



**NEWSLETTER
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A Word from the AASA Chairman

Etienne Hinrichsen

As we are just days away from the tenth biannual conference of the Association, that will be held in Malawi from 13 – 16 September, I can only say that it has once again been a privilege to witness first-hand how the event has come together. With the programme and virtually all logistics having now been finalised, I am looking forward to a great conference and a week packed to the brim with discussions and planning around aquaculture on the African Continent.

During and after the conference I will be accompanying two board members from the World Aquaculture Society (WAS) that are attending the Malawi event and who will be visiting South Africa. Their visit is specifically aimed at gaining more insight into brining a conference of the World Aquaculture Society to Africa in 2017.

Over the years that I have been involved in aquaculture, I have been through a number of seasons in which I have had different views about different aspects of our industry. In the current season I am calling for improved realism. By this I mean that all of us need to become more realistic when we plan and execute aquaculture projects and developments – realising that we have a great responsibility in making sure that the industry is not branded as a sector in which sustainability and success is jeopardised by unworkable planning and figures and facts that do not hold water.

For those that I will not be seeing in Malawi later this month, please enjoy the warmer spring weather that seems to have arrived (I have been told that the tilapia are already spawning).

The Editor's choice

Editorial

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Two items caught your Editors attention, the first was on traceability. Technology is increasingly playing an important role. The second was the increasing demand for seafoods – and the limits of the worlds natural water to supply them.

Editorial Can Smartphones Guarantee Freshest Fish?

By Jon Bowermaster

How fresh is your fish? Boat-to-table fishermen alert chefs to their latest catches via smartphones. One of the oldest tricks in the fish monger's world is trotting out the notion that the cod, snapper, flounder or mahi mahi you are about to be served is "fresh today."

In too many cases that translates into "the fish just arrived in the supermarket or restaurant this morning by truck or plane from some distant place." The reality, of course, is that the fish was most likely plucked from a farm or raised in nets from the sea many, many weeks before. I once sat in a salmon broker's office at a fish farm in the south of Chile while she held out for higher prices as the fish sat on ice on a Santiago runway, waiting, ultimately for days, to be delivered.

Thanks to some novel and enterprising partnerships between fishermen and chefs around the sea borders of the U.S. from Maine to Alaska some restaurants and fish sellers are now guaranteeing that the fish on your plate or in your cloth bag on its way home was swimming free just hours before. Relying on the best of social media and digital technologies, fishermen are going so far as to send chefs texts with photos of what they've just hauled in as a way to help them shape their "fish du jour" menus.

Traceability has become a big trend in the sustainable seafood conversation. Several of the big ocean environmental groups have initiated programs to try to insure you know exactly where your fish comes from—Oceana's "Seafood Fraud" campaign—is a great example. But it is still a challenge for most consumers. I asked the waitress in a mid-sized Midwestern town recently if she knew where the Tilapia on the menu came from and she said no, but that she would find out. She returned five minutes later, having dug the box the fish arrived in out of the garbage. "Ecuador," she said, proud to have an answer. Yet that's hardly the same dining experience as knowing that the squid or striped bass on your plate was caught that morning in the cold Atlantic.

The Trace and Trust program operating in Rhode Island seems to be making everyone happy. The fishermen no longer have to deal with middlemen/wholesalers but can sell directly to restaurants, chefs get the freshest fish available, and customers truly get the best-tasting fish possible. As well as knowing what fish are on the way, the new technology also allows fishermen to keep chefs apprised of what's not available, so that if it's been a slow week on the high seas for cod, for example, it can be taken off the menu rather than forcing restaurants to sell weeks old, frozen fish.

Trace and Trust was established less than a year ago, with a goal of encouraging a market for local, sustainable seafood. It was the brainchild of a trio of fishermen and a business consultant. "We got tired of seeing all of our fish leave Rhode Island," says one of the fishermen, Steve Arnold.

It is the high-tech angle that makes this story so au courant. The direct-to-table fishermen admit the most important tool on their boats today may be their smartphones. Some are watching the Twitter and Facebook feeds by local chefs to be more knowledgeable about their needs. As they are heading back into port they are texting pictures from the back of their boats directly to kitchens.

At their end the restaurants are often getting fish that costs less—because the processor/distributor and his fees have been cut out, and tastes better, insuring return customers.

Boston restaurateur Jose Duarte (Taranta) has taken technology to another limit, creating 2-D bar codes for the fish he serves—known as QR codes, prominently used in Japan and across Europe for tracing inventory—that are silkscreened onto dinner plates using squid ink. The code is then tracked by the Trace and Trust website, which lets users (and Taranta diners) know who caught the fish, when it was caught and the method of harvest. Finally, a use for smartphones at the dinner table that we don't mind at all.

<http://www.takepart.com/news/2011/08/11/can-smartphones-guarantee-freshest-fish>

UN report - global consumption of fish at all time high

From CNN

Figures from the U.N.'s Food and Agriculture Organization (FAO) state fish is currently the most-traded food commodity, worth around \$102 billion in 2008. But as our appetite for fish increases, the world's fish stocks are becoming increasingly overexploited and depleted, which "gives cause for concern" the U.N.'s 2010 State of World Fisheries and Aquaculture report has stated.

Put simply, we are eating too much, says Dr Daniel Pauly, marine biologist and professor at the University of British Columbia. "The pressure we are imposing on the world's fisheries is excessive. Either we are eating too much or we are too many," he said. But he added: "Fishery science is very much divided in this debate. Three or four years ago there was wide consensus that fisheries were

doing very badly, now again it has become a contentious issue, much like talk on global warming," he continued.

Much of the debate is focused around annual figures of global fish catches, which reached a peak of 86.3 million tons per year in 1996. Since then there has been a decline, with 2008's annual fish catch dropping to around 79.5 million tons. While some scientists suggest the downward trend shows a move away from over-fishing and a replenishing of fish stocks, others believe the data proves fish stocks are already overexploited or depleted. Pauly believes the change in fish catches and a spike in fish consumption can be explained, in part, by the expansion of fishing operations into new waters over the last 50 years. "Europe like the U.S. and Japan now get most of their fish from the developing world. As the European stock was depleted, Europe simply went south and expanded. We find the same sort of expansion in Japan and the U.S., so instead of being sustainable, we have just moved on. The logical end of this, and we have begun, is fishing krill in Antarctica. This southward expansion seems to be at an end, because there are no more waters to be conquered.

While scientists disagree on the current state of fisheries worldwide, the FAO has made its conclusions clear, stating global fishing catches will not be able to increase "unless effective management plans are put in place to rebuild over-fished stocks."

Pauly says "The need to rebuild instead of expand is not rocket science. If we do not rebuild our fisheries, how will we ever produce a decent yield?"

<http://edition.cnn.com/2011/BUSINESS/08/25/global.fish.consumption/>

Abalone



New Marifeed abalone diet reduces fishmeal use and satisfies WWF standards

Concern over the sustainability of fishmeal use in aquaculture has led the World Wildlife Fund (WWF) to place restrictions on its use in their new standards for sustainable abalone farming. For abalone fed diets that contain fishmeal the standards require that it should not take more than one kilogram of fish to produce a kilogram of abalone. At present most South African abalone are fed Abfeed-S34®, a diet manufactured by Marifeed (Pty) Ltd, which does not meet this sustainability requirement unless fed in combination with seaweed. However, Marifeed is now offering Abfeed-ES26, a diet that can meet the sustainability requirements of the WWF and provide farmers with the same growth-rate and processing yield as the popular Abfeed-S34®.

In October of 2010 the first comprehensive sustainability standard was set for the abalone industry when the World Wildlife Fund (WWF) released their Abalone Aquaculture Dialogue Standards. These were developed as a set of standards for assessing the environmental and social impacts of individual abalone farms. Perceptions and understanding of issues around sustainability are changing and certain farmers may seek to comply with such a sustainability standard because of ethical motivations but there are also solid market advantages. The once environmentally-unconcerned Asian seafood market is slowly changing and with certain customers there is now the opportunity for South African abalone farmers to obtain a higher price for abalone that have been certified as sustainable.

Not surprisingly, for abalone farms that feed a formulated diet containing fishmeal, the standards place restrictions on both the source of the fishmeal used in the diet and on how efficiently the fishmeal is converted into abalone. The use of fishmeal in marine aquaculture feeds and the sustainability thereof has always been a contentious issue. Meal made from marine finfish is a far superior source of protein than meal from land animals or plants and including it in the diet of the

majority of marine aquaculture species will result in better growth. In the case of abalone, fishmeal has always been an essential component of the diets that Marifeed produces, because of the improvement in growth-rate and processing yield that this ingredient provides. However, since the stocks of many fish that are harvested for fishmeal are declining the environmental responsibility of harvesting these fish to produce aquaculture products is questionable. In short, fishmeal is desirable in a formulated feed in order to maximise production efficiency but the sustainability of the products produced should be questioned.

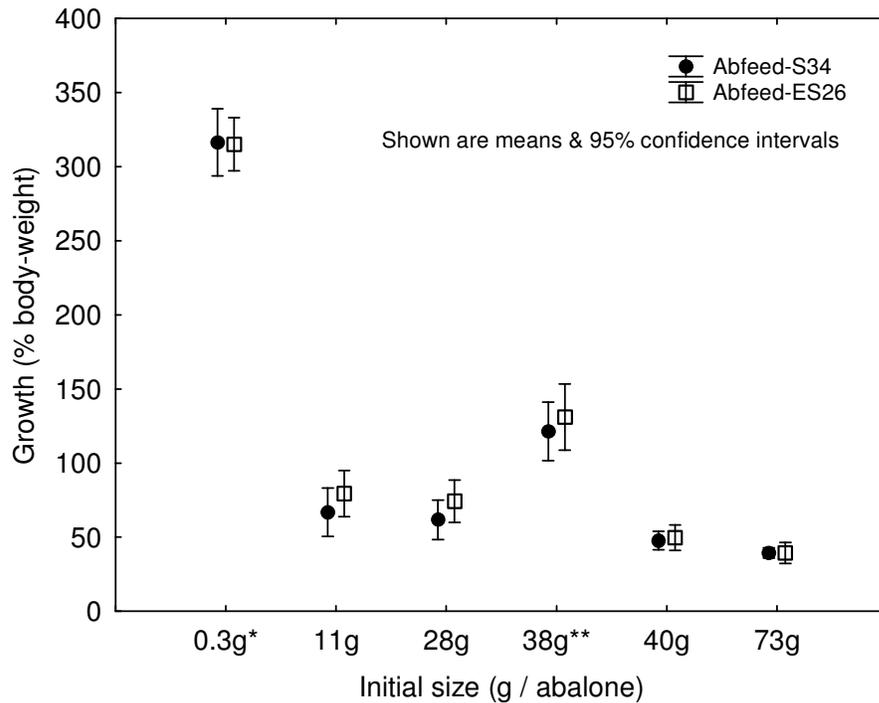
This issue can be addressed from two angles; firstly the feed manufacturer can commit itself to sourcing fishmeal from a well-managed fishery. Marifeed sources its fishmeal from fisheries regulated by South Africa's Marine & Coastal Management but unfortunately there has not yet been enough incentive to cause any of these fisheries to apply for an internationally recognised sustainability certification. Secondly, the feed manufacturer and farmer can commit themselves to producing and using feeds that are highly efficient at converting fishmeal into aquaculture product. The efficiency with which fishmeal is converted into aquaculture product is typically assessed by looking at the Forage-Fish Efficiency Ratio (FFER) or Fish-In-Fish-Out Ratio. Both mean the exact same thing and are measures of how many kilograms of wild fish need to be caught to produce a kilogram of aquaculture product. With the aim of improving the FFER of its abalone diets Marifeed has to date funded a number of research programs at the Department of Ichthyology and Fisheries Science of Rhodes University. Most recently this research resulted in the commercialisation of the relatively low-fishmeal, Abfeed-K26 diet.

With the publication of the Abalone Aquaculture Dialogue Standards there is now a need for a diet that will meet the requirements of the standards yet still give the same growth-rate and processing yield as the industry's standard diet, Abfeed-S34. The standards require that the fishmeal used in abalone diets must be sourced from a fishery that is deemed sustainable, within 5 years of such fishmeal being commercially available in the farming region, and that the diet must have a FFER of less than 1. In terms of the standard, a fishery is only deemed sustainable if they have been accredited by a scheme that complies with the International, Social and Environmental Accreditation and Labelling Alliance (ISEAL).

To the best of our knowledge fishmeal from such fisheries has only become available within the past two years and so this standard does not yet apply. At present the available amounts are relatively small and the cost is high. However, more fisheries are being certified each year and hopefully this will reduce the difference in price relative to conventional fishmeal. In order to develop a diet with an FFER of below 1 Marifeed collaborated with Dr Cliff Jones and Prof Peter Britz of Rhodes University to test a range of candidate diets based upon the original low-fishmeal Abfeed-K26. An essential component of the research has been the optimisation of the protein/energy ratio.

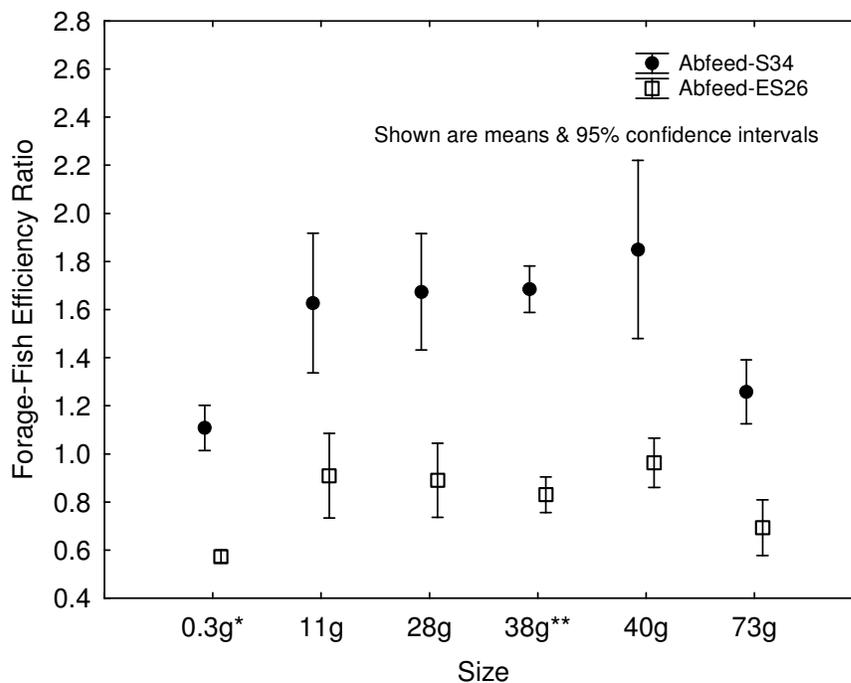
According to Dr Jones, "If the diet does not contain sufficient energy, then the fishmeal content cannot be reduced without affecting growth. In the absence of sufficient energy from carbohydrates, the abalone use protein (in this case, fishmeal) as a source of energy, leaving insufficient protein for meat growth." After numerous growth and processing yield trials at two local abalone farms this research has produced a 26% protein diet which contains far less fishmeal than is present in Abfeed's S34 diet and which achieves an FFER of below 1 at any Feed Conversion Ratio (FCR) below 1.28. Marifeed calls this diet Abfeed-ES26; the 'ES' standing for 'environmental sustainability' and hinting at the green certification farmers could use the diet to achieve. What makes this diet special is that it gives the same growth-rate and processing yield attained with the standard formulated feed, Abfeed-S34, and these results hold true across the size-range of abalone farmed, from the smallest abalone leaving the hatchery to abalone of market-size.

Fig. 1. Growth of abalone of different sizes when fed Abfeed-S34 or Abfeed-ES26. All abalone were grown for four months except the 0.3g size-class, which were grown for three months and the 38g size-class which were grown for eight months.



Although the ES26 diet has consistently achieved FFER's of below 1 in all growth-trials and FCR's of below 1.28, the initial FCR's have been slightly poorer than those of abalone fed S34 (Fig. 2). The ES26 diet is a denser pellet than S34 and we suspect the poorer FCR of ES26 was due to feeders over-feeding this diet, since they were used to feeding the lighter S34. This is something which farmers would need to train their feeders on if converting from S34 to ES26.

Fig. 2. Forage-Fish Efficiency Ratio of abalone of different sizes when fed Abfeed-S34 or Abfeed-ES26. In all cases the FFER of abalone fed Abfeed-ES26 was below 1.



Some farms may need to change their production systems or improve their feed management in order to meet the standards' requirements for feed. At present FCR's on some farms feeding Abfeed diets range as high as 1.5. However, when feeding ES26 an FCR of 1.28 or lower is needed to achieve an FFER of below 1. With a properly designed grow-out system and good feed management all farmers should be able to achieve this. At least two large, South African farms typically achieve FCR's of 1.2 and lower. An FCR higher than this is usually caused by factors that the farmer can correct, such as over-feeding or feeding the Abfeed diets to abalone in basket systems that were designed for feeding kelp.

Farmers who require more information about the new ES26 diet and feeding procedures can contact Mr Kurt Matschke of Marifeed. Since fishmeal is a relatively expensive ingredient, which is reduced in the ES26 diet, Marifeed is currently selling ES26 for less than the standard Abfeed-S34.

Oysters & Mussels



Africa's mollusc stocks at risk from ocean acidification

Human industrial activities release carbon dioxide, which dissolves in sea water, increasing its acidity. This higher acidity damages the mollusc stocks on which many fishermen in Gambia, Haiti, Madagascar, Mozambique and Senegal rely.

"Laboratory studies show that animals that make hard shells and skeletons out of calcium carbonate minerals have a more difficult time doing so when ocean acidification lowers the carbonate concentration in sea water," said Sarah Cooley of Woods Hole Oceanographic Institution, United States, the study's lead author. There is a clear link between increasing ocean acidification and decreasing carbonate production for shells in molluscs such as clams, scallops and conches. "It takes more energy for these animals to create and maintain calcium carbonate structures, so they have less energy for other important life functions like reproduction, growth and metamorphosis," she added.

The study, published in *Fish and Fisheries* last month, says that mollusc fisheries will decline most in poor countries that are already struggling with protein deficiencies. It assessed countries' vulnerability by looking at their reliance on mollusc fisheries, their capacity for aquaculture and their projected population growth. Aquaculture may help control factors such as acidity levels, helping nations to adapt. It found that, 10–50 years from now, many developing countries will face smaller mollusc harvests, with the five countries mentioned above to be hit the hardest. This leaves a narrow window of opportunity for policymakers to devise strategies that allow fishermen to continue benefiting from mollusc fisheries.

Molluscs are a high-quality source of protein and exporting them generates income for some developing countries, Cooley said. In Madagascar, for instance, fishing provides seven per cent of the gross domestic product (GDP) and generates nearly half-a-million jobs, according to 2005 data. But a combination of nutritional, economic and oceanographic factors, such as protein loss, erosion of income, climate change and ocean acidification, makes these nations particularly vulnerable, Cooley said.

In Madagascar, the effects of ocean acidification and climate change are already being experienced, according to Jean Maharavo, acting director of science at the Ministry of Higher Education and Scientific Research. "My recent work shows a close correlation between decline in shellfish harvests and environmental decline in the southwestern parts of the island," he told *SciDev.Net*. Urgent measures are needed to protect submarine areas and to ensure the sustainability of mollusc stocks, he said, adding that alternatives to mollusc fishing must be found. Cooley said that, for adaptation to be successful, vulnerable nations must also include pollution, overfishing and climate change in their plans.

Tilapia



First vaccine for tilapia authorised

By Silvina Corniola

The Secretariat of Agricultural Protection, from the Ministry of Agriculture, Livestock and Supply (MAPA) of Brazil authorised the registration of the first vaccine for use in commercial fish in the country. The authorisation is achieved through the joint work between the Ministry of Fisheries and Aquaculture (MPA) and MAPA.

MPA highlighted that the technical support provided for the analysis of specific processes for aquaculture allowed the Ministry of Agriculture to be able to act more quickly in the analysis of specific veterinary products for the area. The vaccine will be used to protect tilapia from the Nile River, one of the most widely farmed species in Brazil, against the infection caused by *Streptococcus agalactiae* bacteria. This bacterium causes severe syndromes such as septicemia and encephalitis, and infections of the central nervous system of tilapia in the fattening period, especially during the warmer months. This bacterium usually affects tilapia farmed in cages and causes a high mortality rate, with considerable economic loss for producers. The scientific studies conducted by universities in Brazil showed that this disease appears in several states, such as Santa Catarina, Paraná, Rio de Janeiro, Espírito Santo, Minas Gerais, Bahia, Pernambuco, Paraíba and Alagoas, among others.

Director of Monitoring and Control from the Department of Fisheries and Aquaculture of MPA, Henrique Figueiredo, stressed the new vaccine is a definite improvement in aquatic health.

"This vaccine represents an alternative for farmers as an aid to fight and control this important disease in tilapia farming," he said.

The vaccine that has just been approved will begin to be traded on the Brazilian market shortly.

http://www.fis.com/fis/worldnews/worldnews.asp?monthyear=&day=22&id=45401&l=e&special=&n_db=1%20target=

Other



Giant aquaculture project on the cards

Zimbabwe Development Trust in partnership with a consortium of investors yet to be named, plans to embark on a multi-million dollar crocodile farming project at Nuanetsi in Mwenezi District of Masvingo Province. The venture will target the lucrative European market.

Once at optimal production capacity, Nuanetsi will be flagged the biggest crocodile farm in the country with a production capacity of 600 000 crocodiles.

Presenting on: 'The Freshwater aquaculture sector in Zimbabwe' Aquaculture Zimbabwe programmes officer, Garikaimose Tongowona, highlighted at the recent Zimbabwe Agriculture

workshop held in Harare that despite the present inconsistencies and unclear roadmap for the local fish industry, the prognosis for growth of the aquaculture sector, across species and systems appears very positive.

“Demand projections suggest greater output and value in most subsectors, warranting a firmer role gross domestic product (GDP)-wise,” Tongowona said, citing the Lake Harvest Aquaculture Farm, a multi-million investment farm for tilapia fish breams, established in 1997 on Lake Kariba. The farm has heavily penetrated the European market with a significant presence in the region and are currently doing close to 10 000 tonnes of fish a year and targeting 20 000 tonnes by 2013.

While crocodiles are generally synonymous with death in the jaws of a big reptile, commercial crocodile farming, from which is obtained the skin, meat and musk glands, is an extremely lucrative business with a lot of downstream business opportunities in the value addition chain.

Exotic and fashionable, crocodile leather is strong, supple, durable and is considered to be very valuable with common use in the form of handbags, wallets, boots and belts. Innovative fashion houses are exploring crocodile skin clothing collections with the help of improved tanning techniques.

Raised for leather, a crocodile is harvested between 2 to 3 years before it is skinned. By this time the belly exceeds 35cm. Also a delicacy, crocodile has become a very popular meat overseas and is part of a developing unique cuisine, especially in Australia. A succulent white meat with a delicious and unique flavor, crocodile meat has a wider range of products and cuts, crocodile is now available to suit all culinary needs. It is low in fat and high in protein and is best cooked in the same manner as lean chicken and can be prepared into a variety of dishes using wet and dry cooking methods and is ideal in marinade or sauce. The meat is supplied trimmed of fat, vacuum packed on freezer trays and frozen.

The musk glands of some crocodile species are used in perfumes.

<http://www.thebusinessdiary.co.bw/?p=1755>

Regional Roundup

Zimbabwe's aquaculture sector under threat

Zimbabwe's potentially lucrative freshwater aquaculture sector, which could add a lot to the country's GDP, is facing a threat from problems of poaching, illegal fishing and corruption, according to Garikaimose Tongowona, programme officer for Aquaculture Zimbabwe.

Tongowona says that fisheries activities have risen sharply over the years and still provide the bulk of local fish supplies, though the sector is not among the top GDP contributors.

"The capture fisheries resources are almost stretched to the limit in present-day Zimbabwe, as shown by the massive presence of fishing cooperatives on the major lakes," Tongowona notes. He says that there are more than 160 co-operatives at Lake Chivero, also more than 160 at Darwendale Dam and more than 1,000 fisheries permits at Lake Kariba. The situation is made worse by the fact that there are no breeding programmes in place to replenish fast-dwindling aquatic resources, according to Tongowona. "There are challenges of too many fishers, illegal fishing, corruption and no political willingness to develop the sector," he adds.

His organisation reports that the Zimbabwean freshwater aquaculture sector is slowly responding and awakening to a world of opportunities. They say that this is in line with global trends, resulting in demand for white meat products, viability of the crocodile skin business, diminishing wild fisheries resources and rising food costs. There are also downstream opportunities like fish oil

processing, filleting, canning, fish soup manufacturing (frames), fish meal/feed manufacturing, just to mention a few.

According to Aquaculture Zimbabwe, the country has more than 3,910 square kilometres of fresh water. Tongowona adds, however, that there are no local investment incentives and support schemes for development and technical research to develop the fisheries sector. Also, it is reported that there is no financial support from the banking sector. Other challenges affecting the aquaculture sector in general include the lack of a clear legal framework targeting the economic growth of the sector and the need to develop flexible regulatory frameworks with co-ordination across government agencies and government.

Tongowona also notes that there is a need to adhere to international protocols like the Southern African Development Community (SADC) trade protocol/code of conduct for responsible fisheries.

He adds that to develop Zimbabwe's aquaculture sector, including the fisheries industries, there is a need for an overall legislative framework structure definition to provide the basic context in which aquaculture can operate, an economic policy to outline the national economic strength, income distribution, market conditions, investment opportunities and trading conditions.

The fiscal structures have to outline the positive and negative aspects for aquaculture, which is defined as a socially effective activity. Tongowona adds that there is a need to come up with an environmental policy outlining the environmental impact of aquaculture. Other issues will include consumer protection, public health, resource development and management, including employment regulation. Tongowona says that various issues affect aquaculture development, including the cost of production, security and market issues, just to mention a few. He adds that there is a need for policy and planning to develop strategically. It is also noted that the industry is facing increased competition from imports/substitutes, reducing local identity for production.

On disease management, Tongowona says that there is no identification, control and transmission management, resulting in substantial loss potential in most species. "There is a need to implement monitoring and early-warning systems," he says. On environmental quality, he says that there is no framework of suitable environmental standards for the sector and an aquaculture strategy. He adds that organisations like the Environmental Management Agency should come up with programmes to safeguard the country's aquaculture sector.

He says that issues needing to be addressed include market prices, feed supply and technical capacity.

http://www.businesslive.co.za/africa/africa_markets/2011/07/19/zimbabwe-s-aquaculture-sector-under-threat

Try fish farming, Lumbama challenges Zambians

CENTRAL Province Permanent Secretary Denny Lumbama has challenged Zambians to venture into fish farming as a way of diversifying from the tradition of growing maize and other food crops. Mr Lumbama said since the demand for fish in the country was growing, there is need for more Zambians to take keen interest in the fisheries sector and consider going into fishing farming.

Speaking in an interview in Kabwe yesterday Mr Lumbama said the contribution of the fisheries sector to the country's development could be enormous if more people tapped the potential in fish farming. Fish species were depleting in water bodies due to various reasons which include effects of climate change and bad fishing methods. He explained that the Central Province's rich capture of fisheries and fish farming during the 2010 season recorded an increase which saw an additional 2.4 tonnes from emerging fish farmers. "It is clear that the demand for fish is growing steadily in Central Province as elsewhere in the country in response to the population growth and urbanisation which is the reason people should take interest in this sector," he said. He said the

overall per capita supply in the country has declined over the years from the 11 kilogrammes per annum in the 1970s to 6.5 kilogrammes currently.

The Government, he said, would continue to support and encourage Zambians interested in contributing to the growth of the fish industry in the country. He said it is clear that the fish industry has attracted a huge market which has seen the country supplying fish to the neighbouring Democratic Republic of Congo (DRC) through Kasumbalesa border.

http://www.times.co.zm/index.php?option=com_content&view=article&id=489:try-fish-farming-lumbama-challenges-zambians&catid=60:agro&Itemid=105

Dominion Farms Puts Power to Create Wealth in the People's Hands

American investor Calvin Burges heard about the Yala Swamp and its collapsed rice fields from a friend. That was 11 years ago. Today, as he stands, hands akimbo, and casts his eyes across the thousands of acres he has reclaimed he could as well claim to have made economic sense out of a swamp. The rolling rice fields, the John Deere tractors and harvestors that plough through the fields showcase a massive investment --hidden in the heart of Siaya County.

Burges, the owner of Dominion Farms, took us around the vast area that today draw researchers and agro-tourists from all corners of the world. "A friend of mine who had visited the area in 2000 told me there was an opportunity here worth checking out," he recalls. "When we came to Yala the terrain was impenetrable and every inch of where we are standing right now was submerged under swamp water. We leased the land for 25 years, with the chief purpose of transforming it into farmland". Yala was never a swamp to begin with. It was barren land but decades of massive pollution caused by human settlement upstream saw the water slowly stagnate and the swamp gradually grow bigger.

Mr Burges ran into a challenge.

"There are two things to do when you are reclaiming land from a swamp", he says. "First you have to stop the water from filling it up and secondly you have to drain what is already in. Our initial step was to stop the flow of water to the swamp and we built 12km of dykes that ran from the dam down to Lake Namboyo and basically relocate the river. We split it and sent part of it into Lake Kanyaboli and part of it to Lake Namboyo". This stopped the water from flowing into the swamp and the next step for Mr Burges and his team was to drain the water. "For the last three years we have been draining it to lower the water table and as this goes down we start developing the land".The process is challenging and though heavily mechanised, relies on the course of nature and cannot be rushed.

"The land dries from the top down and you have to wait for it to dry substantially before you can use any equipment on it which makes the process painstakingly slow. In addition to this, rain water reverses the drainage process and takes you back to the beginning." Moreover, land reclamation, like any other earth moving exercise like mining and road construction is not cheap. Mr Burges has so far spent over \$40 million doled out in the last seven years. Most of the cost has been consumed by the assembly of tonnes of earth-moving equipment from the US and Brazil and labour costs.

The process is far from over and the costs keep rising.

Dominion Farms sits on five thousand acres of rehabilitated swampland and Mr Burges intends to reclaim all the swamp land under his leasehold. "We have 17,050 acres of property and we have to date developed approximately 5,000 of that but we want to reclaim every bit of it. The water table is falling and soon we can get more equipment on the land. We hope that with all factors holding constant, the rest of the reclamation will be complete in the next two years".

Mr Burges started developing the land so far reclaimed in 2005. He raised the level of the water to make it accessible and then extended the power lines to the farm and to the local communities.

After several batches of crop research, Dominion Farms settled on paddy rice which could produce two harvests per annum. A state of the art rice processing plant with the ability of processing 10,000 tonnes of rice per day was installed and the first batch hit the shelves in 2007.

The farm has a research facility on site and propagates its own rice seed. "Everything is done here from the propagation of the rice seed, growing, harvesting, milling, packaging and sale," says Mr Chris Abir, Dominion Farms director. Retailing at Sh85 per kilogramme, Prime Harvest Rice is the flagship of Dominion Farms' range of products and was recently entered in a cooking contest in Britain and won. The current rice production output for the farm is about 3,500 - 4,000 tonnes per annum and is looking to double this output by the end of next year. At the completion of the reclamation in the next two years, Dominion Farms is looking to expand its output to 10,000 - 12,000 tons of rice a year

Aside from rice production, Dominion Farms has ventured into the production of fingerlings and is the main contract supplier for the government's fish farming ESP programme. "Currently we are supplying the Kenyan government with fingerlings at their request and we sell two million fingerlings per month either directly or through our 26 distributors, says Mr Burges."

The demand for fingerlings is great owing to the adoption of fish farming throughout the country and Dominion Farms has up to 200 farmers in the waiting list. The farm also operates eight trial fish ponds each with the capacity of holding 80,000 fish and is planning to set up tens of ponds in a massive fish cropping programme to cover 160 acres of land. The farm breeds Nile Perch and on small -scale and cat fish which is still on a trial basis. Here again the costs of production are staggering. Currently the farm has spent more than \$2 million on breeding costs alone.

"Fish farming requires proper breeding stock and you have to be very careful to avoid in-breeding," says Mr Burges. "This causes stock that is susceptible to disease. If you are going to have a fish farm you begin from five years before you start the fish farm and continue forever. "You always have to do more research, develop healthier strains and ensure that your fish have the correct growth span and maximum output. We have brought our breed from an average of 24- 29 per cent meat content to an average of 35 per cent and in breeding this is a significant step".

The fish farm is also fully self-sufficient. From the propagation of the breed, the breeding process, harvesting, packaging and selling everything is done at the farm. The fish retails for Sh200 per kilogramme and can be found in local small stores.

"Our target market is Kenya and our prices are deliberately lower. We are trying to reach to the majority of Kenyans who are in the low income bracket," says Mr Burges. "For us at Dominion Farms, money is not the primary goal. The primary concern is providing food security for the growing population".

Part of the conditions for obtaining the lease for Dominion Farms was to improve food security for the local population. In this regard, the farm sells most of its produce directly to retail stores and local supermarkets and avoids dealing with middle men.

"Everything we produce is consumed in East Africa," says Mr Abir. "Some people may buy it and sell it in other markets but what happens to it after it leaves our hands we have no control over it. We have however heard that Prime Harvest rice is in Southern Sudan but we are not the ones sending it there."

In addition to the rice and fish farming programmes, Dominion Farms is venturing into the large scale production of Soya beans. The soya beans are a chief ingredient in the production of fish, chicken and dog feeds which the farm produces.

"We are also in the process of setting up two power sources at the farm", says Mr Burgess. "One will be a biomass digester for the generation of biogas and a hydro-power production plant on a waterfall 1,153 metres above sea level built on a canal on River Yala". The energy generated from the facilities will complement the propane that is usually used to run the heavy machinery at the farm mills. In addition to this, surplus energy will be sold to the national grid and distributed to the locals. Dominion Farms is also an agro tourism site in the western tourism circuit. Every month the management receives an average of 50 requests for visits from learning institutions in Kenya and abroad

<http://allafrica.com/stories/201107210825.html>

Irish investment in African aquaculture

By Bill Corcoran in The Irish Times

For Irish entrepreneur David O'Halloran, adhering to a sustainable business model that helps develop and protect local communities and their environment is the key to enjoying long-term success in Africa's emerging markets.

In late 2006, the Galway man, along with three former colleagues, rejuvenated a business development consultancy called BusinessMinds by turning it into an incubator company that develops, finances and operates sustainable commercial ventures in Africa. The idea behind the enterprise is to offer investors a socially responsible approach to doing business on the continent, while also making a profit. "Historically, many investors in Africa have used a more short-term, exploitative business model, one which has existed since the days of colonialism," O'Halloran says. "Unfortunately, for some investors this remains the modus operandi even today. As in, they take what resources they can and then get out without giving much back to the local economies."

However, O'Halloran says he believes people are starting to realise that such an approach is inherently unstable and increases risk. Not only that, he adds, but many countries in Africa have significant development challenges such as poverty and high rural unemployment. He says BusinessMinds has shown that "by focusing on how you can maximise the benefit for local communities and the environment, businesses can help to address some of these challenges while also increasing returns for their shareholders".

Since 2007, O'Halloran and his partners have established africaJUICE, a company that produces, processes and delivers juice and vegetable products in Ethiopia and has exported to Europe since 2009, and africaFISH, an aquaculture business in Uganda that has just finalised financing for a large-scale catfish and tilapia producer that will supply east African markets. "Both companies are models of sustainability with community ownership, outgrower schemes, low environmental impact and efficient natural resource – like land, water and soil – usage," says O'Halloran. "We spend a lot of time setting up the businesses, which minimises problems down the line, and have a very commercial mindset. "We align with NGOs, donors, and ensure our contract farmers get access to FairTrade markets and are up to speed with all the best practices to grow better crops."

The model the company uses is not reliant on grants as, he says, the business has to be a viable, profitable venture.

"In Ethiopia, where we employ around 3,000 people, we are about to see our venture turn a profit. Currently we do around \$300,000 [€212,000] a month but we expect this to grow by a factor of six long-term."

After graduating as an engineer from University College Galway in 1992, O'Halloran worked around the world for several major energy companies, including Shell International, developing power and gas projects in emerging economies.

It was during this time that he began to develop his ideas on sustainable business practices.

“I started out in Holland, but I was soon sent to more tricky countries to work in, like Iran and Nigeria, and it was here that I first encountered real poverty, the type of which you don’t get in Ireland,” he recalls. “This triggered something in me I guess.

“I wasn’t born with this social conscience, but the idea there had to be a way to do business that was good for communities as well as the environment began to grow throughout this stage of my career, and it has taken me to where I am today.”

“We would love to have more interest from experienced hands- on farmers with fruit and vegetable cultivation experience or experienced aquaculture mangers.”

<http://www.irishtimes.com/newspaper/finance/2011/0812/1224302293475.html>

Fish farming gains popularity popularity in Zanzibar

By Hamoud Said

Fish farming was presently one of key priorities in Zanzibar. The Isles minister for Livestock Development and Fisheries, Mr Said Ali Mbarouk announced here on Saturday.

“He said a study by his ministry in collaboration with the South Korean government, had revealed that over 80 groups had established fishponds.

He said in the short and medium term government would support provide skills and guidance for better production methods to increase the amount of fish harvested. “Aquaculture could be one of the fundamental ways of easing shortage of fish,” said the minister.

He told a newspaper that 30 people from thirty out of the 80 groups will next week fly to China for a 45-day fish farming training. “China has accepted to support the development the fish farming in Zanzibar being carried out with small groups,” he said, adding that the groups have started breeding shrimps and milk fish.

Zanzibar fishing industry mainly centres in shallow sea has been producing fish for local consumption.

<http://thecitizen.co.tz/business/13-local-business/13980-fish-farming-gains-popularity-popularity-in-isles.html>

Environment, Health and Disease issues

Drug Resistance in Food — Coming from Aquaculture?

By Maryn McKenna

In the midst of the giant Salmonella Heidelberg outbreak last week — now up to 107 cases in 31 states, and triggering a recall of 36 million pounds of ground turkey — it was easy to miss that a second and even more troubling strain of resistant Salmonella is on the move. As I wrote last week, that strain is called Salmonella Kentucky ST198, it is much more drug-resistant than the US Heidelberg outbreak, and it has been spreading since 2002 from Egypt and north Africa through Europe, and has now been identified in the United States. Its primary vector appears to be chicken meat.

There is an interesting and troubling aspect to the spreading Kentucky strain that there wasn't time to talk about last week, in the midst of the Heidelberg news. It's this: The authors suspect that this enhanced resistance — to Cipro, and thus the class called fluoroquinolones that are very important in treating Salmonella — may have come into African chickens via drug use in aquaculture.

The authors are especially concerned about farms that practice what's called "integrated aquaculture," in which chicken litter and manure are used to fertilize ponds in which fish are grown, and waste from the ponds is harvested and used as poultry feed.

They write in the *Journal of Infectious Diseases*:

How the ST198-X1 CIPR Kentucky clone entered in the poultry sector in various parts of Africa remains to be determined. This clone was found in at least 2 species of poultry (chicken and turkey). Furthermore, a preliminary investigation revealed that poultry industries of Nigeria, Morocco, and Ethiopia used indigenous domestic fowl, arguing against the dissemination of a common contaminated poultry lineage throughout Africa...

Intensive aquaculture reliant on large amounts of antimicrobial agents may have played an initial role through the acquisition of the genomic island SGI1-K. Intensive pond aquaculture was introduced in Egypt in the mid-1990s, and today, Egypt is responsible for 80% of the farmed fish production on the African continent. The presence of an ISVch4 element from the aquatic environmental bacteria *Vibrio cholerae* in all the SGI1-Ks, -Ps, and -Qs variants harbored by the ST198-X1 CIPR clone points to the role of the aquatic ecosystem in the acquisition of the SGI1. Furthermore, SGI1 variants were reported for at least 2 other serotypes of Salmonella... The independent acquisition of SGI1 by these 3 distinct serotypes suggests that its transfer occurred repeatedly in a single geographic area.

Translating and expanding: The spread of this new resistance factor cannot have been because one vertical commercial breed of chicken was purchased by the widely separated farmers in Ethiopia, Nigeria and Morocco in whose chickens this resistance factor was found; they were all using local breeds. It is possible the resistance could have developed through the use of chicken feed laced with fluoroquinolones, which is sold in Africa. But the association between the resistance DNA and the waterborne bacterium *V. cholerae* suggests that fish farming played a role too, either through medicated fish feed, or because the cycling of chicken byproducts into the ponds and fish and then out again as aquaculture waste may have spread that DNA much more broadly.

This is speculative, but it is also dismaying, because integrated aquaculture is both very common — I've casually observed it, not really looking for it, in several countries in Southeast Asia — and also frequently recommended by food agencies as a way to produce a lot of protein in a sustainable manner with minimal drain on local ecologies. (Here's just a few of the many manuals on it, stashed in the document repository of the UN's Food and Agriculture Organization.)

I can't see any suggestion in those accumulated manuals that inserting antibiotics into the integrated cycle of fish and chicken farming could have unpredictable effects. But it happens that another set of authors have had the same idea, and have just published a warning in *Applied and Environmental Microbiology* regarding the use of antibiotic-laced feed in integrated pig and fish farms in Vietnam.

They used a small experimental farm near Hanoi built on the traditional model, called VAC for vuon, ao, chuong — garden, pond, pigpen — in which the pigsty is built on the dike-bank of the pond so that wastes drain directly into it. (Parenthetical: I once asked a farmer in central Vietnam how his ponds got so perfectly round. He said, with much more courtesy than I deserved, that it was because they were bomb craters, from what is called in Vietnamese "the American war.")

Over a four-month period, the researchers fed the pigs first drug-free feed, then antibiotic-laced feed, then repeated the cycle. During each month, they checked the pigs' manure and the pond's

sediment for the presence of resistance factors in *E. coli* and other gut bacteria. In the months when the pigs were receiving the antibiotic-laden feed, the researchers found significantly higher amounts of antimicrobial resistance in the manure and the pond. To confirm that the drug resistance was not coming from an outside source — runoff from other farms, wildlife, birds — they typed the bacteria from the manure and the sediment, and found they matched.

And it turns out that this was not the first time a warning bell has been rung about the use of antibiotics in integrated animal/fish farms. The lead author in the current paper recorded the same effect in chicken/fish farms in Thailand as far back as 2003. (That was an observation, however — which led them to set up the controlled experiment in the newly published one.)

I extract several lessons from these findings, all of them depressing.

The first is the revelation, new to me at least, that antibiotic overuse is not solely a problem in industrialized-world agriculture, but has spread into small-scale developing-world farming as well. (For many posts on why agricultural antibiotics are a problem, look here and here.) The second is the uncomfortable realization that even small-scale aquaculture can be as environmentally problematic as the giant open-water farms that Barry Estabrook has called “feedlots of the sea.”

And finally there is yet another reinforcement of something that regrettably has been proven repeatedly, dating back to Stuart Levy’s seminal paper in 1976. Once the resistance factors created by agricultural antibiotics get going, there is no way to predict where or how far they will spread — and that the only way to slow their dissemination, and the human health effects that result, is to control the drugs’ overuse to start

<http://www.wired.com/wiredscience/2011/08/resistance-aquaculture/>

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Research matters, Reviews & Training

Report IDs source of salmon virus in Chile

A virus that killed millions of salmon in Chile and devastated the country's fish farming industry probably came from Norway, a major salmon producer said.

Cermaq, a state-controlled Norwegian aquaculture company with operations in Chile, has endorsed a scientific study that identified salmon eggs sent from Norway to Chile as the "likely reason" for the 2007 outbreak of infectious salmon anemia, The New York Times reported. However, "the report didn't pinpoint any company" as the culprit, Cermaq spokeswoman Lise Bergen said.

The virus spread through salmon farms throughout southern Chile, cutting salmon production in half with a loss of \$2 billion and 26,000 jobs in the industry, source of Chile's biggest export product. Since the virus was first found in Norway in 1984, every major salmon-farming region in the world except British Columbia has experienced an outbreak, Don Staniford of the Global Alliance Against Industrial Aquaculture, a non-governmental organization, said. "Once it is discovered, it is impossible to get rid of," he said.

Cermaq says it has developed procedures for screening the virus, invested in new aquaculture facilities and shifted its production of young Atlantic salmon to facilities on land.

http://www.upi.com/Top_News/World-News/2011/07/28/Report-IDs-source-of-salmon-virus-in-Chile/UPI-14151311868907/

Seabass and Tilapia genomic project

A Cambridge genomics company is helping in a project vital to the Asian food chain. Singapore's National Research Foundation is awarding grant to fund the sequencing and assembly of the genome of the Asian seabass. – a fish that is important not only to Singapore but the entire region. Principal investigator in the project is Professor Laszlo Orban of the Temasek Life Sciences Laboratory (TLL).

Eagle Genomics, based at Babraham Research Campus, will be directly involved as a subcontractor to organise the sequencing and assembly of the genome – a classic example of genome content management. Richard Holland, of the Cambridge company said that the project marked a major milestone not only in Eagle's increasing diversification into non-pharmaceutical bioinformatics but also in its continued expansion into the Asian market.

"As seafood is a key component of Singaporeans' diet, it is important that we secure safe and sustainable supplies of foodfish in Singapore. This project aims to achieve a quantum leap in food-related R & D for improved productivity and quality of two foodfish.

1. the Asian Seabass and
2. the Mozambique Tilapia.

Through genetic or genomic selection, assisted by cutting-edge technology, the team hopes to produce superior strains for both species that will have a significant impact on the productivity of foodfish in Singapore and beyond. Since 2004, the team has tested the growth performance of fish through the use of molecular markers and developed several platform technologies such as genetic maps to study the reproductive developments of fish species like Seabass. Today's

'selected generation' of Seabass already shows substantial growth increase over the normal species. Soon, the team will start beta-testing with selected farms to compare the performance of these fish against the stocks currently used for local production. Recently, the team also began working on the development of the Mozambique Tilapia. As Tilapia has a much shorter generation time than seabass, superior lines of Tilapia (or its hybrid) are expected within the next few years. Moving forward, the team wants to improve the disease-resistance potential and food conversion ratio of these fish. It will offer these fast-growing, disease-resistant lines to local and regional farms to improve their quality and yield. The upshot of this is a better quality and more reliable supply of fish products for Singaporeans with potential benefits along the aquaculture value chain.

Richard Holland said it was interesting that Singapore's NRF had focused on global food security as being an important aspect of future biotech. "It echoes Mick Watson's comments at this year's Eagle Genomics Symposium when he debated the point that the cost to the global economy of a failure of farming to keep up with food demand would soon outstrip the cost of treating disease. It is also a topic close to the heart of the BBSRC here in the UK."

<http://www.businessweekly.co.uk/biomedtech-/12545-cambridge-role-in-asian-fish-genome-project>

Regulatory matters

SA Project to benefit local communities

The Ministry of Fisheries and Marine Resources and Aquastel, a consultancy based at the University of Stellenbosch in Cape Town, this week signed an agreement to produce and develop an Aquaculture Master Plan for the ministry.

Uitala Hiveluah, permanent secretary of the Ministry of Fisheries, said the decision to establish such a master plan was part of ongoing efforts to further develop aquaculture and achieve socio-economic benefits for the country as well as secure environmental sustainability.

Danie Brink of Aquastel, the consultancy chosen to draft the master plan said: "The initial stage of the project was to find out about what is currently happening and what could."

According to Brink, about five specialists from South Africa, Namibia and Scotland amongst others will be involved in the project. "The local engineering consulting group will help with infrastructure planning as well as work on geological information systems," he said. Upon completion and after the necessary infrastructure and markets are developed, Brink said the intervention will serve as an opportunity for small to medium scale operators to enter the sector either as producers or service providers. "It will also incorporate indigenous knowledge at institutional level and local communities," he added.

Hiveluah said that the master plan will be for all the 13 regions. It is envisaged that the project will have a great impact on the country and its development would benefit rural areas economically, offering employment for people and marketing the potential for food production. Meanwhile, work of the master plan began on Tuesday, 23 August with a stakeholders' meeting and the draft plan will be completed within four months. The master plan is being funded with a grant of N\$3.8 million by the Africa Development Bank.

http://www.economist.com.na/index.php?option=com_content&view=article&id=24023:project-to-benefit-local-communities&catid=589:markets



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- 14 September 2011 : Field Trip
- 15 September 2011 : Conference Day II & Formal Banquet
- 16 September 2011 : Workshop
Disassemble Exhibition stand (1pm)

EXHIBITORS PACKAGE

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