Chapter 7
Building bridges among scientists and fishermen with participatory action research

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7.1 Introduction

7.1.1 The Challenge of Action Research in European Fisheries

Among developed countries, the European Union (EU) has made comparatively little progress in finding and applying solutions to the crisis of sustainability facing fisheries on a global scale. EU fisheries are managed by an agreement known as the Common Fisheries Policy (CFP). It is a large and unwieldy attempt to manage fisheries that is often more focused on solving political problems around dividing fish than it is on sustainability (Wilson 2009). It is one of the few policy arenas where Member States have ceded decision making power to the EU, giving it political influence beyond that which its economic and environmental importance would suggest.

With its top-down approach, the CFP is unresponsive to local conditions and lacks support from both the communities reliant on fish resources for a living, and other stakeholders interested in the long-term wellbeing of the ecosystem. Fisheries stakeholders in particular view the governance system as top-down controlled, characterised by a history of negative incentives. At the same time, management has failed to meet its own resource-related objectives, with many fish stocks being

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in a poor state (ICES 2011). The European Commission itself tells us that 88 % of EU stocks are being fished beyond agreed targets, and 30 % of these stocks are so depleted they may not be able to replenish (CEC 2009).

7.1.2 The Need for Participatory Action Research

Despite being perhaps the most science-driven policy arena in Europe, the CFP suffers, more than comparable fisheries regimes, from a legitimacy crisis focused on the knowledge base for management decision making (Schwach et al. 2007). It requires a large and constant stream of scientific advice—around 1,600 pages per year—just to make its routine administrative decisions (Wilson 2009). This advice is mainly quantitative assessments of the size of fish stocks from which sustainable catches can be derived and these assessments are often highly uncertain. The foundation of the legitimacy crisis rests with how the science-policy system makes informed management decisions when it is known (or believed) that the underpinning science is uncertain. Understandably, these questions of legitimacy undermine credibility of the institutions responsible for assessment and advice.

Box 1. Regional Advisory Councils (RACs) in brief

Under the auspices of the Common Fisheries Policy, RACs were established by Council Decision (EC) 256/2004 with the intention of increasing the participation of those affected by the CFP in the fisheries management decision-making process. They are the main body for engaging with stakeholders on issues that directly (fisheries management and research) and indirectly (e.g. wind farms, aggregate extraction, conservation planning) affect fisheries, although stakeholders also have the opportunity to provide input independent of the RACs. Two thirds of the seats are allotted to the fisheries sector and one third to other interest groups. Either directly or at the request of the Commission or a Member State, RACs submit recommendations and suggestions to the Commission on matters relating to fisheries.

The command and control management paradigm of the CFP has meant that until recently, conditions have not been fertile for catalysing stakeholder-led or cooperative research initiatives necessary to rebuild trust and credibility. But things are changing. Reflection on the failings of the CFP have led to a tangible change in attitude, both in the policy and the scientific arena, with particular momentum being gained since the inception of the Regional Advisory Councils (RACs)(see Box 1) in 2003. Conditioned by this backdrop, efforts to bring together the knowledge and know-how of scientists and fishermen in Europe are finding more favour.

Fisheries management is a science-policy arena in which interested lay people have a great deal of experience-based knowledge (EBK) to supplement the

research-based knowledge (RBK) of scientists. Over the past 20 years an extensive literature on the importance and usefulness of EBK in management has arisen (see, for example, Felt 1994; Pálsson 1995; Mackinson & Nottestad 1998; Neis & Felt; 2001). Fishermens' EBK may include detailed and long term information on fish behaviour, patterns in distribution and abundance, knowledge of habitats, responses to environment and more (Pederson & Hall-Arber 1999; Mackinson 2001). Many believe that it should be further incorporated in management (Grafton & Silva-Echenique 1997) to increase the credibility of information (Pinkerton 1989), provide additional indices for stock assessments (Rochet et al. 2008), increase knowledge about poorly understood species, and suggest novel hypotheses (Neis & Felt 2001). Indeed, research seeking to integrate the experiences of stakeholders in the knowledge base for management is a rapidly developing field (Bergmann et al. 2004;Murray et al. 2006; Hoefnagel et al. 2006; Ommer et al. 2007; Shackeroff & Campbell 2007; Prigent et al. 2008; Moreno-Baez et al. 2010; Feinholtz 2011). One common driver is using cooperative research funding as an indirect mechanism for financial support to fishermen needing to make drastic cuts in catches (Johnson 2007).The objectives can include legitimate and equitable management, cost-efficient research, and more efficient enforcement due to higher legitimacy among stakeholders.

The incorporation of EBK in management is not easy. Enabling stakeholder participation in research at the European level requires connection and alignment of European management policies, research policies, structure of the funding system and funding instruments. This does not usually occur. When combined with stakeholders' limited capacity for engagement, real or perceived barriers may prevent them from collaborating (Mackinson et al. 2010). Moreover, several studies have shown high variation among fishers' own observations (Felt 1994; Wilson et al. 2006) making direct use of EBK in management decision making difficult. Part of the difficulty lies in the fact that fishermen tend to view the resource on smaller scales than managers and as much more complex systems than stock assessment models can capture (Berkes 1993; Pinkerton 1989). Differences in perception of resources can arise simply as a consequence of the alternative 'windows' that fishermen and scientists use to view the resource (Mackinson & van der Kooij 2006). Many fishermen are also reluctant to share knowledge, fearful that it might be used as a rationale for reducing fishing opportunities (Pederson & Hall-Arber 1999).

As Pálsson (1995) has argued, the metaphor of knowledge as a sort of mental script or 'container' is not accurate. Fishermens' knowledge is part of their overall fishing skill and the knowledge that underlies a skill is intuitive and not easily articulated or even necessarily understood well by the scientist. To make knowledge useful for management requires taking this tacit knowledge out of the local context in which it is embedded and creating more explicit, discursive knowledge (Wilson 2003). This transformation is more than just the translation and transcription (Latour 1987) of the EBK. As Holm (2003) emphasises, it is also a process of 'purification' in which many kinds of beliefs, speculations, hopes and exaggerations are stripped from the EBK, transforming it in to a discourse that can 'hold its own' in scientific debates. Agrawal (1995) argues that this process can change the EBK so much that it becomes unrecognisable to the resource users. Hence, the intention

of empowering fishermen and other resource users by mobilising their experience-based knowledge can actually disempower them, as their knowledge is removed from its context, transformed, alienated or even distorted (Maurstad 2001).

Well-designed participatory action research (PAR)[1] is one strategy that has been shown to be effective in addressing these complex issues of knowledge, participation and management decision making (Reid & Hartley 2006; Johnson & van Densen 2007). What we mean by 'well designed' will be discussed in detail below, but it boils down to an ongoing interchange based on genuine respect for participants' perspectives and contributions. PAR creates not just a set of new knowledge, but a social network of learning; the action research aspect then seeks to link this network to the decision processes of marine management.

There is a broad literature on PAR and, for the most part, the academic lessons about experiences in PAR cut across disciplines and have many similarities that can be used to help design and develop successful approaches. Recent studies have shown that PAR in fisheries can be a learning platform (Leeuwis & Pyburn 2002) that can produce useful science-policy 'boundary objects' for getting to grips with complex issues like the ecosystem approach to fisheries management. Following Cash et al. (2002), boundary objects are knowledge products produced jointly by scientists and others in a policy arena that exhibit high legitimacy and policy saliency as well as scientific credibility. Boundary objects in fisheries management include, for example 'the precautionary approach', 'sustainable fishing', 'long term management plans', 'ecosystem approach', 'Good Environmental Status', 'maximum sustainable yield' and 'biodiversity', but they can also include more specific products such as indicators, models and action plans as long as they have been jointly produced. These objects enable communication and collaboration across a wide diversity of actor groups, while still maintaining local interpretation of their meaning to each of the actor groups. The importance of such concepts increases when the shared meanings become stronger compared to the local interpretations. Joint production of such 'boundary objects' can help steer the relationship between science, managers and fishermen away from the impasses that have been common in the past (Johnson & van Densen 2007; Reid & Hartly 2006). Within the vast science-policy machine of the CFP, PAR remains marginal, but it is growing in frequency and creating stories that give new ways of talking about effective reform that provide common ground among divergent interests.

Embracing these challenges has been the stimulus for the GAP programme (Bridging the gap between science and stakeholders: phase 1- common ground; www.gap1.eu), where participatory action research is at the heart of efforts to demonstrate how by combining their knowledge and know-how, fishermen and scientists can make a difference to achieve sustainable fisheries.

[1] 'Participatory action research'is a type of collaborative or cooperative research, and thus about processes as well as scientific outcomes. It involves stakeholders and scientists working (and learning) together in the planning and delivery of research. The common aim is to improve the knowledge base and quality of scientific information for management advice and legislation.

7.1.3 Casting the Net Wider

While the focus of this chapter is mainly on the interaction among scientists and fishermen, it is not our intention to suggest that the scope of participatory action research should be restricted to this group of stakeholders alone. In general, two types of stakeholders have the most influence on the management of fisheries and the marine environment. The first type we refer to as fisheries stakeholders—individuals and organisations representing direct interests in fisheries, including fishermen, shore side businesses/workers, crew or fishing-reliant families and communities. The second type are environmental non-governmental organisations (ENGOs), and other citizens whose interest and concern is with the wellbeing of the marine environment (and dependent fisheries).

While fishermen have a reputation for having a very independent mind set (see, for example, Creative Research Ltd 2009), the fact that they have to share a common resource means that they derive a number of benefits from being members of fishermens' organisations. Such organisations or associations link the catching sector with processors, marketers, distributors and management in a structured way (Jentoft & Davis 1993; Nielsen et al. 2004). Within Europe, all Member States have national fishermens' associations that have local representatives, and there are many other regional and community-based associations with various levels of formality and organisation. Working with the fishing industry almost always means working with and through these kinds of organisations. At a higher level, they are represented on the RACs. Lessons learned from around the world about the sustainable management of common pool resources, such as fisheries, are that the support and participation of those whose livelihoods are made by exploiting the resource is critical to its success (Ostrom 1990). Obvious tensions arising from the tradeoffs between the desire for short-term economic benefits and long-term societal wellbeing require that participation is balanced by various interests. Tapping into the potential of PAR to help establish a sustainable future for EU fisheries requires balancing these tensions.

ENGOs have played an increasingly important role in the management of fisheries in the last two decades, lobbying to place fisheries within the context of broader environmental considerations. While the fishing industry places high importance on maintaining sustainable fish stocks, they are under constant short-term economic pressure and often lobby for exploitation levels based on the most optimistic resource assessments. It was not until the 1980s when ENGOs began their own lobbying campaigns that industry lobbying began to be balanced and pressure began to build for a more precautionary approach. This role for ENGOs has now become institutionalised in several forms, most critically in Europe with permanent ENGO seats on the RACs. A problem with this institutionalisation is that responsibility has been placed on the ENGOs to maintain and use their limited funds to play this balancing role and there is a serious question regarding the sustainability of this approach. The role of ENGOs in PAR in fisheries is similar to their role overall, their participation is not as intensely active as that of the industry, but their help in

formulating questions and reviewing results is critical for maintaining the saliency and legitimacy of results.

7.2 Learning by Doing

7.2.1 The Gap Programme: Bridging the Gap Between Scientists, Stakeholders and Policy Makers

Phase 1 of GAP (GAP1) was a cooperative planning process funded by the EU's 7th Framework Programme. Its goal was to prepare for a series of PAR efforts by: a) bringing scientists, fisheries organisations, ENGOs and managers together to plan specific PAR case studies focused on issues of shared concern; and, b) designing GAP2, a much larger project that would carry out and monitor the actual PAR efforts and promote a deeper, systematic engagement among fishermen and scientists at the European level. GAP1 consisted of partners in 11 countries, working on regional case studies that focused on addressing science and sustainability issues in the marine environment. These are the PAR studies that are now being undertaken in GAP2 (www.gap2.eu). The future of the GAP programme depends to a large extent on the outcomes of phase 2, but the initial programme laid the conceptual foundation for establishing structures and processes that enable a systematic engagement of stakeholders in research and the governance of EU fisheries. Most of this chapter focuses on what was learned during GAP1 through a 'Good Practice' workshop, joint planning of PAR case studies, and a sociological study (Jacobsen et al. 2011) of the process of initiating participatory research.

GAP1 understood participation in research (i.e. PAR) and participation in management decision making in the following way. While there are common features of the two processes, and the persons involved may be the same, the key distinguishing feature in PAR is that there is an attempt to discuss and reduce the influence of any policy agenda associated with research. Participatory research aims at improving the knowledge and evidence for informed management decision-making. Paradoxically, the way to achieve this, we found, was to link the research to questions relevant to management policy so that the issues on the table and incentive to engage were clear to everyone.

GAP1 involved workshops at both the European and individual case study level. Research plans were developed at the case study level and then reflections on these experiences were made in European level workshops where fishermen, fisheries scientists and ENGOs were in attendance. Examples of the eleven case studies for PAR planning include: the behaviour and migration of brown crabs in the United Kingdom; the behaviour and spatial population dynamics of the spider crab (*Majasquinado*) in Spain; evaluating management objectives for spring spawning herring in the Skagerrak, Kattegat and Western Baltic in Denmark; identifying essential

habitat for demersal fish in the Northern Adriatic Sea in Italy; and, investigating the implications of the proposed 25 nm Maltese fisheries management zone in Malta.

A sociological study consisting of interviews with participants and other parties interested in the relevant fisheries was carried out in three of the case studies. In Marsaxlokk, Malta, fishermen perceive that trawling efforts should increase in the fishery management zone. Scientists propose to share knowledge, perspectives and survey data with them so that they may jointly consider the effectiveness of the management regime of the demersal trawl fishery. In Lake Vättern, Sweden, scientists, regional stakeholders and a fisheries co-management initiative are starting to work together on developing selective gear for whitefish fishing. In South Devon in England, fishermen and scientists are sharing knowledge on the behaviour and migration of brown crab, and using it to assess the sustainability of the crab fishery. The case studies were visited by an anthropologist, whose aim was to follow the sociological aspects of the participatory process. Using an open-question qualitative approach, 19 interviews were undertaken, 11 with fishermen and 8 with scientists. As reflections of the PAR process, it was through these interviews that we hoped to learn to do better. The interviews were transcribed and analysed using a grounded theory approach (Glaser and Strauss 1967) and this analysis was subsequently supplemented by feedback from other GAP1 cases at special plenary session meetings(see Jacobsen et al. 2011, for full details).

7.2.2 Understanding Incentives

Our experiences highlight that where research involves outcomes targeted to benefit society as a whole, these must still translate into tangible benefits for the participants, since this is the basis of their individual incentive to participate. Because of the differences among stakeholders, it is important to clearly identify the benefits and who might be expected to receive them. During GAP1, we held a ‘Good Practice’ workshop where different stakeholders (fishermen, ENGOs, scientists) described their experiences of PAR and discussed differences in incentives and benefits (Box 2). We found that there is a diversity of incentives among stakeholders and many of these are shared. Generally speaking though, incentives for fishermen tend to focus on both short-term and long-term interests in the factors that influence the success of fisheries. Incentives for scientists and ENGOs are more aligned with the generation and accessibility of knowledge, the shift in attitudes and behaviours that this brings about and the long-term benefits that society receives from sustainable resource use.

This learning was a valuable aid to establishing the PAR case studies and was used to establish a good practice guide and code of conduct for cooperative research (see Mackinson et al. 2008; Mackinson & Neville 2009). However, although a Good Practice Guide and general rules of thumb can be a useful starting point for PAR, they should not be thought of as a recipe. Specific planning of PAR requires much more detailed understanding of the incentives for individuals to get involved.

The question that runs through everyone's mind is "What's in it for me?", so it is important to make an effort to understand this.

To foster exchange of knowledge and know-how among scientists and fishermen, we sought to focus on research issues that were less likely to get subsumed by political/sectoral arguments relating to management. However, we found that the incentive to engage was strong when the research questions were clearly linked to management policy issues. The sociological study identified mainly benefits for fishermen. Among these was that through their involvement they obtain more ownership of the project and that this ownership translates into greater confidence in the results. They stated that their involvement in PAR would also help clarify the reasons behind a management rule when it originates from the research. Less intuitive was the benefit identified by some fishermen that engaging in PAR allows them to clear their name when they are wrongly accused of damaging the resource or its habitat.

Box 2. Incentives and benefits of participatory research

Being recognised and valued
- An opportunity to express opinions.
- An opportunity to get a better reputation.
- Improving relationships with other stakeholders.

Improving sustainability
- Greater compliance with management decisions as fishermen have a feeling of ownership over the data provided to decision makers.
- Longer-term agreements can be reached due to improved communication, trust and respect between fisheries' stakeholders, researchers and decision makers.
- Development of co-management arrangements catalysed by successful and mature participatory research processes.

Making better use of available information
- Identification of research priorities of direct relevance to resource management.
- Research that is more focused on finding solutions that lead to more sustainable management of the marine environment.
- Including fishermen's knowledge for improving research design and data accuracy
- More efficient use of available knowledge by partnering with existing activities.

Improving knowledge and understanding
- Improved knowledge and understanding of issues of common concern.
- Catalyst for new ideas and innovative research methods.
- Co-education of fisheries stakeholders and researchers.

- Changing perceptions and attitudes.
- Builds trust between fishermen and public research institutions.
- Mutual respect gained through shared understanding of challenges, expectations and views.
- Fosters long-term shifts in attitudes, helping to engage wider society

The sociological study also explored reasons why fishermen and scientists may not want to be involved in PAR. Three reasons well known in the literature were also recognised in GAP1: fishermen do not have time to do extra tasks; they have negative opinions about research projects; and they are afraid the results will be used against them. Two new reasons were also identified: fishermen have other priorities and there are areas that some fishermen would prefer not to be examined in research. From the scientists' perspective, the extra time that participatory research takes was the most common reason for not wanting to be involved in participatory research. A particularly de-motivating situation experienced by scientists was when fishermen agree to participate and then do not show up at meetings.

On many occasions, we learned firsthand that it is not so much what is written about PAR that counts, but how attitudes and decisions change as a result of engagement. By its nature the value of action research is in the doing.

7.2.3 Recognising and Respecting Differences

Planning PAR requires not only recognition of individual differences, but also how these can be embedded in different social and cultural contexts. These can be subtle issues to understand, but go a long way in preventing many small but potentially significant problems. In GAP1 we found differences that related to alternative belief systems, and different professional and cultural aspects relating to ways of working (Box 3).

Box 3. What needs to be understood and taken into account when working with each other?

About fishermen	About researchers
Way of life	
Love of the sea	Love of the sea
Fishing is a way of life	Driven by curiosity and academic moti-vation
Livelihood – money is important, but not all financially motivated	Not all motivated by academic 'fame'
Want to be involved, feel use-ful/important	Want to be involved, feel use-ful/important

About fishermen	About researchers
Not just short-term vision (but some do)	Try to provide knowledge produced for better stewardship
Education and authority	
Education levels variable	May lack skills for collaborative work
Scientists can be perceived as the 'authority' because of links to government and policy	May need
Perceptions of fish stocks and sustainability	
Embedded in experience and observations of how fish stocks and environments change	Based on scientific understanding of mechanisms that influence population dynamics
Assessment of sustainability deter-mined mainly by their experience of changes over time, catching pat-terns. Less likely to believe models. Views of other fishermen also very influential. Agree on sustainability as the key goal for all stakeholders	Assessment of sustainability mainly guided by scientific surveys and output from models, for which scientists are more trusting. Views of other scientists also very influential. Agree on sustainability as the key goal for all stakeholders
Ways of working	
Time rhythms (tide and seasons) guide work patterns but unpredicta-ble weather can lead to changes in plans at short notice	Constrained by available time of research vessels and weather
Need to fish efficiently as possible to maximise income	Need to design surveys that provide robust scientific information

Some of the fundamental elements necessary for establishing common ground for participatory research among fishermen and scientists are neatly captured in statements made during the workshop:

Message from the fishermen
"The hardest thing for scientists is to explain to fishermen the long term benefits"…. "it's important to learn about ways of working with fishermen and how to convince them of the value of science in helping them to conserve the resource"…. "they need to respect traditional/experienced-based knowledge and see that it can be used in a systematic way valuable to science"…. "Scientists should welcome fishermen to science events and come and talk with fishermen."

Message from the scientists
"Stakeholders need to respect the research process and results, even if it does not meet their expectations or provide the certainty they hoped for"…. "they need to understand that it may not change anything from a political point of view"… "On a practical note, fishermen need to try to welcome scientists on board their vessels, talk with them to understand the reasons for scientific sampling and appreciate the difficulties and time required for research."

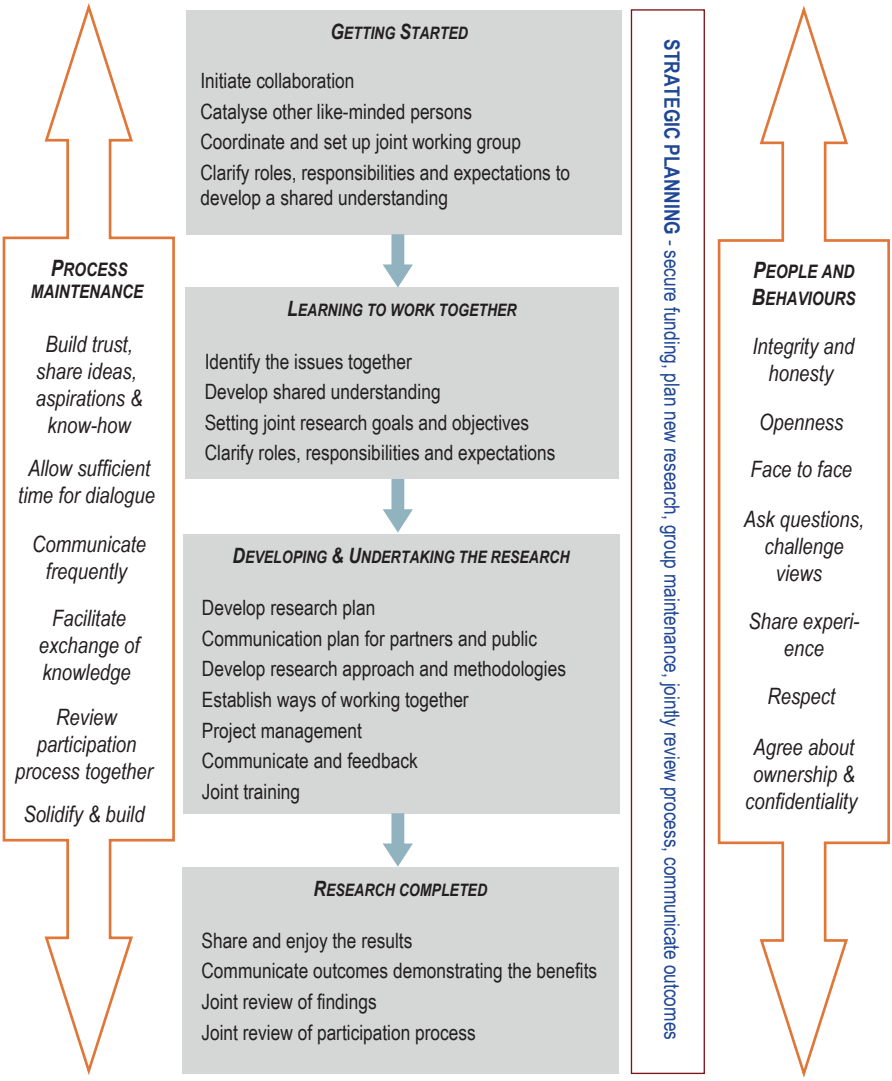

Fig. 12.1 Initiating collaborative research. (See Mackinson et al. 2008 for detailed version)

7.2.4 Balancing People, Process and Delivery

The practical aspects of developing participatory research should follow a logical sequence (Fig. 12.1) similar to that in any well-managed project. To be effective, we learned that (i) the cooperative process needs to be actively managed to work towards outcomes that make a real difference to informing management/ policy; and (ii) establishing and maintaining the participatory processes is arguably the

most important aspect in ensuring successful delivery of the project. This means paying special attention to the consideration of people's roles and their behaviours.

While the project deliberately emphasised the importance of understanding, respecting and giving equal weight to different views and knowledge, we found that it was not necessary that all activities should involve everyone. Excessive and inappropriate involvement at times leads to poor focus and procrastination. It emphasised the importance of including the right people in the right actions at a time when they can have a real influence over the process. In general, we believe that deciding who to involve and when to involve them should be determined by their roles given the specific situational needs of the research. However, because it is difficult to know this clearly in advance, and because PAR is about getting involved, this aspect is very much part of an adaptive process. By this we mean a PAR planning process that is flexible so as to adapt to the particular individuals involved and how they work together to overcome problems. A good example here is the decision not to involve the GAP1 coordinator in regional meetings as originally intended. When we understood more clearly the specificities and interpersonal dynamics of the case study meetings, it was clear that the coordinators involvement might interrupt the natural flow of dialogue, by either requiring the meeting to be held in English (or translated) and because the coordinator would be an outsider. The benefit of being flexible in planning PAR studies is that it provides the opportunity for emergent leadership.

It is well known that getting the 'right people' together is a key ingredient in successful PAR. Experiences of PAR discussed by workshop participants tell that the 'right people' are tuned to working with and learning from others, having personal attributes that enable them to catalyse trust. Within a mix of participants, three types of attributes emerge as being important: 'facilitators'—that are able to listen and ask appropriate questions which help achieve understanding and respect for the knowledge and views of others; 'enablers'—who tend to work to enable effective participation by helping prevent or overcome seemingly insurmountable barriers; and 'leaders'—who motivate and inspire others toward a common goal.

The sociological study revealed that where fishermen were working with scientists prior to GAP1, fishermen were performing one or more of three roles: providing research platforms, acting as data collectors and providing ideas. While some fishermen liked to maintain such roles, others wished to have stronger involvement in generating research hypotheses, planning, data analysis (rarely) and as providers of suggestions to management. Some scientists found it challenging to broaden their view on the roles that fishermen might undertake in research. From a practical point of view there was a clear message that finding ways of working together had to ensure that it did not interfere with the daily activities of the fishermen.

Careful consideration was given to the planning of the regional and European workshops. For regional meetings, we adopted a directive yet sympathetic approach, whereby the local lead scientists were responsible for initiating engagement and making plans for meetings. Informal meetings held at times most convenient to fishermen and in their mother tongues were found to lead to greatest participation. In contrast, European workshops were led by the coordinator and held in English.

Building a personal, yet informal approach, plans for the workshops were communicated to stakeholders directly by the project coordinator. Early on we found that encouraging participation of non-scientists required us to spell out clearly the purpose, expectations and anticipated outcomes. For fishermen, where a day's meeting would mean a day's lost earnings, the offer of financial support was important in their decision whether to attend. Striving to ensure a 50:50 science-stakeholder balance among participants helped set the tone for the meeting, with participants expecting that activities would be focused on building partnerships and developing opportunities for shared learning. Because of possible tensions among some of the stakeholders, a facilitator was employed to help design and run the meeting in a neutral environment. Through a series of engaging activities, workshop participants discussed issues and how best to share knowledge and know-how towards achieving a common aim.

Much of what has been discussed already can be broadly described as the need to get the communication right; a centre stage issue in PAR. The sociological study revealed some specific insights in helping fishermen and scientists to get it right. The importance of one-on-one contact and using the native language of fishermen in communications was emphasised by all interviewees. Among other suggestions, the use of videos instead of written material was a common suggestion for improving communication. A preferred place for meetings with fishermen was on their vessels, or over lunch. Conversations at the fish market or requests to attend meetings were not always welcomed, and meetings when the weather conditions were good for fishing were welcomed even less. Scientists providing feedback were important for maintaining a good research environment:"[…] we offer the fishermen lots of rewards but ultimately, what they would like are some results or some information about the tags that they returned […] they are interested in the knowledge".

Some of the key tactics that worked well in GAP1 are shown in Box 4.

Box 4. Top Tactics

Face to face is best: Throughout GAP1, emphasis was placed on face-to-face meetings, giving the opportunity to openly discuss expectation, fears, ideas and to resolve any concerns. This helped develop depth in understanding, which was beneficial because it enabled individuals to learn how best to help themselves.

Saying it with meaning: In several cases, initial reluctance of stakeholders to participate was overcome by making sure that written material was produced in their native language, even in cases where English was widely used. This demonstrated the genuine effort to connect with those whose involvement was paramount.

A comfortable 'atmosphere': Regional meetings were kept 'informal' using local language, and avoiding unnecessarily involving others for the tokenism of inclusivity.

Scientists and fishermen on board: When asked about what makes for productive cooperation, fishermen and scientists both suggested that scien-

tists should go out on fishing vessels more. Both agreed that this leads to closer relationships and more productive interactions. However, some fishermen told us that they were not completely comfortable with that kind of exposure to outsiders and that they have reservations about inexperienced people on board.

7.2.5 Barriers and Recurring Dilemmas in PAR

Our experience from GAP1 and other work is that enabling stakeholder participation in fisheries research at the European level can be challenging. Some of the possible constraints that either make it difficult, or provide insufficient incentives for both stakeholders and scientists to get involved in participatory research on fisheries and the marine environment are elaborated below. During GAP1, overcoming such issues required that sufficient opportunity was given for the fears, motives and expectations of fisheries' stakeholders and scientists to be discussed openly.

Research policies focused on developing the science required to underpin the CFP has rarely involved collaborative research with stakeholders. Until very recently, research policies have not connected well with aspirations of the Commission to improve the basis of decision-making on the CFP by increasing participation of stakeholders. Even now steps in this direction are tentative both because information derived from the small geographical areas on which PAR is most meaningful are often insufficient to answer the questions the Commission needs answering and because of a reasonable fear of being seen favouring a commercial stakeholder.

Communication among the sections of DG Research and DG Mare that facilitates research on governance and science of fisheries and the marine environment could be improved. The structure of the EU Framework system for tendering for research projects is daunting for scientists experienced with the system, let alone stakeholders who may not be. For the most part, stakeholders simply do not have the capacity to instigate and lead proposals. Rarely are they official project partners. Funding for cooperative research processes is difficult to obtain, but needed for developing the capacity to engage. The newer programmes funding science and society linkages—such as the one that funded GAP1 and GAP2—are an important advance, but even these programmes tend to not fund a great deal of collaborate research as such.

Reluctance of stakeholders to participate in research can be a more significant problem when everything is going well in the fisheries and the corresponding political will diminishes. In times of hardship, innovation and collaboration become essential, with fishermen seeking improvements in economic performance/efficiency that might arise directly through development of new methods or as a result of management action based on outcomes of the research.

Reluctance of scientists to work with fishermen. As noted previously in the discussion on incentives, scientists too may be reluctant to collaborate. In our discus-

sions with scientists it emerged that apublication-based reward system may deter scientists from getting involved. Two reasons for this were cited (i) the length of time it takes to yield publications from collaborative research, (ii) being put off by resistance to publications by those who consider PAR to be 'soft/second class science'.

Our sociological investigation named five ongoing dilemmas in PAR for which there are no clear answers or solutions, but which nevertheless require attention and sensitivity. These are sets of issues that remain difficult to resolve even with a great deal of good will. These five dilemmas are summarised from Jacobsen et al. (2011):

1. *Should research-management links be emphasised or deemphasised?* Fishermen often hope that research results will lead to a modification of regulations while scientists need their research to be useful for management. However, fishermen are also concerned that data may used to reduce fishing opportunities, while scientists may be trusted more if they are seen as distant from the management process.
2. *How close and frequent should scientist/fishermen/manager interactions be?* One goal of participatory action research is to have fishermen, scientists, and managers discussing the basis of regulations before they are implemented. Each of the three cases that were examined was different in this regard and each one had showed problems of its own. In one, there was almost no contact and the fishermen were very dissatisfied. In another fishermen were asked for input but saw no results emerging from that input. In the last case the fishermen found their discussions of management to be satisfactory in terms of substance, but found that they took up a great deal of their time.
3. *How widely should the data gathered in collaborative research be shared?* Can information collected by one project be shared among different scientists? Fishermen do not like to be asked the same questions by different scientists, but, sharing information too widely can lead to information being shared without the fishermen's consent.
4. *How to handle differences in work demands?* Both fishermen and scientists are busy professionals. However working conditions for fishermen can be considerably different to scientists' operating procedures for research. Fishermen are pressed for both time and the desire to be part of a project that has its premises in another working culture.
5. *How to communicate across professional cultures.* Scientists want to disseminate information to fishermen quickly and clearly and fishermen advise them to 'do it on our terms'. The direct presentation of the material, however, requires making use of local communication channels such as the fisheries association. If they rely on the association to communicate in their place this can result in unclear messages attributed to scientists.

7.3 Summary and Conclusions

Research seeking to integrate the experiences of stakeholders in the knowledge base for management is a rapidly developing field. GAP1 made apparent the disparity between the political desire to actively engage a broad range of stakeholders and the practical means by which to achieve it (Mackinson et al. 2010). It challenged the barriers and promoted ideas to better enable the participation of stakeholders in research.

One thing that emerges from the lessons of GAP1 is the multiplicity of the roles that stakeholders can play. ENGOs can provide not just a perspective that balances that of the industry; they provide skills that facilitate the development and acceptance of a useful knowledge base in many different ways. Fisheries stakeholders can do much more than just lobby for fishing interests, they can mobilise the support needed for change.

Box 5. Project 50 %[2]

Project 50 % funded by Defra, UK is a recent example where an innovative partnership between scientists and Devon beam trawlermen was set up with the aim to help to protect fish stocks by reducing the amount of juvenile fish discarded overboard by over 50 %. Time was spent to understand clearly fishermen's motivations, concerns and incentives for change. Together, fishermen and scientists identified barriers to reducing discards and identified measures to overcome them. Social marketing approaches were used to help motivate behavioural change by enhancing fishermen's innovation and responsibility. Fishermen and scientists contributed to modified net designs; they were inspired and motivated to participate as the measures were not imposed by the government. The benefits to the fishermen alone were remarkable: fewer discards meaningless work for crew, improved catch quality, reduced drag and lower fuel costs. In addition, the participation of the fishermen in the development of the modified fishing nets has had significant benefits for the sustainability of fish stocks, the environment, and therefore society as a whole. The fishermen's involvement was entirely voluntary and no charter payments, additional quota or extra days at sea were given, demonstrating how participation by stakeholders can lead to more cost-efficient research.

[2] (http://www.cefas.defra.gov.uk/our-science/fisheries-information/discards-and-fishing-gear-technology/project-50.aspx).

GAP1 also reinforced the understanding that a lot of PAR is about social behavioural change. When participatory processes are appropriately implemented, there are significant benefits for the environment, fish stocks, stakeholders and society. These benefits arise when people find the right incentive for choosing to change

their attitudes and behaviours. Project 50% (see Box 5) is widely recognised as a great European example of the power of PAR in motivating behavioural change towards achieving sustainable fishing outcomes. But one example is not enough to bring about the required stimulusto change the institutional behaviour and structures required for lasting change. The CFP is a large, sluggish system and so far the various attempts at making it more participatory have been marginal. This includes the RACs, which while making a great deal of progress, are highly constrained, including having strong limits on both access to and participation in research. Reforms continue and scommitments from the Commission to move towards greater regionalisation and industry participation are hopeful (CEC 2012, CION 2012).

For many reasons outlined above, PAR has the potential for making an important contribution to the struggle for a more responsive, adaptive and sustainable European fisheries system. The shared experiences in GAP1 have shaped 13 PAR case studies now being carried out across Europe through GAP2. These PAR case studies and efforts facilitating a more systematic engagement of stakeholders is lending impetus to this change. Paradoxically, the success of PAR in making a recognisable difference to management hinges upon the creation of a governance structure where stakeholders have a central role in linking research with policy outcomes.

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