Exploring Opportunities for Sustainable Shrimp Farming in West Africa
FOCUS ON SOUTH-SOUTH COOPERATION

"Sustainable development meets the needs of the current generation without compromising the ability of the future generations to meet their own needs." quote OECD

Aquaculture will increasing fulfill the need to supply fishery products locally and for export.
West Africa Aquaculture is looking to expand, to be able to progress and meet its full potential whilst playing a role in enabling future generations to meet their needs.

West Africa Aquaculture, called WAAq, was bought in 2000 with private venture capital as a previous shrimp farm known as Scan. Scan had achieved 18months of very successful farming but was closed due to bank intervention in 1989. Unused for more than 12 years, the hatchery and farm were derelict.

The first priority was renovation of the Sanyang hatchery and at Pirang farm to rebuild the eroded bunds and ponds to reproduce the original Equadorian design. In the first phase the laboratory, maturation, and half the LPRT and Nursery capacity in Sanyang were completely renovated. In the second phase solar tank, generator, reservoir, pumping, water filtration and air system facilities as well as staff living quarters were completed. In Pirang the first phase development consisted of a quarter section of the farm ponds including a water reservoir, settlement inlet and outlet canals and roads. This was completely renovated and rebuilt within 18months. The second phase, started in 2003, concentrated on the construction of a processing plant capable of handling the farm produce and in accordance with EU specifications for the handling and processing of fishery, aquaculture and other food products.

The Department of State for Fisheries faced a totally new concept in fisheries and rose to this challenge by developing new strategies and legal framework for Sustainable Fisheries Development and formulation of the Residue Control Programme for export to the EU. The department has expertise in dealing with all aspects of export and complying with all the regulations demanded by developed countries. Subsequently, WAAq was approved for Certification for the export of aquaculture products into the EU. The Gambia is the first and only country in the Sahel and West Africa region to have achieved this status. Not only does this strengthen the position of aquaculture in the S+WA region, but enhances the social sustainability of the fisheries sector and moves The Gambia and the region towards achieving the Millenium Development Goals.

The government offers tax concessions and incentives to FDI (Foreign Direct Investors). GIPFZA is the official Gambian organisation designed to be instrumental in advising and helping companies on all technicalities and on best practice to ensure smooth administration and practical functionality. GIPFZA is actively committed to helping FDI to liase between government departments, to overcome the legal requirements and unfamiliarities.

The aim of WAAq has been to rejuvenate the farm and to produce a quality shrimp similar to sea-caught. The strategy has been a low-risk organic-like approach, semi-intensive with low stocking densities. The first ponds were stocked 3 years ago. We achieved 20 tonnes which was absorbed locally and exported to Senegal. Building on this success the following year production increased 100% and was exported mainly to the Middle East and again to Senegal. This year we produced 40 tonnes of which 50% were number 1's (with average weights of 53grams) and 42% number 2's (averaging 40grams) in 200days. We introduced our Atlantic Black Tiger product into EU. Market access has now been established into the UK, Holland, Belgium, France and Spain, where the product has been very well received and the demand exceeds supply.

The success of WAAq to date has been based on, as we say in Gambia, "ndanka, ndanka, jappa golo - translated -slow and steady wins the race", using many Asian ideas and practical solutions in our hatchery and farming techniques. We have tackled areas from broodstock collection and maturation, infrastructure and pond development, farming, processing and food security, to export and marketing. With experience gained from the Sepang Today Aquaculture Center in Malaysia, we have changed some methods and improved our fertilisation through mass spawning techniques, improved LPR survival using simple outdoor culture tanks and improvements on the farming side - simple methods for screen protection against crabs and crocodiles, CD's and scarecrows as bird deterrants and we

introduced night feeding with great sucess. During the 5 years of progress we are aware and sensitive to the problems, the conditions and the challenges, the needs and the possibilites, the diversification potential and the successes possible in the future. The achievements with private investment to date show that WAAq is a sustainable development project with potential to grow and to expand into other areas. West Africa Aquaculture is now at a turning point and needs investment to be able to achieve that goal.

The natural conditions for P.monodon farming are excellent. The farm lies 13^{o}N and 17^{o}W. It is situated on a windy site, at the mouth of the unpolluted river facing the Atlantic and is surrounded by open flat land. Water temperatures range from 34^{o}C in summer to 17^{o}C in winter, pH 8. The salinity range is from 42ppt to 15ppt. These conditions ensure the shrimp have firm meat structure and excellent taste.

Broodstock (12 generations ago, originally from the South-East China Sea) are a by-catch from the artesinal fishermen and are White Spot tested and quaranteened before maturation. PL's are stocked in high saline water and grow rapidly with increased water temperature and with the rains, reduced salinity. Feeding, following the nocturnal habit of the shrimp, is done 5 times a night starting at dusk. Harvesting occurs at the end of the rains as the water temperature starts to fall. The shrimp are iced at the harvest gate and transported immediately to the on-site processing plant.

The plant, with its own potable water supply, has 400m^2 of processing and packing rooms, 2 blast freezers totalling 8ton capacity, 6.5 ton ice capacity and 32 ton freezer storage capacity.

The farm could sustain two cycles of smaller animals (eg size 3 and 4), followed by fish. Oysters and tilapia could be grown concurrently in the outlet canals. In Februray and March when broodstock collection starts the north-east trade winds dry the ponds. Artemia has been found and could be harvested. Salt can be mined (the site originally belonged to a salt mining company). Even a wind farm.

The capacity for Pirang exceeds 500 tonnes per annum. The farm site is approx 325ha of which 208ha can be farmed. Only 25% of this is currently in use at very low densities. A secondary site of 275ha has not been developed at all, but has great potential. The sites occupy unutilised barren land fringed by mangroves, so mangroves are not lost to farming. The Gambia is also very well know as a stop-over for migratory birds and the Pirang farmsite has excellent potential to diversify into eco-tourism. With a young and active labour force on its doorstep, the different activities possible could offer a wide range of employment opportunites, education and improved well being for both males and females.

Since aquaculture is a new concept in The Gambia and there are no Gambian aquaculturalists or technical experts, a training scheme was started in 2003. It offeres employees paid in-house training, over a three year period, based on the idea of STAC in Malaysia. The scheme is basic, teaching a range of relevant theoretical and practical skills, which offer the successful participants a fast track to higher positions within the company. WAAq could greatly benefit from the expertise of experienced farmers able to work under challenging conditions and able to encourage aquaculture through learning by practical application. In the long term, initiatives at school level in marine biology, soil and water chemisty and aquaculture are neccessary in order to encourage a strong base in a completely new industry. In the short term, an educational and practical co-operation and exchange facilty with experts and experienced peoples of Asia and Eastern Africa would be welcome and greatly benefit WAAq as well as encouraging the industry at a level not currently possible to attain.

The site of the hatchery is situated 35k away on the Atlantic coast at Sanyang. Sanyang, which currently runs along the lines of a residential teaching school, has the potential to be developed into a proper training and research facility. The Gambia already has MRC, a medical reseach center for people and ITC, a research center for animals, so why a not Marine and Aquaculture Research Center for Sahel and West Africa (^{SWA}MARC) and with the farm also playing a role towards capacity building?

To date $4.5million dollars has been invested. A further $1.4million of capital investment will be needed to improve current facilities and infrastructure and make the expansion to 52 ponds a reality, with the added advantage of the potential to capitalise on diversity. By achieving economy of scale the project becomes economically viable and can contribute significantly to investment, the country and region.

I thank you for listening and hope this is of interest you so that we may all achieve our goals.

Potential for Investment

+ve aspects

- **A** fully functional and operative hatchery, farm and on-site processing unit
- **Q**uality farmed product similar to sea-catch with proven producion success
- **U**nique natural farming conditions and parameters to match natural growth cycle of P.monodon
- **A**t all locations expansion and growth potential - hatchery, farm and processing
- **C**ost effective, enthusiastic, flexible and readily available labour force
- **U**p-and-coming: Market access to 5 EU countries already established with positive and enthusiastic response.
- **L**ocal disease free broodstock available. Possibility of selecting and maintaining own broodstock.
- **T**ransport advantage - globally well positioned for speedy access to markets. Fresh product JIT (just-in-time) for all Festive seasons leading into the northern summer.
- **U**S$ Price competitiveness and strong new market potential with organically orientated product.
- **R**egional supply center and potential for hatchery to become a marine research facility.
- **E**U certification for aquaculture – the only establishment in the Sahel and West Africa region

- **F**uture possibilities for business diversion into PL supply, fingerling production; finfish, tilapia production, polyculture, crocodile farming, saltmining, artemia production, feed production, seafood, fish and food processing, ecotourism
- **U**pgraded road network with close proximity to air and seaport, both with regular and expanding direct services to EU, Africa, the Americas + the East.
- **T**he government has positive attitude towards development projects that benefit the investor and the country
- **U**seful FDI positively encouraged by Government with an established office (GIPFZA) absolutely committed to helping with legal technicalities
- **R**
- **E**xternal bank accounts and expatriation of funds and profits allowed
- **S**table monetry unit pegged to US$, tax breaks, incentives and subsidies

difficulties

- **S**ecuring a new industry with new ways of working and new ideas, lack of experience and education in marine and aquaculture related areas
- **O**perating with lack of technical expertise at hatchery, farm and product processing units
- **L**ack of trained mechanics and ineffective maintenance of machine park and equipment
- **U**tilities: *(current)* lack of electrical infrastructure (short-term disadvantage, this is now being extended)
- **T**elecommunications**:** *(current)* intermittent communication difficulties (short-term disadvantage, expansion of communications networks is in progress and continually improving)
- **I**mportation: *(current)* reliance on imported goods and the timely arrival thereof
- **O**perational cost increased by importation of feed which could be available locally (this being off-set as an advantage by local availability)
- **N**ot proven: *(threat)* possible overfishing by off-shore enterprises and threat to local artesian supply of unknown P.monodon population (the perception is population increase – not proven)
- **$** cost of fuel

Potential of 500 tonnes shrimp and how to achieve that potential

500 tonnes can be achieved with 52 operational ponds, stocked semi-intensively at 10PLs/m^2 and survival 65%, growth 37grams in 200 days.

This strategy is low-risk and assumes only one harvest per year with low stocking. A gradual increase co-incides with knowledge and experience gained which is vital to be able to farm effectively and efficiently. Alongside this is the potential of diversification.

Year 1
Operation of 15 ponds (low stocking, 5/m^2 - 70 tonnes)

1. *improve and expand hatchery*
2. *regrading of phase 2 ponds (increase capacity of farm with 100%)*
3. *increase capacity of reservoir*
4. *secure working area*

Year 2
Operation of 29 ponds (low stocking, increased to 6.25/m^2 - 175 tonnes)

5. *secure outerbund*
6. *increase pumping capacity*
7. *rebuild phase 3 (increase capacity of farm to 40 approx. 4ha ponds)*
8. *build farm-side feed stores*
9. *start salt collection*

Year 3
Operation of 40 ponds (low stocking, 6.25/m^2 - 250 tonnes)

10. *rebuild phase 4 ponds (increase capacity of farm to 52 approx 4ha ponds)*
11. *construct partial harvest facilities*
12. *continue salt, start artemia collection*

Year 4
Fully operational 52 ponds (low stocking, 6.25/m^2 - 320 tonnes)

13. *continue salt collection, continue artemia collection*

Year 5
Increase stocking to 10/m^2 (yield 500 tonnes)

14. *continue salt collection, continue artemia collection*
15. *start fish farming*

immediate needs

- technical know-how: mechanical, refrigeration, farming and hatchery experts
- practical and educational exchange opportunities
- selection of appropriate broodstock and maturation techniques
- secure the sites: fencing
- heavy construction equipment: 2 bulldozers, 2/3 trucks, 2 tractors, escavator
- hatchery equipment: improve air and water filtration systems
- farm equipment: extra pumps, expand power supply infrastructure

longer term needs

- reconsider energy source taking advantage of solar and wind power
- secure broodstock
- feed production facility
- diversification of the hatchery, farm and processing facilities

challenges

to secure investment to complete the farm and achieve projected capacity whilst diversifying
to better provide for the needs of the current generation
to ensure the needs of future generations are secured