

RECONCILING ADULT EDUCATION NEEDS FOR SUSTAINABLE DEVELOPMENT: THE CASE OF TRINIDAD AND TOBAGO SMALL SCALE FISHERIES

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Abstract

The critical role of fisheries to food security and coastal livelihoods, as well as its impact on dwindling marine resources, motivate an examination of the degree to which education and training needs in the fisheries sector are met. This paper investigates the specific case of Trinidad and Tobago small scale fishers, a particularly vulnerable population whose livelihoods are bidirectionally linked to sustainable development.

The challenges of declining fish stocks, increasing market prices and the fierce competition presented by technology-based fishing techniques, present a persuasive case for context-appropriate education and training for Trinidad and Tobago small scale fisherfolk. Research was conducted to examine the training needs of these fisherfolk, as articulated by key industry stakeholders, including the fishers themselves; and to set these needs off against available training provisions. A reconciliation strategy for education and training was developed to respond to the needs of the industry as well as to the Caribbean priorities of sustainable development and fisheries management.

Key words: *small scale fisheries, sustainable development, training needs specification.*

Introduction

The fisheries of the Caribbean Large Marine Eco-system (CLME) are threatened by the significant transboundary issues of: unsustainable exploitation of fish and other living marine resources; habitat degradation and community modification; and pollution. A comprehensive cooperative framework for governance of the CLME is under development with the goal of facilitating the sustainable provision of goods and services from the Caribbean's shared living marine resources. The key instruments of the framework: policies, legal and institutional reforms as well as marine resource management and associated investments (Whalley, 2011), pose however a potential threat to the livelihoods of artisanal fisherfolk. In the case of Trinidad and Tobago, these restrictive measures disrupt a long tradition of minimal monitoring and control.

The Government of Trinidad and Tobago is committed to sustainable development. The marine environment, as well as education and training, poverty reduction, social inclusion, competitiveness and food security, number amongst key national priorities. Yet, in some cases, tensions exist between the corresponding domains of interest. Small scale fisheries, which exists at the confluence of several national developmental foci, is a case in point. In particular, small scale fishers represent a low-income community with generally moderate to low levels of traditional literacy and low levels of digital literacy. They lie closest to the raw resource by virtue of their position in what is regarded as a vital food production value chain and yet they

generally make little use of modern technologies, such as information and communications technologies, for competitive advantage. At the same time, they are perceived as presenting a threat to dwindling marine resources and their traditional livelihoods are threatened by applicable regulations. The education and training necessary to understand, manage and participate in the new realities of the fisheries sector and its marine environment, present logistical and cultural challenges for these small scale fishers.

Research Problem

As the primary users of marine resources that are measured and increasingly tightly managed, small scale fishers are perceived as intensively exploiting fish stocks (Chakalall, Mahon and McConney, 1998) and are consequently the main targets for regulatory monitoring and control. Singh and Mee (2007)'s demonstration that this approach to resource management contrasted sharply with the fishers' perception that marine resources were over-exploited by the unregulated activities of larger interest groups, was re-emphasized in subsequent qualitative studies (Caribbean ICT Research Program CIRP 2009; Mallalieu and Sankarsingh, 2012). Without context-appropriate training and education for seafaring fishers, as has been provided for leaders of fisherfolk organizations (Almerigi, 2008), conflicts over matters of shared concern and responsibility may remain unresolved.

Many agencies whose interests revolve around different dimensions of social and economic development as well as protection of the marine environment recognize the need for small scale fishers to be educated and trained. In some cases, the needs specified by the different agencies align well. In others, there is disharmony between the needs specified by small scale fishers themselves and those specified by other agents who have quite different strategic agendas.

Research Focus

The scope of research is demarcated by the primary impact spaces for small scale fisheries education and training. In addition to the fishers themselves, the research takes account of other entities that have the highest stake in their education and training. Desk research revealed these entities to be the small-scale fisheries industry and the marine environment, largely comprising the agencies around which the development and governance of the country's small-scale fisheries industry and marine resources revolve. The research focuses on the relationship between the education and training needs for small scale fisherfolk across these primary impact spaces. It examines training motives for the respective stakeholders and explores opportunities for reconciliation of potential conflicts. The outputs and outcomes of the research are of particular importance to various agencies who wish to collaborate on training planning and delivery in order to optimize multi-sector synergy. The research is also of benefit to policy makers and invested private sector companies as a means of understanding the mapping of small scale fisheries training investment to identified development priorities for the sector.

Research Methodology

General Background of Research

As one of seventeen member states of the Caribbean Regional Fisheries Mechanism (CRFM), Trinidad and Tobago derives its marine resource governance and management guidelines from the CRFM whose mission is to "promote and facilitate the responsible utilization 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 industry comprises fishers and their organizations, various Government and pseudo-Government agencies (Potts, Roche,

Maharaj, Ramnath and Doodnath, 2010; Sandy, Leotaud, Leid and Blackman, 2011). The fisheries sector accounts for an estimated 0.07% of Trinidad and Tobago GDP and an estimated 9,000 direct and indirect jobs (Caribbean Regional Fisheries Mechanism, CRFM 2012) out of a total population of roughly 1.3 million. Artisanal fisheries accounts for the majority of all commercial catch (Potts, Rocke, Maharaj, Ramnath and Doodnath, 2010) with the 16.6% of households that are classified as poor or vulnerable, most constrained by matters relating to education and economic capacity (CRFM 2012).

Research Sample

The population of interest to this research is small scale fisherfolk in Trinidad and Tobago. A quantitative survey involving 542 fishermen and women, vendors, and processors indicated that the majority were between the ages of 31 and 40 (CIRP, 2009). Of these, 97.6% were male while 2.4% were female. The majority of the respondents were Afro-Trinidadian (41.7 %), followed by Indo-Trinidadians (41.3%) with the remaining 17% being of mixed descent. Nearly one half of the respondents had received only primary school level education (47.4%), while the other half (48.7 %) had continued on to secondary school. Interestingly, 3.9% had achieved some form of tertiary education. The findings of an independent survey (CRFM, 2012) which examined 158 fishers in Trinidad and Tobago correlated with the demographic findings of the CIRP 2009 study.

When CIRP 2009 respondents were asked to identify the single thing they would change to increase their fisheries earnings, the most popular responses were: purchasing of their own boat, having a bigger boat, getting a better price for fish, the existence of standard prices for fish, proper storage facilities, an end to trawling, a reduction in the cost of fishing equipment, and fisheries related training. Very popular responses included better equipment, the catching of more fish, better facilities and a reduction in the cost of gas. Other popular responses included fish-finder technology and putting an end to marine pollution and seismic operations by oil companies, and the construction of an industrial plant in the Claxton Bay area.

Out of sixty-four open-ended responses, fisheries training was the eighth most popular intervention identified by CIRP 2009 respondents as the preferred means to increase their fisheries earnings. Indeed, the majority (82.8%) had previously indicated that training was important to their fisheries work and 79% had indicated that they were interested in receiving training. CRFM (2012), however, reported that only 26.6% of respondents to their survey conducted in Trinidad and Tobago had received training in the previous five years.

Instruments and Procedures

Desk research, as well as quantitative and qualitative surveys, and other stakeholder consultations were used to gather data that would reveal the extent to which the training needs of small scale fishers intersect, differ and conflict according to the priorities of the different agencies. The nature of the various priorities was examined as the fundamental basis for intersections, differences and conflicts in the articulation of training needs. Documented evidence was drawn from the key authoritative agents and agencies such as the fishers themselves, the Caribbean Fisheries Training and Development Institute (CFTDI), the Seafood Industries Development Company (SIDC), the CRFM, Caribbean Natural Resources Institute (CANARI); and authoritative research sources including the Centre for Resource Management and Environmental Studies (CERMES) of The University of the West Indies and the Institute of Marine Affairs (IMA). Primary and secondary sources were used to capture the scope of training needs for small scale fisherfolk as articulated by the fishers, the small scale fisheries industry and the authoritative agencies with responsibility for marine resource protection.

Data Analysis

Knowledge modeling was used by researchers to construct what they identified as sets of priorities represented within the three impact spaces under consideration, and existent across authoritative documents outlining the strategic intent and operational goals of key resource stakeholders. The concept mapping tool, CMaps, was used to perform an information synthesis of the specific body of extracted knowledge, to identify conceptual connections between those stated priorities, and to visualize the uniqueness and/or the inter-relatedness of relationships between the identified resource stakeholders. This concept map was then used to consolidate, to analyze and to identify neutral themes across which the nature of the fisherfolk, industry and environment interests would be organized. The categorization of the nature of the interests within the three impact spaces was then used by researchers to conduct a comparative analysis with the outcomes of a parallel data collection exercise on articulated training needs for fisherfolk.

Researchers restricted the identification of training needs to those of resource-users such as: fisherfolk, vendors and processors as captured in eight (8) selected sources. The data collection exercise on training needs did not take account of the several other trade and crafts persons, such as those involved in vessel construction and repair, who support the small scale fisheries industry. For each source document, researchers used the following criteria to extract training needs data: i) current training offerings, ii) recommendations from resource-users and resource-managers on desired training and skills for fisherfolk, and iii) recurrent conflict areas for which training is not specified. In addition to the aggregation of training needs per document, each entry was uniquely assigned to one of eight (8) subject areas. Researchers then distributed these subject areas across the neutral themes emerging from the knowledge modeling exercise. An examination of the needs in relation to existing provisions, informed by a recent industry study, yielded observations and recommendations for reconciliation.

Results of Research

Priorities Relating to Impact Spaces: Environment, Industry and Fishers

The priorities relating to each of the different impact spaces are presented in Figure 1. Those relating to the management of the shared resources of the Caribbean marine environment resonate with the transboundary issues elaborated by Whalley (2011), as are evident in the Strategic Plan for the Caribbean Regional Fisheries Mechanism (CARICOM Fisheries Unit, 2002) and the strategic responsibilities of its Forum (Haughton, M.O., Mahon, R., McConney, P., Kong, G. A. and Mills, A, 2004). The priorities for the development of the small scale fisheries industry are succinctly captured in the Strategic Plan for the Development of the Fish & Fish Processing Industry in Trinidad & Tobago (Government of the Republic of Trinidad and Tobago, 2005). The priorities of the individual small scale fishers in Trinidad and Tobago have been captured through extensive quantitative and qualitative empirical studies such as those reported in CIRP (2009); Potts, Rocke, Maharaj, Ramnath and Doodnath (2010), Mallalieu and Sankarsingh (2012) and CRFM (2012).

Analysis of the priorities relating to the marine environment, the small scale fisheries industry and small scale fisherfolk reveal degrees of alignment as well as potential threats. Figure 1 captures these relationships using solid arrows to represent first order alignments or threats and dashed arrows to represent second order alignments or threats.

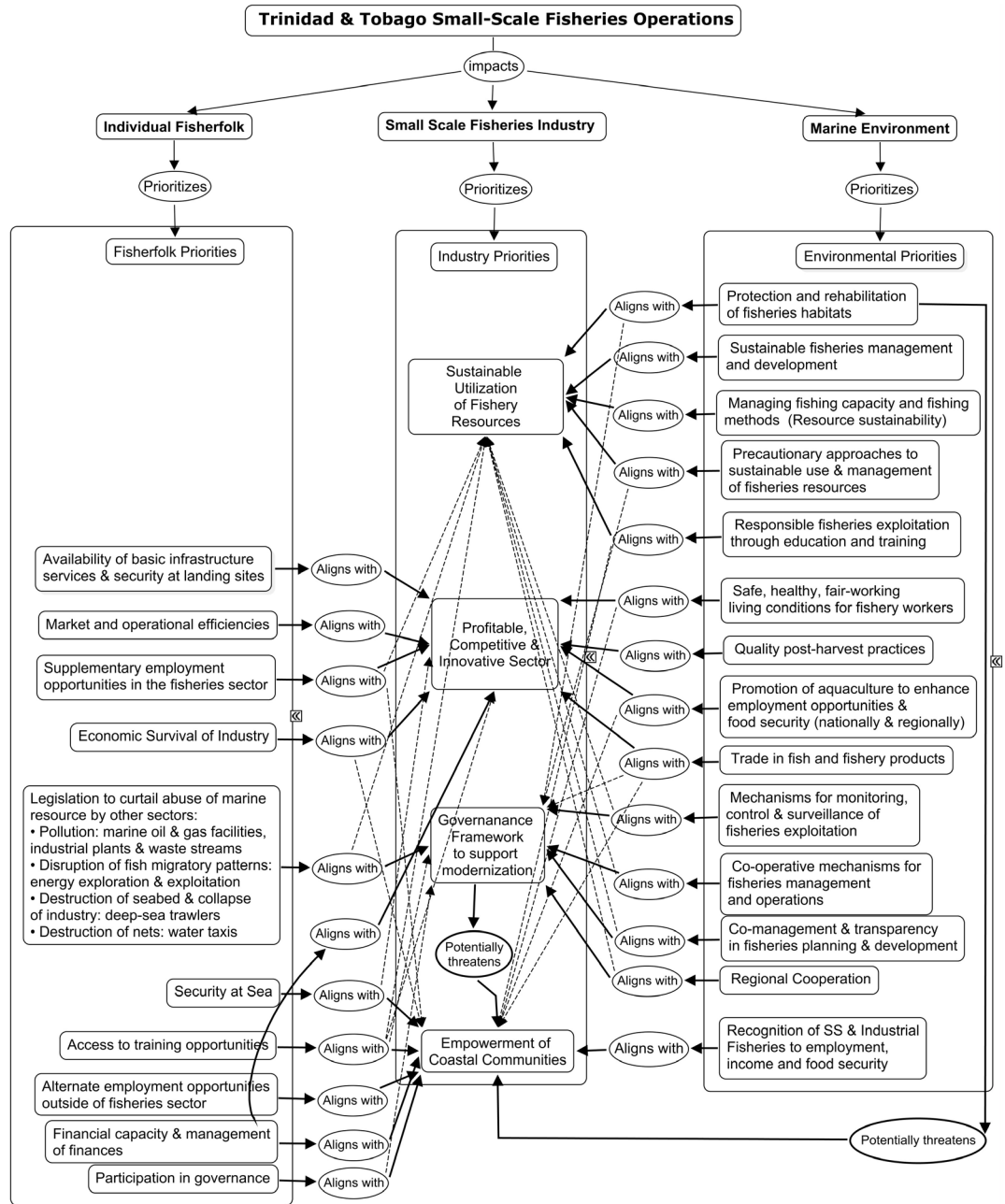


Figure 1: Environmental, Industry and Fishers' Priorities.

Diversity of Interest in Neutral Themes across Impact Spaces

Examination of the concept map of Figure 1 revealed that the following common themes featured prominently amongst the priorities of the three impact spaces of interest:

- (i) *Industry and individual competitiveness,*
- (ii) *Sustainable marine resources and,*
- (iii) *Empowerment of fishers and their communities.*

The nature of the interest invested in each of these neutral themes by the stakeholders in the respective impacts spaces was analysed. The primary interests of fisherfolk were categorized as:

1. Livelihood profitability (“Availability of basic infrastructure”, “Development and enforcement of legislation applicable to other sectors”, “Market and operational efficiencies” and “Access to training opportunities”).
2. Livelihood sustainability (“Economic survival of the industry”, “Availability of basic infrastructure” and “Development and enforcement of legislation applicable to other sectors”).
3. Livelihood security (“Alternate employment opportunities within and outside of the sector” and “Access to training opportunities” and “Financial capacity”).
4. Personal safety (“Safety at sea”).
5. Personal development (“Access to training opportunities” and “Management of finances”).
6. Representation (“Participation in governance”).

The primary interests of the small scale fisheries industry were categorized as:

1. Sustainable resource utilization (“Sustainable utilization of the resources”).
2. Industry profitability (“Profitable, competitive and innovative sector” and “Governance framework to support the modernization of the sector”).
3. Industry sustainability (“Sustainable utilization of the resources” and “Governance framework to support the modernization of the sector”).
4. Skilled work force (“Empowerment of the coastal fishing communities”).
5. Organization of work force (“Empowerment of the coastal fishing communities”).

Finally, the primary interests relating to the marine environment were categorized as:

1. Resource protection and rehabilitation (“Protection and rehabilitation of fisheries habitats and the environment generally”, “Sustainable fisheries management and development”, “Managing fishing capacity and fishing methods so as to facilitate resource sustainability”, “Precautionary approaches to sustainable use and management of fisheries resources”, “Responsible fisheries exploitation through education and training”, “Effective mechanisms for monitoring, control and surveillance of fisheries exploitation”, “Regional cooperation”,).
2. Co-management (“Co-management and transparency in fisheries planning and development”, “Co-operative mechanisms for fisheries management and operations”).
3. Progressive HR Standards (Safe, healthy and fair working and living conditions for fishery workers”, “Recognition of the contributions of small scale and industrial fisheries to employment, income and food security, nationally and regionally”, “Responsible fisheries exploitation through education and training” and “Promotion of aquaculture as a means of enhancing employment opportunities and food security, nationally and regionally).
4. Utilization of fisheries resources according to quality standards (“Quality fisheries post-harvest practices (Quality fisheries post-harvest practices” and “Trade in fish and fishery products according to applicable agreements”).

Figure 2 illustrates the differences in the nature of the interest in competitiveness, sustainable marine resources and empowerment across the impact spaces of the fishers, the industry and the marine environment.

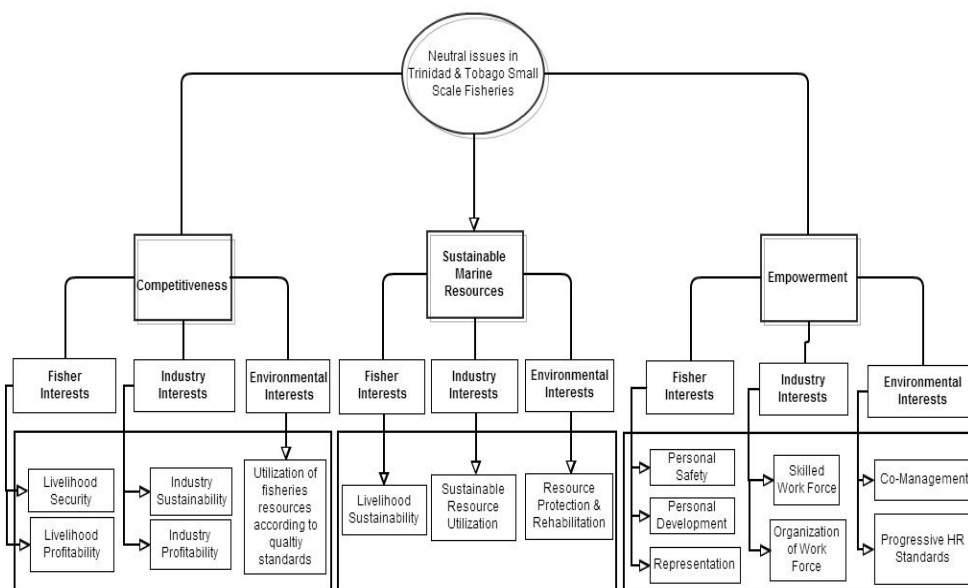


Figure 2: Nature of Interest in Neutral Themes according to Impact Space.

Training Needs: Coverage of Themes and Interests of Different Impact Spaces

Agents and agencies within the three impact spaces under consideration; the fishers, industry and the environment, have all assessed that the realization of their strategic aims relies on the education and training of fisherfolk. In excess of one hundred training needs were identified. These had been reported by, or were derived from the findings of, the SIDC (2012), Whalley (2011), GoRTT (2011), Heileman (2011), Potts, A., Rocke, J., Maharaj, B., Ramnath, S. & Doodnath, L. (2010), CFTDI (2010), CIRP (2009) and SIDC (2005). On examination, the needs were found to fall into the eight categories shown in Figure 3.

Figure 4 illustrates the spread in interests, on the part of the stakeholder groups under consideration, across impact spaces for each category of training need. The eight categories of training needs were related to the three neutral themes of priorities for the impact spaces under consideration as shown in Table 1.

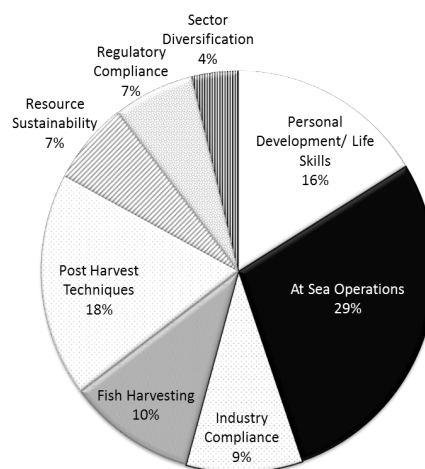


Figure 3: Distribution of 105 Articulated Training Needs.

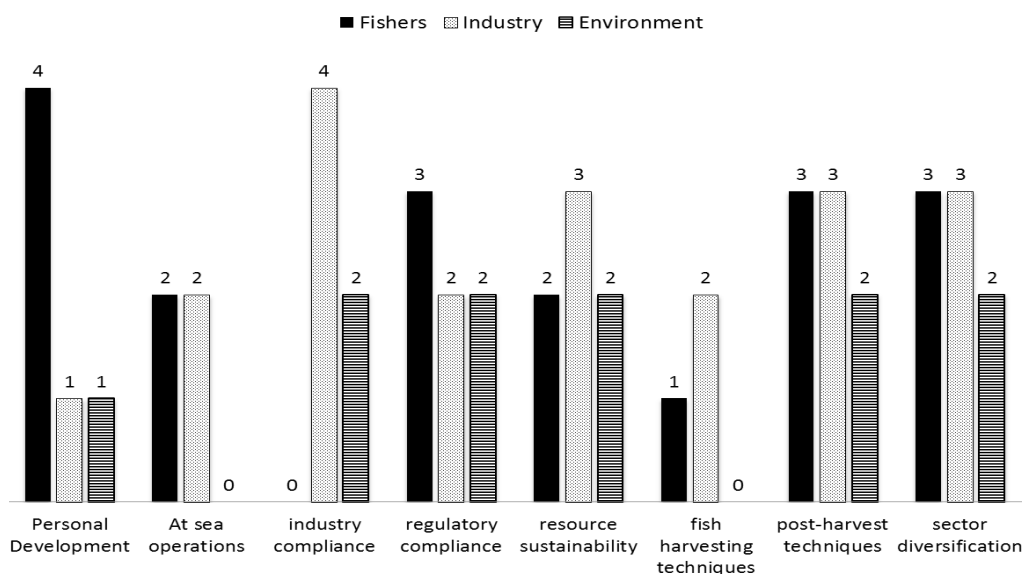


Figure 4: Stakeholder Interests Served by 8 Thematic Training Needs.

Table 1. Categories of training needs which relate to the three neutral priority themes.

Neutral Theme	Categories of Training Needs for Small Scale Fishers
Competitiveness	At sea operations training (primarily maritime skills certification) Industry compliance (Quality Assurance) Fish harvesting techniques Post-harvest techniques
Sustainable Marine Resources	Regulatory compliance (as relate to protection and responsible use of marine resources) Marine resource sustainability (as relates to understanding the need for sustainability, its threats, consequences and applicable responsibilities) Sector diversification
Empowerment	Personal development/ life skills

Training Needs Vis a Vis Existing Training Provisions

A summary of existing training programmes for small scale fishers in Trinidad and Tobago has been documented by CRFM (2012). The eight categories of training needs considered in this study were set against these provisions as shown in Table 2. The totals of the CRFM study have been adjusted and rounded off, as shown, to eliminate Company Administration as a training category under consideration as the current study only takes account of training for small scale fishers who directly handle the marine resource (fish). In the table, categories have been aggregated as necessary to show correspondence between the findings of the two studies and listed side by side to facilitate comparative analysis of the Total and Adjusted Total columns in the same row.

Table 2. Articulated Training Needs Set Against Existing Training Provisions.

Articulated Training Needs (Current study)		Training Provisions (CRFM 2012)		
Itemized Training Needs (%)	Total (%)	Itemized Training Provisions (%)	Total (%)	Adjusted Total
At sea operations training (29)	29	Risks & onboard safety (36.67) Boat skipper (6.67)	43.3	44
Industry compliance (9)	9	Food handling, health & hygiene (10)	10	10
Fish harvesting techniques (10)	10	Fishing techniques (13.33)	13.3	14
Post-harvest techniques (18)	18	Processing and marketing (10)	10	10
Sector diversification (4)	4	Aquaculture techniques (1.67)	1.67	2
Personal development (16)	30	Others (20)	20	20
Regulatory compliance (7)				
Marine resource sustainability (7)		Company Administration (1.67)	1.67	0

Discussion

Tensions arising from misalignments in the strategic and operational agendas of fishers, the industry and marine resource managers, limit gainful opportunities in fishers' livelihoods and inhibit their personal empowerment. They also severely reduce, in direct and indirect ways, the profitability and sustainability of the SSF industry as well as overall regulatory compliance and resource sustainability. However, the strong alignment between fishers' priorities and two of the industry, together with the strong alignment between the priorities relating to the marine environment and three of the industry, as shown in Figure 1, suggest the opportunity for training synergies. The potential threats presented by different priorities, also captured in Figure 1, signal that extra care may be necessary in developing training content and delivery schemes. The alignments and conflicts in priorities highlighted in Figure 1 represent the overarching context within which strategic training programmes may be contemplated.

The dispersion in the nature of the interests within neutral themes, captured in Figure 2, provide important guidance for the architecture of synergistic training programmes. In particular, programmes which focus on matters relating to competitiveness are well advised to consider the nuances between fishers' interests in livelihood security and profitability, against the industry's interests which relate to the sustainability and profitability of the industry. At the same time, it would be important to consider that environmental concerns are manifest in competitiveness to the extent that fisheries resources, extracted from the threatened marine environment, are utilized according to quality standards. This interest reflects, on the part of marine resource managers, (i) an understanding that marine resources are vital to food security and (ii) the concession that, once harvested, marine resources should be responsibly put to good use. A collaborative training programme would adequately represent each of these interests and build rigorous linkages between them.

A training programme with sustainable marine resources as its main focus would be guided by Figure 2 to ensure adequate coverage of matters relating to livelihood sustainability, sustainable resource utilization and resource protection and rehabilitation. These three aspects of sustainable marine resources represent the interests of the different impact spaces and should all be considered. In a similar way, the dispersion in interests relating to the theme of fisherfolk

empowerment captured in Figure 2 would guide the corresponding collaborative training programme. Figure 2 therefore shows differences in interests within neutral themes which inform sensitivity and coverage of training programmes for different stakeholders: trainees, training facilitators, content producers, sponsors and applicable developmental agencies. Coverage that takes account of the needs of the different impact spaces is of immense potential. Curriculum and content developers may wish to arrange that learning outcomes are specified by representatives of the respective impact spaces in a collaborative training programme that is structured, efficient and effective, drawing on intersections in training needs and taking account of differences.

This study has found that half of all training needs are livelihoods-specific, relating to the competitiveness of the small scale fisher or the small scale fisheries industry in one way or other, as depicted in Table 1 and Figure 3. Just over a third of training needs (38%) relate to the sustainability of marine resources, from which the livelihood draws its primary products. Just over one tenth of training needs (12%) relate to the empowerment of fisherfolk who sit at the bottom of the value chain and interact directly with the products of the marine resource.

The research has quantified the intersections between training needs articulated by different resource stakeholders. In particular, Figures 3 and 4 show that personal development and life skills, which accounts for 16% of training needs, serves the interests of fisherfolk, the industry and the environment, with the greatest share accounted for by that of the fishers. Similarly, the interests of the three stakeholders are served by training on the general themes of regulatory compliance (7%), post-harvest techniques (18%) and sector diversification (4%). These areas represent focal points for collaboration between all interest groups. Figure 2 offers guidance on the nature of the interest across the stakeholder groups as an important guide to the development of curricula and delivery schema.

Figures 3 and 4 also show that at-sea operations, which has traditionally accounted for the significant majority of training provisions (CRFM 2012), remains an important area of need for fishers and the industry but does not represent an area of primary need from an environmental standpoint. The highly charged area of industry compliance is polarized between small scale fishers and the caretakers of the marine resource, with the interest of the former primarily served by regulation of commercial fishing; and the interest of the latter heavily concerned with the regulation of small scale fishers. Fish harvesting techniques is also a training theme that is polarized between resource-users and resource-managers, with the fishers most interested in techniques to catch more fish and the sustainability practitioners most interested in the use of techniques to curtail indiscriminate fishing practices.

This research has yielded useful insights into the changing nature of training needs for small scale fishers. In particular, Table 2 shows that existing training provisions strongly emphasize at-sea operations. The table shows that this type of training, which includes risks, on-board safety and survival, navigation and related skills, accounts for 44% of existing training. The table sets this figure off against 29% of all the training needs articulated by, or derived from, the authoritative sources consulted in the present study. Examination of the specifications of training needs reveals that the need for training in at-sea operations remains as strong as ever and that the drop in its relative importance is accounted for by an increase in the needs of training in new thematic areas relating most particularly to personal development, regulatory compliance and marine resource sustainability.

The research has shown that the portion of training needs with respect to industry compliance (9%) matches the existing portion of provisioned training (10%) in this area. Taking account of variances in data gathering and classification methodologies, Table 2 also shows close correspondence in the proportions of needs and provisions in the areas of fish harvesting techniques and sector diversification. There is significantly less correlation between the proportions of training needs and provisions in post-harvest techniques (18% vs 10%) and other areas (20%) not itemized in the CRFM 2012 study. In the present study, other areas of training needs, which relate to personal development, regulatory compliance and marine resource sustainabil-

ity, account for 30% of all training needs. As noted before, overall, the expansion in training needs for small scale fishers lies predominantly in these areas.

The findings reveal tangible opportunities for collaborative training programmes to be contemplated, designed and delivered to meet the evolving needs of fishers, the industry and the environment, despite tensions between priorities.

Conclusions

This research focussed on the twenty-first century problem of training for small scale fisherfolk that arises from the conflicting nature of the demands from various stakeholder agendas. It revealed that the knowledge and skills needed for fisherfolk livelihoods to thrive have changed over time. Major shifts in these needs lie in the areas of the multiple soft skills that are required to engage in an eco-system that is far more intrusive to their livelihoods than ever before. The realities of the threatened shared marine space and demands for quality standards in the handling of fish have motivated the introduction of regulatory requirements that challenge a long tradition of unregulated freedom. Traditional training is hard pressed, at best, to deliver the learning outcomes that are required for sustainable compliance with these regulations.

There are compelling arguments in favour of the collaborative design and delivery of new training programmes by stakeholders across the different impact spaces. The gains include savings in overall training costs as well as minimization in income lost for participating fisherfolk. Equally important are the significant gains in adult education that may be derived from contextual embeddedness and expert coverage of intersecting themes and thematic interactions. This paper has provided a framework for reconciling the training needs of different stakeholders by analysing the intersection of themes, their interactions and potential conflicts. Though the framework has been instantiated for the case of Trinidad and Tobago, it may be applied to the strategic development and delivery of collaborative training programmes in any jurisdiction. The development of a governance framework for the Caribbean Large Marine Ecosystem (Mahon, Fanning and McConney, 2009) presents an ideal opportunity for regional collaboration across the impact spaces of fisherfolk, the fisheries industry and the marine resource environment.

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