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Report of the

SUBREGIONAL WORKSHOP TO PROMOTE SUSTAINABLE AQUACULTURE DEVELOPMENT IN THE SMALL ISLAND DEVELOPING STATES OF THE LESSER ANTILLES

Vieux Fort, Saint Lucia, 4–7 November 2002

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PREPARATION OF THIS DOCUMENT

The FAO Fisheries Department has embarked on a programme of promoting sustainable increases in the production of food fish from aquaculture activities in developing countries, including Small Island Developing States (SIDS). Mindful of the status of the world's marine capture-fisheries the goal of the department has been to assist SIDS to position themselves to mitigate food insecurity, while at the same time ensuring that their aquaculture practices are compatible with their ecosystems. In the case of the SIDS of the Lesser Antilles the assistance took the form of a workshop to examine the past and ongoing aquaculture experiences and to elaborate the institutional and policy constraints and opportunities for sustainable aquaculture development, in the future.

This report is the record of the proceedings of that workshop. It also includes the national aquaculture-status reports of the countries that were represented and the papers presented by resource persons.

The report was prepared by the FAO Subregional Office, in close collaboration with the Development Planning and the Inland Water Resources and Aquaculture Services of FAO, Rome.

Distribution:

All FAO Members and Associate Members
Participants at the Session
FAO Fisheries Department
Fishery Officer in FAO Regional Offices

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ABSTRACT

The workshop was organized by the FAO Subregional Office for the Caribbean in collaboration with the Development Planning and Inland Water Resources and Aquaculture Services of the FAO Fisheries Department, Rome. It was hosted by the Government of Saint Lucia, and attended by 15 participants from seven countries, four regional institutions and the FAO Fisheries Department.

The syntheses of the national experiences and status of aquaculture development in the Lesser Antilles reflected a significant level of diversity in the scale of activities among the island nations; they also revealed many similarities in the results and present status of aquaculture development in the subregion. The case studies elicited very positive comments and enquiries from the country representatives.

In the plenary deliberations, to identify the constraints to and opportunities for developing aquaculture sustainably in the subregion, participants recognized the need to rank the aquaculture development activities based on individual country-priorities and stage of development.

The workshop agreed that participants would consult with the decision-makers in their respective countries and communicate a priority-list of needs for possible technical assistance to the technical secretary of the workshop. It was also agreed that such a list would be used to identify common themes that could form the basis for a possible subregional Technical Cooperation Programme (TCP) project proposal.

CONTENTS

SUMMARY OF RECOMMENDATIONS AND PROPOSAL FOR FURTHER ACTION

The workshop participants noted the results of the many previous attempts to develop aquaculture in the subregion. They also identified the following steps that should be taken to facilitate the development of sustainable aquaculture in the SIDS of the Lesser Antilles:

1) Incorporate aquaculture into national development plans and strategies;
2) Formalizing an aquaculture development policy (including environment and fiscal incentives);
3) Legal framework development; Establish small-scale pilot projects for technology transfer and its evaluation;
4) Economic feasibility studies and marketing analysis for aquaculture proposals;
5) Allocate resources (government commitment) for aquaculture;
6) Strengthen aquaculture related institutions (including monitoring and regulatory systems, capacity building, research);
7) Appropriate technology (development & dissemination);
9) Identify reliable sources of inputs and create access to inputs (broodstock, feed, fingerlings, equipment);
10) Establishing administrative procedures for smooth Evaluation and Approval of projects;
11) Code(s) of Best Practice development (under private-public partnerships); and
12) Attract private sector involvement/investment.

The participants recommended that the steps should be prioritized taken in the order suiting the stage of development of aquaculture in a particular subregional country.

They also recommended that a concerted effort should be made to raise the awareness of the opportunities for sustainable aquaculture development among potential aquaculture stakeholders, decision-makers and natural resources managers in the Lesser Antilles.

It was suggested that an immediate follow-up activity to the workshop could take the form of a Technical Cooperation Programme (TCP) project proposal based on the common priority-needs communicated to the workshop secretariat by the countries that participated.

PART I - MEETING REPORT

BACKGROUND AND OBJECTIVES

1. At the special FAO Ministerial Conference on Agriculture in Small Island Developing States (SIDS) held in 1999, the participating countries expressed their commitment to pursue efforts to achieve food security and to implement development policies and programmes which would secure the sustainability of agriculture, forestry and fisheries sectors in SIDS. Specific to aquaculture, the Ministerial Conference recognized the need to collaborate with the international and scientific communities in both the public and private sectors to:

- Introduce or strengthen aquaculture and inland fisheries where feasible and appropriate;
- Ensure that aquaculture practices are compatible with their ecosystems; and
- Establish networks to facilitate exchanges of technical information.

2. FAO included under its current Programme of Work for the 2002-2003 biennium a sub-programme activity on aquaculture development. For the Caribbean region it is intended to promote aquaculture and inland fisheries and increase their contribution to the achievement of food security. Therefore, a number of case studies and analyses of key aspects of aquaculture and inland fishery production have been carried out. Some of the outputs of these activities, specific to the SIDS of the Lesser Antilles, include contributions towards:

- Identifying and analyzing constraints and commercial and or small-scale rural aquaculture development;
- Identifying mechanisms for promoting regional and subregional information exchange, in aquaculture development and management strategies; and
- Identifying opportunities for promoting sustainable and listing the policy and legal initiatives that governments can use to promote sustainable aquaculture development.

3. Efforts to promote aquaculture development among the SIDS of the Lesser Antilles were initiated in the early 1980s. In 1993 the Italian-funded FAO-AQUILA II project on 'Support to Regional Aquaculture Activities in Latin America and the Caribbean' (GCP/RLA/102/ITA) recognized the different potentials for developing aquaculture in the region following a review of the industry. Subsequently, in co-operation with the Caribbean Community (CARICOM) Secretariat, a project on Caribbean Aquaculture Development (CARAD), aimed at institutional strengthening and increasing co-operation among regional institutions was prepared.

4. The main objectives of the CARAD project proposal are still relevant. However, since the project did not attract the anticipated funding it was not implemented. In a real sense, therefore, the present workshop can be considered as an attempt to use the approach suggested in the original CARAD project proposal to refocus on the status of, and the elements of relevance to, aquaculture development in the SIDS of the Lesser Antilles.

5. At the Twenty-first session of the FAO *Committee on Fisheries* (COFI), held in Rome, March 1995, "some delegations underscored the potential importance that the development of aquaculture might play in future in SIDS. It was noted that aquaculture could

be vital for food and economic development, and could permit a reduction in fishing effort where this was called for". At the same Session, several delegations considered that FAO assistance to SIDS should focus on six main areas, among which was "aquaculture and inland fisheries conservation, management and development". Although the issue of aquaculture development in the SIDS was raised during various subsequent sessions it never managed to gain a priority status, which made it difficult for FAO to support aquaculture development in the SIDS through regular budget funds.

6. In view of the above, FAO organized the Workshop on the Development of Sustainable Aquaculture in the Small Island Developing States of the Lesser Antilles with the aim of assisting the participating governments in their decision making processes related to aquaculture development strategy and policy development. The proceedings and conclusions are detailed in this report.

ATTENDANCE

7. The workshop was attended by 15 participants from seven countries in the region, from four regional institutions, and from the Fisheries Department of the Food and Agriculture Organization of the United Nations (FAO) and the FAO Subregional Office for the Caribbean (FAO SLAC). The countries represented included Antigua and Barbuda, Barbados, Grenada, Saint Vincent and the Grenadines, Saint Kitts and Nevis, Saint Lucia and Trinidad and Tobago. The representatives from the Bahamas and Dominica did not attend, but submitted updated reports on the status of aquaculture in their respective countries. The list of participants is attached as Appendix B to this report.

PROCEEDINGS

Opening Ceremony

8. The workshop started with an opening ceremony in which Mr Randolph Walters, Fishery Officer in the FAO Subregional office for the Caribbean, welcomed the participants on behalf of the Director General of FAO, Dr Jacques Diouf and from the Assistant Director-General of the FAO Fisheries Department, Mr Ichiro Nomura. He proceeded to explain the purpose of the workshop and provide a historical background on FAO's past activities in support of aquaculture development in the subregion.

9. He thanked the Government of Saint Lucia for hosting the workshop and introduced its representative to deliver welcoming remarks and to officially open the workshop.

10. Following the introduction, the Chief Fisheries Officer of the Ministry of Agriculture, Forestry and Fisheries of Saint Lucia, Mr Vaughn Charles, conveyed regards from the Honourable Minister, Mr Calix George. The speaker thanked FAO for having organized the workshop in Saint Lucia and extended a warm welcome to the participants. He then took the opportunity to discuss the importance of food security and the potential contribution aquaculture can play in achieving food security in the SIDS of the Lesser Antilles. The speaker stressed the opportunities for aquaculture with regard to providing products to the tourism sector on the islands and to the Saint Lucia school-feeding programme.

11. The speaker mentioned the recent initiatives taken by the Saint Lucia Fisheries Department in producing fish feeds and support to farmers with these feeds and fingerlings. He highlighted the difficulties that aquaculture operators have experienced in sourcing affordable commercial feeds to ensure competitiveness with marine capture fisheries.

12. He also mentioned the potential for regional-level co-operation under the Caribbean Regional Fisheries Mechanism (CRFM), and the high priority given to aquaculture in the medium term plan of the CARICOM Fisheries Unit. In closing, he expressed the hope that the workshop recommendations will include ideas on how to get the costs related to running an economically viable aquaculture enterprise down and how to increase aquaculture production.

Working Session

13. Mr Walters was elected as chairperson for the workshop. The agenda was discussed and subsequently adopted. The agenda is attached as Appendix A to the present report.

Presentation of Technical Papers

14. The working session was opened with a synthesis of national experiences and status of aquaculture development in the Lesser Antilles following the same format used in the AQUILA II project in order to ensure historical comparisons (see Part II of the report). A Compendium of Fisheries Statistics (extracted from FAO Fishstat Plus) containing the aquaculture production for the Lesser Antilles SIDS and the Bahamas, was distributed as a workshop document. The participants were acknowledged for having submitted their country reports in advance, making it possible to elaborate the synthesis. While noting that national reports and the production figures in the compendium had minor differences, most participants provided some clarifications to their country's status and related personal experiences.

15. The following reports were subsequently delivered:

Marketing Opportunities for Aquaculture Products in the Lesser Antilles

16. Mr Raymon Van Anrooy, FAO Fishery Planning Officer, made a presentation focusing on the following issues:

- Trade in fishery products by SIDS of the Lesser Antilles and Bahamas;
- Markets for aquaculture products in the USA and the EU;
- Current trends in and prospects for fish consumption; and
- Issues of importance to commercially oriented aquaculturists.

17. The discussion which followed focused on fishery product quality standardization, food safety and export barriers encountered, as some of the SIDS of the Lesser Antilles are (still) not allowed to export fishery and aquaculture products to the EU. Many participants conceded that there was a local market for aquaculture products, which cannot be satisfied at present from local production. They also identified issues such as: the relative high prices of aqua-feeds, inadequate and unreliable support systems and infrastructure and access to credit as major dis-incentives to aquaculture development in the subregion.

18. The importance of the CARICOM and Organization of Eastern Caribbean States (OECS) organizations in assisting ways of improving access to the regional and international markets was recognized. The full presentation is included in Part III of the report.

Aquaculture Development of Red Drum (Sciaenops ocellatus) in Martinique and the French West Indies

19. Mr Jean Claude Dao of the IFREMER (French Research Institute for Exploitation of the Sea) station in Martinique presented a report on the status of mariculture development of red drum (*Sciaenops ocellatus)* in the French island. He described the techniques used in red drum culture including broodstock maintenance and spawning, larval rearing and grow-out management.

20. The presentation continued with an overview of the steps being taken to improve rearing techniques of the red drum using marine cages and the strategies adopted by IFREMER in transferring the technology to the private sector. Finally, he described some of the risks of mariculture activities and the solutions developed during the pilot phases; he also suggested some of the basic requirements and conditions that can facilitate the transfer of the red drum aquaculture technology to other Lesser Antilles islands. The presentation is included in Part III.

21. During the discussion some participants requested additional information on the extension services being supplied to farmers and the experiences with hurricane damage to the grow-out cages. Mr Dao indicated that there are eight collaborating farmers to whom IFREMER provides extension services, including juveniles for use in grow-out facilities. The speaker also reported that the cages can be submerged to minimize hurricane damage.

Tilapia Production Systems for the Lesser Antilles and other Resource-Limited Tropical Areas

22. The paper was presented by Mr James Rakocy of the University of the Virgin Islands (UVI). He started by presenting background information on the situation with respect to resources that tropical islands may lack (water supply, soil type, declining supplies from capture fisheries and topography) or have in limited amounts available to justify the establishment of tilapia production systems. He discussed three tilapia production systems: 1) cage culture in small ponds; 2) greenwater tank culture; and 3) aquaponics, a system that combines fish culture with plant culture. The speaker reviewed the techniques, materials, methods (including costs) and the results of his work (at the UVI) with floating cages in ponds to intensively produce marketable tilapia.

23. Mr Rakocy continued to describe the processes involved in the construction and operation of greenwater tank culture producing tilapia. He highlighted the processes of bio-conversion, mechanical aeration and bio-filtration, but cautioned listeners of the need for regular monitoring of this system. He also advised participants that the greenwater tank system has recently been adjusted and is now available for commercial aquaculture in small islands.

24. In describing the aquaponics system, for intensive tilapia production in combination with hydroponic vegetables and other crops such as culinary herbs and medicinal plants, the speaker indicated that the tilapia provided most of the nutrient requirements for plant growth

in the system. He described the various adjustments and changes that had to be made to the system while changing components such as tilapia stocking density and vegetable plant species.

25. The speaker detailed that the selection of the most suitable tilapia production system would depend on the local circumstances. He described that the various systems can be applied on different scales, which make them suitable to contribute to rural family diets and income as well as to large-scale commercial tilapia aquaculture. He argued that hydroponics plants extend water use and reduce discharge to the environment; hence integrated systems require less water quality monitoring than individual systems and that the cost savings can increase profit potential.

26. The speaker concluded that large-scale projects would require some preliminary experience or the availability of advance technical supervision and training, at the outset. The presentation appears in Part III of the report.

Scallop Culture in Bermuda: A Model for the Lesser Antilles?

27. Ms Samia Sarkis-Hillier of the Bermuda Biological Station for Research (BBSR) delivered this presentation. She presented the technical details of the aquaculture development process of two local scallop species (*Argopecten gibbus* and *Pecten ziczac*) in Bermuda. She also described the strategies used to carry the process to commercial production as well as to cultivate acceptance at the local markets.

28. The speaker indicated that the environmental, administrative and socio-economic conditions existing in Bermuda were suitable to facilitate the development of scallop culture, from the experimental to the commercial stages. Some of the conditions she mentioned included: good water quality, no income tax and the potential of embargo on imported similar products, and high local prices for seafood and high market demand.

29. In addressing the question of the feasibility of replicating scallop culture in the Lesser Antilles, Ms Sarkis-Hillier indicated that the turn-key technology is available, the species are tropical, and the hatchery facility costs are relatively low. She cautioned that issues such as zoning of aquaculture areas, leasing of the seabed and environmental monitoring of water quality and aesthetics would have to be considered at the outset.

30. Many participants expressed interest in having access to the scallop culture technology, particularly the participant from Antigua and Barbuda who indicated that "fisheries officials in her country were concerned about a noticeable increase in harvesting pressure on a native bivalve (*Lucine* sp.)". She speculated that it might protect the wild bivalve stocks from over exploitation if the technology proved adaptable for culturing them. Ms Sarkis-Hillier indicated that arrangements to establish pilot projects to transfer the scallop culturing technology to the Turks and Caicos Islands and Cuba were being pursued.

Enabling Policy Frameworks for the Promotion of Sustainable Aquaculture in the Lesser Antilles

31. Mr Raymon Van Anrooy presented the paper, on this topic. It was intended that the presentation would serve as a departure point for the plenary discussions. The speaker commenced his presentation by giving same background on the macro-economic and

aquaculture sector specific policies that could facilitate sustainable aquaculture development in the Lesser Antilles. The full presentation can be found in Part III. The main issues discussed by the speaker were:

- Macro-economic and sectoral policies (e.g. COFI, CCRF, CRFM, Good governance);
- Farm level policies (e.g. related to input subsidies, grants, research and extension);
- The relevance of the Code of Conduct for Responsible Fisheries (CCRF) to aquaculture development in the SIDS of the Lesser Antilles; and
- The pre-requisites for aquaculture development in the SIDS.

32. The subsequent discussion focused on aquaculture development experiences of the SIDS of the Lesser Antilles. A country by country overview was requested by some of the resource persons. The information presented during these overviews complemented the earlier information in the 'Regional synthesis'.

33. The discussions showed that there were significant differences in the levels of aquaculture activities between countries in the region; at the same time they also revealed many similarities. For example, the sentiments expressed may be summarized as follows:

- all the countries had some level of aquaculture activities and failures in the past;
- some countries have very little ongoing aquaculture activities at present;
- generally, there is very limited land space available for inland aquaculture development, so mariculture is seen as the best option;
- acceptance of tilapia among consumers is generally low (except for red tilapia);
- some governments want to diversify their countries' agricultural sector (away from banana and sugar cane) and consider aquaculture as one of the options;
- aquaculture is barely mentioned in national fisheries laws, which are generally outdated.

34. Notwithstanding the diversity of experiences expressed, there was consensus among the participants that the aquaculture technologies described in the case studies could improve their respective aquaculture development status. Some enquired about the possibilities of setting-up pilot projects in their countries. The FAO officers responded by suggesting that one possible vehicle which can be used to facilitate the transfer of aquaculture technology among the countries was the FAO Technical Cooperation Programme (TCP). It was suggested that after participants had consulted further with their national fishery administrators formal communications could be initiated to seek to access facilities such as the FAO-TCP or other possible sources of international assistance.

PLENARY DISCUSSIONS ON POLICIES AND INSTITUTIONAL STRATEGIES FOR AQUACULTURE DEVELOPMENT IN THE LESSER ANTILLES

35. In addressing this agenda item, it was originally intended that the participants would be separated into two groups for each to focus on the following tasks:

- to identify the subregional aquaculture policy constraints and opportunities; and

- to identify the institutional constraints and opportunities in the subregional aquaculture development practices.

36. Because of the limited number of participants, it was suggested to work together instead of dividing into smaller groups as the initial agenda had detailed.

37. The plenary discussion elaborated on the critical issues and realities of aquaculture development in the SIDS of the Lesser Antilles. The participants identified the overall objectives of aquaculture as "Contributing to the achievement of food security" and "Contributing to the sustainable use of the aquatic resources of the Lesser Antilles"; they identified the direct objective as "achieving increased aquaculture production in the Lesser Antilles".

38. The plenary acknowledged various important steps that should be taken to reach the objectives of developing the aquaculture sector. Recognizing the fact that there is hardly any aquaculture development taking place in the SIDS of the Lesser Antilles at present, the following steps were suggested:

A. Incorporate aquaculture into national development plans and strategies;
B. Formalizing an aquaculture development policy (including environment and fiscal incentives);
C. Legal framework development;
D. Establish small-scale pilot projects for technology transfer and its evaluation;
E. Economic feasibility studies and marketing analysis for aquaculture proposals*;
F. Allocate resources (government commitment) for aquaculture;
G. Strengthen aquaculture related institutions (including monitoring and regulatory systems, capacity building, and research);
H. Appropriate technology (development and dissemination*);
I. Identify reliable sources of inputs and create access to inputs (broodstock, feed, fingerlings, equipment);
J. Establishing administrative procedures for smooth Evaluation and Approval*;
K. Code(s) of Best Practice development (under private-public partnership); and
L. Attract private sector involvement/investment*.

After considerable discussion the steps marked with (*) were seen as being covered already by the other steps, and therefore could be left out.

The constraints and opportunities identified for each of the recommended steps are the following:

A. ***Incorporate aquaculture into national development plans and strategies***

Constraints:

- Not enough priority is given to CCRF follow-up on aquaculture related issues
- No aquaculture strategies and plans available to incorporate into general development plans
- Aquaculture has not been considered a priority by the national governments
- Institutional capacity to develop aquaculture strategies and plans is not available

Opportunities:

- Demonstrate to Government that aquaculture can contribute to the achievement of food security, generating income and creating employment
- Emphasize that aquaculture should be part of any diversification strategy, can contribute products for the tourism sector and for export
- Develop institutional capacity to formulate aquaculture strategies and plans
- National fisheries departments should take lead in development of sectoral plans, with stakeholder consultation/involvement
- Comply with international agreements/guidelines (such as the CCRF)

B. ***Formalizing an aquaculture policy development (including environment and fiscal incentives)***

Constraints:

- No clearly defined/documented policies on aquaculture (including fiscal incentives and environmental incentives)
- Limited number of aquaculture strategies available to build policies on
- Limited incentives packages to promote aquaculture development
- Limited local experiences to guide policy formulation in aquaculture
- Competition for limited resources (e.g. with tourism, agriculture and capture fisheries sectors)
- In some instances, national policy strategy is away from agriculture and similar activities
- Limited zoning is carried out (land, water, coastal)
- (Results of past projects suggest that there are limited options available)

Opportunities:

- Focus on integrated approach of development
- Draw on existing experiences within the region as well as beyond in relation to policy development at national and regional levels
- Providing incentives to small-sector as aquaculture do not have to be costly for the government
- Strengthen and promote regional cooperation in aquaculture development (including trade arrangements)
- Include aquaculture in the zoning policies & processes.

C. ***Legal framework development***

Constraints:

- Existing fisheries legislation includes only limited references to aquaculture
- Limited institutional capacity to formulate proper aquaculture legislation
- Limited and outdated laws
- No enforcement of existing regulation
- Laws related to water (access) rights are not in place (yet)
- Laws are not harmonized within the region
- Limited consultation between concerned agencies and with stakeholders

Opportunities:

- Upgrade existing fisheries legislation with specific reference to aquaculture, CCRF and relevant treaties and agreements
- Establish clear regulatory and monitoring systems
- Establish clear and simple administrative procedures to facilitate implementation
- Develop mechanisms for consultation with stakeholders
- Encourage harmonization of legislation within the region through existing (sub) regional bodies such as CRFM and OECS - Environmental and Sustainable Development Unit (ESDU).

D. ***Establishment of small-scale pilot projects for technology transfer and its evaluation***

Constraints:

- Negative attitudes as a result of many bad experiences in aquaculture in the past
- Limited private sector involvement in past experiences and projects
- Ineffective human resource management to make pilot projects a success
- Inadequate resources to allow government officers to implement pilot projects properly
- Lack of information and training in existing technologies
- No proper evaluation procedures/mechanisms to validate results of experiences
- No follow-up mechanism to implement successes
- Proper documentation, preservation and transfer of information has been lacking
- Cultural bias towards/against certain products/species
- Lack of proper feasibility studies, including market analysis
- Insufficient planning involved in technology transfer
- Lack of accountability
- In some instances limited participation of relevant government agencies in past experiences and projects.

Opportunities:

- Existing technologies available in the region
- Establish mechanism or networks for exchange of information (including documentation), utilizing existing agencies such as CRFM, OECS, etc.
- Develop a planned approach for technology transfer (including exchange of information, skills, personnel) taking in consideration traditions and cultural biases
- Develop monitoring and reporting systems to ensure accountability and transparency
- Promote and encourage private sector stakeholder participation in projects
- Develop and promote public education and awareness programmes
- Conduct economic feasibility studies including market, financial and business analysis at different stages of implementation

F. *Allocate resources (government commitment) for aquaculture*

Constraints:

- Lack of or inadequate resources for aquaculture development
- Competition for government resources between sectors
- In some cases lack of political will within the government to make commitments to the sector
- Lack of aquaculture advisory/stakeholders bodies to advise the government
- Insufficient data and information available to adequately inform government
- Information/data flow between departments of fisheries and Government is not functioning properly
- Inadequate project formulation/preparation/planning capacity within fisheries departments

Opportunities:

- Develop/establish aquaculture advisory committees
- Improve information and data collection and analysis systems
- Improve strategic planning and decision making processes
- Demonstrate commitment to development of aquaculture by providing and accessing available funds.
- Encourage and support regional collaboration and information exchange for greater cost effectiveness
- Encourage private sector and financial institutions to invest in aquaculture by providing specific incentives

G. *Strengthen aquaculture related institutions (including monitoring and regulatory systems, capacity building, and research)*

Constraints:

- Poor strategic and human resources planning in fisheries departments
- In some cases only a limited number of aquaculture staff available
- Lack of collaboration between fisheries departments and other departments (e.g. environmental) and research and training institutions
- Limited transfer of knowledge at national level after regional initiatives resulting in lack of continuity
- Inadequate support systems and infrastructure for aquaculture development
- Inadequate funding for institutional development

Opportunities:

- Facilitate strategic and human resource planning processes within fisheries departments
- Further improvement of regional collaboration between fisheries departments in the area of aquaculture
- Strengthen and/or create regional centres of excellence in aquaculture research and training
- On-going opportunities for capacity building of fisheries/aquaculture staff
- Encourage governments to appoint national focal points for aquaculture development to promote networking and ensure continuity and information exchange

- Identify possible sources of funding (public and private, NGOs, donors) for institutional strengthening

I. ***Identify reliable sources of inputs and create access to inputs (broodstock, feed, fingerlings and equipment)***

Constraints:

- Lack of high quality broodstock, appropriate feed, fingerlings and equipment in sufficient quantities at national level
- High relative costs of inputs related to (the production and transport of) small quantities required
- Inadequate planning of production processes and related to ordering of necessary inputs
- Lack of participation/consultation with and among stakeholders in the planning process

Opportunities:

- Ensure that support systems are in place through proper planning
- Centralize purchasing wherever possible
- Identify aquaculture enterprises at national and regional level which can assist in sourcing and accessing inputs
- Establish vertical chain cooperation (e.g. between feed industry, aquaculturists, processors) in the aquaculture products chain

K. ***Code(s) of Best Practice development (under private-public partnership)***

Constraints:

- Lack of knowledge of CCRF and specifically the articles on aquaculture development
- Lack of knowledge on standards for food safety and health issues (HACCP, ISO, CODEX, etc.)
- Lack of understanding of implications of not adhering to codes of best practice
- Lack of organization among aquaculturists (private sector)
- Weak linkages between public and private sector aquaculture stakeholders

Opportunities:

- Improve the image of the sector and its products among consumers
- Raise awareness on CCRF and related aspects among stakeholders
- Fisheries Departments need to provide training regarding CCRF issues and standards
- Promote good management practices in the whole industry
- Encourage the formation of private sector organizations/associations
- Strengthen public sector monitoring and inspection systems to include the development of aquaculture products

39. During the review of the identified constraints and opportunities (above), the plenary recognized that most countries were at different stages in their development of aquaculture, and suggested that care should be taken to prioritize the 'steps' according to their individual stages of development. In addition, concerted awareness raising activities on the potential of aquaculture (among policy makers, managers, present and potential stakeholders) were

identified as critical. Continuous awareness rising is also considered important in order to not lose the momentum created by the workshop.

40. The most emphasized issue among the opportunities identified by the plenary was the need for governments to establish clear transparent aquaculture development policies using mechanisms for consultation with other stakeholders (nationally as well as subregionally). Regional co-operation and exchange of experiences and technology was the second most recurrent issue in the opportunities identified by the plenary. The participants also identified a need to focus on an integrated approach to aquaculture development to ensure its role in contributing to food security and agricultural diversification, where applicable and to ensure compliance with international agreements and guidelines.

CONCLUSIONS

41. The representatives of the various countries were the government aquaculture officers. It is expected that their lines of communication with the Ministers responsible for national fisheries sector development, will ensure the transmission of the workshop results to the appropriate level of national decision-making. Further follow-up on the workshop relative to the re-initiated promotion of aquaculture will depend largely on the interest the returning officers will receive from their Ministries. The CARICOM Fisheries Unit representative agreed to follow up on the workshop at regional level, and especially mentioned that the CRFM could take up the task of functioning as a network for collection and dissemination of information on aquaculture in the region.

42. Many of the participants stressed the urgent need for the development of an aquaculture policy framework and requested information on how to get access to FAO technical support specifically for aquaculture; and technology transfer and policy development; some asked about the possibilities of co-operating with countries and institutions in the subregion where aquaculture pilot projects have been successful. Responding to this the FAO officers provided information on the FAO Technical Cooperation Programme and its guidelines for project proposal formulation.

43. At the end of the workshop it was concluded that this initiative to organize a workshop on sustainable aquaculture development, was highly appreciated by the represented countries and that it is of utmost importance to follow up on what was discussed. New insights into the constraints and opportunities related to aquaculture development in the SIDS of the Lesser Antilles have created awareness on which activities to undertake new initiatives can be based.

APPENDIX A

AGENDA

Monday, 4 November 2002

09.00 AM	Registration
09.30 AM	Opening Ceremony
10.00 AM	*Coffee break*
10.15 AM	Election of Chairperson and Adoption of Agenda, Introduction of participants
10.30 AM	Discussion of the synthesis of national experiences in aquaculture development in the Lesser Antilles
11.20 AM	The marketing opportunities for aquaculture products in the Lesser Antilles
11.50 AM	The experiences of developing commercial aquaculture in the Lesser Antilles: Case Studies from St Croix, Martinique and Bermuda • The experiences and potential for developing Red Drum (*Sciaenops ocellatus*) culture in the Lesser Antilles. IFREMER, Martinique
12.30 PM	*Lunch*
14.30 PM	Case Studies (continued) • Tilapia production for the Lesser Antilles and other resource-limited tropical areas: Cage culture in small ponds, Green water tank culture, and Aquaponics. St Croix, USVI.
15.15 PM	*Coffee break*
15.30 PM	General discussions on the presentations by participants, with references to individual country experiences
17.00 PM	Adjournment

Tuesday, 5 November 2002

09.00 AM	Case Studies (continued) • The experiences of taking the culturing of scallops to a commercial phase in small islands: Case study of the Calico Scallop in Bermuda: A model for the Lesser Antilles?

10.15 AM	*Coffee break*
10.30 AM	Enabling policy framework for the promotion of sustainable commercial aquaculture in the Lesser Antilles
11.15 AM	Discussions on the aquaculture development experiences of each of the participating countries
12.30 PM	*Lunch*
14.00 PM	Discussions on the aquaculture development experiences of each of the participating countries (continued)
15.45 PM	*Coffee break*
16.00 PM	Briefing on the formation composition and mode of operation/ deliberations of the working groups or plenary session
17.00 PM	Adjournment

Wednesday, 6 November 2002

09.00 AM	Plenary session discussions on the strategies (steps to take) to develop sustainable aquaculture in the SIDS of the Lesser Antilles
10.30 AM	*Coffee break*
10.45 AM	Continuation of plenary session
12.30 PM	*Lunch*
14.30 PM	Plenary session discussions on constraints and opportunities for sustainable aquaculture development in the SIDS of the Lesser Antilles
17.00 PM	Adjournment

Thursday, 7 November 2002

08.30 AM	Plenary discussions to finalize/amend the outcome of the discussions on sustainable aquaculture development in Lesser Antilles
10.00 AM	Approval of first draft workshop report Closing remarks and coffee break

APPENDIX B

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