

Fish Culture Engineering

1- Introduction

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During the past few years there has been considerable growth in the global aquaculture industry.

Many factors have made this growth possible. **One** is development within the field of aquaculture engineering, for example improvements in technology allowing reduced consumption of freshwater and development of re-use systems

Another is the development of offshore cages: sites that until a few years ago not were viable for aquaculture purposes can be used today with good results

The focus on economic efficiency and the fact the salaries are increasing have also resulted in the increased use of technology to reduce staff numbers

The development of new aquaculture species would not have been possible without the contribution of the fisheries technologist

Even if some techniques can be transferred for the farming of new species, there will always be a need for technology to be developed and optimized for each species

Aquaculture engineering covers a very large area of knowledge and involves many general engineering specialisms such as mechanical engineering, environmental engineering, materials technology, instrumentation, and monitoring, and building design and construction

The primary aim of aquaculture engineering is to utilize technical engineering knowledge and principles in aquaculture and biological production systems

The production of fish has little in common with the production of snails, but the same technology can be used in both production systems

It is therefore a challenge to bring together both technological and biological knowledge within the aquaculture field

The farm: technical components in a system

In a farm the various technical components included in a system can be roughly separated as follows:

- Production units
- Water transfer and treatment
- Additional equipment
(feeding, handling and monitoring equipment)

Future trends: increased importance of aquaculture engineering

Growth in the global aquaculture industry will certainly continue, with several factors contributing to this.

The world's population continues to grow as will the need for marine protein

Traditional fisheries have limited opportunities to increase their catches if sustainable fishing is to be carried out.

therefore, increase in production must come from the aquaculture industry. In addition, the aquaculture Industry can deliver aquatic products of good quality all year round, which represents a marketing advantage compared to traditional fishing

The increased focus on optimal human diets, including more fish than meat in the diet for large groups of the world's population, also requires more fish to be marketed.

This will give future challenges for aquaculture engineers. Most probably there will be an increased focus on intensive aquaculture with higher production per unit volume.

Important challenges to housing the growth will be availability of freshwater resources and good sites for cage farming

Limited supplies of freshwater in the world mean that technology that can reduce water consumption per kilogram of fish produced will be important; this includes reliable, cost effective re-use technology

By employing re-use technology it will also be possible to maintain a continuous supply of high quality water independently of the quality of the incoming water

The trend to use more and more weather exposed sites for cage farms will continue. Development of cages that can not only Withstand adverse weather conditions but also be Operated easily in bad weather, and where fish feeding and control can be performed, is important.

Rapid developments in electronics and monitoring will gradually become incorporated into the aquaculture industry. Intensive aquaculture will develop into a process industry where the control room will be the centre of operations and processes will be monitored by electronic instruments; robots will probably be used to replace some of today's manual functions