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Fisheries co-management: a comparative analysis

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The paper is based on a review of 22 case studies on fisheries co-management in small-scale, semi-industrial and industrial fisheries in developing and developed countries in Africa, Asia, the Caribbean, Europe, North America and the Pacific. Case studies are classified according to a typology of co-management arrangements. The typology is based on the nature of the decision-making arrangements between governments and users. Decision-making arrangements refer to the roles of governments and user groups, the management tasks and the stages in the management process. Eleven case studies are analysed in detail. The analysis shows that co-management covers a wide variety of collaborative arrangements between governments and users. On the basis of the information from these case studies, a number of observations are made concerning the determinants of the type of co-management regime in place. Determinants include the capabilities and aspirations of user groups, the type of approach, the difficulty of the decision to be taken, the type of management tasks, the stage in the management process, boundaries, types of user groups and political culture and social norms. The paper concludes with the issues that require further research. Copyright © 1996 Elsevier Science Ltd

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This paper describes a comparative analysis of case studies on fisheries co-management arrangements found in the fisheries management literature. The research forms part of the work carried out under the Fisheries Co-management Research Project, a collaborative research project between the Institute for Fisheries Management and Coastal Resource Management and collaborating national research institutions in Asia and Africa. Through literature reviews¹ and case study field research in selected countries, the project aims to develop a set of globally or regionally applicable fisheries co-management models. The project has drafted a research framework, which is an adapted version of the Institutional Analysis and Development framework for common property resources, developed by the Workshop in Political Theory and Policy Analysis.²⁻⁴ The research framework uses an institutional approach to understand decision-making arrangements and was intended as a tool to enable systematic and comparative analysis of the literature review and the field research. Whilst analysis of the field research using the framework is feasible, it was found that insufficient information was available from case studies in the literature review to enable the research framework to be applied. However, the literature review did provide many interesting examples of different types of fisheries management arrangements known as 'co-management' and enabled both a typology of co-management to be constructed as well as comparative analysis to be carried out between cases. A number of well known case studies (e.g. Lofoten fishery⁵, Atlantic Surf Clam⁶⁻⁸) had been reviewed in detail by other authors so it was decided that the analysis should focus on case studies that had not received the same exposure. The purpose of this analysis was to distill similarities and differences in co-management regimes between and within types and the effects of the different arrangements on sustainability, efficiency and equity. Finally, elements of success and failure, as well as future research are identified.

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¹Literature was sourced from a variety of places and included both published and unpublished reports. Martin's (1989, 1992) bibliography of Common Pool Resources and Collective Action provided valuable guidance on relevant documentation. Other sources of literature included the ICLARM and North Sea Centre library and the Food and Agriculture Organisation. Articles were also obtained from researchers, academics and development workers who were or have been involved with fisheries co-management and/or community based management.

²E Ostrom, *Governing the Commons: the Evolution of Institutions for Collective Action*, Cambridge University Press, Cambridge, 1990.

³R J Oakerson, Analyzing the commons: A framework. In D W Bromley, ed, *Making the Commons Work: Theory, Practice and Policy*, Institute for Contemporary Studies Press, San Francisco, 1992, pp 41–59.

⁴E Ostrom, R Gardner and J Walker, *Rules, Games and Common Pool Resources*. University of Michigan Press, Ann Arbor, 1994.

⁵S Jentoft and T Kristofferson, 'Fishermen's co-management: the case of the Lofoten fishery', *Human Organization*, Vol 48, No 4, 1989, pp 355–365.

⁶B J McCay and C F Creed, 'Dividing up the commons: Co-management of the US surf clam fishery', in J S Thomas, L Maril and E P Durrenberger, eds, *Marine Resource Utilisation: A Conference on Social Science Issues*, University of South Alabama Publication Services, Mobile, Alabama, 1989.

⁷B J McCay and J M Acheson, 'Human ecology of the commons', in B McCay and J Acheson, eds, *The Question of the Commons: Anthropological Contributions to Natural Resource Management*, University of Arizona Press, Tuscon, Arizona, 1987, pp 1–34.

⁸B J McCay, 'Muddling through the clam beds: cooperative management of New Jersey's hard clam spawner sanctuaries', *Journal of Shellfish Research*, Vol 7, No 2, 1988, pp 327–340.

⁹S Jentoft and B J McCay, 'User participation in fisheries management. Lessons drawn from international experiences', *Marine Policy*, Vol 19, No 3, 1995, pp 227–246.

¹⁰S Jentoft, 'Fisheries Co-Management: delegating government responsibility to fishermen's organisations', *Marine Policy*, Vol 13, No 2, 1989, pp 137–154.

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This paper aims to complement and supplement the comparative research on user participation and co-management undertaken by Jenfoft and McCay.⁹ This covered a number of well documented co-management cases in developed countries (e.g. Canada, USA, Denmark, Japan, Norway).

What is co-management?

The effectiveness of existing fisheries management regimes in maintaining or achieving sustainable resource utilisation is constantly debated and questioned as fisheries in many parts of the world continue to be under pressure or in crisis. In recent years there has been growing recognition that user groups have to become more actively involved in fisheries management if the regime is to be both effective and legitimate.^{10,11} In this analysis, fisheries co-management is defined as an arrangement where responsibility for resource management is shared between the government and user groups. It is considered to be one solution to the growing problems of resource over-exploitation.^{10,12–14}

Based on this definition, co-management is considered different from community-based resource management (CBRM) because government is also involved in the decision-making process concerning the management of the fishery. Consequently traditional marine tenure systems, traditional fisheries management systems and community-based resource management are not considered to be co-management because government is not involved in the decision-making process. This clear delineation can be awkward in practice. It could be argued that CBRM regimes are co-management if they are recognised in national legislation or they form part of sectoral development policies. However, for the purposes of this analysis, CBRM regimes have been excluded.

The review of the literature on fisheries co-management, according to the definition described in the previous paragraph, was very limited in scope. The exclusion of community-based management regimes from the analysis reduced the number of case studies available for review. Much of the literature that described 'fisheries co-management' case studies, in fact described community-based management arrangements. In addition to the reviews of case studies, articles on theoretical or general country descriptions of co-management arrangements were reviewed. On the basis of this theoretical and empirical literature review, fisheries co-management arrangements were classified into five broad types according to the role government and users play as shown in Figure 1.

Type A: Instructive: There is only minimal exchange of information between government and users. This type of co-management regime is only different from centralised management in the sense that the mechanisms exist for dialogue with users, but the process itself tends to be government informing users on the decisions they plan to make.

Type B: Consultative: Mechanisms exist for governments to consult with users but all decisions are taken by government.

Type C: Cooperative: This type of co-management is where government and users cooperate together as equal partners in decision-making. For some authors, this is the definition of co-management.¹⁰

Type D: Advisory: Users advise government of decisions to be taken and government endorses these decisions.

Type E: Informative: Government has delegated authority to make

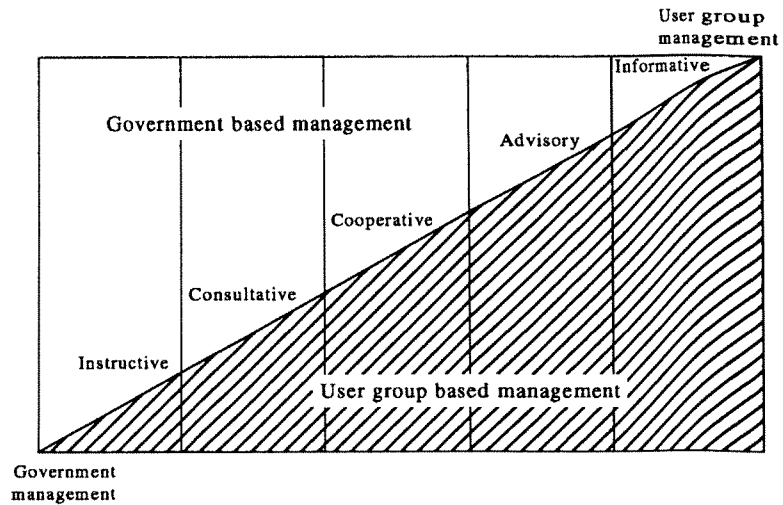


Figure 1. Spectrum of co-management arrangements (adapted from McCay 1993 and Berkes 1994)^{15,16}

decisions to user groups who are responsible for informing government of these decisions.

However, this typology is a simplification of a very complex situation. There is a multitude of tasks that can be co-managed under a different type of co-management arrangement at different stages in the management process. Thus co-management covers a broad spectrum of possible collaborative decision-making between government and user groups encompassing:

- the roles of government and user groups in decision-making;
- the types of management tasks that can and want to be co-managed by user groups and government; and
- the stage in the management process when co-management is introduced (planning, implementation, evaluation).

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¹¹J Raakjaer Nielsen and T Vedsmand, *Fisheries Co-Management: An Alternative Strategy in Fisheries—Cases from Denmark*. An issue paper for the OECD study on the efficient management of living resources, 1995.

¹²F Berkes, 'Co-management and the James Bay Agreement', in E Pinkerton, ed, *Co-Operative Management of Local Fisheries: New Directions for Improved Management and Community Development*, University of British Columbia Press, Vancouver, 1989, pp 189–208.

¹³E Pinkerton, ed, *Co-Operative Management of Local Fisheries*, University of British Columbia Press, Vancouver, 1989.

¹⁴S S Hanna, *Creating User Group Vested Interest in Fishery Management Outcomes: A Case Study of the Pacific Fishery Management Council*, presented at The World Fisheries Congress, Athens, Greece, May 5–9, 1992.

¹⁵B J McCay, *Management Regimes. Property Rights and The Performance of Natural Resource Systems*, background paper prepared for the September 1993 Workshop, The Beijer International Institute of Ecological Economics, 1993.

¹⁶F Berkes, 'Co-management: bridging the two solitudes', *Northern Perspectives*, Vol 22, 1994, pp 18–20.

Roles of government and user groups

In an idealised co-management scenario, both government and user groups cooperate as equal partners for all management tasks and at all stages in the management process. However, in most co-management arrangements, the role of government and user groups vary. Jentoft and McCay⁹ observe that the role user groups play in the decision-making process depends on who and how they are represented. They describe two types of representation for users: functional; which is based on gear types, and territorial, which is based on geography. However, in many developing countries and some developed countries, there may be other types of user group representation based on socio-cultural variables such as ethnicity, gender or religion. The role of user groups in the decision-making process will depend on their relative negotiating capabilities, knowledge and strengths *vis-à-vis* each other and with government. Some groups may feel alienated or poorly represented and decide to boycott the decision-making process. There may also be other stakeholders who have a legitimate right to be represented in the co-management process such as scientists, social scientists and those representing the public interest such as environmentalists. The type of representation is often determined by the political culture of the country and whether participatory or representative democracy is encouraged or discouraged.

Jentoft and McCay⁹ and Raakjaer Nielsen and Vedsmand¹¹ emphasise the importance of level, and related to this, scale. Level refers to the level at which decision-making should and does take place, namely local, regional, national or supra-national. Scale refers to the fisheries resource system and the management tasks to be undertaken; if the system and/or tasks are large and complex then decision-making at a local level may not be effective or sufficient. Some management decisions may have to be made at the national level because the problems and solutions are of a scale that cannot be dealt with at the local level. Increasing the scale implies that there will be more diverse membership and representation so that direct democracy might become difficult and there might also be greater inequalities.

Management tasks

Depending on the particular institutional and organisational set-up, different management tasks may be suitable for different forms of co-management decision-making. There are a number of management tasks, which include policy formulation, resource estimation, access rights, harvesting regulations, market regulations, monitoring, control and enforcement.

For some tasks, for example policy formulation, it may be desirable to have full and equal decision-making by government and stakeholders, whilst for other, such as access rights, it might be more appropriate that this is decided by government, based on consultation with user groups. Different management tasks might be subject to different types of co-management between government and users. With regard to the type of management tasks that can be co-managed, there is a need to differentiate between decentralisation (i.e. moving responsibilities to a lower level of government) from delegation, which might mean transfer of responsibilities from government to a user group organisations (national or local). Depending on the management function itself, as well as the political and social context, some management functions may be appropriate for decentralisation and others for delegation. For example, it might not be appropriate to delegate management functions to user groups which are also in the public interest. Both decentralisation and delegation requires that capabilities and aspirations exist at another level of government and within user groups to carry out these functions. In addition, governments may be reluctant to relinquish some or all of their authority for all management functions.¹⁷

Stage in the management process

Another dimension to co-management is the stage in the process at which users become involved: planning, implementation or evaluation. Under an ideal co-management regime, user groups should be involved at all stages of the co-management process, but what actually occurs might be quite different. Hanna¹⁸ points out that a management process has to be established to achieve particular objectives so the cost-effectiveness of the process has to be compared to other possible processes. A centralised approach at the planning stage will tend to have lower design costs than a cooperative approach, as it is likely to take less time to reach decisions. However, implementation, monitoring and enforcement of the programme might be more costly because the regime is not considered legitimate by users who have had very little to say in its design. Conversely, if there is a lack of information to manage

¹⁷R S Pomeroy, 'A research framework for coastal fisheries co-management institutions', *NAGA, The ICLARM Quarterly*, Vol 16, No 1, 1993.

¹⁸S S Hanna, 'User participation and fishery management performance within the Pacific Fishery Management Council', *Ocean and Coastal Management*, Vol 26, 1996.

the fishery, the co-management approach might lead to lower transaction costs at the planning and implementation phase because fishermen can provide information on fishing patterns, catches and the status of the resource.

Evaluating fisheries co-management

Evaluating fisheries co-management can relate to the meeting management objectives or its impact on the resource and its users. Evaluation does not necessarily entail quantifying these outcomes, but assessing whether co-management has had a positive or negative effect on them. The three main types of outcomes considered most relevant for evaluating a co-management arrangement are sustainability, efficiency and equity. According to Hanna¹⁸ these are defined as follows:

- Sustainability can be divided into stewardship and resilience. Stewardship is the tendency for resource users to maintain productivity and ecological characteristics of the resource. Resilience is the ability of the system to absorb and deal with changes and shocks.
- Efficiency refers to the cost-effectiveness of the arrangement, in particular whether it has reduced transactions costs or improved the net returns to the fishery.
- Equity is divided into representation, process clarity, homogeneous expectations and distributive effects. Representation refers to the extent to which users and stakeholders are represented. Process clarity concerns the transparency of the management process. Homogeneous expectations are the extent to which participants have similar expectations concerning the management process and its objectives. Distributive effects concerns the extent to which the management process has led to a more or less equitable distribution of benefits.

Case studies from the literature review

The 22 case studies in the literature review were classified into a broad typology of co-management arrangements according to the co-management spectrum and based on an *overall* assessment of the type of co-management regime in place. The information available from the case studies in the literature review made it only possible to classify the co-management regime generally, a breakdown by management tasks and stages in the process was not possible. In general, case studies referred to particular fisheries rather than countries, so it was possible to have more than one type of fisheries co-management regime operating within the same country. Table 1 gives the number of case studies reviewed by type.

Typology	Number of case studies
Instructive	2
Consultative	5
Cooperative	6
Advisory	4
Informative	5

This section provides a brief description of 11 selected case studies from the literature review, according to co-management type. Case studies providing the most information about the co-management arrangement were selected. The classification of case studies has been based on the information available in the literature review only. It is therefore acknowledged that there are limitations to such a classification as greater knowledge about each case study might result in a change of classification.

Type A: Instructional

*Inland Waters, Bangladesh.*¹⁹ Since 1986, the government of Bangladesh initiated a New Fisheries Management Policy aimed at improving and sustaining open inland water fisheries as well as greater equity in the distribution of benefits of the fishery. The main policy instrument was to discontinue the leasing of public water bodies to middlemen and replace this system with direct access rights to fishermen. The government hoped for a partnership between themselves and fisher communities. One of the most notable features of the new fisheries management regimes that came into operation following the introduction of this new policy was the active participation of Non-Governmental Organisations (NGOs) as intermediaries between fishers and government. In some of the models described in the paper, the role of government (and NGOs) is *instructive* rather than cooperative. The NGOs take a central role in organising and representing fishers, until such time that they are sufficiently organised to represent themselves. One NGO took over the management of over 800 waterbodies, obtaining long term leases and entering into a cooperative arrangement with landless people to fish the waterbodies. However, the NGO made all financial and management decisions and group members (fishers) are only responsible for labour inputs.

*Lake Kariba, Zambia.*²⁰ Lake Kariba is a man-made lake shared between two countries, Zambia and Zimbabwe. In 1994, the Zambian government decided to implement a fisheries co-management regime for the open access artisanal gill-net fishery on the Zambian side of the lake. This was thought to be a solution to the problems of falling catches, limited resources for enforcement (for fisheries and for smuggling) and poor living conditions of fishers and their families as many were based in temporary settlements. The lakeshore was divided into four zones under the jurisdiction of zonal fisheries management committees, which are comprised of traditional authorities, users, NGOs, entrepreneurs and village committee representatives. The zones were then sub-divided into designated fishing villages. All fishermen and their families were compelled to move from their fishing camps or their own villages to these designated villages; dual residency of villages was prohibited. Within each village, fishing village management committees were formed, which report to the zonal committees. Both committees only have monitoring roles in the fishery and decide where development funds should be spent. It is envisaged that a number of new conflicts will arise as a result of the movement of fisher families to these designated villages. In addition, village management committees appear to be making arbitrary decisions, hold meetings irregularly and lack basic organisational and management skills. At the zonal committee level, the interests of small-scale fishers are poorly represented. However, the process is still at an early stage.

This is a case of *instructive* co-management as all decisions concerning the fishery are taken by the government although users have been involved in the process.

Type B: Consultative

Lake Malombe, Malawi.^{21,22} Lake Malombe, one of the smaller lakes in Malawi, is a relatively shallow lake showing signs of serious over-exploitation. In 1993, the government of Malawi initiated a participa-

¹⁹M Ahmed, D Capistrano and M Hossain, *Fisheries Co-management in Bangladesh—Experiences with GO-NGO-Fishery Partnership Models*, presented at the Fifth Conference of the International Association for the Study of Common Property, Bodo, Norway, 24–28 May 1995.

²⁰J Malasha, 'In search of a New Management Regime on the Northern Shores of Lake Kariba', *CASS Occasional Paper*, University of Zimbabwe, 1996.

²¹S J Donda, *Fisheries Co-management in Malawi*, presented at the Workshop on Fisheries Co-management, Hirtshals, Denmark, 29–31 May 1995.

²²S J R Bland and S J Donda, *Common Property and Poverty: Fisheries Co-management in Malawi*, presented at the Fifth Conference of the International Association for the Study of Common Property, Bodo, Norway, 24–28 May 1995.

tory fisheries management programme aimed at achieving greater participation of fishing communities around Lake Malombe. Committees were established to represent the interests of fishing communities. Government fisheries extension workers trained committee members on the biological basis of fisheries regulations, and were involved in general institutional capacity building. Fisheries regulations were developed through negotiation between the two groups. Enforcement is carried out by the Fisheries Department. The process appears to be *consultative* especially with regard to the determination of harvesting rules, although there are also some instructional aspects to the regime especially with regard to government decisions on the policy and ways to achieve objectives for Lake Malombe.

*San Miguel Bay, The Philippines.*²³ In 1991, the government decentralised the management of nearshore fisheries to municipalities and local fishing communities. The fishery in San Miguel Bay is a multi-gear open access fishery. Government management was not working, the fishery was over-exploited and there were increasing incidences of conflict between users. In 1993, San Miguel Bay Management Council was established to design and implement a management plan for the Bay. The Council comprises representatives from user groups, local government, NGOs, people's organisations, academics and the policy-makers. It is advised and supported by a number of advisory and administrative committees and task forces, which comprise representatives from different administrative levels (i.e. municipal, district, province). The majority of posts are held by the government. The main tasks of the Council are to provide day-to-day policy guidance and administration, to coordinate plans and legislation of local governments and external authorities and to act as an advocate to national government on matters requiring legislation and support to implement the plan.

This case study is classified as *consultative* as decisions are taken by government after consulting with users.

Type C: Cooperative

*Pacific Fishery Management Council (PFMC), USA.*¹⁴ The Pacific Fishery Management Council is the focus of decision authority in fishery management. Regulations are formally enacted by the council, advised by three advisory committees, which represent users, including processors and consumers in one committee, and scientists and economists in the other two. During the planning process to develop a new license limitation programme for the West Coast groundfish fishery, users had an active role throughout the programme design and development phase. The programme is classified as *cooperative* co-management, where government and users are in partnership.

Customary Fishing Rights Areas, Fiji.^{24,25} The fisheries co-management regime in the fishing rights areas of Fiji is, in general, a cooperative effort between national government and users. The fishing rights areas (*qoliqoli*), officially termed Customary Fishing Rights Areas, are under the control of clan chiefs and recognised by government. Management of the subsistence fishery is decided upon and controlled by the traditional authorities but responsibility for the management of the small scale commercial fishery is shared between the traditional clan

²³R S Pomeroy and M Pido, 'Initiatives towards fisheries co-management in the Philippines: the case of San Miguel Bay', *Marine Policy*, Vol 19, No 3, 1995.

²⁴K Ruddle, 'A guide to the literature on traditional community-based fishery management in Fiji', *South Pacific Commission Traditional Marine Resource Management and Knowledge Information Bulletin*, No 5, Noumea, New Caledonia, April 1995.

²⁵A Cooke and K Moce, 'Current trends in the management of *qoliqoli* in Fiji', *South Pacific Commission Traditional Marine Resource Management and Knowledge Information Bulletin*, No 5, Noumea, New Caledonia, April 1995.

chiefs and government in a complex arrangement. Licenses for commercial fishing are issued by the Fisheries Division but before applying, a fisherman must first obtain a permit from the social unit in whose area he intends to operate. This is issued by the District Commissioner, if the tribal group consents. Thus, the traditional authority determines whether commercial fishing can occur and the conditions on the licensee concerning target species, permitted gear, areas exclusion and conservation rules. There is not, however, a uniformity of approach; management strategies depend on the individual Fisheries Office and the chief involved. Whilst this arrangement is classified as *cooperative* co-management, in some areas there remains confusion concerning the ownership of fishing rights and management rights, which has resulted in conflicts between government and traditional authorities.

Type D: Advisory

*Days at Sea Regulation in the Kattegat, Denmark.*¹¹ The days at sea regulation in the Kattegat is an experiment aimed at solving the problems of discard and mis-reporting created by the quota system in the sole and nephrops fishery, and the conflict between fishers and scientists concerning resource estimation. Prompted by fishermen's protests, negotiations between the government and the industry concerning the management of the fishery led to the establishment of a working group. Representatives from the government, the fishermen's association and a research institute meet monthly as a Working Group and make decisions concerning the number of days at sea to be allocated and to review progress. These decisions are communicated to the Danish Regulation Advisory Board, which is a consultative Board advising the Minister. However, all proposals put forward by the Working Group have, so far, been accepted. This co-management arrangement is therefore considered *advisory*.

Type E: Informative

*PO Management in the Dutch Flatfish Fishery.*²⁶ In 1993, a co-management regime for the flatfish industry was implemented in the Netherlands following quota overfishing of flatfish and increasingly poor relations between fishers and government. Responsibility to manage individual fishermen's quotas has been devolved to groups of fishermen who pool their individual quotas. All group members have to be members of the same Producer Organisation, but group membership is not compulsory. These groups are responsible for implementing and enforcing regulations, imposing sanctions and organising intra-group quota exchanges. The government retains responsibility for controlling the national quota (allocated by the European Union) and all tasks relating to the implementation of the Common Fisheries Policy. Fishers were encouraged to join groups through an incentive scheme that gave them slightly higher days at sea and the possibility to rent quota during the whole year. This arrangement is classified as *informative* as the Producer Organisation informs government of the regulations that it has implemented.

Groups are quite homogeneous, which aids cooperation. Only 17% of vessels have chosen to be outside the system. Overall, the system seems to have been successful as national quotas have not been exceeded, levels of inputs and outputs have been stabilised and fishers are satisfied with the group system. However, part of this success might be attribut-

²⁶E Hoefnagel and W Smit, *Experiences in Dutch Co-management on Marine Fish Resources*, Agricultural Economics Research Institute LEI-DLO, The Hague, The Netherlands, 1995.

able to relatively high quotas and low catches, so assessment of whether the co-management programme achieved its goals is difficult to make.

*The matjes herring fishery, Denmark.*¹¹ The matjes herring is a special quality of North Sea/Skagerrak herring sold in the Netherlands as a snack. The season lasts for only 3 months a year. The fishery, prosecuted by purse seiners from Denmark, Sweden and Norway, is coordinated and managed by the Matjes Committee. The Committee holds regular meetings with representatives from the fishermen's organisations, buyers and processors. Decisions on regulations, quota distribution as well as monitoring and enforcement are undertaken by producer organisations in each country. The decision-making process itself is considered transparent; information is distributed to all participants in the fishery. This is thought to be made possible by a relatively small number of participants using the same gear. This arrangement is considered *informative* as the committee has received the approval of the Danish government and informs the government on the decisions they have taken.

*Mechanised beach seine fishery, Inhassoro, Mozambique.*²⁷ In 1981, the beach seine fishermen were organised into a Fishermens Association. This enabled the District Administrator to discuss and negotiate with one group. The Association regulates fishing activities, calls meetings, which local government officials attend and makes decisions concerning the opening and closure of the fishery. The government officials do not interfere in the decisions that are taken. A letter (also signed by the District Administration) is then sent to Provincial authorities informing them of the decisions taken. This is submitted in proposal form to central government for authorisation. As the administrative approval process takes a long time, many of the decisions proceed without formal government authorisation. In effect, the authorisation procedure *informs* government of the decisions taken by the Association.

*Corporate wetfisheries management, Faroe Islands.*²⁸ Between 1975–1990, the wetfish fishery around the Faroe Islands was regulated by the Raw Fish Fund. The regulatory mechanism was a subsidy/tax regime together with a minimum price fixing. The Fund was established according to Faroe Island legislation. The aim of the Fund was to ensure an acceptable income for fishermen and to use it as an instrument to conserve fish stocks as no quota system was in place. It was intended that the Fund would be self-financing. In good years it would generate a surplus that could be used in bad years. It was foreseen that there would be no government subsidies. The Fund was administered by a Board whose members included industry representatives (catching and processing) and government. The industry were in the majority.

Nevertheless pressure from interest groups represented on the Board led to high subsidy levels and taxation seldom used. The Fund was not self-financing and the government had to intervene with additional subsidies. High subsidy levels and distorted prices led to over capitalisation of the fishery and a collapse of the fish stocks. The result was that the country was on the brink of bankruptcy.

While the Fund was in operation, it *informed* government of decisions taken. This is a case of a co-management arrangement that failed. This can be attributed to irresponsible behaviour of the Fund's Board

²⁷A Kristiansen, E Poiosse, M Machava, P Santana and J Meisfjord, *Co-Management of Fisheries in Inhassoro Inhambane Province, Mozambique: A Case Study*, Ministerio de Agricultura e Pesca, Instituto de Desenvolvimento da pesca de Pequena Escala (IDPPE), 1995.

²⁸J Moerkoere, *The Collapse of a Corporate Management System: Experiences from the Faroese Fishing Industry*, paper presented at the World Fisheries Conference Athens, Greece 3–8 May 1992.

members due to their inability to withstand pressure from various interest groups in the fisheries sector.

Discussion

This literature review covered a variety of different co-management arrangements in five regions: Africa, Asia, Europe, North America and the Pacific. They included artisanal, semi-industrial and industrial fisheries in both freshwater and marine habitats. Information on the co-management arrangement varied. Although most of the case studies provided a general overview, there was limited information on the details of the arrangement. With these constraints in mind, the following discussion focuses on whether there are any commonalities and differences between and within types and the effects of the arrangement on outcomes. Finally, elements of success and failure as well as future research issues are identified.

Type of co-management arrangement

As described earlier, the type of co-management regime is determined by the role of users and governments in decision-making. Based on the literature review some form of co-management seems always to be appropriate. However, this does not imply that delegated self-management is more appropriate than an instructive or consultative management arrangement. The proper design principles depend upon the context and conditions under which the co-management arrangement has to work.

These will often evolve gradually⁹ through a process of muddling through. North²⁹ observed that institutional change often occurs as marginal adjustments of old structures rather than radical innovations or total reorganization. The process is always dynamic. Thus, the type of co-management arrangements described in the case studies may change. However, a number of observations can be made that determine the type of co-management regime in place.

(1) Capabilities and aspirations of user groups. The way governments decentralise or delegate management authority has an effect on the type of co-management regime in place. Although the aim of government might be cooperative co-management, this can only be achieved if users are willing and capable of taking on shared responsibilities. Cooperative, advisory and informative co-management occurred in situations where user groups were able and willing to take up the responsibility (Matjes, PO Management and PFMC). Unorganised or poorly represented user groups, low levels of education, lack of empowerment all hindered a more equal participation in the decision-making process. The review indicated that developing countries trying to initiate co-management may be working with communities where there is no existing organisation of user groups so that these have to be introduced. Thus the type of co-management arrangement is more likely to be instructive or consultative until user groups are organised and capable to cooperate more equally in the management process (Bangladesh inland waters and Lake Malombe). Thus, existing organisations of user groups are not a pre-requisite to co-management *per se*, but the nature of user group organisations does play an important role in determining the type of co-management regime.

²⁹D North, *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, 1990.

(2) *Top-down or bottom-up approaches.* The type of approach influences the type and nature of the user group participation in decision-making. It is more likely that the type of co-management approach is instructional or consultative when it is top-down and advisory or informative when it is bottom-up. In some of the case studies, government has actively pursued a policy to promote co-management (Bangladesh inland waters, Lake Kariba, Lake Malombe, San Miguel Bay, PFMC and Faroes). In these cases the type of co-management tended to be instructive or consultative. Whilst the type of arrangement is also affected by the capabilities of users, in some of the cases the implication is that government wants to play the dominant role in the management process. In the matjes fishery and the beach seine fishery in Inhassoro, co-management was 'bottom-up' emanating from well-organised user groups. This is reflected in the type of arrangement: informative.

(3) *Difficult decisions.* Greater user participation in co-management also occurs when governments are unwilling to deal with the political, social or economic responsibility of taking hard decisions preferring to let the user groups deal with the problems (Dutch PO management and Faroes).

(4) *Management tasks.* The type of co-management arrangement to be implemented also depends on the management tasks to be undertaken. In general, although the case studies are not explicit about management tasks, there is evidence that the more specific the tasks are (harvesting and market regulation), the lower the level decisions are taken. In these situations, it is more likely that the type of co-management arrangement will be advisory or informative (Dutch PO management, Matjes, Inhassoro and Kattegat). Very little information was available on the policy formulation process, but there are some indications that, where it does take place, it tends to be instructive or consultative. This observation is supported in the general co-management literature⁵.

(5) *Stage in the management process.* In general, the information from case studies indicate that co-management arrangements, whatever the type, occur during implementation and only occur to a minor extent in planning (Lake Kariba and PFMC). There is no clear evidence from the case studies on user participation in evaluation. However, in the case of the Dutch POs, the Matjes and Kattegat fisheries, there are indications that the implementation process is being continually evaluated by government and user groups.

(6) *Boundaries.* The importance of boundaries in fisheries co-management has been thoroughly discussed in the literature^{2,9}. In general the literature indicates that the more clearly defined the boundaries, the greater the role of users in the decision-making process. However the boundaries issue is very complex as in any fishery there are many boundaries (physical, social, technical, economic, political). The case studies demonstrate that many kind of boundaries are in place, physical (Lake Malombe, PFMC and Faroes), residence (Kariba and San Miguel Bay), organisational (Dutch PO) and socio-cultural (Fiji), lack of land ownership (Bangladesh) and resource (Danish Matjes fishery and Kattegat). Although these are the 'clearer' boundaries there

is often a mixture of boundaries that determine (who, where and how) the type of co-management arrangement.

(7) *Types of user groups.* In most cases user groups were homogeneous either functionally, territorially or socio-culturally. This contributed to group cohesion. Socio-cultural homogeneity was also important for collaboration between user groups (PFMC and Kattegat). Conversely, where there was socio-cultural heterogeneity in multi-user group situations, co-management was more difficult with government taking a bigger role in decision-making (Lake Kariba).

(8) *Political culture and social norms.* The political culture and social norms of the country and/or society also affect the type of co-management arrangement. Societies not familiar with political empowerment may find it difficult to participate on an equal basis with government (Bangladesh inland waters). The political (modern and traditional) structure in the country may also exclude certain types of co-management arrangements and/or encourage others (Fiji, Lake Kariba).

Anticipated outcomes

Although many of the co-management arrangements described in the case studies are still at an early stage of implementation, some overall observations can be made concerning outcomes. Outcomes do not refer to actual outcomes, as in most cases it is too early to assess, but to the outcomes anticipated by the co-managers.

In practically all of the cases, the rationale for introducing a co-management arrangement was the fact that the fishery was nearing overexploitation or was already overexploited. In this respect, co-management was a form of crisis management, seen as a way to impose stewardship over the fish resources (Lake Kariba, Lake Malombe and Inhassoro). In other cases, co-management was implemented in order to prevent or resolve conflicts among user-groups or between user groups and government. In some cases this was in addition to the problem of over-exploitation (San Miguel Bay and Dutch PO management) or where there was no over-exploitation (Fiji and Kattegat). With regards to conflict management, co-management was introduced to make the management process more resilient. Co-management was seen as one way to increase the resiliency of the system to changes in the market (Matjes) or in the system (Faroes).

With regard to the four components of equity, information from the case studies was sparse. Greater representation in the co-management processes was clearly a goal of the process, it was not clear how well stakeholders and users were represented. However, in all except one of the cases, it appears that users and/or stakeholders were better represented than before. It seems evident, that process clarity is great as a result of co-management. There seems to be no difference whether the decision-making arrangement is a Village Committee (Bangladesh inland waters, Lake Kariba and Lake Malombe), a management council (San Miguel Bay, PFMC, Kattegat and Dutch POs), a fishing committee (the Matjes committee), or has no formal structure (Fiji).

Conclusions

The analysis of the literature on co-management has covered artisanal,

semi-industrial and industrial fisheries in both developed and developing countries. It has been restricted to cases that fit within the broad definition of co-management: some form of collaborative arrangement between government and user groups. Many arrangements that have been described as co-management have therefore been excluded as they describe some form of community-based management (traditional or modern) that is not, according to the definition used in this analysis, co-management.

The typology that is used in the analysis provides a simplified way to classify the variety of co-management arrangements that exist. This should be viewed as a guide only, as the situation is likely to be much more complex. Different management tasks may be subject to different decision-making arrangements, and it is possible that in a particular fishery, the whole spectrum of different co-management arrangements are present. However, as so little information was available in the literature review on decision-making arrangements, it was only possible to carry out a broad classification. Furthermore, the classification is not static. A co-management arrangement that is classified as consultative today may be cooperative in the future. This will depend on the factors that determine the type of co-management arrangement. Based on the review of 22 case studies, of which 11 were reviewed in detail, some key determinants were identified.

The capabilities and aspirations of user groups are clearly an important determinant of the type of co-management arrangement. In fisheries where user group organisations are weak or non-existent the government is more likely to have a more dominant role. The case studies from some of the developing countries verify this. The type of approach is also important. It is more likely that the role of government is greater when the co-management approach is top-down; when the approach is bottom-up, the role of user groups is greater. With regard to management tasks, the more specific the tasks, the lower the level decisions are taken, and the greater the involvement of user groups. There was no evidence from the case studies, that users had any significant influence on policy formulation. In the case of developing countries, decisions on whether there should be a co-management approach appears to be taken entirely by government.

Other determinants of the type of co-management arrangement that were identified from the literature review were: the stage in the management process when co-management is introduced, the type of boundaries, the types of user groups and the political culture and social norms of the country or society in question.

With the exception of a few case studies, it seems clear that co-management is a form of crisis management. Governments, observing the failure of their own management regime take the decision to bring users into the management process. The anticipated outcome is that sustainability, efficiency and equity of the resource and its users will be improved. In all the cases reviewed, it has not been possible to evaluate whether these anticipated outcomes have been achieved.

This review should be regarded as an early contribution in the process of understanding the different types of co-management arrangements that exist. There remain significant gaps in the information concerning these arrangements. If these are filled, a better understanding of the general circumstances under which different co-management arrangements work and the factors which influence the movement from one

type of co-management arrangement to another could be achieved. Of particular importance are details concerning the types of decision-making arrangements in place and the key factors that determine and affect these arrangements. Little is known of the affect of co-management arrangements on outcomes (sustainability, equity and efficiency) both in terms of the process itself as well as the impact on the resource and its users. In order to evaluate outcomes, more information is required on user/stakeholder representation, capabilities and participation in the decision-making processes and on whether compliance and enforceability to management rules have increased as a result of co-management.

The case studies currently being carried out by the IFM/ICLARM Co-management Project in Africa and Asia should contribute to these information requirements. A research framework based on the Institutional Analysis and Development Framework will enable both systematic and comparative analysis of information of co-management arrangements in developing countries for a variety of fisheries. The comparative analysis should enable distillation of both the necessary pre-conditions for a particular type of co-management arrangement as well as identification of the key factors that affect the arrangement and its outcome.