Marine Policy 77 (2017) 182–190

Contents lists available at ScienceDirect

Marine Policy

journal homepage: www.elsevier.com/locate/marpol

Socio-economic impacts of a closed fishing season on resource-dependent stakeholders in Tamil Nadu, India: Differences in income and expenditure effects by occupational group

Julia M. Novak Colwell[a,*,1], Mark Axelrod[a,b]

[a] Department of Fisheries and Wildlife, Michigan State University, 480 Wilson Rd, East Lansing, MI 48824, USA
[b] James Madison College, Michigan State University, 842 Chestnut Rd, East Lansing, MI 48825, USA

A B S T R A C T

Resource use restrictions often disproportionately impact the most vulnerable stakeholders. This research aims to understand how conservation policies – particularly harvest restrictions – affect different segments of resource dependent populations. Through an examination of a closed fishing season in Tamil Nadu and Puducherry, India data was collected over three seasons on resource-dependent and independent stakeholder groups' incomes, expenditures, smoothing mechanisms and livelihood enhancement preferences. While regulated harvest-sector stakeholder groups are heavily impacted by the regulation as expected, the results indicate that it is actually the less politically powerful within this group that are disproportionately impacted. Additionally, those individuals in allied professions, outside of the harvest sector and excluded from fisheries management decisions, are also heavily impacted by the closed season. The acceptability of livelihood enhancement options offered to affected individuals is impacted by both gender and cultural constraints. The results highlight distributional equity concerns stemming from a resource management decision and bring attention to the cultural considerations that must be taken when developing viable alternative livelihood options for short and long term relief.

1. Introduction

1.1. Livelihood impacts of environmental regulations

It has been increasingly accepted within the conservation community that conservation policies will not be successful unless they simultaneously speak to local development needs [33]. The way in which policies address these needs has important implications for environmental justice and the related distributional impacts of environmental policies.

Policies can have both limiting and additive impacts on individuals' livelihoods. For instance, policies that promote overspecialization can undermine livelihood diversification and limit adaptive strategy options [3]. Conversely, policies that promote education can increase long-term livelihood diversity options [23].

Some policies exacerbate or alleviate intra-communal inequities. For example, policies that promote production sectors have been shown to marginalize women and create gender specific opportunities that can intensify gender inequities [26]. Bias towards the harvest sector has also, in some cases, led to undervaluation of resources, where important users and their associated resource-dependent livelihood activities are overlooked [10].

Institutions that govern resource use can raise equity concerns [22]. For example, conservation policies may decrease poorer users' resource endowment [5]. In the case of the Hilsa fishery in Bangladesh, fishing restrictions have been based on an undervaluation of the Hilsa fishery's importance to some Bangladeshi communities' food and economic security [18]. As a result, poorer segments of the fishery dependent population have been disproportionately impacted by a government decision to close fishing grounds and seasons. Unequal access to aid among fisher households has exacerbated the problem [20].

This research aims to understand how conservation policies – particularly harvest restrictions – affect different segments of resource-dependent populations. By understanding who is impacted by regulations, decision makers can develop strategies to proactively mitigate negative social consequences while maximizing overall conservation and development benefits. Some scholars assert that short term losses from ecosystem restrictions impact the poor most and that these losses

* Corresponding author.
E-mail addresses: julia.mn.colwell@drexel.edu (J.M. Novak Colwell), axelrod3@msu.edu (M. Axelrod).
[1] Present address: Pennoni Honors College, Drexel University, 5016 MacAlister Hall Philadelphia, PA 19104, USA.

http://dx.doi.org/10.1016/j.marpol.2016.10.026
Received 12 August 2016; Received in revised form 11 October 2016; Accepted 12 October 2016

can be mitigated by providing training programs and alternative income streams, or by establishing savings or credit groups [32]. This study demonstrates that while the poor may be most impacted by restrictions, these impacts may manifest in different ways for different occupational groups, given the limits on individuals' adaptation options that stem from cultural and gendered constraints. Finally, policy adaptability may be the most important mitigation measure for limiting inequitable impacts of marine conservation policy.

1.2. Causes of unequal impacts

Unequal access to resources and inequitable policy impacts may be fueled by socio-economic factors. Some scholars assert that even if individuals have equal access to a resource, they may not have equal ability to take advantage of that access [1]. Therefore, certain factors may enable one group to access a range of resource options while inhibiting another group from doing so. These factors are important to identify for management or development initiatives [4]. Putnam [25] asserts that low levels of certain types of social capital limit livelihood options: individuals who have limited networks may have difficulty accessing certain opportunities. Opportunities to seasonally diversify rural livelihoods vary by gender, education level and skill set [16]. In South Asia, a range of cultural constraints prohibit some women from accessing certain resources and livelihoods options. The practice of purdah, for example, prohibits some women from leaving the home, making livelihood opportunities that rely on outside-the-home movement untenable [2]. In caste fishing areas in India, women are responsible for shore-based activities, while only men have access to fishing harvest as a livelihood option [26]. Similarly, local rules prohibit non-caste fishermen from harvesting fish, restricting these individuals to jobs associated with stocking boats, transporting supplies and boat maintenance duties [29]. Others are constrained from non-fishing professions due to fishing caste identity [15]. When socio-cultural factors limit individuals' opportunities to adapt under changing circumstances, further uneven and inequitable policy impacts may result. Those facing such constraints may limit the negative impacts if they have training that allows them to pursue alternative livelihoods when harvest is restricted.

The above stakeholders are often not considered in the policy process, but they may be affected by harvest restrictions. Stakeholders with fewer options to diversify often have higher stakes in management decisions [5] and may require targeted inclusion in the decision making process. However, those with more power (and wealth) tend to capture more benefits from conservation policies [32]. Even if stakeholder groups are included in decision making processes, intragroup power relationships may direct maximum benefits to some individuals over others. Fig. 1 outlines the conceptual relationship between power, inclusion, derived benefits and livelihood options.

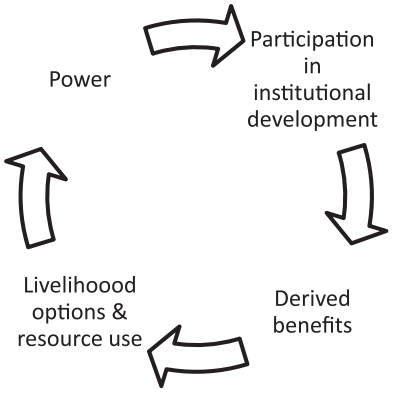

Fig. 1. Conceptual framework of feedback loop where livelihood strategies and resource use influence an individual's power and their inclusion in policy making, thereby impacting the derived benefits received from policy.

Occupation and gender are indicators of marginalization, as socio-cultural factors limit certain individuals to certain livelihoods. This study assesses whether marginalized groups – particularly non-harvest sector workers – face different strains from harvest restrictions than consulted stakeholders. Additionally, this research differentiates between impacts on boat owners and employed harvesters. Finally, it considers whether impacts can be mitigated by an ability to diversify to other income earning activities (i.e., decreasing resource dependence).

2. Material and methods

2.1. India's seasonal marine fishing ban

To investigate unequal impacts of harvest constraints and viable mitigation measures, this study examines a closed fishing season (i.e., seasonal ban) in India. This resource management decision involved individuals from the production sector (i.e., fish harvesters), while other members of allied sectors[2] were not consulted. The study was conducted in caste fishing areas along the Eastern coast of India where a 45 day seasonal, mechanized[3] fishing ban is enacted each year from April-May.

The seasonal ban is India-wide and implemented at the state level. It was originally instituted on the Western coast (Kerala) as a mechanism to resolve conflict between artisanal and mechanized fishers. This conflict between large (mechanized) and small-scale (artisanal) fishing was particularly heated in Kerala, Goa and Tamil Nadu (TN) where there was a significant tradition of fishing, pitting artisanal and mechanized fishers at odds. Trawlers frequently destroyed artisanal gears and the larger quantity of fish landed by trawlers was seen as a threat to small-scale fishers. The original ban was timed to coincide with the Southwest monsoon season. During this time on the West coast, fishers face increased safety risk, and a large number of species spawn, maximizing the conservation and safety benefits of a closed season. However, on the East coast of India, the ban was timed to coincide with the lean season, resulting in little objection from mechanized fishers but potentially fewer conservation benefits. In 2001, TN (Fig. 2) joined an annual East coast ban that remains in place from 15 April to 29 May (*V. Vivekanandan, personal communication, May 7, 2015).*

The ban is upheld as one of the only successful state-sponsored fisheries management regulations in India [31], due to the history of its joint evolution between fishing communities and the government. In contrast, multiple unsuccessful regulations are in place under the TN Marine Fisheries Regulation Act of 1983, including net and mesh size restrictions [6]. The initial decision to implement the ban was a joint exercise between fisheries professionals, scientists, and mechanized boat owners. Representatives of mechanized boat fishers were consulted in the late 1990s during the first technical committee's meeting for the TN ban. During this time, the season and duration were agreed upon between these stakeholders. More recently (2013), in national level discussions regarding ban modifications, small-scale motorized and non-motorized fishers were also consulted in a series of stakeholder meetings held at CMFRI[4] regional centers along the TN coast (*E. Vivekanandan, personal communication, June 29, 2015*). Other allied sector stakeholders were not consulted. Both this narrow consultation process and the wide-range of stakeholders makes the TN ban a good case for assessing unequal impacts on marginalized groups.

As a fisheries management regulation, the ban aims not only to

[2] Members of the allied sectors are defined as "adult members…engaged in marketing of fish, making/repairing net, laborer, etc. (laborer includes head load workers, helpers, etc. at the landing centers) and other fishing associated activities such as auctioneers, ice breakers, members involved in collection of bivalves, other shells, seaweed, ornamental fish, etc." (CMFRI, 2010:13).

[3] Mechanized boats have engines over 25hp and a net hauled in by machine rather than man power.

[4] India's Central Marine Fisheries Research Institute.