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 Innovation & Investment
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Aquaculture Exchange: David Little, University of Stirling

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4 January 2016 James Wright



Professor of aquatic resources and development discusses Southeast Asia's evolution and the role of academia in aquaculture



David Little first witnessed how seafood was farmed in Southeast Asia back in 1980 during a [Voluntary Services Overseas](#) adventure in Thailand. “I’ve really done nothing else since,” he wryly told the *Advocate* in December. But most people in the aquaculture industry know that’s not the case. Little is highly regarded for his work at the University of Stirling in Scotland and for his generous contributions to the Global Aquaculture Alliance (GAA) in fostering collaborative relationships between producers and the knowledge centers that support their work.

After spending 15 years in Thailand, collaborating with the Asia Institute of Technology and various other projects, Prof. Little has gained a unique perspective on the changes the region has experienced as technological innovations have made their various impacts. He made time in his busy schedule — in the run-up to the holiday season, during students’ oral examinations — to share some knowledge and insights about the role of academia and the students who will one day carry on with his important work.

Southeast Asia is a crucial production region for the global seafood supply. Why has aquaculture been embraced there like nowhere else?

It's a combination of factors. There's huge consumption and huge demand. Many cultures in Southeast Asia call themselves rice-fish cultures. Rice is the staple carbohydrate and fish is the staple quality food, if you like. And those populations sustain themselves through fishing, originally, and once population densities and demand go above a certain level then that becomes a very important stimulation to move into aquaculture. That of course happened thousands of years ago in southern China where population densities were very high. That prompted the evolution into what became known as the Mulberry dyke systems in Guangdong Province, where pond carp culture was highly integrated with agriculture.

As populations have become more urbanized they're less able to go catch fish and shrimp out of community water bodies, and they're more dependent on trade, and they're buying protein. Farming gives you a more consistent supply chain. In 1980, in the parts of Thailand I used to live, you'd go into fresh markets and there'd be an abundance — a huge variety — of mainly wild-caught products. You go there now, there's farmed catfish, farmed tilapia, farmed snakehead, farmed shrimp piled high, and much smaller quantities of wild products.

If European producers have to have higher welfare for salmon, then everyone should have higher welfare. So we started asking Asian producers what they thought of higher welfare, to which there was a bit of a snigger and a laugh. 'I think human welfare comes first,' was a common reaction, and quite understandably.

So countries like Thailand, Vietnam, Bangladesh became leaders because the pressure is that much higher. It's that combination of high consumption of seafood and high demand because of high population pressures, urbanization — these are the factors.

How much of what Thailand produces is intended for international trade?

There's a few misconceptions there. Thailand is quite interesting in that there's also quite a large domestic consumption of shrimp. There's no doubt about it that shrimp has been the product that's gone for export, because it's got a high value. What you get, as countries get better off themselves, and indeed as the price of shrimp in real terms has dropped, you get more domestic consumption. For example, China, if you go back five years ago, would have been a very big exporter of shrimp, but now is importing like crazy from everywhere.

In a poorer country, like Bangladesh, a much higher proportion of shrimp is exported. That can give you a simplistic overview of what aquaculture is doing to those countries. Actually, the domestic market is often far, far bigger. If you look at Thailand, the headline number is shrimp, but if you add it all up, the catfish, the tilapia, all the multiple numbers of smaller species, they are often as important or more important.

I think you'll find the same in most of these countries. In terms of tonnage, what Bangladesh exports is tiny in comparison to what it's growing and eating itself. I suspect it's the same in Indonesia. That's, if you like, the hidden story. We see, in the West, what we get on our plates, but actually what is a more interesting story is what they're doing for themselves. And they're trading with each other. There's a lot of Southeast Asian shrimp going into China. There's been traditional trade with different types of species between these countries, that now have modern distribution techniques, and growing demand. It's really taking off.

Should western markets, then, be concerned about securing supplies of farmed seafood from Southeast Asia and China?

It's a real factor, I think. The point about shrimp is we can expect to see those markets for shrimp changing hugely going forward, away from a commodity — how big is it, what is it worth, which is very much the case now — to markets being able to differentiate. What type of shrimp? How is it actually grown? There's a lot of interesting work that can be done to help that process along. I don't think necessarily more is better. We've learned that from every commodity. It's more of how much extra value can be built in for the actors in the chain.

Rather than everyone, everywhere, growing and eating white shrimp produced intensively, what we might want to see is other types of shrimp with higher values, perhaps grown in different ways, that can get credibility in the market. For example, products organic or other ethical values that consumers are willing to pay more for. I think we'll see more of that.

But yes, the West can play a bigger part in that, because that's how those markets work. In some ways Asian markets are already ahead, because they will pay very good money for very high-quality product. We see that in richer countries in Asia like Japan or Korea. They'll pay top dollar for seafood in a way that we don't.

What is academia's role in aquaculture and its continual improvement? It seems to be an industry that relies heavily on science and new technology.

If you pooled all the knowledge about chickens into warehouses there'd be many more warehouses with knowledge for chickens than for aquaculture, which is a long, long way behind the curve in terms of just the basic knowledge sets. We have much greater diversity of the types of systems we use for growing aquatic animals and indeed the very species. We're not dealing with a few strains of chickens, we're dealing with different classes of animals — crustaceans, finfish; there's a huge range. There's a lot more to learn and a lot less we know. Therefore, in comparative terms, people who make a living developing knowledge in a structured way and passing it on, whether it's through formal teaching or less formal types of outreach, can have an important role. There's good examples of that. You can trace the take off in the Egyptian tilapia sector to training that was given by Auburn University.

Let's not downplay what farmers do for themselves. Most of the real innovation is a combination of local and outside knowledge. I guess that's the same in any sector, but never more so than in aquaculture. Maybe it's the local knowledge of how you move live juvenile carp around combined with an FAO initiative to take up Brazilian-inspired technical innovation in induced breeding, moving it to China, going to India, going to Vietnam and moving it down and around through Asia. Such development might have been government-inspired in specific programs but they would have gone nowhere unless there was the right institutional context for that knowledge to be used and moved around. It took sometimes a couple of decades to play out but once it got into the hands of people who make money work — innovators, entrepreneurs — that's when it really took off. Then, you get that indigenous innovation process happening as people share information. All sorts of information changes happen when people adapt knowledge and use it locally.

It's certainly not just about academics shutting themselves in a lab and coming up with answers. It's very much about how we engage with other stakeholders and share information and indeed learn from each other.

Professor Barry Costa-Pierce was saying that aquaculture is overlooked in academic programs with fisheries components. Considering the growth of the industry do you think that will change?

I'd like to think it will. Academia is very competitive. Everyone out there is trying to say, 'Hey, look at us, we're important,' to attract money, to attract students. It's only going to happen if we make it happen, if we continue to make the point, and I think Barry did that in your article. We're in a fast-growing part of our food supply, and how can we look at global food security if we're not looking at one of the most important sources of high-quality food, and not just the bit that's stagnant but the bit that is growing really fast. I agree with him that we have to look at a more joined-up approach to that continuum between natural, exploited stocks to controlled farmed stocks. And there's a lot of stuff in between that some people call fisheries, some people call aquaculture, and in fact we need to have knowledge from both sides. It's really about how we manage aquatic resources in the bigger scheme.

What we've got to do, and where GAA is massively important, is this awareness-raising program, opening up people's understanding where the food comes from and why aquaculture should be part of that future.

What projects are you currently working on that could impact production?

There's a new initiative from Scottish government called the Scottish Aquaculture Innovation Center, which is trying to bring together commercial actors and academia. That's because there's been a view that academia does

still do its own thing and businesses need knowledge, they need support. I absolutely challenge that. Institutions have always worked with industry, or else we would have been irrelevant a long time ago. Of course, we can always do it better, we can do more of it, and cleverer. Any initiative that facilitates that is good, and it's exactly what GAA does on a global scale and perhaps should do more of as we go forward with these new mechanisms GAA is trying to bring in. I think getting people working together, understanding each other's languages is critical. Also that incentives for academia are often different than for industry, but that doesn't mean you can't work together. The Land Grant University system in the U.S. is a good model.

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We have a lot of joined-up science here at Stirling. Something we've got going, something that GAA is partially funding, is looking at higher welfare shrimp production. We made a case for this. To give you an idea of how this work started, we had a European so-called framework FP7 project called SEAT. One of the strands of that was trying to look at how the trade between Southeast Asia and Europe — we import over 60 percent of our seafood, a lot of it farmed, a lot of it from Asia — could be sustained and how it would be a win-win for both sides. One of the things you get there is European producers who see lots and lots of low-priced pangasius coming out of Vietnam and flooding their markets and undermining their position. How do we look at these things in the round? And are they alert to the fact that there are lots more jobs and potential benefits to Europe that we get in adding value to such imported, farmed products?

So you take the broader view, and one of the things we saw was that European legislation was moving to a much more level playing field. If European producers have to have higher welfare for salmon, then everyone should have higher welfare. So we started asking Asian producers what they thought of higher welfare, to which there was a bit of a snigger and a laugh. 'I think human welfare comes first,' was a common reaction, and quite understandably. So we took some case studies from Europe and we worked with the Scottish salmon industry, which has pioneered something called Freedom Food, which is a higher welfare salmon standard, and we told the farmers' story, basically. We translated it into Vietnamese, Chinese, Thai, Bangladeshi, so that we could orientate people to the idea that better fish welfare is not a bad thing, in fact it's a very good thing.

Is animal welfare a bit of a hard sell in Asia?

I think it's seen very much as a developed-country concept. If you're working with small-scale farmers who are not wealthy, the idea that we should be growing fish or shellfish in a way that optimizes the animal's health, and costs the farmer more, it could be a hard sell. I think the way we'd be engaging Asian researchers into this whole idea is, what we found in Scotland, which is that the farmers made more money. Higher welfare meant more productive systems in their case. If you're going to get someone to grow most productively and be most efficient, generally it's not going to be a badly looked-after animal. It's sort of common sense on one level but it depends on how we approach the problem — are we really looking through the eyes of the people who we're trying to engage in this process?



The University of Stirling's sustainable aquaculture studies programs explore governance, resource efficiency, environmental resilience and societal impacts, to name a few.

Stirling is involved with creating Scotland's first mussel hatchery. Apparently growers there struggle to find reliable sources of seed stock. How has the industry survived this long without this resource?

It has because there has been enough natural spat and they got better at collecting it. They reached a tipping point where they saw the advantage of having hatchery control over the cycle, all those things that potentially lead through to genetic improvement. You could potentially think about selective improvement. You see this with many species. If you go look for snakehead hatcheries in Asia, you look in vain, even though it may be developed farming and valuable markets. It's because there's still a lot of wild, easily available seed. So why invest in a hatchery? It depends on what stage you're at as to whether the incentives are there. This is another thing you can do much better if you work collectively. The Scottish government puts in a bit of money, and the biggest stakeholders put in more money and you can take those risks when it comes to longer-term and more collective-benefit outputs.

What do you see in today's students? Are they passionate about the potential of aquaculture?

I think we see a big difference between potential undergraduates and post-graduates. I went to an FAO meeting in Vigo, on what a bad reputation aquaculture still has in many developed countries and how most people favor wild fish over cultured fish. We've not worked out how to communicate positively with young people. It's still seen as something that's got a bit of a mixed track at best. For a young 18-year-old who's setting out, they might veer more toward another choice. That's why we've got to have a positive and proactive profile to attract more interest at that level. Where we have no problem is at the post-graduate level, because the numbers will always be smaller and more specialist at that stage. We get such fantastic cohort students year after year; our MSc classes are very international. They tend to be people who know what they want to do or at least, perhaps, what they don't want to do. Often they're still not set on whether they want to go into industry or regulation. They're looking to what life will offer them. But they know it's exciting, they know we're in a growth area with lots of challenges.

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