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Collaborative Research in Fisheries

Co-creating Knowledge
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Chapter 8

The Italian Job: Navigating the (Im)Perfect Storm of Participatory Fisheries Research in the Northern Adriatic Sea



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Abstract In fisheries management there is now a broad consensus on the importance of including and integrating fishermen and their knowledge. This shift reflected by the latest reform of the EU Common Fisheries Policy indicates, at least in principle, a move away from the traditional centralised ‘top-down’ model to a more decentralised ‘networked’ system of governance. What happens though to this ideal of participation when there is limited agreement about what the problems are and how to handle them? The GAP project case study in Chioggia, located in the Northern Adriatic, provides an opportunity to illustrate this question through exploring the differing perceptions and competing narratives surrounding ‘la crisi’ (the crisis) in the fisheries in question. Simply put, ‘la crisi’ represents a crisis in the sector, with stock collapse and the ruination of local fisheries-based livelihoods a

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likely outcome should the status quo be maintained. This perspective is held by many fishermen and a number of scientists working with them and yet is opposed by a counter narrative of ‘stability and ecosystem health’, promoted by regional fisheries managers and affiliated scientists. The Chioggia case study, a participatory research initiative between scientists and local fishermen, seeks to bridge this gap in knowledge by mapping the spatial and temporal distribution of resources and fishing effort in the Northern Adriatic Sea. The paper emphasises the challenges and opportunities that this research collaboration entails and assesses its capacity to catalyse or inhibit the conditions necessary for mobilising collective action in fisheries management.

Keywords Participatory research · Knowledge systems · Fisheries management · Policy processes · Decentralisation

8.1 Introduction: A Sailor’s Tale of Stormy Seas and Different Perspectives on the Weather

A shift in emphasis has occurred over the last two decades with top-down fisheries management approaches giving way to more direct and broader-based engagements (Symes 1997; Jentoft et al. 1998; Gutiérrez et al. 2011). One such approach to decentralised fisheries management is the EU GAP project, which takes a very practical approach to enhancing participation and broadening the policy arena and knowledge base used in fisheries management. It is this approach (termed the ‘GAP method’) that we describe here with a focus on how successful it has been to bridge the gaps between different groups of stakeholders, and particularly between scientists, managers and fishermen, and their knowledge systems.

We draw on the GAP case study in the Northern Adriatic focussing on a mixed fishery which operates in a complex governance context with multiple social, economic and environmental conflicts and concerns.

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In particular, the fishermen who took part in the project were part of the demersal trawler métier, i.e. otter-board and ‘rapido’ trawlers based in Chioggia, the most important fishing port in Italy. While this métier currently includes about 80 fishing vessels, the port of Chioggia also includes the following: mid-water pelagic trawlers (approximately 10 fishing vessels), hydraulic dredgers (approximately 70 vessels) and artisanal fishermen (10 fishing vessels) (Source: Coast Guard data). There is little confidence or trust within and between stakeholder groups and a widespread lack of agreement on even the most basic descriptors of the fisheries and the resources upon which they are based. This is a typical “wicked problem” in conservation, where different groups cannot agree on the problem or its solution. This of course makes it challenging for all those working on their management and those affected by management decisions.

A key issue for local fishermen, scientists and managers is whether the fisheries of the Northern Adriatic are sustainable. Some questions of particular importance include: what are the status of the stocks and are they over-fished or not? Are catches declining or stable? How does stock status affect fisheries and fishermen? In what follows, the views of various stakeholders are provided.

My main worry is that I made a big mistake having two sons. Their life is lost because instead of suggesting they do something else, I convinced them to join the boat to work with me, but now there are no fish remaining (Chioggia fisherman, interview).

I started working in this field in 1976–77. At that time, the fisheries were still expanding and good catches were available. So you know, the catch per unit effort has decreased a lot and even the total landings (Fisheries scientist, interview).

Since the 90s, there has been a continuous decrease not only in revenues but also the condition of exploited resources... some species declined earlier and some species later whereas some disappeared or collapsed entirely. In the last (few) years, this crisis has become more evident (Fisheries scientist, interview).

The problem is that stock assessments have rarely been applied in the Mediterranean, [...]. Such assessments might have shown earlier that, [...] stocks were over exploited (Fisheries scientist, interview).

These views, commonly expressed by local fishermen and scientists working with them, describe the fisheries of the Northern Adriatic and associated fishing communities, as a ‘system in crisis’. This perspective often includes the view that fisheries have failed or that stocks are collapsing, overfishing is rampant and fishing livelihoods are under extreme threat.

By contrast, the managers of the Veneto Region (those responsible for local management of the region’s fisheries) and the scientists that work with them have a different view, particularly with respect to the status of the stocks:

In general, there is no significant problem in terms of stocks of the Northern Adriatic. Our data shows stability and in fact an increase in total production across species over the last several years (Fisheries economist & statistician for the Veneto Region, interview).

This is a view of stability and viability, at least concerning the fisheries resources themselves, and portrays an optimistic picture where the outlook is positive and

business as usual can prevail. What this clearly demonstrates is a lack of agreement on the basic facts and indeed more broadly on the political descriptors used to justify specific courses of action or inaction, such as those related to ‘la crisi’ (the crisis). This is particularly true in areas where the knowledge base is limited or where the credibility and legitimacy of existing knowledge is contested.

I know only this - in Italy reality is the way you look at things [...] To believe only in official statistics is difficult because there are a lot of things that are true but are not included in the statistics (Italian fisheries expert, interview).

However, it is worth mentioning that the Veneto Region has accepted certain problems, such as overcapacity, high fuel costs, marketing problems etc., for which the region has some capacity and interest to address. This is demonstrated by the set-up of a ‘fishery crisis unit.’ But tellingly, at present, the issue of fish stocks remains un-addressed, as management of fish stocks is far more difficult and Veneto Region does not have adequate capacity to address the issue.

Irrespective of whether the crisis is an ‘actual or convenient truth’, both framings are gross oversimplifications of extremely complex systems, and clearly demonstrate the gap that exists in thinking between proponents of the two framings (Friend 2009). Moreover, these competing positions and their story lines legitimise certain forms of knowledge and action and exclude others and are the means by which actors and institutions take political positions with regard to ownership over resources (Friend 2009).

[the impression is that]... there is no political pressure to change, so a big crisis could be useful’... [it seems that]...’ most are against change so it is good if there is a big crisis, a big collapse, rather than a gradual decline (Fisheries scientist, interview).

Finally, in addition to calling into question the credibility of the knowledge base, the legitimacy of policies and the capacity of policy-makers are also called into question:

The rules from Brussels are made by incompetent people who do not know our real situation; they have wrong data, we should provide them the real data (Chioggia Fisherman, interview).

Our fish is different from that of the Mediterranean Sea. We’ve been to Rome to protest and when we go back we will talk with the minister to find a solution, hoping that at least he understands the difference between a scallop and a tuna [...] the problem [will not be solved by] restrictions on fishing. The problem is that the institutions that make decisions do not understand the material on which to legislate. The Adriatic Sea is very different from the Mediterranean Sea (Chioggia fisherman, interview).

It is in the context of low levels of trust between stakeholders, the lack of credibility and legitimacy in the knowledge base for management, as well the different conceptualisations and narrative framings of fisheries management problems, that the tiny GAP ‘life raft’ plots its course across the great stormy seas of the Northern Adriatic.

This case study aims to determine if, in this complex scenario, the GAP method can be successful in bridging these differences by working collaboratively to produce knowledge according to agreed methods and shared platforms. The aim was to

find common ground on basic management issues (such as the status of the stocks) and strategic actions necessary to rebuild them by forming alliances around mutual interests to engage with and shape the management discourse.

8.2 Planning the Voyage: Scale, Concepts and Methods

Our case study operates at lower spatial (and administrative) level from the Mediterranean Advisory Council, which was seen by the Common Fisheries Policy regionalisation process as the level to interact with fishermen representatives (EU Reg. no 1380/2013). Instead the case study operated at a regional administrative and ecological scale (Reid et al. 2006), i.e. the Veneto Region and the ‘fishery system’ includes fishermen and their community, fishermen representatives, managers and policy-makers. Focussing at this scale was considered to have two primary advantages:

- At this level, fishermen are able to represent themselves and their experience-based knowledge (EBK) directly rather than by proxy through their associations.
- This is the scale where administrations have some real power in terms of fisheries management.

Conceptually the chapter draws from Johnson and van Densen’s (2007) framework for cooperative research processes and directly applies Raakjær’s (2009) work on policy processes in fisheries governance. It does so to support an examination of how, in the knowledge production process, groups of actors, form alliances to pursue certain interests shaped by ideas and agendas, and the language of supporting narratives (Raakjær 2009). This approach is not applied to determine whether there is a crisis or not, should that even be possible in a system as varied and complex as the mixed fisheries of the Northern Adriatic, but rather to challenge these simple narratives and explore if and how they relate to policy process formulation. A key focus throughout is to analyse how scientists and fishermen cooperate in the co-production of knowledge and how this may shape conditions for collective action.

Our conceptual frame is ‘operationalised’ through incorporating a number of mixed social and natural science methods including field and participant observations, oral histories, semi-structured interviews and surveys conducted with 94 local fishermen. The research was carried out between 2008 and 2014.

Structurally, the chapter begins with a description of the origins and inception of the collaboration carried out under the GAP1 project, followed by details of the process of problem identification and the formulation of research objectives. We continue by describing the scale and approach, conceptual frame and methods used, including what we call ‘critical signals’ which emerged throughout the collaboration within GAP2. Finally, we outline and discuss the key results and outcomes of the participatory research process.

8.3 Setting Sail: Early Voyages

8.3.1 *The Ship, the Crew, and the Compass, Building Alliances in Participatory Research: GAP1*

Prior to the GAP project, which was conceived and initiated in 2008 by ISPRA (Italian National Institute for Environmental Protection and Research) researchers in the context of Chioggia, collaborative research with fishermen meant fisheries scientists were allowed on board fishing vessels during commercial trips and scientists able to hire vessels to conduct sampling exercises. Moreover, besides a degree of information sharing and occasional joint projects, no stable relationship existed between ISPRA and local policy-makers such as the Veneto Region fishery office and larger fishing associations.

The GAP1 project was an attempt to move away from such a conventional approach and establish a collaborative process between fishermen and fisheries scientists that was equitable in nature. Equitable referred to recognising fishermen's needs and capacities and then supporting these with scientific resources in a participatory way.

It could be said that GAP1 activities focussed mainly on building alliances with fishermen and their representatives (National Fishermen Organizations) in line with Johnson and van Densen's first two stages of a cooperative research process, i.e. problem identification and mapping out the research approach and design specification (Johnson and van Densen 2007). The follow-up GAP2 project (which commenced in 2011) focussed on implementing the last three stages of Johnson and van Densen's approach, specifically data collection, processing and analysis and the communication of results. We focus on both GAP1 and GAP2 so as to adequately analyse the initiation, implementation and evaluation of the GAP method as applied in the Northern Adriatic.

One of the first strategic alliances formed early on in the GAP process was with the UNIMAR consortium. UNIMAR represents a consortium of fisheries research cooperatives from the main national fishermen's organisations. Such a consortium was seen as key to horizontal collaboration between different entities, including in respect to their long-lasting experience in collaborating with fishermen. UNIMAR's relationship with both fishermen and the Ministry of fisheries was also seen as significant.

Several internal meetings were held in Chioggia by ISPRA researchers (also involving the stakeholder partner UNIMAR), before starting project activities, so as to define the possible route for GAP case study development. Personal and research aims were clarified as well as details regarding strategy and tactics necessary to ensure the success of the project. It is noteworthy that these initial consultations were held behind closed doors and did not include fishermen or their representatives.

A number of techniques were used during this phase including brainstorming and future scenario planning. In particular though, we would like to highlight the

use of the “social-tachymeter”, a method that allows participants to reflect on the range of stakeholders that could ‘support or fight against’ – to different degrees – a proposal. The method also allows for defining the tactics and strategies required to change the attitude of stakeholders, starting with the more neutral ones (Jelfs 1982).

It was decided to hold a start-up meeting with local representatives of National Fishermen Organizations (Federpesca, Federcoopesca, Legapesca and AGCI), delegates of local fishermen cooperatives and fishermen who were interested and influential in order to kick-start effective collaboration between stakeholders and fishermen in Chioggia. The latter also included fishermen who had already collaborated with ISPRA in the past.

The GAP1 kick-off meeting was held on the 6th December 2008 and was attended by 11 fishermen – most of them acting also as fishermen representatives – five ISPRA scientists and one UNIMAR representative. The meeting focussed on highlighting positive experiences of fishermen-scientists’ collaboration and outlining GAP aims. ISPRA’s role was recognised as important by participants because of its long history in Chioggia while UNIMAR’s presence was considered strategic in terms of allowing for better communication with National Fishermen Organizations. All participants were in favour of an open and collaborative process.

8.3.2 *Charting the Waves: Creating a Common Ground*

Having identified the main players, six meetings followed that put forward the most important concerns of fishermen in relation to their activities and fisheries management (Table 8.1). Participatory research activities that could provide (scientific) evidence to foster solutions were also discussed. The emphasis from the outset was to produce knowledge collaboratively that could be considered scientifically credible and secondly to ensure legitimacy as a consequence of producing knowledge collaboratively with fishermen. The issues of primary importance to the process are presented below.

Table 8.1 Main fishery-related issues as identified by fishermen during GAP1

1. The minimum landing size regulations for some species were considered by fishermen to be too big
2. The regulation on the mesh size (EC Reg. no. 1967/2006; with new rules to be adopted on the 1 June 2010) and the need to test the selectivity of fishing gears
3. The progressive reduction of trawling areas due to other economic uses of the sea such as mariculture, sand extraction, off-shore LPG terminals, etc.
4. The effects of pollution and other anthropogenic pressures on fisheries resources
5. The duration of summer trawling closure (for some fishermen a management measure that was not effective as it was too short while for others it came at the wrong time)
6. The need to reduce fishing effort (e.g. hours of fishing per week)
7. Problems related to the facilities and functioning of the Chioggia wholesale fish market (e.g. trade and value of fish)

Discussions with local fishermen showed that whilst fishermen were willing to collaborate with scientists, there was a considerable lack of trust between the two groups. This was apparent in terms of the desire for privacy of information from fishermen, something exacerbated as a result of earlier collaborations where information was not shared back with participating fishermen.

I offer my-self to collect and provide data provided that such data from my fishing vessel is not shared....fishermen working in restricted inshore areas would not be willing to share such information (Chioggia fisherman, interview).

I would be happy to collect data again, but doing so manually is time consuming, it would be better to use electronic devices. But I think a degree of privacy should be ensured and only aggregate data used. Moreover, I never saw the results of the data analysis (Chioggia fisherman, interview).

Other fishermen expressed similar concerns:

We are not sure whether our data will be used against us or not (Chioggia fisherman, interview).

There was at least one fisherman whose main concern was the necessity to act quickly:

It is necessary to take immediate action. I use legal fishing gear and mesh size, but I accidentally catch undersized species..., I could be fined despite respecting the law. I would be happy to host scientists who could show data on such issues (Chioggia fisherman, interview).

Discussions and rich dialogue continued, and an attempt was made by scientists to raise awareness with regard to how decisions are made in Brussels. The debate was also enriched by scientists who gave several presentations on the main issues of interest raised by fishermen, specifically on minimum landing sizes, the spatial use of the Adriatic Sea, fishing gear selectivity and discards. Over time, and in response to these discussions, two meta-issues were prioritised:

- Selectivity of fishing gear in relation to minimum landing size and mesh size obligations.
- The spatial use of the sea and management proposals to reduce conflicts and promote sustainable fisheries (e.g. revision of summer trawling closure; reduction in fishing effort).

As these issues were quite broad, discussions continued with ISPRA scientists who suggested a sampling approach that could provide the information required to describe the status of fisheries in relation to the above concerns and influence current management. Estimates on possible costs, protocols and timeframes were also provided. Accordingly, a draft scheme was put forward that included:

- sea trial experiments on fishing gear selectivity;
- log-book installation for self-sampling by fishermen;
- on-board observations by scientists pertaining to biological data on major target species in the Northern Adriatic Sea.

This scheme was fully debated with regard to costs, sharing of money between research institutes and fishermen, expected results and time frame. It is worth noting that fishermen discussed even the general methodological approach and the need for data collection from fishing vessels of different sizes and using different fishing gears. This showed the fishermen empirical knowledge included complex sampling concepts such as what scientists call “random stratified sampling”.

The fishermen involved stressed the need to establish such research activities immediately. Unfortunately, this proved difficult as GAP1 was largely a preparatory initiative aimed at defining and outlining the project scope and direction for GAP2. In addition to this, there was a gap between project phases and no guarantee over future funding. Therefore, the collaborators agreed on submitting a proposal to the Veneto Region fishery office to support selectivity trials and reducing undersized fish catch. The remaining issues, principally that of the spatial use of the sea, self-sampling and the fishing ban, were incorporated in the GAP2 proposal.

Fishermen decided that “it is necessary [that] the proposal includes all fishermen organizations” (Chioggia fisherman), and attempted to convince fisheries officers of the importance of this. Notwithstanding the effort put forward by scientists and fishermen, the proposal to the Veneto Region was rejected. The official position taken was that there was no financial instrument available to support it.

Despite the frustration of a negative outcome and a lag in activities, contacts with fishermen were maintained even after the end of GAP1. When the GAP2 proposal was accepted, activities started again with the full participation of all involved.

8.4 Sailing Together: Putting Collaborative Research into Practice, the GAP2 Experience

GAP2 focussed only partly on the objectives identified in GAP1 since the most urgent issues at that time (e.g. selectivity trials) had become outdated. The Chioggia case study under GAP ended up taking an approach which focussed on building a common knowledge base to describe the dynamics of fisheries resources and fishing effort with a view to providing management recommendations. The main goals of the case study related to the formalisation of a proposal for rethinking the duration and enforcement of the summer fishing ban and a proposal for regulating fishing effort in terms of hours at sea at the end of summer fishing closure. Field activities were designed to suit this purpose and coordinated, discussed, and framed in a series of meetings that were aimed at verifying the progress of the project and sharing information and knowledge in an open and friendly environment. Field activities included the collection of catch data by scientific observers during commercial fishing, the use of electronic logbooks to allow fishermen to self-sample spatially explicit data on commercial catches, and the surveying of trawling in the Veneto Region’s administrative waters. The various activities were integrated together in the course of several open meetings including mutual learning events and exchange

activities (e.g. an exchange to visit and learn from fisheries operations in the Netherlands). In addition, a detailed survey was carried out with a hundred fishermen and skippers which focussed on collecting opinions about current fisheries management practices (and in particular the summer fishing ban). The overall approach adopted within GAP was a participatory one with specific attention paid to getting fishermen to contribute their experience-based ecological knowledge (i.e. in trawl-survey design and data interpretation and in corroborating scientific results [see Sect. 8.4.4]) as well as through discussions on possible management alternatives aimed at addressing biological and economic needs.

Given that this chapter focuses on the process of collaboration, how it was instigated, how it operates and what we can learn from the process, we do not describe the scientific rationale/background and methodological approach adopted for sampling. Instead we focus on how the participatory approach was developed and implemented in each collaborative activity.

8.4.1 A Time for Dialogue: The Beginnings of a Shared Narrative

Critical to the participatory process was ensuring regular open meetings between collaborators. Informal meetings were held on a monthly basis and were open to all fishermen who wished to participate, although over time mainly GAP fishermen participated. They were notified of meetings mainly by phone and through the GAP case study Facebook page.

Timings of the meetings were important to ensure a good turnout. Meetings were mainly held on non-fishing days and at the fish market hall, a place considered more neutral and easy to reach by fishermen. Occasionally, when the fish market hall was unavailable, meetings took place at the ISPRA Chioggia branch. Usually scientists prepared a draft agenda for the meetings which also outlined issues which required a decision by the group. Short presentations were made detailing on-going activities, results and any other relevant issues for the project, including controversial matters and problems that had to be solved.

Meetings had an open structure, starting off with a session that allowed fishermen to discuss issues arising from their fishing activities. New agenda items were also raised when needed for discussion.

Participation initially was poor due to the mistrust of fishermen in the real capability of the project to change the ‘business as usual’ attitude of fisheries management authorities in the area. Fishermen also showed a lack of confidence in researchers and their activities. It was not uncommon to hear them say: “you [researchers] always say the same things’ or ‘you talk too much, but do too little” (Chioggia fisherman).

Gradually, by working with researchers, fishermen realised that collaborating researchers were sincere and were working to improve the sustainability of the fish-

eries and in this regard prioritised the interests of fishermen. Through this collaboration, researchers also learned about the problems of fishermen and better understood their mindset. Over time a “stable” group of fishermen – from 5 to 10 – participated regularly in the meetings. Although they still complained at times about the lack of tangible results, they nonetheless actively engaged in GAP activities and over time had more trust in the project.

By participating we hope to change things’, ‘We invest time in meetings because we believe in this working group’, ‘It will take time to change things for the better’ (Chioggia fisherman, interview).

There were still fishermen who remained skeptical. One fisherman said: “It has been years that I have been working with scientists but I do not see any results” (Chioggia fisherman). This fisherman stopped participating for several months but in the end other GAP fishermen convinced him to keep working with the team and show camaraderie and commitment to the overall cause.

We feel that the approach taken, that is, the on-going series of meetings, debates and planning discussions, maintained momentum, prevented or quickly addressed problems from emerging in the group and contributed to building a cohesive unit and developing mutual trust and credibility between stakeholders and their knowledge systems.

8.4.2 Fishing for Trust: Scientists and Fishermen Working Together to Collect Catch Data

The collection of fishery-dependent data on-board of commercial fishing vessels by ISPRA scientists was the first field activity undertaken by the group. Eighty-nine fishing trips with on-board researchers were carried out during 2012–2014 to collect biological data for eight of the most important commercial species. These target species were selected together by fishermen and researchers on the basis of their economic value and ecological importance. Discards were also analysed and served as a proxy for benthic assemblages (Piras et al. 2016). Field work was carried out across seven fishing vessels (five otter-trawls; two rapido trawls), and involved interactions with members of fishing vessels belonging to fishermen participating in the GAP project. Information on fisheries resources and their biological cycles and status were also collected. As a result of the data collection process, better two-way communication and trust were established between researchers and fishermen. Fishermen welcomed researchers to their fishing grounds and showed them their fishing gear and equipment (usually a well-kept secrets). They also let them know whether they comply with regulations or not and shared their own traditional knowledge and experience with researchers.

The reason for the latter was, as one fishermen explained: “you [researchers] have so much to learn from us fishermen, who go fishing every day” (Chioggia fisherman).

While fishermen welcomed researchers, they also questioned their understanding of the sea. Being at sea together reduced the distance between researchers and fishermen and, facilitated discussions about the fisheries ‘crisis’ and management problems/solutions. Fishermen increasingly valued the work of scientists and adopted their methodological approach, noting that scientists were also hard workers: “you are not only sitting comfortably in front of your computer” (Chioggia fisherman).

In other words, fishermen no longer viewed researchers as people who collected data for their own research purposes only (c.f. Jacobsen et al., 2012), but rather as people who collected biological data together with fishermen in an effort to address fishermen’s needs in a bottom-up manner. Collaboration on board was crucial to stimulate exchange of knowledge and experiences on both sides.

8.4.3 Creating a Common Platform for Collecting and Storing Fishing Data: Electronic Logbooks and Self-Sampling

Based on earlier experiences developed in ISPRA, GAP2 scientists engaged fishermen so as to adopt electronic logbooks to record high frequency (i.e. haul by haul) geo-referenced data on catches. These devices were installed on March 2012 on five otter-trawls and two rapido trawls so that fishermen could collect data for the same eight target species selected for the on-board activities. This approach is, essentially, a self-sampling activity (Kraan et al. 2013), where fishermen record data themselves during commercial fishing. It results in a sharp increase in the number of records made available to scientists as compared to those that would be collected by on-board observers, in this case self-sampled data from 4800 hauls. A statistical analysis of the preliminary data showed that fishermen’s self-sampled data were almost perfectly aligned with data independently collected by scientific observers, thus confirming their accuracy (i.e. fishermen are as accurate as scientists in their data collection or put another way, make similar mistakes) (Mion et al. 2015). This is a significant step towards a shared perspective on the credibility of self-sampled data.

That said, one of the main concerns of fishermen regarding their participation in this activity was related to privacy of data and lack of trust, namely the worry that data generated could somehow be used “against them”. An example of this would be using the data to restrict fishing areas. After a year and a half of collaboration, one fisherman stopped collecting logbook data when he was fined because he sold some gastropods whose collection was forbidden in some areas. The fisherman accused GAP scientists of giving the GPS data that showed he was fishing in a restricted area to the control agency. Although the scientists said that they had not passed on such data, the fisherman stopped using the logbook and also decided against hosting observers on board. However, he continued to participate in meetings (being in fact one of the most frequent attendees).

This particular incident led the GAP group to agree that use of data by scientists would be agreed upon by the whole group (scientists and fishermen) and that data could be published only when aggregated and according to specific agreements.

Whilst the original misunderstanding was unfortunate, it ended up being a catalyst for ethical use of data, i.e. how and under what conditions data would be used, by whom and in what format.

It is also noteworthy that the data collection software is being further developed thanks to ongoing requests and suggestions from fishermen to improve usability. Additional functions have been added to allow fishermen easier access to their data and its interpretation (i.e. GIS map interpolations of haul coordinates, histograms displaying timeline catch per species etc.). In addition, and importantly, self-sampling activities have had the additional merit of demonstrating to fishermen that scientists trust them to collect crucial data and for fishermen that the data being used for assessment purposes is ‘locally owned’ and credible.

8.4.4 Trawling for Knowledge: The Summer Fishing Ban

Fishermen have repeatedly expressed concerns about the appropriateness of the summer fishing ban as a management measure. Common concerns relate to the timing and duration of the ban. The temporary trawl fishing closure (initially enforced in Italy in the late 80s and usually lasting about 30–40 days from late July to early September) was adopted as a management practice to reduce fishing mortality of juveniles of (some) target species. In order to test the effectiveness of such a measure and identify the spatial distribution of demersal resources, in particular of juveniles, at the end of the fishing ban, a fishery independent survey (i.e. otter-trawl survey) was carried out in 2012, 2013, 2014 and 2015. In the beginning, some fishermen had difficulty understanding the usefulness of the survey and the methodological difference between fishery-dependent and fishery-independent sampling. One fisherman wondered: “why are we going to fish where we know that the catch will be scarce?” (Chioggia fisherman).

As an offshoot of these discussions, a big debate ensued regarding involvement of only one fishing vessel to guarantee standardisation of sampling activities (a typical methodological problem that was put forward by scientists). At the end of a long discussion, a compromise was made by selecting two GAP fishing vessels with similar features (overall length, tonnage, engine power, fishing gear, etc.). The decision to involve only two vessels resulted in “jealousies” among fishermen who were either involved or excluded from the activity. Over time, however, fishermen accepted the decision without too much complaint.

The sampling scheme represented a compromise aimed at integrating scientific investigation with fishermen’s knowledge and expectations and resulted in choosing 21 sampling stations in the Veneto Region administrative waters (from 4 to 18 NM from the seashore). Fishermen’s contribution and experience was fundamental in defining sampling site allocation as well as timing and movements to optimise sampling activity. Fishermen also fully supported researchers during the sorting, sampling and measuring of catches so as to ensure that activities were carried out within the scheduled time and to an agreed standard.

Fishermen were paid (i.e. for renting their fishing vessels) for such activities, but the price they received was very low, covering just their expenses, as the main purpose was to support collaborative actions as opposed to simply buying fishermen's time. The resulting experiences at sea further promoted trust building and the exchange of opinions beyond those that focussed on professional fishing issues more commonly discussed.

At the end of each annual survey, results were presented in open meetings at the Chioggia town hall, which were also attended by (non-GAP2 participating) fishermen, local and regional administrators, policy-makers, coast-guard officers, scientists, journalists, etc. Some fishermen criticised the data during the presentations and were sceptical about its usefulness, claiming that in the few days between the survey and the beginning of fishing, the situation at sea might have changed sharply. On the other hand, a fisherman who participated in field activities praised the group's results saying:

Congratulations to all for the work done in so short a time. I hope you were satisfied, even though I think my colleagues (beyond the GAP team) are not very satisfied. I think this may be because they do not fully understand what our purpose is in doing this (Chioggia fisherman).

Interestingly, the debate often heated up when the discussions moved away from perspectives on the credibility of the biological data, i.e. technical contestations over knowledge, to their management implications. This might suggest that rather than 'not fully understanding the purpose' of the collaborative research, fishermen were aware of the use of its results and their possible implications for access and use of the fisheries.

Over time, the authors observed a gradual decrease in the number of participants in these open meetings (from about 100 people in 2012 to 60 in 2015), yet they continued to attract the interest of all fishermen in Chioggia town. For instance, fishermen (not part of GAP) who participated in the meeting took pictures of species' distribution maps and shared them in real time to colleagues on social media. Presentations were also an occasion for the GAP group to socialise: after the presentation of the results, the fishermen-researchers continued to interact "among the stoves and pots," and each year a dinner was organised to cook and eat fish caught at sea. Moreover, every year, catches were shared with charities identified by fishermen and scientists together. The authors feel these are small but significant advances in building relationships, mutual understanding and trust between stakeholders.

8.4.5 Applying a Survey Approach to Broaden the Understanding of Fishermen Perceptions around the Fishing Ban

As already alluded to, the midsummer fishing ban - its duration, application, and regulations particularly those pertaining to effort - was the issue of highest priority in the GAP group. This theme was also somehow the least controversial, since there

was a general agreement (both amongst fishermen and scientists) on the need of extending its duration and reducing fishing effort for the following fishing season. One of the reasons this was not as politically charged as it could have been has to do with the provision of subsidies to fishermen over the duration of the closed season. Yet, it should be noted that some fishermen stated that this would also be their opinion even without additional subsidies.

However, as the fishing ban would have far-reaching implications, it was considered necessary to open the discussion to those fishermen outside the GAP collaboration, particularly those discussions which would deal with potential conflicts as well as the general vision around the purpose and efficacy of the ban. Accordingly, taking advantage of a parallel project aimed at assessing the impact of European regulations in the Northern Adriatic Sea fisheries, an ad hoc survey was carried out. The survey involved nearly a hundred fishermen and skippers from the Veneto Region, who used different fishing gear, with fishermen having an average fishing experience of 28 years. Questions on the fishing ban were included in the survey.

A clear majority of those interviewed (70%) stated that they did not agree with the current duration of the summer fishing ban, most of them commenting on the need to increase its duration. In addition, 95% of those interviewed suggested an alternative period for the ban, although the periods suggested varied greatly amongst fishermen depending on the fishing gear used. This highlighted a strong and shared belief that the timing and duration of the ban was inappropriate. The consensus on the ban and potential fishing effort restrictions and the need to enforce them helped the GAP2 group to finalise their proposal to revise the fishing ban. This exemplifies the importance of developing a shared understanding and narrative to bridge the knowledge gap and create a common platform upon which to base management discussions and decisions. Furthermore, it also highlighted the need to build upon, where possible, the rather limited resources and reach of the GAP project, by engaging with similar or related initiatives.

8.4.6 Navigating Stormy Weather

Whilst encountering some rough waters, so far the description of the GAP process could suggest that the process was largely smooth sailing. Problems that have been described so far are primarily seen to have emerged from within project activities or as a result of outside events linked to fisheries dynamics and other management processes. This is possibly due to the need to represent in a coherent manner what was, at some points, a turbulent affair. In reality, whilst collective action did take place, there were significant periods of tension, as described below, which had to be resolved.

One on-going area of difficulty was in accessing funds from the Veneto Region for priority collaborative initiatives. For example, a proposal was drafted to monitor and raise awareness about heavy metal contamination in gastropods as it had considerable economic implications. Despite the project being ‘accepted in principle’, it was not funded, apparently due to an overall shortage in funding available for the region. Another project proposal related to experimenting with the “pulse trawl” in Chioggia

(an idea put forward by GAP fishermen after a presentation made in Chioggia by the Dutch GAP fisherman, J. Bajii), had the same outcome. Informally, Veneto Region officers mentioned to us that there would have been a greater possibility of both projects being funded if the proposals themselves were supported by all fishermen cooperatives and organisations of the Veneto Region and not just a restricted number. In other words, they would have liked to see a much more involvement of fishermen cooperatives. Other proposals put forward by GAP affiliated fishermen and scientists, for example one to study the sand smelt fishery, were also rejected.

These failures of GAP scientists and fishermen working to establish a collaborative platform for monitoring aimed at broadening the knowledge base to solve specific resource problems. Yet they served to demonstrate a difference in political/research priorities between local scientists and those of the Veneto Region. This in itself highlighted the limitations of working through a small project like GAP with limited resources available to tackle large, complex problems.

Despite the lack of success accessing funds and the resultant frustration that emerged across stakeholders, such efforts were still very important for the following reasons:

- They allowed the group to act proactively to try and solve problems through maintaining the participatory nature of the GAP approach to solving fishermen's and fisheries-related problems.
- They allowed the group to increase collaboration with the Veneto Region administration which facilitated a better understanding of the latter's priorities and to participate in meetings from which the group was previously excluded.
- They illustrated the relevance of group activities and helped policy-makers better understand the nature of collaborative research.
- They showed that in order for GAP proposals to be successful, a higher degree of involvement of regional fishermen's organisation was required.

Moreover, such activities allowed us to maintain a certain momentum in a situation where tangible outputs from project activities were few (due to the need to collect data for at least 2 years to make it scientifically robust enough for managers and policy-makers). This was important given our experience (as scientists) at higher management levels (e.g. the EU Common Fishery Policy), which places a clear emphasis on direct evidence and credible scientific knowledge in decision-making. As such, we consider it important to see a similar approach taken in local management decisions in the Veneto Region.

8.5 Sighting 'Terra Firma': Mirage or Reality?

8.5.1 From GAP Life Raft to Flotilla

Empirically, the participatory research activities provided substantial evidence that it was necessary to rethink the summer fishing ban. In order to promote this change, it was necessary for the GAP group to become a bigger player in the management

arena, not only at the Veneto Region administrative scale but also, and more prominently, at the Northern Adriatic Sea scale. To this end, field results (GAP logbook and survey data, as well as on board observations) were presented at a meeting of the FAO Adriamed project in late 2013. The presentation resulted in the establishment of a working group (WG) on the effectiveness of the summer fishing ban. In October 2014, the Adriamed WG met and several presentations were given, including one summary of GAP results and the outcomes of the survey that involved fishermen of the Veneto Region and focussed on the appropriateness of the summer fishing ban. In preparation for the meeting, and in order to set the agenda and the contents of the communication, the GAP team conducted a focus group on the summer fishing ban. Fishermen were asked to provide insights and ideas and make requests regarding changing the duration of the fishing ban, all keeping in mind the outcomes of the survey. The discussions were passionate and direct as can be seen below:

Croatian fishermen should stop fishing as we do in Italy. Not only trawlers should be stopped, but also fishing with set nets and pots... During the ban Croatians enter the markets with their fish – this is not fair. It is not only Italians that should protect biological resources: the Adriatic is like a bathtub, all activities have an impact on resources (Chioggia fishermen).

Fishermen also told scientists: “Listen, you have to report exactly what we said, i.e. all aspects, even the most controversial ones because they are very relevant for us” (Chioggia Fisherman).

The detailed report of the focus group was well received at the FAO-Adriamed project WG meeting. The GAP participatory approach and the data collected were also commended. Adriamed agreed to put forward a detailed report highlighting the effectiveness of and possible revisions needed to the fishing ban that would be discussed in a forthcoming FAO GFCM plenary session. The GAP group also made further steps forward. In two different meetings, the proposal for the revisions to the summer fishing ban were drafted, proposing revisions to the regulations adopted in 2014. The new text proposed that the summer trawling ban should commence from the 15th of July to the 15th of September and it should be such for all trawling activities conducted within the Northern Adriatic Sea Fishery District. In addition, it was suggested that for the 8 weeks following the ban, fishing effort was to be restricted to a maximum of 60 h per week. Even after that eight-week period, fishing effort should not exceed 72 h a week. In order to generate support for the extended fishing ban, informal contact with different fisheries officers and politicians of the Northern Adriatic Sea fishery District were made. These processes compliment and add value to the GAP experiences, outcomes and visions. However, it should also be noted that the proposed revisions to the summer fishing ban rules was not accepted, as a number of issues need to be tackled first. These include: (i) the economic cost of the extended ban as fishermen receive compensation (subsidies) during the ban period, thus extending the ban will increase costs (despite some fishermen agreeing to a no cost extension; a key question is who will pay for this?); (ii) the need for a formal agreement among different regions (and thus fishermen) along the Northern Adriatic Coastline; and (iii) the adoption of a common strategy with other countries such as Slovenia and Croatia which is not straightforward as there is no binding obligation to use similar management approaches in the Adriatic Sea across the EU countries.

It is worth mentioning, in this context, that the GAP group also attended, in early March 2015, a meeting of a Pan-Adriatic project dealing with a common approach to fisheries management. The approach, outcomes and management proposal developed in GAP were welcomed by participants. This illustrated not only the value of the GAP case study generally but also, specifically, of building new knowledge and narratives under a participatory process involving fishermen and policy-makers. Given the positive feedback, the GAP group was invited to give a talk in another meeting that was to be coordinated by the fishery officer of the Emilia Romagna Region (a region neighbouring the Veneto Region) who was also the coordinator of the Northern Adriatic Sea Fishery District. This was another occasion to promote the GAP management proposal and approach (Raicevich et al. 2015).

An important point to make at this point is that though the GAP project had a limited reach, influence on decision-making was greatly increased through the use of the broader collaborations.

8.6 Making Port, Dropping the Anchor: Journeys End?

The Chioggia case study is a unique attempt in the Northern Adriatic Sea to operationalise the ‘GAP method’ in a complex and politically charged governance context. It has been successful in building a strong alliance of local fishermen and government scientists around a set of shared interests and values, and through the use of a common narrative (Raakjær 2009). This Chioggia case, which has focussed on sustainable fisheries management, has through the co-production of knowledge created to a certain extent a common platform from which both local fishermen and scientists have been able to reach an understanding over the current status of fisheries management and the need to extend the fishing ban in the Northern Adriatic. This has been achieved through an on-going participatory process of problem identification, research design and co-production of knowledge, in the process also bridging different knowledge systems (Reid et al. 2006). In doing so, it has demonstrated the potential of working together from the ‘bottom up’ in the pursuit of a broader more credible and legitimate knowledge base for fisheries management. Given the scale of the problem, however, and the fact that vested interests will try to ensure the maintenance of the status quo, in this case a centralised, top-down approach to management, GAP is a good beginning in ensuring broad and long lasting change. There is a need for others to build upon it as a viable approach of including fishermen and fisheries scientists in setting management objectives for addressing some of the problems faced by the fisheries sector. An example of where the approach gained some traction was the work with the Adriamed WG in relation to the summer fishing ban in the Northern Adriatic.

Whilst there were considerable successes, there remain serious institutional and practical challenges to fisheries management in the region (i.e. given the multiple administrative and ecological scales involved, *sensu* Reid et al. 2006), especially in

relation to the limited resources available in GAP. One such challenge identified by the case study team is bringing fishing associations and Veneto Region managers together in support of more evidence-based decision-making. Our results demonstrate that influencing the policy agenda and ensuring appropriate policies is not simply a matter of providing knowledge up the management chain, but also instilling a participatory research (and the knowledge it produces) approach as a long term tool to include fishermen at the decision-making table. This then becomes a political issue, in the sense that knowledge becomes a political currency, and thus has implications in terms of enabling fishermen's associations to represent fishermen and their interests. It also has implications in terms of the changing roles and responsibilities of scientists, fishermen and other stakeholders in the contemporary management of fisheries resources. Accordingly, collaborative research is political. Recognising that this is so affords a very real opportunity to work with fishermen, scientists and other stakeholders using collaborative research in a more politically nuanced and targeted way. If we seek to make explicit the interests and rationalities with which all stakeholders operate, how alliances are formed and discourses and policies shaped, we would expect to see greater traction for mobilising collective action. This is no easy task, nor short trip, but should this voyage continue, we hope and expect that the fisheries management challenges of the Northern Adriatic Sea will be better addressed.

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