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Chapter 9

Participation

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9.1 DECISION MAKING THEORY

Since the Second World War, public policies have been closely aligned with the development of the welfare state and the need to address the causes and effects of economic cycles, as well as those events that, in economic and social science circles, are classed under the generic heading of *market failures*. One of the basic tasks of public decision-makers should be to provide a solution to such questions and guarantee the stability of the economy and society as a whole.

Public policy decision-making, viewed from the economic perspective, revolves around two key features. Policies are grounded in an approach known as ends-means rationality. From this approach, in the early 1950s, there gradually unfolded a theory that remained predominant for over three decades—the public intervention theory. This methodology first identifies the ends or objectives to be pursued and then selects the best means of attaining them, in two separate steps. The responsibility for developing public policies belongs to the regulator, which has always been the institution legally charged with the task. In some cases it has fallen to the state, in others to federal or regional administrations.

To establish their ends or goals, representative democracies have customarily resorted to a political process through which collective preferences are determined by way of a suitable electoral procedure, in which individuals are able to express their preferences. The results reveal the collective preferences from which the social welfare function can then be derived. The second part of the process is to maximise social welfare using the technical instrument best suited for the purpose, to the exclusion of any other criteria. The outcome of this procedure is a welfare-optimising public policy that enables the public authorities to decide on the optimum allocation of available resources. This public intervention theory placed the regulator in the role of mere specialist intermediary between collective wills and their technical and scientific transformation into practical public policies.

From a global perspective, resources are allocated by means of a mathematical optimising technique or, in any event, a formal technical mechanism, in which the regulator solves the problem by simply applying the best available calculating techniques. Whatever the difficulties involved in the calculation process, or in the design and implementation of the political process used to determine collective preferences, the role of the regulator, in this scenario, is restricted to the mentioned function.

Public action was considered absolutely neutral and technocratic. Thus, its legitimacy was always based on the fact that it was the means by which optimal policies could be developed, using totally objective criteria, in which neutrality had to be guaranteed by the impartiality of the procedures used in the process. The performance of policy-makers was evaluated only in terms of their capacity to efficiently attain the goals determined through the electoral process. Preferences were the prerogative of individuals and the community; once their wills had been expressed through that process, the regulator, as a specific agent, should be free of any preferences. In so far as the welfare theory largely solved the basic problems of the optimisation programme, it was along these parameters that it pursued a long-lasting discourse [1].

From the arguments that have been put forward about regulation and regulators, it is easy to see that role of scientists, experts and knowledge in this model had to be to provide the scientific and technical analyses needed to devise an optimising programme technically suited to the preferences expressed by the collective will. From their neutral position, their role as a part of this process should also include proposing designs for optimal policies, which policymakers are then obliged carry out, always accepting they are not allowed to interfere in the public decision-making process.

Historically, economics and decision theory have been firmly split between two subfields or branches: positive and normative. The positive branch takes the main weight of providing the basic analyses to explain phenomena and supply the concepts and models needed to understand facts. The approach of the positive branch of science has been to maintain a basically passive role with respect to facts. As such, it has not involved itself deeply by intervening with its models in the analysis of the concrete realities that surround us.

The normative branch, meanwhile, has essentially taken up the task of applying the methods and models proposed by the positive branch to the melting pot of practical problems that are raised. As such it has taken responsibility for the applied aspects of resource science and management, preparing the best means to achieve the goals demanded by the policymakers, while dealing with the particular complications of specific realities. This specialisation in the practice of the two branches showed up quite sharply during the period mentioned, and served as a basic cognitive model. This conception of public policies provided the basis for the regulative procedures referred to in the literature as top-down models. Indeed, as already indicated, in this model the regulator acts as an all-powerful, providential agent who assumes responsibility for the planning and implementing the policies.

From the simplified explanation given above, it is easy to foresee the kind of criticism this approach was liable to receive. It is a frame of reference within which at least two key agents in the public policy-making process were denied any opportunity to express their preferences and, therefore, had to feature as neutral agents in policymaking.

While complying with what public policies have calculated to be the plan needed to maximise social welfare, the different agents in society see their position become uncertain when some of the agents discover that some policies fail to satisfy their interests. When this happens, findings suggest that those agents who see their aspirations unfulfilled react strategically, and neglect the plans assigned to them by regulators. In fact, they tend to place their own interests above or on the same level as the theoretical common goal proposed by the regulator.

Criticism from different quarters demonstrated that the ‘conventional model’, based on public intervention theory, suffers from an absence of any analysis of agents’ interests. As a result, theorists have gradually introduced the idea of the importance of group action by agents sharing common objectives when it comes to public policy-making. At the same time, however, agents were considered as a set of indeterminate individuals with neutral interests or as a set of individual interests interacting with a global outcome, which, in equilibrium, neutralised their mutual influence over public policies.

Acknowledgement of the active presence of individuals, social groups or institutions with their own objectives, separate from the collective welfare objective, as defined by the regulator, represents a break with the idea that each should passively comply with the optimising programme devised by the policymaker. From this context, there arose the need to analyse the behaviour of agents and groups, all defending their own objectives and the impact they would have on the decision-making processes. This analysis, which enabled the recognition of the importance of different social groups and communities and of their influence over policymakers and public decisions, was extended to include the regulators themselves who had, until then, been seen as the essence of neutrality.

The natural extension of the notion of self-interest groups to include apparently super-neutral agents highlighted the need to develop a more global theory of the participation of stakeholders involved in public policies, whether these be general or sectoral. This is particularly important in the European context, and even more so in sectors where decision-making has been centralised in the European institutions, as is the case in the primary sector.

9.1.1 The incorporation of participation in modelling

Successive criticisms, and the evidence that has been found to support it, have generated new proposals to incorporate participation in the models used to explain the public policy-making process. It is clear that an inclusive approach has prevailed among the social agents, who have diverse interests participating in the various stages of decision-making ([2] pp. 59–77).

In some cases, and in some economic and social sectors in particular, the interplay of audiences and participation patterns has been organised on an institutional basis and a stable institutional organisation has been created. In other cases, developments have been informal, with varying degrees of transparency. Regulators (from, for example, state and regional governments and parliaments), who are formally charged with the responsibility of adopting the decision, work alongside them. These agents also have their own interests and act as key players in the game of pressure.

Even the state administrative bureaucracy often ends up taking part. In principle, the administration might be thought to play the dual roles of expert advisor on technical aspects of decision-making and guarantor of the implementation of policy decisions. However, despite apparently having no stake in the decision, the state administration very often ceases to act as a non-stakeholder and, instead, uses pressure to protect its own interests. It has also been seen to display a tendency towards competitive bias in budget distributions.

Contemporary civil society, moreover, tends to be constituted by a proliferation of groups organised around different objectives. These are, very often, non-profit seeking organisations with interests linked to the various types of deficit that exist in modern society. All are engaged in pursuing specific objectives and all use pressure to sway public policy decision-making, sometimes to the point of mobilising their members and supporters to wage a campaign of resistance [3].

In addition to these groups, social organisations, with a long tradition of being interested in the structures of economic and social activity, are also involved in the policy process. These include unions, employers organisations, and various types of professional associations. Historically, the research community has been attracted by social organisations from the primary sector—in particular farmers' and fishermen's associations—and in professional bodies within the public administration, who all take an active part in public policy design.

It is also important to bear in mind the receptive attitude that decision-makers have developed towards these groups. They have no doubt learned both that the various agents can serve as providers of useful and interesting information, but also that they possess an expertise that can be properly channelled only by involving them in a participative model. Thus, organisations drawn from civil society have gained increasing recognition as an instrument by which the improvement of the decision-making process can be achieved and as an important legitimating factor for decisions affecting social and political life. As such, they have been included in the deliberation process. Thus, it is of interest to consider their importance and establish how they can be made to fit into the public policy-making process. This places participation at the forefront of the analyses and concerns of both theoreticians and practitioners.

9.2 EUROPEAN INSTITUTIONS, PARTICIPATION AND KNOWLEDGE PROVISION

The dynamics of the development of the EU have resulted in a multi-tiered institutional model in which the historical institutional structures of the Member States co-exist and interact with those that are being created and developed within the Union. This institutional framework has given rise to a polycentric, multi-tiered decision-making system, which differs from the traditional state system, without actually creating a new state or new government in the traditional sense of such terms. While the institutional and administrative structures of the Member States, with their corresponding sub-tiers at regional and local level, remain valid, there now also exists the European level, with its own institutions and its own way of dealing with the relationships involved. Thus, the decision-making model used in the EU has given rise to a complex pattern of co-ordination between the institutions involved and between the various vertical and horizontal tiers of government. These changes have no doubt had a profound effect on the functions fulfilled by the public policy-making centres at the state or regional level, which, with varying degrees of difficulty, have managed to adapt to the new demands [4].

Thus, in the space of a few decades, a continental-scale Union is being created. This has seriously challenged our capacity to develop and implement public policies that reach beyond the boundaries of Member States. Through consensus-building techniques in the complex structure that has been set up, it has been possible to construct the Union as we now know it. It is precisely the way it is put together that has turned it into one of the hubs of the globalisation process currently taking place world-wide.

Nevertheless, some of the problems, incoherence and uncertainty, which agents have to face, arise precisely out of the difficulties involved in putting into practice the policies generated by such a complex machinery. Its complexity is reflected in the problems that have to be addressed at the various stages of policy-making, starting with their scientific and technical conception, through the preparatory stage, the administrative work, and so on. The inherent characteristics of the methodology employed are such that, as a result of the difficulties involved in dealing effectively with such complexity, legitimacy issues are raised by the public, who are often dissatisfied with a model that strikes them as distant and complicated. Part of the knowledge base should be used to highlight the difficulties involved in conducting a participative process within such an environment, identify possible sources of failure and the options made available through its incorporation.

Given that the EU is not grounded on the traditional mechanisms of democracy in operation in the Member States, it cannot rely heavily on political representation for its legitimacy. In this respect, much of its legitimacy may stem from the effectiveness of the public policies it develops, something which, in many sectors, is not easy to achieve. There has been notable difficulty in achieving positive outcomes from the public policies affecting the fishing sector, for example.

Fishing and agriculture were the first sectors in which the responsibility for public policies was transferred from the Member States to the Union: thus, they have been regulated at Union level from its earliest stages. The first rulings that were eventually to make up the CFP began to be adopted in 1970. The distance created by the transfer of power from the Member States to the European decision-making centre reinforced its top-down dynamics and drew even more attention to the effects of the hierarchical regulation model. In a large number of European countries, the various organised stakeholder groups within the fishing industry, basically those of the harvesting sector, began to barricade themselves ever more tightly into their professional and sectoral organisations at the state level. These organisations have not managed to develop a routine of interrelation and open intervention with the European centres for the creation and implementation of fishing policies: particularly European Commission. As a result, the industry has never had representatives who could influence the policies created by the Commission. Nor have European decision-makers ever succeeded in gearing their policies to match the interests of the key agents within the sector.

In the fishing industry, participation at European level has been very superficial. Any exchanges that have taken place have been between privileged spokesmen, such as Ministers of fisheries and fishing administrations in individual Member States. And so, the fishing industries of the individual Member States have turned to the Council of Ministers in their search for an opportunity for talks at the European level. While doing so, the industry has conducted a strategy of putting on the pressure once decisions have been taken, but remaining absent from the arenas in which they are discussed and developed.

This process has revealed the presence of a two-fold crisis. On the one hand, neither state nor European level regulation models have, as yet, succeeded in creating the proper channels to integrate the fishing industry's stakeholders and to link the different levels and centres of decision-making in a coherent manner. As a result of this failure, for a long time, the only policies that were introduced were vertical policies, the legitimacy of which few of their targets recognised. Fishing industry firms, meanwhile, also lacked a sectoral structure on a European scale that would allow them to consolidate their interests at that level of action.

All these institutional factors that enabled the persistence of the top-down structure of fisheries management in Europe give rise to the idea that the crisis involved in finding the right model of governance could be held largely to blame for the crisis in stocks which European fisheries have suffered in recent decades. At the same time, the industry's stakeholders have stressed the need to introduce new structures that do not emanate from governments or public administrations; and for themselves, and other stakeholders and civil society organisations affected by the polices, to participate in fishing policy making processes.

In the European setting, a strategy known as governance has been devised in an attempt to ensure a new model of governability for economic sectors and society as a whole. One of the key features of this governance model is that economic and social agents are assigned an input, enabling them to participate to different degrees in the creation and implementation of public policies. These governance models are characterised by the fact that the rules of play, which are different from those that have prevailed traditionally, are shaping new ways for the representation of both general and private interests. In the area of knowledge-base provision, the various stakeholders are able through their participation to bring elements to the participative process that would otherwise not be introduced into collaborative knowledge creation processes.

9.3 DIFFERENT APPROACHES TO THE PROBLEM: MODES OF CONSTRUCTING A COLLABORATIVE KNOWLEDGE BASE

The quality of outcomes from scientific models, and of related proposals for the regulation of the fishing industry, depend, in part, on the quantity and quality of the available data and models to make the knowledge system work. It is, therefore, essential to ensure that industry actors collaborate in the process. However, their degree of involvement may differ [5]. The different levels of participation are presented below in ascending order of the degree and complexity of commitment. These models of collaboration are cumulative in that each one incorporates the basic perspective of the earlier ones. The scheme is based on Wilson [6] and was developed from collaborative research, though we use it here for participatory approaches to creating the management knowledge base. This is laid out in detail in Chapter 4. In summary the four models of collaboration are.

The Deference Model: Scientists are the experts and the best way to get an accurate picture of nature is to rely on their professional judgement. *Experience-based versus Research-based Knowledge*: Scientists and fishers see the world differently because of differences in training, experience and culture. Science can be improved by listening to what fishers have to say about the resource. *Competing Constructions*: Scientists and fishers collaborate within interest groups to create pictures of the resource that reflect particular concerns. *Community science*: Collaborative fisheries science conducted in the context of cooperative management.

9.3.1 Deference model

The notion of deference has been studied in various contexts (such as, organisational, semantic, cognitive) and some of its connotations are common to all, while others are found in one context and not in others [7]. In the case in hand, this notion will be considered in the specific sense proposed by Wilson [6]. Deference, as it is understood in the present context, therefore, refers to a specific attitude on the part of industry actors, in particular those of the harvesting sector. It is the attitude that actors display when they subordinate their own interpretation of activity in the fishing industry to that of third parties. The observations made by these actors over years of activity in the industry, their conjectures and systematisation of the knowledge acquired from experience, and their stock of empirical learning, are all subordinated to scientific knowledge. Thus, they take on a subsidiary role in regulatory policy-making, adopting an attitude of deference, and allowing scientific knowledge to prevail over all other forms. They accept that scientists and scientific data play an essential role in order to interpret reality and make the models operative. This is what makes them comply with the demands of scientists engaged in assessing stock dynamics or making TAC recommendations.

The industry actors in this case take the view that scientists are cognitively better equipped than they are to generate proposals and to suggest possible solutions. Scientists' analyses are understood to have been conceived from the universal body of scientific knowledge and to be better adapted to regulatory demands than those based on empirical knowledge, which is local or non-universal. It is thus accepted by fisheries actors that the effectiveness of scientific methods and tools has been proven and is beyond doubt. Thus, those who are properly instructed and trained in the use of such a tool are able to achieve a fuller understanding of the facts, enabling them to develop general proposals with the accredited potential to transform reality. As a result of this acknowledgement, fisheries actors defer to the knowledge tools in the hands of scientists. While the industry actors may not understand the specific procedures and may be unable to apply the techniques involved, they trust the scientists to solve problems of both a specific and a general nature.

Another aspect of deference is that, for collaboration to work, scientists and the industry—often with encouragement from the public sector—need to agree on a plan of action, which requires a framework of sustained collaboration. This has been achieved in many instances and many countries. Thus, within the scheme of this collaborative knowledge mode, industry members assume the task of compiling information drawn out of their activity, in order to satisfy the requests of scientists.

This, in synthesis, is the acknowledgement of science as a tool that fisheries actors, without directly understanding it, nevertheless rely on. Such reliance is possible because society has accepted that if it follows the rules of play laid down by scientists, assuming them to have been correctly and scrupulously formulated, this tool can lead them to great achievements. In summary, industry actors have no direct understanding of the techniques but nevertheless defer to them.

9.3.1.1 Some examples of deference collaboration

A practical example of this model of collaboration in knowledge production is the process of tagging. In a work about tagging of bluefin tuna (*thunnus thynnus*) Cort [8; 36–49] relates bluefin-tagging experiences in Europe during 1911 and 1991 and he explains his own campaigns between 1976 and 1991 with 5763 units tagged. He explains the excellent collaboration he could obtain from several fishing vessels using a live bait method in the Cantabrian Sea. This is a practice used extensively with all the species of commercial interest. It constitutes an archetype of deferential collaboration.

In the last ten years, the collapse of the codfish has lightest off alarm bells and numerous campaigns of cod-tagging have been undertaken. In Canada and the USA, the Regional Northeast Cod-tagging programme was undertaken during 2003, and, recently, another programme of tagging has been undertaken in the Baltic and North Seas. Certainly, contemporary tagging programmes use very sophisticated mechanisms: able to measure the depth, the salinity, the temperature of the water in which the fish swims several times each hour. Nevertheless, the collaboration procedure remains essentially the same as that employed in traditional tagging programmes. To relate this to industrial fisheries, the presence of scientists on board fishing vessels is very common and there have been a variety of experimental and research campaigns carried out on a collaborative basis. For example, an important campaign was undertaken within the European Union Bigeye Programme to collect by-catch information on the European tuna purse-seine fleet. Between June 1997 and May 1999, a total of 62 observers' trips were conducted as a part of this project and it is considered the largest observer programme ever carried out in the European tuna purse-seine fishery [9].

9.3.2 Experience-based knowledge (EBK)

9.3.2.1 The rationale for such a term

The term "Experience-Based-Knowledge" comes from the generalisation of a succession of more restrictive concepts, each of which represents a different aspect of the same idea. Thus, Traditional Ecological Knowledge, Indigenous Knowledge, Native Knowledge, Fisher Knowledge, *etc*., each highlight different aspects of knowledge creation and transmission. Some place an emphasis on the experience held by a community through the activity of past generations. Others focus on the nature of the community in which the experience has accumulated, its main cultural features and the specific values that distinguish it from other fishing communities, who have in turn acquired their own knowledge over several generations. Others aim to illustrate the importance of the experience acquired, not by the community, but by individual fishermen throughout their working life. Here, issues such as the specific characteristics of women in fisheries also come into play. Nevertheless, the point of convergence of all these concepts is that experience is the basic element that they contribute to knowledge creation.

9.3.2.2 The difference between deference and EBK

Experience-Based-Knowledge (EBK) is a further step in the evolution towards an understanding of the collaboration of the fishing industry with the scientific community in the production and use of resource users' knowledge.

In the deference model, co-operation came from the recognition of the capacity of science to assess the facts. It was accepted that responsibility for the preparation of regulatory plans and methods should be grounded in scientific method. Collaboration with the needs of science was therefore offered, under the assumption that public policies that had been developed within scientific parameters would be both influential and effective. Fishermen's role in deference knowledge production was limited to providing technical input and the data needed to develop it properly. The EBK-type collaborative strategy, however, involves the integration of the knowledge possessed by fishermen and other stakeholders into the scientific model. The long-lived relationship of such actors with the environment in which they work and live provides them with close, detailed knowledge of the key variables of various aspects of the industry, which scientists do not usually possess. This type of knowledge is frequently related to ecological knowledge: the conditions in which fishermen work and the way in which they coexist with the different species. Thus, as well as providing the data needed to make the chosen models work, the aim of EBK is also to broaden the scope of existing models. Of course, the scope of EBK does not include proposing a model to replace the scientific one. It was never intended to do so. It was neither conceived nor authorised for such a purpose.

9.3.2.3 The need for new contributions to the traditional scientific model

Though this type of collaboration can be extended to include stakeholders from different sectors of the industry, its clearest and most successful manifestations have been seen in the harvesting sector [10]. A basic issue to be borne in mind with respect to stock assessment and stock dynamics is that they are performed by indirect means, using long-term catch records. For this reason, scientists use catch levels as a direct input in their models, but there are many other related data that fishermen could provide but which, normally, no one demands. Traditionally, it has not been common practice to take into account the knowledge of the agents who make those catches, or to ask for information regarding, for example, the strategies used or the species involved.

Some recent failures in the regulation of major commercial fisheries have brought to light questions about the nature of fishers' knowledge. Meanwhile, serious threats hang over a large number of commercially important fisheries. Both of these situations reveal the need for further research into current methods and knowledge sources, in order to address regulatory issues with new management tools. Failure to predict the dynamics of some stocks and the difficulties involved in obtaining accurate estimates of the situation of others have led numerous analysts to change their focus. They are now beginning to question the uncertainty and ignorance that prevails in some areas of our knowledge of fisheries and the congruity of key aspects of our public policies. This is one of the reasons for importance being attached to the need to incorporate other forms of knowledge into the traditional scientific model. It has also provided one of the main motives for the switch of attention towards the knowledge of the actors involved in the use and exploitation of fishing resources.

One explanation for the historical persistence of this lack of awareness is that scientists have traditionally considered such knowledge to be superfluous to the requirements of their scientific method. It is true that the two approaches employ very different building procedures and the disparity of their formats has for a long time led to the idea that there is only a very loose link between them.

Indeed the fisherman's goal is ultimately tied to the success of his economic project, which is why his familiarity with environmental specifics and knowledge of the species he fishes are so important to him. The keys to a good catch have a lot to do with the fishermen's knowledge of the habitat of the fishing grounds, the choice of species for each time of year, the market price of each species, and the areas where they are most likely to be caught. The fisherman weighs up his chances of catching each species or combination of species and makes the choices he considers will bring him the most benefit, taking account of his restrictions. This is what makes the difference between a working team successfully conducting a project in an efficient firm and another failing in the attempt. Scientific knowledge, meanwhile, concerns itself more with the laws and patterns that can be drawn from the different disciplines that study fishing activities and species. When it comes to stock dynamics, scientists are concerned, above all, with the evolutionary patterns of fish populations, an issue in which the geographical area in which the catches are made is relatively unimportant; or at least much less important than it is to the fishermen.

Since the fisherman's knowledge is based on his perceptions of the environment in which each species lives and develops, his main concern is with getting to know specific details of the spatial and temporal environment of each species. In fact, fishermen deal with fishing resources on a much smaller scale than the regulator or scientist because their relationship with those resources takes place in the playing field. Fishers' catch strategies are designed on the basis of the knowledge acquired through a long-run, cumulative interaction with the different species and the different catch strategies employed. This places them in a privileged position to learn about the characteristics most pertinent to their work, such as the places where each species can be found in greater or lesser abundance, its living habits, the most and least favourable ocean parameters to locate and catch each species, and so on. This provides them with what are, basically, local and qualitative assessments of the nature and activity of the species. There is a basic set of tools—including radar, echo-sounders and decca—which is used to measure specifically these variables, and the skipper keeps a log of the location of the fishing grounds and catch sizes over the different seasons. In this respect, the mechanisms that give the resource user his knowledge serve an essentially different purpose from those used by the scientist, and the nature of the research made by each depends on their priority goals. In EBK, quantitative accuracy does not in principle need to be very high, because that is not its chief purpose.

Fishermen's information and knowledge builds up through empirical testing over relatively long periods of time. It develops during their daily activity in the medium where the activity takes place. Their professional activity and their increasing knowledge-base on catches and resources form a complex unit in which individual and collective identities are developed. The scientist, meanwhile, understands knowledge production as coming from a universe of generalisation. Scientists perform in a scenario in which they play the role of observers, rather than actors; they are more concerned with general rules and less with the specific behaviour of a stock in a particular place at a particular time or the details of the habit of a certain species. Their main concern is to understand the mechanism behind the resource behaviour, from the scientific perspective of their particular discipline. Their aim is to obtain both qualitative and quantitative assessments [11].

Research goals also differ across the two perspectives. For the fisherman, the learning and transmission of knowledge, and the way it is used with the species that he fishes, is a way of introducing cognitive certainty and security into a natural and social environment that is risky and competitive. Thus, the ideas and expectations, forged through the information exchange, help to form a mental positioning system or cognitive map to guide and control his performance in an uncertain and unstable environment. In this way, knowledge and information bring some regularity and order to the uncertainty surrounding the fisherman's adventure. In this respect, it can be said that the flow and exchange of information generate predictable and regular behaviour in the fisherman. They replace randomness and error with predictability or redundancy.

The fundamental virtue of EBK is that it can provide qualitative—and even quantitative—data for certain key indices and components. This contrasts with the difficulties of traditional regulation in aspects relating to the heterogeneity—in terms of feeding, breeding, habitats of repose, maximum mobility—of the medium in which stocks develop. This heterogeneity was not taken into account in the traditional scientific model, where such differences were usually considered irrelevant to the central issue. Despite this, their importance was illustrated by Wilson *et al.* [12]. Thus, in the normal course of events, the conversion of experience-based knowledge into scientific knowledge requires proper translation, so that the two logics can converge into operational resource management models [13].

A major boost to the legitimacy of the integration of EBK in knowledge production came from the recognition of this approach by the United Nations. In 2002, the UN proposal, Agenda 21 for Sustainable Development, pointed out the need to incorporate EBK into the core of scientific knowledge in order to further understanding of natural systems. The proposal also drew attention to the limited capacity of the existing scientific knowledge schemes of the time to evaluate natural resources. In consequence, it announced that further progress should be made in that direction, indicating the need for international assistance in the promotion of sustainable development. Since information of the EBK type was considered essential for such a task, its potential as a genuine source of knowledge became recognised at international level, and, as such, it was merged into some conventional scientific programmes.

9.3.2.4 Examples of EBK

In the example to illustrate the deference model, Cort [8] indicates another interesting variant of collaboration that fishermen offered him during the tagging campaigns. Fishers were suppliers of empirical knowledge and providers of conjecture and hypotheses related to several aspects of tuna behaviour, such as their preferred oceanographic and environmental conditions. For Cort, the information derived from tagging and the knowledge provided by fishers and by fishermen's professional organisations was of valuable importance to his PhD. In this work, he identified the cognitive structures of fishermen, which have proven their validity to make predictions on different aspects of the fishing system and to use their marine knowledge to secure the survival of their fishing operations.

A somewhat different experience was found on the Galician coast by Freire and Garcia-Allut [13] From information provided by the artisanal Galician fishermen, Freire and Garcia-Allut made an in depth study of the microhabitats of key species. Using information from fishermen as a starting off point, they made an X-ray like map of the seabed and established what species were living their and what their habitats were. In addition, they could explain fishermen's knowledge base and their socio-economic adaptations and fishing strategies in those microhabitats. Freire and Garcia-Allut explain how such expertise, which has accumulated in the community, makes it possible for them to live from the heritage that passed on that knowledge. After this experience, they developed a software package so they were able to apply that methodology to other case studies.

Other interesting cases of EBK collaboration were the participation of the fishermen and their professional associations in the election of the most suitable places to install artificial reefs in the Cantabrian Sea during the 1990s. While, in the Mediterranean, around the island of Menorca, and, in the Atlantic, around the island of Hierro, the election of Marine Protected Areas (MPAs) was conducted in collaboration with fishermen and their professional associations [10].

In some social science disciplines, it is very common to make use of extremely varied sources. In some such studies, the proportion of oral testimonies, in relation to other sources, and the importance attributed to them, is greater [11]. There are numerous case studies of this nature have emerged from the fields of ethnography, anthropology and sociology. Another study regarding fishers' behaviour when organising work teams in the Cantabrian artisanal fleet is based upon significant oral research [14].

9.3.3 Competing constructions

9.3.3.1 Fishing economics as a normative science

The principal objective of analysis conducted by the various scientific disciplines in fisheries over the last fifty years has been to investigate the causes of over-fishing crises. During this time, the different areas of fisheries science have been engaged in trying to provide applied regulatory methods and public policy proposals to deal with the problem of over-fishing. Among all these applications of science to the regulation issue, however, one model has proved extraordinarily successful. This is the bio-economic model, which, throughout the whole of this period, has displayed a clear normative perspective. The basic aim of this model has been directed specifically at regulation problems [15].

One of the most important points made in the conclusions drawn from the bio-economic model is that over-harvested fisheries (known as 'free access fisheries') result in an automatic resource revenue loss and, that, in such open access fisheries, the productive capacity of many fisheries, sooner or later, exceeds their reproductive capacity. A large number of public policy instruments have been devised to deal with the over-fishing problem and to correct this revenue loss.

During this period, the scientific approach towards fishery management problems has become increasingly inter-disciplinary. Fishery management was, first, approached as a biological issue; and the economic perspective was added later. Used in conjunction, these two approaches have given rise to the bio-economic model, upon which public policy has been largely based in recent years. This bio-economic model has gained outstanding relevance, moreover, because it gave birth to a specific discipline within fishery regulation. This model has enabled us to link biological concepts, such as the natural mortality rate, fishing mortality rate, birth and growth rates of species, expressed in quantitative terms as weights, with concepts such as revenue from catches, fishing effort costs and economic returns from the resource, expressed in monetary terms.

The mathematical expression of this model and its subsequent extensions have enabled advances in the two disciplines to be linked together in a common formal language. This has provided a good means by which to capture the sense of problems and to meet demands raised by regulators, while developing a pool of knowledge from which a specific framework has evolved. The advantage of this procedure is that it has provided a common quantitative and qualitative language for public policy. For over three decades, the bio-economic model has been the dominant paradigm in the realm of fishery regulation. Since its first conception, and throughout its subsequent development, it has been permanently available for the regulation and planning of fisheries. Thus, its orientation has been manifestly normative and applied; and it has been the regulator's instrument of choice. Thanks to its availability and capacity to provide solutions based on precise quantitative and qualitative proposals, its legitimacy has been fully recognised throughout the whole of the fishing industry. The recommendations derived from this perspective usually provide a clear and relatively concise mandate, which allows the regulator to make public policy proposals and to reach clear decisions. In this sense, it is also highly appreciated by the regulator, whose decisions tend to be aimed at limiting fishing effort and sustaining resource revenue.

It is worth stressing the interdisciplinary approach and the symbiosis of disciplines involved in the bio-economic model. The importance of this for the scientific context and the regulatory scene is, without doubt, comparable, disciplinary differences notwithstanding, to that of biochemistry, for example. It has additional value, moreover, in that it serves as a example for more extended symbioses currently being tested in other disciplinary areas of fisheries science. Much energy is being devoted to developing this interdisciplinary approach and the isomorphism of the bio-economic model is being extended to new fields and disciplines and further developments within the original bio-economic model.

Another aspect to the fisheries management problem, meanwhile, is that, due to its initial characteristics, the bio-economic model has resulted in a top-down centralised way of managing fisheries, similar to that critically analysed in the first section of this study. They reveal the same methodology in the way that several important agents were lacking in the decision-making process. The successive incorporation of participants with their competing interests and their competing constructions has developed a more inclusive approach to policy-making.

The customary regulation models of the past—which were designed for barely industrialised fisheries—often dated from far back in history and were based on decentralised resource allocation mechanisms. Such models functioned as self-management regimes and the principal stakeholders in the sector were usually involved in the running of them. These regulatory models began to break down, however, as the fisheries became increasingly industrialised and pressure on resources led to general overexploitation [16]. At the same time, bio-economic models gradually replaced the traditional type, and, after a long period during which this last methodology has sustained the centralised type of regulation, new bottom-up competing perspectives have emerged in fisheries policy making.

9.3.3.2 Participation with competing constructions

When the views of the interested parties are introduced into the problem-solving process, significant changes take place in the scientific formulation of the issues. In addition to the issues raised by scientists with respect to reality and the questions posed by the regulators, it became necessary, in the new set-up, to address those brought up by individuals, interest groups, or others affected by the decisions. In other words, attention had to be given to the issues perceived from the stakeholder perspective. In this new scenario, participation became even more important, both in the decision-making process and in the preparation of the scientific research agenda by stakeholders. In this model, the boundaries between scientific output and management are not as strict as in the bio-economic model and there is a growing need to construct a framework in which the different scientific disciplines can collaborate in seeking the answers to the questions that arise.

Thus, the participation of stakeholders has led to a formula in which the means for generating regulatory proposals have become enormously complex and the classic biology-economics twofold method has been invaded by new disciplines. At the same time, this development has led to a significant opening up of the regulatory framework where, formerly, only the harvesting sector, professional fishermen and the state regulatory bodies were privileged to speak. A great variety of stakeholders have joined in the public policy-making process, which now includes processors, wholesalers, recreational fishers, and representatives of civil society such as environmentalist groups. All of these have incorporated their own interests and values into the collaborative agreement on public policy design, with the result that the scientist's role is no longer reduced to preparing what Pellizzoni [17] has coined as "the best argument". Very often, participants take up conflicting, as opposed to simply competitive, positions. It is rare for stakeholders to put forward their own assessments of certain strategic variables to address the regulatory problem, with proposals to collaborate in stock assessment for example, or even possibly in setting TAC levels and deciding on quotas.

Scientists will be required to devise alternative scenarios to allow for the diversity of positions that now converge in the public policy-making process. It will, therefore, be necessary to establish a basis of collaboration for all the stakeholders, both in knowledge production and in certain stages of the decision-making process.

Through the range of collaboration models, from the deference model, through EBK and particularly in the competing construction model, participation has become increasingly inclusive. It now does not only feature demands of those directly involved in the industry; it is being extended to include all those affected by decisions, who, in turn, are contributing their own demands. As a result, we are now beginning to see demands from consumers, environmentalists, and defenders of gender equality, for example, with the result that, as participation is becoming more extensive and inclusive, the public policy-making process is adopting a bottom-up approach that will inevitably make it more complex. In this respect, the competing construction model includes and envelops both the deference model and the EBK model, while also inviting the collaboration of all industry stakeholders in the creation of new knowledge.

The significance of this change in the field of fisheries science is that, under the new participation proposals, the actual fishing stakeholder finds a way to collaborate in scientific production, while also sharing in making decisions, which replace those imposed by the centralised mechanisms of the past. This enables us to recapture, from a different angle, the link between the debates over collaborative rule-making on the one hand and co-management on the other, both of which, in theory as well as in practice, share the common component of participation in decision-making.

9.3.3.3 Examples of competing construction

There are several cases of competing constructions related to Icelandic Individual Transferable Quota (ITQ) management during the last decade (see, for example, [18]); and there is also a recent case of competing construction derived from a collapse in the anchovy fishery in the Biscay Gulf [19]. An interesting case of competing construction taking account of particular discourses has arrived with the adoption of a moratorium on the Atlantic tuna fishery by the European purse seine fleet. The moratorium has been adopted specifically in the area of the Gulf of Guinea. The generalised use of Fish Aggregating Device (FAD) by the purse seine fleet, along with the intensification of captures with longlines, had signalled probable over-harvesting in some species. This has been of particular importance in the youngest cohorts. The portable FAD is a mechanism that works like an attractor for tuna in the ocean and it constitutes a very effective fishery technique, the use of which was not restricted either inside or outside the 200 miles EEZ. During its intensive utilisation by the European industrial purse seine fleet since beginning of the 1990s, it demonstrated a particular capacity for the capture of juveniles.

However, in 1997, the European purse-seine fleet, through its producers' organisations (POs), decided to establish a voluntary moratorium, which was implemented and enforced by themselves. This moratorium was in force for three months, between November of 1997 and February of 1998. The other fleets fishing in the same area did not agree to this decision. The following year, the PO proposed to repeat the restriction on the use of FAD and they invited the other fleets to join in with the moratorium, but did not have any success.

Thus, a typical competing-construction debate began. However, there was not an adequate forum of discussion within which to develop the debate and the International Convention for the Conservation of Atlantic Tunas (ICCAT) do not have the authority to compel all fishers to comply with the moratorium. This was despite the fact that, by the following fishing year—when the same fleet proposed to maintain the existing moratorium in the Atlantic in the same terms as the two preceding years and to take a new decision to extend it to the Indian Ocean for a duration of two months—ICCAT produced positive results of the impact of the moratorium, particularly with respect to juvenile cohorts and decided to support seriously the measure.

Subsequently, the EU adopted specific legislation to support the moratorium: EC regulation 973/2001 compels the European purse-seine fleet to comply with the moratorium. However, this regulation does not have sovereignty over non-European fleets, and, thus, this international organisation cannot force affiliated countries to fulfil the terms of the moratorium.

In this case, analysis made by one sector of the harvesting industry has led to a voluntary reduction in captures of juvenile tuna. Other interests in the same fisheries have not agreed with that analysis and have continued fishing. ICCAT have acknowledged the measure, but they have not convinced other fishing stakeholders join their organisation or to comply with this particular regulation. Thus, discourse on this issue remains twofold.

ICCAT recommends the moratorium to its partners. The discourse of the European tuna fleet was constructed, apparently, on a resource preservation basis, and it was a decision taken by a significant element of the private sector on a voluntary basis. This discourse had connections with the philosophical line of ICCAT and other international organisations and councils. Nevertheless, the longline and native coastal fleets did not adopt the moratorium plan. Native coastal fishers argued that European purse seine initiatives have a primarily commercial intent and that their fleet does not hold becoming involved in the sound management of resources as its principal objective. Native fishers remark that, due to an excess in the supply of tuna (particularly yellowfin, skipjacks and bigeye), international prices of these species have been declining since 1999. To avoid losing money and to reach a convenient market adjustment, the challenge for European fleets has been to stop the race fish by, at times, stopping fishing. Coastal fishers argue that the moratorium, on the European fleet, was necessitated by the high level of captures made in relative and absolute terms, over a period of many years. They attribute the saturation of supply in tuna markets to the European fleet and, in the same way, they were also in agreement with the introduction of a long-term severe regulation for FAD. Thus, during the moratorium period, coastal purse seine and bait-boats have increased their captures, arguing that there is a need to develop the domestic tuna fishery in underdeveloped countries. They support the moratorium for Europeans and suggest the period of moratorium should transferred to increase its effective and restrict the captures of the European fleet even further.

Longliners target older cohorts of tuna species. This kind of tuna have a special market position with sushi-like products, and they have been defending their capture-selectivity discourse. Basically, according to ICCAT data on captures, they have been very active in catches, but less sharply exposed to competing discourse in this debate.

9.3.4 Science as community

Behind the term "competing construction" lies a twofold discourse. Stakeholders are thought, on the one hand, to have interests to defend, and, on the other, to have specific expertise to offer; expertise that is very difficult to obtain by other means. From the point of view of contrasting interests, each has his own perspectives and some of his constructs will compete with those of the rest. At the same time, however, their knowledge of reality enables them to make a potentially very valuable contribution to the knowledge pool. In this context, therefore, it is not hard to appreciate that there are both management-related issues and expertise-related issues at stake [20].

The competing constructs created by the different stakeholders may follow increasingly separate trajectories, leading them into divergent dynamics and eventually to a scenario of conflicting constructions. These dynamics find the scene ready-prepared, with stakeholders from strongly contrasting cultural backgrounds and economic circumstances, non-convergent expectations and an asymmetrical power structure [21]. In conditions such as these, collaboration between scientists and stakeholders will, of course, be of a very elementary nature and the result of the divergence will be seen in poor stock condition.

The whole group of stakeholders may, on the other hand, eventually become aware of the common objectives they share. If so, even while each stakeholder maintains his own position and interests, the community may collectively perceive that areas of agreement do exist. In so far as this is possible, they will see co-operation as a solution that benefits the whole community. It is understood, therefore, that the community as a whole has reached a level of understanding with respect to the need to collaborate to achieve their shared objectives. This situation can accommodate a convergent dynamic between management needs and stakeholder demands, through the pursuit of common goals.

In this scenario, in addition to being affected by regulations, stakeholders also acquire an interest in joining in cooperative tasks. Thus, the stage has been reached in which the whole set of actors has understood that healthy fisheries need to be properly regulated. Stakeholders and scientists alike find the right conditions in which to develop a favourable co-operative dynamic, both in the management arena and that of scientific and technical production. This effectively implies a high level of stakeholder participation in both of these areas. Starting with the competing constructs of the stakeholders, it is worth stressing the collaborative aspect of scientific production, because it is a subject that has not received the same attention in the academic literature as in the research on co-management in business and decision-making.

In this respect, participation is acquiring increasing relevance, because its influence is being transferred both to the decision-making process and to collaboration of stakeholders with scientists and the joint preparation of the scientific research agenda. At the same time, it is becoming easier to establish a framework in which different scientific disciplines can collaborate in order to pool the expertise they have to offer and incorporate it into of the process of solving management problems, and, possibly, into the general flow of scientific knowledge [22].

From the point of view of the evolution of the collaboration between the two worlds, such stakeholder-science collaboration is the most worthwhile and most ambitious scenario for co-operative understanding between the two. It draws from the deference model by accepting that scientists are a necessary tool for a proper analysis of reality, and it tries to integrate the knowledge of the agents in the solution of the scientific and management problems that arise. It also proposes a departure from past histories and competing interests and a switch towards convergent collaboration and the construction of a solid framework for proper resource management.

The fishing community is, without doubt, the fundamental link in the chain. It has the basic characteristics needed to drive this collaboration, because it is a social setting with a shared culture, a close understanding of the goals that can be achieved and a suitable framework to put into practice the agreements that are reached.

9.3.4.1 Examples of community science

In a report developed in the context of collaborative research in fishing industry in the USA, Canada and Europe there is a discussion concerning the intervention of stakeholders in collaborative research in the North Sea [23] The report offers an overview of ongoing collaboration between scientists and stakeholders in several countries of Northern Europe and, subsequently, analyses two Danish experiences. These experiences can be characterised as being close to the community science that we have analysed in this section. The author proposes that these two experiences are like experiments that could be fitted within the community science discourse, and that could be disseminated to advantage. The actual situation is the result of a collaborative dynamic way of developing participation between the stakeholders in the industry. The first project was the ‘Kattegat Sole Project 2004’; and, the second, the ‘North Sea Sandeel Project 1995–2005’. These projects feature a close relationship between the fishermen, scientists and regulators. The projects are, in fact, integrated plans, where collaborations are taking place at different levels and regarding different aspects, beginning with knowledge production and continuing with management and regulative aspects. Fishers take part in a collaborative way in the TAC assessment, they are involved in by-catch evaluation, and they collaborate by completing electronic log-books As Pauksztat [23] argues in relation these projects:

> Collaborative research in Denmark seems to be part of a new alignment of the actors involved in fisheries management. Instead of facing each other as potential opponents, fishermen and biologists are increasingly perceived as working together as parties towards the common goal of providing accurate stock assessments and realistic biological advice.

9.4 REGIONAL ADVISORY COUNCILS

9.4.1 Regional Advisory Councils and Participation

Earlier in this chapter we described how participation became incorporated into the models of decision-making. However, the practical results of the theoretical recognition of the importance of participation were, in the area of EU fisheries policy-making relatively limited—consisting of the Advisory Committee on Fisheries and Aquaculture (ACFA)—until Regional Advisory Councils (RACs) recently claimed their place in the system.

The usefulness of RACs is not primarily related to providing the Commission with information on different stakeholders' positions, although this is also an objective [24], but rather to providing the Commission with advice/opinions, which have already been negotiated from the different positions of stakeholder groups. Even though it is possible to submit majority and minority reports as advice, there is little doubt that consensus-advice will be most influential within the CFP decision-making process. The Commission (and other recipients) will likely be receptive to any proposal coming out of the RACs; but definitely most receptive to advice with broad backing from within the RACs. Consensus-advice has the backing of all the involved stakeholder groups and all groups should ideally feel ownership over measures resulting from this advice. In this sense, the RACs need to arrive at a compromise, like any other decision-making body within Europe.

It should be emphasised that RACs have not been given any decision-making powers. The Commission argued that such a move would not be compatible with the primary legal foundations of the CFP, under the terms of the Treaties of the EU. However, as the following quotation from a high-ranking official in DG Fisheries indicates, there has also been some concern expressed at the European level regarding how RACs would 'behave', which might have led the Commission to take the cautious road:

> We certainly have no plan, and I do not legally speaking think we can have a plan, to make these bodies decide anything. I think that their influence could be very great if there is a real discussion in these organisations and a real negotiation and moving away from the sort of primitive defence of short-term interest by everybody. Then I think that the recommendations made from the advisory councils . . . It would be difficult for the Commission to move significantly away from those. So there may be some quasi-automatic process whereby, even though a proposal has to come through the Commission and go through the Council and the Parliament, we would not normally change what is coming from these advisory councils. If on the other hand they are dominated by fishing interests and purely defend minimum change from the status quo then obviously there will be a problem.

(Interview with high-ranking DG Fisheries official, November 2003, Brussels)

It would clearly be worthwhile to look more closely into why and how the RACs obtained the powers that they did. Equally, it would be interesting to look at how the of RACs, as institutions, fit into broader EU developments regarding governance and decision-making procedures. This will, however, not be the focus here.

Alongside the issue of their potential powers, another key problem to be addressed in the preparatory phase leading to the establishment of RACs was to determine what scale the term *regional* should refer to. It is important to note that fishermen deal with the resources on a smaller scale than the regulators, and also that centralised management, taking the whole of the Union as one macro-unit, has not proven effective and is unlikely to do so in the future. The outcome of this discussion was five geographically defined RACs, together covering all EU waters (the Baltic Sea, the Mediterranean Sea, the North Sea, north-western waters, and south-western waters), However, it was also recognised that some fisheries did not fit in to this geographically based scheme and so two regional councils, defined by their type of fishery or species, were also set up: these being for pelagic stocks and for the high seas/long distance fleet [25]. The RACs add complexity to the polycentric, multi-tiered decision-making system, which has developed within the

Union, by introducing a new layer to the system: a level at a larger scale than the Member State, which is recognised as being too low a scale for management of shared stocks; and lower than the EU level, which is at too great a scale to efficiently take into consideration all the different aspects of fisheries in different areas.

In order to obtain legal status, full recognition, and the right to financial and technical support, RACs must adhere to the rules laid down by the Union. RACs are, for practical reasons, limited in their membership, albeit still attempting to guarantee the inclusion of representatives of all the interest groups affected by the CFP. These representatives include those from groups that are directly affected by fisheries decisions—the *fisheries sector*, which includes the catching sub-sector, shipowners, wholesalers, processors, and women's groups. These fisheries interests were allotted two thirds of the seats in each RAC. Second, RACs also include representatives of *other interest groups* affected by the CFP. These are members of society who have an interest in fisheries management but who are outside fisheries interests. These include environmental protection groups and organisations, consumers, and representatives of aquacultural interests and recreational fishermen. Such groups were allotted one third of the seats on the RACs [25].

The EU's requirement of not discriminating between Member States or stakeholders has meant that inclusiveness has had to be taken very literally: in principle the Greek industry can participate in the Baltic RAC despite no *de facto* interest in the area. The broad range of stakeholder groups mentioned in the regulation means, also, that there are seats reserved for interest groups who have found it more difficult to send representatives. This has been the case for aquaculture representatives and consumer organisations during the first operational year of the North Sea RAC [26]. Nor are the lines between the two overall stakeholder segments intuitively logical. Anglers and the angling industry could just as well have been put in the industry group, since they are extractive users; and the women's groups might fit better among the other interest groups, which is actually where the North Sea Women's Network has ended up on their own request. The anglers opposed this move because, in their view, an industry group is now occupying a seat allotted to other interest groups [26]. In general the grouping of stakeholders into two groups seems technocratic and divisive, and the inclusion of a variety of interests in the group of 'other interests' may serve to dilute the voice of the environmental NGOs, who are perceived as the main opposition to the industry, particularly with respect to desired fishing mortality rates.

9.4.2 The knowledge base of the Regional Advisory Councils

From a model of 'competing constructions', which we described in theoretical terms earlier, the stakeholders in the RACs will have to move towards a community model and find areas of agreement in the pursuit of properly regulated, healthy fisheries—which is their common goal. Formal scientific knowledge, as well as knowledge in the broader sense, will be very significant in this process. The RACs will advise the Commission on a broad and broadening range of issues and, for this purpose, they are in need of knowledge to act as a lubricant for compromise. In the negotiations over proposals for new management strategies, disputes will often arise over factual issues. This can often be mediated by the input of relevant knowledge, which stakeholders can agree on accepting.

9.4.2.1 Funding and the Limited Pool of Expertise

The RACs have not been supplied with a budget to commission or carry out research of their own. If a RAC wishes to have a study carried out it will have to find external funding for it. This can be done by applying for public funding in the concerned Member States or funding from member organisations. Another way to get the project carried out could be by submitting an expression of interest in the context of the EU's Research Framework Programmes or other more indirect approaches. The Member States involved in each RAC oblige themselves to provide support to the functioning of the RAC [25]. However, there is no explanation as to what "*appropriate support*", which is the wording in the Council [25] regulation, means. It is not likely that Member States will be eager to increase the overall amount spent on managing a sector of decreasing importance. An example of how Member State support could work in practice is the Key Fishing Areas Study.

The proposal for the Key Fishing Areas Study was formulated by the North Sea RAC's Spatial Planning Working Group during 2004 and 2005. The pilot study aims at mapping key fishing areas in relation to both effort and sensitivity (for example, nursery grounds). Although funding for the entire study remains a problem, RAC stakeholders are expected to receive financial support from the British Department for Environment, Food and Rural Affairs (DEFRA) to conduct a scoping study. This is because DEFRA has set aside an allocation within its science budget to assist the work of RACs. DEFRA, which is a government department with a conservation mandate, recognised, through their participation in the working group meeting, that fish and fisheries risked becoming squeezed by better organised interest groups from other sectors: for example, offshore wind farming. DEFRA, therefore, saw an interest of its own in the study. Important aims of the scoping study are going to be to identify and consider potential sources of funding for the full study as well as making a full project application [27].

The RACs will receive transitional financial support from the EU for their first five years. In the first year the maximum support for a RAC will be 200,000 € (a maximum 90% of the overall operating costs). This figure will decrease to maximum 110,000 € in the fifth year (a maximum 50% of the overall operating costs). In addition, the EU will provide up to 50,000 € each year, with no time limits, to support translation and interpretation (Council, 2004). In relation to the knowledge base of the RACs EU funding only covers "*travel and accommodation expenses of experts attending RAC meetings*" ([25] Annex II, Part 1). The financial statement for the first half of 2005 for the North Sea RAC shows that, of the total funding of 141,300 € only 16,300 € came from membership fees; and a mere 6000 € was spent on scientific consultants in this period [26, 28]. This indicates that the operating budget will only contribute to a very limited degree to the knowledge base.

The limited funding available for developing their knowledge base puts the RACs in an analogous position with that of DG Fisheries/the Commission itself, which also has a very limited scientific capacity of its own, and largely has to rely on goodwill from the Member States' national fisheries institutes to provide manpower and support for its Scientific, Technical and Economic Committee for Fisheries (STECF) [24], as well as indirectly with respect to the International Council for the Exploration of the Sea (ICES).

The RACs are, in this sense, going to compete with the Commission (and to some extent also ICES) for the goodwill of Member States and their national fisheries institutes.

Besides the funding problem, there is also the fact that the pool of fisheries expertise is limited. One participant at a meeting of the ICES/NSCFP Study Group on the Incorporation of Additional Information from the Fishing Industry into Fish Stock Assessments (SGFI) in March 2005 reflected over this issue in a discussion:

> The RAC must address [. . .] how scientists can be able to participate in this, there is a great demand on scientific staff, if the RAC wants advice it increases the work load and it will involve three different bodies [STECF, ICES, RACS] giving differing advice on the same issue.

(Observer notes, meeting of SGFI, March 2005, Stavanger, Norway)

In relation to competition for resources, the Commission has already stated its fear that fisheries advisory activities risk being given a lower priority within ICES because the national fisheries laboratories prioritise other work [24]. This effectively means that RACs, if successful in attracting the necessary funding from external sources or members, risk withdrawing scientists from other tasks. However, if the added value of the studies formulated by RACs proves important—more 'value for money'—then this might not be a problem in the longer term. Nevertheless, it does constitute a potential short-term conflict over limited resources. The conclusion of this discussion are dependent on the RACs obtaining their knowledge base by 'conventional' means through the market. An alternative is the suggestion put forward at an SGFI meeting to create a network of "*Friends of the RACs*", which would be willing to provide information to the RACs and their working groups in an informal way (Observer notes, meeting of SGFI, March 2005, Stavanger, Norway). This would put less pressure on the RACs and, perhaps, also place them less in direct competition with other actors. It is, however, doubtful that larger scale studies could be carried out in this informal way.

9.4.2.2 Providing Alternative Science and Incorporating Fishers' Knowledge

If the RACs manage to promote their own research agenda to support their knowledge base, it seems likely that they will promote an agenda where fishermen's (and other stakeholders') knowledge has significant weight. However, it is going to be up to the RACs themselves to decide if they should bring forth alternative science, and not merely function as a voice for stakeholder opinions reacting to Commission proposals. The Commission has suggested that the RACs be used for "*consultation between scientists and the fishing industry*" (section 5.1 [24]), something that seems to be more related to exchanging viewpoints than actually conducting science. Such an approach does not really seem to constitute a move towards 'community science' in the sense we have discussed earlier in this chapter. In the same context, the Commission also stated that the RACs will be important sources of information from stakeholders. A participant at the SGFI meeting in March 2005 commented on these ideas from the Commission:

> The regulation says very little about the role of scientists, but we have written in that scientists will be invited to participate as experts. They can come from member states, ICES

> or elsewhere, but the RAC will have to pay for its own funds. The Commission seems to think that the RACs are there to give stakeholder views instead of giving alternative ideas, but the RAC wants to give alternative scientific views as well.

(Observer notes, meeting of SGFI, March 2005, Stavanger, Norway, underlined)

This indicates that the RACs will have to do some work to establish a position where it is natural that they advance their own scientific agenda. However, based on the (limited) experience so far, it seems likely that the RACs are determined to do just that. At the moment, at least three proposals for scientific studies, including the Key Fishing Areas Study, have been or are in the process of being developed within the remits of sub-groups under the North Sea RAC [26, 28].

It is explicitly stated in the proposal for the Key Fishing Areas Study that fishers' knowledge should be taken on board as a potentially very valuable source of information on issues such as "*the distribution of fish, their movements in space and time, spawning sites, nursery areas as well as information on fishing activities*". Moreover it is stated that the collection of "*fishers' knowledge is a specialised task, and is not simply a matter of asking questions from a scientific perspective. Much of the information may not fit scientific paradigms*" [27]. Much emphasis is, consequently, placed on incorporating fishers' knowledge.

9.4.2.3 Areas of Interest and Conflicts between Stakeholders in the RACs

In this section we will take a brief look at a few of the issues that can be expected to be of particular interest to stakeholders participating in the RACs. The required knowledge base of the RACs will clearly depend on the priorities of the involved interests, as RACs are mandated to be pro-active and bring issues up of their own accord. However, much of the essential knowledge base of the RACs will of course depend on the issues presented to them. Nevertheless, RACs are likely to have particular hobbyhorses and angles on the different issues.

Furthermore, RACs will, as mentioned above, be most influential on issues where they can come to consensus-decisions. This will clearly not always be easy: lines of conflict will often be between the 'industry-group' and the 'others-group'; in other cases lines of division will also be between industry representatives from different segments or countries. These conflicts are also bound to influence the nature of the knowledge base and how it will be utilised. The following sections draw heavily on Wilson [29].

One of the issues attracting the interest of stakeholders in the RACs is the various kinds of MPAs. The North Sea RAC has already set up a working group to deal with spatial planning, under whose remit MPAs fall. MPAs will be one of the main areas for dispute between stakeholders in the coming years, as the perspectives of the industry and the environmental groups differ. Whereas more or less permanently closed areas are popular among environmental NGOs, these find little sympathy among industry-interests, which instead prefer seasonal closures—aimed at, for example, the protection of spawning stocks—or real-time management—where areas are closed when there is, for instance, too high a by-catch of juveniles, and then opened again when the situation changes. RACs will consequently need knowledge of the effects of various types of MPAs. An important question is whether permanently closed areas are valuable in conserving fish stocks, which can later be utilised; or rather have only values from the perspective of conserving biodiversity in the marine environment. Information on factors such as bottom type, currents and migrations may facilitate the difficult compromises on issues relating to MPAs. However, it should also be noted that the field of spatial planning and MPAs is an area where the industry and the environmental groups can join forces against other sectors, which want to use the sea or seabed for purposes other than fishing, with likely negative effects for fish, fisheries and the environment: for example, the oil industry and wind farming. The proposed Key Fishing Areas Study is a good example of this. All the stakeholders in the North Sea RAC, as well as DEFRA, have an interest in protecting fish stocks and breeding grounds from the damaging activities of other sectors. Although there are conflicting perspectives among stakeholders on spatial management measures, in practice it has been possible to arrive at the consensus that the knowledge base is incomplete and that this can have negative effects on the position of fish and fisheries activities vis-à-vis the claims of other sectors [27]. It is, thus, both an area of alignment and tension between the different stakeholders.

A cross-cutting issue, which attracts the interests of RACs, is the socio-economic aspects of fisheries management, which is particularly interesting for the industry. This is also going to be an issue in relation to the possible development of MPAs. The North Sea RAC has, as in the case of spatial planning, set up a working group to deal with socio-economic issues. Knowledge about socio-economic considerations is repeatedly mentioned as under-prioritised in fisheries management—ICES deals only with biological and technical aspects of fisheries management—and it is, therefore, highly likely that the RACs will try to balance this by focussing more on socio-economics. Socio-economics is also of particular interest to angling-interests, who believe that the socio-economic value of angling in Europe is underestimated. Angling and angling-interests are going to become increasingly importance in the coming years and their active role in the RACs constitutes the first time they have been formally recognised in relation to EU fisheries management.

Finally, technical measures, relating to fishing gear and techniques, constitute an area where the RACs will increasingly contribute and be in need of knowledge. This is an area where scientists conducting a closer relationship with those actually carrying out fishing will be very useful—as has been the case in many cooperative research programmes. The large variety of gears and possible modifications also makes this area particularly appropriate in negotiations where one must arrive at a compromise to become influential. Wilson [29] presents an example of conflicts and conflict-resolution with the intervention of knowledge in the North Sea RAC, which has recently been drafting a multi-annual plan for North Sea plaice. The main part of the plan involved effort reductions through decommissioning and days-at-sea. The impact of 80 mm mesh sizes on certain sub-stocks in certain areas, however, was a sticking point with the industry from just one country, and with the conservationists because of discards. This point was critical and was resolved only when promises were made of further research with respect to mesh sizes and discards in these areas.

The areas discussed above do not, of course, constitute an exhaustive list those issues of interest and relevance to stakeholders in the RACs. Inevitably, the agenda of these new regional organisations will be driven not only by the stakeholders themselves but, to a large extent, by the requests of the Commission or concerned Member States.

9.5 CONCLUDING REMARKS

The traditional view of public intervention theory placed the regulator in the role of a mere specialist intermediary between collective wills and their technical and scientific transformation into practical public policies. Public action was considered absolutely neutral and technocratic. Thus, social capital and legitimacy was always based on the fact that optimal policies could be developed, using totally objective criteria, in which neutrality had to be guaranteed by the impartiality of the procedures used in the process.

Critics, and their evidence, opposed to the traditional view have generated new proposals to incorporate participation into models in order to explain the public policy-making process. From that time, an inclusive approach has prevailed among the social agents and stakeholders participating in the different levels of decision-making.

The dynamics of the EU's development have resulted in a multi-tiered institutional model in which the historical institutional structures of the Member States co-exist and interact with those that are being created and developed within the EU. Furthermore, during recent years, the complexity of this structure has reinforced traditional public policy path-dependences. Fishing and agriculture were the first sectors in which the responsibility for public policies was transferred from the Member States to the Union, and they have been regulated at Union level from its earliest stages, essentially in a top-down style.

The knowledge and the quality of the inputs to develop scientific models and applied results, are very important issues when it comes to managing resources in a reasonable way, and this is related to the participation and expertise of scientists and stakeholders. When the views of stakeholders are introduced into the problem-solving process, the scientific formulation of the issues can be elaborated with richer inputs but with new complexities.

In this scenario, in addition to being affected by regulations, stakeholders can also learn to acquire an interest in joining a cooperative task. Thus, to arrive at healthy fisheries they need to be properly regulated. Stakeholders and scientists alike must find the right conditions in which to develop a co-operative dynamic, both in the management area and that of scientific and technical production. This places attention on both sides simultaneously, and it produces a more complex management-science framework.

To put this participation into practice a system of regional-scale, decentralised management units is operational within the EU. They are known as Regional Advisory Councils (RACs). The purpose of the RACs is precisely to bring together the separate elements of management, policy-making, and collaboration in knowledge production into a single forum, in order to develop a co-management model, at a larger scale than the local level and closer to the resource than the unique, but distant, European authority. Knowledge will be a crucial instrument to reaching this destination, and knowledge-based management probably will be a key source of rational resource exploitation.

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