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SUMMARY REPORT

THIRD MEETING OF THE WORKING GROUP TO PROMOTE SUSTAINABLE AQUACULTURE DEVELOPMENT

**(Electronic Meeting)
24 November 2020**

**CRFM Secretariat
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Summary Report of the Third Meeting of the Working Group to Promote Sustainable Aquaculture Development (Electronic Meeting), 24 November 2020

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Summary Report of the Third Meeting of the Working Group to Promote Sustainable
Aquaculture Development (Electronic Meeting), 24 November 2020

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LIST OF ACRONYMS AND ABBREVIATIONS

| | | |
|-----------|---|---|
| ACP | - | African, Caribbean and Pacific states |
| CARICOM | - | Caribbean Community |
| CARIFORUM | - | Caribbean Forum of African, Caribbean and Pacific States |
| Cefas | - | Centre for Environment, Fisheries and Aquaculture Science of the United Kingdom |
| CRFM | - | Caribbean Regional Fisheries Mechanism |
| FAO | - | Food and Agriculture Organization |
| JICA | - | Japan International Cooperation Agency |
| NACA | - | Network of Aquaculture Centres in Asia-Pacific |
| RAA | - | Aquaculture Network for the Americas |
| SME | - | Small and Medium-sized Enterprises |
| TCDC | - | Technical Cooperation between Developing Countries |
| ToRs | - | Terms of Reference |
| UWI | - | University of the West Indies |
| WGA | - | Working Group to Promote Sustainable Aquaculture Development |

SUMMARY REPORT

The primary aims of the Third Meeting of the Working Group to Promote Sustainable Aquaculture Development were to: consider the report of the study on the Status of Member States Implementation of the 5-year Work Plan for Aquaculture Development in CRFM; discuss prioritisation of the gaps in implementation of the 5-year Work Plan for Aquaculture Development in CRFM and issues related to the implementation of these activities; and, considerations for a way forward; review the status and trends in aquaculture in the CRFM States; and consider and agree on a Concept Note for a regional project on aquaculture. The deliberations and recommendations of the Working Group are to be brought to the attention of the CRFM Executive Committee and the Caribbean Fisheries Forum for further consideration.

Fisheries Officers, Scientists and aquaculture focal points from CRFM Member States attended the Meeting, which was held electronically via GoToMeeting. The Meeting was chaired by the Convener, Mr. Peter A. Murray, Advisor, Fisheries Management and Development of the CRFM Secretariat. In attendance as resource persons were Dr. Susan Singh-Renton, Deputy Executive Director, CRFM Secretariat; and Dr. Maren Headley, Programme Manager, Fisheries Management and Development, CRFM Secretariat. Ms. Dominique Lockhart, Observer, The Bahamas, also participated in the Meeting.

Call to order

The Meeting was called to order at 08:32am Belize time (09:32am Jamaica time and 10:32am Eastern Caribbean time) by the Convener, Mr. Peter A. Murray. After an Opening Prayer by Dr. Singh-Renton, the provisional Agenda was tabled and was accepted by the Meeting with one addition under Any Other Business – a presentation by Ms. Lockhart on the Seaweed Aquaculture Pilot Programme which she is spearheading (see *Appendix 1*).

Introduction of participants, review of the ToRs of the Working Group and election of Chair

Participants introduced themselves (see *Appendix 2*).

The Convener presented the current Terms of Reference (ToRs), which were accepted without amendments and are shown at *Appendix 3*. It was proposed that the agenda should, to the extent practicable, indicate the linkages to specific ToRs.

The Working Group convener, Mr. Peter A. Murray, Advisor, Fisheries Management and Development of the CRFM Secretariat was asked to serve as Chair of this meeting of the working Group.

Summary and update since the 2nd Meeting of the CRFM Working Group to Promote Sustainable Aquaculture

The Convener tabled the Summary Report of the 2nd Meeting of the CRFM Working Group to Promote Sustainable Aquaculture. He noted the update since the last Meeting would be captured in the agenda items to follow.

Discussion

There was no substantive discussion on this item

Action

The Working Group:

Noted the Summary Report of the Second Meeting of the CRFM Working Group to Promote Sustainable Aquaculture

Noted also that updates would be provided by the Secretariat in the course of the agenda items to follow

Update on status and trends in aquaculture in the CRFM States

The Meeting Convener presented an update on status of and trends in aquaculture in the region (*Appendix 4*), to set context for the Meeting.

While this Agenda Item sought to address Working Group Terms of Reference 9, discussion on this Agenda Item also addressed Working Group Term of Reference 8.

World capture fisheries production has plateaued since the early 1990s and reached about 96.4 million tonnes in 2018. Aquaculture production, on the other hand, has continued to grow to 82.1 million tonnes in 2018, accounting for 46 percent of total production and 52 percent of fish destined for human consumption.

Aquaculture continues to be the fastest-growing animal-food-producing sector; and, also to outpace population growth, accounting for 46.8 percent of fish production in 2016, 45.7 percent in 2008, up from 42.6 percent in 2006. Globally, it is set to overtake capture fisheries as a source of food fish. The global community has recognised and reiterated the crucial role of aquaculture for food security and nutrition and in providing for the livelihoods of the world's people.

In the Latin America and the Caribbean (LAC) region, Chile, Brazil and Ecuador have been the major contributors to aquaculture production. There is a wide variety in technology levels and the contribution of the sector to rural livelihoods is increasing. Aquaculture in the region has grown since the 2000, totaling about 3.1 million tonnes in 2018, representing 3.8% of global aquaculture production and equivalent to about 18% of the total LAC fish production of this year.

Caribbean production represents the smallest proportion of LAC fisheries and aquaculture in 2018, with 1% of totals in each case. The 2018 aquaculture production of 34,313 tonnes represents 0.04% of global production. Nevertheless, as fisheries decline, aquaculture aspires to fulfill local fish needs as well as to generate export revenues. In many Caribbean countries, aquaculture is significant in the provision of fish and / or livelihoods, for example, tilapia development projects were part of the disaster response effort for Haiti after a devastating earthquake in 2010, while aquaponics (growing fish with vegetables in recirculation systems) with tilapia is also being pursued in several countries. Here, aquaculture development proposals and projects, supported by foreign aid or start-up companies are commonplace.

The most significant production, in Caribbean countries, is related to freshwater environments. Nile tilapia features significantly in aquaculture production of most Caribbean countries, complemented by a striped catfish (*Pangasius*) project in the Dominican Republic. Shrimp (marine and freshwater) projects intended for exports were frequent in the region, but currently do not show any significant production. Red algae and a red drum project in Martinique achieved adequate production in marine waters, so as to be registered in the FAO database. *Gracilaria* and *Eucheuma* are traditionally consumed in the Caribbean, with its farming activities long considered as a good solution to provide work opportunities. Current proposals for marine aquaculture include “offshore” cobia farming. In countries such as Honduras, tilapia and shrimp production are successful export businesses and offer relevant local employment.

The CRFM has identified aquaculture as a priority since 2002. The aquaculture sector is not well developed in the CARICOM region. Because of the limited potential growth of wild catches in the Caribbean region,

sustainable expansion and intensification of fish production through responsible aquaculture development should be a major objective for countries in the region. The Caribbean Community Common Fisheries Policy aims at promoting the sustainable development of fishing and aquaculture industries in the Caribbean Region as a means of, *inter alia*, increasing trade and export earnings, protecting food and nutrition security, assuring supply to Caribbean markets and improving income and employment opportunities.

Expansion of Caribbean mariculture is critically dependent upon the identification of species with highest commercial potential. Integrated Multitrophic Aquaculture is currently being considered as a basis for an ecosystem approach to the mariculture paradigm that can enable farmers to diversify their output by replacing purchased inputs with byproducts from lower trophic levels, without new sites; leading to increased profits and reduced financial risks due to weather, disease and market fluctuations.

The CARICOM approach to aquaculture development will have to be multifaceted to address the range of available natural land and fresh-water resources in the region, while incorporating the commercial elements. Because of the limited potential growth of wild catches in the Caribbean region, sustainable expansion and intensification of fish production through responsible aquaculture development should be a major objective for countries in the region.

Discussion

A query was raised with regard to exactly what is meant by “aqua-parks” referred to in the presentation (cited in the ongoing FAO study that had informed the presentation). No further clarity was achieved in the discussion and the Presenter / Convener committed to inquiring further.¹ The Working Group noted a concern with regard to the impact of coastal (or other) aquaculture on the nearshore marine environment, consequent upon outflows of water from aquaculture. This, it was suggested, further emphasises the need to consider integrated approaches to aquaculture, including / such as integrated multi-trophic aquaculture.

The Working Group was reminded of the concern expressed by the CARICOM Fisheries and Aquaculture Priority Commodity (FISHCOM) Working Group about the fact that there were a number of “starts and stops” to aquaculture development among CARICOM / CRFM Member States and that there were key lessons to be garnered from this and the experiences of other island States in other parts of the world, not least among which being the need to revisit the way we are managing for aquaculture development.²

With reference to the information in the presentation that, between 2013 and 2015, Trinidad and Tobago had looked at issues of the enabling environment for aquaculture and the recognition that there were some 16 elements to be considered. In this regard, the Working Group was informed that 14 of the 16 elements had been “very successfully” implemented. The representative from Trinidad and Tobago agreed to make a presentation on this at the next meeting of the Working Group. The Meeting was also pointed to the fact that competition among aquaculturists could militate against successes as they have been known to compete with each other in a manner that appeared to be detrimental to all their interests; and hence, there may be a need to consider “private / private” partnerships as well as the often-touted public / private partnerships. This could possibly be linked to the Working Group’s Term of Reference (#7) to “provide guidance for the adoption and implementation of credible aquaculture certification schemes” and should be an item for discussion at the next meeting of this Working Group.

¹ Jamaica has been touting the concept of “agro-parks” (or Agro-industrial parks) – clusters of key value chain processes to facilitate streamlining, including by consideration of locations. As such, an Agro Park is an area of intensive, contiguous, parcel of land for agricultural production, which seeks to integrate all facets of the agricultural value chain from pre-production to production, post harvesting and marketing. (c.f. https://japarliament.gov.jm/attachments/article/1265/1265_2014%20Ministry%20Paper%2048%20-%20Agro%20Park.pdf) These are seen as being a means of enhancing the productivity of the production-processing chain from which everyone in society will gain benefit.

² FISHCOM had recommended at its 5th Meeting, in April of 2020, that: “Where appropriate consider reorienting approaches to aquaculture development with the focus on supporting investments in SME partnership(s) between the public and private sectors, and in collaboration with financial / credit institutions »

Discussion ensued on the effectiveness of placing aquaculture under departments of agriculture given the perception that it was more related to agriculture than to capture fisheries, the Belize experience was referenced but it was suggested that this is not seen as being as successful as would have been hoped. It was opined that the important factors for success in promoting aquaculture development were the availability of sufficient qualified human resources and adequacy of financial resources.

Action

The Working Group:

Noted the Status of and Trends in Aquaculture in the region; in particular, in and among CRFM Member States

Agreed that the experiences of Trinidad and Tobago in determining the important elements of the enabling environment which need to be addressed in promoting aquaculture development, would be presented at the next meeting of the Working Group

Agreed that the issue of competition among aquaculturists as potentially hindering aquaculture development and the consequential need to consider “private / private” partnerships should be discussed at the next Working Group Meeting

Noted the view that the important factors for success in promoting aquaculture development were the availability of sufficient qualified human resources and adequacy of financial resources

Status of Implementation of 5-year Work Plan for aquaculture development in the Caribbean – Study Report

The Meeting Convener presented the Report of the Study on the Status of Member States Implementation of the 5-year Work Plan for Aquaculture Development in the CRFM.

This Agenda Item sought to address Working Group Terms of Reference 5; however, discussion *de facto* focused around Working Group Terms of Reference 8.

Between the end of February and the second week of July 2020, the CRFM Secretariat carried out a survey to determine the status of implementation and achievements to date with regard to the 5-year Work Plan on Aquaculture. The Survey sought to capture all that countries are doing on aquaculture, both government-led and non-government-led activities, including identifying all activities that are supported by donor, private sector and / or NGOs. By this means, the CRFM had hoped to determine if and which elements of the 5-year action plan for aquaculture development are being advanced satisfactorily, as well as areas of continuing weaknesses. Eleven of the seventeen CRFM Member States responded to the survey.

With regard to the national actions that have been, or are being, taken with regard to the specific activities described in the 5-year Action Plan, some kind of strengthening of governance frameworks or capacity building(-related) activity has been carried out / initiated (see reference document # WGA 2020/03/06.1). However, relatively little has been done with regard to strengthening data management and knowledge sharing systems for aquaculture. While some work has been done with regard to market support, almost nothing has taken place to improve access to credit; neither has this been seen as being a priority worth addressing, where countries have addressed the issue of disaster risk management, it has not been specific to the aquaculture sub-sector, but to Agriculture as a whole.

None of the Work Plan activities were considered by countries to be well advanced or almost completed. One country felt that they had completed the development of curricula for basic skills training; while one respondent opined that the preparation / revision of a national aquaculture plan / policy was completed, though it is in need of review / revision. One respondent also thought that while national legislation related to aquaculture had been revised / prepared, there was need for this to be developed further. These notwithstanding, a number of issues simply have not been given serious consideration as yet in the countries.

Several factors should be considered about the current status of implementing the 5-year action plan. Most notable among these is the inadequacy of the human capacity, including for business planning and implementation; whether by way of numbers of persons or areas of study, within national fisheries agencies to lead and support aquaculture development. Most Member State fisheries agencies have their genesis in marine capture fisheries and the management thereof, thus, the approaches to aquaculture management and development may not be appropriate for leading / guiding aquaculture development in keeping with what may actually be necessary. In a number of cases, the limitations in availability of land and water resources, in a majority of Caribbean SIDS, limits development of aquaculture to the extent required to substitute / replace demand for marine capture species, whether for local consumption or export. Potential aquaculturalists are often challenged in the acquisition of initial capital investment needed for their ventures.

Where countries have the land space and available freshwater resources, or extensive marine coastline, they should / could be encouraged with their land-based aquaculture and / or near-shore mariculture. Consideration may need to be given to view aquaculture more as a business enterprise, than has hitherto been the case with commercial marine capture fisheries; with the focus on business development in a manner similar to agriculture, in terms of management or investment and providing market support. The current weakness in the enabling environment may explain why almost nothing has taken place to improve access to credit; neither has this been seen as being a priority worth addressing. If aquaculture is to play its much-touted potential role in boosting fish production, food security and employment in the region, this must be remedied.

Aquaculture research and development should also be seen within this context; with a strategic focus on supporting investments and partnership between the public and private sectors. In this regard, attention should be drawn to the Indies Greens Tilapia and Organic vegetable Farm in Antigua which is being featured internationally as success story; and experiences of the SNAPPER Tilapia Fish Farm in St. Kitts, growing tilapia in sea water; which are making headway on innovative aquaculture. The experiences of Haiti and the rapid growth of aquaculture there since the earthquake may offer useful lessons for the other countries; and, begs the question of what changes occurred that led to the growth of aquaculture in recent years when for many years before nothing happened is probably something that might also be considered moving forward.

There is need to monitor implementation of the 5-year Action Plan. Given the biennial planning cycle for CRFM, it is proposed that the CRFM Secretariat carry out a similar survey (utilising the same survey instrument) to determine the status of implementation and achievements, six months before the end of the biennium. This would allow two months for circulation and responses and one month for analysis, such that the results would be ready to “feed” into the preparation of the next Biennial Work Plan which would be approved in time for the beginning of the next biennium; allowing for subsequent commencement of implementation of the next 5-year action plan at the beginning of the 2023 - 2024 programme year.

Discussion

During the limited discussion, the Meeting was reminded that the CRFM Results-Based Management (RBM) Policy and the CARICOM RBM reporting framework, both constrained Member States to report annually, and this had implications for reports on aquaculture development being incorporated

Action

The Working Group:

Noted the Report on the Status of Member States' implementation of the 5-year Work Plan for Aquaculture Development in CRFM circulated as *CRFM Special Publication*, No. 30.

Noted also the proposed biennial schedule for continued monitoring of the implementation of the Work Plan

Recalled that the CRFM Results-Based Management (RBM) Policy and the CARICOM RBM reporting framework, both constrained Member States to report annually, and this had implications for reports on aquaculture development being incorporated

Endorsed the proposed biennial schedule for continued monitoring of the implementation of the Work Plan

Recommended the proposed biennial schedule for continued monitoring of the implementation of the 5-year Work Plan for Aquaculture Development to the Caribbean Fisheries Forum, for its consideration

Priorities for addressing gaps in implementation of CRFM's 5-year Aquaculture Work Plan

In the main, this Agenda Item addressed Working Group Terms of Reference 5. The concept note on demonstrating the feasibility of integrated multi-trophic aquaculture (ITMA) system(s) to improve sustainable production, implicitly addressed Working Group Terms of Reference 2, 4, 13 and, 14. Aspects of the recommended amendments to this concept note would contribute to addressing Terms of Reference: 8, 10, and, 15.

The CRFM Secretariat's survey to determine the status of implementation and achievements regarding the 5-year Work Plan on Aquaculture has indicated none of the work plan activities were considered by countries to be well advanced or almost completed. In ***Appendix 5***, table 1 shows a prioritisation of the activities not being implemented by Member States, notwithstanding being seen as applicable by the applicable respondent(s).

The 5th Meeting of the CARICOM Fisheries and Aquaculture Priority Commodity Working Group (FISHCOM) was of the view that while it was important to encourage investment in the sector, it was useful to know what had been the experiences of others who would have made such investments - what led to successes where they occurred, and what contributed to failures where observed.

While recognising that a review of those experiences would be very useful in determining how best to advocate for increased investment in the aquaculture industry, the FISHCOM opined that there is need for strong research-supported business and marketing strategies, with the major output being new and strengthened national and regional seafood value chains supporting realization of the blue economy opportunities and sustainable development goals.

The FISHCOM recommended that: "in order to support its sustainability and effective technology transfer, and as a fundamental strategy for marine fish and aquaculture commodity and associated industry development, CRFM should establish a commercial Research and Innovation Centre to undertake

partnership ventures with existing / new appropriate private or public sector parties. CRFM's equity in the Centre should be obtained from various sources including government, international development agencies and philanthropic entities.”

An ongoing study, by FAO, on the status and trends of development on aquaculture in the wider region has noted that a number of factors might force this region to compete with other countries in regard to aquaculture development during the coming decades, thus calling for more efficiency and competitiveness together with more and better science and technology, and much needed better governance schemes and leadership. To increase production of native fish, with potential impact on small and medium scale aquaculture, there is a need to fully develop and transfer technologies and important improvements are needed in genetics, feeds, feeding systems and sanitary regulations. It is further suggested that development of aquaculture in our countries should address governance and sustainability issues, with emphasis on the effects of climate change and that of this activity on the environment. Lessons already learned in countries like Chile and Brazil should be considered, while promoting investment, employment and food production. Horizontal support schemes between countries to cooperate in technology, capacity building, human development and sustainability approaches in aquaculture should be encouraged and welcomed. New means to further support this horizontal transference of knowledge and technologies should be devised. In many areas, as well, there is a clear need for training and support to elaborate development proposals and national / regional aquaculture policies and plans.

At its 14th Meeting, the CRFM Ministerial Council had:

Agreed that economic models for varying scales and types of aquaculture operations (including multi-trophic aquaculture and aquaponics) should be promoted among Member States

Tasked the CRFM Working Group to Promote Sustainable Aquaculture Development (WGA) to work along with Member States to investigate the potential across the spectrum, and to facilitate access to relevant models for both large-scale and small-scale operations that could guide policy-makers and investors;

Mandated the CRFM Secretariat to provide necessary support (including convening forums and training sessions) to empower small-scale fishers to better harness the potential for sustainable aquaculture, particularly in the smaller island states.

In keeping with this direction, the CRFM Secretariat has incorporated issues related to aquaculture into a concept note that it has submitted to the Development Bank of Latin America (a.k.a. CAF) for a project on climate change in fisheries. CAF has informally agreed to provide the funding / resources for development of the Project Identification Form (PIF) for submission to the GEF. The fisheries-related aspects of that concept note were briefly presented to the Working Group

The Convener presented another concept note, developed by the CRFM Secretariat, for a project for which it expects to seek funding. This draft concept note specifically deals with aquaculture and is geared to demonstrating the feasibility of integrated multi-trophic aquaculture (ITMA) systems to improve sustainable production. The concept also speaks to preparation of a detailed activity implementation plan for the development of ITMA, with practical recommendations for short and medium-term objectives; based on information and understanding gained from industry analyses, economic valuations, feasibility assessments and research, as well as capacity building and support for investment in ITMA. The Working Group was invited to make suggestions for the further development and refinement of the concept note.

Discussion

During the discussion it was pointed out that the concept note on demonstrating the feasibility of integrated multi-trophic aquaculture (ITMA) system(s) to improve sustainable production has the “ability” to help the working group address a number of its Terms of Reference that it hitherto had not addressed. It was also suggested that the concept note should be made to incorporate aspects related to: gender, youth and decent work; building resilience in light of the recent COVID-19 pandemic and its potential impacts on and implications for aquaculture development; as well as, address consideration of improving knowledge management in the region, in particular as it relates to development of the aquaculture sub-sector.

Following a query, the Meeting was advised that the reference to the lending facility was different to that of a commercial research and development facility recommended by the FISHCOM. Mindful of this, the WGA accepted that the activity which speaks to “Providing support by way of a loan facility for on-lending to fish farmers, through a partnership between credit unions (or similar credit institutions) and the CRFM; in support of integrated multitrophic aquaculture / mariculture” should not be limited to credit unions but should be broadened to consider credit / funding institutions more broadly. Additionally, it was suggested that the research and development facility concept could / should be linked to the capacity building aspect of the concept.

Action

The Working Group:

Noted the gaps identified in the implementation of the CRFM’s 5-year Work Plan for Aquaculture and the prioritisation of these gaps

Noted the recommendations of the Fifth Meeting of the CARICOM Fisheries and Aquaculture Priority Commodity (FISHCOM) Working Group that CRFM should establish a commercial Research and Innovation Centre to undertake partnership ventures with existing / new appropriate private or public sector parties, as a fundamental strategy for marine fish and aquaculture commodity and associated industry development

Noted also the highlighted trends of development on aquaculture in the wider region

Noted further the directive from the CRFM Ministerial Council that the Working Group work along with Member States to investigate the potential across the spectrum of economic models for varying scales and types of aquaculture operations, and to facilitate access to relevant models for both large-scale and small-scale operations that could guide policy-makers and investors

Noted the concept note that the Secretariat has submitted to the Development Bank of Latin America fisheries for the funding / resources to develop a Project Identification Form for submission to the GEF; and, which incorporates issues related to aquaculture development

Also noted the concept note on demonstrating the feasibility of integrated multi-trophic aquaculture (ITMA) system(s) to improve sustainable production

Advised that the concept note on demonstrating the feasibility of integrated multi-trophic aquaculture (ITMA) system to improve sustainable production should clearly articulate aspects related to: gender, youth and decent work; building resilience (especially in light of the recent COVID-19 pandemic and its potential impacts on and implications for aquaculture development); as well as, address consideration of improving knowledge management in the region, in particular as it relates to development of the aquaculture sub-sector.

Also advised that the activity proposed in the abovementioned concept note which speaks to “Providing support by way of a loan facility for on-lending to fish farmers, through a partnership between credit unions (or similar credit institutions) and the CRFM; in support of integrated multitrophic aquaculture / mariculture” should not be limited to credit unions but should be broadened to consider credit / funding institutions more broadly.

Further advised that the research and development facility concept proposed by FISHCOM could / should be linked to the capacity building aspect of the concept note on demonstrating the feasibility of integrated multi-trophic aquaculture (ITMA) system(s) to improve sustainable production.

Recommended, on revision, the concept note on demonstrating the feasibility of integrated multi-trophic aquaculture (ITMA) system to improve sustainable production to the Caribbean Fisheries Forum, for its consideration

Noted that based on the discussions on this and previous agenda items, the CRFM Secretariat would be positioned to discern how it might continue to provide necessary support for Member States to better harness the potential for sustainable aquaculture

Any other business

The Working Group noted the intervention from Ms. Dominique Lockhart, who led off her intervention with a number of queries. She questioned: how it is that commercially non-viable aquaculture species could be seen as sustaining / supporting food security of countries, even if the techniques are available / viable, especially for low income households to be able to access; whether the CRFM and / or participants at the Working Group meeting are enabled to make decisions with regard to management of fisheries, including redirecting of resources; and, whether the meeting / participants are aware of any countries where the fisheries have “collapsed” such that they are no longer practical.

It was pointed out that the approach in the region to aquaculture had been fairly *ad hoc*. There have not been enough resources to do specific research, though there has been some adaptation of available techniques and species to suit the region. The *ad hoc* approach thus far therefore continued to limit the overall impact on investment options. In light of the recent COVID-19 pandemic, the region has seen aquaculture as playing an important role in contributing to regional resilience building, and this provides a fresh opportunity to ensure a more consistent and structured approach. With regard to the redirecting of resources, the possibility of advising the redirection of resources can occur but effecting such redirection would be challenging without senior-level government support. Management of public / private partnerships could be one way to help facilitate access to new resources and shift political will as well as, in addition to networking among government ministries to harness the human resources available in other ministries. It was confirmed that collapse of capture fisheries had occurred, with some well-known examples being the Peruvian anchovy, Georges bank cod stocks, herring stocks of the north Atlantic.

Ms. Lockhart then presented on a proposed seaweed aquaculture joint-venture project that had been encouraged toward further development in three of four prospective territories (see ***Appendix 6*** for project summary). She noted that aquaculture in The Bahamas has been validated by the Inter-American Development Bank, having been included in a \$200 million loan facility, in part to sustainably develop the marine economy.

More than satisfying a need with a locally grown, premium seaweed product she is seeking to market seaweed aquaculture from the region as a solution to a number of problems, but none more urgent than the unsustainable use of our water resources. The water footprint of animal products is per calorie up to twenty times higher (beef being the most water costly) than the equivalent for cereal and starchy roots. However,

whatever the evidence suggests there has not been a slowing in the consumption of beef. As a result, some consider beef to be an irresponsible animal product, and others suggest it is unsustainable and that plant-based diets are the future for meeting the needs of the global food supply. Nearly all the water used for the production of beef is attributable to the production of feed crops. For either outcome seaweed aquaculture offers a solution.

The water-efficient operation they are proposing will produce a premium animal feed that essentially eliminates the disproportionate water consumption attributable to traditional feed crops. Conscientious farmers will have an alternative to evolve their operations toward sustainability. A seaweed aquaculture sector doesn't threaten the monoculture farming systems that are currently in place; rather, improving the sector will provide the stop-gap measures needed to shift from monoculture to polyculture. In responding to the issue of whether the water footprint of the current feed crops is unsustainable, it is suggested that the demand for these crops is so great that they are either forced to overproduce to compete or they compel the market to continually rely upon their products to maintain market share, all the while facing other serious environmental factors that could lead to cascading failures. Ms. Lockhart is of the view that seaweed aquaculture will also be more regularly consumed in Western diets as a source for protein and other health and nutrition benefits, but again also as the foodstuff that has a water footprint so low that it can be marketed as a solution to a universal problem.

Ms. Lockhart also noted the desire to develop a micro-equity programme for seaweed aquaculture by low-income households.

Discussion

It was suggested that the concept of low-cost food from aquaculture is very difficult to achieve. Production costs and efforts dictate that the price will be close to the next best alternative but still subjected to what consumers are willing to pay

In the ensuing discussion, it was noted that seaweed aquaculture was being considered in Belize, against this context a mariculture policy is being developed with a seaweed aquaculture focus. Belize is also looking into models for aquaponics as well as developing technical manuals on tilapia and snapper farming based on the Central American experience. Belize is also introducing new genetic lines for tilapia for farmers, possibly from Taiwan or from Costa Rica or Honduras through coordination with OSPESCA. This is all within the context of an INFOPECA project. It was suggested that, with these initiatives, Belize could be considered the industry leader for the region and should be in a position to set an example, on how to get it done, for the region.

The Working Group queried whether Ms. Lockhart's proposal was focused on the local market or would the products be available for export. This begs the issue of certification, including dealing with environmental standards and the routine monitoring of this, so that this industry can be certified and recognised internationally for the standard of product.

It was mooted that there is potential for the Working Group to help Ms. Lockhart, while benefitting the region, possibly among other ways by setting up an *ad hoc* "task force" of a number of contacts for Ms. Lockhart to keep networking in an informal way until more formal arrangements, such as public / private partnerships, can be made.

Action

The Working Group:

Noted the presentation made by Ms Lockhart and **thanked** her for it

Noted also a number of initiatives being taken by Belize with regard to the further development of aquaculture

Considered ways in which the Working Group could collaborate with Ms. Lockhart's initiative, at least informally in the first instance, before more formal (such as public / private partnership) arrangements could be developed.

Suggested that one possible mechanism to collaborate with Ms. Lockhart's initiative was by setting up an *ad hoc* "task force" of contacts with whom Ms. Lockhart could keep networking

Summary of recommendations for submission to the Executive Committee and Forum

The Working Group discussed its recommendations for carrying forward through the CRFM governance structure.

Action

The Working Group:

Recommended the proposed biennial schedule for continued monitoring of the implementation of the 5-year Work Plan for Aquaculture Development to the Caribbean Fisheries Forum, for its consideration; mindful that the CRFM Results-Based Management (RBM) Policy and the CARICOM RBM reporting framework, both constrained Member States to report annually.

Recommended, on revision, the concept note on demonstrating the feasibility of integrated multi-trophic aquaculture (ITMA) system to improve sustainable production to the Caribbean Fisheries Forum, for its consideration

Place and date of next meeting

Noting that the Fourth Meeting of the Working Group would most likely be electronic, the Working Group charged the Secretariat to determine the appropriate date.

Adjournment

The Chairman thanked Member States for participating and opined that this Third Meeting of the Working Group to Promote Sustainable Aquaculture Development had been fruitful. He, however, lamented the limited active participation of Member States' representatives.

The Deputy Executive Director thanked the Convener for taking on the responsibility of Chair for the Meeting and echoed the sentiments. She also reiterated the importance of aquaculture for the region and the importance of receiving feedback on the proposals presented to the Meeting.

The Meeting was adjourned at 11:30am Belize time (12:30pm Jamaica time; 1:30pm Eastern Caribbean time)

Appendix 1 – Agenda

Third Meeting of the Working Group to Promote Sustainable Aquaculture Development (Electronic)

24 November 2020

| | ANNOTATED AGENDA |
|----------------|--|
| ITEM 1 | Call to order <i>The Convener will call the meeting to order and present the provisional agenda for the acceptance of the meeting</i> |
| ITEM 2 | Adoption of the Agenda <i>The meeting will adopt the agenda including any other items of business brought to the attention of the WGA that are of relevance to its ToRs not elsewhere considered. The list of meeting documents will also be confirmed</i> |
| ITEM 3 | Introduction of participants and review of the ToRs of the WG and election of Chairperson <i>Participants will introduce themselves. The Convener will briefly present the Working Group ToRs. The WGA will propose any revision to the ToRs that may be deemed appropriate. The WGA will agree on a country representative to chair the current meeting</i> |
| ITEM 4 | Summary and update since the 2nd Meeting of the CRFM Working Group to Promote Sustainable Aquaculture <i>The Meeting Convener will provide a summary of the 2nd meeting of the WGA and an update of activities since then</i> |
| ITEM 5 | Update on status and trends in aquaculture in the CRFM States <i>The Meeting Convener will present a update on status of and trends in aquaculture in the region, to set context for the meeting</i> |
| ITEM 6 | Status of Implementation of 5-year Work Plan for aquaculture development in the Caribbean – study report <i>The Meeting Convener will present the report of the study on the Status of Member States Implementation of the 5-year Work Plan for Aquaculture Development in CRFM</i> |
| ITEM 7 | Priorities for addressing gaps in implementation of CRFM's 5-year aquaculture work plan <i>The Meeting Convener will present a prioritisation of the gaps in implementation of the 5-year Work Plan for Aquaculture Development in CRFM. Issues related to the implementation of these activities and considerations for a way forward will be presented. Project concepts to address these implementation gaps will be tabled</i> |
| ITEM 8 | Any other business <i>The WGA will consider the Seaweed Aquaculture Pilot Programme being spearheaded by Ms. Dominique Lockhart of the Bahamas</i> |
| ITEM 9 | Summary of recommendations for submission to the Exec Comm & Forum <i>The WGA will consider and agree on any recommendations that it may wish to make to upcoming meetings of the CRFM Executive Committee and/or the Caribbean Fisheries Forum</i> |
| ITEM 10 | Place and date of next meeting <i>The WGA will propose a place and date for its 3rd meeting</i> |
| ITEM 11 | Adjournment |

Appendix 2

Attendees at the Third meeting of the Working Group to Promote Sustainable Aquaculture Development

| Country | Name and Contact Information |
|----------------------------|--|
| Anguilla | Mrs. Kafi S. Gumbs Director Department of Fisheries and Marine Resources Government of Anguilla P.O. Box 60 Crocus Hill The Valley AI-2640 Tel: 264-497-2871 264-497-8705 Cell: 264-583-7070 264-772-9998 Fax: 264-497-8567 Email: kafi.gumbs@gov.ai |
| Antigua and Barbuda | Mr. Jerelle Aaron Focal Point on Aquaculture Fisheries Division Point Wharf Fisheries Complex Lower North Street St. John's Tel: 268-462-1372 Fax: 268-462-1372 Email: Jerelle651@gmail.com fisheriesantigua@gmail.com |
| Barbados | Colvin Taylor Fisheries Division Princess Alice Highway Bridgetown PBX: 246 535 5800 Fax: 246 436 9068 Email: Fisheries.Division@barbados.gov.bb |
| Belize | Rigoberto Quintana Senior Fisheries Officer Belize Fisheries Department Fisheries Compound Princess Margaret Drive Belize City Tel: 501-224-4552 Fax: 501-223-2983 Email: seniorfisheriesofficer@fisheries.gov.bz Gilbert Andrews Coastal Zone Management Authority and Institute Fisheries Compound |

| | |
|-----------------|---|
| | <p>Princess Margaret Drive Belize City Tel: 501-223-0121 Email: waterquality@coastalzonebelize.org</p> |
| Dominica | <p>Mr. Kurt Hilton Fisheries Liaison Officer Fisheries Division Ministry of Agriculture and Fisheries Government Headquarters Kennedy Avenue Roseau Tel: 767-266-5291 Email: khiltonflo@gmail.com</p> <p>Mr. Dorian Sanford Fisheries Liaison Officer Fisheries Division Ministry of Agriculture and Fisheries Government Headquarters Kennedy Avenue Roseau Email: sanforddorian@hotmail.com</p> |
| Grenada | <p>Mr. Moran Mitchell Chief Fisheries Officer Fisheries Division Ministry of Sports, Culture and the Arts, Fisheries and Co-operatives Botanical Gardens Ministerial Complex St. George's Tel: 473-404-7026 Email: mitchellmoran767@gmail.com</p> |
| Guyana | <p>Ms. Nakita Dookie Fisheries Officer Fisheries Department Ministry of Agriculture Regent and Vlissengen Roads Bourda Georgetown Tel: 592-220-1508 592-225-9551 Email: nakita.dookie@gmail.com fisheriesguyana@gmail.com</p> |
| Jamaica | <p>Mr. DeHaan Brown Fisheries Officer Fisheries Division Ministry of Industry, Commerce, Agriculture and Fisheries 2C Newport East Kingston 15 Tel: 876-967-1601 Fax: 876-924-9182 Email: ddbrown@micaf.gov.jm fisheries_jamaica@live.com</p> |

| | |
|---------------------------------------|---|
| Montserrat | <p>Mr. Alwyn Ponteem Chief Fisheries and Ocean Governance Officer Department of Fisheries Ministry of Agriculture, Trade, Lands, Housing and the Environment P.O. Box 272 Brades Tel: 664-491-2075 Fax: 664-491-9275 Email: ponteena@gov.ms Up669929@myport.ac.uk</p> |
| Saint Lucia | <p>Mr. Ezechiel Joseph Jr. Aquaculture Focal Point Fisheries Assistant Department of Fisheries Castries Tel: 758-468-4135 758-468-4143 Fax: 758-452-3853 Email: ezechiel.joseph@govt.lc deptfish@govt.lc</p> |
| St. Vincent and the Grenadines | <p>Mrs. Jennifer Cruickshank-Howard Chief Fisheries Officer Fisheries Division Richmond Hill Kingstown Tel: 784-456-1178 784-456-2738 Fax: 784-457-2112 Email: fishdiv@vincysurf.com jencruickshankhoward@yahoo.com</p> |
| Suriname | <p>Ms. Aartie Tedjoe Fisheries Department P.O. Box 1807 Cornelis Jongbawstraat 50 Paramaribo Tel: 597-472-233 597-476-741 Fax: 597-424-441 Email: visserijdienst@gmail.com</p> |
| Trinidad and Tobago | <p>Mr. Harnarine Lalla Fisheries Officer Fisheries Division Ministry of Agriculture, Land and Fisheries #35 Cipriani Boulevard Newtown Port of Spain Tel: 868-623-5989 Fax: 868-623-8542 Email: h_lalla@hotmail.com Ms. Nadia Ramphal Fisheries Division Ministry of Agriculture, Land and Fisheries</p> |

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| | <p>#35 Cipriani Boulevard Newtown Port of Spain Tel: 868-623-5989 Fax: 868-623-8542 Email: nadiaramphal@hotmail.com</p> |
| FAO | <p>Ms. Kathleen Allen Aquaculture Development Expert Food and Agriculture Organization of the United Nations (FAO) 2nd Floor United Nations House Balmoral Gap, Marine Gardens Christ Church Barbados Tel: 246-426-7110 Fax: 246-427-6075 Email: Kathleen.Allen@fao.org</p> |
| The Bahamas | <p>Ms. Dominique Lockhart Project Lead Seaweed Aquaculture Pilot Programme P.O. Box N3332 Nassau THE BAHAMAS Email: lockhartdominique@yahoo.com</p> |
| Caribbean Regional Fisheries Mechanism (CRFM) Secretariat | <p>Dr. Susan Singh-Renton Deputy Executive Director CRFM Secretariat Top Floor, Corea's Building Halifax Street Kingstown ST. VINCENT AND THE GRENADINES Tel: 784-457-3474 Fax: 784-457-3475 Email: susan.singhrenton@crfm.int crfmsvg@crfm.int</p> <p>Dr. Maren Headley Programme Manager, Fisheries Management and Development CRFM Secretariat 3rd Floor Corea's Building Halifax and Hillsboro Streets Kingstown ST. VINCENT AND THE GRENADINES Tel: 784-457-3474 Fax: 784-457-3475 Email: maren.headley@crfm.int</p> <p>Mr. Peter A. Murray (Convener / Chair / Rapporteur) Advisor, Fisheries Management and Development CRFM Secretariat Fisheries Compound Princess Margaret Drive P.O. Box 642</p> |

| | |
|--|--|
| | <p>Belize City BELIZE Tel: 501-223-4443 / 4 / 5 Fax: 501-223-4446 Email: peter.a.murray@crfm.int secretariat@crfm.int</p> |
|--|--|

Appendix 3

Terms of Reference (revised) of the CRFM Working Group to Promote Sustainable Aquaculture Development (WGA)

Background and Rationale

According to the FAO State of World Fisheries and Aquaculture Report 2010, aquaculture continues to be the fastest-growing animal-food-producing sector and to outpace population growth, with the per capita supply from aquaculture increasing from 0.7 kg in 1970 to 7.8 kg in 2008, an average annual growth rate of 6.6 percent.

Aquaculture accounted for 45.7 percent of the world's fish food production for human consumption in 2008, up from 42.6 percent in 2006. It is set to overtake capture fisheries as a source of food fish. While aquaculture production (excluding aquatic plants) was less than 1 million tonnes per year in the early 1950s, production in 2008 was 52.5 million tonnes, with a value of US\$98.4 billion.

The majority of fishers and aquaculturists are in developing countries, mainly in Asia, which has experienced the largest increases in recent decades, reflecting in particular the rapid expansion of aquaculture activities. In 2008, 2.9 percent of fishers and fish farmers were in Latin America and the Caribbean.

The aquaculture sector is not well developed in the CARICOM region, with significant development limited to countries like Jamaica and Belize. Other countries like Guyana, Suriname and Trinidad and Tobago have begun to put more emphasis on aquaculture as an area for development. The practices mainly involve the use of ponds to culture such species as penaeid shrimp (*Penaeus* spp.), tilapia (*Oreochromis* spp.), carp (*Ctenopharyngodon idellus*, *Hypophthalmichthys nobilis*, *Hypophthalmichthys molitrix*) and cachama (*Colossoma macropomum*). Also, there is long line culture for algae (*Eucheuma* spp. and *Gracelaria* spp.) in St. Lucia and the mangrove oyster (*Crassostrea rhizophorae*) in Jamaica.

Most CARICOM states have limited land and freshwater resources, however some, like Suriname, Guyana and Belize, do have ample supplies. On the other hand, most states have larger expanses of marine space than land mass, which offers the potential for the promotion and development of mariculture. As such the approach to aquaculture development will have to be multifaceted in its focus, design and implementation in order to address the needs of those with ample land and fresh water resources and those with less of these resource endowments, while incorporating the commercial elements of aquaculture. The CRFM has identified the promotion and development of aquaculture as one of the programme areas within its 2002 Strategic Plan and CRFM First Medium-Term Plan (2004 – 2007) and CRFM Second Medium Term Plan (2008 - 2011). With this in mind, it identified aquaculture development policy formulation as one of the areas to be addressed under the CRFM / JICA Master Plan Study (2009 2011), which included the delivery of two Regional Aquaculture Development Planning Workshops in March and August 2011 involving Belize, Guyana, Haiti, Jamaica, Suriname and Trinidad and Tobago. Some of the common issues identified at the March 2011 Regional Workshop were in the areas of aquaculture policy, legislation, institutional capacity to conduct research, development and provide extension services, technology, feed production and marketing.

In relation to the recently approved Draft Agreement Establishing the Caribbean Community Common Fisheries Policy, objective (a) of section 4.3 is aimed at promoting the sustainable development of fishing and aquaculture industries in the Caribbean Region as a means of, *inter alia*, increasing trade and export earnings, protecting food and nutrition security, assuring supply to Caribbean markets and improving income and employment opportunities, while section 10 Fisheries Sector Development states that Participating Parties, to the extent of their capabilities, will endeavor to promote and adopt measures to

enhance the development of the fisheries and aquaculture sectors and to improve the welfare and socio-economic conditions of fishers and fishing communities, including, *inter alia*, by:

- (a) improving the business, financial and insurance environment;
- (b) promoting and facilitating joint ventures;
- (c) promoting access to training;
- (d) supporting capital investment; and
- (e) promoting the involvement of stakeholders, in particular in planning and management activities, including by supporting the formation and strengthening of fisherfolk organisations. The Policy document in section 20 also recognizes the need to develop a protocol on aquaculture.

With the above in mind and recognizing the need to put in place a mechanism to promote and provide support for the development of aquaculture in the region, the Secretariat, in keeping with Article 11 (Sub-Committees of the Forum) of the CRFM Agreement, is proposing that a working group for the promotion of aquaculture development be established.

Objectives

The objective of the working group would be to:

1. Promote sustainable aquaculture development at the national and regional levels, mainly for the purposes of:
 - increasing food production and security;
 - improving rural income and employment;
 - diversifying farm production; and
 - increasing foreign exchange earnings and savings.
2. Advise the Forum on policies, programmes and projects to promote the development of aquaculture.

Terms of Reference

The terms of reference for the establishment of a CRFM Working Group to Promote Aquaculture Development, are as follows:

1. Assist member States in conducting feasibility studies, socio-economic analyses, policy, planning and project formulation;
2. Promote interdisciplinary research on selected aqua-farming systems for adaptation or improvement of technologies, and for the development of new technologies that are environmentally suitable/appropriate and utilizing renewable energy sources;
3. Promote market and value-added product research to facilitate improved marketing and trade of fish and fish products from the aquaculture sector;
4. Provide assistance to train and upgrade the core personnel needed for national aquaculture planning, research, training, extension and development;
5. Keep under review the policy and legal frameworks for sustainable aquaculture development in the region including the gaps and weakness, and propose recommendations to the Forum for their improvement;
6. Develop guidelines for the introduction of alien/exotic/non-indigenous fish species into aquaculture operations and the avoidance of invasive species and pathogens in such operations;
7. Provide guidance for the adoption and implementation of credible aquaculture certification schemes;
8. Identify bottlenecks and constraints to aquaculture development and make proposals to the Forum to address them;
9. Monitor scientific and technological developments in aquaculture and keep the Forum updated;

10. Promote the establishment of a regional information system to address common priorities that may be identified with respect to information and knowledge exchange;
11. Assist member states in strengthening their national aquaculture agencies/organizations;
12. Assist the national agencies/organizations in testing and adapting existing technologies to local requirements and in the training of technicians, extension workers and farmers;
13. Promote the transfer of appropriate aquaculture technologies and techniques developed at the national and regional levels;
14. Facilitate the exchange of national experts, technical know-how and information within the framework of TCDC;
15. Advise on and support activities geared towards sustainable feed development for aquaculture; and
16. Assist in the development of programmes for the promotion of the participation of women and youth in the aquaculture industry/sector at all levels.

Mode of Operation

The CRFM Secretariat will be responsible for coordinating the activities of the Working Group.

The Working Group, through the CRFM, should work closely with staff of national and regional aquaculture and related institutions, and of regional organizations such as the FAO Commission for Inland Fisheries and Aquaculture of Latin America and the Caribbean (COPESCAALC), FAO Aquaculture Network for the Americas (RAA) and the Network of Aquaculture Centres in Asia-Pacific (NACA) in order to make full use of available technical expertise.

Membership of the Working Group and Participation

The membership of the group would be comprised of Member States and agencies which are interested in collaborating and cooperating in the promotion of aquaculture development at the national and regional levels.

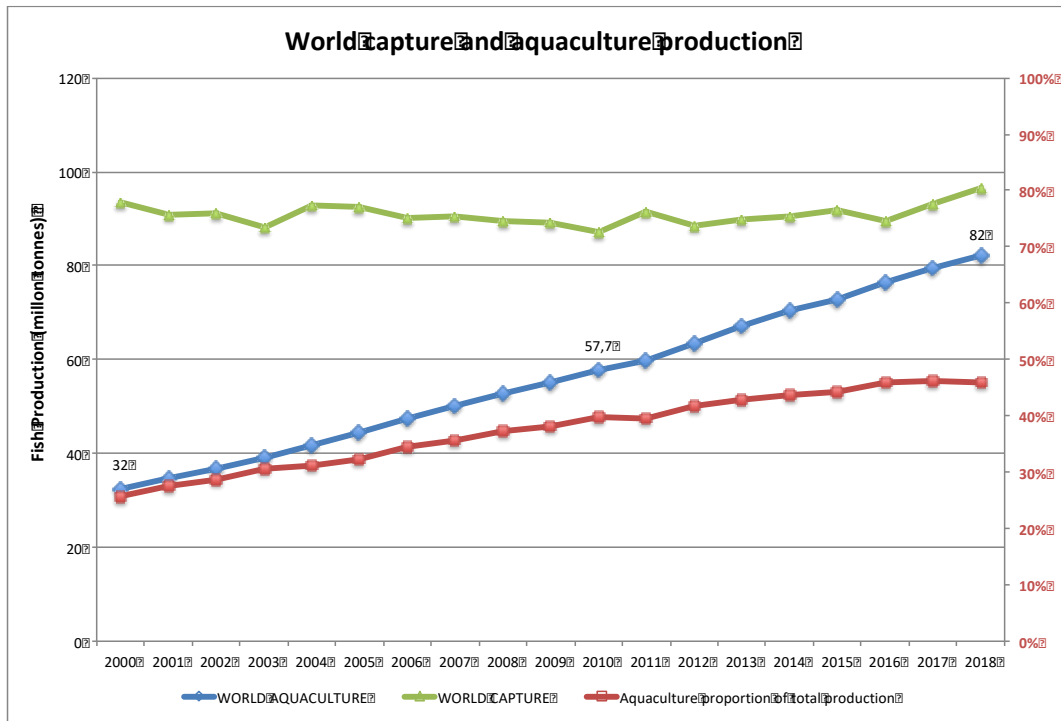
Working Group Meetings

The Working Group will meet by way of regular electronic meetings and an annual on-site meeting subject to the availability of funding.

Appendix 4

Update on status and trends in aquaculture in the Caribbean

World capture fisheries production has plateaued since the early 1990s and reached about 96.4 million tonnes in 2018. Aquaculture production, on the other hand, has continued to grow to 82.1 MM tonnes in 2018, accounting for 46 percent of total production and 52 percent of fish destined for human consumption.



World fish production by capture fisheries and aquaculture 2000-2018 (excluding aquatic plants) (FISHSTATJ, 2020)

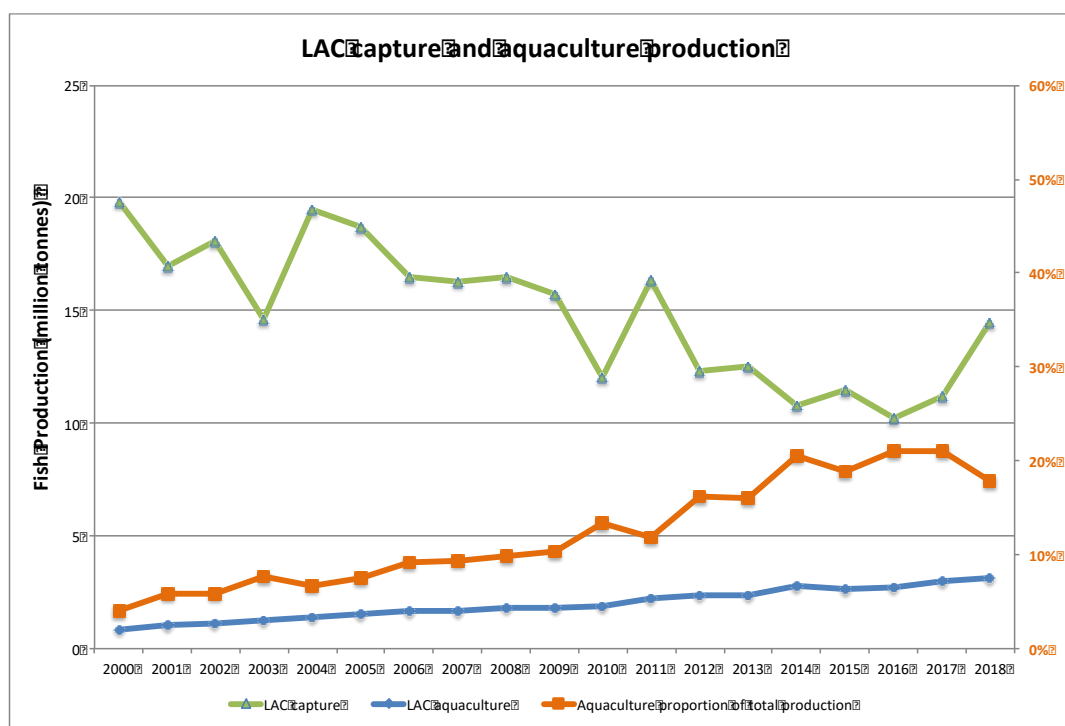
According to FAO, aquaculture is understood to mean the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants. Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated. For statistical purposes, aquatic organisms which are harvested by an individual or corporate body which has owned them throughout their rearing period contribute to aquaculture while aquatic organisms which are exploitable by public as a common property resource, with or without appropriate licenses, are the harvest of fisheries.

Aquaculture continues to be the fastest-growing animal-food-producing sector; and to outpace population growth, accounting for 46.8 percent of fish production in 2016, 45.7 percent in 2008, up from 42.6 percent in 2006. Globally, it is set to overtake capture fisheries as a source of food fish. In the outcome document of the United Nations Conference on Sustainable Development, held in Rio de Janeiro, Brazil in 2012 (entitled “The Future we Want”) the global community recognised the crucial role of aquaculture for food security and nutrition and in providing for the livelihoods of the world’s people. This was reiterated in the 2013 United Nations General Assembly resolution on Sustainable Fisheries (A/Res/68/L.19).

Most fishers and aquaculturists are in developing countries, mainly in Asia, which has experienced the largest increases in recent decades, reflecting the rapid expansion of aquaculture activities. In the Latin America and the Caribbean (LAC) region, Chile, Brazil and Ecuador have been the major players. The

aquaculture contribution to total fish production in the Americas has risen markedly over the years. However, there is a wide variety in technology levels and the contribution of the sector to rural livelihoods is increasing.

LAC fisheries, largely influenced by the anchovy fisheries of Peru, are quite volatile, but have generally declined since the mid-1990s. In 2018, the wild fishery output increased slightly from 2017, to 14.4 million tons. Aquaculture in the region has grown since the 2000, totaling about 3.1 million tonnes in 2018, representing 3.8% of global aquaculture production and equivalent to about 18% of the total LAC fish production of this year.



Fish production by capture fisheries and aquaculture in the LAC region, 2000-2018 (excluding aquatic plants).

Source: FAO, FISHSTAT, 2020

LAC Aquaculture production characteristics 2000-2018 (excluding aquatic plants)

| | 2000 | 2010 | 2018 | 2018 % LAC | 2018 % World | Average accumulated rate 2010-2018 |
|-----------------|------------|------------|------------|------------|--------------|------------------------------------|
| Caribbean | 39 700 | 37 119 | 34 313 | 1.1% | 0.04% | -1.0% |
| Central America | 88 747 | 238 859 | 410 392 | 13.1% | 0.50% | 7.0% |
| South America | 710 487 | 1 579 558 | 2 694 919 | 85.8% | 3.28% | 6.9% |
| LAC total | 838 934 | 1 855 536 | 3 139 624 | 100.0% | 3.82% | 6.8% |
| Total World | 32 417 727 | 57 743 941 | 82 095 054 | | | |

Source: FAO, FISHSTAT, 2020

Value of LAC aquaculture production, 2010-2018 and comparisons (US \$ 1 000)

| | 2000 | 2 010 | 2018 | 2018 % LAC | 2018 % World | Average accumulated rate 2010-2018 | Relative value 2018 (US\$/kg) |
|-----------------|------------|-------------|-------------|------------|--------------|------------------------------------|-------------------------------|
| Caribbean | 58 618 | 66 195 | 63 838 | 0.4% | 0.03% | -0.5% | 1.86 |
| Central America | 383 291 | 871 928 | 1 473 745 | 8.6% | 0.59% | 6.8% | 3.59 |
| South America | 2 206 372 | 7 323 943 | 15 614 462 | 91.0% | 6.30% | 9.9% | 5.79 |
| Total LAC | 2 648 281 | 8 262 065 | 17 152 044 | | 6.92% | 9.6% | 5.46 |
| World | 46 556 671 | 129 298 468 | 247 796 496 | | | 8.5% | 3.02 |

Source: FAO, FISHSTAT, 2020

Overview of Caribbean aquaculture

Caribbean production represents the smallest proportion of LAC fisheries and aquaculture in 2018, with 1% of totals in each case. The 2018 aquaculture production of 34 313 tonnes represents 0.04% of global production. Aquaculture growth in this region has also been very variable since 2000, with an average loss of -1% in the period 2010 - 2018.

This region consists of small countries with limited resources, and potential competition for space with tourism. Nevertheless, as fisheries decline, aquaculture aspires to fulfill local fish needs as well as to generate export revenues. In 2018 accounts for about 18% of total LAC fish production (Fig. 7), but that rate has fluctuated substantially in this period, as a result that somewhat volatile capture fisheries.

In many Caribbean countries, aquaculture is significant in the provision of fish and / or livelihoods³. For example, tilapia development projects were part of the disaster response effort for Haiti after a devastating earthquake in 2010, while aquaponics (growing fish with vegetables in recirculation systems) with tilapia is also being pursued in several countries. Here, aquaculture development proposals and projects, supported by foreign aid or start-up companies are commonplace⁴.

In Caribbean countries most significant production is related to freshwater environments. Nile tilapia features significantly in aquaculture production of most Caribbean countries, complemented by a striped catfish (*Pangasius*) project in the Dominican Republic.⁵ Shrimp (marine and freshwater) projects intended for exports were frequent in the region, but currently without do not show any significant production, except for a Puerto Rican project in Sabana Grande, that deals with river prawn *Macrobrachium rosenbergii*. Red algae and a red drum project in Martinique⁶ (foreseen by Paquette, 1998) achieved adequate production in marine waters, so as to be registered in the FAO database. *Gracilaria* and *Eucheuma* are traditionally consumed in the Caribbean, with its farming activities long considered as a good solution to provide work opportunities. Grenadian production was adequate in 2018, so as to rank among the top 10 countries of the region, interestingly, including successful algae production for direct consumption,⁷ rather than relying on the market for chemical extraction of agar. Current proposals for marine aquaculture include “offshore” cobia farming.⁸ In countries such as Honduras, tilapia and shrimp production are successful export businesses and offer relevant local employment.⁹

Cuba leads the Caribbean aquaculture by volume. This is primarily based on culture-based fisheries of silver carp in freshwater reservoirs, to meet domestic needs. In 2018, the main Cuban production in the FAO database includes whiteleg shrimp, African catfish, and common carp. Current development plans

³ Fao Fact Sheet

⁴ <https://www.forbes.com/sites/daphneewingchow/2019/07/03/aquaculture/#331807625688>

⁵ <https://www.seafoodsource.com/news/aquaculture/pangasius-producer-in-dominican-republic-gains-entry-to-us-market>

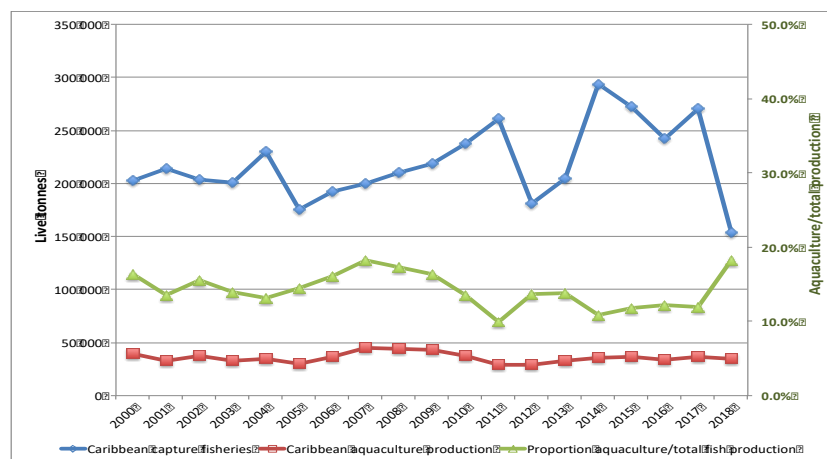
⁶ <https://archimer.ifremer.fr/doc/1998/acte-2546.pdf>

⁷ <https://atlanticgoldseamoss.com/>

⁸ <https://www.nature.com/articles/s41893-018-0205-y>

⁹ <https://thehealthyfish.com/history-of-fish-farming-in-honduras/>

focus on genetically selected tilapia¹⁰, though lately with relatively low production. The main purpose of aquaculture in 2018 still relates to fulfilling domestic needs, responding to ongoing trade embargos, though income from export is also considered attractive. Other Caribbean countries have a similar history of species introductions and differential aquaculture development trajectories, and in many cases, national/governmental goals are supplemented by further interest in exports by private companies, even if the Caribbean is an area with long-standing deficit in domestic fish supplies.



Caribbean fish production from capture fisheries and aquaculture (2000 - 2018, excluding aquatic plants. Source: FAO, FISHSTAT, 2020

Overall growth in Caribbean aquaculture has been negative in the period 2010 - 2018, with high variability between countries.

Top 10 aquaculture producers in the Caribbean, 2010-2018 (Live tonnes)

| Country | Rank | | Production (tonnes) | | 2018 % Caribbean | Average accumulated rate 2010-2018 | Principal species |
|--------------------|------|------|---------------------|---------|------------------|------------------------------------|--|
| | 2010 | 2018 | 2010 | 2018 | | | |
| Cuba | 1 | 1 | 118,222 | 108,228 | 83.3% | -1.2% | Silver carp, Shrimp, Nile catfish, Common carp |
| Dominican Republic | 3 | 2 | 23,230 | 25,000 | 7.3% | 8.9% | Nile tilapia, Striped catfish |
| Jamaica | 2 | 3 | 19,522 | 16,166 | 4.7% | -11% | Nile tilapia |
| Haiti | 4 | 4 | 13,600 | 14,000 | 4.1% | 19% | Nile tilapia |
| Martinique | 5 | 5 | 12,222 | 11,222 | 0.1% | -6% | red drum |
| Saint Lucia | 6 | 6 | 11,222 | 11,222 | 0.1% | 12% | Nile tilapia |
| Barbados | 12 | 7 | 11,222 | 11,222 | 0.1% | 38% | Nile tilapia |
| Guadeloupe | 9 | 8 | 11,222 | 11,222 | 0.1% | 10% | red drum |
| Puerto Rico | 7 | 10 | 11,222 | 11,222 | 0.1% | 2% | Giant river prawn |
| Total Caribbean | 7 | 13 | 191,919 | 181,313 | | -1% | |

Source: FAO, FISHSTAT, 2020

Aquaculture in the CRFM

The CRFM has identified aquaculture as a priority since 2002. The aquaculture sector is not well developed in the CARICOM region. Most CARICOM States have limited land and fresh water resources; in fact, this was the rationale for the decision by the OECS members of CARICOM, in the mid-1990s, that land-based aquaculture would not be the focus of their fisheries development thrust, except as a subsistence activity for small farmers. Notwithstanding, the 1999 OECS Fisheries Management Strategy and Implementation

¹⁰ <https://www.ipscuba.net/salud-y-ciencia/programa-de-mejoramiento-genetico-fortalece-la-acuicultura-cubana/>

plan speaks to the conduct of applied research on aquaculture / mariculture in support of the stated aim to create a diversified and sustainable production base.

This has prompted OECS countries, as well as Jamaica, to see the potential for aquaculture as part of their fisheries development paradigm. Aquaculture production by CARICOM Member States, has been mainly due to only a few of the countries.

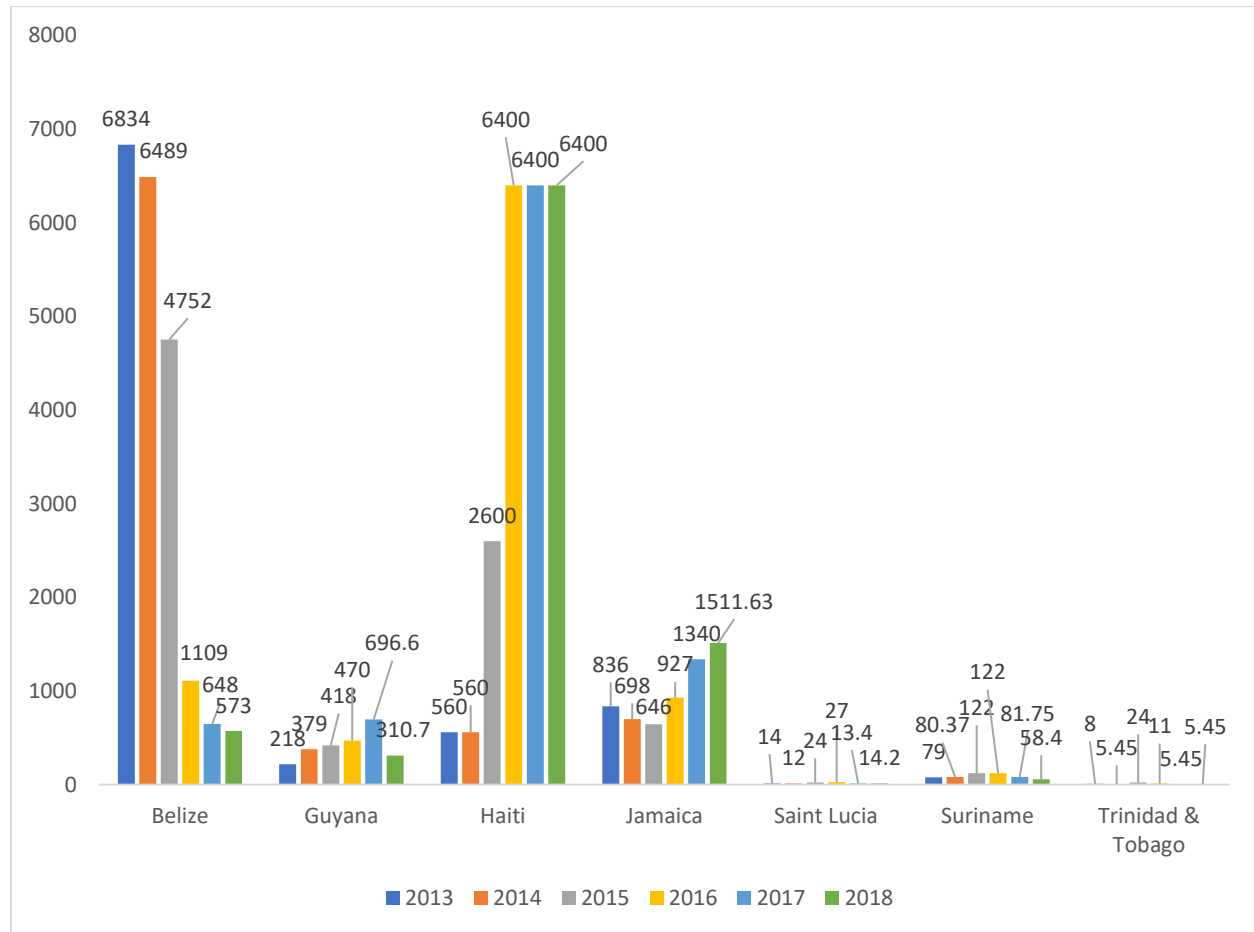


Figure 1 Trend in aquaculture production among CRFM Member States from 2013 to 2018 (meat weight in metric tonnes)

Because of the limited potential growth of wild catches in the Caribbean region, sustainable expansion and intensification of fish production through responsible aquaculture development should be a major objective for countries in the region. In keeping with this, aquaculture development policy formulation was identified as one of the areas to be addressed under the CRFM / JICA Master Plan Study (2009 - 2011).

It is recognised that many Caribbean nations have seen the potential of mariculture to help meet local demand for fish and other marine products and to relieve pressure on capture fisheries. Governments and investors are especially interested in culturing species that are traditionally associated with the Caribbean, such as spiny lobster, queen conch and Nassau Grouper. Most States have large expanses of marine space, which offers the potential for development of marine-based aquaculture or “mariculture”. In 1980 a “Case paper for the establishment of a mariculture system in the Commonwealth Caribbean” was presented to the Caribbean Development Bank; it recommended rapid expansion of mariculture systems in the region. In the early 1980s, the French Departments experimented with cage culture of some snapper species and it

was thought that these methodologies had the potential to be utilized in other Eastern Caribbean islands provided that the preferred geographic and physical characteristics were accessible.

The CRFM had identified aquaculture as a priority since 2002, with aquaculture development policy formulation being identified as one of the areas to be addressed under the CRFM / JICA Master Plan Study (2009 - 2011). In that year, it was announced that the CARICOM development strategy for 2013 - 2020 includes plans to develop the sector by adopting an ecosystem approach to aquaculture. Recognizing the need to put in place a mechanism to promote and provide support for the development of aquaculture in the region, the CRFM Secretariat also established a Working Group to Promote Sustainable Aquaculture Development (WGA) at the national and regional levels, mainly for the purposes of: increasing food production and security; improving rural income and employment; diversifying farm production; and increasing foreign exchange earnings and savings as well as advising the Caribbean Fisheries Forum on policies, programmes and projects to promote the development of aquaculture.

The inaugural meeting of the WGA considered a report on the potential for fish farming in the Caribbean. The Report set out a five-year action plan for aquaculture development, which was subsequently approved by the CRFM's Ministerial Council. Towards these goals, the WGA has taken on board the major challenges identified for aquaculture development in the Caribbean, which include: availability of freshwater, technology transfer; feed access and availability; small-scale farmers – “new” technical assistance; governance and political willingness; and, application of the Ecosystem Approach to Aquaculture. The Working Group, coordinated by the CRFM Secretariat, seeks to work closely with staff of national and regional aquaculture and related institutions, and of regional organizations such as the Commission for Inland Fisheries and Aquaculture of Latin America and the Caribbean (COPESCALC), FAO Aquaculture Network for the Americas (RAA) and the Network of Aquaculture Centres in Asia-Pacific (NACA) in order to make full use of available technical expertise.

In the Caribbean Community Common Fisheries Policy, objective (a) of section 4.3 is aimed at promoting the sustainable development of fishing and aquaculture industries in the Caribbean Region as a means of, *inter alia*, increasing trade and export earnings, protecting food and nutrition security, assuring supply to Caribbean markets and improving income and employment opportunities. Section 10 Fisheries Sector Development states that Participating Parties, to the extent of their capabilities, will endeavor to promote and adopt measures to enhance the development of the fisheries and aquaculture sectors.

Consistent with this direction, Saint Lucia had at one time developed useful production levels of the marine alga, *Gracilaria* spp; and, in December 2018, a group of local sea moss farmers exported sun-dried sea moss from Saint Lucia to the United Kingdom. The technology for this had been “exported” to Grenada and Antigua, but appeared not to have caught on to any major extent. In recent times, St. Kitts and Nevis has concluded that an aquaculture sector will create both livelihood and investment opportunities and will, in its most developed version, create many job opportunities for educated, specialised and skilled people including all management levels. To this end it has also committed to ensure that the necessary regulatory framework is maintained to encourage and protect investments and incentives in aquaculture

The Bahamas also considered the feasibility of sponge aquaculture as a sustainable low-cost industry. Culture of the mangrove oyster (*Crassostrea* spp.) had been considered in Saint Lucia in the early 1980's and a culture project was set up in Jamaica in 1997 for this oyster. A study published in 2003 suggested that prospects for farming the Caribbean Spiny Lobster, *Panulirus argus*, were worthy of consideration. Because of the limited potential growth of wild catches in the Caribbean region, sustainable expansion and intensification of fish production through responsible aquaculture development should be a major objective for countries in the region. However, there is evidence of detrimental effects on coastal environments thus suggesting that farming of spiny lobster may be an unsustainable venture, based on current practices. This is partially due to management strategies that skip the many lacks in knowledge about nutritional and culture requirements of tropical lobsters.

More recently, Jamaica began revitalizing its aquaculture by the development of aqua-parks and incorporation of aquaculture in the legislative framework being currently put in place. This together with the provision of duty concessions for feed for tilapia production; as well as introducing a new species: Basa (*Pangasius* sp), which are important food fish with an international market. Focusing on *Tilapia* spp., Trinidad and Tobago has identified approximately 16 major elements as being critical in the creation of the enabling environment to encourage interest and investment in aquaculture, of which 14 have been implemented. This includes increasing staffing complement to deal with aquaculture and the preparation of a national aquaculture policy. A programme of aquaculture incentives aimed at encouraging increased interest and investment in the aquaculture sector has also been identified

Against all this, commercial feasibility of mariculture needs to be reviewed. It has been suggested that in some cases, the hatchery technology may be a major constraint, while in other species, problems may exist in the nursery or grow-out phases of production. There are also candidate species for which the culture technology is well developed, but market prices are too low to allow for profitable production in the Caribbean. Expansion of Caribbean mariculture is critically dependent upon the identification of species with highest commercial potential. Integrated Multitrophic Aquaculture (IMTA) is currently being considered as the basis for an ecosystem approach to the mariculture paradigm that can enable farmers to diversify their output by replacing purchased inputs with byproducts from lower trophic levels, without new sites; leading to increased profits and reduced financial risks due to weather, disease and market fluctuations.

The CARICOM approach to aquaculture development will have to be multifaceted to address the range of available natural land and fresh-water resources in the region, while incorporating the commercial elements. Because of the limited potential growth of wild catches in the Caribbean region, sustainable expansion and intensification of fish production through responsible aquaculture development should be a major objective for countries in the region.

Appendix 5

Priorities for addressing gaps in implementation of CRFM's 5-year aquaculture work plan

The CRFM Secretariat's **survey** to determine the status of implementation and achievements regarding the 5-year work plan on aquaculture has indicated none of the work plan activities were considered by countries to be well advanced or almost completed. Table 1 shows a prioritisation of the activities not being implemented by member states, notwithstanding being seen as applicable by the respondent.

We have already considered the factors that should be considered with regard to the current status of implementing the 5-year action plan; reiterating that most notable among these is the inadequacy of the human capacity. Limitations in availability of land and water resources in Caribbean SIDS limits development of aquaculture to the extent required to substitute / replace demand for marine capture species, whether for local consumption or export. Potential aquaculturalists are often challenged in the acquisition of initial capital investment needed for their ventures. In cases where cultured species there are of high value, there is investment from large companies.

Consideration should be given to approaching aquaculture more as a business enterprise, with the focus on management or investment and providing market support. As said previously, almost nothing has taken place to improve access to credit available for supporting improvements in aquaculture; furthermore, this has not been seen as being a priority worth addressing. If aquaculture is to play its much-touted potential role in boosting fish production, food security and employment in the region, this must be remedied.

Aquaculture research and development should also be approached with a strategic focus on supporting investments and partnership between the public and private sectors.

The 5th Meeting of the **CARICOM Fisheries and Aquaculture Priority Commodity Working Group** (FISHCOM) considered, *inter alia*, the Jamaica experience in tilapia production by a major private sector company; the Belize experience with different types of aquaculture production, especially shrimp production for export; and the work done by the public and private sectors in aquaculture in Trinidad. The Working Group was of the view that while it was important to encourage investment in the sector, it was useful to know what had been the experiences of others who would have made such investments - what led to successes where they occurred, and what contributed to failures where observed.

While recognising that a review of those experiences would be very useful in determining how best to advocate for increased investment in the aquaculture industry, the FISHCOM opined that there is need for strong research-supported business and marketing strategies, with the major output being new and strengthened national and regional seafood value chains supporting realization of the blue economy opportunities and sustainable development goals.

This discussion engendered a view that CRFM should establish commercial aquaculture and mariculture production research innovation and training venture(s) in partnership with existing/new appropriate private or public sector parties as a fundamental strategy for development of this sub-sector and for CRFM's own sustainability, with CRFM's equity being sourced from international development agencies and philanthropic entities. The FISHCOM recommended that: "in order to support its sustainability and effective technology transfer, and as a fundamental strategy for marine fish and aquaculture commodity and associated industry development, CRFM should establish a commercial Research and Innovation Centre to undertake partnership ventures with existing/new appropriate private or public sector parties. CRFM's equity in the Centre should be obtained from various sources including government, international development agencies and philanthropic entities."

A **recent (ongoing) study**, by FAO, on the status and trends of development on aquaculture in the wider region¹¹ has noted that while the availability of sites, low population densities, and a variety of climatic conditions used to guarantee an easier expansion of aquaculture in LAC as compared to other continents, technologic developments such as recirculating aquaculture systems (RAS) and open-ocean farming might diminish those advantages and force this region to compete with other countries in more challenging terms during the coming decades, a fact that calls for more efficiency and competitiveness together with more and better science and technology, and much needed better governance schemes and leadership.

| 1 | 2 | 3 | 4 | 5 |
|---|---|--|---|---|
| 1- to 2-year MSc Aqua Programmes | 3-year Ph D Programme | Production of series of training videos related to Caribbean aquaculture, online | Market feasibility studies for indigenous and locally produced species | Industry research local feed material substitution small scale fish farming |
| Inter and intraregional working internship programme | Caribbean Aquaculture Conference and Trade Fair | Institutional research reproductive biology indigenous and local species | Market and Technical feasibility assessments of Ornamental Fish Culture | |
| Cage culture technology & tropical aquaculture research | Access US\$25 million soft loan to on-lending directly to farmers (specifically) to start-up fish farms | | Institutional Research Low trophic level species | |
| Access US\$10 million soft loan to Credit Unions to (generally) on-lend to fish farmers | | | | |

Table 1. Perceived gaps in implementation of 5-year Aquaculture work plan
 Relative level of required immediate action: 1 - smallest to 5 - largest
 (based on percentage of respondent countries not implementing applicable activities)

The study goes on to suggest that to increase production of native fish, with potential impact on small and medium scale aquaculture, there is a need to fully develop and transfer technologies. Also, important improvements are needed in genetics, feeds, feeding systems and sanitary regulations. Enhancement of human and organizational capacities, together with a more direct participation of private entrepreneurs in the R&D process will also be needed. It is further mooted that development of aquaculture in our countries should address governance and sustainability issues, with emphasis on the effects of climate change and that of this activity on the environment. Horizontal cooperation will allow lessons already learned in countries like Chile and Brazil to be considered, while deploying future development efforts in other parts of this region, and promoting investment, employment and food production. Aquaculture can strengthen the intra-regional market, allowing to cover domestic demands with local products rather than extra-

¹¹ In March 2020, the Aquaculture Branch of the FAO Fisheries and Aquaculture Department initiated the preparation of Regional Aquaculture Reviews ahead of the Global Conference on Aquaculture. The draft chapter on the Latin American and the Caribbean refers

regional imports, incorporating technological innovation to adapt to the new scenarios arising from climate change.

It is said that horizontal support schemes between countries should be encouraged and welcomed, to cooperate in technology, capacity building, human development and sustainability approaches in aquaculture. New means to further support this horizontal transference of knowledge and technologies are desirable and should be devised. In many areas, as well, there is a clear need for training and support to elaborate development proposals and national / regional aquaculture policies and plans¹².

At its 14th Meeting, the **CRFM Ministerial Council** discussed the issue of aquaculture development and accepted that there are several challenges that hamper aquaculture production in the CARICOM region; mindful that it requires investment, as well as the policy, legal and regulatory frameworks, capacity building, the identification of the species with potential and ensuring good supplies of brood stocks, setting up good health systems and addressing the constraints, such as high input costs, feed and land availability, cost of credit, water systems, and the technical expertise required to conduct the operations in a systematic and proper manner. Additionally, other critical elements include extension support, research and development, skills training (including at the basic farm level), addressing climate change and disaster risks, including problems that may arise due to flooding. Following on extensive discussions on the issue, the Council:

Agreed that economic models for varying scales and types of aquaculture operations (including multi-trophic aquaculture and aquaponics) should be promoted among Member States

Tasked the CRFM Working Group to Promote Sustainable Aquaculture Development (WGA) to work along with Member States to investigate the potential across the spectrum, and to facilitate access to relevant models for both large-scale and small-scale operations that could guide policy-makers and investors;

Mandated the CRFM Secretariat to provide necessary support (including convening forums and training sessions) to empower small-scale fishers to better harness the potential for sustainable aquaculture, particularly in the smaller island states.

In keeping with the direction given by the Ministerial Council, the CRFM Secretariat has incorporated issues related to aquaculture into a concept note (see reference document # WGA 2020/03/07.1) that it has submitted to the Development Bank of Latin America (a.k.a. CAF) for a project on climate change in fisheries. The project would seek to “accelerate progress towards achieving the SDG targets in respect of climate change adaptation and mitigation in respect of coastal fishing communities and the fisheries sector and promote blue growth in CARICOM Countries”. CAF has informally agreed to provide the funding / resources for development of the Project Identification Form (PIF) for submission to the GEF.

The CRFM Secretariat has also developed a concept note (reference document # WGA 2020/03/07.2) for a project for which it expects to seek funding; specifically dealing with aquaculture and geared to demonstrating the feasibility of integrated multi-trophic aquaculture (ITMA) system to improve sustainable production, including a detailed activity implementation plan for the development of ITMA, with practical recommendations for short and medium-term objectives; based on information and understanding gained from industry analyses, economic valuations, feasibility assessments and research, as well as capacity building and support for investment in ITMA.

¹² Ibid.

Appendix 6

Seaweed Aquaculture Pilot Programme

Development and Investment in the aquaculture sector will be driven by private sector interests, progressive planning, managing the available skill sets, innovative financing structures, joint venture partnerships, intentional behaviour and dynamic action. Creating the business enabling environment to minimize risk, grow a culture of opportunity and attract capital investment is conditioned upon the appropriate responses from the private sector, the public sector and indeed the third sector bridging the gap between potential and performance. Capacity building and building resilience in the region from our current position is a challenge, especially as our defining business identity and culture is proved vulnerable and nonessential. The way forward is developing essential, quality products and services, sustainably produced, and regenerative, utilising our most valued, abundant resource: our pristine marine environments.

The Seaweed Aquaculture Pilot Programme is motivated by food insecurity in the region and identifying and prioritizing valuable commodities for their export potential. The project aims to install test farms in the marine environments of four neighbouring territories: The Bahamas, the Turks and Caicos Islands, Jamaica, and Haiti to evaluate the potential for the cultivation of commercially valuable species of seaweed (sea moss) to service various industry applications. The low investment costs relative to terrestrial crop production indicate seaweed aquaculture is one of the lowest risk investments we can make that can be grown from cautiously small initial investments, increasing to significant scale in step with demand.

Fueling this growth will be target market identification and development. Also, the kind of individual and regional branding that will define a premium product, nurtured in an unspoiled, immaculate marine environment; and branding that will deliver recognition and estimation in a global marketplace. The valorisation of regional seaweed and other aquaculture products will rely on government provisions that must build a regulatory framework that enforces quality assurance and careful production, and provisions that will lower production costs, and make exporting from the region more affordable for new businesses to find secure footing in the early stages of growth.

The aquaculture business environment is fiercely competitive, however regional economic re-development is hinged on us outperforming in the seaweed sector and in other aquaculture markets. To do this we need to first reconsider our timeframe. While there are new applications for seaweed and seaweed extracts being developed annually, existing major players are already positioned to supply these needs. We can grow a superior quality product, but we need to anticipate or even engineer the needs of the market and work to expand the consumption of seaweed products to position ourselves to be premium suppliers now. Domestic consumption could help to lower food costs and the costs of agricultural production, but it is in export value where we can realize real potential gains. We also need to identify practicable ways to implementation and development resources and incentives.

There are attractive markets for a regional seaweed product. Currently we are investigating animal feed production because global fodder security is a condition of global food security and we can sustainably develop a production capacity that respects the shared space of the marine environment. Seaweed for animal feed can also have a beneficial impact on water resources management and other climate benefits. Seaweed for human consumption is also increasing in Western food culture as companies are actively advocating for and engaged in plant-based foodstuffs dominating in food culture. Impossible Foods Inc. is an example of one such company whose agenda is the commitment to a dramatic increase in the consumption of plant-based foods and an evolution in food culture toward a vegetarian culture to accommodate global demand. The energy sector is researching seaweed applications for energy production. As a renewable biomass, seaweed biomass could hopefully replace biomass currently being incinerated for energy such as trees which, given the rate of growth are not classed as renewable by environmental advocates. We already have

generated interest from the cosmeceutical sector whose product requirements match the local marine environment.

The partner proposal for this initiative is the Micro-Equity Programme. This special purpose vehicle is being designed to create avenues to investment for ordinary citizens and unsophisticated investors. This programme addresses poverty reduction, the commitment of regional governments and third sector agencies and one of the sustainable development goals. Adoption of the programme is voluntary, however the design of this financial product will be holistic and low risk to make it a viable and safe financial product for ordinary citizens to have ownership in the growth of the aquaculture industry.

Public-private partnerships should be structured to encourage the establishment, growth, and expansion of new and existing industries. The Seaweed Aquaculture Pilot Programme is partnered with the CRFM for project development support, identification of resources, regulatory framework development and information sharing. We are also partnered with The Bahamas Agriculture and Marine Science Institute (BAMSI) for the implementation and co-management of the test farm and for the potential development of a fisheries improvement programme, curriculum development, the collection of scientific data on the marine environment and educational resources in the national interest.

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Nassau, The Bahamas

CRFM

The CRFM is an inter-governmental organisation whose mission is to “Promote and facilitate the responsible utilisation of the region’s fisheries and other aquatic resources for the economic and social benefits of the current and future population of the region”. The CRFM consists of three bodies – the Ministerial Council, the Caribbean Fisheries Forum and the CRFM Secretariat.

CRFM members are Anguilla, Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, St. Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago and the Turks and Caicos Islands.

