Aquaculture Association of Southern Africa

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A Word from the AASA Chairman

Etienne Hinrichsen

Mid year 2010 already! Surely something we didn't see coming (at least I didn't). And now with the World Cup on us I see Africa shaking up its feathers and putting a good foot forward for the world. In the same vein I have been hearing of many Southern African aquaculturists cooperating on the world stage in aquaculture and even leading some significant international projects. I foresee increasing international involvement as aquaculture continues to move forward in our region.

In terms of South Africa, I have been keeping my ears on the ground with regards to how aquaculture (both development and regulation) fits into the new departmental structures of the government. Most of you will be aware by now that the old aquaculture division in the Marine and Coastal Management Branch is now combined with the old aquaculture section in the previous National Department of Agriculture to form the new fisheries section in the new Department of Agriculture, Forestry and Fisheries (DAFF). To me personally this makes more sense to have the entire national aquaculture governance effort (at least from a development point of view) within one government structure.

To get out of the winter chill I recently undertook another visit to the coast and had the fortune once again of visiting the coastal industrial development zones. These areas are targeting aquaculture development as future tenants in the industrial zones. With well suited infrastructure it is evident that these areas will become increasingly attractive to aquaculture developers and investors.

The 2011 AASA conference may seem a long way off, but from the AASA office we have already circulated a call for proposals to various countries and organization. The deadline for submission of preliminary proposals is approaching and we hope to announce the venue for next year's conference in the near future.

The Editor's choice

Adrian Piers newsletter@aasa-aqua.co.za

Editorial

Development of commercial African Aquaculture is dependent on more than farmers and natural resources. Suppliers of essential inputs such as feeds and equipment are vital for the growth of the industry. It is therefore very encouraging to see this segment of the industry developing and starting to produce supplies made for African conditions here in Africa to fulfil this need. Below is a recent example of this taking place.

On the other side of the production process, readymade Tilapia meals are now available from Amazon.com on the Internet. Have a look at this website:-

http://www.amazon.com/s/ref=bl_sr_grocery?ie=UTF8&search-alias=grocery&field-brandtextbin=Lillian's%20Healthy%20Gourmet

Global Aquaculture Solutions (Pty) Ltd from South Africa is proud to announce that in partnership with the expert weight engineering firm, WeighData Industrial from Cape Town, they are building and launching Africa's first fully automated and mobile fish and abalone weighing and grading machine. This fully electronic mobile grader and scale combination automatically weigh, count and grade as much as 80 live animals per minute with the results able to be logged for download onto a

PC/Laptop in Excel format. This technology is build to withstand the most rugged marine and freshwater marine environments. A Pescalator (screw elevator) can be used to suck/hoist fish directly from ponds/nets/tanks/floating cages (it can be mounted on a barge) onto the grading receiving area, and can also be supplied which would result in full automation of the whole process of live fish grading and weighing and counting (total and per grade).

The Express Mobile Aquaculture Grader is used in marine environments where high-speed sorting of fish and abalone in fish farming is a requirement for effective management. It grades fish and abalone according to a predetermined weight program, sorting up to 80 live animals per minute. The Mobile Grader is a robust unit built from high quality food grade material using the latest military specification electronics for process control. Each grader can be custom built to client specification and is easy to maintain, with standard off the shelf spares available in most countries.

For further information contact Kriek Bekker at kriek@globalaquaculture.co.za

Abalone

South African Parliament budgets for Aquaculture

The scale of her department's support for local technology initiatives runs from abalone to zircon, Science Minister Naledi Pandor informed MPs. Speaking in the National Assembly during debate on the science and technology budget vote, she sketched details of some of the projects, aimed at creating sustainable jobs and wealth-creation opportunities, in which her department was involved. "Aquaculture is a noteworthy example. The department supported an aquaculture abalone-harvesting pilot project at Hondeklip Bay in the Northern Cape. "This has shown us that it is possible to utilise aquaculture to improve abalone production for commercial purposes."

The project would now draw in the Northern Cape government, the private sector and the department into a R48.8-million capital investment project to develop an abalone farm. This would produce 120 tons of abalone, and create 120 full-time jobs and 25 part-time job opportunities. Further, two abalone hatcheries would be established, one in the Northern Cape and another in the Western Cape, she said.

http://www.iol.co.za/index.php?set_id=1&click_id=14&art_id=nw20100421085435113C489715

Eels

Japanese researchers successfully complete artificial eel cultivation cycle

Japanese researchers have learned how to successfully cultivate eel completely out of the wild. Japanese scientists at the National Research Institute of Aquaculture, Fisheries Research Agency announced on April 8th that they have successfully farm bred eel, completing an artificial cultivation cycle, a world first that could help protect one of Japan's traditional foods. The type of eel, known as unagi in Japanese, is a popular delicacy in the country, and can commonly be found in both grocery stories and restaurants. Mature eel have traditionally been caught in tubular traps. However, for decades small eel have been captured in mass quantities in the wild and raised to maturity on farms for eating. This method has unfortunately caused stocks of the fish to plummet in recent years. Sankei News reported that in 1957 approximately 207 tons of small eel were caught, but by 2008 that number had dropped to just nine tons. Beyond that, attempts at farm breeding the animal have not been successful worldwide.

In response, scientists at the Fisheries Research Agency began studying artificial breeding methods. By 2002 the Agency had accomplished artificially fertilizing and incubating eel eggs. The Agency has also had success in raising eel larvae to maturity. This year the Agency took matured, artificially raised eel, ranging between then ages of 2 to 5 years, and were able to repeat the process of egg fertilization and incubation. The Asahi reported that on March 26th, approximately 250,000 eggs from one eel were fertilized, of which 70% were successfully incubated. By April 2nd the eel larvae were being feed nutrients, and 100,000 were still alive as of April 8th. This has demonstrated the completion of a farm-style cultivation cycle for eel. While the researchers note that the technology used is still extremely costly, and other have mentioned the need for the determination of the safety and taste of these artificially raised eel, a means to save the animal from overfishing and possible extinction have been found. It also stands to reason that the outcome of the research will help drastically reduce the price of domestic eel within Japan, and generate a new potential export for worldwide markets, something which in both Japanese consumers and business can rejoice.

http://www.fis.com/fis/worldnews/worldnews.asp?monthyear=&day=22&id=36290&l=e&special=&ndb=1%20target=

http://www.examiner.com/x-16352-Japan-Headlines-Examiner~y2010m4d9-Japanese-researchers-successfully-complete-artificial-eel-cultivation-cycle

Ornamentals

Japan Koi tour

From Servaas de Kock

Booking for the 2010 koi harvest season in Japan has opened. Early booking is essential so please visit http://www.koinet.co.za/jtour/index.htm for picture gallery, dates and all relevant information, and also option to registration if you are interested.

KoiNet and AquaNet
info@koinet.co.za
www.koinet.co.za

Shrimp and Prawns

Indian aquaculture output grows 30% in a year!

Aquaculture production in India grew by more than 30% during the 2009-10 financial year mainly due to higher output in the Andhra Pradesh and Tamil Nadu regions. India's total aquaculture production reached 106,000 tonnes and exports also increased, according to the Marine Products Exports Development Authority. The country's production and exports are again expected to climb this year as more coastal farms embark upon white shrimp *Penaeus vannamei* farming projects, said Anwar Hashim, national president of the Seafood Exporters Association of India (SEAI).

However, production in coastal aquaculture fell to 88,803 tonnes with an estimated value of €329.3 million, according to MPEDA. Aquaculture spanning 108,000 hectares bred 75,997 tonnes of shrimp. The decline was around 28.4% in production and 10.9% in area compared to the previous year. Freshwater shrimp production was 12,806 tonnes from an aquaculture area of 1,644 hectares during the year, representing a 53% fall in production and 63% in area use. The drop in production was attributed to the global economic recession, which saw lower international seafood prices, particularly for shrimp, said MPEDA. In addition, the profitability and production of Indian black tiger shrimp *Penaeus monodon* is being adversely impacted by competition from cheaper *vannamei* farmed in Thailand, Vietnam, Indonesia, and other Asian countries, the authority said.

India mainly produces black tigers and processing plants are currently running at just about 30% capacity. Monodon are more expensive to raise yet have lower yields than vannamei. According to SEAI, the cost of production for *vannamei* is $2.29 (€1.87) per kg, or half that for black tigers. Farmers can raise 20 tonnes of small-to-medium *vannamei* per hectare versus 2-3 tonnes of large monodon per hectare. Also the survival rates in most black tiger farms are only around 40% due to the species being prone to disease. The survival rate of *vannamei* is around 95-98%. The price of black tigers are at least 15% higher than *vannamei* in the global market.

http://www.worldfishing.net/news101/indian-aquaculture-output-grows-30

Tilapia

Tilapia Situation Report

By Kriek Bekker

The tilapia aquaculture industry in Sub-Saharan Africa is slowly coming to the party with numerous projects going up and into production all over Africa. These includes projects we know of either already in production or targeted for Nigeria, Ghana, Cameroon, Kenya, Congo Brazzaville, DRC, Angola, Zambia, Zimbabwe, Mozambique and South Africa.

Numerous enquiries are received and entertained by Aquaculture technology supply companies all over the world from clients in Africa and one South African company in this supply industry, are currently in discussions with and consulting to seven tilapia projects at the moment.

Inhibitive for Africa entering the export market with this species, especially into the EU fresh fish market, is the current pressure on Tilapia prices due to the global economic depression the world is still experiencing as well as cheap Tilapia and Pangasius products finding their way into the EU by especially Mainland China and Vietnam. The first unconfirmed cases of residue traces in the latter are however reported from Europe and we expect the normal import/market apprehension/backlash to these fish entering the EU if validation of this report becomes a reality.

However, the main drive at the moment for Africa entering and developing its own continental Tilapia industry, is for targeting domestic markets as there is still a strong local demand for this species. Take into consideration the immediate population of West Africa running into the 250 Million bracket – a market who knows Tilapia and has a reasonable per capita consumption of seafood (the best in Africa), one can see that there is still good developmental opportunities for servicing the in-house consumer needs in these countries.

South Africa is still experiencing the negative aquaculture vibes for the development of a local Tilapia industry in terms of inhibitive winter temperature levels as well as the statutory restraints of allowing *O. niloticus* species to be farmed in this country (the last country in the world which disallows the farming of Nile Tilapia within its borders). Fortunately a serious application for a large project with the latter is due to be made to local authorities which could become a watershed application for this species and industry. The outcomes of this will soon determine whether South Africa will become part of Africa's Tilapia development or not. If not soon, we will see more and more local and international investors swinging their focus and funding away from this country to opportunities awaiting them in other countries in Africa.

The author of this report, is also involved with the administrators of the Tilapia Chat-group on Yahoo (4 000 members) with the preparation towards the formulation of an Africa Tilapia Study Group. The aim of this group is to bring closer to home the common issues and interests pertaining specifically to the farming of Tilapia here in Africa.

This study group aims amongst other to:

Work towards an African Tilapia Conference where world experts on various Tilapia topics can meet with local entrepreneurs and existing farmers and discuss relevant industry matters pertaining to this species.

Also entertaining the idea of a weekly/and or monthly African Tilapia newsletter, hosted by the Yahoo Tilapia Chat Group and dealing with communal matters of interest.

Working towards improvement of Tilapia genetics specifically for conditions in Africa – thus entertaining the idea of a serious breed selection program for both Niloticus and Mossambicus based somewhere in Africa most suitable for the developing industry on this continent.

Same goals towards feed and feed companies with the ultimate aim of some of them coming to the party with this study group towards various feed solution whereby various projects in different countries could become equity participants in these feed plants spaced strategically over Africa and thus reap the benefits of better quality, more accessible and more affordable Tilapia feed. Currently, more than 80% of all feed used in current Tilapia projects in Africa, is imported.

This Africa study group, will also seek to obtain membership of WAS and WAC and try to find and lobby international sponsors to fund this study group and for the hosting of visitors and experts in coming to Africa to share their knowledge and expertise with this Forum.

The ultimate objective would also be for this Study Group to evolve into a full African Tilapia Association with its own agenda and own international conferences. Membership will also be sought of the North American Tilapia Association.

These are some activities in the pipeline for Tilapia in Africa. This obviously does not cover the entire agenda for this industry but it will be extended once this Species has organized itself into the above mentioned forums. More about this later…!

Trout and Salmon

Report from the Western Cape Trout Association

From Henk Stander

Our previous meeting was held on 25 th November 2009. Three new entrants in the trout sector attended that meeting and they would possibly join up with the association in 2010. All the current members have paid up their membership fees for 2009 and the association has a healthy positive bank balance.

The year 2009 was a good rainfall season in the Western Cape. The average quality of the trout was much better than in 2008. The total production was approximately 475 tons of trout. The production predictions for 2010 are targeted at 607 tons with three farms indicating an increase in production on their side (Lourens Ford Estate, Lamont and Molapong Aquaculture).

We saw a number of price increases on the trout feed side in 2009. A request came from industry to NutroScience to produce a high energy diet for the trout. A meeting with NutroScience was held on 25 February 2010. NutroScience agreed on the high energy feed diet and it was suggested that a number of feed trials must be done this year on different commercial trout farms to compare the feed. The supply of fry feeds also seems to be a problem during certain times of the year. The association received a letter from Blue Atlantic Trading in connection with ITAC's guidelines and conditions pertaining to rebate provision for salmon used in processing. A letter from the Aquaculture Division from Stellenbosch University was received by which they thanked the association for the sponsorship of R 2 500 to renovate the Jonkershoek Trout Hatchery.

Main challenges:

- High input cost
- Reliable local fry feed supplier
- High water temperatures in the summer months
- Marketing
- Economies of scale/volumes

Hands-On Fish Farmers Co-op is part of the USAID Farmer to farmer support Program, and through this sixteen aquaculture experts will visit South Africa in the next four years presenting

workshops on various topics. Henk Stander is off to Switzerland for a training workshop on fish health management and diagnostics.

NEMBA Legislation

The chairman gave an update of the proceedings of the NEMBA process and the meetings that he attended at the previous WCTA meeting. He confirmed that he has written a letter to Ernst Swart. Ernst Swart did reply and said he is not sure why there is a big worry. He did send the latest maps to Krijn. All the current trout waters did fall in the green markings except for a part of the Lourens River. Areas where no information for are available fall in the orange markings. No go areas are marked red. Dean Impson must now first approve the maps before Ernst can continue. Tilapia, *O. niloticus* will be allowed in specific zones in the Western Cape. Krijn suggested that you should make sure your new site falls within the green area. The maps are available on the internet. Krijn does have the correct web address available, or you can contact Dr. Ernst Swart directly.

New Chile Aquaculture law will cost US$ 1 billion+

Chilean salmon farming companies will have to invest more than USD 1 billion between 2011 and 2014 to fulfil the new environmental and sanitary requirements set forth in the new General Fisheries and Aquaculture Law (LGPA), passed last month. Some USD 600 million would have to be allocated to working capital, and the rest, USD 400 million, to the development of new infrastructure to increase security and control levels that prevent contagion among fish, El Mercurio reports. The industry has faced a sanitary, environmental and labour crisis since 2007 as a result of the outbreaks of the infectious salmon anaemia (ISA) virus that spread among the farming centres in the south. The estimated investment was calculated by the banking sector, which assesses sector development following the renegotiation of liabilities with salmon farming firms, while totalled USD 1.6 billion.

According to the president of the Salmon Industry Association of Chile AG (SalmonChile), Cesar Barros, the sector has not yet quantified the figure that will be needed to adapt to the new norms and begin the industry's takeoff. "Everything depends on the speed it takes to recover certain levels of production. All the investment is not from one day to the next," Barros said. Although many resources will be needed, salmon farming "is also going to produce significant income," he added. For Barros, the new investments will likely raise production costs up to 30 per cent. Next year will be more complex for Chilean salmon farming, a product of the impact of the ISA virus, experts predict.

In 2009, salmon shipments overseas tallied USD 2.174 billion, 12 per cent less than in 2008. Some 458,066 tonnes of salmon were exported last year, 23 per cent less than the 592,512 tonnes sent overseas during 2008. Harvests are expected to reach 190,000 tonnes this year.

http://www.fis.com/fis/worldnews/worldnews.asp?monthyear=&day=8&id=36140&l=e&special=&ndb=1%20target=

Regional Roundup

Scientist urges aquaculture investment in Malawi

By Charles Mkula in the Southern Times

As stocks of Malawi's prided tilapia, *Orechromis shiranus* fish species continue to dwindle in the country's water bodies, scientists are calling for increased investments in aquaculture to reduce fishing pressure on Lake Malawi, one of the world's fresh water bodies and the main source of the species commonly known as Chambo.

Senior scientist at the World Fish Centre in the country's Zomba city, Dr Daniel Jamu says it is urgent that the country finds alternatives to the falling fish stocks that provide proteins to its consumers. “Our water bodies have declined and are on the edge, so it is very important that we venture into aquaculture to preserve rare fish species, especially the Chambo which is the country's pride.” he said.

The supply of fish from the lake has declined from about 30, 000 tonnes a year, in the past 15 to 20 years, to 2, 000 tonnes, Research Into Use (RIU) Information Officer, Ralph Mwenenguwe reveals. Mwenenguwe says declining fish stocks are a result of population growth and over fishing, among other reasons. In response, RIU was launched in 2008 and focuses on facilitating institutional arrangements that ensures that research outputs are put into use from where lessons are drawn. RIU facilitates the establishment of aquaculture innovation platforms across the country by bringing together the fish value chain stakeholders to enhance innovation and address challenges in the sector.

Mwenenguwe says RIU will between 2010 and 2011 distribute an estimated five million fingerings of *Orechromis shiranus* to 1, 700 fish farmers. 'With the current average of two ponds per farmer of 400 square metres, it is expected that 1 700 fish farmers will benefit from the improved good quality fingerings,' he says. Currently 4 000 farmers are already in fish farming and own ponds in Malawi.

New breeding plant begins construction in Namibia

The Ministry of Fisheries and Marine Resources (MFMR) began the construction of a new fish breeding plant in Leonardville 170 km south of Gobabis last week. It will be one of the country’s biggest and most equipped plant of its kind. “The project, to be completed in phases, will cost about USD 4.9 million and thus far two boreholes and fencing for the high tech breeding centre have been completed,” Acting Director of Aquaculture Alushe Hitula said. “The farm, unlike others, will be equipped with a hatchery, a nursery as well as a grow-out pond for the breeding of tilapia and catfish. It will be the first of its kind in Namibia,” said Director of Aquaculture Dr Ekkehard Klingelhoeffer.

The feasibility study for the project showed that the region possesses abundant quality water to sustain the project. The scheme’s development would benefit the area economically by offering employment to young people and increasing resources and marketing potential for food production, according to the study’s results. According to Hitula, the Leonardville breeding farm will employ approximately 30 permanent staff and an additional 30-60 temporary staff for the effective running of the plant. The initial production capacity of the plant will be about 36 tonnes per year and ideally, at full production, 120 tonnes annually. Due to this high output once the plant is running at full capacity, Namibia will be seeking to export its products to Angola first and subsequently other markets. Funding for the project has come from the Ministry of Fisheries and the central government.

MFMR Minister Bernardt Esau said he would like to see more Namibians eat their country’s fish. He said he will ascertain all regions enlarge their fish per capita consumption from 10 to 14 per cent within the next five years. He also noted his desire to see the rebuilding and management of fisheries and aquatic resources set firmly in the Ministry's Strategic Plan and other government policy documents, and that the fishable biomass levels of all commercial species help create jobs that will raise the living standards of Namibia’s fishing communities. The only way to achieve this, he said, is to form a partnership with the chiefs of the fishing industry. "My vision is to see the benefit from the fisheries resources continue to make a difference in the lives of many Namibians," Esau stated.

Similar projects may be launched in Noordoewer, Rietfontein, Divundu, Uis and Usakos pending their feasibility studies.

http://www.fis.com/fis/worldnews/worldnews.asp?monthyear=&day=16&id=36227&l=e&special=&ndb=1%20target=

http://fis.com/fis/worldnews/worldnews.asp?l=e&ndb=1&id=35903

Namibia budgets for aquaculture development

New Fisheries Minister, Bernhard Esau has requested a N$322 180 000 budget for management and administration, as well as aquaculture development in 2010/11.
Esau said of the proposed total budget, N$153 070 000 will go towards capital projects.

The marine and inland aquaculture programme will receive N$81 667 000.
Last year, the forecast for oyster production was about 800 metric tonnes (or 13 million oysters); for abalone, the forecast was seven tonnes per year. The oyster production yielded N$26 228 084, and abalone N$1 252 800. Esau said Agribank would avail N$8 million for the aquaculture sector to help mariculture farmers with start up financing and for the expansion of existing businesses.

Three new aquaculture centers have been built, with an expected yield of 351 tonnes of fish valued at about N$3.5 million. A fish feed plant was completed in the Omusati region, and has produced 38 tonnes valued at N$158 550 since March last year. Esau said other aquaculture projects produced satisfactory results. The Chinese Government has given a grant of N$15 million to aquaculture development here. The grant will be used to upgrade the Hardap Inland Aquaculture Centre. The first phase of the Ongwediva Inland centre was completed at N$11 750 000 and the second phase of the Kamutjonga Inland Fisheries will be completed before the end of this month.
The upgrade of the Mpungu fish farm in the Kavango cost N$3 117 104 and N$191 000 was allocated to put up fencing around the ponds as a flood control measure at Karovo fish farm. Last year, the ministry in conjunction with the National Youth Service (NYS), deployed 24 youth members that have been employed on fish farms at a cost of N$271 000 in allowances.
Esau said employment in the aquaculture sector is growing, with over 800 Namibians employed.

Ugandan farmer promoting integrated aquaculture

By Michael Ssali

The Ugandan farmer is challenged to think hard about how to use the available land resource to produce more food for the ever growing population. Farmers must adopt more productive strategies. One of the strategies could be to discard such stone age practices as hunting and gathering fish in our lakes. We have exhausted the lakes and the rivers and, since the consumers of fish are increasing, the way to go should be fish farming in the numerous swamps across the country. Farmers should also engage in fish rearing on our lakes and rivers in what is known as cage culture. We must increase food production in every land unit that is allocated to agriculture and at the same time engage in aquaculture.

Mr. Paul Ssekyewa, Chairman of Masaka District Fish Farmers Association, and Managing Director of Ssenya Fish Farms, says that one way to increase farm yields is to integrate fish farming with crop and animal production, especially for farmers living close to swamps and river banks. Crop and animal husbandry farmers must be helped to appreciate the advantages of integrating their activities with fish farming. Fish is an important cash commodity, harvested about twice every year and it is also a much needed nutritive food for the farming household. He says crop and animal husbandry practiced along fish farming helps to alleviate costs and increases farm profits. “Animal manure, for example, can be used to fertilise fish ponds,” he says. “Chicken droppings put into fish ponds promote the production of planktons and other natural foods for fish.” Cattle and goats droppings can also be used in the same way to fertilise fish ponds. The practice increases fish yields and the farmer’s profits especially as some of the money that would have been spent on fish feeds is saved. But also the farmer saves some more money that would have been spent on other inputs such as manure for crops as the mud left at the bottom of the fish pond after harvesting fish has been discovered to be very good manure for the crop garden.

Mr Ssekyewa is quick to point out however that all application of animal manure in fish ponds should be done under the guidance of a veterinary or an agriculture extension service provider. He says there are specific manure application rates which should be observed by the farmer for best yields. While fish farmers are encouraged to buy feeds from farmers' shops they are advised at the same time to devise a cost effective way of using farm wastes, to make efficient use of resources within the farm and to make use of all locally available alternative feeds. The practice cuts costs and makes fish farming a lot easier and more profitable. Fish ponds are water reservoirs and water from the ponds can be used to irrigate the crops. The animals and the chicken can drink the fish pond water. Some crop's leaves can be fed directly to fish and some green fodder grown along the edges of fish ponds and wherever else to mitigate soil erosion can be used to make composite for fertilising the ponds.

On his farm at Ssenya where he keeps cattle and goats Mr. Ssekyewa has over 30 fish ponds. He is mainly engaged in fish seed production but recently he added rice growing as another farm activity and it is interesting how he has integrated rice growing with fish farming. While maintaining the required water level in the rice paddies he has dug channels around the paddies in which he raises fish. This is one way in which a rice farmer can increase his income and his family's food security. He will harvest the rice and at the same time he will have fish. Farmers who live close to food processing industries or grain mills can take advantage of some by-products from the factories or mills such as maize bran, chicken offals, discarded cassava or maize or millet flour, or malwa residues and such non poisonous food waste.

http://www.monitor.co.ug/Magazines/Farming/-/689860/907506/-/xa8y3y/-/

Fish farmers can net profits in arid lands

By Sammy Cheboi

Fish farms are sprouting up in the unlikeliest of places — the dry arid lands of Ukambani. Yes, hundreds of fish ponds are being constructed in the region and other arid and semi-arid lands thanks to a government project seeking to stimulate rural economies. In the drought-prone Kamuru Village of Kangundo District, Mr Domiciano Maingi first ventured into the uncharted waters last year and put up 12 ponds, all stocked with either tilapia or catfish. He has not regretted clearing his napier grass on his two-acres to pave the way for the ponds. His is a picture perfect illustration of what the government wants to achieve among small-scale farmers in some selected 140 constituencies in its economic stimulus package announced by Finance minister Uhuru Kenyatta in this year's budget. The constituencies are in high aquaculture areas of Central Kenya, Western Kenya, and parts of Rift Valley, Nyanza, Eastern and Coast regions, with plans to scale up in other parts in the next financial year.

Known as the fish farming enterprise programme, the venture is a boon to farmers like Maingi whom the government now relies on for supplying fingerlings for stocking the 28,000 fishponds to be put up by July this year. Under the programme run by the fisheries ministry, farmers are helped to construct a pond and stock them with quality fingerlings-free of charge. The Sh1.12 billion programme has been running since January and so far, some 13,444 ponds are ready against the target of 28,000. Mr Sammy Macharia of the Fisheries ministry says Treasury has so far released Sh623 million, enough to construct 14,000 fishponds, stock them with fingerlings and buy feeds to last eight months when the fish is ready for harvesting.

Besides the catfish and tilapia he rears for sale, Mr Maingi is raising thousands of fingerlings which he supplies to farmers supported through the programme. So far, he has supplied 30,000 fingerlings in Taita Taveta, Kitui (10,000), Machakos (30,000) and Kajiado North (30,000).

Mr Maingi sells a kilo of tilapia for Sh250 and there are some which weigh in at 3kgs. Male-only fingerlings fetch him Sh10 each and the mixed sex ones for Sh3. "I can say the business is not bad. I stumbled upon a huge fish in the pool that had formed on the stream flowing through my farm. That motivated me to venture into fish farming," he says. Farmer Ann Njeri has also plunged

headlong into the fishy business at the Kamiti Fish and Integrated Farm in Kiambu District. She has been at it for the last three years. She has beauty fish in her hatcheries which fetch Sh50 an inch, and she has some which are 10 inches long. Like Mr Maingi, Ms Njeri has been contracted to supply to the farmers in addition to her 600 regular customers. "I switched from cultivating tomatoes to fish ponds and the results have been good. Very good indeed," she says. Ms Njeri sells approximately half a million fingerlings every month at a Sh3 and Sh10. Her farm also serves as field demonstration for farmers.

http://www.nation.co.ke/News/regional/Fish%20farmers%20net%20profits%20in%20arid%20lands%20/-/1070/900344/-/74i9ko/-/

http://www.nation.co.ke/business/news/Fish%20rake%20in%20Sh138%20million%20for%20farmers/-/1006/899196/-/530x2kz/-/

Lack of fingerlings delaying Kenya fish farming project

By Ouma Wanzala

Lack of fingerlings is delaying roll-out of more fish ponds under the Sh22 billion constituency-based stimulus plan, putting a further blot to the economic rescue plan that was mooted last June, but failed to kick off. The fish farming project which included the construction of 200 fish farming ponds in 140 constituencies at a cost of Sh1.12 billion was to create 120, 000 new jobs. It was aimed at putting money into people's pockets at a time when many businesses were reporting lower sales and profits on the country's soft economy.

However, the government sponsored Economic Stimulus Programme plan did not hit its target due to low pace at which the government released money and lack of capacity at the local level to spend the billions of shillings that Treasury plans to send to the constituencies. Only Sh5 billion has so far been spent out of the Sh22 billion. Fisheries minister Paul Otuoma said that his ministry has a shortage of about 24 million certified tilapia and catfish fingerlings to support the fish farming plan. Only 4,000 out of 14,000 fish ponds in the first phase that have been stocked with fingerlings across the country. "Breeding of good and quality fingerlings requires time and that is why we seem to be moving slowly, but it's our hope that we will complete the project as planned," the fisheries development minister said. Dr Otuoma said he is banking on the government-run Kenya Marine and Fisheries Research Institute to ensure quality fingerlings are sold to farmers, a move that will boost production at a time when the sector is facing low volumes.

Statistics at fisheries ministry indicate that in 1999 the country harvested 1.2 million tons of Nile Perch though stocks have dwindled to 300 metric tons. Lake Victoria is among the water bodies that has recorded a decline from 200,000 metric tons in 1999 to about 114,000 metric tonnes in last year, with no signs of stocks recovering soon.

The farming project is also grappling with lack of fish food. "We are working with various companies that deal in feed production to ensure that they adhere to the required standards." Private players such Dominion and other 25 manufacturers have been brought on board to ensure that the fingerlings and food are enough to meet the demand. The current capacity of fish feed in the market is 14,000 metric tons while the ministry requires about 100,000 metric tons in coming months. "We are actively engaged with feeds manufacturers to produce quality fish feeds that will result in better fish growth," he said. Dr Otuoma said his ministry will be seeking additional funds from treasury to enable fish farmers who are in areas which cannot hold water for long buy lining to put in the fish ponds. "Even though treasury has zero-rated those linings it's not enough as most Kenyans who are keen on fish farming do not want to be left behind."

Kenya has potential to harvest more of the commodity with over 1.14 million hectares of land viable for fish farming. If the potential is fully exploited, production could be increased to 11 million metric tons per annum and fetch Sh750 billion. Dr Otuoma said the current production is only 4,220 metric tons with a total area under aquaculture production standing at 722 hectares. If successful, the

project is likely to employ 280,000 youths and who will earn Sh700 million. Delay in training extension officers to monitor good farming methods at the grassroot levels is also dashing hopes of rural poor benefiting from project

http://www.businessdailyafrica.com/Company%20Industry/-/539550/911504/-/item/0/-/15l4aqgz/-/index.html

Kansanshi launches K200m community project in Zambia

By David Chongo in Solwezi

Kansanshi Mine has launched a K200 million poultry, irrigated vegetable and fish farming community empowerment project under parent company First Quantum Minerals Group's corporate social responsibility programme. Releasing details public relations manager Godfrey Msiska said the project was targeted at creating income generating activities for the surrounding Kyafukuma community near the mine. He said the three-phase programme was aimed at not only creating employment for the local community but also enriching the environment and communities in which Kansanshi Mine operates. Msiska said the projected amount in the exercise included the cost of rehabilitating old existing infrastructure, maintenance works, construction of new buildings, training and purchase of materials and livestock. "Kansanshi will provide funding to meet the cost of rehabilitating the existing infrastructure such as the canals. The vegetable-farming project will entail the setting up of an irrigation system to tap water from one of the rivers in Kyafukuma, so that the community can grow vegetables all year round.

The budget on this project also covers training of the community in appropriate and sound training in fish farming, purchase of 11,000 fingerlings and start-up feeds, chicks, medicines, chicken feed, drinkers, feeders, doors, lamps and charcoal; all the inputs for vegetable growing which include fertilisers, seeds, pesticides and fungicides, spray pumps and other similar implements," he said.

Beside the K84 million set for irrigated farming in the K200 million funding, K49 million would go into poultry farming and K67 million toward fish farming.

The project, in which Kansanshi is has received technical assistance from the district veterinary, fisheries and agricultural offices, follows the mine's promotion of the Jatropha out-grower programme in Kabwela and Mushitala and the bee keeping project in Mutanda.

http://www.postzambia.com/post-read_article.php?articleId=8781

Fish depleted in Lake Tanganyika

By Emmanuel Kapampa in Mpulungu, and Lawrence Kabutu in Kalomo.

Fisheries Department in Mpulungu is alarmed at the rate fish stocks are being depleted in Lake Tanganyika due to overfishing. In an interview, district fisheries officer Lloyd Haambiya said the department would by mid this year embark on a massive sensitisation campaign to warn people on the dangers of overfishing. He said the problem had been exacerbated because over 80 per cent of the population in Mpulungu depended on fishing for their livelihood.

''What we now know is that there is so much pressure on the lake. Along the shores alone, there are over 48 fishing camps. And one day, we might wake up to find lake Tanganyika is just a bathing tub, without fish,'' he said.

And the Fisheries Department in Kalomo has stepped up activities at Kanchele fish farm aimed at meeting the demand of fingerlings (fish seed) to fish farmers in Southern Province. Kalomo district fisheries officer Roy Wakumelo said the Kanchele Fish Farm, which is the only fish seed centre in Southern Province, was also integrating fish farming with piggery and poultry production that included duck rearing. He explained that the fish and fish seed distribution would be very beneficial to the farming community and the residents on the plateau districts where fish was scarce and

expensive. He observed that the department of fisheries in Kalomo district was encouraging fish farmers to rear pigs and ducks in order to use the droppings as manure for the fishponds so as to grow the plankton which was the natural food for the fish.

Wakumelo was optimistic that the fish farm would be productive as a fish seed centre in the province and meet the growing demand for fish seed.

http://www.postzambia.com/post-read_article.php?articleId=8041

Feeds

Sustainable fishmeal can support expanding aquaculture

Growth in production from aquaculture, and agriculture, will not be limited by ensuring the supply of fishmeal and fish oil is sustainable. This is a central message Dr Andrew Jackson will deliver at AquaVision. Dr Jackson is the Technical Director of the International Fishmeal and Fish Oil Organisation (IFFO) and a keynote speaker at AquaVision. “In 1960 virtually all fishmeal, 98.5%, was used in pig and poultry feeds,” says Jackson. “At the time, pig and poultry producers were concerned they would not be able to increase production without new sources of fishmeal. As we all know, in the past 50 years the production of both species has increased enormously yet today they use less fishmeal than in 1960. We will see a similar transformation in aquaculture, though marine raw materials will continue to make an important contribution. That is why we are working to ensure the supply is sustainable through the application of effective regulation and strict sourcing criteria.”

http://www.allaboutfeed.net/news/sustainable-fishmeal-can-support-expanding-aquaculture-4339.html

Minister opens ‘World First’ Brine Shrimp Aquaculture Project

Australian Fisheries Minister Norman Moore embraced the aquaculture potential of Western Australia earlier this week when he opened a cutting edge-design commercial brine-shrimp farm at Port Gregory. Brine-shrimp, also known as Artemia are a key component of the food used in the commercial aquaculture of fish and prawns. An expert team led by Department of Fisheries scientist Sagiv Kolkovski, had developed the technologically-advanced facility to cultivate the minute Artemia, in partnership with Cognis Australia, the world’s biggest producer of the naturally occurring red pigment, beta-carotene. The farm is located at Cognis Australia’s Port Gregory plant, where the company farms micro-algae from which beta-carotene is extracted. Brine shrimp is a critical food source for the aquaculture industry and is normally sourced from overseas. The department, in partnership with Cognis, have spent the past seven years perfecting a way of breeding the tiny creatures. Lead scientist Sagiv Kolkovski says it is a significant development. "In terms of completely controlled system it's the first time that it's farmed in the world," he said. "Here we have a full control of the system and no one has done it in the world in a commercial size as it is now."

“This new facility has potential to create a new multi-million dollar industry in rural Western Australia and will help lead to more sustainable fish farming practices both domestically and internationally,” Mr Moore said. "The development of this project marks the culmination of seven years’ research work, providing a much-needed source of high quality, sustainable fish-feed for Australian and international fish-farms. The project embodies the State Government’s goal of promoting sustainable fishing and aquaculture practices and ensuring there are fish for future generations.”

The development is a collaboration between the State Government, the aquaculture industry and the Fisheries Research and Development Corporation (FRDC).

Artemia feed on micro-algae and can be an unwanted pest in the production of beta-carotene. However, researchers have devised an Artemia rearing system that can work effectively in tandem with Cognis' large-scale commercial micro-algae plant, turning a potential threat into an opportunity. Because it feeds on the highly nutritious algae, the Artemia produced will be of the highest-grade quality and contribute to the reduction of the reliance on imported Artemia supplies and other less sustainable fish feed sources, answering one of the main criticisms levelled at the industry. Artemia produced at the plant will also help fill the regular gaps in Artemia supply to Australia's commercial aquaculture industry as a result of market shortfalls.

http://www.thefishsite.com/fishnews/12063/minister-opens-world-first-aquaculture-project

Seaweed based feed to produce organic farmed Salmon

Galway-based Ocean Harvest Technology announced on Tuesday its intent to begin commercially producing a new seaweed-derived salmon feed ingredient that will make possible the world's first organically raised farmed salmon. OceanFeed's development is being celebrated as a key breakthrough in product quality and environmental consciousness within the farmed salmon industry, currently worth a yearly EUR 6 billion.

The new feed is meant to take the place of the synthetic additives now used in commercial salmon feed. Extensive trials with farmed salmon have been conducted with some of the world's leading salmon farm companies, and they have yielded excellent results regarding the health, taste and appearance of the salmon raised on OceanFeed. Leading aquaculture feed producers have already been showing great interest across the globe. EWOS UK, a leading salmon feed producer, has already optioned the first year's production, according to Business World. "The long term importance of aquaculture in helping to feed the world has always meant that sustainable solutions would need to be found," said Ocean Harvest CEO Patrick Martin, Irish Examiner reports. "The belief is that OceanFeed will be a key ingredient in helping to make the industry more environmentally, as well as financially, sustainable." OceanFeed is made with a proprietary blend of seaweeds harvested from waters around the world, but some of its key elements are sourced exclusively off the Irish coast. It is the first 100 per cent sustainable and organic marine sourced complete aquaculture feed formula. Martin said Ocean Harvest is developing a firm in the West of Ireland that will eventually be able to supply salmon farms in Scotland, Norway and Chile.

"It was during research into the commercial application of seaweed derived products that the potential emerged for a sustainable ingredient in the salmon feed industry," said Martin. "After many years of development, we moved from testing in small numbers to major ocean testing with some of the biggest players in the salmon market."

http://www.fis.com/fis/worldnews/worldnews.asp?monthyear=&day=8&id=36131&l=e&special=&ndb=1%20target=

New type of astaxanthin being marketed

Naturxan announced that it has completed an expansion of its production and distribution capabilities to provide worldwide availability of Aquasta, a naturally sourced astaxanthin made from Phaffia yeast for enriching and pigmenting salmon and trout consuming aquaculture feeds.

While the aquaculture industry was once dependent on synthetic, non-renewable sources of astaxanthin to achieve the signature pink color of wild salmon, naturally sourced Aquasta has proven as effective as synthetic astaxanthin in commercial field trials involving fresh, frozen and smoked fish such as Atlantic salmon, Coho salmon and Rainbow trout. Aquasta is made from renewable ingredients and satisfies the health and purchasing preferences of consumers and retailers that prefer naturally derived aquaculture products.Aquasta has a high and more proportional astaxanthin bioavailability than some other astaxanthin sources, is reliably dose

responsive, and the astaxanthin is virtually identical to that from krill, which is consumed by wild salmon to give them their healthy natural coloration.

http://www.marketwatch.com/story/naturxan-llc-expands-production-and-distribution-of-aquastar-naturally-sourced-astaxanthin-to-meet-global-aquaculture-demand-2010-05-27?reflink=MW_news_stmp

Promising results with new Crayfish feed

By Suzi Fraser

Increased demand for noble crayfish and increasing interest in farming the species requires a better and more reliable feed, and Nofima has developed a new feed that is giving extremely good results.

The Noble crayfish *Astacus astacus* is a freshwater crayfish found in many parts of Europe. In Norway, the noble crayfish is found in the southern and eastern parts of the country. Stocks have fallen dramatically, with a 70 percent reduction recorded over the past 30 years, and the species is today on the Norwegian endangered species list. The drastic decline in wild stocks coincided with increased interest in the species among Norwegian consumers. Consequently, during the 1980s interest in farming noble crayfish rose significantly. The majority of noble crayfish was previously exported overseas, but today Norwegians consume virtually all that is harvested in Norway.

Relatively few "customized" feeds are available that are specifically adapted for freshwater crayfish. Roger Strand, owner of Kasa Krepseoppdrett in Hvaler, wants to test out different types of feed combinations, including the most common today, artemia. As a preliminary project, Nofima scientists Sten Siikavuopio and Harald Mundheim have developed a completely new dry feed, which has been named Nofima noble crayfish feed. This feed was originally developed for king crabs, but has been modified so it is suitable as a starter feed for crayfish larvae. In all, four different dry feed types were used in the trial in addition to the control feed, artemia. The scientists registered the crayfish larvae's interest in the various feed types, as well as growth and survival rate. Nofima's feed and artemia produced the same result – the best survival rate for the larvae.
"The preliminary results are extremely promising and we recommend continuing with the development of this feed," the scientists say. The project is financed as a fellowship through Innovation Norway.

http://www.aquafeed.com/read-article.php?id=3246&sectionid=2&utm_source=Aquafeed+English+Newsletter&utm_campaign=6a1486c387-Aquafeed_Newsletter_04-29-10&utm_medium=email

Environment, Health and Disease issues

Integrated Multi-Trophic Aquaculture critically examined

Inka Milewski, of the Conservation Council of New Brunswick, points out that there are sustainability issues to pursue with salmon aquaculture and that research on integrated multi-trophic aquaculture (IMTA) has been slow to deliver. However, she has also implied that work on IMTA is somewhat responsible for impeding aquaculture policy development and diverted resources away from important issues, such as the replacement of wild fish products in salmon feed. Unfortunately, she has failed to put several of her criticisms in the appropriate context, resulting in information with the potential to mislead.

Fish pens for aquaculture have become a familiar sight in New Brunswick's coastal communities. Marine biologist Thierry Chopin argues that by integrating cultured seaweed and shellfish,

aquaculture operations can reduce the impact of fish farms on the marine environment. IMTA is indeed an old concept. Asian countries, where the practice started, also entered the intensive monoculture era and are now realizing that IMTA, and its many variations, had their attributes and should be revisited. The aquaculture industry and researchers have never pretended that IMTA was the solution to and for everything. But one thing is certain - the human population is increasing and wants more proteins of seafood origin. It is generally agreed that the capture fisheries will not fill this gap; consequently, aquaculture will have to. It is now up to us to develop the better aquaculture practices of tomorrow.

We have always invited the Conservation Council of New Brunswick to our IMTA workshops and have benefited from the participation of other environmental non-governmental organizations. A direct dialogue would be much more constructive than inflammatory commentaries through the media.

No form of intensive food production is without impact, including aquaculture or the wild capture fisheries. One criticism of salmon aquaculture is the inclusion of fish meal and oil in commercial feed. Current commercial salmon diets in Canada contain much less fish meal (about 15 to 25 per cent) and fish oil (about 15 to 20 per cent) than before (40 to 60 per cent). In Atlantic Canada, by-products (trimmings) of wild catch fisheries are used to supply some or all of the marine ingredients. A new salmon feed is now commercially available, which includes no marine ingredients. We have also heard people saying that marine fish should eat marine ingredients: you cannot have it both ways!

Historically, most of the reduction fishery (small fish such as anchovies, menhaden and sardines) had gone into the production of pet feeds and farm animal feeds. Then, this fishery supplied a significant part of the marine ingredients for farm fish feeds. The landing of the reduction fishery has been stable (fluctuating between 15 and 30 million tonnes since the 1970s) and the fishery would likely return to supplying pet and farm animal feeds in the absence of aquaculture demand. This is not to justify relaxed vigilance for finding replacements for marine ingredients in salmon feed, but simply to suggest that an absence of salmon farming will not stop the use of this resource.

Finding replacements for marine ingredients is a priority, and there are several large research projects worldwide on this. Using land plant proteins is not without its impacts. Extra farmland area (more deforestation) would be needed, which, moreover, would need to be irrigated on a planet already suffering from water availability problems. The price of some staple food crops used in traditional agriculture (corn, soya, etc.) would rise considerably due to announced competition for their uses, as recently seen when they were potentially sought out for energy crops for the production of biofuels. Partial substitution with organisms already living in water, such as seaweeds, could, in fact, be a very interesting option. If cultivated in the water column, there would, then, be no issue of raking up seaweeds attached to the bottom.

It has also been suggested that fish farms should be pulled from the open water and placed on land or in closed containment. This is one approach which may help address some sustainability issues, but is not without its problems. Energy - often diesel or electric power - is required to pump and aerate water. Nutrients are either pumped back into the water or settled somewhere and "trucked" off site. Land-based tank systems leave a "carbon footprint," and only partly solve the nutrient issue. One "impact" may simply be traded for another: a case of environmental problem shifting, not solving.

Integrated multi-trophic aquaculture (IMTA) is another approach, which aims to capture some of the nutrient load from fish farms while producing other marine products of commercial value. Species that can utilize the lost nutrients from fed fish are grown adjacent to cages. As with closed containment and replacement of marine ingredients, IMTA is one of several options with the potential to improve the sustainability of salmon aquaculture.

The obvious question to ask is, what production of co-cultured species is required to recover the nutrients generated by salmon? Unfortunately, there is no simple answer. There are three types of

nutrient waste from a salmon farm: dissolved nutrients, small particulates and 'heavier' settling solids. So by default, there is already a need for three different species groups to accommodate the different waste streams. Even within these groups, diversity may be required.

For example, we are well aware that the kelps presently cultivated are not growing year round; consequently, multiple seaweed species will be needed to span the entire fish grow-out period. Then, there is the issue of ratios between species, so a simple production value cannot be reported. This is further complicated by the fact that there is also the potential for multiple transfers: nutrients may cycle through two or more species groups before they are captured. There are no quick and easy answers and, as is often the case in science, the process of finding these answers is frustratingly slow, especially to those of us who are trying to find them.

The reality is production of co-cultured species may need to be done on a scale complementary to the scale of salmon production. It has taken decades to reach current salmon production levels and learning new species husbandry. We have to rethink the definition of what an "aquaculture site" is within the broader framework of Integrated Coastal Zone Management. Amending regulations to allow such culture will not occur overnight.

This should, however, not discourage the salmon industry from practicing IMTA, as even small amounts of co-cultured species production are useful. We started our project in 2001 and nine years later, out of 96 sites in Southwestern New Brunswick, five sites have the combination salmon (or cod)/mussels/kelps, and 11 other sites have been amended to develop IMTA. This is a conversion of almost 16 per cent in nine years. Moreover, it would not be reasonable to anticipate an instant conversion, as the industry needs to progressively develop markets to absorb the co-cultured biomass. There are no simple solutions! It will take time for IMTA to develop to full scale, but we are nine years further ahead.

http://telegraphjournal.canadaeast.com/opinion/article/1008653

Research matters, Reviews & Training

Research in Africa

From Reuters by Kate Kelland

Africa's contribution to the global body of scientific research is very small and does little to benefit its own populations, according to a report from Thomson Reuters released on Monday. Like India and China, Africa suffers from a "haemorrhage of talent", the report said, with many of its best brains leaving to study abroad and failing to return.

"The African diaspora provides powerful intellectual input to the research achievements of other countries, but returns less benefit to the countries of birth," Jonathan Adams, director of research evaluation at Thomson Reuters, said in a statement as the report was published. Adams and colleagues, who use a Thomson Reuters database to track scientific publications, found that three nations dominate Africa's research output with South Africa leading by a long way, ahead of Egypt in second place and then Nigeria.

"Africa's overall volume of activity remains small, much smaller than is desirable if the potential contribution of its researchers is to be realised for the benefit of its populations," said Adams. The report found that part of the problem was down to a "chronic lack of investment in facilities for research and teaching", a deficit the authors said must be remedied. Adams said the reason behind this was not simply money: "The resources available in some African countries are substantial, but they are not being invested in the research base." In fields of research relevant to natural resources, however, the study found a relatively high representation of African research as a share of world publications. South Africa's 1.55 percent share of research in plant and animal science is the continent's biggest share in any field, it said, with this output surpassing Russia's 1.17 percent but well behind China's 5.42 percent share in the same field. The report pointed to a few examples of countries which, despite low output, produced much higher quality research than larger neighbours.

Malawi, for example, with one-tenth the annual research output of Nigeria, produces research of a quality that exceeds the world average benchmark while Nigeria hovers at around half that impact level, the report said. "The challenges that the continent faces are enormous and indigenous research could help provide both effective and focused responses," it added.

http://af.reuters.com/article/topNews/idAFJOE63B00C20100412?pageNumber=2&virtualBrandChannel=0

Investing in Aquaculture

Nigerian opportunities

Kwara State, Nigeria, has many rivers and water bodies which would serve as good locations to set-up fish farms. Opportunities exist in various areas of the fishing sub-sector, these include:

Production of table fish
Construction of fish farms
Storage, processing and preservation of captured fish
Fish seed multiplication
Transport and Financing

Incentives are available. The Kwara State Government is willing to extend a number of incentives to serious investors including the provision of land and infrastructure, tax holidays and assistance with obtaining financing.

http://www.tradeinvestnigeria.com/investment_opportunities/966245.htm

Conferences and Upcoming Events

Offshore Mariculture 2010

16 June to 18 June Dubrovnic, Croatia

An international two-day conference, with technical visit day, on the offshore fish farming business. Aimed at growing offshore fish farming businesses the conference will explore the progress and prospects for offshore aquaculture in European and international waters. Following two successful previous events, Malta 2006 and Alicante 2008, the third Offshore Mariculture Conference will be held in Dubrovnik, Croatia from 16-18 June 2010. As before the two day technical conference will be followed by a third day dedicated to a visit to a fish farm.

www.offshoremariculture.com

Global Conference on Aquaculture 2010

9 to 12 June Bangkok, Thailand

FAO in partnership with NACA and the Thai Department of Fisheries, are organizing this Global Conference on Aquaculture 2010, to evaluate where the aquaculture sector stands today and face the challenges and opportunities.

Website: http://www.aqua-conference2010.org

Aquatic Resources of Kenya II (ARK II)

16th– 19th November 2010

Advances in Research Development

Organised by KENYA MARINE AND FISHERIES RESEARCH INSTITUTE

http://www.kmfri.co.ke/conference/flyer_revised_electronic_version_FINAL.pdf