Report of the

NEPAD–FAO FISH PROGRAMME – NFFP – WORKSHOP ON DEVELOPING AQUACULTURE AS A BUSINESS WITHIN AN ECOSYSTEM APPROACH TO THE SECTOR

Lusaka, Zambia, 20–24 January 2014
Report of the
NEPAD–FAO FISH PROGRAMME – NFFP – WORKSHOP ON DEVELOPING AQUACULTURE AS A BUSINESS WITHIN AN ECOSYSTEM APPROACH TO THE SECTOR

Lusaka, Zambia, 20–24 January 2014
This document represents the report of the NEPAD–FAO Fish Programme (NFFP) Workshop “Developing Aquaculture as a Business within an Ecosystem Approach to the Sector”, held from 20 to 24 January 2014 in Lusaka, Zambia. It was prepared by the Aquaculture Branch of the FAO Fisheries and Aquaculture Department and the FAO Subregional Office for Eastern Africa, organizers of the workshop.

The contribution of Mr Patrick White, Consultant, is greatly acknowledged. FAO staff Dr Nathanael Hishamunda, Dr Doris Soto, Dr Ana Maria Menezes and Dr Junning Cai, and FAO consultant Ms Elisabetta Martone contributed to the preparation of this report. Contributions from Prof. Emmanuel Kaunda of NEPAD PAF-AWG, Ms Mercy Sandra Kavalo of Bunda College and Mr Arturo Clement from Global Salmon Initiative (GSI)/Chile were critical to the organization and delivery of the workshop. FAO Representation in Zambia, especially Dr George Okech (FAO Representative), Ms Celestina Lwatula, Ms Florence Mwiya and Mr Noble Kalwa, provided invaluable support to the meeting.

The statements included in the appendixes are reproduced as submitted.
ABSTRACT

The workshop “Developing Aquaculture as a Business within an Ecosystem Approach to the Sector” was held at the Protea Hotel in Lusaka, Zambia, from 20 to 24 January 2014. The workshop was organized by the NEPAD–FAO Fish Programme (NFFP), jointly with the FAO Subregional Office for Eastern Africa. The objective was to enhance the capacity of decision-makers and personnel in the public sector in understanding and promoting aquaculture as a business within an ecosystem approach to aquaculture (EAA); this in order to facilitate the transformation of aquaculture in Africa from a public-funding-driven, subsistence-oriented and non-viable sector to an economically vibrant, private-sector-led and sustainable enterprise.

The workshop was attended by 33 participants from 16 African countries. Participants included fisheries/aquaculture officers, extension personnel, and staff from civil society organizations (farmers associations, non-governmental organizations, etc.). Other participants were from FAO Rome, FAO Subregional Office for Eastern Africa, NEPAD Fish Programme in Malawi, and international experts from Chile and France.

The EAA section of the workshop informed participants of the definition, objectives, principles and application of the EAA and trained them on the steps for its developing and implementing in their countries. Recommendations were made with reference to the assistance required to facilitate its implementation. They included: provision of technical assistance and expertise by FAO; identification of funding; incorporation of the EAA into the national aquaculture strategy and development plans; development of a new EAA for Africa; elaboration of new case studies and/or pilot projects; and cooperation through regional bodies.

In the section on aquaculture as a business, participants learned about the “user-friendly tool for investment decision-making in aquaculture” developed by the Aquaculture Branch of the FAO Fisheries and Aquaculture Department. They also learned how to use this tool effectively. They realized the many ways the model could help them improve the management of their operations. The following recommendations were formulated: organization of training on the tool at the country level; publication of case studies on aquaculture as a business; provision of assistance on improvement of national policies to enable aquaculture as a business; and funding demonstration projects on doing aquaculture as a business.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANAF</td>
<td>Aquaculture Network for Africa</td>
</tr>
<tr>
<td>EAA</td>
<td>ecosystem approach to aquaculture</td>
</tr>
<tr>
<td>EIA</td>
<td>environmental impact assessment</td>
</tr>
<tr>
<td>FCR</td>
<td>feed conversion ratio</td>
</tr>
<tr>
<td>FIRA</td>
<td>Aquaculture Branch of the FAO Fisheries and Aquaculture Department</td>
</tr>
<tr>
<td>GDP</td>
<td>gross domestic product</td>
</tr>
<tr>
<td>GSI</td>
<td>Global Salmon Initiative</td>
</tr>
<tr>
<td>NEPAD</td>
<td>New Partnership for Africa’s Development</td>
</tr>
<tr>
<td>NGO</td>
<td>non-governmental organization</td>
</tr>
<tr>
<td>SIDA</td>
<td>Swedish International Development Cooperation Agency</td>
</tr>
<tr>
<td>SMEs</td>
<td>small and medium-sized enterprises</td>
</tr>
<tr>
<td>TCP</td>
<td>technical cooperation programme</td>
</tr>
</tbody>
</table>
BACKGROUND OF THE WORKSHOP

1. There is increasing consensus that aquaculture in Africa needs to be treated as a commercial activity. In order to provide an enabling environment for the development of commercial aquaculture in Africa, policy-makers and personnel in the public sector need to: understand basic economic and business principles; appreciate the function of market mechanisms and business operations; acquire skills needed to design and implement policies; and provide assistance and advice that align environmental, social and governance objectives (e.g. food security, poverty alleviation and business objectives of stakeholders in the private sector).

2. Africa is home to some of the largest aquatic biodiversity in the world, especially freshwater, and a region of great opportunities and needs. Therefore, it is important to make sure that aquaculture grows in a way that will promote socio-economic development, food security and nutrition while not threatening conservation of natural resources. For this purpose, an ecosystem approach to aquaculture (EAA) development is necessary.

3. An EAA is a “strategy for the integration of the activity within the wider ecosystem such that it promotes sustainable development, equity and resilience of interlinked social-ecological systems”[1]. It provides a planning and management framework whereby parts of the aquaculture sector can be effectively integrated into local planning. It also affords clear mechanisms for engaging with producers and government for the effective sustainable management of aquaculture operations by taking into account environmental, socio-economic and governance objectives. Therefore, an EAA can facilitate the adoption of the Code of Conduct for Responsible Fisheries and national policies and regulations at any geographical or administrative scale. For example, it can facilitate the development of aquaculture as a new business activity and/or the implementation of management plans for its improvement within transboundary ecosystems (e.g. shared watersheds). An EAA also facilitates addressing the potential equity and access issues that can arise in developing aquaculture as a business.

4. Within this framework, a five-day regional capacity building workshop on developing aquaculture as a business was organized. It was held at the Protea Hotel in Lusaka, Zambia, from 20 to 24 January 2014. The workshop was organized within the framework of the GCP/RAF/463/MUL project known as NEPAD–FAO Fish Programme (NFFP) and the efforts of the FAO Subregional Office for Eastern Africa to promote aquaculture as a business in the subregion.

5. The workshop drew a total of 33 participants from 16 African countries, namely: Benin, Burundi, Cameroon, Djibouti, Ethiopia, Ghana, Guinea-Bissau, Kenya, Mali, Mozambique, Nigeria, Rwanda, Senegal, Togo, Uganda and Zambia). Other participants were from FAO, Rome, FAO Subregional Office for Eastern Africa, NEPAD Fish Programme in Malawi, and international experts from Chile and France. They attended as resource persons. The list of participants and the workshop agenda are included in Appendixes 1 and 2, respectively.

PURPOSE OF THE WORKSHOP

6. The objective of the workshop was to enhance the capacity of decision-makers and other players in the public sector (such as extension personnel, and staff in civil society organizations) in understanding and promoting aquaculture as a business within an EAA; this in order to facilitate the transformation of aquaculture in Africa from a public-funding-driven, subsistence-oriented and non-viable sector to an economically vibrant, private-sector-led and sustainable enterprise.

7. During the workshop, recommendations were made with reference to the assistance required to facilitate implementation of the EAA and for the improvement of the user-friendly tool for aquaculture investment and management, and promoting aquaculture as a business. For

---

example, recommendations included more training workshops, identification of funding, and development of case studies.

WORKSHOP ACTIVITIES

Official opening

8. The official opening was conducted on the first day of the workshop. The ceremony was officiated by Dr David Shamulenge, the Permanent Secretary at Zambia’s Ministry of Agriculture and Livestock. A statement was also given by Dr George Okech, the FAO Representative in Zambia. Their speeches are in Appendixes 6 and 7, respectively.

Presentations

Overview of the background, objectives and content of the workshop

9. Dr Hishamunda, from FAO, recalled the objectives of the workshop as being to:
   a) Entice and/or enhance the capacity of farmers and their assistants to:
      - develop business acumen in aquaculture;
      - plan properly when conducting aquaculture operations;
      - obtain loans when needed;
      - assess profitability level and financial wealth of their farms.
   b) Promote the spirit of sustainability when conducting aquaculture. In this regard, he indicated that sustainability in aquaculture encompasses five aspects:
      - ecological sustainability;
      - technical sustainability;
      - economic sustainability (competitive profits);
      - social sustainability (social equity);
      - legal sustainability.

10. He concluded by showing that the EAA is a strategy for achieving these main elements of sustainability of aquaculture, hence promoting sustainable development of the sector. This strategy, he pursued, includes equity and resilience of interlinked social and ecological systems.

11. Dr Hishamunda also showed that where aquaculture is promoted as a business it can provide social and economic benefits to society by:
    - providing food and nutrition security;
    - contributing to national economic growth;
    - improving countries’ balance of trade;
    - reducing poverty (through revenue generating and employment creation);
    - providing technological knowledge, funding research, and improving ecological health of ecosystems.

Overview of aquaculture as a business: experience in Eastern and Southern Africa

12. This presentation was made by Dr Ana Maria Menezes from FAO Subregional Office for Eastern Africa and Dr Emmanuel Kaunda from the New Partnership for Africa’s Development (NEPAD). The presentation focused on aquaculture development (growth) in Africa with case studies on cage culture in Malawi and on the Lesotho – Katse Dam. It was noted that aquaculture growth in Africa is dominated by Egypt (72.6 percent), Nigeria (15 percent), Uganda (5.5 percent), the United Republic of Tanzania (1.2 percent) and Madagascar (1.2 percent). The top five producing countries have strong implementation plans, privatized services, strong governance and tenure rights compared with poor performers that had none of these. The main drivers of aquaculture growth have been seed, feed, information, market and capital, which have remained a challenge in many African countries and to varying degrees.
13. Discussions focused on the role of government in some cases of aquaculture development and challenges being faced by top aquaculture producing countries such as Egypt and Nigeria.

14. The analysis showed that the forms of aquaculture development in Egypt and Nigeria had taken advantage of established government infrastructure and research. Government can intervene in infrastructure and public–private partnerships. As for lessons learned from Egypt, there are problems emerging such as pollution and user rights conflicts.

Country presentations

15. During the first day, the 16 workshop countries made their presentations. These are summarized in Table 1, with discussion notes shown at the bottom of the table. Each country presentation highlighted the presence/absence of aquaculture policy, strategy and plan, legal provisions such as licences, permits, government support to the sector, main issues faced by small and large industries, main assistance provided to small and medium-sized enterprises (SMEs) by large enterprises and main concerns regarding aquaculture from other stakeholders. The participants shared experiences about promoting aquaculture as a business in the context of other development objectives (e.g. environment protection, food and nutrition security, and poverty alleviation).

16. The presentations addressed, inter alia, the following issues or topics:
   - A brief summary of the country’s policies, strategies and plans in promoting aquaculture, including environmental/social requirements (e.g. EIA, licensing process) and indicating financial and non-financial support measures (e.g. access to funding and credit).
   - A brief description of the existence and role of SMEs and cooperatives in rural and aquaculture development and their potential contribution to the economy, society and people.
   - A description of the existence and roles of large enterprises in rural and aquaculture development and their contribution to the economy, society and people. Existence of effective rural extension services for production, environmental management and enhancing the financial and business skills of fish farmers and other key industrial players in the aquaculture value chain (e.g. traders).
<table>
<thead>
<tr>
<th>Country</th>
<th>Aquaculture Policy</th>
<th>Legal requirements</th>
<th>Government support</th>
<th>Main issues faced by small industries (small farms, cooperatives, etc.)</th>
<th>Main issues faced by large industrial enterprises</th>
<th>Main assistance provided to SMEs by large industrial enterprises</th>
<th>Main concerns regarding aquaculture from other stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benin</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>– Licences and permits (environmental impact assessment [EIA]), control of exotics and movement of live animals</td>
<td>– Financial assistance – Infrastructure, provision of feed and fingerlings – Equipment and technical support</td>
<td>– Feed–fingerlings – Aquaculture equipment and aquaculture materials</td>
<td>– Insufficient support from the State – Lack of equipment</td>
</tr>
<tr>
<td>Burundi</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>– EIA, regulation of exotics, movement of species, imports and export permits, health certification</td>
<td>– Credit provision – Distribution of fingerlings – Veterinary services</td>
<td>– Limited access to financial support – Limited access to quality fingerlings and fish feed and insufficient quantity – Difficulty in accessing credit</td>
<td>– No large aquaculture enterprises in Burundi</td>
</tr>
<tr>
<td>Cameroon</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>– Licences and permits, EIA, control of exotics and movement of aquatic animals</td>
<td>– Financial assistance to farmers, training, subsidies in fish feed and fingerlings</td>
<td>– Lack of access to credit, lack of feed, high cost of farm, rentals</td>
<td>No large industries</td>
</tr>
<tr>
<td>Djibouti</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>– Environmental regulation</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Country</td>
<td>Aquaculture Policy</td>
<td>Aquaculture Strategy</td>
<td>Aquaculture Plan</td>
<td>Legal requirements</td>
<td>Government support</td>
<td>Main issues faced by small industries (small farms, cooperatives, etc.)</td>
<td>Main issues faced by large industrial enterprises</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------</td>
<td>----------------------</td>
<td>------------------</td>
<td>-------------------</td>
<td>--------------------</td>
<td>------------------------------------------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>– Licensing provisions, EIA, control of exotics</td>
<td>– Supply fingerlings, hatcheries in some regional states, extension service</td>
<td>– Market access, inputs (seed, feed), access to credit, technology (know-how)</td>
<td>– No large-scale aquaculture</td>
</tr>
<tr>
<td>Ghana</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>– Licensing, EIA, water use rights, non-use of exotic species, confinement of cultured species, breeding, use of drugs, input permits, export controls</td>
<td>– Inputs credit support, start-up grants, letters of comfort, research, extension, hatcheries, training, fish health surveillance</td>
<td>– High cost of feed, inadequate supply of fingerlings, lack of credit, low productivity, market challenges</td>
<td>– Lack of adequate seed, high cost of permits (EIA), poaching, lack of trained staff, lack of funds, poor infrastructure</td>
</tr>
<tr>
<td>Guinea-Bissau</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>– Regulation under way as aquaculture in still new</td>
<td>– Government to support through aquaculture operational plan</td>
<td>– Funding, inputs, human resources, infrastructure, extension services</td>
<td>– No large industrial enterprises</td>
</tr>
<tr>
<td>Kenya</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>– No regulations specific to aquaculture, have fisheries act, EIA required for large investments</td>
<td>– Economic Stimulus Program, extension services, training, certification of seed and feed</td>
<td>– Lack of affordable and quality feeds and seed, lack of credit, poor access to markets</td>
<td>– Lack of affordable quality feeds, lack of market, legislation</td>
</tr>
<tr>
<td>Country</td>
<td>Aquaculture Policy</td>
<td>Aquaculture Strategy</td>
<td>Aquaculture Plan</td>
<td>Legal requirements</td>
<td>Government support</td>
<td>Main issues faced by small industries (small farms, cooperatives, etc.)</td>
<td>Main issues faced by large industrial enterprises</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------</td>
<td>----------------------</td>
<td>------------------</td>
<td>-------------------</td>
<td>--------------------</td>
<td>---------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>Mali</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Licences and permits (in course of adoption), EIA, regulation of genetically modified organisms (GMOs), movement of species</td>
<td>Training, extension services, exchange visits and provision of funds</td>
<td>Insufficient fingerlings, lack of technical expertise</td>
<td>Lack of finances</td>
</tr>
<tr>
<td>Mozambique</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Licensing applied to industrial aquaculture</td>
<td>Credit, provision of inputs (feed, seed), extension services</td>
<td>Lack of funding, feed and seed, weak technical assistance</td>
<td>Animal diseases, lack of qualified staff, market access</td>
</tr>
<tr>
<td>Nigeria</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No licensing: except in imports and exports, no EIA except for cage culture and shrimp farming, exotic banned</td>
<td>Grants and subsidized inputs, extension and training, hatcheries, feed mills and processing centres</td>
<td>High cost of feed, poor quality seed, credit and insurance, high investment cost, lack of good markets</td>
<td>- High cost of feed, lack of credit, high investment costs. - No specific assistance to SMEs</td>
</tr>
<tr>
<td>Rwanda</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Aquaculture and fisheries law in place, EIA requirement for large investments, e.g. cage culture</td>
<td>Concession acquisition in Lake Kivu, tax-free on importation inputs, subsidized fingerlings, guarantee fund for SMEs</td>
<td>Few extension officers to offer advisory services to farmers</td>
<td>-</td>
</tr>
<tr>
<td>Country</td>
<td>Aquaculture Policy</td>
<td>Aquaculture Strategy</td>
<td>Aquaculture Plan</td>
<td>Legal requirements</td>
<td>Government support</td>
<td>Main issues faced by small industries (small farms, cooperatives, etc.)</td>
<td>Main issues faced by large industrial enterprises</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------</td>
<td>----------------------</td>
<td>------------------</td>
<td>-------------------</td>
<td>--------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>Senegal</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>– EIA</td>
<td>– Site selection, elaboration of projects, credit research, entrants, infrastructure, commercialization, technique assistance</td>
<td>– Fish feeds &lt;br&gt; – Access to credit</td>
<td>– Do not understand aquaculture business &lt;br&gt; – Strengthen fish feed producers and enhance quality</td>
</tr>
<tr>
<td>Togo</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>– EIA, regulation on exotics and animal movements</td>
<td>– Technical advice to farmers, seed provision, subsidies</td>
<td>– Difficult to access seed, feed and credit &lt;br&gt; – Lack of new production techniques</td>
<td>– Nil</td>
</tr>
<tr>
<td>Uganda</td>
<td>No²</td>
<td>Yes</td>
<td>Yes</td>
<td>– Aquaculture rule 2003 provides for licences and permits, EIA for large investments, control of movement of live animals, farming of exotics</td>
<td>– Access to inputs, tax exemption on aquaculture inputs, training, research, extension services, hatcheries, feed, veterinary services</td>
<td>– Lack of capital, low production, inadequate raw materials, market challenges</td>
<td>– High taxes, inadequate raw materials, market challenges</td>
</tr>
<tr>
<td>Country</td>
<td>Aquaculture Policy</td>
<td>Aquaculture Strategy</td>
<td>Aquaculture Plan</td>
<td>Legal requirements</td>
<td>Government support</td>
<td>Main issues faced by small industries (small farms, cooperatives, etc.)</td>
<td>Main issues faced by large industrial enterprises</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>----------------------</td>
<td>-----------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>------------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>Zambia</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>– Fisheries act provides for licences, restrict movement of animal and farming of exotics, EIA, water rights</td>
<td>– Hatching, extension services, research, training,</td>
<td>– Lack of credit, inadequate extension services, lack of inputs (seed, feed)</td>
<td>– Inefficient regulation, lack of capital, high cost of feed, lack of information</td>
</tr>
</tbody>
</table>

1 Aquaculture strategy in form of master plan for fisheries and aquaculture.
2 Have fisheries policy but no aquaculture policy.
Case study: the development of salmon farming in Chile from the perspective of an ecosystem approach to aquaculture: what should have been done differently?

17. A presentation was made by Mr Arturo Clement from the Global Salmon Initiative (GSI), and a former general manager of one of the largest salmon farming companies in Chile. He described how the production of salmon started and how investors developed their business plans while addressing (or failing to address) the environmental, social and governance objectives. He also described the new initiatives in Chile towards area management of aquaculture with clusters of farms in designated neighbourhoods.

18. The main points highlighted in the presentation included:
   - Global Salmon Initiative – a driver for innovation and sustainable aquaculture development;
   - three pillars of GSI are increasing sustainability, cooperation and transparency;
   - benefits of industry cooperation – sharing knowledge, best practice;
   - areas of focus – biosecurity, feed and nutrition, standards and communications
   - government support through regulation.

Ecosystem approach to aquaculture presentations and case studies

Introduction to the ecosystem approach to aquaculture and how to develop aquaculture as a business under this framework

19. This presentation was made by Dr Doris Soto from FAO. The workshop was informed that aquaculture development should be guided by three main principles:
   a) Aquaculture should be developed in the context of ecosystem functions and services (including biodiversity) with no degradation of these beyond their resilience.
   b) Aquaculture should improve human well-being and equity for all relevant stakeholders.
   c) Aquaculture should be developed in the context of other sectors, policies and goals.

20. In the presentation, explanation was made on what the EAA is. The EAA is a strategy for the integration of the activity within the wider ecosystem such that it promotes sustainable development, equity and resilience of interlinked social-ecological systems.

21. The EAA can be implemented in existing, expanding or new aquaculture ventures. It can also be used at any geographical scale (farm, aquaculture management area or park, watershed, national, regional and global level). It was stated that developing aquaculture as a business requires clear development objectives and enabling national and local policies with the capacity to properly balance economic, social and environmental objectives – not always an easy task.

Implementing the ecosystem approach to aquaculture practical training by working groups

22. This presentation was made by Dr Doris Soto and Mr Patrick White. The next activity introduced the EAA planning framework and provided hands-on training on how to balance socio-economic, environmental and governance objectives and how to prepare development and management plans for aquaculture as a business in this context. Presentations were made giving an overview of the steps for development of a management plan and EAA implementation including:
   a) Initiation and planning:
      - scoping (the aquaculture area/system to be managed) and baseline data needed;
      - set broad objectives (for the development of aquaculture as a business).
   b) Identify and prioritize issues/potential issues (environmental, socio-economic, governance):
c) Develop management system:
- set operational objectives;
- select measurable indicators;
- evaluate/select management options;
- identify the responsibilities for implementation of the different parts of the management plan.

d) Implement and monitor
- finalize management plan;
- formalize management plan;
- review performance;
- report and communicate.

e) Tools in support of the EAA.

23. The participants undertook group exercise on how to develop and implement an aquaculture management plan within the EAA.

24. First, a presentation was made to introduce the methodology that should be used to develop a management plan for case study. The participants were divided into two groups – cage and pond culture. A rapporteur for each group was selected.

25. The participants then:
- identified the scope and high-level objectives;
- identified the stakeholders;
- identified the issues, taking into consideration the key stakeholders;
- prioritized the issues using risk assessment;
- developed a management plan to address the priority issues.

Aquaculture business within the ecosystem approach

Background objectives and scope of the business training

26. This presentation was made by Dr Nathanael Hishamunda from FAO. In this presentation, participants learned about the “user-friendly tool for investment decision-making in aquaculture”. They were informed that the tool is interactive, user-friendly, Excel-based and allows rapid data entry by the user. It can assist small and medium-scale fish farmers in their decisions on whether to invest in aquaculture or not. It has been tried in Guinea-Bissau, Madagascar, Senegal and Zambia. Essentially, the tool relies on technical and socio-economic data and allows for the analysis of the following farming systems:
- monoculture pond-based farming (grow-out);
- polyculture pond-based farming (grow-out);
- cage culture (grow-out);
- fingerling production in ponds.

27. For each system, the tool consists of a series of linked spreadsheets within a workbook file. It has four data entry sheets to enter data on:
- farm details;
- stocking and production details;
- information on production inputs other than feed and seed;
- information on investment and financing.

28. The tool also has five result sheets to cover:
- summary of the information provided;
- average level of profitability;
- annual level of profitability of the farm;
• cash flow of the farm;
• financial situation of the farm.

Developing aquaculture as a business: lessons learned from the salmon industry

29. Mr Arturo Clement from the GSI made a presentation on aquaculture as a business, emphasizing the importance of profitability and reducing operational costs by controlling feed, disease and enhancing performance.

Basic elements on developing aquaculture as a business

30. This first part of the presentation on aquaculture as a business from the farmers’ perspective was made by Dr Junning Cai from FAO. The following key points were shared with the participants:
• profit as a primary indicator of business performance;
• key elements of business planning;
• basic outline of a business plan;
• key components of a business plan;
• record-keeping as a foundation of business planning and management;
• comparative case studies of the profitability of tilapia pond culture in different countries.

31. The second part of the presentation (also by Dr Cai) discussed aquaculture as a business from the government’s perspective. The following key points were shared with the participants:
• aquaculture gross domestic product (GDP) as a basic indicator of the sector’s economic performance;
• government needs to consider trade-offs among economic, social and environmental dimensions;
• understand aquaculture business from a value chain perspective;
• market as an invisible hand is an efficient mechanism for economic development;
• the invisible hand needs help from government as the visible hand;
• the visible hand should avoid interfering with the invisible hand.

Investment tool for assessing economic profitability and financial feasibility of aquaculture farms – demonstration and practical exercises

32. Dr Hishamunda and Dr Cai introduced the “user-friendly aquaculture investment and management tool”. This tool was developed by the Aquaculture Branch (FIRA) of the FAO Fisheries and Aquaculture Department. It is an interactive, user-friendly model designed within Excel that enables users to conduct a complete economic and financial analysis of a proposed or already-functioning aquaculture operation. It was designed in such a way that it requires no previous knowledge of economic concepts or advanced skills in the use of spreadsheets. When used properly, it may provide valuable assistance to small- and medium-scale aquaculture producers for improving the financial management of their operations.

33. Briefly, it consists of a series of linked worksheets within a spreadsheet file. The first four worksheets ask from the user input data on production and economic characteristics of the aquaculture operation, including size of the farm, number of ponds, stocking densities, feed conversion ratios (FCRs), survival rates, price of fingerlings and feeds, and selling price. The model also requires an estimate of the investment required to build the facility, including construction of grow-out units (e.g. ponds) and purchase of land and machinery. Based on the information provided, the last four worksheets of the model will produce a series of standard financial forms (enterprise budget, income statement, balance sheet and cash flow budget) that may be used to compile a business plan and support an agriculture loan application for the operation. The tool also offers customized advice to the user based on the results of the analysis.
This tool is designed for the analysis of hatchery, nursery, recirculation, pond-based and cage-based aquaculture operations.

Participants were introduced to the tool and its components and were requested to form four groups for practical exercises. A sample of results from the exercise is shown in Appendix 4. Deeper analysis was undertaken during this exercise on developing or promoting aquaculture as a business and on evidence-based decision-making on policy issues or sector management. With the aid of the tool, participants evaluated economic and financial analysis of fish culture in ponds in Africa.

Participants were asked to use the tool to determine what species to farm (tilapia or catfish) from a farmer’s perspective and what species to promote from the government’s perspective. The group exercise was also designed to let participants use the tool to conduct sensitivity analysis to determine whether to farm large or small fish, whether to use fertilizer, and whether to borrow at a higher interest rate.

Workshop evaluation

A questionnaire was designed to assess the usefulness and areas of improvements of both the various aspects of the workshop and the tool used. The evaluation results are shown in Appendix 5.

Participants, particularly the policy-makers, were satisfied with the general presentation of doing aquaculture as a business in Africa and elsewhere, the presentation and assessment of the situation by each participating country, and the synthesis of the situation in the region.

Participants learned much from the theoretical training in EAA implementation and the practical exercise. They found the EAA training useful or very useful and were satisfied with the training.

Participants also learned much about aquaculture as a business. They found the training and the practical use of the spreadsheet very useful and were generally satisfied with the training. More training was requested in this area. Improvements to the tool were also suggested.

Closing ceremony

The workshop was officially closed by Dr Harris Phiri, Deputy Director, Ministry of Agriculture and Livestock, Department of Fisheries.

WORKSHOP OUTCOMES AND FOLLOW-UP

Ecosystem approach to aquaculture outcomes and follow-up

The EAA section of the workshop informed the participants of the definition, objectives, principles and application of the EAA and trained them in the steps for its development and implementation in their countries.

Participants suggested the following regarding implementation of the EAA in their countries:

- **Advocacy on the EAA to high-level decision makers.** Participants could recommend the implementation of the EAA to ministers responsible for aquaculture. They could create awareness. Information should be provided via the Aquaculture Network for Africa (ANAF) to governments.
- **Disseminate the EAA strategy.** Participants could explain the concepts and principles of the EAA strategy to aquaculture departments and colleagues.
- **Recommendations for starting to implement the EAA.** The first step should be to evaluate country needs. In addition, an important step would be to undertake aquaculture zoning and to ensure that environmental impact assessments (EIAs) are undertaken for
larger projects. The development of aquaculture parks and farmer clusters should be promoted.

- **Promotion of the EAA.** There should be active promotion of the EAA to extension service and service providers.

**Aquaculture business outcomes**

44. In general terms, the tool was very well received by participants. Participants rapidly learned how to use the tool in an effective manner. They realized the many ways the model could help them improve the management of their operations. Participants provided useful comments and suggestions that will be used to improve various aspects of the tool.

45. In particular, they made suggestions on how to improve the business part of the training, namely:
   - more time for training (up to ten days);
   - accounting material difficult for non-business people (i.e. biologists);
   - translation into other FAO languages;
   - clarify technical terms;
   - train financial institutions;
   - more time for business training;
   - more training courses;
   - provide summary table for presenting to banks;
   - facilitate sensitivity analysis;
   - disseminate widely.

46. Suggestions on how to improve the investment tool were:
   - provide table with default values;
   - allow decimal places;
   - more demonstrations;
   - link model to other models for synergy;
   - train farmers/investors;
   - allow input of farm name;
   - ensure ANAF countries use the tool;
   - monitor and evaluate the use of the tool regularly;
   - include sensitivity analysis, internal rate of return and other formulae;
   - provide an operations manual;
   - improve layout and movement between spreadsheets;
   - export financial tables that could be used for a business plan or application for credit.

**WORKSHOP CONCLUSIONS AND RECOMMENDATIONS**

**Ecosystem Approach to aquaculture conclusions and recommendations**

47. The following recommendations were made with reference to the assistance required to facilitate implementation of the EAA:
   - **Technical assistance.** FAO to provide technical assistance and expertise to develop management plans and to strengthen and facilitate the implementation of the EAA.
   - **EAA training.** There should be more training workshops given and there should be longer workshops for detailed training. Training activities could be partnered with universities for dissemination and training. Training should be provided for:
     - trainers;
     - government officers;
     - technicians.
• **Identification of funding.** There is a great need for donor funding to initiate the implementation of the EAA. In particular, technical cooperation programmes (TCPs) should be developed for projects. There should be funding provided for training and resources to implement and to undertake the initial baseline survey.

• **Policy and regulations.** The EAA should be incorporated into national aquaculture strategy and development plans. In some cases, national aquaculture strategy and development plans will need to be revised. A policy brief on the EAA should be prepared for policy-makers.

• **Case studies and projects.** A new version of the EAA should be developed for Africa. There should be new practical case studies/pilot project undertaken. Existing EAA case studies should be documented. There is a need for a detailed EAA manual.

• **Regional cooperation.** There should be cooperation through regional bodies, especially for transboundary waterbodies.

**Aquaculture business conclusions and recommendations**

48. The following recommendations were made.

49. **Training:**
   • organize training on the tool at the country level;
   • train stakeholders at all levels, technicians to help farmers;
   • capacity building for farmers;
   • train farmers in business skills;
   • training financial lending institutions;

50. **Information:**
   • publish case studies on doing aquaculture as a business.

51. **Facilitating policy and uptake:**
   • provision of assistance on improvement of national policies to enable aquaculture as a business;
   • target the tool for policy-makers.

52. **Funding:**
   • guarantee funds for loan collateral;
   • provide TCPs;
   • support data collection;
   • demonstration projects on doing aquaculture as a business.
APPENDIX 1

LIST OF PARTICIPANTS

Abegaz, Hussein  
Senior Fishery Expert  
Ministry of Agriculture  
P.O. Box 62347  
Addis Ababa, Ethiopia  
Tel.: (+251) 911 172571  
E-mail: abegaz.issa@gmail.com  
Husseinfish99@gmail.com

Aryee, Emmanuel  
Deputy Director  
Fisheries Commission  
GP 630  
Accra, Ghana  
Tel.: (+233) 302 675135  
Mob.: (+233) 208370147  
E-mail: Osuhibibio@yahoo.com

Agapito, Jeremias  
Eng. Agro-Pecuario – Private Sector  
Ministerio Pecas  
Inhambane-Zavala Zumbanene  
Mozambique  
Tel.: (+258) 823529816  
E-mail: agapito.jeremias@gmail.com

Abdoulaye, Niane  
Technical Director  
National Aquaculture Agency (ANA)  
Dakar, Senegal  
Tel.: (+221) 775239528  
E-mail: niane25@gmail.com

Alio, Andrew  
Assistant Commissioner Aquaculture  
MAAIF, Directorate of Fisheries Resources  
Entebbe, Uganda  
Tel.: (+256) 772567189  
E-mail: andrewalio@gmail.com

Banda, Kambani  
Camaraman  
Zambia National Information Services  
P.O. Box 50698  
Lusaka, Zambia  
Tel. (+260) 978543365  
E-mail: bkambani@yahoo.com

Banguina, Kekeou  
Ingeneur Agronomie Zootechnique  
Ministerie de l’Agriculture Elevage et Peche  
BP 1095  
Lome, Togo  
Tel.: (+228) 22 2113470  
Mob.: (+228) 9008112  
E-mail: banguinaandre@yahoo.fr

Calenga, Carlos Fabias  
National Institute of Aquaculture  
No. 347 Rue Consiglieri Pedroso  
Maputo, Mozambique  
Tel.: (+258) 2135000  
Mob.: (+258) 823045189 / 842594000  
E-mail: fbshec@gmail.com

Chomba, Kalunda  
Interpreter  
Freelance  
P.O. Box 51134  
Lusaka, Zambia  
Tel.: (+260) 977805471  
E-mail: KalundaChomba69@yahoo.com

Clement, Arturo  
Global Salmon Initiative (GSI)/Chile  
Los Lomeas 1621 P. Vares  
Chile  
Tel.: (+56) 998871909  
E-mail: aclimentd@gmail.com

Conduito de Pina, Francisco  
Promoter  
Aquareire  
Rue Marien N’gouasy, 8C  
Bissau, Guinea-Bissau  
Tel.: (+245) 6607842 5902821  
E-mail: conduitranp@hotmail.com

Habulembe, Ian  
Aquaculture Economist  
Department of Fisheries  
P.O. Box 350100  
Chilanga, Zambia  
Tel.: (+260) 278618 / 974388485  
E-mail: ianfish2011@yahoo.com
Iwa, Leon  
Director of Fisheries  
Homologue  
Cotonou, Benin  
Tel.: (+229) 96606234  
Mob.: (+229) 94078457  
E-mail: iwaleon@yahoo.fr  
iwaleon@gmail.com

Keita, Madi Matene  
Conseiller Techniche  
Ministere du Developement Rural  
MDR/Ministere Delegue Charge de l’Elevage de la Peche et de la Securite Alimentaire  
Bamako, Mali  
Tel.: (+223) 20226919/  
Mob.: (+223) 66726307  
E-mail: madikeita13@yahoo.fr

Kouam, Jean  
Chef Service de la Peche Continentale Artisanale Maritime  
MINEPIA – DPAIH  
Yaoundé, Cameroun  
Tel.: (+237) 77614352  
E-mail: Kouam.jean@yahoo.fr

Makihoumed, Mohamed  
Director of Fisheries  
Ministry of Agriculture and Fisheries  
Zone Boulaas Industriel  
Djibouti  
E-mail: Makimaha17@yahoo.com

Mandishii, Changwe  
Freelance Interpreter  
P.O. Box 32979  
Lusaka, Zambia  
Mob.: (+260) 978788013  
E-mail: mandishi@yahoo.com

Msetaka, Esther  
Journalist  
Zambia Daily Mail  
P.O. Box 31421  
Lusaka, Zambia  
Tel.: (+260) 977981650  
E-mail: estherwiti@yahoo.com

Muazu, Mohammed  
Director of Fisheries  
Federal Ministry of agriculture And Rural development,  
PMB 135, Garki  
Abuja, Nigeria  
Tel.: (+234) 8033735943  
E-mail: modmazu@yahoo.com

Mupeseni, Kennedy  
Journalist  
Times of Zambia Newspaper  
P.O. Box 30394  
Lusaka, Zambia  
Tel.: (+260) 97345792  
E-mail: kcmupeseni@gmail.com

Murekambanze, Alain  
Direction des Eaux, de la peche et de l’Aquaculture Conseiller  
Tel.: (+257) 79654354  
E-mail: almurek@yahoo.cfr

Musonda , Venantious Mulenga  
Chief Aquaculture officer  
Fisheries Department  
P.O. Box 350100  
Chilanga, Zambia  
Tel.: (+260) 211 278618  
E-mail: venantiousm@gmail.com

Ngalande, Patrick  
Director Fisheries  
Ministry of Agriculture & Livestock  
Lusaka, Zambia

Osure, George Owiti  
Principal Fisheries officer  
State Department of Fisheries  
P.O. Box 1084-40100  
Kisumu, Kenya  
Tel.: (+254) 721971882  
Mob.: (+254) 735911458  
E-mail: gowiti2002@yahoo.com

Rutaganira, Wilson  
Aquaculture and fisheries Program Coordinator  
Rwanda Agriculture Board  
Kigali, Rwanda  
Tel.: (+250) 788306364  
E-mail: wilsonruita@yahoo.co.uk
Shamulenge, Dr David  
Permanent Secretary  
Ministry of Agriculture & Livestock  
Lusaka, Zambia

Soungue, Ablaye  
Economist  
Agence Nationale de l’Aquaculture (ANA)  
Dakar, Senegal  
Mob.: (+221) 775429543  
E-mail: asoungue@gmail.com

Tembo, Norman  
Journalist  
Zambia Information Services  
P.O. Box 50698, Lusaka, Zambia  
Tel. (+260) 966668139  
E-mail: normantembo1@gmail.com

Tsibi, Blakewoe  
MAEP/INFA  
TNG Agronomiste  
BP 401  
Kpaline, Togo  
Tel.: (+228) 24501321 / 90264512  
E-mail: blakewoe@yahoo.fr

Ussumane So, Augusto  
Aquaculture Private Project Promoter  
Bairro Missira, Bissau, Guinea-Bissau  
Tel.: (+245) 6788891  
Mob.: (+245) 5592877  
E-mail: losserlida@hotmail.com

White, Patrick  
AKVAPLAN-NIVA AS  
BP411, CEDEX 26402, France  
Tel.: (+33) 4 475768014  
Mob.: (+33) 678619186  
E-mail: Patrick.white@akvaplan.niva.no

Zang, Jean Paul Ondoua  
Sub Director of Aquaculture  
MINEPIA  
Ministere de l’elevage de Peches  
Et des Industries Animales  
Yaoundé, Cameroon  
Tel.: (+237) 9408483  
E-mail: ondouajean@yahoo.fr

Zulu, Amos  
Journalist  
Zambia Information Services (ZANIS)  
Ministry of Agriculture & Livestock  
P.O. Box 50698  
Lusaka, Zambia  
Tel.: (+260) 977982320  
E-mail: amoszulu@yahoo.com

NEPAD  
Banda, Lisungu  
Project Officer  
NEPAD Fish Node  
P.O. box 219  
Lilongwe, Malawi  
Tel.: (+265) 000378275  
E-mail: lisubby@gmail.com

Kaunda, Emmanuel  
Technical Coordinator  
NEPAD PAF-AWG  
P.O. Box 219  
Lilongwe, Malawi  
Tel.: (+265) 999510796  
E-mail: ekaunda@yahoo.com

Kavalo, Mercy Sandra  
Administrative Assistant  
NEPAD Regional Fish Node  
Bunda College  
P.O. Box 219  
Lilongwe, Malawi  
Tel.: (+265) 997932408  
E-mail: mercykawere2@yahoo.com

FAO  
Cai, Junning  
Aquaculture Officer  
FAO Italy  
Rome  
Tel.: (+39) 06 57053589  
E-mail: junning.cai@fao.org
Chilala, Martin  
FAO National Consultant  
P.O. Box 350100  
Lusaka, Zambia  
Mobile: (+260) 977720569  
E-mail: mmchilala@gmail.com

Dejen, Eshete Dresiligne  
National Fisheries Officer  
FAO Subregional Office  
Addis Ababa, Ethiopia  
Tel.: (+251) 919374431  
E-mail: Eshete.Dejen@fao.org

Hishamunda, Nathanael  
Senior Aquaculture Officer  
Economics, Policy & Planning  
FAO Rome  
Tel.: (+39) 06 57054122  
Fax: (+39) 06 57053020  
E-mail: nathanael.hishamunda@fao.org

Manning, Peter  
Consultant  
FAO Rome  
Italy  
Tel.: (+39) 06 5705560  
Mob.: (+39) 3481195003  
E-mail: peter.manning@fao.org

Menezes, Ana Maria  
FAO-SFE  
Fisheries and Aquaculture Officer  
Ethiopia  
E-mail: ana.menez@fao.org

Mwiyia, Florence  
Programme Assistant  
FAO – Zambia  
Mob.: (+260) 973207890  
E-mail: florence.mwiya@fao.org

Okech, George  
FAO Representative  
FAO Zambia  
Mob.: (+260) 975533547  
E-mail: George.okech@fao.org

Soto, Doris  
Senior Aquaculture officer  
Aquaculture Branch, Fisheries & Aquaculture  
Department  
FAO Rome  
Tel.: (+39) 06 57056149  
E-mail: doris.soto@fao.org
# APPENDIX 2

## AGENDA

<table>
<thead>
<tr>
<th>Day 1 (20 January 2014)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30 – 09:00</td>
<td>Registration</td>
</tr>
<tr>
<td>09:00 – 09:15</td>
<td>Self-introduction of participants</td>
</tr>
<tr>
<td>09:15 – 09:30</td>
<td>Opening remarks:</td>
</tr>
<tr>
<td></td>
<td>– FAO representative</td>
</tr>
<tr>
<td></td>
<td>– Zambia government representative</td>
</tr>
<tr>
<td>09:30 – 10:00</td>
<td>Overview of the background, objectives and contents of the workshop (Hishamunda)</td>
</tr>
<tr>
<td>10:00 – 10:30</td>
<td>Group photo and coffee break</td>
</tr>
<tr>
<td>10:30 – 11:00</td>
<td>Overview of aquaculture as a business: Eastern Africa’s experience (Menezes)</td>
</tr>
<tr>
<td>11:00 – 12:30</td>
<td>Country presentations (9 presentations * 10 minutes/presentation = 90 minutes)</td>
</tr>
<tr>
<td>12:30 – 13:30</td>
<td>Lunch break</td>
</tr>
<tr>
<td>13:30 – 15:30</td>
<td>Country presentations (12 presentations * 10 minutes/presentation = 120 minutes)</td>
</tr>
<tr>
<td>15:30 – 15:50</td>
<td>Coffee break</td>
</tr>
<tr>
<td>15:50 – 16:30</td>
<td>Country presentations (4 presentations * 10 minutes/presentation = 40 minutes)</td>
</tr>
<tr>
<td>16:30 – 17:30</td>
<td>Introduction to the Ecosystem Approach to Aquaculture (EAA) and how to develop aquaculture as a business under this framework (Soto)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day 2 (21 January 2014)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30 – 10:30</td>
<td>Case study: the development of salmon farming in Chile from the perspective of an EAA (and what should have been done differently?) (Clement, Soto)</td>
</tr>
<tr>
<td>10:30 – 10:50</td>
<td>Coffee break</td>
</tr>
<tr>
<td>10:50 – 12:30</td>
<td>Implementing the EAA practical training by working groups (Soto, White)</td>
</tr>
<tr>
<td>11:00 – 12:30</td>
<td>1) Scoping and identification of stakeholders (2 working groups with 3 teams each; a) government, b) private sector, c) civil society</td>
</tr>
<tr>
<td></td>
<td>1.1) brief reporting by groups</td>
</tr>
<tr>
<td>12:30 – 13:30</td>
<td>Lunch break</td>
</tr>
<tr>
<td>13:30 – 15:30</td>
<td>2) identification of issues (socio economic, environmental and governance) and prioritization of issues by risk assessment (3 working groups)</td>
</tr>
<tr>
<td></td>
<td>2.1) brief reporting by groups</td>
</tr>
<tr>
<td>15:30 – 15:50</td>
<td>Coffee break</td>
</tr>
<tr>
<td>15:50 – 17:30</td>
<td>3) development of an EAA management plan (2 working groups with 3 teams each; a) government, b) private sector, c) civil society</td>
</tr>
<tr>
<td></td>
<td>3.1) brief reporting by groups</td>
</tr>
</tbody>
</table>
### Day 3 (22 January 2014)

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30 – 10:30</td>
<td>4) Implementing the management plan</td>
</tr>
<tr>
<td>10:30 – 10:50</td>
<td>Coffee break</td>
</tr>
<tr>
<td>10:50 – 12:30</td>
<td>4) Implementing the management plan</td>
</tr>
<tr>
<td>12:30 – 13:30</td>
<td>Lunch break</td>
</tr>
<tr>
<td>13:30 – 14:30</td>
<td>Background, objectives and scope of the business training (Hishamunda)</td>
</tr>
<tr>
<td>14:30 – 15:30</td>
<td>Developing aquaculture as a business: lessons learnt from the salmon industry (Arturo Clement)</td>
</tr>
<tr>
<td>15:30 – 15:50</td>
<td>Coffee break</td>
</tr>
<tr>
<td>15:50 – 16:30</td>
<td>Basic elements on developing aquaculture as a business (Cai)</td>
</tr>
<tr>
<td>16:30 – 17:30</td>
<td>Investment tool for assessing economic profitability and financial feasibility of aquaculture farms: demonstration (Hishamunda)</td>
</tr>
</tbody>
</table>

### Day 4 (23 January 2014)

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30 – 10:30</td>
<td>Investment tool for assessing economic profitability and financial feasibility of aquaculture farms: group exercises (Participants)</td>
</tr>
<tr>
<td>10:30 – 10:50</td>
<td>Coffee break</td>
</tr>
<tr>
<td>10:50 – 12:30</td>
<td>Investment tool for assessing economic profitability and financial feasibility of aquaculture farms: group exercises (Participants)</td>
</tr>
<tr>
<td>12:30 – 13:30</td>
<td>Lunch break</td>
</tr>
<tr>
<td>15:30 – 15:50</td>
<td>Coffee break</td>
</tr>
<tr>
<td>15:50 – 17:30</td>
<td>Investment tool for assessing economic profitability and financial feasibility of aquaculture farms: group exercises (Participants)</td>
</tr>
</tbody>
</table>

### Day 5 (24 January 2014)

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30 – 10:30</td>
<td>Investment tool for assessing economic profitability and financial feasibility of aquaculture farms: group exercises (Participants)</td>
</tr>
<tr>
<td>10:30 – 10:50</td>
<td>Coffee break</td>
</tr>
<tr>
<td>10:50 – 12:30</td>
<td>Workshop evaluation</td>
</tr>
<tr>
<td>12:30 – 13:30</td>
<td>Lunch break</td>
</tr>
<tr>
<td>13:30 – 15:30</td>
<td>Wrap-up: evaluation results, way forward, etc. (Soto)</td>
</tr>
<tr>
<td>15:30 – 16:00</td>
<td>Closing (Host country representative)</td>
</tr>
<tr>
<td>16:00 – 17:30</td>
<td>Farewell coffee</td>
</tr>
</tbody>
</table>
APPENDIX 3

SUMMARY OF THE ECOSYSTEM APPROACH TO AQUACULTURE CASE STUDY RESULTS

Pond culture case study
A summary of the outputs of the case study is given below.

Scope
The whole lake watershed.
There are common problems.

Overall objective
Sustainably increase food and nutrition security within the countries bordering the lake through the development of small aquaculture businesses throughout the watershed.

Species
Initially determine markets.
Tilapia (well-known technologies; productive strains available).

Type of pond system
Pond size – 500 (10 × 50 m) – 2 000 (25 × 40 m) m² determined by the area, topography (slope, etc.), business model.

Target production
Assume each of the three countries wishes to increase production by 5 000 tonnes within 5 years (i.e. an increase of about 15 000 tonnes in total).
Assume there is sufficient water to fill and maintain the ponds and sustain fish production.

Stakeholders
Chiefs, fish marketers, Ministries of Fisheries & Agriculture, NGOs, local consumers, local communities, food producers, Ministries of Environment, lenders, aquaculture associations, processors, hatcheries, feed companies, local governments, researchers, transport, water management authority, equipment suppliers, FAO, WF, other organizations, banks.
Leading agency should be the lake management authority.

Governance issues
- leadership
- harmonization of regulatory frameworks
- governments /institutes priorities contributions
- information communication training
- research

Socio-economic issues
- low income of the community
- high unemployment rate
- high level of malnutrition
- environmental degradation

Ecosystem issues
- pollution
- escape of fish
- water shortage
- loss of wetlands
- erosion and siltation
- disease and poor management
- predator control
- energy use and climate change
- changing lake and water quality
- feed associated and environmental problems
- changes in fish communities

Risk assessment

<table>
<thead>
<tr>
<th>Environmental issues</th>
<th>Socio-economic issues</th>
<th>Governance issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease</td>
<td>High unemployment</td>
<td>Leadership</td>
</tr>
<tr>
<td>5 × 2 = 10</td>
<td>5 × 2 = 10</td>
<td>3 × 4 = 12</td>
</tr>
<tr>
<td>Escapes</td>
<td>Low income</td>
<td>Legislation</td>
</tr>
<tr>
<td>3 × 4 = 12</td>
<td>5 × 4 = 20</td>
<td>3 × 5 = 15</td>
</tr>
<tr>
<td>Pollution</td>
<td>Poor management</td>
<td>Research</td>
</tr>
<tr>
<td>3 × 5 = 15</td>
<td>3 × 5 = 15</td>
<td>3 × 3 = 9</td>
</tr>
<tr>
<td></td>
<td>Low productivity</td>
<td>Govt. contribution</td>
</tr>
<tr>
<td></td>
<td>4 × 5 = 20</td>
<td>1 × 4 = 4</td>
</tr>
</tbody>
</table>
## Results of the group exercise on environmental issues

<table>
<thead>
<tr>
<th>Issue</th>
<th>Operational objective</th>
<th>Indicators</th>
<th>Targets (year)</th>
<th>Activities</th>
<th>Responsible institution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pollution</strong></td>
<td>Reduce pollution by 30%</td>
<td>Oxygen levels</td>
<td>10% 20% 30%</td>
<td>Training on pond management</td>
<td>Ministry of Agriculture/Fisheries/NGOs</td>
</tr>
<tr>
<td></td>
<td>Improved water quality</td>
<td>Nitrogen levels</td>
<td>10% 25% 50%</td>
<td>Training on better feeding practices</td>
<td>Ministry of Agriculture/Fisheries/NGOs</td>
</tr>
<tr>
<td></td>
<td>Reduce feed conversion ratio (FCR)</td>
<td>FCR (from 2.5 to 1.5)</td>
<td>2.2 1.8 1.5</td>
<td>Programme to improve feeding practices and feed quality</td>
<td>Farmers and Ministry</td>
</tr>
<tr>
<td><strong>Fish escape</strong></td>
<td>Reduce fish escape</td>
<td>Percentage of fish escaping / pond</td>
<td>10% 20% 30%</td>
<td>Inlet and outlet screening</td>
<td>Farmers and Ministry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of reports on escapes</td>
<td>10 5 2</td>
<td>Stock assessments</td>
<td>Researchers/Ministry</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Random sampling of fish in the lake</td>
<td>Researchers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Implement methodologies to count fish in ponds</td>
<td>Ministry of Agriculture/Fisheries/NGOs/farmers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Periodic fishing</td>
<td>Fishermen/Ministry/researchers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Awareness and sensitization of farmers and fishers</td>
<td>Ministry of Agriculture/Fisheries/NGOs</td>
</tr>
<tr>
<td><strong>Disease</strong></td>
<td>Prevent disease outbreak</td>
<td>Reduction in fish mortality</td>
<td>10 15 30</td>
<td>Training and sensitization on disease prevention and control</td>
<td>Ministry of Agriculture/Fisheries/NGOs</td>
</tr>
<tr>
<td></td>
<td>Control diseases</td>
<td>Number of reports on disease outbreaks</td>
<td>20 10 5</td>
<td>Adopt best management practices (BMPs)</td>
<td>Farmers</td>
</tr>
<tr>
<td></td>
<td>Produce disease-free fish</td>
<td>Percentage of diseased fish</td>
<td>10% 20% 30%</td>
<td>Source fingerlings from a disease-free zone</td>
<td>Farmers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Treatment programme for infected fish</td>
<td>Farmers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Quarantine fish coming from outside</td>
<td>Farmers</td>
</tr>
</tbody>
</table>
Results of the group exercise on governance issues

| Issue                          | Operational objective                                      | Indicators                                                                 | Targets(year) | Activities                                                                                                                                  | Responsible institution                                                                 |
|--------------------------------|-----------------------------------------------------------|                                                                           |               |                                                                                                                                          |                                                                                            |
| Harmonisation des textes       | Adopter une Convention commune dans le domaine de l’aquaculture entre les pays membres | -Nombres de documents adoptés; -Nombres de rapports produits;              |               | Demande d’assistance technique auprès de la FAO; Suivi de la mise en œuvre du projet; Reunions de sensibilisation dans les pays membres; Recrutement de consultants Diagnostic des cadres juridiques des pays membres; Reunions d’harmonisations des textes législatifs et réglementaires; Elaboration du projet de convention commune; Restitution du projet de convention dans chaque pays; Tenue d’un atelier régional d’harmonisation des textes Tenue d’un atelier de validation du projet de convention commune; Soumission du projet de convention au pays membres; Adoption de la convention commune dans le domaine de l’aquaculture par les pays membres | -Commission sous régionale; - Ministères chargés de l’aquaculture des trois pays; Ministères des Affaires Etrangères et de la Coopération internationale des pays membres; -FAO |

---

1. The text uses a mix of French and English. The English translation is provided for the operational objectives and activities.
<table>
<thead>
<tr>
<th>Issue</th>
<th>Operational objective</th>
<th>Indicators</th>
<th>Targets(year)</th>
<th>Activities</th>
<th>Responsible institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recherché</td>
<td>Renforcement de l’investissement dans la recherche en aquaculture</td>
<td>Allouer 0,5 % du budget National à la recherche aquacole en cinq ans</td>
<td></td>
<td>X</td>
<td>Réunion de sensibilisation ; Création d’un réseau sous régional de la recherche aquacole ; Evaluation des résultats de recherche ; Identification des thématiques sur la recherche aquacole dans les pays membres ; Recherche de financement ; Renforcement des capacités des chercheurs ; Mise en œuvre des thématiques identifiées ; Vulgarisation des résultats de recherche ; Suivi et évaluation des résultats de recherche</td>
</tr>
</tbody>
</table>

1 This group worked in French. Therefore, results are presented in French.
### Case study: cages

<table>
<thead>
<tr>
<th><strong>High-level objective:</strong></th>
<th>Maximize sustainable commercial cage culture in the lake for country export and domestic supply.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Species:</strong></td>
<td>Multispecies (no exotics).</td>
</tr>
<tr>
<td><strong>Production system:</strong></td>
<td>Cage culture.</td>
</tr>
<tr>
<td><strong>Production:</strong></td>
<td>Small to medium scale 5 000–7 000 tonnes per year.</td>
</tr>
<tr>
<td><strong>Stakeholders:</strong></td>
<td>Fishers, fish farmers, fish traders, local community, NGOs, academics, local/regional governments, tourism, water transport, hydropower, irrigation, agriculture, livestock.</td>
</tr>
<tr>
<td><strong>Ecosystem issues:</strong></td>
<td>Disease outbreaks, fish escapes, introduction of exotic species, destruction of habitats, poor-quality feed, poor-quality seed.</td>
</tr>
<tr>
<td><strong>Socio-economic issues:</strong></td>
<td>Reduced fishing area, conflict with other users, reduced access to water use, poaching, transport route blocked, tourism activities blocked, health and safety of workers, low prices of fish for fishers.</td>
</tr>
<tr>
<td><strong>Governance issues:</strong></td>
<td>Policies, plans for sustainable cage culture, regulatory and enforcement, ensure participation of stakeholders, inadequate market information, inadequate extension services, poor infrastructure, high taxes for input of feed, limited access to capital, poor leadership of farmers, political stability, incentives and subsidies for the sector, inadequate expertise, technological gaps, R&amp;D, bureaucratic process.</td>
</tr>
</tbody>
</table>

### Risk Assessment

<table>
<thead>
<tr>
<th>Governance issues</th>
<th>Socio-economic issues</th>
<th>Ecosystem issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital $5 \times 5 = 25$</td>
<td>Conflicts with other water users</td>
<td>Poor feed</td>
</tr>
<tr>
<td>Infrastructure $5 \times 4 = 20$</td>
<td>Lower fish prices</td>
<td>Nutrient impacts</td>
</tr>
<tr>
<td>Poor stakeholder involvement</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Results of the group exercise on management plan

<table>
<thead>
<tr>
<th>Issue</th>
<th>Operational objective</th>
<th>Indicators</th>
<th>Target</th>
<th>Activities</th>
<th>Responsible institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce conflicts</td>
<td>Reduce conflicts with other water users</td>
<td>No. of conflicts/thefts/damages</td>
<td>4 meetings per year</td>
<td>Conflict mechanism</td>
<td>Ministry of Fisheries / local leaders</td>
</tr>
<tr>
<td>Improve profitability</td>
<td>Increase access to capital</td>
<td>No. of people accessing loans</td>
<td></td>
<td>Training credit schemes</td>
<td>Ministry/NGOs</td>
</tr>
<tr>
<td>Improve economic profitability</td>
<td></td>
<td>Level of profitability</td>
<td></td>
<td>Business training</td>
<td>Ministry/NGO</td>
</tr>
<tr>
<td>Facilitating good governance</td>
<td>Full participation of stakeholders</td>
<td>No. of workshops</td>
<td>3 workshops/year</td>
<td>Stakeholder meeting</td>
<td>Ministry / local leaders</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4 meetings/year</td>
<td>Study consultancy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Committees</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zonation of carrying capacity estimates</td>
<td>6 month identify zone; 6 month carrying capacity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.5 month licences</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aquaculture zone mgt plan</td>
<td>Plan with report</td>
<td></td>
<td></td>
<td>Study consultancy</td>
<td>Ministry</td>
</tr>
<tr>
<td>Environmental sustainability</td>
<td>Reduce potential nutrient impacts</td>
<td>Water quality change; O₂, NO₃, PO₄, etc.</td>
<td>National standards</td>
<td>Conduct environmental impact assessment (EIA)</td>
<td>Ministry</td>
</tr>
<tr>
<td></td>
<td>Reduce impacts of wild fish</td>
<td>EIA completed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ensure best management practices (BMPs)</td>
<td></td>
<td></td>
<td>Guidelines and training</td>
<td>Ministry</td>
</tr>
</tbody>
</table>
Comments/notes:

- The operational objectives should be expressed in quantitative terms as much as possible, e.g. reduce diseases by a certain percentage, or for pollution – reduce oxygen by 30 percent.
- Need to involve the stakeholders, private sector, and producers in the implementation of activities.
- For each activity, there should be a timeline and budget.
- Farmer associations need to be involved in the management plan and should appear.
- Impacts on wild fish may be difficult to measure but one could use genetic markers where possible.
## APPENDIX 4

### SAMPLE RESULTS OF TECHNICAL AND ECONOMIC PERFORMANCE (TEN-YEAR AVERAGE) OF THE TWO OPERATIONS

<table>
<thead>
<tr>
<th>No.</th>
<th>Performance indicators</th>
<th>Tilapia</th>
<th>Catfish</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Total revenue (US$/year)</td>
<td>351 563</td>
<td>675 000</td>
</tr>
<tr>
<td>2</td>
<td>Production of the targeted species (kg/year)</td>
<td>140 625</td>
<td>140 625</td>
</tr>
<tr>
<td>3</td>
<td>Yield of targets species (tonnes/ha)</td>
<td>14</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Price of fish harvested (US$/kg)</td>
<td>2.5</td>
<td>–</td>
</tr>
<tr>
<td>5</td>
<td><strong>Total cost (US$/year)</strong></td>
<td><strong>304 633</strong></td>
<td><strong>597 785</strong></td>
</tr>
<tr>
<td>6</td>
<td>Variable cost (US$/year)</td>
<td>273 476</td>
<td>387 328</td>
</tr>
<tr>
<td>7</td>
<td>Seed (US$/year)</td>
<td>45 000</td>
<td>45 000</td>
</tr>
<tr>
<td>8</td>
<td>Feed (US$/year)</td>
<td>145 000</td>
<td>463 050</td>
</tr>
<tr>
<td>9</td>
<td>Labour (US$/year)</td>
<td>57 600</td>
<td>25 000</td>
</tr>
<tr>
<td>10</td>
<td>Maintenance and repairs (US$/year)</td>
<td>3 000</td>
<td>3 000</td>
</tr>
<tr>
<td>11</td>
<td>Fuel and lubricants (US$/year)</td>
<td>10 000</td>
<td>10 000</td>
</tr>
<tr>
<td>12</td>
<td>Electricity (US$/year)</td>
<td>3 000</td>
<td>3 000</td>
</tr>
<tr>
<td>13</td>
<td>Financial charges (US$/year)</td>
<td>9 076</td>
<td>–</td>
</tr>
<tr>
<td>14</td>
<td>Other operating costs (US$/year)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>15</td>
<td>Fixed cost (US$/year)</td>
<td>31 157</td>
<td>10 457</td>
</tr>
<tr>
<td>16</td>
<td>Depreciation of fixed assets (US$/year)</td>
<td>23 000</td>
<td>2 300</td>
</tr>
<tr>
<td>17</td>
<td>Interests on investment loans (US$/year)</td>
<td>8 157</td>
<td>8 157</td>
</tr>
<tr>
<td>18</td>
<td>Other fixed costs (US$/year)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>19</td>
<td><strong>Net income (or profit) (US$/year)</strong></td>
<td><strong>46 930</strong></td>
<td><strong>77 215</strong></td>
</tr>
<tr>
<td>20</td>
<td>Net income per unit of pond area (US$/ha)</td>
<td>4 693</td>
<td>7 721</td>
</tr>
<tr>
<td>21</td>
<td>Net income per unit of production (US$/tonne)</td>
<td>334</td>
<td>7 722</td>
</tr>
<tr>
<td>22</td>
<td>Net profit margin (%)</td>
<td>15%</td>
<td>11%</td>
</tr>
<tr>
<td>23</td>
<td>Profit (or return) on investment (%)</td>
<td>20%</td>
<td>–</td>
</tr>
<tr>
<td>24</td>
<td><strong>Gross profit (or gross operating margin or net return above total variable cost) (US$/year)</strong></td>
<td><strong>78 087</strong></td>
<td>–</td>
</tr>
<tr>
<td>25</td>
<td>Gross profit per unit of pond area (US$/ha)</td>
<td>7 809</td>
<td>–</td>
</tr>
<tr>
<td>26</td>
<td>Gross profit per unit of production (US$/tonne)</td>
<td>555</td>
<td>–</td>
</tr>
</tbody>
</table>
APPENDIX 5

RESULTS OF THE EVALUATION

The breakdown of evaluation respondents was as follows:

<table>
<thead>
<tr>
<th>Number of forms</th>
<th>23</th>
</tr>
</thead>
<tbody>
<tr>
<td>English forms</td>
<td>61%</td>
</tr>
<tr>
<td>French forms</td>
<td>39%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Categories</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy-makers</td>
<td>48</td>
</tr>
<tr>
<td>Extension officers</td>
<td>39</td>
</tr>
<tr>
<td>Others</td>
<td>13</td>
</tr>
</tbody>
</table>

The results of the evaluations were as follows:

How much did you learn from the initial part of this workshop: the general presentation of why doing aquaculture as a business in Africa and elsewhere, the presentation and assessment of the situation by country, and the synthesis of the situation in the region.

![Graph showing responses to initial part of workshop](image1)

How much did you learn from the first part of this workshop: Implementing EAA?

![Graph showing responses to first part of workshop](image2)
How would you rate the usefulness of the EAA part?

![Chart showing the rating of the usefulness of the EAA part.](image1)

How would you rate your satisfaction with the EAA part of the Training?

![Chart showing the rating of the satisfaction with the EAA part.](image2)

How much did you learn from the Business part of this Workshop?

![Chart showing the learning from the Business part.](image3)
How would you rate the usefulness of the Business part of this Workshop?

![Usefulness Bar Chart](chart1.png)

How would you rate your satisfaction with the Business part of the Training?

![Satisfaction Bar Chart](chart2.png)
OPENING STATEMENT BY HIS EXCELLENCY, DR DAVID SHAMULENGE, PERMANENT SECRETARY OF THE MINISTRY OF AGRICULTURE AND LIVESTOCK, ZAMBIA

FAO Representative to Zambia, Dr George Okech
NEPAD Regional Fish Node Coordinator, Professor Emmanuel Kaunda

Distinguished invited guests,
Ladies and Gentlemen,

It is my honour and privilege to be accorded this opportunity to officiate at this regional NEPAD-FAO programme workshop on developing aquaculture as a business within an ecosystem approach to the sector being held here in Lusaka at Protea hotel. I wish to welcome you all to Zambia and hope that you will enjoy the Zambian hospitality. I wish to thank the organizers for choosing Zambia to host this important five days’ workshop.

Chairperson,

I am told that this workshop is intended to enhance the capacity of decision makers and personnel in the public sector such as policy makers, extension personnel, staff in civil society organizations and others in understanding and promoting aquaculture as a business within an ecosystem approach in order to facilitate the transformation of aquaculture in Africa from a public-funding driven, subsistence-oriented and non-viable sector to an economically vibrant, private-sector led and sustainable enterprise.

Chairperson,

The fisheries and aquaculture sector are important because of their contribution towards generation of employment, as a source of food as well as incomes. In Zambia, for example, total fish production is estimated at 70,000 metric tonnes of which 12 percent is from aquaculture and over one million people benefit directly and indirectly from the fisheries resources. The aquaculture sector is slowly expanding with emergence of cage fish farming in our lakes and rivers.

In order to address slow growth of aquaculture in the country, the Zambian government has prioritized support to the sector. The national aquaculture development strategy and plan are being revised to accommodate new government policy pronouncements with emphasis on promoting aquaculture as a business. This workshop therefore is being held at an opportune time where the workshop outputs will enrich our new aquaculture plan.

Chairperson,

To attain its full potential to contribute for human development and social empowerment the aquaculture sector may require a favourable environment and new approaches that are achievable. So, there is obvious need to adopt policies and practices that ensure environmental sustainability related to environmentally sound technologies and resource efficient aquaculture systems. Through the revision of the strategy and plan, the Zambian government is putting in place measures to ensure that aquaculture grows in a way that promotes socio-economic development, food security and that it does not threaten conservation of natural resources for the immediate needs of the users of these ecosystems and also for future generations.
Chairperson,
Ladies and Gentlemen,

We all know that ecosystems are complex and dynamic units that provide goods and services. Aquaculture has direct impact on the ecosystem. Not only aquaculture but also other human activities may have an impact on the ecosystem. These activities need to be managed in an ecosystem context. Through ecosystem approach to aquaculture its maximum achievement can be ensured by creating the appropriate environment for improved support to producers, enhanced participation of stakeholders, and strengthened networking.

I am confident that this workshop will achieve its objective of enhancing the capacity of participants so as to be able to promote aquaculture as a business within an ecosystem approach to the sector.

In conclusion, chairperson,

I wish to thank the food and agriculture organization (FAO) and NEPAD fish node for implementing this capacity building workshop. I, therefore wish all of you fruitful deliberations and hope that the workshop will be enriched through sharing of experiences with experts from other countries. Zambia should use every opportunity available through such fora to gather necessary information required for increasing fish production and productivity in the country.

I take this opportunity to invite our guests to spare their free time to observe and enjoy the beauty of our country during their stay in Zambia.

With these few remarks, may I, therefore, declare this regional workshop on developing aquaculture as a business within an ecosystem approach officially open.

I thank you.
APPENDIX 7

STATEMENT BY DR GEORGE OKECH, FAO REPRESENTATIVE IN ZAMBIA

Permanent Secretary (Livestock), Dr David Shamulenge
Distinguished Experts and participants,
Colleagues,
Ladies and Gentlemen,

It is an immense pleasure and a big privilege for me to be given the opportunity to address this important gathering. I wish to convey to you all, the warmest season greetings of Professor José Graziano da Silva, Director-General of the Food and Agriculture Organization of the United Nations, FAO, which I have the honour to represent in this superb and charming country, Zambia. On behalf of the Director-General of the FAO and the Regional Representative for Africa, Mr Bukar TIJANI, let me welcome you to this workshop.

Honourable Minister,

I would like to thank you and request you to convey to the Government and people of Zambia, our sincere gratitude for accepting to host this meeting. At FAO, we strongly believe that this workshop is of extreme importance to the Africa region as it strives to develop its aquaculture sector as a vibrant, profitable, self-sustained and private-sector-led industry. Allow me, also, Honourable Minister, to say how much we value your presence among us today.

Ladies and Gentlemen,

As you are aware, in the last two decades, aquaculture has been one of the fastest growing food sectors in the world, producing from 17 million metric tons in 1990 to nearly 84 million tons in 2011, globally. However, even though Africa and especially Sub-Saharan Africa is endowed with no fewer natural resources for aquaculture than elsewhere, aquaculture development in the region has been falling far behind the global performance. In 2011, aquaculture production in Africa was about 1.5 million tons or merely 1.84 percent of the World’s total. By producing just 0.54 million tons of fish, Sub-Saharan Africa barely contributed 0.65 percent of the global aquaculture production.

To the opinion of many experts, one of the major factors hindering aquaculture development in Sub-Saharan Africa is that promotion of aquaculture has over-emphasized aquaculture as a means of rural livelihood, and overlooked the importance of treating aquaculture as an economic enterprise capable of generating competitive profits and generating decent employment in addition to producing fish for consumption. African policy makers no longer accept this situation to continue.

There is increasing consensus among policy makers and development planners that aquaculture in Africa needs to be treated as a commercial activity. In order to provide an enabling environment for the development of this type of aquaculture in the region, there is the need for stakeholders to understand basic economic and business principles, appreciate the function of market mechanisms and business operations. It is also important to acquire skills needed to design and implement policies and provide assistance and advice to farmers that align environmental, social and economic objectives of aquaculture development and to ensure its sustainability. It is within this spirit that this Workshop on Conducting Aquaculture as a Business within the Framework of the Ecosystem Approach to the Sector Development is organized.
Distinguished Participants,
Ladies and Gentlemen,

Evidence has shown that developing aquaculture as a business supplies more aquatic products for home consumption, thereby directly enhancing food and nutritional security. When properly conducted, aquaculture as a business also generates many more socio-economic benefits to communities, to society as a whole and to national and regional economies. Some of these benefits include generating profits for stakeholders, contributing to countries GDP, creating employment for all, paying labour incomes, providing tax and export revenues to governments and contributing to countries’ balance of trade. But, aquaculture cannot be developed in isolation. Its development must occur within countries’ general macro-economic and social development.

It is for this reason that FAO has been promoting an ecosystem approach to aquaculture, a “strategy for the integration of aquaculture within the wider ecosystem such that it promotes sustainable development, equity and resilience of interlinked social-ecological systems”. The ecosystem approach to aquaculture provides a planning and management framework whereby parts of the aquaculture sector can be effectively integrated into local planning. This approach also provides mechanisms for engaging with producers and governments for an effective sustainable management of aquaculture operations, facilitates the adoption of the Code of conduct for responsible fisheries and of national policies and regulations at any geographical or administrative scale, and facilitates addressing the potential equity and access issues that can rise in developing aquaculture as a business.

Ladies and Gentlemen,

I do not wish to anticipate on the discussions that will take place in this meeting. Nevertheless, allow me to recall that the aim of this workshop is to enhance the capacity of decision makers and personnel in the public sector in understanding and promoting aquaculture as a business with a wider ecosystem approach in mind. The ultimate short- to medium goal is to facilitate the transformation of African aquaculture from a public-funding-driven, subsistence-oriented and non-viable sector to an economically vibrant, private-sector-led and sustainable enterprise.

During the workshop you will discuss, inter-alia, the general Ecosystem approach to aquaculture framework and some practical insights on how to implement it. You will also have the opportunity to learn from other countries’ experiences in this area, particularly lessons learned from outside the African continent. Fundamental principles in developing aquaculture as a business will be explored. Additionally, there will an introduction to and a hands-on application of an Investment Decision Making Tool in Aquaculture which FAO developed to guide farmers’ decisions to invest in the sector.

Honourable Minister,
Distinguished participants,
Ladies and Gentlemen,

At this juncture, I wish to say my sincere gratitude to the Government of Sweden and its International Development Agency (SIDA) which, through the project “NEPAD-FAO Fish Programme-NFFP” (GCP/RAF/463/MUL), has generously funded this workshop in addition to the contribution from the FAO Sub-regional Office for Eastern Africa.

I also want to note the presence, in this room, of colleagues from FAO Headquarters in Rome and the FAO Sub-regional Office for Eastern Africa. They are at your disposal as resource persons for this workshop. Non-FAO experts, Mr Arturo Clement and Mr Patrick White, you came all the way from Chile and the United Kingdom to share your international experiences. We value your inputs. We especially appreciate the support of the Global Salmon Initiative (GSI) that made presence of the Representative of Chilean farming Companies, Mr Arturo Clement, to be with us today, and wish to
reiterate our warm welcome and long life to the FAO-GSI partnership to support aquaculture in developing countries.

With these few remarks, I would like to conclude my intervention by wishing you a fruitful meeting.
APPENDIX 8

GROUP PHOTOGRAPH OF WORKSHOP PARTICIPANTS

@FAO Zambia
This document represents the final report of the NEPAD–FAO Fish Programme Workshop “Developing Aquaculture as a Business within an Ecosystem Approach to the Sector”, held in Lusaka, Zambia, from 20 to 24 January 2014. The objective of the workshop was to enhance the capacity of decision-makers and personnel in the public sector in understanding and promoting aquaculture as a business within an ecosystem approach to aquaculture (EAA); this in order to facilitate the transformation of aquaculture in Africa from a public-funding-driven, subsistence-oriented and non-viable sector to an economically vibrant, private-sector-led and sustainable enterprise. The workshop participants included fisheries/aquaculture officers, extension personnel, and staff from civil society organizations (farmers associations, non-governmental organizations, etc.). Recommendations were made with reference to the assistance required to facilitate the implementation of the EAA at the country level and to further improve the “user-friendly tool for investment decision-making in aquaculture” developed for this purpose by the Aquaculture Branch of the FAO Fisheries and Aquaculture Department.