportunities in this developing sector.
- Identify and catalogue the prerequisites for development of a consistent and coherent policy and regulatory framework for offshore Aquaculture in the E.U. and the European Economic Area (comprising 25 Member States and members of the EFTA).
- An increase in public awareness, understanding and acceptance of the technologies concerned and the benefits accruing to the wider public through their appropriate deployment.