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Policy Perspectives

Perspectives on resource management and environmental policy from the Centre for Resource Management and Environmental Studies (CERMES), Faculty of Pure and Applied Sciences, University of the West Indies, Cave Hill Campus, Barbados.

The Centre for Resource Management and Environmental Studies (CERMES) has initiated this outreach publication, ***Policy Perspectives***, primarily in order to share some of the lessons from recent projects. Our interdisciplinary applied research projects emphasise learning-by-doing through the collaboration of researchers, beneficiaries and other parties. The information in these policy briefs may be used by policy-makers and their advisers to strengthen the linkages between research and policy in the Caribbean. This connection is often weak in natural resource management and governance.

Network analysis in marine resource governance from a policy perspective

This is the first in a series of policy briefs on marine resource governance with emphasis on small-scale fisheries in the eastern Caribbean. The briefs are outputs of a 4-year research project on the topic that uses a conceptual framework derived from complex adaptive system (CAS) and social-ecological system (SES) perspectives. Network analysis is part of this research. How networks and their analysis fit into marine resource governance from a policy perspective is the focus of this brief. Others will follow on the research framework and lessons learned from project implementation.

Social networks among actors and stakeholders, and networks of organizations and countries, are gaining prominence in studies of natural resource management and policy. This is especially so where adaptive management based on participation and co-management characterize governance.

In this issue we promote networks as real and measurable phenomena that exist in marine resources governance and can be analyzed using network analysis in order to learn and improve governance.

What are networks?...Definitions

Networks can be defined in many ways. They are structured or patterned relationships among individuals, groups and organizations. They include vertical and horizontal patterns of exchange, interdependent flows of information, reciprocal lines of communication. A network is a structure of nodes (e.g. individuals, organizations, countries etc.) connected to each other by one or more specific types of relationships or ties (e.g. information, trade, finance, assistance, conflict etc.).

Everyone has a personal network of family, friends and associates. In these networks you are the 'ego' and the others are called 'alters'. If an organization such as a government fisheries authority or fisherfolk organization is at the centre of the network its alters can be the other organizations with which it does business, cooperates, competes or conflicts.

Networks versus conventional views

Networks originated in mathematical graph theory, but have become common in many academic disciplines and business. They can be mapped to show the characteristics of the ties between the nodes. In network analysis, unlike most other types of investigation, it is mainly the ties or connections that are being studied rather than the nodes. Both are displayed in network diagrams where nodes are the symbols and ties are the connecting lines (Figure 1).

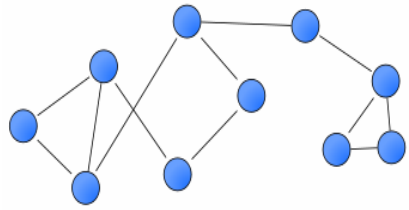

Figure 1: Simple network diagram

If the network above was of the officers in a typical fisheries department you would realize that it does not look like a conventional organizational chart or organogram (Figure 2).

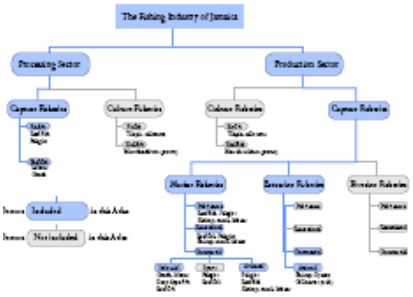

Figure 2: Fallacy of the formal organogram

The network has no neat hierarchical structure of who reports to whom and clearly defined teams or sections. However, we all know that reality is closer to what the network shows as people talk more and work more with their friends, bypassing formal lines of authority and communication.

If we want to research how things actually happen, then we need to consider networks. In a formal structure we always see the Permanent Secretary of Chief Fisheries officer as the policy adviser to the Minister who is policy-maker. In reality we know that there are many stakeholders and interest groups that have strong influence on policy (fisheries or otherwise).

Powerful influences on policy and management may have many network connections, or they may be the only people connecting different groups so that relationships have to pass through them. These features show up in network analysis.

Analyzing networks

Network analysis examines system structure by measuring the relationships and flows between nodes. Depending on the type of analysis (food web, community, fishery, business) network nodes can be individuals, organizations, countries or whatever entities are appropriate. The focus on ties (relations between a focal node and other nodes) and links (relations only between other nodes in the focal node's network) as the main features that confer network properties, rather than the nodes themselves, is distinctive to network analysis. Ties and links between nodes may be characterized in many ways.

In social network analysis the strengths and directions of the flows of information, assistance, funds, conflict and other types of exchanges are quantified and described. Analysts use terms such as centrality, betweeness and density to describe networks. In small-scale fisheries systems, network analysis can assist in determining characteristics that confer resilience and adaptive capacity in governance.

Networks and marine resource governance

In social ecological systems (SES) such as fisheries, networks consist of nodes and links that represent components and the relations between them. The relations can be entirely social, entirely ecological (food web), or mixed (Janssen et al 2006).

In the fisheries governance arrangements in the eastern Caribbean the SES emphasis is on people and organisations connected by ecosystems. For example, the large pelagics, flyingfish or any other CRFM or WECAFC Working Group connects the countries and their fisheries authorities in data sharing and some level of collaborative analysis with the aim of making management decisions (or tendering the scientific advice for policy decisions) that later get implemented. You can use network analysis to map and measure the various actors involved and how they interact in coming to decisions.

The governance of tuna management in the Caribbean is an example of a SES network across different scales. ICCAT (an international organisation with contracting parties); CRFM, OECS, WECAFC (regional organisations), national fisheries management authorities, and fisherfolk organisations (local) are nodes.

The relations between the organisations in this network (see Figure 3) can be examined as management, political, cultural and other types of interactions. Power is revealed in these interactions. ICCAT, a multilateral agency, relies mainly on "big science" to set quotas and conserve resources. The member nations, or contracting parties, enforce international rules on their fishing industry based on this science and the management decisions it facilitates. When local perceptions of resource availability and sustainability are at odds with the international view, there is potential for conflict. Authors have argued that marine resource governance (and especially of fisheries) at the international, regional, national and community levels are mismatched and poorly linked.

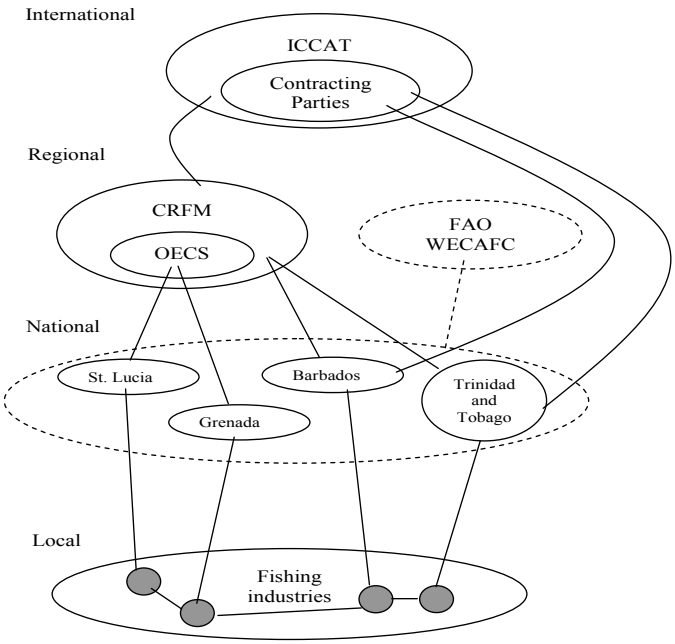

Figure 3: Cross-scale networked governance in Caribbean tuna management. ICCAT=International Commission for the Conservation of Atlantic Tuna, CRFM=Caribbean Regional Fisheries Mechanism, OECS=Organization of Eastern Caribbean States, FAO=Food and Agricultural Organization of the United Nations, WECAFC=Western Central Atlantic Fisheries Commission (Adapted from Berkes 2006). Dashed lines of FAO WECAFC and around its member states indicates relationships of secondary importance. Dark-filled fishing industry circles represent dense networks of non-State stakeholders. Source: McConney et al (in press)

The CERMES MarGov project (see box below) is all about unravelling the intricacies of marine resource governance in the eastern Caribbean by examining cases such as that of ICCAT and large pelagics as briefly introduced above.

What international agencies communicate effectively with their member countries? Which Fisheries Divisions inform their fishing industries on international and regional policy to improve participation in decision-making? What channels are used to exchange information? Can fishing communities that lack a consistent voice in policy through well-established goups play a role in governance? What policy enables weak links between national and community level groups to be strengthened through self-organisation? MarGov seeks to address governance questions like these via network analysis.

This policy brief is an output of the CERMES project on ***Marine resource governance in the eastern Caribbean*** (the ***MarGov project***). Its preparation was carried out with the aid of a grant from the International Development Research Centre (IDRC), Ottawa, Canada. The views expressed are those of the author(s) and do not necessarily represent those of the IDRC. Additional information on MarGov is available on CERMES' web site.