Ministerial Conference on Fisheries Cooperation Among African States bordering the Atlantic Ocean

Ministry of Agriculture, Livestock, Fisheries and Rural development Republic of Gabon

CONFERENCE REPORT

Regional Seminar on Commercial Aquaculture Development in African Countries Bordering the Atlantic Ocean (ATLAFCO)

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Cover page:

Photos: Fish farms of some African countries (Gabon, Uganda and Ghana)

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The Ministerial Conference on Fisheries Cooperation among African States Bordering the Atlantic Ocean (ATLAFCO) would like to express its thanks to the many persons and organizations who have, through their dedication and cooperation, enabled this seminar a success. Our gratitude goes first to the Ministry of Agriculture, Livestock, Fisheries and Rural development of the Republic of Gabon notably Hon. M. Raymond NDONG SIMA the Minister and his staff of Directorate of Fisheries and Aquaculture.

We would like to express our heartfelt thanks to the authors of this report, namely James Miller and Will Leschen who also made efficient preparations for this seminar by recruiting a wide selection of the key commercial aquaculture sector producers and researchers from across the African continent to take part to this seminar.

Also, we would like to extend our gratitude to all who participated, as well as the staff, specialists, and members of aquatic producers professional organizations, Fisheries and Aquaculture administrations, sub regional organizations and research centers of member states and others countries from across Africa, who have deeply contributed by their experiences to the conclusions and recommendations on which this report is based.

We wish to combine in the same honour and spirit of the fish farmers in Africa, who contributed to the success of this unique conference and the adoption of a road map that ATLAFCO will work on to produce a subsequent three year follow up program which will aim to put these recommendations into concrete and practical activities and outcomes .

At the level of the ATLAFCO, this seminar has been initiated and coordinated by the Executive Secretariat.

Finally, ATLAFCO wishes to express its gratefulness to Overseas Fishery Cooperation Foundation of Japan (OFCF Japan), which has allowed this project, through its financial support, to achieve its objectives.

The authors remain the only responsible for mistakes that might occur in this report.

CONTENTS OF THE REPORT

PREFACE

ATLAFCO organised a regional seminar on commercial aquaculture from 8 to 10 June 2011 in Libreville, Gabon in collaboration with the Ministry of Agriculture, Animal Husbandry, Fisheries and Rural Development and the Department of Fisheries and Aquaculture. The conference was held at the Laico Okume Hotel.

The seminar had some 100 participants who represented the following institutions and countries:

- Private sector producers, administrations responsible for management and promotion of the aquaculture sector as well as scientific research and training institutions and other stakeholders in aquaculture development from the following countries: Angola, Benin, Cameroon, Congo, Côte d'Ivoire, Gambia, Gabon, Ghana, Guinea, Guinea Bissau, Liberia, Mauritania, Morocco, Namibia, Nigeria, Uganda, the Democratic Republic of Congo, Senegal, Sierra Leone, Togo and Zimbabwe.

- Intergovernmental institutions represented included :
  - Marketing Information and Technical Advisory for the Fisheries Industry in Southern Africa (INFOSA)
  - Sub-Regional Fisheries Commission (SRFC)
  - Regional Fisheries Commission for the Gulf of Guinea (RFCG)
  - The Fisheries Committee for the West Central Gulf of Guinea (FCWC)
  - The Economic Community of Central African States (ECCAS)
  - FAO representative

- Development Partners :
  - Japan
  - Overseas Fishery Cooperation Foundation of Japan
  - The African Development Bank

- The Press was represented by :
  - Wari / TV5 monde
  - APA News
  - Agence Maghreb Arab Presse
  - Daily independent newspaper
  - Local Press in Gabon

The list of participants is in annex to the report.

The seminar was opened by His Excellency, ***Mr. RAYMOND NDONG SIMA****, Minister of Agriculture, Animal Husbandry, Fisheries and Rural Development in Gabon and* ***Mr. Hachim EL AYOUBI, Executive Secretary of ATLAFCO (COMHAFAT) , as well as the FAO Representative****.*

The opening remarks called on the more than 100 participants to contribute to the success of this unique conference, which for the first time, brought together private sector aquaculture producers as the leading contributors along with experts from government, NGO's and other stakeholders. In order to introduce all of the 22 countries present the seminar began with a presentation of photos on each country which were sent in prior to the meeting. It was also the occasion for the organisers of the seminar to express their many thanks to Dr. Guy Anicet RERAMBYATH, the DG of the Ministry of Agriculture and Natural Resources , Dr. Gilles Boupana, the Director of Aquaculture and their secretarial staff who played a major role in the successful preparations and documentation of the seminar.

The seminar was led collectively by Mr. William Leschen and Mr. Jim Miller, experts in aquaculture.

Preamble: Workshop organisation

Presentations were given from Day 1 – Day 3 in each of sessions 1-7 (from Outline above) with the presenters being listed at the head of each session below. To view any of these presentations and further details of the workshop online these will be available on the main SARNISSA www.sarnissa.org site

Mamadou Abibou Diagne ONA Senegal mamadou_diagne@yahoo.fr was elected as the Chair for the meeting along with Tunde Atanda Federal Fisheries Dept Nigeria tundeatanda@yahoo.com, as Vice Chair, with the following 3 reporters:

1. Mr. Salieu Sankoh IMBO, USL, Sierra Leone saliensankoh@hotmail.com
2. Mme Godeleive Konunga ERAIFT RD Congo konugagodelieve@yahoo.fr
3. MrSaid Sedki INHRH Morocco saidsedki@gmail.com

Session 1: Introduction: "Fifty years……. and then a change in the waters"

Presenters

James Miller US private consultant jimfishafrica@gmail.com
Will Leschen, Institute of Aquaculture, University of Stirling, UK wl2@stir.ac.uk www.aqua.stir.ac.uk

Aquaculture in sub Saharan Africa has been under a process of development since the late 1950's, however despite considerable funding and support from both international, internal donors and finance, by the year 2000 it had shown very limited increases in production and associated infrastructure, employment and income generation compared to south Asia and also its northern African neighbour Egypt. The approach and methods used for over 50 years by both donors and practitioners alike were based on the repeated promotion of project orientated, small scale rural, often integrated, subsistence culture systems which relied heavily on local resource availability. Many if not most of these systems lasted no longer than each donors project funding cycle, as witnessed by the literally thousands of abandoned fish ponds which permeate the landscape of this vast continent, whilst to a large extent government extension services remained inadequate in passing on new technologies and proven economically viable models for sustainable production systems.

At the turn of the century the penny finally dropped for som. in terms of the necessity for a new approach to be implemented, primarily led by the private sector which began to develop fish farming and other aquatic production on a commercial basis as a business. Although initially limited to countries such as Nigeria, Zimbabwe, Ghana, Zambia, Uganda and Kenya for fish, Mozambique and Madagascar for shrimp, and South Africa and Namibia for shellfish and molluscs, production began to increase significantly in the 2000s as a result of the entrance of mid to larger scale commercial primarily cage and pond farms. Nigeria's vibrant catfish (*Clarias gariepinus*) industry which led the charge was based primarily on smaller to mid-scale peri-urban systems which are now supported by a reliable hatchery and commercial feeds sector.

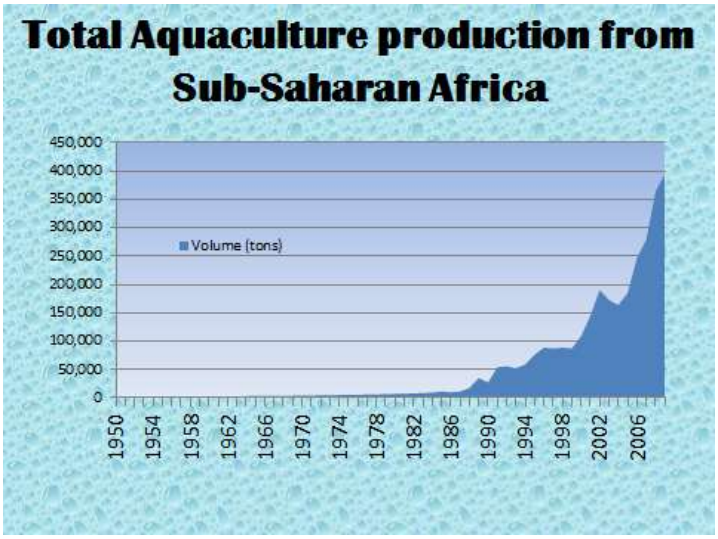

Figure 1 Total Aquaculture Production from sub-Saharan Africa 1950-2007
Source FAOFish Stat

This rise in aquaculture production has also been driven by increasing market demand for fish across the continent due to declining capture fisheries, with fish prices in certain countries now making aquaculture a feasible economic proposition. However by June 2011 this commercialization of aquaculture had only really been limited to the countries mentioned above, leaving other countries still pursuing a donor driven, smaller scale livelihoods based strategy which clearly is still struggling in its implementation and effectiveness in increasing fish production. It should be noted that there are still considerable differences between the francophone, lusophone and anglophone sectors of African aquaculture, most notably that the top five fin fish producing commercial farms are located in English speaking countries, with the largest marine shrimp producers in lusophone Mozambique and francophone Madagascar. There are obvious differences in population and demand for fish and aquatic products across the continent, but perhaps some countries could better enable or encourage the private sector investors.

Figure 2. The two main farmed fish in Africa remain Oreochromis niloticus and the African catfish, Clarias gariepinus, shown above

Over this 50 year period there have been numerous meetings, workshops, conferences relating to African aquaculture development which have almost all been frequented by government and donor driven sectors with few concrete outputs which have led to actual increased fish and aquatic production. It was therefore seen that on the back of this new commercialization, a seminar focused on producers was long overdue. Therefore a 3 Day workshop was organized by ATLAFCO (COMHAFAT) to focus on"The Road Forward to Commercial Aquaculture in Africa" where leading players, i.e. producers in the commercial sector, should come together along with key aquaculture experts from other African countries in order to interact, share information and

contacts across borders and languages, and by the end of the workshop to come up with a series of specific, defined and realistic recommendations as well as more clearly defined roles of the private, markets, government and NGO sectors. Particular attention was taken to ensure the participants list contained a strong commercial sector presence, whilst also including key government and others, with a balance between English and francophone participants.

In contrast to many previous such meetings of mostly government and institutional staff, the organizers sought a practical orientation, centered on private sector producers to establish "**The Way Forward to Commercial Aquaculture in SS Africa"** based on achievements realized in countries advanced in aquaculture such as Nigeria, Ghana, Uganda, Zimbabwe and Kenya.

The conclusions and recommendations of the seminar are presented in this report and include the need to clearly define the roles and responsibilities of government and the private sector as well as NGO's and markets. Three groups representing producers, institutions and researchers compiled recommendations including indicators for quantifying progress in aquaculture development as well as methods to attract more investors into supporting aquaculture enterprises. The workshop was held in Libreville, Gabon between the 8-10th June 2011.

Session 2: Overview of Commercial Aquaculture in Sub Saharan Africa (SSA)

Presenters:

Maurice Danjinou, Royal Fish Benin, Fish Hatchery Manager, mauriceboris@hotmail.com
Anders Nielsen, Fish Farmer, Consultant, Aquaculture Equipment Supplier, Aqaan Int, UNIDO, Ghana anders1993@me.com
Felix Gbolade, Felimar, Hatchery & Fish Farm owner, also commercial equipment and feeds supplier Nigeria felimaraqua1@yahoo.com
Guillaume Gaudin, Concepto Azul/Aquasol, Researcher, marine shrimp hatchery specialist Cameroon gguillaume89@hotmail.fr
Judith Makomba, Researcher, OPED, Aquasol, Macrobrachium hatchery specialist Cameroon jmakombu@yahoo.fr
Abdoulaye Wague IMROP Mauritania - Shellfish Mollusc production awague11@yahoo.fr
Abudala Napuru, Source of the Nile Fish Farm, Fish Farm & Hatchery Manager, Uganda anapuru2002@yahoo.com
Mme Aissatou Seck, Fish Farm Owner, La Ferme Vert, Cote D'Ivoire aidablue@yahoo.com
Kekeou Banguina DPA/MAEP govt overview of aquaculture in Togo banguinaandre@yahoo.fr
Appolinaire Ahotondji SODEPAL, COMEPAL, Fish Farmer, Gabon aahotondji@yahoo.fr

With contributors to the seminar coming mainly from private sector fish farming professionals, following the presentations many lively debates took place, which focused on:

- the choice of species for production,
- fish and shrimp seed supply,
- feeds,
- Farm management and marketing.

Several Anglophone countries including Nigeria, Ghana, Zimbabwe, Uganda and Kenya have greatly stepped up their private sector fish farming development in the last years whilst Cameroon has ongoing activities in both small-scale marine and fresh water shrimp farming; conditions are favourable in other countries for replication of these systems. Egypt leads Africa in aquaculture production at some 0.8million MT, whilst in sub-Saharan Africa, Nigeria tops the list of producers with some 0.15 m MT of production, mainly of African

Figure 2 *Typical concrete rendered blockwork tanks in peri-urban Nigeria producing catfish for Nigeria's growing urban markets*

catfish (*Clarias gariepinus*), produced at over 5,000 fish farms concentrated mainly in the south west, but with sites in all 36 states of the country.

Much interest was sparked from the Nigerian example presented of growth in peri-urban fish farming with a video being shown as well as a presentation. This approach has spread widely and helped many Nigerians develop profitable, small to medium peri-urban fish farms and hatcheries consisting of concrete tanks built within their compounds, where problems of poaching and land tenureship are minimized. Other innovations have also occurred in Nigeria with development of "Fish Farm Estates" which were developed with cooperative management of complexes of concrete tanks, which are managed by technicians; in these estates, the owners of the tanks are often government workers and others, some of who received credit for start up activities.

With Nigeria's population at over 150 million, demand for fish is very high at over 1.8 million MT per annum, which is not fully met with supply sourced from domestic capture fisheries of 0.6m MT, aquaculture at some 0.15m MT and imports of some 0.7m MT.

With increasing demand for fish throughout Africa and the dwindling capture fisheries in most countries, aquaculture development offers an alternative to sustaining the supply of fish to markets. Trends indicate limited increased investment in fish hatcheries and fish feed mills by the private sector. In the past, governments had made significant investment in fingerling production "stations"; however most of these did not achieve significant fingerling supply with many now being abandoned or highly subsidized with little or poor quality output. A few in Nigeria have been successfully divested to the private sector and this should be considered in other countries.

Productive and cost effective hatcheries are essential to establishing a sustainable aquaculture industry as has been clearly shown in several Anglophone countries. Participants at the seminar underlined the many opportunities for investors to build aquaculture infrastructure including hatcheries and feed mills, and create employment. The industry has grown at some 20% or more per year in Nigeria since 2000 and this reflects a world trend.

Cage farming of fish is well established in Zimbabwe despite its political instabilities, where "Lake Harvest" serves as an example of the largest fish farm in Sub Saharan Africa. A video was shown highlighting the company's production, marketing and considerable benefits to its now over 300 full time staff. This cage production system of raising fish is now also establishing in Ghana and Uganda, where low volume, high density cages are being used to raise tilapias. Efforts are being made to help the fishermen of Lake Victoria enter into raising fish in cages. Many of these fishermen have lost their jobs due to the collapse of the Nile Perch fishery and now some are starting to farm tilapia in cages. Catfish hatchery producers in Uganda have always found a market for their fingerlings among the fishermen who use the lively catfish juveniles as bait to fish for nile perch.

Prior to Session 3 Mr. Hachim El Ayoubi Executive Secretary of COMHAFAT gave an overview presentation on the activities and objectives of the organization www.omhafat.org

Session 3: Value Chain Development and Commercial input supply for Aquaculture

Presenters
Blessing Mapfumo, international marketing organization& former fish farmer, INFOSA Namibia blessing@infosa.org
Atunde Atanda, Deputy Director Federal Fisheries, also private fish farmer, Nigeria tundeatanda@yahoo.co.uk
Watson Pasipimire, Fish Farm and Hatchery Manager, Lake Harvest, Zimbabwe watson@lakeharvest.com
Gabriel Koko, NGO & Commercial Aquaculture Suppliers Guide compiler, Fish For Africa, Ghana gabkoko1@fishforafrica.org

Several aquaculture commercial suppliers guides were presented at the conference from specific countries (Uganda, Nigeria) as well as the relatively new East, West and Southern African regional guides from SARNISSA. These reflect the emergence of a value chain supported by investors and entrepreneurs at all levels from the supply side of equipment and services to production with infrastructure and feeds. Further downstream the processors and wholesale and retail marketers play an important role. This broad value chain has greatly diversified livelihoods, with it is estimated some 1.5 jobs created for each ton of fish produced. Lake Harvest in Zimbabwe and Tropo Farms in Ghana being examples of commercial producers providing significant employment and benefits to now hundreds of staff in both direct and indirect employment post-harvest processing and value chain through to the final consumers.
In some countries specialized groups or companies are now equipped (mechanically or manually) to construct fish farms and ponds.

Gear and feed suppliers are also increasing in number with most equipment being imported, however increasingly African entrepreneurs are finding niche markets to manufacture and sell locally produced equipment at competitive prices eg cage manufacture in Nigeria, demand feeders and hapas in Uganda, with Kenya becoming the first sub Saharan African country to have a franchised Aquashop business selling aquaculture equipment and inputs in six retail outlets in western Kenya following a commercial model developed successfully in the veterinary livestock sector. Participants were particularly vociferous about the growing number of aquaculture consultants, many of whom are poorly qualified and spreading misinformation and poor advice. Vetting of consultants is presently under discussion in several countries and is in fact being considered by the Fisheries Society of Nigeria (FISON) as a certification process.

Market information is increasingly available with the spectacular increase in cell phone and internet use which in terms of aquaculture market chains has brought “the village” to the towns and cities and considerably shortened the market chain. There has been a great increase in demand for fish in national and regional markets, which are replacing European markets that were previously targeted by the likes of Lake Harvest and SON Fish Farm in Uganda; in the past, Lake Harvest exported 80% of its production to western markets in Europe and the Americas, but now the opening of regional markets, and relatively high prices for tilapia across southern Africa, have reduced this to 10%.

Domestic fish trade is still not keeping up with demand however growth in the Nigerian fish farming industry shows the high value of production and employment created in only the past 10 years:

Aquaculture Source	Value of sales $US	% of total value	Estimated Employment throughout Nigeria
Table Fish production	477.3 m	54	178,000
Fish Fingerling production	18.6 m	2	372
Fish Feeds	380.9 m	44	1075
Total sales	876.8 m		179,447

Table 1 Value (US$) and estimated employment in key sectors of Nigerian aquaculture sector 2009 Source FISON (Fisheries Society of Nigeria), and Atanda, Atunde (pers communication 2011)

Studies indicate Nigerian consumers appreciate farm-raised fish as they come from a known source without pollution, which is increasingly a problem in capture fisheries.

Early on, many fish farmers bought fish fingerlings caught in the wild, but now the trend is only to purchase quality, fast growing fingerlings from a well-known fish hatchery. Several hatcheries in Nigeria now produce more than 0.5 m catfish fingerlings each month. The major fish hatcheries in Nigeria have quality brood fish stocks such as the Dutch and Scottish varieties of *Clarias*, which exhibit high survival, rapid growth and low feed conversion ratios. Tilapia production has also been greatly increased in Zimbabwe, Ghana and Uganda on four specific farms where millions of sex-reversed fingerlings are produced monthly.

Expansion of the value chain is demonstrated in the growing numbers of suppliers as shown in several Aquaculture Buyer's Guides in Uganda and Nigeria. SARNISSA has also expanded these into regional buyer's guides for west, east and southern Africa. These are helping investors and existing farmers locate suppliers and they are increasing competition and quality, which is helping moderate prices. Participants heard of national Fish Farmers Associations such as RENAPIB in Benin and the Walimi Cooperative in Uganda who are now actively providing marketing support services to their members in fish marketing and fingerling sales, acting as bridges between producers and suppliers.

The recently created EAC (East African Community) Trade Agreement has significantly improved the movements of goods across borders, an example being the movement of fish (both live fingerlings and market fish) between Kenyan and Ugandan markets, also into Rwanda and Sudan. This is an example of how regional trade agreements can open up market chains between countries, thus benefiting aquaculture development. Nevertheless, issues of concern include effective regulation and monitoring of aquatic animals movements for disease and quality control for food safety.

Session 4: Aquatic Animal Feed Production – Fish, Shrimp and FW Prawn

Presenters:

Felix Gbolade – as above
Guillaume Gaudin - as above
Judith Makombu– as above

The conference dealt with issues concerning fish and shrimp feeds as the greatest cost in production at some 70% of total operating costs. For certain participants quality commercial feed production in country was the key sector which needed to be developed for aquaculture to take off as a viable business. Many producers, in trying to save money, have established small-scale fish feed production at their farms. This has cost them high investments in generators, special equipment and additional labour costs. The trend in most countries is to encourage small-scale fish farmers to focus on production and to purchase fish feeds and seed from well-known sources. The participants discussed how scale of production should dictate whether or not farmers should use "on farm produced feeds" or purchase commercially produced fish feeds. It was agreed that for smaller scale farmers, on farm feed production was an economically viable approach if carried out correctly. However, at a certain level of production it becomes more economical and resource effective to purchase commercially formulated feeds. There were considerable enquiries and interest for information on small scale feed formulations and methods of calculation.

Specialized fish feed mills are growing in number in Nigeria, Uganda and Kenya. Industrial production of fish rations now includes extruded (floating) pelleted feeds and this represents a high initial start up investment. Nigeria now has four specialized feed mills, which only produce pelleted, floating fish feeds. Each of these companies have expanded sales networks across the country and the feed industry is becoming a significant employer as indicated in Table 1. Nevertheless, some 12 brands of fish feeds are still imported to Nigeria, and feed from at least four countries is supplying Ghana's growing cage culture on the Volta Lake to respond to the high demand. Participants stated the need to establish in-country manufacture of floating (extruded) fish feeds, especially for application in cage fish farming.

Figure 4 An Extruder: Sigma Feeds Nairobi Kenya, producing floating feeds for the Kenyan aquaculture industry now opening up opportunities for commercial cage culture across the country

In order to maximize growth, many Nigerian and Ugandan Clarias farmers use imported, finely graded 40-50% protein fish feeds during the first 1.5-2 months of production, then switch over to locally produced, high quality, less costly fish feeds to top up their production. With such a system, some of the better fish farmers achieve production to market size (0.5-0.7 kg) in only four months, affording them 2.5-3 production cycles each year for Clarias. Whilst there are several

successful examples of fish-pig livestock integrated tilapia commercial farms in Zambia which achieve impressive growth rates from fertilised green water ponds which are then supplemented with a cheaper 17% protein pelletized feed. In contrast, the Namibian Government has set up its own fish feeds mill in cooperation with Spanish and Cuban government assistance, which raises the question of who should take up the mantle of developing the successful manufacture of formulated fish feeds, the private sector or government?

Session 5: Field Visits: Day 2 Afternoon

The seminar participants visited one private fish farm and a government fish station in Libreville. The farmer visited also raised pigs, the waste of which was used to fertilize ponds. All ponds were dug in the water table, which provided shallow, weed infested ponds with low fish production. A visit was also made to the Peyrie Government Fish Station, which is located in the centre of Libreville. This facility included a catfish hatchery, financed by the japaneese cooperation (OFCF) and a series of ponds used for training and demonstration. The offices of several projects were based at this station. Both sites visited suffered from limited water supply, which has obvious implications in terms of production.

Session 6: Research, Training and Extension

Presenters:

Mutambwe Shango Professor, Researcher, ERAIFT/UNIKIN RDC mutambwe@yahoo.fr
Ouphouet Konan Amede Fish Farming Consultant Cote D'Ivoire ouphouetaboua@yahoo.fr

Participants described research activities which were being carried out in a number of countries. Considerable on farm/station research was carried out during the colonial period particularly in the francophone countries, much of which although well documented, has not been accessed, and remains in the vaults of institutes libraries and government departments to this day. Current research is ongoing in Cote d'Ivoire, Nigeria, Ghana, Cameroon, Namibia, Mauritania and others, with DRC being active in researching and developing and completing the breeding and ongrowing cycles of potentially new promising species for aquaculture. It was good to hear participants describe examples of action research linked to private farms, however overall this remains extremely limited with much need for improvement in this area. Important on farm private sector research in marine (*Penaeus monodon / P. notialis*) and fresh water (*Macrobrachium vollenhoferi*), small-scale shrimp farming is ongoing in Cameroon which illustrates under the right conditions and incentives private sector companies can be effective in developing economically new production systems. Similar works are ongoing in Nigeria at NIOMR (Nigerian Institute for Oceanography and Marine Research) and NIFFR (Nigerian Institute for Fresh Water Fisheries Research). Participants welcomed news on farming of molluscs in Mauritania. APDRA (Association des Pisciculteurs pour le Developpement Rural en Afrique) a francophone international NGO, were particularly commended for their success, sustainability and long term approach in small-scale, low input aquaculture development, in Cote d'Ivoire, Guinée Conakry, Cameroon, and Mozambique, etc.

Producers requested that publications and outputs from researchers need to be made more accessible to the many different stakeholders involved and also in a format and language that is clearly understood. They also added that research agendas and topics should be producer driven and not continuously repeated and replicated in different countries unbeknown to each other.

A particular plea or request was made by producers for the research community in each country to produce specific holistic models of individual production systems indicating their economic, social and markets based suitability for particular regional areas.

Training is being carried out in most countries but was considered by most of the participants as being inadequate and limited in its implementation, application and effectiveness. This has unfortunately, been the situation for many years in SS Africa and calls were made for improvement. The conference participants particularly underlined those government fisheries departments needed to re-evaluate the skills and capacities of their staff in order to better address the needs for information dissemination and training of the up and coming commercial, private sector aquaculture sector. Examples were given of the many other skills required in aquaculture to produce fish farm managers and employees.

Participants noted that graduates were not always needed, but rather multi-talented individuals with skills not just in technical aquaculture, rather also in communications, construction, personnel management, basic business management and increasingly information technology as with use of computers. It was recommended that training should be much more hands-on and that staff could best be trained by actually working at a private sector fish farm and/or hatchery for several weeks or more if possible. This being far more effective than the copious "study tours" carried out ad infinitum annually to China, Thailand etc where African Fisheries Department officials undergo a continual stream of on farm (off bus on bus) visits and lecture based training which unfortunately has few practical hands on components. Examples of such on farm practical training are now to be found available at the Egyptian Aquaculture Center and the commercial Clarias hatchery of Royal Fish Benin. The emergence of private sector extension support to aquaculture in Nigeria, Ghana, Kenya, Uganda and elsewhere takes precedent from the veterinary services and is beginning to raise the level and quality of services delivering technical advice and information; again competition driving up standards and offering alternatives to the previous monopoly of government extension. However this is an area where effective monitoring and regulation are required in order to ensure delivery of quality services.

Session 7: Institutions

Presenters

Atunde Atanda, as above
Martial Kouderin Chairman RENAPIB National Fish Farmers Association Benin renapib@yahoo.fr

Development of aquaculture in the region is dependent on a wide range of institutions at many levels from international organizations such as the African Union, FAO, NEPAD, COMHAFAT, African Development Bank, through national policy level Fisheries Departments, Banks, national and regional level fish farmers associations, District assembly administration to village level credit and lending unions. In essence it is the interaction (or lack of it) of these range of organizations which has in the past and will in the future affect the development of aquaculture in the sub Saharan African region.

However it should be stated that in the last ten years of commercial aquaculture growth it has been primarily the private sector which has independently led this increase in production whether it is the spectacular development of fish farming in Nigeria or the large scale vertically integrated export orientated shrimp sector in Mozambique and Madagascar or the growing cage culture based tilapia farms of Zimbabwe, Ghana and Uganda. Atunde Atanda presented a slightly different scenario for Nigeria where essentially it has been entrepreneurial peri-urban Nigerians who have

developed a vibrant market led catfish industry with the help and support of several international private sectors particularly the dutch.

Over the last 10 years the government Fisheries Dept in Nigeria have gradually reduced their direct involvement by actually selling off to the private sector a number of their Federal fish research stations and hatcheries which were never economically viable, overstaffed and always dependent on a external annual budget which was unreliable and thus adversely affected the efficient running of the station. There are positive examples of government institutional led policies in SSA aquaculture. The past Fisheries Minister for Namibia was very proactive in developing the obvious potential for his country's shellfish industry, with now a commercial oyster hatchery now supplying spat for the growing on growers who are developing lucrative export markets in South Africa and further afield in south Asia.

There was much discussion on the Ghanaian government's ban on imported tilapia particularly from China, with opinions divided on whether this was a positive policy mechanism, restricting free trade? or protecting their nascent (young) but growing commercial tilapia industry. Much was also made by private sector participants of the bureaucracy and the interminable process required for new producers or investors to legally set up new fish or shrimp farms. The message to government present was "3 months not 3 years", if not many potential investors will and already are going elsewhere. This led on in the discussions that Fisheries Departments should re-evaluate and re-assess the skill sets, experience and capacities of their individual staff. Do they have the necessary range of skills to support this growing commercial sector in terms of business planning, cost benefit analyses, environmental impact assessment, commercial fish farm and staff management, commercial feed production, aquaculture farm construction, monosex tilapia and clarias hatchery production, aquatic animal diseases and their on farm treatment?. If not then it should be a priority for the respective governments to implement individual training programs to address this. If not the Fisheries Departments will get left behind. Several questions were addressed to and about NEPAD and particularly what has been its progress and also concrete outputs in the development of African aquaculture (especially to benefit individual producers and the market chain) since the "Fish For All Summit" in Abuja, Nigeria, in 2005. Unfortunately although invited, a representative from NEPAD was unable to attend but it is hoped that in subsequent similar such workshops they will be present.

Fish Farmers Associations were also widely discussed with Martial Kouderin of RENAPIB, the Chairman of the national Beninois fish farmers association giving an informative presentation on its activities. He described how the Association allowed Beninois fish farmer members a good representation at national level. For paying their annual dues member received a package of benefits including advice and support on a network of buyers and sellers for both their market fish and also fingerling sales, with the association acting as a"broker" for easing marketing of their products. Similar to RENAPIB the successful example of Walimi National Fish Farmers Cooperative in Uganda was also quoted. They like RENAPIB also hold an annual Fish Farmers Symposium in Kampala which is now after three years self-supporting. Fish farmers and others quite willingly pay a fee for attending, there is an associated Trade and Equipment Suppliers Fair, and a series of presentations given by both the research sector and also private producers. It should be noted this symposium is not held in an expensive Kamapala hotel, but in a perfectly adequate exhibition hall on the outskirts of Kampala and to re-iterate the symposium actually pays for itself with this year commercial exhibitors coming from other countries: South Africa, Kenya and Namibia. It was also noted that there were far more examples across SS Africa where Fish Farmers Associations had not worked and disbanded after only a few years often following

government and outside funding had been sourced to initiate them . There is therefore the need to study closely the business, administrative and social infrastructure of the Beninois and Ugandan associations which have been self-financing, sustainable and ultimatimately successful in benefitting their members.

Grass roots district to village level institutions were also discussed particularly in relation to the provision of credit. It was noted that this continued to restrict small to mid-scale producers or new entrants to the industry. Examples were given where fish farmers associations had become involved in the provision of loans in Kenya and Ghana with mixed results. It was also noted that women's groups consistently had higher levels of repayment and ultimately self-sustainability.

Session 8: Action Agenda Including Recommendations

Action Agenda Including Constraints, Indicators of progress, Recommendations, and Methods to attract investors.

On the third day of the conference the participants were divided into three groups: a) Producers b) Researchers and c) Institutions, to discuss constraints affecting growth in aquaculture development. These groups also elaborated indicators of progress and recommendations as well as methods to attract investors to the sub-sector. The discussions were highly participatory with surprisingly effective interaction and communications between the Anglophone and francophone speakers. This bodes well for continued exchanges and similar bilingual workshops in the future. SARNISSA has greatly contributed to this cross over and is to be commended for this technical collaboration, which is essential for African aquaculture to develop.

List of Constraints, Recommendations and Indicators for Aquaculture Development as noted by three Groups: Producers, Researchers and Institutions.

CONSTRAINTS

1.1 Producers:

Constraints	Solutions	Comments
1. Low level of investment	Viable projects can attract investors	
2. Unclear policies	Well defined, realistic, clearly budgeted National Aquaculture Strategy	
3. Ineffective use of qualified professionals	Get the right people for the job	
4. Limited training capacity	Establish Centre of Excellence for training with qualified staff having practical experience	Training should be done in an area having a number of fish farmers in order to bring in more lessons learned from producers. In such a setting it is possible for trainees to actually work on private fish farms as part of hands on training. Practical knowledge of the actual construction and management of fish ponds including feeding, sampling and harvesting are often needed.
5. Poor communications of technical information	Provide clear technical information through different approaches in media.	Make the most effective use of new technology ie mobile phones and internet – break monopoly of government extension services. Internet training workshops for farmers as already carried out by sarnissa in Ghana, Kenya and Uganda.

Constraints	Solutions	Comments
6. Little access to credit	Create National. Aquaculture Fund to guarantee loans through cooperatives	National committee to oversee including equal representation from all sectors eg govt , producers, hatchery, market, commercial input suppliers, NGO, research and teaching etc.
7. Lack of qualified groups to elaborate feasibility studies	Need for inclusion of comprehensive feasibility studies	Training at different levels within the education and research and commercial sectors. Provision of easily accessible examples of Aquaculture Farm Feasibility Studies, Business Plans, Cost Benefit Analyses and Environmental Impact Assessments on online websites and networks ie SARNISSA.
8. Excessive taxation of producers	Exoneration of taxes on inputs for aquaculture.	Tax free period for new entrants eg 9 years income tax holiday for commercial Clarias hatchery Royal Fish Benin. Abolish tax and handling costs for imported fish feeds.
9. Poor feeder roads	Government should develop such infrastructure.	Presently new larger scale commercial farms are having to integrate feeder road costs into their total budgets Eg West African Fish and Tropo Farms in Ghana. However possibility of governments providing subsidies per mile for newly constructed aquaculture feeder roads.
10. New Business start up time for aquaculture	One Stop Shop for all administrative needs to start up a new business.	"One stop shop and help centre " for all forms, documents, permits and administrative requirements for starting up a new aquaculture farm located in national capital, whilst also making downloadable on special website which incorporates national fish farming business and site registration.
11. Difficulty in finding quality inputs	Deal with well-known hatcheries and other suppliers and south-south tech support.	Example of Aquashops now operational in Kenya – 6 franchised retail outlets selling aquaculture equipment, feeds and inputs in Western Kenya
12. Need to sensitize decision makers for improved food security through aquaculture	Popularize fish farming through annual "best fish farmer of the year" award and popular TV and radio programmes as well as newsletters, etc.	Requires organisation perhaps best by National Aquaculture Association. However please note in past in some countries in the past awards have been purely political not based on production or innovation

1.2 Researchers

Constraints	Solutions	Comments
1. Lack of specialists	Train at all levels of competences- fisheries officers, technicians; specialized training for fish farm managers; make training practical, hands on and on the job; carry out specialized training in fish diseases, fish disease treatments , nutrition and biology;	
2. Lack of Training Centers	Create specialized training institutes;	Encourage practical training at private sector fish farms. Suggestion could be for govt or other donors to provide one or more commercial farms with an amount each year to have trainees working on farm for 2-3 week periods.
3. Lack of Research Laboratories	Invest in new research labs;	Designate 4-5 laboratories across the continent as key centres for: nutrition, aquatic animal health, breeding genetics hatchery, environment, production systems etc. These could be part of Aquaculture Centres of Excellence.
4. Lack of researchers	Recruit and train more researchers	Perhaps ensure researchers are output orientated – relating research to increasing aquaculture production.
5. Limited use of research by producers	Establish research programme with producers – Symposium, RENAPIB Beninois Fish Farmers Association Annual fish farmers conference.	Increase links between researchers and producers through online networks eg SARNISSA, also Tilapia Yahoo and WIOMSA for mariculture. Hold regular annual aquaculture conferences where producers and researchers can get together to exchange and collaborate eg Ugandan Fish Farmers
6. Limited financial support to research	Create laboratories of excellence in applied, producer-driven research.	As mentioned already above – perhaps these could be partially financed and sponsored by larger aquaculture producers and feed companies who would get free use eg UNIMA shrimp producers Mozambique, Lake Harvest, Tropo Farms etc.
7. Lack of communications of results in research to producers	Improved extension support services and their privatization ?; mobilisation of researchers	Recommended means of doing this. - Through online networks like sarnissa – also their own Univ and Inst websites – Researchers need to address how they get their results to non-internet users – perhaps through national Fisheries Dept – they (all Univs and research insts in one country) can compile 6 monthly newsletter which can be disseminated out through Fisheries Dept offices at national , regional and district level – not expensive just requires one national university co-ordinator eg for RDC Prof Shango Newsletter must be in format and language that is understandable to all producers

1.3 Institutions

Constraints	Solutions	Comments
1. Lack of political stability for policies in aquaculture	Clarification of policies with elaboration of National Aquaculture Strategy	– Strategy and National aquaculture plan must be realistic, specific and clear in its objectives – must be associated with specific costs and budgets for each activity – must clearly define roles of each sector: govt, private, research, academic , markets, NGOs etc also must be in format easily understandable by all – must be readily accessible to all – at Fisheries Depts offices also on line – Neighbouring countries to collaborate over mutually beneficial components to each other's plans
2. Limited access to regional fish markets	Increase availability of fish for markets; increase aquaculture production –	Example of EAC and benefits already to Kenya , Uganda etc . Role here for the likes of NEPAD and INFOSA? To negociate concessions for cross border movements of aquatic products between neigbouring countries. Also at national govt policy level to protect national and regional markets by enforcing embargo on outside tilapia imports eg current example Ghana with Chinese tilapia.
3. Unclear Land Tenure / ownership	Clarify legal land tenure policies; survey lands to verify ownership	This is very complex and varies between countries – Perhaps water and adjacent riparian land rights need to be clear in constitution for encouraging dev of cage culture eg Volta Lake Ghana. For land ownership ?? Clear in case of peri urban systems in Nigeria – in rural cases ? Perhaps under Fish Farm Registration system each new farm registering has to provide verifiable land ownership or rental documentation in order to register.
4. Unreasonable taxes on import of aquaculture inputs	Exoneration of taxes –	Need to encourage govts and fisheries depts to be more proactive in bringing in tax concessions. Perhaps incentive could be that the likes of WorldBank DFID Africa Dev Bank, NEPAD etc will offer specific funding for Fisheries Depts of those countries which implement tax exoneration for imported aquaculture feeds and inputs – This "carrot and stick approach" can also be used by the above international donors to make national govts implement other beneficial actions eg making govt fish stations self financing – if not sell to private sector etc
5. Poor rural infrastructure-roads, etc.	Improved government support to build feeder roads in rural areas.	Govt could provide subsidy per km for new fish farmers wishing to build feeder roads to new sites - dependent on feasibilities studies .

2. INDICATORS OF PROGRESS IN AQUACULTURE DEVELOPMENT

Through group discussions, participants proposed indicators to measure progress in aquaculture development. A baseline study would be required to establish the present situation as the starting point. Thus bench marks were proposed to quantify progress on the road map of aquaculture development as follows:

Category	Indicator(s)	Comments
2.1 Producers	• increased annual aquaculture production –	Governments or others? Private sector? need to provide accurate, trustworthy figures, obtained with a clear, transparent methodology of data collection
	• increased profits to farmers –	Producers need to trust the collectors of such data in order for them to provide accurate information. However it is unrealistic to expect to obtain accurate figures on fish farmers profits or losses – also some are not actually aware if they are making a profit or loss
	• affiliation of fish farmers to organized associations –	This can be a positive indicator but depends on how active and beneficial actual fish farmers association actually is - good examples RENAPIB Benin, Walimi Uganda – but plenty more examples of bad ones
	• increased employment in aquaculture farms –	This is a realistic measurable indicator and is already being collected by the likes of FISON in Nigeria to monitor its own industry – caution should be taken since not necessarily an indicator of progress – ie govt aquaculture stations employing 40 people to produce very little…. Should be used alongside national production to show ratio of kgs produced to nos of persons employed in the industry - then compare countries
	• increase in contribution of aquaculture to the GNP	- Measured on value of production? This ok but again problems collecting national aquaculture production statistics – this needs to be addressed - built into national Fish Farm registration system making it compulsory for registered farms to report annual production figures - if not they lose their registration. .
2.2 Researchers	• increased availability of aquaculture products in the market –	Good realistic measurable indicator - requires regular markets monitoring by Fisheries Dept or again perhaps outside private sector can provide this at a price? - then making results easily accessible to all – Kenyan Fisheries Dept have mobile text service to all which provides up to date data on prices at landing stages and Nairobi fish markets
	• increased availability of aquaculture inputs and equipment in the market –	A potentially good indicator and SARNISSA now have 3 SS African regional aquaculture trade directories now downloadable off the internet. Some countries have far more companies and services listed than others eg South Africa, Uganda, Kenya, Ghana compared to the likes of Malawi, Cote D'Ivoire etc
	• increased number of research laboratories and commercial fish farms –	Increased nos of research labs is not necessarily an indicator of increased aquaculture dev or production - it depends what the labs and associated researchers are actually doing – An interesting and valuable statistic at national level would be the ratio of aquaculture researchers to the kgs aquaculture production in the country ?? Far more useful

Category	Indicator(s)	Comments
2.2 Researchers	• diversification of aquaculture products to the market –	Value addition….Processing…..use of ice…..smoking fish……creating consumer recognized brands.
	• increase in sustainable fish farms	This is returning to the issue of accurately measuring the nos of "active""real " fish farms in each country. These must be actually producing something on an annual basis - if not then they are removed from the national fish farms register
2.3 Institutions	• increase in number of active fish farmers and functional commercial farms with recorded annual production,	
	• increase in quantity of fish available in the markets,	
	• increase in aquaculture production,	
	• increase in number of new jobs created at fish farms,	
	• establishment of national fish farmers association, which offers real benefits to members, -	
	• increase in number of trained farm managers	This a realistic good indicator however firstly we need an SS African training course and certification for fish farm managers to be put in place ? Suggestion to get started - form Working Group including existing large scale commercial fish farm managers eg Wilson Pasimpimire Lake Harvest, Abudala Napuru SON FF, Enos Were Dominion Farms, Maurice Danjinou Royal Fish Benin Hatchery + at least one large scale shrimp farm manager ie UNIMA, 2 fish farmers assocs representatives Ben Kiddu Walimi Assoc Uganda, and Martial Kouderin RENAPIB Benin + 2-3 representatives from research and academic community for practical curriculum development eg Tom Hecht RSA, Charles Ngugi Kenya. Such working group to develop way forward for Farm managers training course - Funding available through COMHAFAT, NEPAD? for initial working group?
	• increased contribution of aquaculture to GDP, -	
	• increased availability of credit to fish farmers, -	Bankers and lending agencies need to be sensitized to the potentials in aquaculture.
	• increase in investment in aquaculture	

3. RECOMMENDATIONS MADE BY EACH GROUP

Category	Recommendations made	Comments
3.1 Producers	• All countries should elaborate and apply a National Aquaculture Strategy,	The key here is that this be applied and respected.
	• The private sector should have the leading role in developing aquaculture,	Aquaculture development can only occur if market driven and carried out by the private sector. Government should not invest in fish fingerling or table fish production as governments are ineffective at production activities. Let the private sector do this and limit government intervention to regulations and monitoring as well as some limited training. If well organized, a government centre could manage a national brood stock facility where private farmers / producers could access well-maintained, pure genetic brood stock lines. This requires good management and should be self-supported and managed like a business.
	• Government should encourage organisation of fish farmers into associations,	Aquaculture producers must be motivated to do this themselves to assure sustainability of such a group.
	• Assistance from NGO's and International organisations should be well utilised,	There is need to improving access to information about funding support from international and other NGOs – Example of this is WorldFish Center (WFC) African Aquaculture Funding Guide – over 100 pages on funding opportunities also they have similar scholarship and academic/research funding guide. These are freely available/downloadable to all on WFC website
	• Success stories should be replicated in each country, -	Example of this are case studies of successful aquaculture production systems and businesses , fish farmers associations etc available on SARNISSA website eg Lake Harvest Zimbabwe – Tilapia , Royal Fish Benin – Clarias, Tanzania Womens Coop – Seaweeds, Namibia – oyster cultivation
	• Countries should streamline legal and administrative requirements to better attract investors,	Eg as above suggestion for "one stop shops" which have all necessary forms and documentation for starting up an aquaculture businesss
	• Governments should publicize and apply the norms established in the Aquaculture Strategy,	As mentioned above National Aquaculture Plans and Strategy must be easily accessible for all – also in a format which is easily understandable for all
	• Governments should standardize registration of fish farms and hatcheries,	
	• Governments should establish an Aquaculture Fund in a transparent manner to support aquaculture development.	Well-defined criteria are needed for this and it should be established in a transparent manner.

Category	Recommendations made	Comments
3.1 Producers	• Governments should encourage establishment of fish feed mills.	These should be private sector driven, unless govt example in Namibia proves to be economically viable
3.2 Researchers	• carry out an inventory of research laboratories	SARNISSA has this on their website.
	• establish a programme of research in collaboration with producers in agreement with the national aquaculture strategy	This could be accomplished through a farmers association.
	• identify sources of financial support for research	Farmer-driven research could attract donors.
	• establish research centres of excellence	One such centre could be beneficial in a country but it should be self-supporting, through training programmes and brood stock management with sales.
	• improve communication in extension for results of research	Technical newsletters and other documentation can be distributed to producers through meetings and mailing lists.
	• increase mobility of researchers to the field to work more closely with producers	Many researchers are not connected to the field and they should be communicating regularly with producers who are taking risks and investing their money to produce. In Western and Asian countries, some well-organized producer groups actually fund farmer-driven research. This is also prominent among companies, who are stakeholders in the aquaculture industry. Conceptu Azul is an example of this in Cameroon and Mozambique.
3.3 Institutions	• each country should have a National Aquaculture Strategy elaborated in a participatory manner with all stakeholders	
	• the private sector should play the lead role in developing aquaculture	Private sector producers should be the key players involved in decisions about their industry in a given country.
	• governments should encourage aquaculture producers to form associations	Producers should be the instigators of their own associations in order to ensure sustainability.
	• contributions of NGO's and International Organisations should be well-utilised.	The participatory approach should be used involving all stakeholders.
	• successful aquaculture activities should be publicized and replicated	Media and newsletters can contribute much to sensitisation of decision makers.
	• governments should attract more investors through programmes set up to reduce red tape as with "one stop shops"	There are examples of one stop shops in Africa which have proven to be very effective as in Kenya, Uganda and Nigeria.

Category	Recommendations made	Comments
3.3 Institutions	• Aquaculture development strategies should be well publicised and widely distributed.	If established in a participatory, inclusive manner all stakeholders will have ownership in the National Aquaculture Strategy.
	• Governments should establish standards for aquaculture installations	This could include environmental considerations such as water quality standards. However as stated above the govt Fisheries Depts must have the capacity and expertise in their staff to do this – If not then they need to provide their staff with the training and education to do so.
	• Governments should establish an Aquaculture Development Fund to encourage investors	Private aquaculture suppliers could perhaps sponsor this partially – private public partnerships where at all possible should be encouraged.
	• Governments should encourage establishment of feed mills for formulated fish feeds.	This should be private sector driven. As above depending on outcome of Namibian experience

4. ATTRACTING INVESTORS

Category	Indicator
4.1 **Producers**	• Confirmed profitability of aquaculture enterprises
	• Guaranteed market prices for aquaculture products
	• Availability of qualified, competent aquaculture managers
	• Attract investors through proven, positive, profitable management of aquaculture farms
	• Unconstraining regulations on aquaculture farms and their initial setting up
	• Availability of improved infrastructure – feeder roads, land, water, etc.
Category	**Indicator**
4.2 Researchers	• Encourage aquaculture producers to form associations
	• Producers should operate with clear business plans to show investors
	• Markets for aquaculture products should be clearly defined
	• Brands or labels for aquaculture products should be established for aquaculture producers for consumers to recognize
	• Clarify all legal issues concerning establishment of aquaculture farms.
4.3 Institutions	• Political stability for investment in aquaculture farms
	• Developing political will to support aquaculture industry
	• Develop regional markets for aquaculture products
	•For all aquaculture inputs and equipment establish exoneration from import taxes
	• Improve rural infrastructure such as feeder roads and other infrastructure.

9. CONCLUSIONS

This seminar was considered a resounding success in bringing together mainly private sector aquaculture producers to discuss their farms and how they reached where they are today, often through many challenges and lessons learned. This type of exchange is unique because it gathered the private sector and the government officials for the first time of the member countries of ATLAFCO. Thus it is hoped that the example of this seminar should be replicated in the future.

"With the recommendations of the seminar, participants left the meeting with enthusiasm to bring new energy to aquaculture development. This has been especially needed in the countries, which have lagged behind their neighbours. Much infrastructure has been aggressively put in place in some member countries, such as, Nigeria, Ghana, Benin, including modern fish hatcheries and feed mills with extruders for manufacture of floating fish feeds, plus feed distribution networks. Another key element in aquaculture management in those countries lies in good pond construction and use of modern fish transport methods, which provide high survival of fingerlings and other fish being transported.

The venue of future such seminars should consider modest hotels and meeting halls as has been initiated in Uganda with great effect. There, farmers willingly pay to participate in such informative conferences and are pleased to see costs kept to a minimum. Aquaculture producers are taking many risks with their investments and they are pleased to see such meetings managed at low cost. This shift in emphasis is also discouraging un-necessary payment of sitting fees to government officials who attend such meetings. Also it encourages the private sector to begin to arrange, sponsor and run their own regional meetings or workshops.

Finally, concrete outputs are coming about as a result of this meeting with exchange of technical information and cross border consultancies already being planned with private sector experts in the meeting already having firm invitations to travel to other countries to help develop aquaculture. Again this confirms the benefits of the seminar, which can only grow now that the some 100 participants from 25 African countries know each other and plan to follow up with regular exchanges.

13. Annexe 1: List of participants

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