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The 2nd International Symposium on Cage Aquaculture in Asia (CAA2)

Reported by Matthias Halwart[1]

The Second International Symposium on Cage Aquaculture in Asia (CAA2) was held in Hangzhou, P.R. China, from 3 to 8 July 2006. It was attended by some 300 participants from over 25 countries.

The FAO Fisheries and Aquaculture Department made a special contribution to the symposium in the form of a global synthesis (A.G.J. Tacon & M. Halwart) and eight regional review presentations on cage aquaculture for China (J.X. Chen *et al*.), Asia (S. de Silva & M. Phillips), Northern Europe (J.A. Grottum & M. Beveridge), the Mediterranean (F. Cardia & A. Lovatelli), Sub-Saharan Africa (P. Blow & S. Leonard), Latin America and the Caribbean (A. Rojas & S. Wadsworth), Northern America (M. Masser & C. Bridger), and Oceania (M. Rimmer *et al*.).

In the global overview, Mr Tacon highlighted that the production of farmed aquatic organisms in caged enclosures has been a relatively recent aquaculture innovation; it was pioneered in Norway in the 1970s with the rise and development of salmon farming. The development and use of intensive cage farming systems was driven by a combination of factors, including the increasing competition faced by the sector for available resources. While there is little statistical information on the total global production of farmed aquatic species within cage culture, there is some information on the number of cage rearing units and production statistics being reported to FAO by some member countries. These data have been complemented, to the extent possible, by expert information. To date, cage culture has been largely restricted to the culture of higher-value (in marketing terms) feed-fed omnivorous and carnivorous fish species. The shift towards intensive cage culture systems has also brought its share of problems and constraints. Despite these, cage aquaculture is currently one of the fastest growing segments of global aquaculture production. Its development would need to be supported by appropriate policy and planning, legal and management frameworks.

Mr De Silva reported that cage culture in Asia is very diverse, in particular with regard to the intensity and size of operations. Asia has the lowest *per caput* availability of freshwater amongst all the continents. Consequently, cage culture is now often seen as a very effective way of secondarily utilizing this relatively scarce primary resource for food fish production. The great bulk of inland cage farming operations tend to be subsistence farming. Marine and brackish water cage farming in Asia is a relatively recent development, and increasingly gaining popularity. Most marine cage farming depends on trash fish as the primary feed, which is a factor that will impact on long term sustainability.

In China, Mr Chen noted that the beginning of modern intensive cage culture for food production and ornamental purposes dates back

to the 1970s. It was first adopted in freshwater, afterwards in brackish and marine environments. Due to its advantages, cage and pen culture quickly expanded countrywide. In some sites, the balance of the ecosystem has been affected due to an overload of cages and pens with consequent problems. The fishery policies of the Chinese government require local authorities to limit the number of cage and pen fish operations to a reasonable level in order to keep the ecological balance in a harmonious environment.

Mr Rojas reported aquaculture nowadays as a significant commercial activity throughout Latin America and the Caribbean. While there are 33 Latin American and Caribbean countries involved in aquaculture, Chile and Brazil account for the bulk of production. In his presentation, A. Rojas paid special attention to the case of Chile as the majority of the cages used for fish production in Latin America and the Caribbean is located there.

An overview of the status and future prospects of cage and net pen culture of marine and freshwater finfish in North America was provided by Mr Bridger. After four decades of evolution and growth, North American cage culture production and diversity is growing and future development and sustainability appears bright. A great deal of public research and private innovation in cage culture technology, development of new species, and advancement of management techniques have taken place in North America. However, much more technological development will have to take place if open ocean aquaculture is to meet its projected potential.

Mr Grøttum reflected that after its beginnings thirty years ago, the aquaculture industry in Northern Europe has matured. The majority of production is in Norway, Scotland, Ireland and Faeroe Islands. However, countries such as Finland, Iceland, Sweden and Denmark also have cage culture industries. All relevant aquaculture production using cage technology in Northern Europe is carried out in marine waters. Over the years, there has been a significant decrease in the environmental impact from the cage culture industry in Europe. Despite the problems, there has been a more or less continuous growth in production, and the industry has become an important economic contributor to some of the remote rural regions of Europe.

Mr Cardia noted that for the Mediterranean countries, marine cage culture in the area started to develop widely in the mid-1980s, mainly in Spain and Greece. The rapid development of cage culture in the 1990s, mainly in Turkey and Greece, culminated in a market crisis in the late 1990s and even more during the period 2000-2002 with a drop of market prices to minimum values. Several constraints currently limit the expansion and the development of marine cage culture in the Mediterranean. These include species diversification, the development of suitable commercial feeds and a positive market response to newly introduced farmed species.

Mr Leonard observed that cage aquaculture was an emerging activity in the countries of Sub-Saharan Africa. Presently only a handful of successful examples exist - the tilapia farms in Zimbabwe, Zambia, Malawi, Kenya, Ghana and Uganda. There is also potential for brackish and marine water cage culture but as yet there has been little development in this sub-sector in the region. The main constraint to the development of competitive cage culture in the region is the unavailability of locally produced, high quality feeds at competitive prices. If this and some other constraints are addressed, it is estimated that the region offers enormous scope for the commercial development of aquaculture of small-, medium- and industrial-scales.

From the Oceania region, Mr Halwart on behalf of Mr Rimmer and his co-authors informed that cage aquaculture is little practised in the region; most of the limited production is from Australia and New Zealand. Among the reasons for the limited development of cage aquaculture in the region are the considerable community concern regarding the impacts of large-scale aquaculture, the moratorium on further development of marine aquaculture in New Zealand and the low population bases and relatively poor infrastructure in many of the Pacific Island countries.

FAO's contribution was very well received by the organizers and audience. The Asian Fisheries Society President, Dr Chan-Lui Lee, expressed his and the organizers' gratitude to FAO during the closing ceremony by handing over a certificate of appreciation.

The regional reviews and global overview are currently being edited and will be finalized as an FAO Fisheries Technical Paper in 2007.

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