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Enhancing community empowerment through participatory fisheries research

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ABSTRACT

This paper reports on the outcomes of a project that engaged researchers and fishers together in adapting participatory social science approaches to the purposes and the constraints of community-based fisher organizations. The work was carried out in the Scotia-Fundy Region of Atlantic Canada (the Bay of Fundy and Scotian Shelf) between 1999 and 2003. After a period of reflection on what was collectively learned from our experiences in this project, the academics went back to the community partners in a recent workshop for further discussion and refinement of the lessons. We conclude that true participatory fishery research, utilized in support of community-based management, can be a particularly powerful tool. However, it has few effective shortcuts, it must deal early in the research process with power imbalances, and it should involve significant political engagement and empowerment through co-learning. This assessment of participatory research in coastal fisheries also has significant implications for how we think of social capital and on how we may develop community-based resource management for a sustainable future.

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1. Introduction

While fishermen in the Canadian Maritime inshore (coastal) sector have some avenues for involvement in management decisions, this exists only to a limited degree [1–4].[4] Nevertheless, such involvement, in conjunction with marine science data gathering, implies considerable investments of time and energy on the part of fishermen, as a condition of their license to fish. The federal Department of Fisheries and Oceans (DFO) provides few resources to support this involvement in research and management, placing considerable strain on fishermen's organizations. Thus, despite the widespread recognition of the need to "manage fishermen as well as fishing", and to have the social science knowledge base to accomplish this, involvement of fishers in acquiring this knowledge (as opposed to, say, biological sampling programs) is a challenge if it further increases the demands on their time without producing clear benefits.

This paper reflects on efforts to bridge this gap through participatory social science research, and in particular the learning process we experienced during a 4-year project focused on revising standard participatory research approaches in order to support community-based management of the inshore (coastal) fishery in the Canadian Maritimes [5].

The command-and-control management that dominated over the past half century in fisheries of industrialized countries has created many problems, not least of which are those within communities—ones that must be addressed if community-based means of managing fisheries are to develop effectively [6,7]. To move toward more effective fisher participation in management, we see research empowerment as a reflection on the research side of what must be addressed on the management decision-making side. That is, if one cannot get collaborative research linkages right, collaborative management institutions will be unlikely to follow.[5] Our resulting focus on participatory research fits with the renewed interest in the subject arising from a number of perspectives, including: interactive governance [7], the

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[4] The inshore sector is one of three fishing sectors operating in the Canadian Maritimes—the others being the mid-shore and offshore sectors. The inshore sector is a multi-species fishery that employs boats of under 40 feet in length.

[5] Whether one speaks of community-based management, of co-management, or of devolution of natural resource management, the objective is to involve those affected by management decisions in the decision-making process.

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importance of place-based learning for resilience [8,9] and collaborative learning [10].

Taking advice from our community partners, and building on the learning approaches of Paulo Freire [11], this project began with the assumption that participatory research must not remain too much under the control of the academic partners. Thus, our main direction should be to promote equal sharing of power over all research decisions—an approach that might seem very basic in participatory research. Yet, participatory protocols that actually devolve significant levels of decision making to community partners in terms of choice of projects are rare [5,12].

In what follows, we reflect on our experiences in the project, and discuss some of the conclusions we have reached about how participatory research in coastal fisheries can be improved in the future. The focus of the discussion here is on the processes involved, rather than being outcome-oriented (cf. [13]). Furthermore, it is important to note that while we have presented and discussed this paper with our community partners, in a workshop aimed at improving future collaborative efforts, the paper is primarily directed to academics, and provides ideas on what we, as academics, learned from our efforts to devolve the power to make research decisions to our community partners.

The remaining sections of the paper are arranged as follows: a review of the ideas involved in participatory research and empowerment, an examination of the Maritimes fisheries context and project partners, an analysis of project experiences, a set of "lessons learned" and concluding remarks.

2. Background: participatory research, empowerment and making a difference

As we outlined in a previous article on this research project [5], participatory research has foundations in action agendas and seeking positive change. The assumption is that those who are most affected by any negative circumstance should be empowered to affect the direction of research and of the resulting remedial policy [14,15]. In our research, we have been seeking two things: a better foundation for sustainable resource use and building more sustainable coastal communities—both of these objectives seem best approached through community-based management, particularly in the fisheries sector. But empowering members of affected fishing communities is not a straightforward process [16–18]. For example, as noted elsewhere, participatory research is not empowering if the collegial stage of working together comes too late in the research process to redress inherent power imbalances [12].

Paulo Freire [11] provides guidelines for redressing some of these power imbalances and for building a co-learning environment. There have been many developments in the understanding of participatory research since the original publication of his seminal work, *The Pedagogy of the Oppressed* in 1968, but the fundamental premise is still as relevant and urgent today as it was then. Namely, the essence of education, and in this case participatory research, is the practice of freedom, and to the extent that limits are placed on the exercise of that freedom by powers in society, then societal transformation becomes impossible. Furthermore, liberation must be a mutual process.

For example, for academics doing research with coastal communities, there is a particular dimension to a critical pedagogy that is essential. Freire ([19], p. 79) criticized the stance of intellectuals "who judged themselves the proprietors of knowledge" and who claimed "to be able to "conscientize" rural and urban workers without having to be "conscientized" by them as well". So the challenge facing the academics in this project was to avoid acting as "society's knowledge elites", and to enter as co-learners into a "learning community" oriented toward better understanding the world and how it can be transformed.

In recent thinking about social transformations, a term that arises frequently is social capital—often used as a form of shorthand for the collective processes needed to effect positive change. As has been pointed out elsewhere, social capital is a concept that has generated a great deal of interest as well as confusion; for example, is it an explanans or an explandum, a dependent or independent variable [20]? In the literature, two uses of this term are oft-discussed: Bourdieu's use is from a critical Marxist perspective in which social capital feeds into the maintenance of social class and privilege ([21], p. 360), whereas Putnam's use of the term emphasizes the civil society benefits of norms, networks, shared values and trust generated by frequent interactions ([21], p. 359). There is a tension between these two uses of the term, as well as a significant difference in the "political project" the term is designed to further [22]. However, from our point of view, both approaches seem to attribute to social relationships a concrete or fixed characteristic, rather like a "fund" that can be drawn upon as needed. As Harvey has pointed out, this is partially a problem of the language used: capital is seen as "a stock of productive assets of certain value (a set of things) out of which a flow of services can be generated" ([23], p. 49–50). For example, Ballet et al. have argued that: "community social capital remains a potential *resource* until its *ownership* is legitimized" ([21], pp. 361–362; emphasis ours). On the other hand, Harvey views capital both as the process of circulation of value (a flow), and the stock of assets implicated in those flows ([23], p. 50). He then asks the vital question: "by what process was [capital] constituted and how is it sustained?" ([23], p. 50). With respect to the role of social capital in community-based management and other forms of participatory governance, this has proven to be a crucial question.

Another problem with many discussions of social capital is a tendency to reduce the embeddedness of social action in a wider social life down to a cost–benefit ratio: e.g., suggesting that social capital as a "costly form of organization" may require more "investments" than can be justified given the "returns" ([21], p. 366). In this approach, the important aspect of how power relations affect collective action has been addressed as a mere factor in collective choice rationality—when will the richer members of a community further collective actions and when will they "go it alone" by relying on their greater economic endowments ([21], p. 364)? But power, and the wider political arena in which power is effective, is a much more complex set of factors than such an approach would suggest. As we shall demonstrate in what follows, social capital as a concept must be significantly enriched if it is to encompass the political engagement and the collegial learning required to support community-based management and social transformation in fisheries.

3. The project

The project involved a wide range of participating partners, including several First Nations, a number of non-native fishing organizations, three non-profit organizations and four universities. The First Nation partners—Acadia First Nation and Bear River First Nation of Nova Scotia, and the Mi'kmaq Confederacy of Prince Edward Island—opted to work together on a single activity. The fishing organizations originally included Halifax West Fishermen's Association, Bay of Fundy Inshore Fishermen's Association (BFIFA) and Guysborough County Inshore Fishermen's Association in Nova Scotia, as well as the Fundy North Fishermen's Association from New Brunswick. At the request of the Halifax West Fishermen's Association, the neighboring Eastern Shore

Fishermen's Protective Association was invited to participate as well. A number of partners brought in non-profit organizations to facilitate the work; for example, the BFIFA involved the Bay of Fundy Marine Resource Centre[6] (MRC) and the Saltwater Network,[7] while Eastern Shore invited in the Fishermen and Scientists Research Society[8] (FSRS). These groups proved to have the capability to act as boundary or bridging organizations in "translating" between fishers and scientists [24]. Finally, the four academic institutions involved had one participant each—Wiber (University of New Brunswick), Charles (Saint Mary's University), Kearney (at that time with St. Francis Xavier University) and Berkes (University of Manitoba). [During the first year and for various reasons, the cluster of Halifax West, Eastern Shore and the FSRS decided not to participate in the project. The funds allocated to their pilot project were reallocated to other partners.]

Our approach in this project was both to empower and to support fishermen. First, the majority of the research budget was divided and then allocated to partners to conduct the research; we put the majority of the funding directly into their hands. Second, we asked our partner organizations to define research problems that met their needs; they set the information agenda. Each community partner identified a pilot project (in one case, several partners collaborated on one activity) with the only limitations being imposed by the funding source and our project goals: projects had to involve a social science question and partners had to be willing to share their findings with each other. Third, to improve how the research is carried out, we discussed how and why social science had failed to meet the partners' expectations in the past, explored alternative research methods with them, helped to develop the research tools and facilitated the training of research personnel. Finally, we developed mechanisms to share ownership of the resulting data, followed partner wishes in terms of information storage and worked with the partners on analysis and dissemination of the results. The pilot projects were intended to be small-scale and exploratory, but partners were drawn to timely and important topics that tended to increase the scale of the research.

The research interests of the community partners were diverse, as has been reported elsewhere [5], and research topics included assessing the economic impact of alternative allocations of quotas for harvesting the fish stocks, evaluating the local response to a Supreme Court decision that recognized an aboriginal right to commercial fishing [25],[9] and measuring the level of involvement of female family members as crew on inshore boats. To undertake the research, all partners either reassigned a staff person or hired a part-time researcher. Most projects involved primary data collection through face-to-face or telephone interviews, with the exception of one, which sought to build management capacity among the membership by holding information workshops on topics such as how natural science feeds into policy decisions and the tax implications of inter-generational transfers of the fishing firm.

For all projects, the academic team members acted as consultants, but did not do primary data gathering. Notably, both the community partners and the academic team were learning as the project progressed. None of us knew what would be the best way to proceed and our interest was in finding a better way to do social science research, so as to facilitate community-based management in a marine and fisheries context. The projects undertaken by each partner and some information about the collaboration and outcomes are listed in Table 1.

4. Analysis of the project experience

We summarize some important considerations and key areas of impact in Table 2, within the three categories: institutional frameworks, barriers and politics (described in detail below). Entries in each category are grouped as either positive or negative—although it is perhaps unfortunate to frame matters through this dichotomy, this does give some indication of both the challenges that had to be overcome and of the strengths on which we were able to draw. In particular, we feel there is much to be learned from reflecting on the challenges faced in building a participatory research approach.

Although there is some overlap between the categories—institutional frameworks, barriers and politics—these help to distinguish some of the salient variables that we argue will invariably affect the way participatory research unfolds. The term "institutional frameworks" refers to a variety of factors, including: the legal regime and bureaucratic structures that regulate fishing in Canada,[10] the organizational framework for fishermen's groups,[11] and the spatial characteristics of communities and of the administrative territories in which they fish.[12] The term "barriers" refers to a wide variety of difficulties that were faced both in undertaking participatory research and in helping the partner organizations to become familiar with social science approaches. Finally, the term "politics" is used to explore the interactive dynamics both of those involved collaboratively in this project, and of the participants with surrounding communities and institutions of which they are a part. We have summarized just a few of these in Table 2. As is clear from Table 2, each of the above themes challenged both the academics and the community partners.

4.1. Institutional frameworks

Examples of such frameworks include the Fisheries Act, bureaucratic structures of the federal DFO, Indian and Northern Affairs Canada, and the International Development Research Centre, funding strategies of the Social Sciences and Humanities Research Council of Canada, university structures, bylaws of the various fishermen organizations and structures of the intermediary organizations we dealt with.

The academics in the project conceptualized "community" as the key institutional framework for community-based management, noting the limitations of this approach [26–28] and the pitfalls of assuming community homogeneity [29–31]. In our case, the community approach did indeed work, given that all of our

[6] The Bay of Fundy Marine Resource Centre (MRC) is a non-profit community-based institution, offering services, facilities and technical support relating to all aspects of the Bay of Fundy's marine economies and ecosystems.

[7] The Saltwater Network was created by and for community-based organizations to support community-based marine management around the Gulf of Maine; it involves a network of resource centers on both sides of the Canada–US border.

[8] This Nova Scotia based organization furthers collaborative research between fishermen, scientists and the general public in order to promote the conservation of North Atlantic fisheries stocks.

[9] The *Marshall Decision* (R.V. *Marshall* S.C.R. 1999) recognized an aboriginal right to a commercial level of involvement in the Canadian Maritimes fisheries at a time of upheaval in the industry. It brought many First Nation communities into the sector at a time when resource privatization and stock declines were resulting in state-enforced effort reductions.

[10] This was doubly onerous for natives who have to work within the regulatory framework of the federal department of Indian and Northern Affairs, as well as that of the federal fisheries department.

[11] For example, the three provinces vary according to how fishermen's organizations are mandated and on the participation required of fishermen.

[12] For example, native communities often do not fish adjacent coastal waters as a result of the mechanisms employed in obtaining fishing rights for First Nations [25].

Table 1
Summary of community initiated projects

Partners	Mi'kmaq First Nations	Bay of Fundy Inshore	Fundy North	Guysborough(1)	Guysborough(2)
Objectives	Assess impact of *Marshall Decision* of the Supreme Court of Canada	Assess economic impact of more groundfish quota	Survey members on preferences for management roles	Build knowledge among members through workshops	Study role of women in the fishery
Methods	Interviews	Interviews, secondary data	Interviews	Five workshops on topics selected by membership	Telephone interviews
Project facilitation	Term employee; social science background	Full-time employee; fishing background	Part time; Master's student in anthropology	Organized by GCIFA staff	Summer student intern
Problems with project	Access to community members difficult. Low sample size obtained	Employee lacked research skills—terminated employment before project completion	Interview schedule and production of report took longer than expected	Unexpectedly low turnout for some workshops	N/A
Sample size (if relevant)	15 fishers, elders and youth	7 fishers	20 fishers	N/A	107 women respondents from 400 contacted
Universe	4 native communities in two provinces	70 active license holders	200 fishermen in association area	345 full-time and 253 part-time fishermen	3190 women of working age in the county
Outcome	Written report	Written report	Written report, newsletters, AGM workshop	Average attendance of 20 members per workshop	Written report
Data control agreement	Yes—full partner control	None	Yes—complete data sharing/consulting on dissemination	Yes—limited data sharing/consulting on dissemination	Yes—limited data sharing/consulting on dissemination

Table 2
Summary of project lessons

	Negative	Positive
Institutional frameworks	• Partners often viewed community-based management as illusory, since they had little real control • Complexity of research setting consumed time and resources • Financial accountability constraints limited community role in top-level decision making within the project • Academic need to publish not a priority for community partners and community capacity building not valued in academic institutions	• "Community" as conceptual framework continually expanding as original partners pulled in others • Complexity of maritime fisheries created great diversity in options for research across the five case studies • Flexibility of the funding source, and its mandate for innovation enabled power sharing in research design • The interface between science and community within this experiment expanded the world view of both
Barriers	• Working in an alternative paradigm within the initiative made communicating with bureaucrats difficult • Capacity building was required both for communities and for academic institutions—recognition of this slower on academic side • Lack of awareness of coastal issues among wider society • A discrepancy in expectations (i.e. communities expected academics to have great policy influence) • Average age of fishermen and problems of burn-out in fisher organizations	• Need to establish common values amongst participants was time consuming but a positive force in collaboration • Communities recognized both their need for and their lack of capacity for social science research • The need to get our message out forced us to explore new ways of communicating • Recognizing serious political and economic limitations in effecting real change and finding innovative ways to address them • Capability to find resources to support fisher organizations and First Nations—i.e. inviting in community and students
Politics	• Politics were both internal and external to the project (e.g. individual goals and narrow interests could be disruptive to group objectives) • Some communities had experiences with research in their communities that had created negative prior impressions of social science • Physical distance created difficulties for all partners in remaining engaged with and truly understanding the context of others	• The long record of applied work in the area by two of the academics enhanced support for the project within communities and recognition among bureaucrats • Expectations underwent transformation on both sides, with personal and organizational growth (as through *Turning the Tide*) • Finding alternative ways to communicate enhanced self-organization (learning communities) within and among partner groups

partners had strong ties to geographical areas and attendant resource stocks. However, it rapidly became obvious that geographically defined communities rarely found it effective to work *solely* within their respective boundaries. Instead, many partners established horizontal links and networks in an effort to facilitate collaborative efforts that crossed community

boundaries, to manage waters that were shared by a number of communities. Sometimes this worked effectively to integrate their approaches across regions, and sometimes (as will be discussed below) local politics interfered with effective cooperation.

Because these inter-community relations were fraught with potential tensions, the impact on our research was difficult to predict. Sometimes, for example, it had a positive effect in that it pulled in more partners, but this itself proved a challenge to our limited resources of time and research funding. While inter-community collaboration may present challenges when coordinating fishing activities, it will be a very important factor in the drive to develop integrated management approaches for larger ecological areas. This development enhanced our appreciation for the role of mediating institutions and for the reality that communities were already heavily involved in horizontal cross-scale linkages.

The dominant institutional framework that affected our research, however, was the management approach of the federal regulator. The DFO has pursued a policy of privatization of fishing rights through individual transferable quotas, one that has dramatically transformed the broader fishery [6,32]. All of the community partners involved in this research have experienced severely curtailed access as a result of market-driven allocations that favor the financially privileged in the inshore, the mid-shore and offshore fleets. In response, most inshore fishermen have had to reduce their effort with respect to groundfish (with stock collapses having contributed to this as well) and focus more on species remaining open to them such as lobster, scallops, crab and sea urchin. This has involved them in increasingly complicated cycles of open and closed seasons and of gear conflicts [33]. Furthermore, many of our partner organizations are First Nation communities, which involved the project in considering the regulatory regimes affecting native food and ceremonial fisheries,[13] as well as the post-Marshall agreements[14] that were facilitating the aboriginal commercial fishery. As a result, effective community participation in inshore fisheries has been largely constrained on the one hand by minimal fish stock access and on the other by federal bureaucratic mandates that restrict the fisherman's role in management. Our community partners expressed a great deal of frustration with the role they were allocated; from their perspective it amounted to taking on increasing responsibility without any corresponding transfer of power.

Meanwhile, academics involved in the research faced their own institutional framework. On the positive side, this enabled us to choose research topics as dictated by community needs and interests, to build collaborative links at the interface of science and community, and to devolve research power to our partners in innovative ways. However, these academic institutional frameworks also included: the requirement to publish in order to receive future funding, a lack of university recognition of and support for participatory research and community outreach, limited funding and various financial constraints on the funding that did exist. For example, the national funding agency from which we secured funds to do this research required that an academic institution administer the funds according to a set of accountability rules that in many ways interfered with empowering communities in the participatory research. In some ways, the most difficult of these constraints was the requirement to publish; community interest in purely academic publication was low, while data control agreements and the working out of collaborative authorship slowed down the publication process. A more creative result was recognizing the need for quite different deliverables; community partners saw the need to understand how to organize themselves better, as well as to find ways to inform and engage the dominant urban society and the policy sector in protecting the public good in resource management. Meanwhile, the academics began to recognize the many commonalities to be explored in the resource management problems of various parts of the world, and the collaborative learning opportunities that were possible in bringing communities together to share their experiences.

4.2. Barriers

The above bureaucratic and academic frameworks operated in such a way as to create some significant frustrations that turned out to be fundamental to our self-organization as research partners. For example, in our previous efforts to collaborate on better resource management, the academic and community partners identified several common concerns, including concentration of the right to fish into a few corporate hands, loss of fishing rights in coastal communities with concomitant loss of economic viability, and untenable technological pressure on the resource stocks (often masked by bureaucratic mantras such as "too many fishermen chasing too few fish") [6,27,32]. This led to a common perception of the doubtful sustainability of command-and-control management and of privatization regimes, as well as a common interest in seeking alternative paradigms, including community-based management. These common values facilitated communication and agreement within the research partnership (despite many tensions), but those same values simultaneously made it difficult to communicate with members of the wider society (businessmen, developers, tourists, urban residents), or with federal or provincial bureaucrats operating within a very different management paradigm.

While our research plans at the outset were focused on capacity building within our partner organizations, we failed to recognize the significant ways in which capacity building must proceed among academics as well. Further, capacity building had to be developed both at the level of the individual (individual academics or individual members of community partners) and at the level of the institution (universities, academic funding agencies, research institutes, community organizations). In particular, one cannot count on individual capacity building necessarily translating into capacity building for the organizations—for example, despite the capacities of individual academics, universities might still not value community work over publishing in refereed journals, and if certain individuals in government or in community partners move or retire, their organizations may be left no further ahead. However, recognizing this fact has led us in subsequent research to think more broadly and creatively about capacity building, and to subsequently turn our attention to the many resources that could be effective in institutional change, including transformational learning, video production and media communications (see www.coastalcura.ca).

Other barriers included the deep level of frustration and burnout that many community partners experience as their members grapple with the institutional framework in which they find themselves, as well as the deep frustration among academics when their work turns out to make little real difference to the

[13] The Supreme Court of Canada established the aboriginal food and ceremonial fishery as a priority in the allocation of fish stocks in the 1990 *Sparrow* decision (see [34]).

[14] See R.V. *Marshall* S.C.R. 1999 [3]: 456 and 533. While the Marshall Decision recognized a commercial-level right of access for First Nations in the Maritime Provinces of Canada who were signatories to 18th Century Peace and Friendship treaties, the subsequent clarification of this decision limited the benefit to a "moderate livelihood" and required that a community level of benefit must result from any aboriginal commercial fishery. One problem is that the Supreme Court of Canada did not specify how the food and commercial fisheries were to be reconciled [25,35].

problems they have identified. An aging cohort of participants impacts both the inshore fishery sector and academia, as it does much of Canadian society. In particular, we found that many fishermen are close to retirement and are tired of the struggle with bureaucracy. As one fisherman commented, very few Canadians pursue their livelihoods in such a context of all-encompassing regulation.

These various factors contributed to a discrepancy between the expectations of fishermen and those of academics. Academics were largely interested in finding a way to satisfy the information needs that would lead to wise management and to thereby provide leadership in participatory research models. Fishermen, as it turned out, were much more aware of the political nature of their struggle. But fishermen also often had an unrealistic expectation of the authoritative voice that social scientists could bring to bear, many wanting the researchers to act as advocates for the inshore fishery sector as opposed to advocates for wiser management.

4.3. Politics

This discrepancy of expectations is a good introduction to the wider issue of the politics that can affect participatory research. Examples considered here include the interactions among project co-investigators, the politics between adjacent coastal communities and various professional networks, the linkages created during a previous "*Turning the Tide*" project [36],[15] and the internal politics of the project's community partners.

In considering political realities, it is important to recognize that the marine space is increasingly crowded with conflicting uses [33]. For example, in the Maritimes fisheries following the *Marshall* decision, many communities were torn apart by the tensions created when natives entered the fishery. This context could easily have prevented native and non-native communities from working together [25]—although fortunately, in some cases, local-level initiatives overcame such obstacles. The broader fishery sector is also characterized by particularly "thick" relationships, including those resulting from adjacent communities who fish the same grounds, from political networks centered around organized labor or around different fish capture technologies, from different kinds of academic specialization, and from a myriad of research projects and their respective funding agencies.

A difficult aspect of doing participatory research, then, is in finding ways to work across existing networks (that can be divisive) and across institutional barriers, as well as in building trust through new networks and social links [37–41]. In the ongoing restructuring of the Canadian coastal economy [42] competition for access to increasingly scarce resources is creating conflict between coastal communities. In this context, communities that were working with academics could be seen to have an unfair advantage, and the academics in this project were on several occasions contacted by members of coastal communities who wanted to know why they had not been selected as project participants. Thus, the very act of selecting research partners can be seen as unfair and highly political [43]. In fact, in formulating this project, the academics simply called a meeting with those individuals and communities with whom they had previous experience. Several partner organizations were at that time involved in ongoing social science research projects, one academic had worked for a time with a fishermen's union and as an organizer for another community partner, and a second academic was involved with the *Turning the Tide* project, all of which provided many communities with opportunities for interaction with academics. These were the communities we drew on in designing this project. In the subsequent stages of the research, community partners contributed significantly to how the research questions were framed—and this in turn was affected by their previous interaction with the academics. In fact, previous relationships and new opportunities to meet in a safe environment helped to build capacity on both sides for learning from each other.

A safe environment for beginning that process of mutual engagement was very important. Bridging organizations, such as the MRC played an important role in creating the possibility to work together. Early in this project, we expected that the MRC and other organizations such as the FSRS would play an equally important role in facilitating the research and particularly in alleviating the demands on fishermen themselves. In other communities, women from fishing households were ready to assume a role in capacity building for fishermen's organizations. However, several factors combined to challenge the work of these organizations and individual actors. A primary problem was the lack of core funding that plagues civil society organizations; most expend much of their energy in a continual round of seeking funding to stay afloat. Related to this is the general reality of limited organizational resources—in the case of the FSRS, a consideration in dropping out of the research may have been their primary commitment to natural science research and consequent concerns about over-extending themselves if also engaged in social science. This in turn appears to have effectively prevented the continuing involvement in the project of the two community partners that relied on the FSRS for research support. Individuals in fishing communities, like bridging organizations, also faced difficult political decisions about how best to expend their limited resources, and not all individuals who were involved at the outset continued their involvement throughout the project.

Internal politics within communities could contribute to such decisions. For example, in native communities, the election of a new chief and council could subject existing research agreements to review and delay. On the other hand, the research process sometimes helped to build consensus within communities, as was the case with one partner organization, which used the funding to tap into and build on a strong common value set among the membership. Common interests often worked to further political partnerships, as with the agreement to link research interests among all the First-Nation partners in this project, yet lack of geographic proximity sometimes hampered effective participation, as many of our partners were separated by many hours driving time.

In summing up the various factors that influenced how our participatory research unfolded, we cannot stress enough the importance of the wider societal and economic context. Fishing communities have long been difficult places to make a living, but as management scheme follows upon management scheme (limited access, gear restrictions, temporal restrictions, privatization), fishermen and their families have become subject to incredible regulatory pressures that have sometimes translated into significant financial difficulties. The last 50 years has taken an incredible toll in terms of individual, community and ecosystem health on Canada's coasts [42]. In responding to this situation, fishermen have often found themselves at loggerheads with the very organizations and individuals that they feel should be there to make the situation better, including federal and provincial regulators and the natural and social scientists who have come to their communities to study the situation. They feel disempowered at the same time that they face increasing demands, including:

[15] *Turning the Tide* was a project funded by the Pew Fellows program in Marine Conservation, and involved building bridges between native and non-native fishing communities in the Canadian Maritimes after the *Marshall Decision*.

collecting natural and social science data, supporting the cost of public infrastructure such as harbours and docks, devolution of management responsibilities, and competition for ocean and coastal spaces. While public and stakeholder consultation is now mandated as an important part of the coastal and ocean management process, members of coastal communities argue that most consultation is token at best, that they collect research data but have no hand in analyzing it or theorizing about the significance of that data, and that federal regulators have effectively blocked real sharing of management powers.

In this context, speaking of social capital as a fund that can help coastal communities lift themselves out of the difficulties that face them seems unrealistic to say the least. On the other hand, members of coastal communities are uniquely placed to inform and participate in the management process. The question is, what resources are available to them in order to affect real change? This research asked questions then about the role that participatory research can play in building on and transforming existing knowledge, networks and relationships.

5. Lessons learned

At the national and the international level, governments, NGOs and international agencies such as the World Bank have been experimenting with devolving resource management decisions to the local level [44]. However, many of these experiments have not involved sufficient capacity building (particularly as relates to information needs for wise management) or organizational and financial resources to do the job properly. Nor has the literature demonstrated much reflection on how these experiments have unfolded. Post-mortems tend to take an *ad hoc* rather than a broadly comparative approach, and generally seem to focus on blaming rather than on learning from the experience.

In reflecting on our own experiences, we would argue that it is important to assess both the costs and the benefits of various approaches to capacity building. More open discussion of the above mentioned institutional and political contexts as well as significant barriers in dealing with them is an important part of building a viable approach to participatory research in support of community-based fisheries management. It is also important for making a contribution to the way that participatory research might be promoted and supported in the future, in terms of marine systems both nationally and internationally.

Recent literature has focused on "social capital" in predicting when communities are capable of taking on a resource management role. This literature tends to view social capital as a fixed fund of good will, trust and cross-connections that can be drawn on to solve social problems. Working with participatory approaches to research and fishery management have led us to broaden the thinking on social capital, and in particular to instead view social capital not as a "fund" but as a process that must be nurtured in particular ways so that trust and network relationships can develop through co-learning [10]. Toward this end, we can contribute the following lessons learned.

First, social capital is a political process of engagement that is ongoing and that can take different directions and have different outcomes depending on a number of factors such as those we have listed above. The process of engagement that preceded our project, and that continued throughout it, is still present today in a subsequent manifestation of our collaboration with the partner organizations. In securing new funding to continue our work, it seems that community and academic partners have been constantly negotiating the boundaries of their relationship. While the community partners have been willing to expend time and resources to search for appropriate funding, their own organizational demands and political realities mean that they each needed funds to be directed to their local and specific problems. Academics, on the other hand, tend to focus on larger-scale issues and generalized outcomes. Neither side could make significant investments in seeking funds, or in doing the research, without tangible and valued returns on their investment. This requires finding a good balance for both sides.

Second, participatory research does exact a toll. As many organizations need time and resources to keep themselves afloat or to meet existing commitments, they are challenged to spare the time to do research as well. In the project reported in this paper, the small pilot projects that were undertaken were not always viewed as empowering, since they further strained limited resources. But, on the other hand, some of these pilot projects allowed horizontal linkages and networking, as in the case of First Nations partners, and most partners valued the research relationship enough to remain involved in further research planning. More work needs to be done to transform funding agencies, academe and the research process in order to make it worth the investment required of communities involved in participatory research.

Third, in this transformation, funding agencies and NGOs must think creatively about how to redress the inherent power imbalances that will be inevitably found in the highly political process of participatory research—both within communities and in their engagement with external political actors. For example, capacity building must take place at both the individual and the organizational levels if there is to be any longevity in the lessons learned. Inter-community linkages should be encouraged and developed from the outset (as our partners encouraged from the beginning of the project) as this will result in more resilient local capacity. Much more resources will be necessary for this aspect of building community-based management capacity than is currently envisaged in most devolution schemes. Despite these challenges, positive outcomes are possible: most of the project's original partners continued to work with us after the project was completed and have been fully involved in seeking further funding and designing more social science research. This led to success in establishing a 5-year Coastal Community–University Research Alliance (www.coastalcura.ca), enabling us to continue to build local capacity to address social science needs for community-based management.

6. Conclusions

Participatory research and community-based management have considerable, yet often unrealized, potential in coastal fisheries of the world. They are, to a great extent, two sides of the same coin. In thinking about participatory research, we envision the building of a co-learning environment that is empowering for all participants—in the spirit of Paulo Freire. This runs parallel to the need to move participatory governance forward more effectively and in a more grounded way—which requires looking inside the "black box" of social capital, through an explicit focus on history, wealth distribution, power imbalances and barriers to transformational dialog [45,46]. To this end, political analysis and engagement with power need to be better connected to community-based management approaches and theories, in which "social capital" has taken a privileged position.

We need further synthesis and integration, for example, of the science–community interface and of power differences in terms of knowledge control (e.g., through explicit publication agreements and data control agreements), but also in the wider sense of democratic science. There is a role for boundary organizations to bridge between fishers and scientists, and in general for NGOs to

build capacity among academics, fisher communities and managers. A focus on collaborative learning [9,10] and a process-oriented approach, with attention to linkages and networks, allows for understanding community-based management as an ongoing process, and for reflection on later experiences in the light of the past (ongoing reflexivity). Space and time specifics will always be very important, but we suspect that many lessons learned will have much wider applicability.

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