Chapter 18
Conclusion

Mackinson, S[1,2] Holm, P.,[3] Hadjimichael, M[4]

[1] Centre for Environment, Fisheries and Aquaculture Science (Cefas), Pakefield Road, Lowestoft, Suffolk, NR33 0HT, UK
[2] *Current affiliation:* Scottish Pelagic Fishermen's Association, Heritage House, Shore Street, Fraserburgh, AB43 9BP, United Kingdom. Email: steve.mackinson@scottishpelagic.co.uk
[3]UiT The Arctic University of Norway, Norwegian College of Fishery Science, Tromsø, Norway.
[4]University of Cyprus, Department of Social and Political Sciences, Nicosia, Cyprus

Abstract
This chapter summarizes the arguments and discusses the results of the GAP project in the context of the ongoing reform in fisheries governance.

1. Introduction - Exploring the transition zone

A prominent feature of global marine environmental governance and the management of fisheries during the last decade has been the building of opportunities for scientists, stakeholders, policy makers and non-governmental organisations to communicate, negotiate and work together. Progress has been made. The GAP experience has demonstrated that collaborative research does work. Nevertheless, much work remains to be done. While GAP has shown that collaborative research may succeed at the level of individual projects, things get more complicated if the approaches deployed in the GAP project are going to form part of the standard institutional setup for fisheries governance. There are unresolved issues in relation to how multi-actor collaboration in research and innovation can provide a vehicle for inclusive governance. At the same time, much work needs to be done in order to evaluate what happens at the margins of collaborative approaches. Even collaborative approaches cannot include all stakeholders and accommodate all interests, and we need to understand more about how such approaches distribute and redistribute power and influence (c.f. Griffin, 2013).

Despite being perhaps the most science-driven policy area in Europe, the Common Fisheries Policy (CFP), has suffered from a legitimacy crisis that also focused on the knowledge base for management and decision making (Schwach et al. 2007, Wilson 2009, see Chapter 2).

The foundation of the legitimacy crisis has centred on how the science-policy system makes informed management decisions when (i) it is known (or believed) that the underpinning science is uncertain, (ii) the impact of science on the policy process can be unclear, and (iii) there are differing perspectives on what we should do with our seas. Understandably, these questions of legitimacy also undermine the credibility of the institutions responsible for scientific assessment and advice.

The command and control management paradigm of the CFP has meant that until recently, conditions have not been favourable for catalysing the type of participatory research initiatives necessary to rebuild trust and credibility. But things are changing. Reflections on failings of the CFP have led to a tangible change in attitude among stakeholders and scientists, and created opportunities for developing inclusive governance approaches in the 2014 reform of the CFP (see Chapter 2, section 2.3). This backdrop means that efforts to bring together the knowledge and know-how of scientists, fishermen, policy managers and civil society organisations are becoming more prevalent; a key motivation being that the knowledge base for management plans and how they are implemented is accepted by society and those whose livelihoods depend upon them.

The shift towards the ecosystem approach adds force to this movement because its added complexity and diversity of interests that need to be taken account of has contributed to the broadening of the knowledge and expertise required for management as well as the need for active user participation (Mackinson and Middleton 2018). At the same time, new Information and Communication Technologies (ICT) have drastically improved the capacity for collecting, combining and utilizing data and information from different sources (Holm and Soma 2016). As a result of these shifts – and the EU reform initiatives seeking to take advantage of them – the contours of a decentred and participatory governance regime are visible, built on co-management, active stakeholder engagement, and co-creation of common knowledge bases for management.

However, because participation and inclusive approaches are rather new in many areas of the EU fisheries research agenda, there is a desperate need to learn quickly how to do this well and thus help avert tensions that arise between society, policy and science when environmental sustainability concerns appear in conflict with maintaining livelihoods. Arguably, the organization and authorization of knowledge for management, forms one of the most dynamic parts of the evolution of European fisheries policy and management.

In the case studies presented in this book we have explored what goes on in the transition zone between top-down management and participatory governance, in particular in the ongoing transition from expert dominated towards collaborative arenas for knowledge creation. The chapters expose the bare bones of experiments in participatory research, showing how the knowledge frameworks and relationships shape the chances of success and provides personal critical accounts of what it takes to do better.

2. Putting 'participatory research' on the European fisheries research agenda

As a collective, the CS papers describe the complexity of European fisheries in some detail. As practical field experiments, they are significant in demonstrating applied participatory methods and their utility across a range of research issues. By having to confront the mechanisms of the established order they reveal how participatory research can generate new insights and produce a wealth of new knowledge to contribute to the world of science and management. One particularly successful example is the red shrimp case study in Palamós, Spain (Chapter 10). Here, excellent collaborative working between local fishers, scientists and the regional Government of Catalonia has produced well-accepted, environmentally sound management measures – many promulgated by local fishers themselves – which have prevented the collapse of an extremely valuable fishery. The red shrimp fishery is now thriving, and used as a best-practice example along the Mediterranean coast. Not only have each of the GAP case studies produced useful new fisheries data, the personal accounts described in each chapter testify their contribution to understanding the challenges and benefits of the participatory approach.

In addition to the in-depth case studies, GAP served to facilitate and promote inclusive dialogue on emerging issues of the reform of the CFP and implementation of the Marine Strategy Framework Directive (MSFD). Two pivotal workshops during CFP reform provided a stage for policy makers, industry, managers and scientists to discuss 'Putting the Science into Regionalisation'. Other pioneering workshops included: a fisher-focused interactive workshop on collaborative management of octopus fisheries in Northern Spain, UK-French collaboration on the Channel scallop fishery, Multi-stakeholder workshops on Irish Sea herring management plans, discussions on the process for developing long term management plans for North Sea demersal fish and Western Baltic herring, and Spanish and French collaboration on sustainable FAD fishing for tuna in the Indian Ocean.

A re-occurring theme across all case studies and workshops has been the need for effective communication between all partners. This has meant working together to develop a 'common language', an exemplar being the international symposium on the theme of 'Participatory Research and Co-Management in Fisheries' (GAP 2015a), where innovative approaches were used to help participants share their experiences of participatory research and discuss its evolution in the EU and beyond. As with the development of the 'common language', it has been important to tailor GAP's outputs to those who will be using them, such as in the final Policy Briefing (GAP 2015b) that summarises the key impacts. Open access to the Participatory Research Toolbox (GAP 2015c) and all briefings and reports is available via the GAP website (www.gap2.eu). In making the knowledge gained from the project accessible in such ways, we hope that GAP lives beyond the natural conclusion of the project and helps to

evolve collaboration in other areas of research. By continuing to build strong working relationships between partners in such diverse fisheries as the UK crab, Danish herring, Norwegian cod, Dutch flatfish, and Italian cuttlefish, it has been the aim of the project to leave a footprint of – or rather a blueprint for – collaboration. Signs of its application are now visible across a range of national (e.g. Pastoors and Quirijns 2017, Mangi et al. 2018) and EU projects (e.g. Discardless (www.discardless.eu) and Pandora (http://pandora-fisheries-project.eu/)), and have been used to develop detailed guidelines to support them (Mackinson et al. 2017).

3. GAP lessons

Active inclusion of stakeholders in research from conception has been crucial to the development and success of the case studies. Rather than a tokenistic involvement in data collection, GAP processes attempted to bring all stakeholders together in the design of research at the outset, as well as offering ownership of data collected at the conclusion of the research. This is perhaps nowhere more clearly illustrated than in GAP's Swedish case study in Lake Vättern (Chapter 4), where members of a co-management group proposed, and undertook their own research experiments, studied the population structure and the selective fishing methods for Whitefish. This process continues beyond GAP with the methods being proposed to enter into local legislation. Similarly, and following the example set by the Red Shrimp case study (Chapter 10), the Maltese case study resulted in fishers and the Maltese Department of Fisheries and Aquaculture collecting data, which will potentially be used to complement the country's management plan for trawl fisheries (Chapter 15). At the same time, some of the case studies, for example the Western Baltic spring spawning herring case study (Chapter 6) and Steigen coastal cod (Chapter 9), highlight the thin line between success and failure of collaborative research, particularly when the 'management wall' is reached.

Taken together, the CS chapters bring out the great variability in fisheries across Europe. This is important to keep in mind when we are extracting lessens from the GAP experience. Since the fisheries of Europe are confronted with a range of different problems, and work under a variety of technical, economic and societal conditions, it is not likely that we can find one model to fix it all. In line with this, we want to warn against one simplistic interpretation of the GAP experience, namely that developing the knowledge base for effective management points to local co-management as a general solution, even though the obvious success stories in GAP, be it the Red Shrimp in the Mediterranean or the White Fish of lake Vättern, indeed seem to promote co-management as an effective mechanism. While these case stories are fabulous and inspiring, it is important to emphasize the unique set of preconditions that have made these cases work. In this sense, the CS from Chioggia, Italy, Steigen, Norway, and FADs in Spain and France, are equally important, despite the multiple obstacles encountered. In general, we want to argue, the conditions that these CS projects have to deal with are more typical across European fisheries, thus Chioggia might serve as a better test case for

collaborative research than Palamos. Or rather, a robust inclusive approach to fisheries governance must be able to withstand the challenges of Chioggia, not only enjoy the fruits of Palamos. To be sure, under the right conditions, co-management remains an ideal allowing active stakeholder participation and collaborative approaches on knowledge production as well as decision-making, but it is not a requirement. Nevertheless, because of the nested scales and complexities of contemporary fisheries, governance often necessitates linking local, regional and global issues in increasingly intricate ways. Fisheries management cannot be solved primarily at the local level. Instead, the crucial lesson from GAP is about how the top-down structures of the TAC machine can be modified in order to accommodate co-management component as integrated elements. Instead of either top-down control or local co-management, we need both within a nested systems approach (Ostrom 1990; Wilson 2009). The GAP project has demonstrated that this is indeed possible, even without massive investment and explicit reform efforts. Within the emerging structures, based on collaborative platforms of the ACs and the emerging institution of Long Term Management Plans, we can see the shape of a nested system operating in practice, as in the cases of WBSS herring (Chapter 6) and Elasmobranches bycatch (Chapter 16).

The top-down system of fisheries management is already under heavy pressure to handle the complexities of fisheries management. With the acceptance of the ecosystem approach, and the general movement towards including a more heterogeneous set of interests as stakeholders, this pressure will continue to grow. A nested approach along the lines suggested here seems to be an obvious approach to meet this challenge: by systematic mobilization of knowledge and management effort at the local level, within a generalized framework that takes care of higher-order problems. The main challenge, from this perspective, is to strengthen the boundary infrastructure that allows for appropriate division of responsibilities and interaction between the levels in such a nested system.

4. Responsible Research and Innovation (RRI): a knowledge framework for the Ecosystem Approach.

The principles of inclusion, participation and transparency upheld in GAP resonate with the wider EU research agenda for adopting Responsible Research and Innovation (RRI, see Box 1) as a framework for directing and delivering research and its outcomes in a way that society wants and accepts. We see the RRI framework as an enabler of opportunities to create an environment for collective action initiatives to emerge and be sustained.

Box 1. Responsible Research and Innovation
RRI means societal actors (researchers & innovators, citizens, policy makers, business, research funders, NGOs etc.) working together during the whole research and innovation process to better align both the process and its outcomes with the values, needs and expectations of society. *Active engagement* and *participatory research* are cornerstones of RRI.

GAP is just one example of the broader range of Responsible Research and Innovation (RRI) projects funded by the European Commission. It is necessary now that the lessons learnt from this contribute to helping research policy-makers and funders understand how they can build collaborative approaches into future projects – both within fisheries and beyond.

With the experience gained from participatory research case studies around the world, it has become clear that the basic idea of collaboration in research and innovation is deeply connected with the principles of inclusive governance, which are embodied within the ecosystem approach to fisheries (EAF). Indeed, 50 years' experience on the principles and operational guidance for ecosystem management[1] shows that elements of inclusive governance form part of the foundations of EAF:

> Involve all stakeholders in knowledge-sharing, decision-making and management; Ensure coordination, consultation and cooperation, including joint decision-making, between fisheries and other sectors; Recognize that management objectives are a matter of societal choice; Decentralize decision and action to the lowest appropriate level[1].

This perspective highlights that getting the science right is not always enough. Having more and better data only goes part way to address issues of sustainability in managing fisheries. In itself it cannot substitute for stakeholders' non-compliance with management measures, their feelings that science misrepresents what they see on (or under) the water, and their lack of trust in the data and how it is used. Getting it right requires generating the knowledge-base *on par with* developing the trust and confidence among stakeholders, researchers and managers, so that solutions are understood and fit-for-purpose (Holm and Soma 2016). By evolving what it takes to carry out RRI in practice and to ensure its utility in management, future work needs to focus on embedding collaborative approaches in a systematic way.

[1] United Nations Food and Agriculture Organisation (FAO) Code of Conduct for Responsible Fisheries, the 5th Conference of the Convention on Biological Diversity (CBD), the 2001 Reykjavik Declaration, the FAO Technical Guidelines on EAF and on other instruments dealing with the subject, (see http://www.fao.org/fishery/topic/13261/en)

But why is this more important now than ever?

The regional approach to fisheries management, established in the 2014 reform of the Common Fisheries Policy (CFP), strived to provide the conditions that EU Member Countries now need to collaborate with stakeholders and scientists when deciding how to best manage fisheries in regions where they share fishing interests. While the regionalized approach may take some time to produce mature collaborative partnerships (Linke and Jentoft 2016), it is important to begin moving in the right direction. European citizens today expect their seafood to come from sustainable, responsible, and ethical fisheries, which puts fishermen, managers, and scientists in the spotlight. Indeed, societal acceptance, or 'the social licence' to fish has never been more important given the public awareness of the wasteful discarding of fish and the environmental imperative for healthy ecosystems.

Without taking too great a leap then, it is reasonable to expect that the CFP's focus on an ecosystem approach in the context of regionalization has the potential to lead to the proliferation of participatory research practices, the rise of the 'scientific fisherman' (Dubois et al 2016), and the development of more collaborative management arrangements.

5. Conclusion

Stakeholders may frequently challenge the validity or interpretation of scientific advice because of the negative impact that policy decisions arising from it can have on their lives. This 'tension' between society, policy and science is plainly evident when environmental sustainability concerns appear in conflict with maintaining livelihoods. This is why research seeking to integrate the experiences of stakeholders in the knowledge base for management is a rapidly developing field. As an example of this phenomenon, GAP 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. 2011). It challenged the barriers and promoted ideas to better enable the participation of stakeholders in research (Mackinson and Wilson 2014). The case studies presented in this volume have been the vanguard of a transition of management approaches and the changing knowledge requirements to support it. Active participation in research has been used as a way to reduce tension by focusing on creating knowledge that is both scientifically credible and legitimate. Today there are many projects operating in Europe and around the world, where this is 'par for the course'.

After seven years at the forefront of participatory research in Europe's fisheries, the GAP team and all those who have shared in the projects work are moving forward with co-created new knowledge, and adding momentum to the ever-growing enthusiasm for the value of collaboration in research and policy-making. Our sense is that in the slow transition to an ecosystem approach – and the inclusive governance it demands – research and management approaches are at a tipping point in their readiness to make it work. Policy bodies are more

sensitized than ever to the idea that society should be actively involved in research that underpins policy 'with and for' EU citizens.

There have been positive signs from a range of international organisations with regards to a growth in research participation – the UN FAO's 'Voluntary Guidelines on Securing Sustainable Small-Scale Fisheries' recently highlighted the importance of co-management (an outcome of participatory research) in ensuring long-term sustainability (Chuenpagdee and Jentoft 2019). The Directorates General for Research and Innovation, and Maritime Affairs and Fisheries have both closely followed GAPs work, and are committed to spreading 'responsible research and innovation' more widely across all forms of policy making. This policy interest is reflected in the scientific arena, exemplified by the ICES conference in 2016 entitled *'Understanding marine socio-ecological systems: including the human dimension in Integrated Ecosystem Assessments'*, where discussions about stakeholder collaboration and participatory research were in the spotlight.

Finally, on behalf of the whole GAP team would like to thank all those who have been involved in, or simply followed, the GAP journey. We hope to have imparted some useful knowledge, challenged perspectives, and inspired you.

References

Dubois, M., Hadjimichael, M., Raakjær, J. (2016). The rise of the scientific fisherman: Mobilising knowledge and negotiating user rights in the Devon inshore brown crab fishery, UK. Marine Policy 65: 48-55. 10.1016/j.marpol.2015.12.013.

Chuenpagdee, R. and Jentoft, S. 2019. Eds. Transdisciplinarity for Small-Scale Fisheries Governance: Analysis and Practice. Dordrecht: Springer.

Eliasen, S.Q., T.J. Hegland, J. Raakjær. 2015. Decentralising: The implementation of regionalisation and co-management under the post-2013 Common Fisheries Policy. Marine Policy 62: 224-232.

GAP 2015a. Policy Briefing 4: GAP2 International symposium. (http://gap2.eu/gap2general/gap2-international-symposium-post-event-brief/)

GAP 2015b. Policy Briefing 5: Building Bridges Through Participation – Concrete Outcomes & Cementing Change. (http://gap2.eu/news/policy-briefing-5-building-bridges-through-participation-concrete-outcomes-cementing-change/)

GAP 2015c. Participatory Research Toolbox. (http://gap2.eu/methodological-toolbox/)

Griffin, L. (2013). Good governance, scale and power: A case study of North Sea fisheries. New York: Routledge.

Holm, P., Soma, K. (2016). Fishers' information in governance: A matter of trust. Current Opinion in Environmental Sustainability, 18: 115–121.

Linke, S., & Jentoft, S. (2016). Ideals, realities and paradoxes of stakeholder participation in EU fisheries governance. Environmental Sociology, 2(2): 144–154.

Pastoors, M.A., Quirijns, F.J. (2017). PFA Self-sampling report 2015–2016. PFA report 017/02, 2017.

Mackinson, S.,Middleton, D. (2018). Evolving the ecosystem approach in European fisheries: Transferable lessons from New Zealand's experience in strengthening stakeholder involvement. Marine Policy 90: 194-22. https://doi.org/DOI: 10.1016/j.marpol.2017.12.001

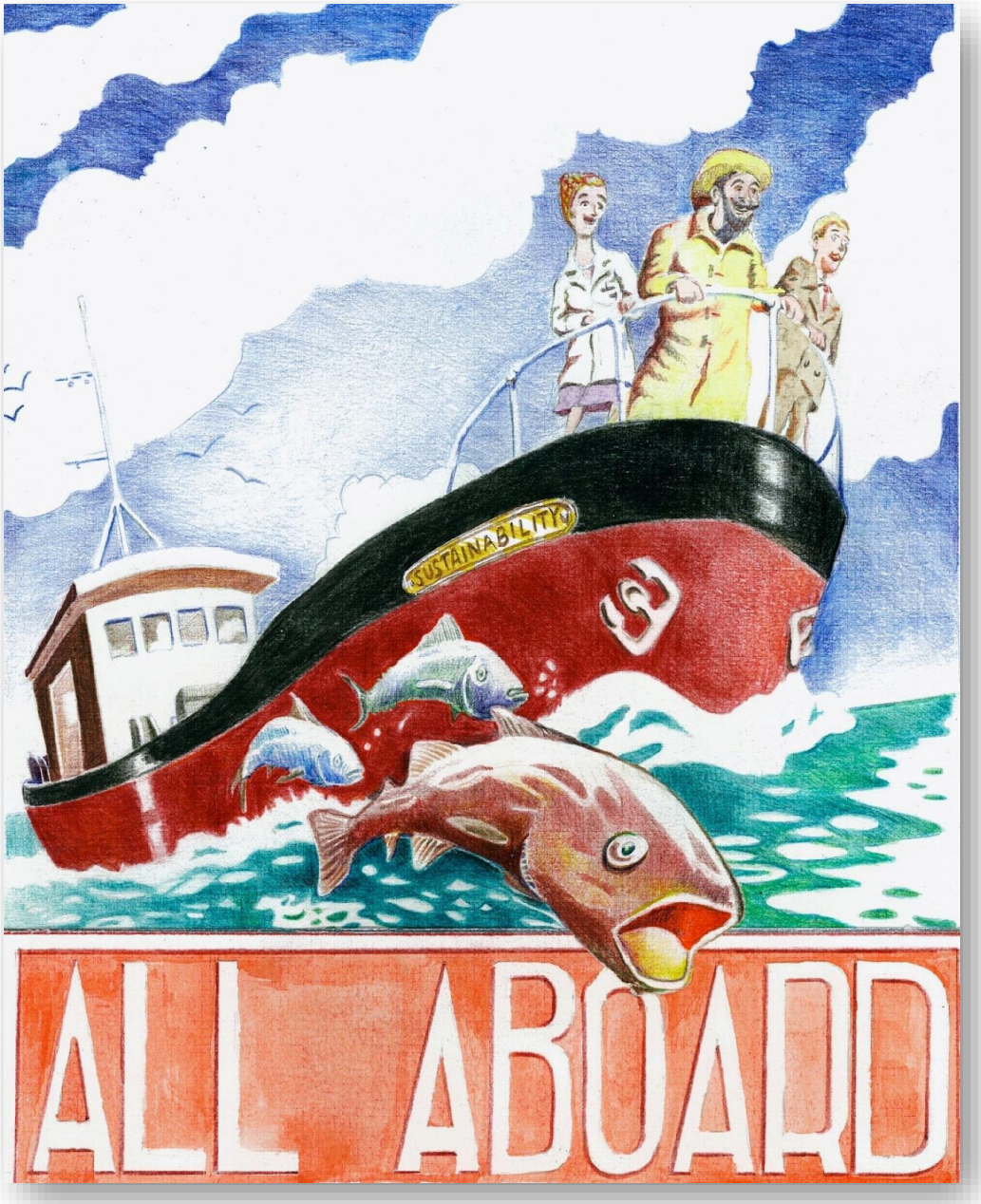
Mackinson, S.,Wilson, D.C.K. (2014). Building bridges among scientists and fishermen with participatory action research. 121-139 In Social Issues in Sustainable Marine Fisheries Management. Spring, Chapter 7. Mare publication series 9, Urquhart, J., Acott, T., Symens, D., Zhao, M. Springer, Dordrecht.

Mangi, S., Kupschus, S., Mackinson, S., Rodmell, D., Lee, A., Bourke, E., Rossiter, T., Masters, J., Hetherington, S., Catchpole, T., Righton, D. (2018). Progress in designing and delivering effective fishing industry-science data collection in the UK. Fish and Fisheries, Wiley. Fish and Fisheries. 2018: 1–21. DOI: 10.1111/faf.12279

Mackinson, S., Mangi S., Hetherington, S., Catchpole, T., Masters, J. (2017). Guidelines for Industry-Science Data Collection: Step-by-step guidance to gathering useful and useable scientific information. Fishing into the Future report to Seafish. 65p. June 2017.

Ostrom, E. (1990). Governing the Commons: The Evolution of Institutions for Collective Action. New York: Cambridge University Press.

Schwach, V.; Bailly, D.; Christensen, A.S.; Delaney, A.E.; Degnbol, P.; van Densen, W.L.; Holm, P.; McLay, H.A.; Nolde Nielsen, K.; Pastoors, M.A.; Reeves, S.A. & Wilson, D.C. (2007). Policy and knowledge in fisheries management: a policy brief. ICES Journal of Marine Science 64(4) 789-803.


SUSTAINABILITY
ALL ABOARD

HOW HAS GAP2 MADE A DIFFERENCE?

GAP2 brings fishers, scientists and policy makers together to conduct 'participatory research' - a form of collaboration that places equal value upon fishers' and scientists' knowledge. Such research partnerships can provide the knowledge needed to sustainably manage and govern Europe's fisheries, and has already made a difference since collaborations began in 2008.

CREATED
'FAO Adriamed', a collaborative group working on sustainable fishing practices in the Adriatic sea, was founded following the GAP2 Italian case study's annual trawl survey.

ANALYSED
GAP2's work undertaken with tuna fishing vessel skippers in the Indian Ocean via a series of international workshops, is helping to address questions of sustainability around the use of 'Fish Aggregating Devices' (FADs) – an ethical issue of importance to consumers worldwide.

INSTITUTIONAL
GAP2 has helped forge a first-time opportunity for fishermen and scientists to work together as part of an ICES (International Council for the Exploration of the Seas) Working Group – WGMARS.

IMPLEMENTED
Learning from the GAP2 case study on self-sampling in Dutch flatfish fisheries is being used in plans implementing the CFP policy on banning fish discards.

EXEMPLIFIED
GAP2's work has provided tangible examples and role models of Responsible Research and Innovation.

INTEGRATED
GAP2's Estonian case study has meant that fishers' views have been truly integrated into the country's national 'Marine Spatial Planning' process.

INSPIRED
GAP2's exchange programme has directly inspired the creation of a knowledge-sharing network for fisheries near Chioggia, Italy: 'NETs of Knowledge'. This group is modeled on experiences Italian fishers had in the Netherlands, whilst on GAP2 exchange.

PIONEERED
GAP2's work on the Channel scallop fishery, including both French and UK stakeholders, is a pioneering example of 'regionalisation' in fisheries management: a cornerstone of CFP reform.

SHAPED
GAP2's successes and challenges have helped shape plans leading to continued success of the new UK sustainable fishing charity "Fishing into the Future".

What activities have GAP2 case studies been involved in?

6087 ACTIVITIES

4931 SELF-SAMPLED FISHING TRIPS

366 JOINT FIELD TRIPS

34 PAPERS PUBLISHED

330 MEETINGS

81 CONFERENCES

200 MEDIA ARTICLES

277 INTERVIEWS

68 WORKSHOPS

Twitter Followers

- 42% Civil Society
- 16% Science Related
- 18% General Interest
- 3% Policy Makers
- 7% Media
- 14% Fishing Industry Related

2008

GAP Project commences

2009

European Commission launches a public debate on how we manage our fisheries, including a Green Paper on Common Fisheries Policy reform

2010

GAP2 Project commences; 13 collaborative research case studies established across Europe

2011

2012

Passage of draft proposals for reformed CFP through legislative processes

GAP2 exchange programme goes global

February 2013 - GAP2 Social Sciences workshop in Chioggia, Italy

2013

2014

Reformed CFP comes into force

GAP2 Methodological Toolbox goes live online

February 2014 – GAP2 'Putting the Science into Regionalisation' workshop in Brussels, Belgium

April 2014 – GAP2 collaborative workshop on UK and French scallop fishing in Brixham, UK

2015

GAP2 International Symposium "Participatory Research and Co-Management in Fisheries" in Barcelona, Spain

Who is reading our work?

- 20% Policy Maker
- 20% Wider Public
- 29% Scientist
- 31% Industry Stakeholder

Who is involved in GAP2?

- 297 Fishers
- 67 Scientists
- 41 Policy makers
- 19 PhD/MSc students

GAP
Connecting Science Society and Policy