Regional Study
on
Economic Opportunities in Shrimp Farming in West Africa:
an initial review
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Outline of presentation

- Background and purpose
- Global markets and West African shrimp
- Technical options and feasibility
- Environmental sustainability
- Marketability
- Investor attractiveness
- Community involvement
- Conclusions and recommendations
Background and purpose
Regional study - background and purpose

• Study initiated by SWAC in May 2004
  – Technical support from the World Bank and with financial support from the Japanese government

• Geographical scope
  – West Africa, from Senegal to Cameroon, but studies focus on Senegal, Gambia, Guinea Bissau, Guinea, Cote D’Ivoire, Nigeria and Ghana

• Study purpose
  – “to conduct a market-led study to identify the opportunities and challenges of sustainable shrimp farming in the region and to use these findings to inform all stakeholders on the broader challenges and conditions necessary for developing sustainable businesses in West Africa through South-South private sector cooperation”.

• SWAC’s specific interest in this study
  – to help identify new economic opportunities for the West African private sector while promoting sustainable, equitable development.
Regional study - context

• International and regional frameworks
  – FAO Code of Conduct for Responsible Fisheries
  – New Partnership for Africa’s Development (NEPAD) on “New Directions for Fisheries and Aquaculture in Africa”, known as the “Fish for All Summit”. Participants, drawn from twenty six (26) African Union member states, Regional Economic Communities, civil societies, local institutions and international organisations adopted the Abuja Declaration on Sustainable Fisheries and Aquaculture in Africa.
  – World Bank and partners initiatives in sustainable fisheries and aquaculture

• South-south cooperation framework
  – Asian aquaculture – 90% of global production and high demand
  – Asian private and public institutions well developed
  – Potential opportunities for cooperation in shrimp farming
Regional study - content

*Regional study consists of three parts:*

1) a summary
2) five individual expert reports and
3) a synthesis document

*Five individual expert reports:*

1) Marketing and processing report by John Dallimore, TNC Partners, Germany

2) Environmental aspects and sustainable development report, by Dr. Michael Phillips, NACA, Thailand

3) Shrimp aquaculture specialist report, by Dr. Janet Brown, Stirling University, UK

4) Socio-cultural aspects report, by Pierre Failler, University of Portsmouth, UK, with the collaboration of Moustapha Deme, Djibril Balde, Asberr Mendy, Amadou Saine, Momodu Koroma (from various research centres in West Africa)

5) Investment promotion report, by Jegathesan, JJ International, Malaysia
Global markets and West African shrimp farming
Global shrimp production and market trends

- **World shrimp production growing**
  - Risen by over 1 million mt in the last 10 years to 4,655,000Mt in 2003

- **Wild fishing capture is now stable**
  - Around 3 million mt and unlikely to increase.

- **Shrimp aquaculture production growing**
  - Provides 1,655,000 mt in 2003
  - Predictions for increased aquaculture production from major producing countries – Brazil, China, Indonesia, and Vietnam plan significant increases
  - An additional 1 million tonnes could become available in 10 years?
  - Disease issues under better control with better husbandry
  - Big increase in white shrimp production – especially in SE Asian countries – the home of black tiger shrimp (*Penaeus monodon*)
Shrimp farm-gate prices are falling

- Shrimp prices will continue to fall – probably reaching US$3.00 – US$3.50 before becoming more stable
- Many producers facing difficulties with rising feed and operation costs, against falling market prices – production prices for white shrimp species (ex-farm) need to be US$2.00-2.50/kg for profitability in competitive market
- Producers in SE Asia and other major producing countries only able to remain competitive by being highly efficient in management and inputs (feed, fuel, pumping etc)

Expanding markets with high standards

- Demand is increasing but so are market access difficulties
- Alternative marketing strategies (Fair Trade labels; organic; size differentiation; product development) could show better returns
- Strong indications for niche market demand e.g. “shrimp from Madagascar” which now attracts significantly higher prices
- With prices falling, emerging markets are being found in the booming economies of SE Asia and China
- Food safety standards more stringent – from “farm to fork” – requiring increased investment in food safety and quality standards
Technical options and feasibility
Potential marine shrimp species

- **P. monodon**: exotic species of significance to aquaculture with existing technology available and good market potential.

- **P. notialis**: Local West African species which form the bulk of fishery catches, but there is currently no known culture technology. Market potential good, but will compete with other white shrimp products.

- **P. karathurus**: Local West African species also extensively fished and of high quality and good taste. Can grow to large sizes but no known technology available or tried for use in aquaculture though similar markets as that of **P. monodon**.

- **Parapenaeopsis atlantics**: Local West Africa species also part of trawl fishery catch - No known aquaculture development.

- **P. vannamei**: Apparently introduced and some reports of catches in Guinea and other adjoining States? Low prices and anticipated to remain so.

- Research on culture of **P. notialis** and **P. karathurus**
Potential freshwater “prawns”

- **M. rosenbergii**: Exotic species apparently available in West Africa (Senegal?) – complete culture systems available and could be utilized as a commercial fresh water prawn. Potential for polyculture production with other fish (eg tilapia) and part of subsistence and local market developments.

- **M. vollenhovenii**: Indigenous species that appears to have the technology available for aquaculture established. Is available throughout the region, though does not grow to the sizes achievable by *M. rosenbergii*. Will face similar and to a degree poorer marketing capabilities than *M. rosenbergii*, but could have potential for local in-country marketing.

- Consideration should be given to the feasibility of extensive culture of local freshwater prawns (*Macrobrachium vollenhovenii*) or semi-intensive culture of the exotic species *M. rosenbergii*. 
Shrimp farming systems

- There are many diverse shrimp farming systems worldwide – from low input extensive to high input super-intensive farms.

- Technology for shrimp farming is readily available.
Shrimp farming systems

- In the current situation in West Africa the needs for supporting infrastructure and skills for super-intensive or intensive shrimp farming would be difficult to meet.

- This leaves the systems of choice as either semi intensive or extensive. Market information indicates that prices are likely to remain highest for the largest shrimp and these systems are the most likely systems to produce large, healthy, good quality shrimp.

- West Africa represents almost the last opportunity in the world to establish low intensity farms that can also reliably produce local shrimp species at large sizes that will command high prices at no or very little environmental cost.

- One option to ensure intensity levels are kept at sustainable levels of semi-intensive or extensive culture might be to advocate the use of low input organic farming methods
Shrimp seed

- Shrimp farming requires a reliable supply of quality disease free hatchery seed

- *Penaeus monodon*, is a non-indigenous species, widely found in the wild along the west coast of Africa, probably the result of an earlier introduction.

- This resource provides the potential for development of a *P. monodon* hatchery system based on local resources, avoiding the need to introduce shrimp from other regions, and risks of import of disease.

- Advantage of *P. monodon* is that hatchery technology is readily available in Asia and eastern Africa, and sufficiently well understood that it is amenable to adaptation for aquaculture in West Africa. Two hatcheries already exist in West Africa.
Shrimp feed

• Shrimp feeds not available in the region, except through imports.

• Development of feeds based on imports of questionable sustainability, and will add costs and problems associated with customs and import procedures.

• In some countries, local fish feeds are being produced, such as in Senegal. Some research, or perhaps cooperation with an Asian business with experience in shrimp feed, may help develop locally suitable feeds, based largely on local resources.

• Use of “semi-intensive” farming systems can reduce costs of feed.

• Avoid diverting “human food fish” to shrimp feed
Shrimp disease

- Shrimp disease is one of the major risks to shrimp farming worldwide.

- No information in West Africa, but there is a good probability that the region is – so far – free of major known shrimp viral diseases.

- Lack of serious shrimp disease in Madagascar for example is one of the key factors contributing to success in this leading shrimp market in Africa.

- A major comparative advantage for shrimp farming in the West Africa region. Need to keep region free of major diseases

- Strengthen capacity for shrimp disease control and management

- Strict control on introductions of new species/new stocks of existing species.

- Regional cooperation essential
Shrimp farming in West Africa: 
*technical challenges and opportunities*

**Opportunities**
- Potential valuable commercial species which could be developed for shrimp farming
- Disease status very good due to limited shrimp farming activities, assisting the industry to by-pass the failures of other regions around the world.
- Semi-intensive farming systems could be developed

**Challenges**
- Limited local shrimp farming technology requiring financial and technical assistance
- Limited availability of shrimp feed and seed and investment necessary
- Infrastructure for production and processing facilities away from main population centres is weak
- Production costs potentially higher than other major production regions in the world. Products will therefore have to be exceptional and aimed at specific niche markets for commercially viability
Environmental sustainability
Shrimp farm sites

• Countries of West Africa from Senegal to Cameroon have many characteristics that make them environmentally suitable for shrimp farming

• Countries are also on the same latitude as shrimp producing countries in Asia growing *Penaeus monodon*, and in South America

• From Senegal to Cameroon, there are coastal land areas that (superficially at least) are physically suitable for shrimp farming in all countries. Extensive areas of flat land behind mangrove areas can be found, as well as more open coastal flats where ponds might be constructed.

• However, detailed feasibility studies at potential sites are essential to make decisions on suitability of different areas.

• Limited action to designate sites or incorporate shrimp farming within coastal zone management plans

• Need for government assistance to help in the identification and legal designation of suitable shrimp farming sites.
Mangroves and coastal wetlands

- Shrimp farming must be developed without impacts on mangrove forests.

- Mangroves are found extensively in the region, from Senegal to Cameroon, with important areas in Guinea Bissau, Guinea, the Niger delta and Cameroon.

- This region contains mangroves of the Niger Delta, which is the single most extensive mangrove system in Africa, and third worldwide after India and Indonesia.

- As the livelihoods of many people living in coastal areas of West Africa are also dependant on mangroves and other coastal resources, shrimp farming must be developed to avoid potential conflicts with other coastal habitat users.

- Apart from the rice and mangrove areas, are so-called “tannes” or the non-exploited zones that are recognized as having scope for aquaculture development, making use of areas that cannot be used for agriculture.
Other environmental characteristics

Climate
• Countries of West Africa from Senegal to Cameroon have many characteristics that make them environmentally suitable for shrimp farming

Water quality
• Coastal areas of the West African region have water suitable for farming of *Penaeus monodon*, and other shrimp species.
• Water salinity can be found within acceptable limits throughout the region, although the large delta areas are subject to wide fluctuations on salinity that have an influence on shrimp farming.
• Areas close to urban areas should be avoided due to pollution risks
• Shrimp hatcheries require full strength seawater – there are fewer sites but some island locations available

Soil
• Acid sulphate soils are common throughout the West African region, particularly near mangrove areas. Whilst suitable soils exist, careful site selection is required to properly assess soil conditions, and site farms in areas with suitable soils.
Shrimp farming in West Africa: 
*environmental challenges and opportunities*

**Opportunities**
- Environmentally suitable sites available
- Development of environmentally sustainable industry
- Learning from other regions on environmentally sustainable aquaculture approaches

**Challenges**
- Detailed feasibility studies at potential sites are essential to make decisions on suitability of different areas.
- Land ownership and integration into existing land use patterns
- Limited action to designate sites or incorporate shrimp farming within coastal zone management plans
- Need for government assistance to help in the identification and legal designation of suitable shrimp farming sites.
Marketability
Marketability of West African shrimp

Key factors:

- **Demand** - for shrimp increasing and wild shrimp fisheries in West Africa stagnant or declining
- **Quality** (including taste) - infrastructure needed to ensure good on-farm and post-harvest handling and processing. Good environments essential for image of “clean” shrimp
- **Reputation** – existing traders have created a “name” for West African shrimp
- **Product types** – frozen, with similar or better quality than wild shrimp
- **Processing skills** - experienced workforce, used to handling and controlling quality is essential. West Africa has companies able to meet and sustain these levels. Capacity building essential.
- **Hygiene Standards**: Local health and veterinary staff have some skills but, training and equipment needed to ensure meeting of international standards
Marketability of West African shrimp

Key factors:

- *Export facilities*: The region has ports for exportation of shrimp products to world markets. Infrastructure from the hinterlands and project location is limiting for exporting and servicing the project with raw materials.

- *Infrastructure and services*: Large shrimp farming projects may need to be based as self-contained units. This requires substantial investment.

- *Marketing*: Market links already created by West African fishing companies can be built on. The removal of wholesalers and other elements of the distribution chain is essential for the commercial success.
Marketability of West African shrimp

Marketing strategy:
• West African shrimp products targeted to:
  – mainly international markets for frozen shrimp
  – African markets for fresh and frozen shrimp
• Due to the current low prices in world shrimp markets, expected to continue, it is essential to carefully consider many different ways of not only producing the shrimp, but in the presentation and continuity of the products.
• This will require extensive business contacts between the buyers and traders to ensure the products satisfy their demands, and they can generate sufficient returns to the investor.

Accessing international markets for West African shrimp products
• Internal requirements for HACCP, traceability and quality assurance.
• External requirements: Veterinary inspection services with necessary capability to inspect and control products.

Alternative markets:
• Fair Trade and Organic Certification or Labelling
Shrimp farming in West Africa: 
*market challenges and opportunities*

**Opportunities**
- Declining wild catches opening opportunities for aquaculture
- Capitalising on the existing good market perceptions of its locally caught shrimp for both a “mainstream” product and a product that meets the criteria of niche (organic, fair trade) markets.
- Environmentally sound shrimp to attract high niche market prices and can present potentially high returns for the investor.
- Building on an invest in existing market links and post-harvest/processing capacity

**Challenges**
- Implementation of stringent food safety legislation for producers and processors
- Investment in high quality farm production and post-harvest management and processing procedures (eg HACCP)
- Investment in inspection and veterinary services
Investor attractiveness
Investor attractiveness

West Africa has a very favourable geographic situation, but shrimp aquaculture will develop only if West Africa closes a number of gaps—or perceived gaps—in its investment environment:

• **Legal framework** – lack of legal framework or coastal zoning schemes dedicated to aquaculture constrains investment, especially concerning questions of the right of land use

• **Infrastructure** – In many areas that are suitable for shrimp farming, communications and electricity coverage is poor or inexistent. If an investment project can only be considered as a self-contained unit, this is a comparative disadvantage due to costs.

• **Lack of technical competence** – Although trained staff can be recruited at the labour level, at the management level, qualifications and competence in the fields of aquaculture and shrimp farming are lacking in most cases. Investment projects relying too heavily on expatriate staff may be both less enticing for the investor and meet with less responsiveness in local communities.
Investor attractiveness

- **Investment environment** – West Africa, rightly or wrongly, has a reputation that investments are risky. Therefore, West Africa should be prepared to attract investment interest before it endeavours to attract investment.

- **Lack of regional co-operation** – Many aspects related to the development of a shrimp farming sector are best handled on the trans-national level for all West African countries. As there are Rules of Origin and “de facto” tariffs despite the existence of ECOWAS, foreign investors may be dissuaded from investing in West Africa.
Investor attractiveness

Two major considerations for attracting FDI into West African shrimp aquaculture will be:

- Avoiding, if possible, to go into direct competition with well-established shrimp-producing regions in the mass shrimp market;
- Stretching the margins the producer/first processor can make on the product, for instance by reducing the number of intermediaries along the supply chain.

- Both can be done if the currently good image and above-average price of West African shrimp are kept and carefully developed. A strategy that has been successful in this context in the past is the sale of branded and labelled product in the form of a franchising system.
Institutions for aquaculture

• Institutions and legal frameworks required for sustainable development of shrimp (and other) aquaculture in West Africa

• Present policies cover some key issues, under fisheries or environment laws, but longer-term development of the sector requires focussed aquaculture legislation

• Capacity to manage and regulate aquaculture appears to be very limited at the moment in all countries in West Africa. Major capacity building effort needed!

• Aquaculture promotion affects all countries in the West African region, as natural resources along coastlines are shared. A common concerted action plan and management system with all concerned stakeholders will allow countries to enjoy the full potential benefits from the development of the sector.
Community involvement and sustainable livelihoods
Community involvement

• To examine reactions of communities towards possible establishment of a shrimp farm;
• To evaluate the potential impacts of the establishment of a shrimp farm for communities;
• To measure the potentialities and qualifications of populations, entrepreneurs and governments to run or follow the development and the operation of a shrimp farm as well as existing training schemes;
• To present proposals in order to establish shrimp farm projects within a process of sustainable development.
Current context

- Artisanal reservoirs (traditional fish ponds) constitute favourable sites to any project of shrimp farming;
- Communities already have know-how which can at the same time be perfected and diffused towards other coastal areas of West Africa like Sierra Leone;
- Local communities are becoming aware of the financial interest that shrimp farming can represent;
- Communities show real capacities of initiatives to seize opportunities linked with the demand emanating from local markets (national agglomerations) and abroad.
Community activities

*Impact 1: Land occupation*

- In all of the West African countries, mangrove areas are used traditionally for their aptitude for rice growing by local populations.

- As the foundation of local food supply and playing a paramount role in national food security, the farming of rice was always a major activity for the populations of mangrove areas.

- It thus structures the social organization of work and the rhythm of life of the communities.

- Consequently, the establishment of a shrimp farm on the territory of these communities is paired, in general, with the confiscation of the grounds that they had been using for rice culture. On the other hand, the use of the “tannes” or the non-exploited zones is unanimously recognized as an opportunity to make the most of the vast expanses inadequate for any agricultural use.
Community activities

**Impact 2: Fishing activities**

- Fisheries sectors in West Africa are all confronted with serious imbalances, particularly with regard to the exploitation of the resources. The majority of coastal demersal stocks with high commercial value, intended in priority for export, are fully exploited, even overexploited.

- Factories specialized in the processing of shrimps work clearly below their capacity, and if this is the case, purely and simply have to close due to a lack of raw material (Gambia and Senegal).

- But: in Gambia and Casamance (Senegal), communities think that land-based shrimp farming activities will induce indirect competition with fishing activities. What they fear is that the juvenile collection in the natural environment will consequently affect the production of wild shrimps, which is already in difficulty.

→ Fishermen of the communities are favourable to shrimp breeding, provided that the juveniles do not come from the area.
Community activities

*Impact 3: Compatibility with other activities*

- Beyond rice culture, a certain number of complementary uses of the mangrove exist:
  - Traditional fish farming. Whether it be in Casamance or Guinea Bissau, breeding of fish such as tilapia and mullet is carried out in the easily flooded basins which are used as fish ponds before being planted out of rice.
  - Collection of marine invertebrates. Reserved to women and children, helped sometimes by the men who bring them with their pirogues to the collection place, as in Casamance. The “arches” collection is carried out mainly from December till June, the second part of the year being rather reserved for agricultural work, mainly rice culture.
  - The collection of oysters from mangrove feet, also a female occupation, is on the other hand a year round activity, with however, a diminution in intensity at the time when all the labour force is required to work in the rice fields.
  - The plantations of cashew trees result partly from the will of the women to maintain a certain form of financial independence with respect to the family circle. Recently in fact, the papaw trees are being massively introduced into the villages from the littoral of Casamance to the area of Biombo.

The development of freshwater shrimp breeding in such basins in partnership with traditionally farmed fish constitutes, according to communities, a step easy to cross. They perceive in this activity a possibility of topping up their incomes and of improving the food supply of the community.
Impacts related to potential community involvement into shrimp farm projects

- Employment (mangrove knowledge, availability)
- Shrimp ponds (complementary activities to rice)
- Various services
People’s mentality and the natural environment

• The construction of a shrimp farm at a place occupied by the populations since their birth generates disturbances of a mental nature. More than the potentialities of job creation, this aspect is fundamental for the acceptance of any farm establishment by the communities concerned because it touches to their mental universe, and the participative element of their identity.

• In a general way, there does not appear to be any customs or habits not compatible with shrimp farming. However, in Guinea Bissau, animists’ populations of the coastal area hold certain zones of mangrove as worship places.

→ Therefore, the establishment of shrimp farms cannot be done on sites having a religious or sacred function or belonging to a ritual process.

→ In order to ensure the impossibility of such a mistake, the establishment of the shrimp farms must be conceived with the participation of the local communities. Only they know what the mangroves and other places conceal and uses that one should not transgress. Moreover, only a concerted approach with the populations will be able to allow for the choice of a site that minimizes mental disturbances. This last point requires in the meantime a significant research effort.
Prospects for a community win-win situation

• One of the fundamental points raised by the communities during the interviews is the obvious lack of information on shrimp farming in general.

• FAO Code of Conduct for Responsible Fisheries stops when most of the harmful impacts start to occur.

➔ Community well-being oriented shrimp farms
Conclusions and recommendations
Summary

• **West Africa has the potential to capitalise on the existing good market perceptions** of its locally caught shrimp by developing a shrimp farming sector for both a “mainstream” product and a product that meets the criteria of niche (organic, fair trade) markets.

• It is in an unique position to develop a sustainable shrimp aquaculture sector in part due to its very favourable climatic conditions, disease status and geographic location.

• Adverse impacts on the ecosystem must be kept to a minimum with appropriate planning of the construction and operation of a farm whose production methods and impacts respect community livelihoods.

• **Shrimp produced under these conditions are very likely to attract high niche market prices** and can present potentially good returns for the investor.
Shrimp farming in West Africa
- the opportunities

- Potential valuable commercial species which could be developed for shrimp farming
- Areas could be developed which are environmentally and socially acceptable for sustainable shrimp farming and which meet the criteria set by the major markets
- Well developed processing industry already supplying high value shrimp products to the major markets
- Potential to utilize existing good trade links with major markets to create brand of excellence for farmed shrimp products
- Potential exists to create alternative brands which are certified, as organic or fair trade, allowing market prices for quality above normal market prices
- Disease status very good due to limited shrimp farming activities, assisting the industry to by-pass the failures of other regions around the world.
Shrimp farming in West Africa – the challenges

- Limited local shrimp farming technology requiring major financial assistance and long-term investment at all levels
- Investment to establish and ensure food safety which will qualify products in the major markets
- Infrastructure for production and processing facilities away from main population centres is weak
- Production costs potentially higher than other major production regions in the world. Products will have to be exceptional and aimed at specific niche markets for commercially viability
- Some negative perceptions of the West African region could impact negatively on investment
Conclusion

• Development of shrimp farming (and indeed other forms of aquaculture) in west Africa will take time and requires micro-, meso- and macro-level interventions

• The study identifies a number of interventions, for further discussion and consensus building, during the Round Table
Recommendations

Possible micro-level, short to medium term interventions:

- Foreign Direct Investment to re-activate existing hatchery/farms
- Formation of producers’ co-operatives in artisanal shrimp producing areas to encourage development of small-scale shrimp/prawn farming.
- Dissemination and discussion of study results in Asia and West Africa to raise profile of shrimp farming in West Africa and encourage south-south cooperation in investment and technical assistance
- Establishment of a feed mill
- Technical assistance (Cameroon, Ghana, and Nigeria) in breeding and culture of local freshwater prawns
- Establishment of a training centre or centre of excellence in shrimp aquaculture at an operating shrimp farm
- Preparation of an investment guide for shrimp farming in West Africa
- Training and awareness raising through regional cooperation and south-south collaborations
- Assessment of broodstock availability and disease status
Possible meso- and macro-level, medium to long-term, interventions:

- Developing a **centre of excellence** for vocational workplace-based training to widen the potential positive impact of shrimp farming on the local, national and regional level. Support the centre of excellence through South-South cooperation to draw on the technical expertise available in Asia.

- **Strengthening of legal, regulatory and institutional framework** including implementation of coastal resource management plans and development of siting criteria that adhere to responsible shrimp farming guidelines

- Developing **criteria** for shrimp from West Africa of high quality to be marketed under a West African shrimp brand (organic, fair trade, other niche markets)

- Strengthening of **regional coordination** in West Africa for sustainable shrimp aquaculture

- Establishment of a franchise network in the target markets selling branded high-quality West African shrimp and training for promotion the brand

- Promotion of south-south cooperation through investment and technical assistance to support the implementation of the above recommendations
Thank you

Merci beaucoup