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# The **ASEM** **Aquaculture** Platform

**Sustained Supply, Finding Solutions,  
Bridging the Divide**

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# TABLE OF CONTENTS

Foreword	7	Customers trust the brands to do the homework for them	20
What is aquaculture?	8	Better socioeconomic impacts for a sustainable future	21
ASEM: from informal, practical dialogue to change	9	China's success story: adapting old practices for new needs	22
Modern-day livelihood steeped in tradition	10	SPEAR: an EU-Asia collaboration	24
The pangasius phenomenon: reconciling production boom with sustainability	12	Who's who in global aquaculture	26
Europe-Asia-Africa: collaborating for the future of aquaculture	14	International S&T cooperation among ASEM Partners	28
Farmed fish can be an excellent choice	17	Titles of Related Interest	29
What is certification?	19		





# FOREWORD

Inspired by the current spirit of globalisation, Europe and Asia formalised their renewed interest in closer cooperation with the establishment of the Asian European Meeting (ASEM) in 1996. It is no coincidence that pretty soon aquaculture was identified as one of the priority topics where both regions were believed to benefit from closer cooperation. Admittedly, approaches may differ widely and competition is a reality, but both regions have realised that several issues that are crucial to the sustainable development of aquaculture call for a joint solution. The mutual benefits of cooperation (or at least a dialogue) on issues such as trade, education, research, socioeconomics and policy, are increasingly being acknowledged. The ASEM Aquaculture Platform has taken up the task of structuring the dialogue between Asia and Europe on those diverse fronts, starting from a research-driven, multi-stakeholder forum.

Often links between scientists from the East and West are the catalysts for initiatives and interactions with (and between) other stakeholders, be it as facilitators on new joint ventures, better extension services to local farmers and associations or the involvement of local governments in capacity building. In many respects, the ASEM Aquaculture Platform operates in a diffuse manner, starting by connecting and streamlining existing initiatives as long as there is mutual benefit.

This brochure offers an overview of the various aspects of the Asian-European linkages in aquaculture, and puts the activities of the ASEM Aquaculture Platform into perspective.

## What is ASEM:

Ever since the late Middle Ages (and even earlier), Europe and Asia have mutually influenced each other's societies to varying degrees. Trade routes have introduced previously unknown goods and flavours, and new technologies have travelled east to west as well as west to east. Nevertheless, several practices remained locked to their traditional region, despite obvious opportunities for successful applications elsewhere. In aquaculture, several examples exist of regional practices that barely found their way to a wider application, including integrated polyculture in China, carp farming in Poland, and oyster farming in Italy.



**Patrick Sorgeloos**  
ASEM Aquaculture Platform

## What is aquaculture ?

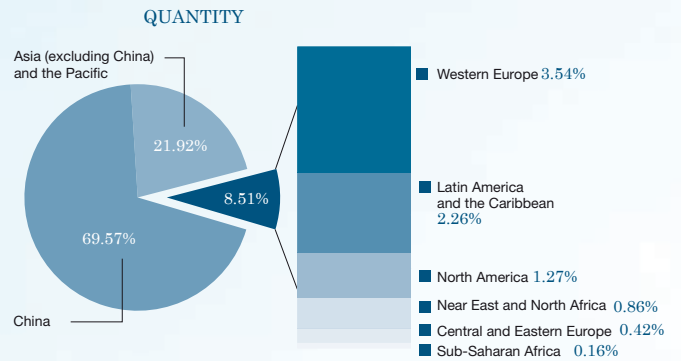
As the world population continues to grow, so does the need to produce more food. Aquaculture is one of the more promising solutions to our planet's destroyed, dwindling or stressed food sources and systems. The term defines a sector that differs from traditional notions of fishing, insofar as the seafood is cultivated or fattened instead of harvested entirely from the wild. The consequences of over-fishing, pollution and environmental damage have meant that we can no longer rely solely on capture fisheries to supply us with the volumes required to keep the growing population fed. Aquaculture addresses this need. In fact, much of the fish we eat today already originates from its production.

Will we be able to produce the amount of food needed to sustain the human population in the future? Of all the animal food-producing sectors, the Food and Agriculture Organization of the United Nations (FAO) claims that the aquaculture sector is the fastest growing. The sector accounts for more than 40 % of the world's produced food fish. Estimates suggest that at least an additional 40 million tonnes of aquatic food will be needed over the next two decades in line with projected population growth figures, if per capita consumption is to remain stable.

About 90 % of the world's aquaculture today is produced in Asia and the Pacific, which highlights the acute dependency of countries outside the region to be supplied with this portion of their overall food sources. Modern aquaculture, as pioneered by the Japanese in the 1960s, now takes its cue from Europe. Indeed, European aquaculture technology has become the most advanced in the world. As such, commercial and scientific interaction between Europe and Asia has become the cornerstone of aquaculture's evolution. Sustainable aquaculture is reliant on successful relations between these two regions. It is one of the key strategies of the European Commission, and the sole objective of the Asian European Meeting (ASEM) Aquaculture Platform.

The process of farming water's natural produce, such as fish, molluscs, aquatic plants and other organisms, is referred to as aquaculture. Unlike fish that swim freely in the ocean, rivers and lakes and which are caught for consumption (capture fisheries), these are fed and reared in controlled environments. Some say the concept is similar to agriculture, where products are also cultivated to be sold (importantly, however, most aquatic species still rely on renewal from wild populations).

### Aquaculture production by regional grouping in 2004



### Did you know?

- Captured and cultivated fish provided more than 2.6 billion people with at least 20 % of their animal protein intake in 2004.
- In 2005, an estimated 63 million tonnes of farmed aquatic product was produced by the world's aquaculture sector, with a value of almost EUR 50 billion (USD 78 billion). This is 60 times more than the 1 million tonnes produced in 1950.
- China is by far the largest aquaculture producer in the world today, with an estimated 70 % of the total production quantity worldwide.
- In 2004, western Europe produced over 50 % of the world's farmed salmonoids, while the majority of carp worldwide was produced in China.
- An estimated 41 million people worked as fishers and fish farmers in 2004. One-quarter of this total accounts for fish farmers specifically.
- In terms of aquaculture production, we eat more freshwater fish than any other species group (some 17 million tonnes of carps, barbels and other carp-like fishes). In 2004, we also ate more Pacific cupped oyster than any other individual species (4.4 million tonnes).
- Since 1970, the aquaculture sector worldwide has grown at an average rate of 8.8 %. Capture fisheries had lower rates of increase after the initial big expansion after World War II. Some recent analyses indicate their output may be shrinking by perhaps as much as 0.7 % per year, mostly as a result of overexploitation.

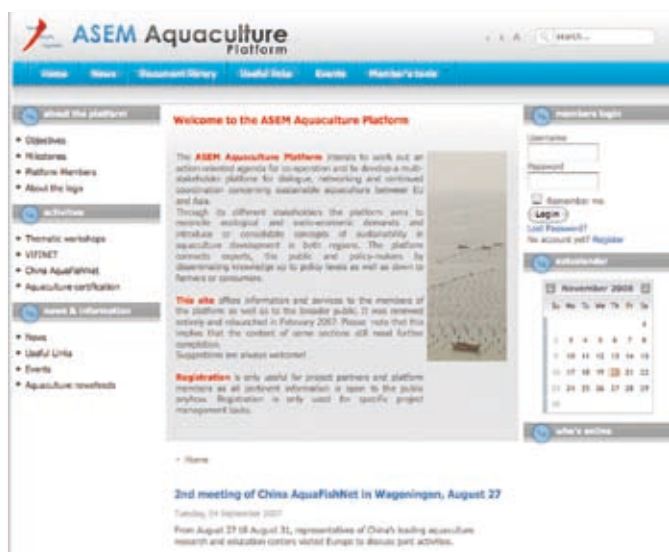


## ASEM: from informal, practical dialogue to change

Whilst a lack of communication can give rise to misunderstanding, even conflict, good communication can lead to opportunities that drive a better future. In the global context, where radical changes to the planet are ever present, the need for collaboration between countries is essential to bring about solutions to common problems. The issue of food security and safety, for example, is a challenge that compels countries around the world to collaborate in mutually beneficial ways. It is with this spirit of cooperation that the ASEM Aquaculture Platform offers a forum in which dialogue — even in its simplest form — can help support sustainable aquaculture in Asia and Europe.

The main objective of the Asian European Meeting (ASEM) Aquaculture Platform is to bring together the main parties involved, identify the obstacles affecting the aquaculture sector in Europe and Asia, and facilitate open discussion as a neutral host. Most recently, ASEM has brokered dialogue between crucial Asian and European stakeholders on the issue of aquaculture certification and pangasius farming in Vietnam, both topical issues that require the kind of impartial discussion forum that ASEM provides.

The approach is straightforward and it achieves results. ASEM has forged alliances between partners, inspired recommendations on future directions in research, trade and production, and encouraged joint activity in pursuit of research excellence, good governance, fair trade, social equity, and sustainability.



Beyond the information detailed in this publication, more information is available through the ASEM website at [www.asemaquaculture.org](http://www.asemaquaculture.org)

Strengthening the relationship between the two regions was an idea formalised in 1996 when a number of Asian and European nations set up a new political consultation mechanism. By 1999, with support from the European Commission, these Asia-Europe Meetings identified priority areas for science and technology cooperation. In 2003, this evolved into the ASEM Aquaculture Platform with financial backing from the Flemish Administration for Economy, Science and Innovation, and shortly after from the European Commission (EC).

**‘In fostering good relations and dynamic dialogue between Europe and Asia, the platform’s underlying aim is to reconcile aquaculture’s socioeconomic demands with its ecological ones.’**

Today, there are 45 ASEM members- 43 countries and 2 international institutions (the ASEAN Secretariat and the European Commission- participating in the ASEM Aquaculture Platform’s process: 27 EU Member States, and Brunei, Cambodia, China, India, Indonesia, Japan, Korea, Laos, Malaysia, Mongolia, Myanmar, Pakistan, the Philippines, Singapore, Thailand and Vietnam. Platform participants range from scientists, traders, producers and policy-makers to consumers: they represent 30 universities and research institutes, 10 governmental and inter-governmental organisations, and 10 individual companies.

In fostering good relations and dynamic dialogue between Europe and Asia, the platform’s underlying aim is to reconcile aquaculture’s socioeconomic demands with its ecological ones. In this regard, it frequently hosts workshops on important common issues, which in the past have attracted hundreds of participants and yielded recommendations for future actions.

The ASEM Aquaculture Platform’s networking activities also extend to education and training by fostering staff and student exchanges between the two regions, identifying joint research projects, and paving the way towards joint degrees. Additionally, the platform facilitates access to information, and participates in related projects.

The platform is funded by the Flemish Administration for Economy, Science and Innovation, the Flanders Research Foundation, Ghent University, the European Commission, and the platform partners. It is coordinated by the Laboratory of Aquaculture and Artemia Reference Center of Ghent University, Belgium.

# MODERN-DAY LIVELIHOOD STEEPED IN TRADITION

The origins of pond fish farming in central and eastern Europe (CEE) go back to the time of the Roman Empire. The practice of fish rearing in this region was further developed by priests and monks during the Middle Ages to supply fish to the growing number of monasteries. Today, although advances in technology have accommodated many improvements, the tradition is still very much alive and part of the social fabric of CEE countries, with festivals and educational programmes marking the handover of heritage to the next generation. Some of tomorrow's innovative thinkers have already begun to set targets on aquaculture production for CEE tourism.

'The basic principles and practices of pond fish farming in the region haven't changed much throughout the centuries,' says László Váradi, who heads the Network of Aquaculture Centres in Central-Eastern Europe (NACEE), a group that promotes dialogue both within CEE, between eastern and western Europe, and between Europe and Asia. Of course, he adds, considerable technological progress has been made to make the work easier and more efficient, and to achieve a better product.

Although the main purpose of aquaculture production in CEE today is to satisfy local market demand, the amount of fish consumed in the region is less than half the average of the fish consumed by western Europe. The export of fish and fish products for some CEE countries is, nevertheless, significant: the Czech Republic is the main exporter of carp to Germany; around one-quarter of Poland's total domestic trout production is exported to Germany; caviar is an important export item for Russia; and in 2003, tuna alone accounted for more than 74 % of the total Croatian fish export.



## Rebuilding a profitable, collaborative industry

Aquaculture production in CEE suffered as a consequence of the political and economic changes in the region in the 1990s. Between 1990 and 1996, total production dropped from 465 000 tonnes to 174 000 tonnes. The drop in production volume can be attributed partly to the price increase of input materials, and uncertainties related to the change in ownership of farms (state-owned to private). Since the economy's stabilisation, there has been a gradual increase in aquaculture production (the total volume in 2006 had increased to 237 000 tonnes).

Besides being a commodity, freshwater fish farming is very much part of the cultural makeup of many CEE countries, with museums displaying artefacts and relaying the history of rural fish farming life. In some countries, specific customs are still performed, such as during the Czech Republic's popular Trebon carp festival and Hungary's festival in honour of St Peter, protector of fishermen. A children's fairytale book on carp has even been produced in Poland, accompanied by a nationwide television programme known as 'Mr Carp'.

CEE fish farms are relatively large in size (the largest in Hungary is about 5 000 ha). Most are privately owned (some by worker stakeholders), and although aquaculture's contribution to employment is relatively small, in some rural populations it is one of few livelihood options. This situation, however, is set to change as the concept of aquaculture and tourism (e.g. recreational fishing) harnesses more support in CEE. In fact, the future trend predicted in the region is not the intensification of fish pond technologies and production, but rather a profit increase through these new services.

'It is widely acknowledged now that fish ponds are not only production facilities but also provide services for water-related recreational activities, contribute to the maintenance of biodiversity, have a positive role in water management, and improve landscape value,' says Dr Váradi. 'About seven years ago, the pioneering CEE farmers who began to use farms in a multifunctional capacity, now have revenues that are 20 % to 50 % higher than those of conventional fish farms. The traditions are still there but the industry is evolving.'

The central and eastern European region represents the following countries: Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, the Former Yugoslav Republic of Macedonia, Hungary, Latvia, Lithuania, Moldova, Montenegro, Poland, Romania, the Russian Federation, Serbia, Slovakia, Slovenia, and Ukraine.

The political changes in the early 1990s in CEE and in some Asian countries also severed what was a fruitful exchange between the regions in various capacities, including joint research and development (R&D) projects, conferences and expert exchanges. As a response, the West-East-South (WES) project was launched and was financed by the government of the Netherlands in 1994 to rebuild these collaborative activities.

'Thanks to the WES (project), Hungary's Research Institute for Fisheries, Aquaculture and Irrigation (HAKI) has since become an important European partner of several Asian institutions,' says the Director of HAKI, Dr László Váradi. The institute currently collaborates on various aquaculture development projects with partners from China, Indonesia, Laos, Nepal, Thailand and Vietnam. Likewise, as a result of the WES project, Can Tho University's College of Aquaculture and Fisheries has become an internationally acknowledged centre in aquaculture education and research in Vietnam, a major contributor to the aquaculture breakthrough of the Mekong Delta, and an important partner in joint European initiatives.

With the establishment of the Network of Aquaculture Centers in Central and Eastern Europe (NACEE) in 2004, a regular information exchange is maintained with the Network of Aquaculture Centers in Asia-Pacific (NACA). The collaboration between NACEE (with a membership of 41 aquaculture institutions from 15 CEE countries) and NACA (with a membership of 17 Asian countries) provides a solid framework for various Europe-Asia development initiatives.

'Although the transition from a centrally planned to a market economy proved to be a long and difficult process, we now witness the signs of revitalisation of collaboration between CEE and Asian countries in the field of aquaculture,' says Dr Váradi. 'Even new opportunities are emerging as EU Member State CEE countries become donors, providing financial assistance to some Asian countries aiming at the improvement of food security and rural livelihood.'

HAKI is a valuable partner of the ASEM Aquaculture Platform, particularly for its renowned expertise in freshwater fish reproduction and culture, and activities in those regions where freshwater fish culture is significant in terms of sustaining a livelihood (e.g. Laos, Cambodia, and the Mekong Basin). Furthermore, HAKI has very useful experience in cooperation projects that embrace the active participation of local communities.

# THE PANGASIUS PHENOMENON:

## Reconciling production boom with sustainability

A particular group of catfish has gained notoriety in recent years for its exceptional increase in production, which may even surpass that of salmon as among the world's top farmed fish performers. Pangasius, a freshwater fish native to the Mekong river, is Vietnam's remarkable success story. With production figures tipping the scales at a phenomenal 1 million tonnes each year, the rapid growth has given rise to a host of challenges which stakeholders are all too keen to resolve.

The Mekong is one of the largest rivers in the world. It runs from Tibet in the north, and settles into Vietnam's Mekong Delta in the south. The Delta is responsible for 70 % of Vietnam's total fisheries and agriculture production, making it one of the most important natural resources for the country's economy. In fact, Vietnam's current position as the second largest exporter of rice in the world (Thailand leads) can primarily be attributed to the Mekong Delta.

'The natural conditions of the Mekong Delta are also very suitable for aquaculture,' says Dr Nguyen Van Hao, Director of the Research Institute for Aquaculture No2 (RIA2). 'It has flat land, fertile soil, and abundant water — for dry and wet seasons, both fresh and sea water. The Mekong Delta is also very diversified.' It is home to hundreds of species of fish, including some 20 different species of catfish.

Tra (*Pangasianodon hypophthalmus*) and basa (*Pangasius bocourti*) are fresh water fish that belong to the Mekong's catfish group. Their mild taste and lean, boneless flesh have made pangasius both convenient and attractive to the international market. What began in earnest as catfish farming in the 1950s for domestic consumption, has turned into Vietnam's most profitable aquaculture venture. Today, 90 % of the world's pangasius production is farmed in Vietnam, and distributed to 50 markets in the world (approximately half is exported to Europe).

'No fish can compete with this fish,' says Dr Hao. 'Our farmers work hard, there are good natural conditions, and good policy; these are the reasons why we produce more and more fish for domestic consumption and for exporting.'

Global production of pangasius soared from just 10 000 tonnes in 1995 to 1 million tonnes in 2007. Some estimates suggest the figure is likely to reach 2 million tonnes in coming years. As one of the fastest growing types of aquaculture in the world, it is not without its drawbacks. Along with environmental and social concerns expressed by various stakeholders (and the ubiquitous 'ban' or 'blacklist' threat), some forecasts suggest that Vietnam's boom is unsustainable with warnings of an inevitable crash, in the same way that Taiwan's production boom in black tiger shrimp collapsed in 1983.



### The role of NGOs in aquaculture

Non-governmental organisations (NGOs) perform an important role in dealing with the challenges associated with sustainable aquaculture. This role is often misconstrued to represent the voice of opposition or the thorn in the side of producers and governments. The perception is largely inaccurate, with some NGOs playing an active role in bringing stakeholders together in a spirit of mutual consensus, and using research results to promote sustainable solutions.

In the case of the World Wildlife Fund (WWF), its two key aims in regard to aquaculture are environmental and social sustainability. Although global in scope, the WWF aquaculture strategy is to focus on countries that are principal aquaculture producers. This NGO's objective is to develop certification standards by facilitating dialogue between stakeholders, who are ultimately (as a collective) responsible for decision making on sustainability issues.

Dr Hao accepts that there are challenges facing Vietnam's rapidly growing pangasius industry at present. He highlights the following four as the most critical: the high criteria set by the international market; environmental degradation (e.g. ecological capacity of the Mekong river); husbandry (seed quality, feed, and disease); and competition with other countries. He is also quick to add that collaborative research and strategies are underway to resolve some of these issues, and that the greatest constraint in terms of implementing better management and monitoring systems is time itself.

Vietnam's RIA2 is currently working with Australia's AusAID programme and the Network of Aquaculture Centres in Asia-Pacific (NACA) to develop better husbandry, health, and environmental management practices for the Mekong's pangasius industry. The research is intended to increase the efficacy and profitability of small-scale farmers while simultaneously reducing the industry's ecological footprint.

For the project, the ASEM Platform (among its many activities in support of Vietnamese pangasius farming) was invited to broker links with European stakeholders. As a result, major European seafood processor Marine Harvest VAP Europe and its sister company Marine Harvest Pieters are now working with NACA, RIA2 and the

**'What began in earnest as catfish farming in the 1950s for domestic consumption, has turned into Vietnam's most profitable aquaculture venture.'**

World Wildlife Fund (WWF) to assist in developing appropriate practices for pangasius farming in Vietnam.

'Marine Harvest believes in the future of pangasius' says Mrs Siska Bourgeois, HR and Communication Director at Marine Harvest VAP Europe, 'and wants to intensively support the sustainable development and growth of Vietnamese pangasius farming. We are now elaborating possible local projects in cooperation with Ghent University and RIA2.'

WWF recognises that developing standards is necessary for sustainable pangasius production in Vietnam. 'Vietnam is putting in a lot of effort but there are a lot of constraints on ensuring that the

actual production is going to be sustainable – that you can deliver quality and safety, protect the environment, and deliver on social responsibilities at the same time. Keeping that balance is difficult,' explains WWF's Aquaculture Advisor in Vietnam, Dr Flavio Corsin.

The organisation has initiated a process to develop measurable, performance-based standards for certifying pangasius aquaculture. The Pangasius Aquaculture Dialogue (PAD) involves a comprehensive representation of the industry, including farmers, processors, buyers, feed and chemical manufacturers, researchers, other NGOs and government representatives. The objective is to develop standards based on what the top 20 % of performers are already doing and to promote the movement of the whole sector towards better performance. The standards are expected to be finalised by mid-2009.



One million tonnes of pangasius (pictured) were produced globally in 2007

# EUROPE - ASIA - AFRICA:

## Collaborating for the future of aquaculture

The ASEM Aquaculture Platform inspires a number of programmes and projects that support student exchange between Asia, Europe and Africa. The students all profit from their experiences working and living in other countries, both in terms of the quality of their research and their exposure to different cultures. Communication is the biggest challenge they all face, not only in terms of language but in the way people work, learn and live. Each of them gain an experience they will never forget.

### Asia to Europe

Hoàng Anh Nguyễn Ngọc is a 24 year old aquaculture student from Vietnam, now working on a Master's degree in food technology with Professor Marc Hendrickx at the Catholic University of Leuven in Belgium. She graduated from Vietnam's Can Tho University (CTU) in 2006 and came to Europe as part of the Mekong 1000 project. Ms Nguyễn Ngọc's work in aquaculture has focused on genetic diversity, specifically on the Nhai and Lim Kim fish. Her studies revealed poor genetic diversity in both species, one of which is on its way to extinction.

People make the place, as the saying goes. Ms Nguyễn Ngọc has been able to get a lot out of her experiences in Europe, despite language and cultural problems, thanks to the support of her new colleagues. 'I have very close contact and work with my supervisor, Ines Cole,' she says.

Ms Nguyễn Ngọc looks forward to continuing collaboration with her European colleagues when she returns to Vietnam. 'I have learned a lot from them, and have caught up with new knowledge,' she said. She found the cultural differences between Belgium and Vietnam to be challenging, but hopes to take the best from each. 'Then I can widen my knowledge, not only in terms of my professional studies but also my new lifestyle,' she says.

The Mekong 1000 programme provided prior training in English to students planning to study abroad. She was able to communicate but said, 'If I have time I would like to study Dutch so that I can talk to local people in their own language. Also, it will help if I come back to Belgium to learn more in other programmes, or to get my PhD.'

She dreams of taking a PhD in Europe, and hopes to gain knowledge by pursuing research and collaboration with scientists in all parts of the world. 'I have some good friends from my class, they are so friendly and I think whenever I have the chance to collaborate with researchers in Africa, I will do all my best for that project,' she says.



## Africa to Europe

Mark Mutuku, an aquaculture researcher of the Kenya Marine and Fisheries Research Institute, pursued a Masters degree in Aquaculture at Ghent University in Belgium on a Flemish interuniversity scholarship (VLIR-UOS), and carried out his thesis work at CTU in Vietnam. He now lives in Kenya, and is exploring the salt lakes of the Rift Valley to find potential sites for Artemia production.

Mr Mutuku earned his Bachelor degree in Fisheries from Moi University in Kenya, and later volunteered at Sagana fish farm. There, he learned about the Flemish scholarship through former beneficiaries and was inspired to apply.

'Working in Belgium was a great achievement, academic-wise, because I gained independent know-how in aquaculture,' says Mr Mutuku. 'This was further boosted by my subsequent internship in Vietnam, and by later research work. In fact, my current zeal is based on that.'

Mr Mutuku was impressed by the practical and integrative approach of the Belgian university, by the strong links between its departments, and the resources that made research possible. But his experiences in Vietnam made the greatest impression on him. 'I did an internship at the College of Aquaculture and Fisheries, CTU, in the Mekong Delta. It was a nice experience, because I learned about culturing mudskipper but I was also able to take time to explore,' he says. 'I keep in touch with my lecturer, Dr Nguyen Van Hoa.'

'I have really loved keeping in contact with the people involved in my work in Vietnam,' he continues. He looks forward to working in Europe or Asia again because researchers there 'have moved faster in aquaculture'.

'The current status of aquaculture research in Kenya,' Mr Mutuku explains, 'is that some strides have been taken, but we have not yet realised our full aquaculture potential.' He believes there is a real need for capacity building and continued exposure to developed aquaculture practices.

Mr Mutuku says his work in Europe and Asia will benefit Kenyan aquaculture. To gain more expertise, he believes, more collaborative research is needed. 'Aquaculture will be improved, food security will get a boost, and we can generate income,' he adds. 'We have a plan to undertake aquaculture activities and set Kenya as a good example in Africa.'

'My great experience can be attributed to Professor Sorgeloos, who initiated a programme to send African students for internships at Can Tho University,' says Mr Mutuku. 'Dr Hoa has been instrumental for the success of this initiative. Based on this, we will take aquaculture in Kenya to great heights and initiate more collaborative research programmes with the three continents.'

Mr Mutuku is currently working with Ghent University's Professor Sorgeloos to establish an Asia-Africa-Europe aquaculture platform.

## Europe to Asia

Stijn Vandendriessche is an aquaculture graduate from Belgium, who had a very positive experience as a graduate student in Vietnam. 'My subject was about larviculture of mud crab, a species that has some economic value and possibilities,' he says, explaining that Vietnam provides the perfect physical environment for researching commercially interesting species.

'The ASEM platform is a good idea,' he says, 'because we can clearly gain a lot on both sides. Maybe we (Europe) have more knowledge and resources but in Asia they have the right materials and environment.'

Mr Vandendriessche found that his experience of working in Vietnam helped his career. The first-hand knowledge he gained of the environment and culture of Vietnam afforded him a distinct advantage, as Belgium is one of Vietnam's biggest fish importers. 'Our company (Hottlet Frozen Foods) imports frozen fish, and more than 90 % comes from Asia,' he explains. 'Vietnam accounts for about 25 % of our total volume.' He now travels four or five times a year to the region and is prepared both for the climate and the way people work and communicate in Vietnam.

'The experience I had in Vietnam was unforgettable,' says Mr Vandendriessche. Although he experienced some culture shock when he first arrived, he soon made friends and adjusted. 'Maybe the results of my research were not as good as I'd hoped for,' he says, citing communication as one of the major obstacles, 'but the most important thing I learned there is patience, a sense of perspective, and working with other people who are generally very shy,' he says. 'My time in Vietnam helped to open my mind.'

## Mekong 1000

In an effort to modernise a specialised workforce in the Mekong Delta, the Mekong 1000 project promotes the training of Vietnamese PhD and Master-level students from the region at 14 universities in Europe and beyond.

The region's several provinces have united under the project, with the support of Flemish universities, to fund the training of 1 000 young students between 2006 and 2011, graduates who upon their return will take up positions in provincial and city administrations in the Mekong Delta. This collaboration will, it is hoped, enhance the technological and economic capacities of the Mekong Delta region, and strengthen its ability to cope with the pressures of economic globalisation.

The project, which is coordinated through Can Tho University (CTU) in Vietnam, grew out of an ASEM Aquaculture Platform meeting and is the brainchild of former CTU rector Professor Le Quang Minh. 'Aquaculture is a very important subject that we have to develop in the Mekong Delta, together with agriculture and biotechnology,' Professor Minh explains. 'Expertise in these areas is very important for the development of the region. That's why there are students pursuing so many different subjects in aquaculture,' he says, referring to the programme's many subspecialty areas.

Professor Minh described the project's fruitful partnership with Ghent University in Belgium, a country that is among Vietnam's biggest fish importers, and expressed hopes that the programme will expand. 'So far, the aquaculture programme with Ghent University

is one of the more successful programmes in terms of its impact on the economics of the Delta because of the number of students who have been able to join the programme,' he says.

'We have established a network of several universities in Vietnam and Europe to work on aquaculture, and we are working on extending the network to other parts of Asia,' said Professor Minh, adding that a Chinese university has already agreed to join the project.

Professor Minh expressed hopes that the programme's network will widen to include Africa. 'One of the important deliberations we are working on now is a partnership between Vietnam and some African countries, so that we can receive African students into our universities,' he says.

'The main challenge we face is that the programme's funding is approaching its end. We've built a really strong team of scientists, and the momentum of the programme is really good,' Professor Minh says, adding that the project partners are eager to secure continued funding so that the programme can maintain its momentum and energy.

When the project was launched, Professor Minh was responsible for promoting subjects of importance to the region's development. In addition to Mekong 1000, he has been involved in a number of other joint research projects. The ASEM Platform played a key role in bringing European and Asian partners together, and planting the seeds of partnership.





# FARMED FISH CAN BE AN EXCELLENT CHOICE

The role of aquaculture is to produce high quality fish that consumers want to eat at prices they can afford. Aquaculture is therefore, at least partially, stepping into the gap left by depletion of world fish stocks due to overfishing in recent decades. Thanks to aquaculture, fish that was once expensive, such as salmon, is now within the price range of most consumer budgets and people are buying it in quantity.

Dr John Godfrey, Chairman of European Research into Consumer Affairs, headed the EU-funded CONSENSUS project which looked at ways of making the aquaculture industry sustainable and economically successful. He believes there is a future for both aquaculture and traditional fishing fleets.

'People want the same qualities from farmed fish as they want from wild fish,' he says. 'Namely, they want to eat the fish they like, such as salmon and cod, at prices they can afford. Price is the main criterion for most consumers, and only a minority are interested in whether the fish is farmed or wild.'

Expanding the aquaculture industry is important because fish consumption is rising at the same time that natural stocks are dwindling (this applies in particular to farmed fish that do not need feed from capture fisheries).

There is currently also much media focus on the health benefits of fish. The European Commission is helping to spread awareness of the health benefits of fish with research projects such as SEA-FOODPLUS, which is increasing people's knowledge of the ability of fish consumption to help prevent such serious diseases as cancer, cardiovascular disease, and even some mental illnesses.

**'Price is the main criterion for most consumers, and only a minority are interested in whether the fish is farmed or wild.'**

'There is an idea that wild fish is healthier than farmed fish,' says Dr Godfrey. 'But that often isn't the case. Farmed fish can be much healthier than wild. For example, wild fish that come from the Baltic area are often far less healthy to eat than fish farmed in a cleaner region of the ocean because the Baltic area is heavily polluted.'



Within the EU, there are stringent health requirements for farmed fish, but there are also less scrupulous producers who overcrowd their fish and don't follow regulations for feeding and waste drainage. Overcrowding and poor drainage can both lead to disease in fish.

'There is a strong motivation within the aquaculture industry to keep to high standards,' explains Dr Godfrey, 'because any lowering of standards reflects badly on the whole industry. Aquaculture is anxious that less scrupulous fish farmers are producing farmed fish that are not good and are spoiling the image of the industry. These will hit the headlines of course.'

Fish farming at its best can produce very large amounts of excellent quality fish and shellfish. Aquaculture producers are rightly making increasing efforts to produce healthy, unpolluted fish, which is good for the public and for the fish farmers who need healthy stock. The biggest opportunities for quantitative increases in aquaculture are with organisms low in the food web, simply because plants and

plant eaters are at the bottom of each food web and available in hugely superior quantities than all the animals living off them and off each other. This is why different species of carps, oysters and clams, cockles and arc shells account for the global top three product groups by quantity.

Aquaculture can also help deliver the message that polluted coastal seas and inland waters need to be cleaned up so that the harvest from marine and fresh waters, both farmed and from the wild, can keep up with growing demand.

'I think fish farming has had an easy ride because of the over exploitation of the fish in the sea and the extremely bad management of wild fish capture,' says Dr Godfrey. 'If this situation changes, capture fish production can increase. I don't think aquaculture will ever replace wild fishing unless exploitation continued at the same levels as recent years. I am enough of an optimist to think that that won't happen!'

For more information on the CONSENSUS (pictured) and SEAFOODPLUS projects log onto (respectively) [www.euraquaculture.info/](http://www.euraquaculture.info/) and [www.seafoodplus.org/](http://www.seafoodplus.org/)

# WHAT IS CERTIFICATION?

Year after year, aquaculture is relied on to produce high volumes of quality fish and aquatic food to complement capture fisheries and feed the growing human population. As aquaculture production continues to grow substantially to meet these demands, improved management becomes increasingly necessary. Certification is a kind of 'seal of approval' procedure whereby an official certification body provides assurance that a product, process or service conforms to a prescribed list of requirements.

Certification in aquaculture is an effective way to reduce the negative environmental and social impacts that may exist in the process of production. In its draft guidelines for aquaculture certification, the Food and Agriculture Organization of the United Nations (FAO) explains that, 'The aquaculture industry and market increasingly recognise that credible certification schemes have the potential to reassure buyers, retailers and civil society regarding these concerns.'

The FAO also notes that as a production sector, aquaculture comprises many and varied methods, facilities, practices and products. Its systems also vary from country to country, and operate under different social, economic, political and environmental circumstances. Nevertheless, in order for the sector to grow and contribute effectively to the global challenges of food security, poverty reduction and economic development in forthcoming years, the farming, processing and quality control systems of each country must run under the highest possible standards.

**'... the farming, processing and quality control systems of each country must run under the highest possible standards.'**

Over the years, governments and industry have responded to environmental, social and consumer concerns. Food safety standards have increased. Policies governing environmental sustainability are being implemented. Certification is part of the armoury of viable solutions, and has become popular as a way to capture the highest value and growth segment of the market.

The European Commission (EC) has promoted and participated in the development of certification standards to ensure that they are transparent and not discriminatory. The key objective is to ensure trust in the quality, security and sustainability of the aquatic food consumed by hundreds of millions of people.

The EC is soon to launch a Green Paper, which highlights the need for greater understanding of private certification schemes (since current schemes are mostly privately owned, direct EC participation as a consequence is minimal). This will be followed by a public consultation strategy, asking for feedback on how these schemes can assist EU exports, and how the EU might better facilitate market access to producers in developing countries required to comply with private certification schemes.

One of the main tasks of the ASEM Aquaculture Platform is to facilitate dialogue on issues where a lack of communication between Asian and European operators and regulators or between other stakeholders has given rise to misunderstandings or conflicts of interest. The platform seeks to identify and engage the main parties involved, in the understanding that mutually respectful policies based on scientific knowledge can help identify solutions.

The platform's processes enable open discussion and joint exploration among the parties. In this regard, the ASEM Aquaculture Platform has facilitated contacts between Asian and European stakeholders, as illustrated by the ASEM Aquaculture Dialogue on Thai shrimp certification and on pangasius culture in Vietnam. Members also attended the FAO workshops on the development of certification guidelines, and closely interact with the Network of Aquaculture Centres in Asia-Pacific (NACA).

## More information

The website developed by the Network of Aquaculture Centres in Asia-Pacific (NACA) and the Food and Agriculture Organization of the United Nations (FAO) is a comprehensive source of information on aquaculture certification. Building consensus is part of the process of developing international guidelines. The site provides the opportunity for any member of the public to engage in the debate by sharing their experiences and views.

**Log onto [www.enaca.org](http://www.enaca.org)**

# CUSTOMERS TRUST

## The brands to do the homework for them

Aquaculture fish retailers have a difficult job. They have to source top quality products for their customers while trying to find the best prices for the company and following the stringent requirements of food quality and safety legislation in a young and burgeoning industry.

Peter Hajjieris, Director of Sustainability and External Affairs at the frozen food giant Birds Eye Iglo (Europe), has worked with the supermarket sector for over 15 years. He believes aquaculture can help the fishing industry and help reduce the waste of food. 'The role of the retailer is to give consumers safe and responsibly-sourced food at an affordable price,' he says. 'One of the main benefits of aquaculture is that fish retailers are able to plan supplies better and food can be sold to customers without too many price fluctuations — this is particularly relevant for fresh fish.'

**'The main benefit of aquaculture for the retailer is continuity of supply and the ability to ensure that they can offer customers regular portion sizes and freshness.'**

This is an important bonus for the consumer as well. Regularity of supply and price are far more difficult in the capture industry, where a poor catch of one type of fish over several weeks will send prices skyrocketing. In this way, aquaculture is lifting the pressure on wild fish stocks, provided overall supply keeps in line with demand.

'The main benefit of aquaculture for the retailer,' explains Mr Hajjieris, 'is continuity of supply and the ability to ensure that they can offer customers regular portion sizes and freshness, which is

crucial. Fish can go from farm to supermarket in two to three days.' So, what are the responsibilities of the retailer when sourcing aquaculture fish, and how do they ensure they are purchasing high quality farmed products? 'Retailers have a detailed code of practice,' says Mr Hajjieris. 'This sets things such as environmental standards, the amount of space the fish have to swim in, and what they are fed on.'

'I think customers trust the brands to do the homework for them,' he says, 'as they do for food safety or when they buy an electrical appliance, for example. There are legislative requirements too. Most retail suppliers have sound technical sourcing and procurement policies in place. There is a lot of emphasis now on responsible sourcing, cutting down negative effects on the environment, etc, and retailers have taken this on board.'

European aquaculture is currently facing a lot of competition from Asia, where aquaculture has exploded over the past two decades, partly as a result of the continent's growing population. Much farmed fish and shellfish is coming to Europe from Asia at the moment because of strong aquaculture traditions in some countries and because conditions, such as climate and geography, are often more favourable to aquaculture in Asia.

'The European aquaculture industry is more hampered than in Asia,' says Peter Hajjieris. 'This is because the European industry has far more exacting conditions, some of which aren't really necessary. We are much stricter in what we require. Regulations for building fish farms are quite rigorous in Europe. It is a much more expensive business to open an aquaculture farm here than in Asia.'

On the other hand, the rapid growth of trade and distribution systems makes clear rules and enforcement indispensable to ensure consumer safety and meet other policy requirements. The efforts in Asian countries to strengthen their food safety capacity e.g. in terms of public oversight, is part of expanding safety assurances. That is an important step in building the trust in new labels or being able to cooperate in the value chain of already well-established brands.



# BETTER SOCIO-ECONOMIC IMPACTS FOR A SUSTAINABLE FUTURE

Aquaculture's economic progress in the last few decades has put it in the spotlight, particularly its more 'industrial' aspects. Not only does aquaculture make high quality food accessible to consumers, but it is also a good money earner. Indeed, its results are often expressed in financial terms before the quantities produced are highlighted.

It can also have positive social effects, particularly when the right type of husbandry technology can be fit into the economic strategies of resource-poor communities. The burning question is how to combine good economics with sustainable social and environmental conditions when the going is rough and far from ideal.

**'The burning question is how to combine good economics with sustainable social and environmental conditions when the going is rough and far from ideal.'**

Several collaborative projects have recently researched complementary approaches to the use of aquaculture as a means for lifting people out of poverty or to improve environmental and socio-economic impacts through more integrated resource use in fishpond systems in Asia.

Another line of work investigated a technological aspect of aquaculture by seeking to make better use of bacterial and other growth of organisms on the pond floor or on surfaces of sticks, the latter of which are put into fish ponds to prevent theft. Cultivating fish,



which can feed on such organisms directly, reduces the need for expensive feed and helps recycle nutrients which might otherwise deteriorate the water quality in the pond itself or pollute waterways receiving the effluents.

Combinations of fish and horticulture have also been tested, where organically-enriched pond soils serve as fertilisers for high value vegetable production on embankments, thus generating much more income (in combination) than from any of the component activities alone. So people who have fallen on hard times enter into a virtuous cycle of socio-economic improvements.

A complementary approach to the specific challenge of peri-urban aquatic food production systems started out with a participatory assessment of the problems. These systems are central to the livelihoods of many poor people; however, wetlands accommodating these systems commonly represent the only accessible means of disposing of human excreta. Although attention has been drawn to the benefits of such wetlands, their value is usually unmeasured and the impacts of contamination, altered access rights, urbanisation, changing consumer perceptions and varying land, water and waste values remain unknown.

Another project developed a better understanding of the role of peri-urban food production systems around Hanoi near the Red River Delta, the environs of Ho Chi Minh City (Vietnam), Phnom Penh (Cambodia) and Bangkok (Thailand). It developed management strategies and planning approaches with key stakeholders, including how to control skin problems of aqua-farmers and sanitary risks in their products. The lessons learned and some pilot activities are now being further amplified through collaboration with the Network of Aquaculture Centres in Asia (NACA) and its STREAM Initiative, promoting rural development and addressing poverty alleviation.<sup>1</sup>

These and other research collaborations connected to planning, investment and development activities have provided some useful insights into the nexus between the technical and socio-economic aspects of aquaculture. Sharing these insights more widely and combining scientific and more traditional knowledge is a good way to contribute to both solving some very real problems and creating new opportunities. Ultimately, such activities contribute to building more sustainable futures.

1. For more information, see N. Estrella, and C.E. Nauen, 2008, catalogue of synopses of International S&T Cooperation (INCO) projects on challenges in fisheries, coastal zones, wetlands and aquaculture.

# CHINA'S SUCCESS STORY: Adapting old practices for new needs

China is the world leader in aquaculture, producing approximately 70 % of the world's farmed fish. This is hardly surprising, as aquaculture has been practised in China since around 2 500 BC. Aquaculture emerged in Europe during the Middle Ages<sup>1</sup>, but contemporary aquaculture has been most intensively developed in the past few decades, largely in response to stagnation in the world's fisheries and overexploitation of popular species.

Significant advances in biology have also played a key role in the growth of aquaculture, and recent collaborations between Chinese and European researchers have provided mutual rewards: Western aquaculture has benefited from China's long experience with polyculture and subsequent leadership in the field of integrated multitrophic aquaculture (IMTA); and, conversely, Western approaches have helped Chinese research to shift from a narrow, reductionist focus towards a more interdisciplinary approach.

Professor João Gomes Ferreira of the Institute of Marine Research in Portugal, who has worked on several collaborative projects with Chinese researchers, described China's aquaculture industry as, 'huge, vibrant, creative, but in various aspects fragile, particularly for export markets.'

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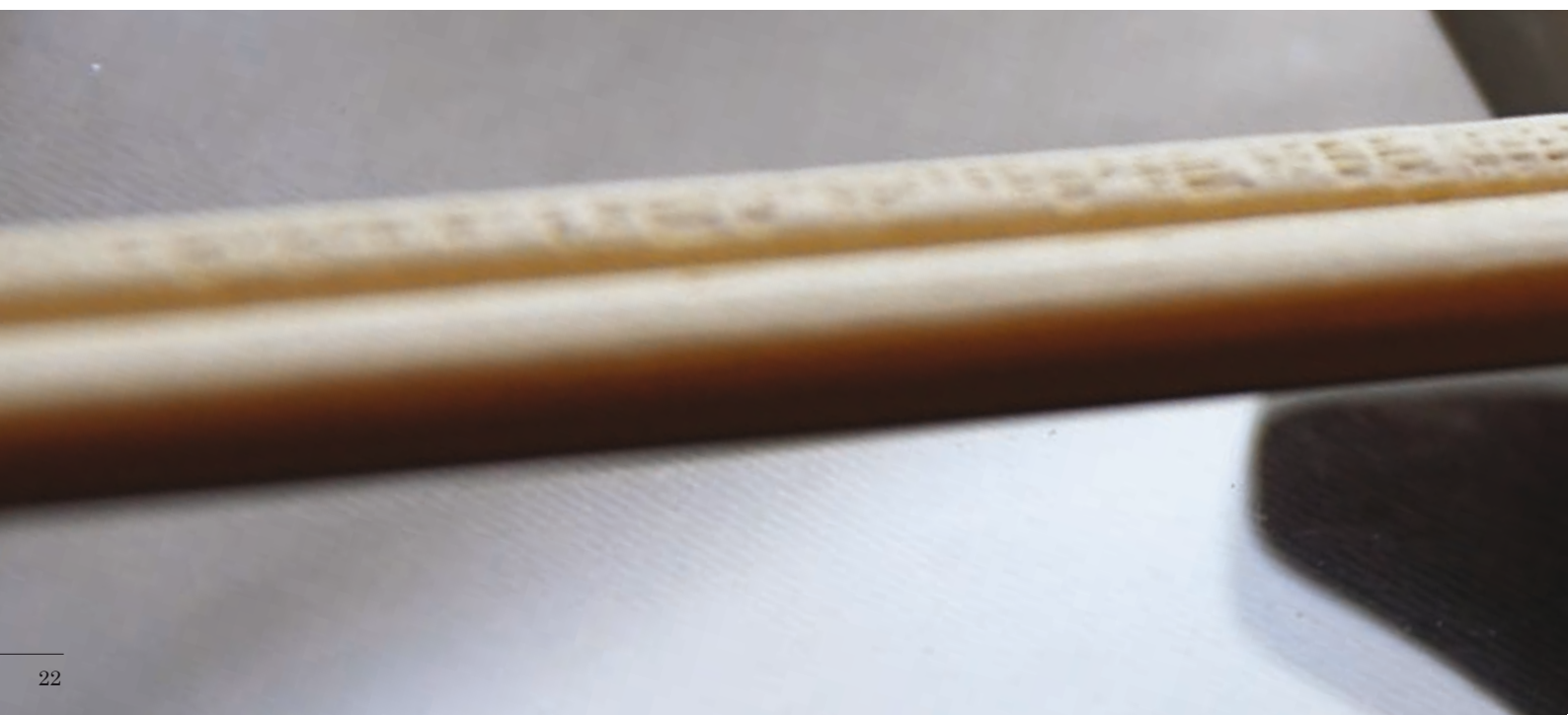
1. Oyster farming began in Italy in Roman times.

The primary challenges for aquaculture worldwide are establishing sustainable production practices and maintaining quality. While high production can be achieved in the short term using monoculture-based farming, the long-term, cumulative effect has been a degradation of coastlines and reduced overall capacity. Pollution and disease are a major concern for the industry as a whole, and efforts to establish more sustainable management have brought together Asian and European researchers and policy makers alike.

China's success in aquaculture, Professor Ferreira said, is largely owed to its long tradition of cultivating animals and plants in water. Recently, it has pioneered significant advances in the area of IMTA, and this sustainable approach to farming seafood in coastal waters has been widely adopted in China.

The centuries-old tradition of polyculture offers limited benefits, as it often involves growing fish together that share the same needs. IMTA draws on polyculture practices but offers an innovative approach to seafood farming that addresses environmental sustainability, economic diversification and social acceptability.

IMTA is all about recycling. It involves using the waste products from one species or process to feed another, thus mimicking nature. For example, instead of having a pond filled with one kind of fish or shellfish that need to be fed by hand, one water system houses several species (e.g. fin fish, seaweed, and shellfish) that can live together symbiotically. In IMTA, different species are intensely



cultivated in proximity to one another and benefit from the flow of nutrients. The goal is an environmentally sustainable and economically balanced (i.e. more species, less risk) system.

The tradition of reusing fertiliser has also contributed to the success of China's aquaculture industry. 'It seems perfectly logical that the nitrogen and phosphorus coming off the land, which give rise to algal blooms, should be used as a foodstuff,' Professor João Ferreira says, explaining that these algal blooms can be harnessed in the growing of oysters.

Achieving the right balance in IMTA aquaculture is a science in its own right, as it entails selecting species that benefit one another, get along, and are all of commercial value. Yields might not be high in the short term, but because the system can be sustained over a longer period and growing more species means exploiting a wider share of the market, the system is far more robust than its monoculture equivalents in the long term.

Two variations of IMTA have recently taken off in China: suspended, multi-species aquaculture inshore and multi-species, large-scale sea-ranching in deeper waters offshore. Basic research has focused on production capacity, environmental factors that help seaweeds, shellfish and fish to grow (not excluding agricultural run-off), and the 'bioremediation' efficiency of different seaweeds and shellfish. Together with practical demonstrations, it is hoped that advances in these areas will make the IMTA approach more attractive to commercial farmers in the East as well as in the West.

The adoption of IMTA in China is significant because, while a substantial body of legislation addresses the protection of coastal areas, participation and coordination have lagged. More than 25 legislative instruments address issues such as dumping, marine protected areas, and environmental impact assessment, but enforcement is a different story.

Good aquaculture management requires understanding ecosystem processes, nutrient flows, cultivation practices and business, but sustainable management takes into account social and political factors as well. While Western aquaculture can benefit from China's advances in IMTA, China has benefited from collaborating with Western researchers to develop integrated, sustainable management models.

According to a study led by Professor Ferreira and Professor Jianguang Fang of the Yellow Sea Fisheries Research Institute in China, modelling offers a powerful tool for achieving integrated, holistic aquaculture management. Advanced statistical modelling can be used to test the effects of different environmental and social factors on sustainability and carrying capacity.

The aquaculture industry as a whole has benefitted greatly from collaborative scientific research projects, although implementation of hard-earned research results remains a challenge. Importantly, researchers from both China and Europe have enjoyed working with one another and experiencing new perspectives.



# SPEAR: AN EU-ASIA COLLABORATION

Between 2004 and 2007, the SPEAR (Sustainable options for people, catchment and aquatic resources) project mobilised teams of aquaculture stakeholders in Europe and Asia to address the challenges currently facing the industry worldwide, notably those of sustainability and food security. It was part of the European Commission's INCO-DEV (International Cooperation with Developing Countries) strategy and funded by successive EU Research Framework Programmes.

SPEAR focused on coastal zones in areas where communities depend on marine resources. A deeper understanding of the structure and dynamics of these areas, both physical and social, was the main goal of the project. Integrating hard-earned knowledge in these disparate areas made it easier to develop tools for interpreting relevant data accurately and consistently. The project addressed some of the major gaps in research, such as up-scaling theoretical models to accurately reflect real-life situations.

Studies undertaken looked at two aquaculture systems in China — one rural, one urban — both of which are essential to the livelihoods of the surrounding communities. Professor Ferreira studies ecological modelling of marine systems in suspended multi-species aquaculture.

'During the decade or so that I have been involved in cooperation with China,' he says, 'I have seen a clear shift in the capacity of the Chinese scientists towards a much more process-oriented rather than descriptive focus. China is mainly focused on the production and disease components of research, but the frequent use of integrated multitrophic aquaculture (IMTA) is an ecological component of their work that hardly exists in Europe.'

According to a SPEAR publication, unsustainable use of coastal and marine resources is pervasive, and includes well-documented destruction of coastal wetlands through settlement, over-fishing and coastal pollution. For the most part, current aquaculture practice in China requires more concerted effort towards sustainability, an issue that the SPEAR project helped to address.

Most of the project had to do with the development of targeted management tools, including some web-based tools. Recent advances in statistical modelling played a role as well, as vast





amounts of geographical, climatic, social and economic information can now be incorporated into such tools. Modelling enables managers to determine the most sustainable approach for their area, and helps them to make better, informed decisions about their stock and business practice.

A balance between production and ecosystem capacity are possible, according to Professor João Ferreira. 'Carrying capacity is currently classified under four categories: physical, production, ecological, and social,' he says. 'All these need to be addressed, and a combination of field work, experiments and a range of mathematical models are appropriate tools to do so.'

The challenge of modelling is to incorporate a realistic level of detail, and to do this, a large number of variables need to be fed into the system. Aquaculture models need to be able to cope with fluxes of nutrients, organic matter and sediments in farming sites. For example, changing ecological processes including the seasons, changes taking place at the bottom of the sea affecting wild species, and a myriad of human interactions (from overexploitation of resources to sewage discharge). The data fed into the models comes from field programmes, satellite imagery and experimental measurements.

According to SPEAR, transitioning towards sustainable use of oceans and coastal zones remains a substantial challenge both for Europe and China. 'Scientific research has played a role in the institutional process, but not as strongly as might have been expected. Among the major factors making the transition lengthy and sometimes messy are the differences in perspectives among major social groups, which, naturally, lead to different interpretations of the available evidence,' the team reports.

The benefits of IMTA, a sustainable form of aquaculture, have been successfully demonstrated using modelling. Simplifying the interface of such models to make them valuable, practical diagnostic management tools is the focus of some research.

Funding, political support and compatibility with socio-economic organisation are all essential for research results to be adopted in a timely fashion, the SPEAR report concludes. To that end, international collaboration is pivotal to addressing the challenges of sustainability in aquaculture.

The European Environment Agency's report on coastal zones in 2006 highlighted continuous degradation of Europe's coastal zones, and illustrated how short-term economic decisions have ultimately led to structural decline. Meanwhile, the coastal regions of China are relatively prosperous but although excess nutrients in runoff have been cleverly exploited by mariculture, heavy metals and other pollutants are a growing problem.

Unfortunately, despite ongoing research into such problems, it usually takes a long time for society to act on a problem identified by scientists (unless there is a specific disaster that has attracted attention). The European Marine Directive, which runs through 2012, addresses degradation of European coastal zones while China has doubled its spending on its environmental programmes (the current 'Five Year Period' ends in 2010). A pilot structure for Integrated Coastal Zone Management (ICZM) exists in Xiamen and is planned for Shanghai. Although our knowledge is extensive, our ability to act on this knowledge remains a big challenge.

More information on SPEAR is available at [www.biaoqiang.org](http://www.biaoqiang.org) (in English) and [www.spear.cn](http://www.spear.cn) (in Chinese).



# WHO'S WHO IN GLOBAL AQUACULTURE

The ASEM Aquaculture Platform brings together a range of representatives from Europe, Asia and beyond to generate ideas in which different regions in the world may work together in ways of mutual benefit. When their efforts are combined, the key aquaculture networks in the industry (some of which are listed below, and include government, research, education and civil society) are responsible for driving the future of a dynamic and global aquaculture industry.

## AQUA-TNET

The Aquaculture, Fisheries and Aquatic Resource Management Thematic Network in Education & Training was founded in 1996. There are currently over 100 partners in the network, representing universities, training organisations, associations and research performers working in aquaculture, fisheries and aquatic resource management.

More information: [www.aquatnet.com](http://www.aquatnet.com)

## AquaTT

The European network for training and technology in aquaculture, founded in 1992, provides project management and training services to support the sustainable development of Europe's aquatic resources. Its mission is to bridge the knowledge gap between the R&D environments and the commercial sector.

More information: [www.aquatt.ie](http://www.aquatt.ie)

## Asian Fisheries Society (AFS)

Fishery professionals in Asia established the non-profit scientific society in 1984 to encourage networking and cooperation between Asian stakeholders. The objective is to enhance food security and generate opportunities via sound management practices, sustainable development and efficient use of aquatic resources.

More information: [www.asianfisheriessociety.org](http://www.asianfisheriessociety.org)

## Chinese Society of Fisheries (CSF)

Established in 1963, the CSF is an academic public organisation, joined (on a voluntary basis) by scientists and technicians in fishery and in other related fields. CSF is a bridge between the central government and numerous fishery scientists and technicians, and is an important force for the development of fishery science and technology.

(no English website available)

## CONSENSUS

The collective aim of the 21 partners in this initiative is to work towards a sustainable European aquaculture industry by building protocols that are based on low environmental impact, high competitiveness, and ethical responsibility.

More information: [www.euraquaculture.info](http://www.euraquaculture.info)

## European Aquaculture Society (EAS)

The history of EAS stretches back to 1975, when the idea of a European Mariculture Society (the name was changed in 1984) was first promoted. EAS produces the quarterly Aquaculture Europe magazine (distributed to more than 60 countries), the peer-reviewed bi-monthly journal Aquaculture International, and arranges thematic groups to facilitate information exchange.

More information: [www.easonline.org](http://www.easonline.org)

## European Aquaculture Technology Platform (EATP)

EATP was established in November 2007 to bring together all European aquaculture stakeholders in order to promote knowledge development, research and innovation in the sector. Realising the need for the sector to speak with one voice, the Technology Platform will develop a vision for the future, complemented by a strategic research agenda and implementation plan.

More information: [www.eatpnet.eu](http://www.eatpnet.eu)

## **Federation of European Aquaculture Producers (FEAP)**

FEAP is comprised of members from national European aquaculture associations. It aims to develop and establish a common policy on the production and commercialisation of aquaculture species (specifically farming).

More information: [www.feap.info/feap](http://www.feap.info/feap)

## **Network of Aquaculture Centres in the Asia-Pacific (NACA)**

The core aims of the intergovernmental organisation are as follows: capacity building through education and training; collaborative research and development through networking among centres and people; development of information and communication networks; policy guidelines and support to policies and institutional capacities; aquatic animal health and disease management; and genetics and biodiversity.

More information: [www.enaca.org](http://www.enaca.org)

## **Thai Department of Fisheries (DOF)**

DOF implements policies to support sustainable fisheries and aquaculture in Thailand. The department has installed an efficient shrimp quality control system in response to stringent import regulations.

More information: [www.fisheries.go.th/english](http://www.fisheries.go.th/english)

## **Vietnam Association of Seafood Exporters and Producers (VASEP)**

Established in June 1998, VASEP is a non-governmental organisation that aims at supporting the development of Vietnam's seafood industry.

More information: [www.vasep.com.vn](http://www.vasep.com.vn)

## **World Aquaculture Society (WAS)**

Some 3 000 members from 100 countries make up WAS, a non-profit organisation founded in 1969. Its key focus is to strengthen and facilitate communication and information exchange on high priority topics and emerging issues within the diverse global aquaculture community.

More information: [www.was.org](http://www.was.org)

## **WorldFish Center**

This non-profit, non-governmental organisation within the Consultative Group of International Agriculture Research (CGIAR) works in partnership with a range of agencies in pursuit of its main mission to reduce poverty and hunger by improving the fisheries and aquaculture industries. With 250 staff members in 13 countries across Asia, Africa and the Pacific, the WorldFish Center conducts research-for-development to improve small-scale fisheries and aquaculture. It also co-hosts the global archive of all fish at [www.fishbase.org](http://www.fishbase.org).

More information: [www.worldfishcenter.org](http://www.worldfishcenter.org)

## **World Wildlife Fund (WWF-Aquaculture)**

WWF is a major international non-governmental organisation active in such areas as sustainability of natural resources, and sustainable production and consumption, including aquaculture.

More information: [www.worldwildlife.org/what/globalmarkets/aquaculture](http://www.worldwildlife.org/what/globalmarkets/aquaculture)

# INTERNATIONAL S&T COOPERATION AMONG ASEM PARTNERS

## International Science & Technology Cooperation Projects (INCO) among ASEM Partners (FP5 and FP6: 1998-2006)

### **Global aquaculture: identification of key international research themes – GLAIKIT**

ICA4-CT-1999-50006: 01/12/1999 to 30/11/2000 (12 months)

### **Responsible aquaculture: a world research and technological challenge – REAQWO**

ICA4-CT-2000-50001: 15/03/2000 to 14/05/2001 (14 months)

### **Artemia biodiversity: current global resources and their sustainable exploitation – ARTEMIA**

ICA4-CT-2001-10020: 01/01/2002 to 31/12/2004 (36 months)

### **Control of epiphytism in Gracilaria chilensis mariculture – EPIFIGHT**

ICA4-CT-2001-10021: 01/10/2001 to 01/04/2005 (42 months)

### **Culture and management of Scylla spp. – CAMS**

ICA4-CT-2001-10022: 01/12/2001 to 30/11/2005 (42 months)

### **Anti-infectious immune effectors in marine invertebrates: characterisation and application for disease control in aquaculture – IMMUNAQUA**

ICA4-CT-2001-10023: 01/11/2001 to 31/07/2005 (42 months)

### **New native fish species for Asian aquaculture: conserving natural genetic reserves and increasing options for sustainable use of aquatic resources – ECOCARP**

ICA4-CT-2001-10024: 01/11/2001 to 30/09/2004 (35 months)

### **Zero discharge aquaculture by farming in integrated recirculating systems in Asia – ZAFIRA**

ICA4-CT-2001-10025: 01/01/2002 to 30/06/2006 (54 months)

### **Improved resource use efficiency in Asian integrated pond-dike systems – POND LIVE**

ICA4-CT-2001-10026: 01/11/2001 to 31/10/2005 (48 months)

### **Hazard analysis of antimicrobial resistance associated with Asian aquacultural environments – ASIARESIST**

ICA4-CT-2001-10028: 01/12/2001 to 31/05/2005 (42 months)

### **Policy research for sustainable shrimp farming in Asia: a comparative analysis of Bangladesh, India, Thailand, and Vietnam with particular reference to institutional and socio-economic aspects – PORESSFA**

ICA4-CT-2001-10042: 01/05/2002 to 30/06/2005 (38 months)

### **Development of a diagnostic tool for the detection of fish-borne trematodes – TREMKIT**

ICA4-CT-2001-10080: 01/05/2002 to 31/07/2006 (51 months)

### **Aquachallenge: Aquaculture challenge-Asia: international workshop to discuss strategies to achieve the goals of sustainable aquaculture, high-quality environmentally acceptable products, with current technological, scientific and environment**

ICA4-CT-2001-50017: 01/01/2002 to 30/09/2002 (9 months)

### **Managing agrochemicals in multi-use aquatic systems – MAMAS**

ICA4-CT-2001-10031: 01/01/2002 to 31/12/2006 (48 months)

### **Production in aquatic peri-urban systems in Southeast Asia – PAPUSSA**

ICA4-CT-2002-10020: 01/01/2003 to 30/06/2006 (42 months)

### **ASEM Aquaculture Platform – AqASEM**

INCO-CT-2004-502505: 15/05/2004 – 14/05/2006 (24 months)

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For several countries in Asia, many of which have long-standing traditions in farmed fishing, aquaculture represents one of the fastest growing and most profitable industries in the region. Europe, on the other hand, is more of a newcomer, but has developed advanced technologies, research and teaching, which contribute to high, value added production. It is also a major export market for Asian production.

Over the past few years, the configuration of east and south-east Asian and EU countries present at Asia-Europe Meetings (ASEM), initially intended for high-level political dialogue, also spawned channels of interaction in other areas, including policy and technology. Multi-stakeholder dialogue platforms comprising scientists, research managers, business people, civil society organisations, public managers and others, were set up to generate better mutual understanding, build trust, exchange experience, and foster and use new collaborative opportunities.

Some of the thematic areas of highest mutual interest were first identified at a ministerial meeting of ASEM science and technology ministers in Beijing, China, in 1999. Aquaculture ranked high on the agenda, and led to the ASEM Aquaculture Platform in 2002. This publication is an overview of the work conducted by this platform in support of collaboration between Europe and Asia in the field of aquaculture.



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