

Utilizing social sciences in fisheries management

Patricia M. Clay ⁽¹⁾ and James R. McGoodwin ⁽²⁾

⁽¹⁾ *National Marine Fisheries Service, Northeast Fisheries Science Center, 166 Water Street, Woods Hole, MA 02543, U.S.A.*

⁽²⁾ *Dept. of Anthropology, Campus Box 233, University of Colorado, Boulder, CO 80309, U.S.A.*

Accepted April 4, 1995.

Clay P. M., J. R. McGoodwin. *Aquat. Living Resour.*, 1995, **8**, 203-207.

Abstract

Historically, nation-state level fisheries management has relied primarily on the disciplines of biology, ecology, and to some extent economics – usually in some combination, and with varying degrees of emphasis and success. Recently, as an increasing number of fisheries have begun to experience severe declines there has been increased interest in how social scientists might help to address some of these problems. In managing fisheries, it is humans who must be understood and managed. Furthermore, some managers have begun to question the view of biological conservation as the primary goal of management, seeing economic and social goals as equally important.

Social science studies of fisheries indicate that not all members of a given user group operate in the same way, or have the same impact on marine ecosystems. People's behavior is often influenced by family, community, and other sociocultural variables in addition to economic and ecological considerations. Using the perspectives and methodologies derived from disciplines such as anthropology and sociology, fisheries managers should be able to develop policies which integrate and balance economic, social and biological objectives. Management systems which are more compatible with broad user group values should result in higher compliance and reduced enforcement costs.

An overview of recent social science research pertaining to fisheries management is discussed, and examples presented on the relevance of social science information in crafting successful management regimes.

Keywords: Sociocultural variables, management regimes, anthropology and sociology, fisheries management, user group, enforcement costs.

L'introduction des sciences sociales pour la gestion des pêches.

Résumé

Historiquement, pour chaque pays la gestion nationale des pêches a reposé principalement sur l'apport de la biologie et de l'écologie avec seulement dans quelques cas une extension à l'économie – généralement au travers de quelques rapprochements et ce, avec divers degrés de développement et de succès. Récemment, comme un nombre croissant de pêcheries ont commencé à connaître des phases de déclin majeur, il y a eu un regain d'intérêt pour savoir comment les sciences sociales pourraient aider à résoudre certaines des questions posées. Pour la gestion des pêches, ce sont en effet les comportements humains qui doivent être analysés et régulés. En outre, plusieurs gestionnaires ont commencé à s'interroger à propos de l'idée même de conservation des ressources prise comme objectif premier de la gestion des pêches, mettant en évidence l'importance équivalente des objectifs sociaux et économiques.

Les études de pêcheries réalisées en sciences sociales indiquent que tous les membres d'un groupe donné d'usagers ne se conduisent pas exactement de la même façon, et n'ont pas le même impact sur les écosystèmes marins. Le comportement de ces acteurs est souvent déterminé par la famille, les communautés d'appartenance, et autres variables socio-culturelles qui s'ajoutent aux déterminants économiques et écologiques. En utilisant les perspectives et méthodologies déduites des disciplines telles que l'anthropologie et la sociologie, les gestionnaires des pêches devraient être capables de mettre en

œuvre des politiques de régulation qui tiennent compte d'un équilibre entre les objectifs de natures diverses, économiques, sociaux, biologiques. Les systèmes de gestion qui sont les plus compatibles avec les valeurs du plus grand nombre d'usagers devraient permettre d'augmenter l'adéquation des systèmes au comportement des acteurs et réduire ainsi les coûts de contrôle.

Une revue des travaux récents en sciences sociales à propos de la gestion des pêches est présentée ici, et quelques exemples sont donnés, illustrant l'importance des informations fournies par les sciences sociales pour la définition de régimes de gestion les mieux adaptés.

Mots-clés : Variables socio-culturelles, régimes de gestion, anthropologie et sociologie, objectifs de la gestion, groupes d'usagers, coûts de contrôle.

INTRODUCTION

Fisheries are a system, involving the physical environment, marine organisms, and the people who harvest, utilize and manage these resources. Historically, nation-state level fisheries management has relied primarily on the disciplines of biology, ecology, and to some extent economics – usually in some combination, and with varying degrees of emphasis and success. Recently, as an increasing number of fisheries have begun to experience severe declines there has been increased interest in how social scientists might help to address some of these problems (see Fricke 1985 for a discussion of changing views of social science in U.S. fisheries management). In managing fisheries, it is humans who must be understood and managed. Furthermore, some managers have begun to question the view of biological conservation as the primary goal of management, seeing economic and social goals as equally important.

As we include people more fully in our analyses, we must identify user groups and other stakeholders – utilizing both our criteria, and theirs. Until recently it was relatively easy to identify fishery user groups. Generally, these were the people who harvested fishery resources for subsistence and/or commercial purposes. Now, however, increasingly diverse groups are competing for fishery resources. Recreational or sport fishermen, for example, now must frequently be considered in establishing fisheries policies along with the more traditional user groups. In a broader sense, all interests laying claim to water resources must be considered, including industrial plants, agricultural interests, urban water supply users, etc. Further, none of these groups is homogenous. Behavior of individuals within each stakeholder group is influenced by subgroup characteristics such as ethnicity, age, class, and community of origin.

All interested parties should be represented when establishing policies for managing water resources. The identification of these parties, their aims, practices and desires, is an area where social scientists can make important contributions to fisheries management. Social scientists can also help to identify new and alternative management institutions (such as various

forms of co-management) which may better integrate these diverse interests in the management process.

Background

Social scientists see fisheries as complex systems, involving harvesters, buyers, processors, wholesalers, retailers and consumers; support industries such as equipment, fuel and ice suppliers; families and community networks; and scientists, managers, administrators, and legislators. The interactions of these various individuals and groups, their knowledge bases, values and perceptions of the fishery, all contribute to the types of fisheries policies enacted, as well as to the success or failure of management systems. Social scientists can make a special contribution in conceptualizing the comprehensive view of fisheries which is needed in fisheries management today.

To be most effective in supporting successful fisheries management, social science must be used throughout the management process. In the design phase, social and economic research and analyses can identify management strategies that will provide less social and/or economic disruption and dislocation and be best accepted by fishing communities and other stakeholders, thus minimizing costs and maximizing compliance. By combining these insights with biological and ecological information, managers should be able to create a more effective plan.

In the evaluation phase, social science analyses can identify such problems as:

- Distribution and equity concerns
- Behavioral aspects related to job satisfaction requiring special efforts in both education and enforcement
- Erroneous conceptions that need to be addressed to avoid unnecessary conflict
- Existing local resource use patterns that could be integrated with current management regimes

Awareness of these factors should clarify the social, economic, and biological costs of proposed regulations, helping to achieve management objectives and provide sustainable fisheries for the benefit of all stakeholders.

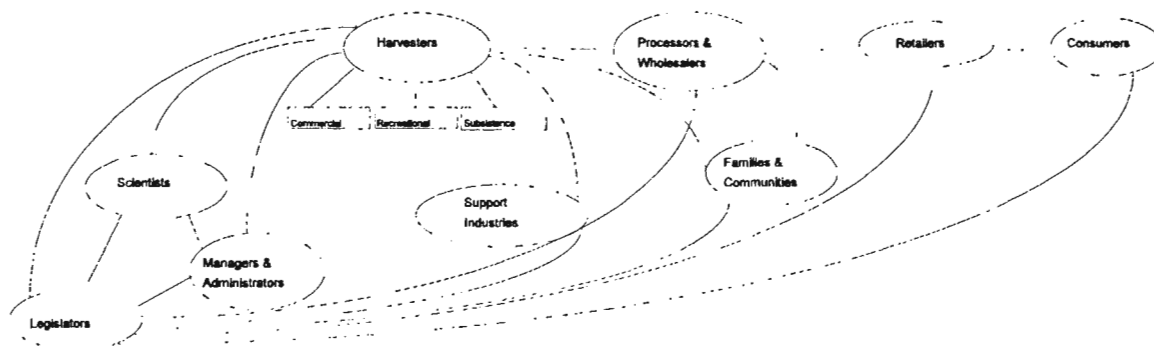


Figure 1. – The fisheries system.

Some types of social science studies of fisheries

At the harvest level, social science studies of fisheries reveal that not all harvesters or fishing fleets operate in the same way, or have the same sorts of impacts. Resource utilization and behavior of harvesters and their corresponding fleets is often influenced by family, community, and other sociocultural variables as well as by economic and biological factors. By utilizing perspectives and methodologies derived from disciplines such as anthropology and sociology, fisheries managers should be able to develop policies which consider and balance appropriate economic, social, and biological goals. As a result, management programs are much more likely to be compatible with harvesters' values, resulting in higher levels of compliance and reduced enforcement costs.

At the management level, social science studies examine both the structure of management institutions (national, regional and local) and the rules (formal and informal) by which fishery policies are crafted and adopted. Such studies illuminate which people or stakeholder groups have structural power, informal influence, access to information, and/or officially recognized knowledge – and which do not. Sources of conflict in the policy decision making process (e.g., communication problems and mistrust among stakeholders) can then be distinguished and explained. Strategies can subsequently be designed which facilitate less combative and more consensual decision making.

Harvesters, buyers and processors

Studies of harvesters, buyers and processors fall under a variety of categories. Social scientists study fishing vessel crews and shoreside employees; how these are chosen, patterns of interactions at sea and on land, remuneration policies, and commitment levels to the fishery as a way of life. Others studies investigate the actual activity of fishing or buying or processing, and explore formal and informal rules of access to fishing rights or grounds, ethno-ecology, information networks, capital management, superstitions and rituals, attitudes toward and patterns of innovation and

change, or fishing behavior and strategies. Research on markets is frequently conducted, examining the influence of price versus kinship in deciding buyer and seller preferences and the existence and nature of formal institutions (e.g., cooperatives) and informal trade networks. Broader studies of fishing communities examine politics and conflict, ethnic divisions, gear-based or product-based divisions, and patterns of family involvement in the fishery.

These studies invariably demonstrate that people do not react either uniformly or solely on the basis of biological assessments. Acheson (1984) describes a case where regulations designed to curb exploitation instead generated a more capitalized fleet, with greater fishing power. In another study, Davis (1984) showed how regulations imposed by the national government conflicted with an existing local management system, leading to resistance by harvesters and circumvention of the intended limited entry program. Frequently, cultural and social beliefs and structures affect user group reactions to management actions. Doeringer *et al.* (1986) revealed how differences among ethnic groups (kinship-based versus capitalist-based hiring practices) affect attempts by managers to reduce the fishing labor force. Structural initiatives to encourage displacement of fishing effort from one fishery (perhaps an overexploited one) to another are often contingent on social attitudes and practices. For example, the choice between inshore and offshore fishing is often related to the desire of fishing crews to spend time with family, especially young children (Binkley, 1990). As well, job satisfaction varies among fisheries, even within small geographic areas (Gatewood and McCay, 1990).

Studies of processors and buyers also show that factors other than the efficient use of capital are important and that social ties often support economic exchanges, in contravention of the commonly used model of anonymous markets. Wilson (1980) found that long-term relationships between retailers and wholesalers were mutually beneficial in confronting uncertainty and other characteristics of the fresh fish market.

Table 1. – Some fisheries social science topics.

Types of Stakeholder Groups	Types of Studies	Types of Concerns
Harvesters – Commercial, Recreational	Design of Policies	Distribution & Equity
Subsistence	Evaluation of Policies	Behavior & Job Satisfaction
Buyers/Dealers/Wholesalers	Basic Data Collection on Stakeholder Groups	Cultural Miscues & Miscommunication
Processors	Social Impact Assessment	Local Resource Management Patterns
Retailers	Other Theoretical/Predictive Research	
Consumers		
Support Industries		
Families/Communities		
Scientists		
Managers/Administrators		
Legislators		
Coastal Property Owners		
Water Users		

uncertainty and other characteristics of the fresh fish market.

Scientists and managers

Studies of managers examine perceived and formal management goals, attitudes of scientists and managers, current management practices, paths of information flow, legal and social bases for management and existing mechanisms for conflict resolution. Factors scrutinized are often subtle (*e.g.*, venues for public hearings; use/lack of translators for non-native speakers, and normative register of language used [*e.g.*, academic versus casual]), but can critically influence the inclusion or exclusion of various stakeholder groups. Differences in physical and social structural constraints (*e.g.*, infrastructure, institutional procedures, and work patterns) and cultural constraints (*e.g.*, past experiences with regulations, goals, and attitudes) can also inhibit dialogue (McGoodwin, 1990; Smith, 1982).

Charles (1992) postulated that conflicts in fishery management arise “from natural tensions between three differing fishery paradigms (or “world views”), each based on a different set of policy objectives” what he calls the conservation paradigm, the rationalization paradigm, and the social/community paradigm. Such incompatibilities are often responsible for the reduced effectiveness of communication among participants in the fisheries management process (Clay, 1993).

Policy makers, like other groups, are heterogeneous and exhibit diversity of views and goals. For example, Callicott (1991) documented conflicts between managers who strove for conservation (which allows for use and change) and those who advocated preservationist policies (which seek to maintain a specific status quo). These and other conflicts can immobilize management institutions and inhibit successful management (Cicin-Sain and Orbach, 1986).

Theories of common property and co-management

Traditional fisheries management often assumes that fisheries are open access and therefore subject to the “tragedy of the commons”. In recent years, however, social scientists have focused attention on the efficacy of local, informal systems of resource management. Rather than being open access, such fisheries are managed under common property regimes. A number of basic requirements for the success of such systems are difficult to achieve in most industrial nations or locales. Libecap (1989) and Ostrom (1990), for instance, found that participatory decision making was least difficult in small, stable groups where mutual monitoring is generally easily accomplished, and in cases where the access rights are clearly defined. Isolated inshore fisheries are the most likely to meet these criteria (Schlager, 1990; Scott, 1993). However, some such systems (both historical and current) have been documented in industrial nations (*e.g.*, Acheson, 1975; Davis, 1984; Dyer and Leard, 1994; Ruddle and Akimichi, 1984; Stiles, 1986). When these conditions do not apply, some form of joint federal-local management may more appropriate; this is often called co-management (*e.g.*, McCay and Acheson, 1987; Pinkerton, 1989).

CONCLUSION

There is increasing recognition that fisheries management is as much a “people-management” problem as a biological or economic one. By definition, a fishery does not exist in the absence of human fishing effort. Effective fisheries management must be responsive not only to biological and economic concerns, but to social and political ones as well. New approaches must be developed that facilitate collaboration and communication among all parties involved in – or affected by – the management process or management actions. Social science can make important contributions in these endeavors by providing policy makers with information concerning

value systems, perceptions of social and economic equity, and the social and economic conditions under which management regimes are most likely to succeed. This will require that social science be fully integrated into the policy making process. The challenge to social scientists will be to develop more rigorous, uniform, and replicable means of analysis so that policy makers and managers can use social science data and information with greater confidence and understanding.

REFERENCES

- Acheson J. 1975. The lobster fiefs: economic and ecological effects of territoriality in the Maine lobster industry. *Human Ecology* 3, 183-207.
- Acheson J. 1984. Government regulation and exploitative capacity: the case of the New England groundfishery. *Human Organization* 43, 319-329.
- Binkley M. 1990. Work organization among Nova Scotian offshore fishermen. *Human Organization* 49, 95-408.
- Callicott J. B. 1991. Conservation ethics and fishery management. *Fisheries* 16, 22-29.
- Charles A. 1992. Fishery conflicts: a unified framework. *Marine Policy* 16, 379-393.
- Cicin-Sain B., M. K. Orbach, 1986. Mutual mysteries: Washington/regional interactions of fisheries management policy. *Policy Studies Review* 6, 348-357.
- Clay P. 1993. Management regions, statistical areas, & fishing grounds: criteria for dividing up the sea" Northwest Atlantic Fisheries Organization Scientific Research Council Document 93/98. 34 p.
- Davis, A. 1984. Property Rights and access management in the small boat fishery: a case study from southwest Nova Scotia" In: Atlantic Fisheries and Coastal Communities: Fisheries Decision-Making Case Studies, C. Lamson, A. Hanson eds. Dalhousie Ocean Studies Programme, Halifax, Nova Scotia, 133- 164.
- Doeringer P., P. I. Moss, D. G. Terkla eds. 1986. The New England fishing economy: jobs, income & kinship. University of Massachusetts Press, Amherst, Massachusetts, USA, 147 p.
- Dyer C. R. Leard 1994. Folk management in the oyster fishery of the U.S. Gulf of Mexico. In: Folk Management in the World's Fisheries: Lessons for Modern Fisheries Management, C. Dyer, J. R. McGoodwin eds. University Press of Colorado, Niwot, Colorado, USA, 55-90.
- Fricke P. 1985. Uses of sociological data in the allocation of common property resources: a comparison of practices. *Marine Policy* 9, 1, 39-52.
- Gatewood J. B., B. J. McCay, 1990. Comparison of job satisfaction in six New Jersey fisheries: implications for management. *Human Organization* 49, 14-25.
- Libecap G. D. 1989. Contracting for property rights. Cambridge University Press, New York, 132 p.
- McCay B. J., J. Acheson eds., 1987. The question of the commons: the culture and ecology of communal resources. University of Arizona Press, Tucson, Arizona, USA, 439 p.
- McGoodwin J. R. 1990. Crisis in the world's fisheries: people, problems, and policies. Stanford University Press, Stanford, California, 235 p.
- Ostrom E. 1990. Governing the commons: the evolution of institutions for collective action. Cambridge University Press, New York, 280 p.
- Pinkerton E. ed. 1989. Co-operative management of local fisheries: new directions in improved management and community development. University of British Columbia Press, Vancouver, British Columbia, 299 p.
- Ruddle K., T. Akimichi eds. 1984. Maritime institutions in the western Pacific. Senri ethnological studies no. 17. National Museum of Ethnology, Osaka, Japan, 327 p.
- Schlager E. 1990. Model specification and policy analysis: the governance of coastal fisheries, Ph.D. dissertation. Workshop in Political Theory and Policy Analysis, Indiana University, Bloomington, Indiana, USA, 247 p.
- Scott A. 1993. Obstacles to fishery self-government. *Mar. Res. Econ.* 8, 187-199.
- Smith M. E. 1982. Fisheries management: intended results and unintended consequences. In: Modernization and Marine Fisheries Policy, J. R. Maiolo, M. K. Orbach eds. Ann Arbor Science, Ann Arbor, Michigan, USA, 57-94.
- Stiles G. 1976. The small maritime community and its resource management problems: a Newfoundland example. *Marine Policy and the Coastal Community* D. M. Johnston ed. Croom-Helm Publishers, London.
- Wilson J. A. 1980. Adaptation to uncertainty and small numbers exchange: the New England fresh fish market. *Bell J. Econ. Manage. Sci.* 11, 491-504.