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Gone fishing? Intergenerational cultural shifts can undermine common property co-managed fisheries

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ABSTRACT

Conventional common property thinking assumes that a central goal of management is to maintain social-ecological systems in a healthy and resilient state, including maintaining the ability of communities to harvest across time and generations. Little research has been done, however, on how common property systems are affected by demographic shifts, the social status of emerging livelihoods, and the employment aspirations of users for their offspring. An empirical case study from Chile (well known for its common property fisheries) suggests that major socio-cultural shifts are now occurring, with a lack of entry by new fishers and an aging population of existing ones. These types of social and cultural changes are increasingly common through globalization and worldwide economic development, and pose significant policy challenges across broad classes of common property systems. The Chilean case reveals that community adaptive capacity can come at the expense of social-ecological common property systems, and highlights the need to consider the broader context of 'slow' social variables.

1. Introduction

Many issues of resource sustainability pertain to environmental goods susceptible to overexploitation, where extraction is difficult to regulate. Common property regimes – where ownership is shared and enforced – have been frequently suggested as a solution [1].

Implementing a common property regime, even according to "best practices" (e.g., Ostrom's design principles), however, is no guarantee of success [2]. For instance, common property systems can disrupt existing functioning institutions [3] or create imbalances in power and the allocation of benefits [4]. Consequently, efforts to systematically understand the contexts and factors associated with successful social and ecological outcomes continue: for example, through 'diagnostic' frameworks that explicitly incorporate feedbacks, multiple scales, and ecosystem components [5,6].

Regardless, the viability of common property systems in part hinges on collective action, including the shared desire to maintain resources, and a willingness to bear costs in time, energy, and money toward the development and enforcement of norms and regulations. However, little attention has been paid to how collective desires to maintain resources may be eroded.

Implementation and maintenance of common property systems depend on the right mix of incentives and local user interests in organizing for and investing in the system. Yet the crucial role of intergenerational change (as a 'slow' social variable) in determining the resilience of common property regimes is often missed, despite calls in social-ecological systems theory for their consideration [7]. Instead, the preponderance of attention is on 'fast' (e.g., stock recruitment) ecological variables and their direct effects on the sustainability of natural resources.

In commons problems, examples of 'slow' variables are intergenerational shifts in education levels, employment opportunities and expectations, changing notions of 'success', altered motivations, and rural-to-urban migrations. Critically, the aforementioned demographic and cultural changes could lead to a lack of recruitment of new fishers. While research on common property has considered the livelihood diversification of fishers [8,9], and the recruitment of marine species [8,10], relatively little attention has been paid to recruitment of new marine users.

Through an exploration of a well-known example of a common property system, we aim to show that a creeping crisis for co-managed common property systems exists in demographic shifts, changes in the

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social status of livelihoods, and the employment aspirations of users for their offspring. These types of social and cultural changes are common in economic development [9] and can pose policy challenges across broad classes of common property systems.

Below, we highlight the Chilean artisanal fisheries context and similar instances of social change in fishing industries around the world. We then detail the methods and results of our investigation of slow social changes in the Chilean case study, asking how enduring the quality and nature of the system might be, or fail to be. We then discuss the relevance of our findings for common property in Chile, and potential solutions.

2. Social change and fishers: Aging, recruitment, and alternative livelihoods

One of the world's best-known and highly regarded common property regimes for fisheries resources is the Territorial User Rights Fishery (TURF) system in Chile. It is a national co-management governance regime for benthic resources.

As detailed in Gelcich et al. [11], Chile's TURF system emerged in a void, where open-access extraction of marine resources (in particular the economically valuable mollusc *Concholepas concholepas*, or 'loco') and roving harvesters prevailed. Due to the confluence of political crisis, plummeting resource stocks, and innovative collaborations between fishers and scientists, a new regime of governance was introduced in 1991, which has since delivered stabilized stocks.

To participate and benefit from TURFs, fishers must be members of licensed fishing associations known as syndicates (or colloquially known as *caletas*). Syndicates are also required to submit and pay for an initial baseline study, and be reviewed on a yearly basis. To date, over eight hundred concessions to areas of the seabed and the species within them have been assigned [12] to approximately 300 associations [13]. In addition to enabling fishers to participate in the TURF system and gaining exclusive access to resources, membership in syndicates also serves to increase social and economic security through risk-spreading and cost- and benefit-sharing.

Small-scale artisanal fishers, to which the TURF system primarily applies, tend to operate boats of less than 10 m in length. Membership in syndicates and participation in small-scale fishing in general continues to reflect the inherited and family nature of the profession, being passed on from parents to children. Importantly, TURF participants are generally a mix of divers (who directly extract benthic resources) and fishers (e.g., who operate dive boats and engage in monitoring and enforcement). At the time of research, artisanal fishers had exclusive access to fisheries resources within five nautical miles of shore for a large section of Chile's coastline.

Since the initial implementation of the TURF system, Chile has experienced significant economic and industrial development along its coastline, which has generated demand for marine resources and opportunities for coastal communities in terms of employment (e.g., tourism and construction). These socio-cultural changes, however, may come to threaten the resilience of the system.

The effects of socio-cultural change on the persistence of small-scale fishing communities and systems have been documented worldwide, most notably in the lack of recruitment of new fishers. For example, in North Norfolk in the United Kingdom, downsizing in fishing crews, increasing start-up and operational costs, and changing professional aspirations among youth and among existing fishers for their children were identified as reasons why recruitment has become difficult [14]. As Johnsen and Vik [15] note, factors both within the fishing industry and outside of fishing can act independently or interactively to affect whether a person enters or stays in the industry. In their study, Norwegian fishers who had exited the industry cited educational and other occupational opportunities, poor working conditions, and personal lifestyle preferences (e.g., insufficient time with family) as causes. Johnsen and Vik [15] additionally note that these reasons may be interacting with changes in the broader Norwegian welfare state and reductions in the size of the fishing fleet.

Similarly, a recorded dearth of interest among youth to participate in fisheries was found in a recent study in Newfoundland, Canada [16]. In Newfoundland, youth perceptions that fishing opportunities are few and are of low-status, and that greater job prospects exist elsewhere are being compounded by the erosion of social ties and capital from out-migration, giving even fewer reasons for potential fishers to stay. The trend of aging fishers is also noted in Taiwan [17], Japan [18], and other OECD countries – including France, Scotland, Australia, and the United States [19].

What is clear from recent studies is that recruitment and exit from fishing is not a simple phenomenon with single causes and interpretations [20], nor are the effects of socio-cultural change homogenous across age classes and community members [21].

Despite this, in the realm of common pool natural resource management, the effects and implications of 'slow' socio-cultural change have not received much attention, and examples of solutions are lacking. In addition, studies on recruitment generally have not examined these kinds of changes and their implications for sustainability in the context of celebrated common property systems.

While shifts away from the fishing profession are being addressed in parts of the world – for instance, via initiatives to enhance transferrable skills in the fishing sector in France to decrease the perception that fishing is a professional "dead-end" [19] – such efforts are piecemeal and can be of limited success if they do not address underlying causes [14].

In addition, a common thread in the academic literature is that socio-economic factors that lead to the diversification of livelihoods or transitions away from primary resource extraction are generally positive for resource sustainability [8,22]. Such a perspective may overlook the contributions that common property regimes like TURFs can deliver toward resource and social sustainability at larger scales.

In the context of Chile's TURF regime, fishers have become environmental stewards, more species have been protected under the system, and fishers have been able to maintain their livelihoods and diversify [11]. The TURF system thus appears to be well managed from a linked social-ecological point of view. However, given the development of Chile's economy in recent decades, there is reason to anticipate that generational differences in the perceived value and viability of fishing may threaten the TURF system. In particular, this study sought to examine whether the TURF system's future was at risk from attendant social and economic changes, including in demography and the attitudes, aspirations, and behaviours of small-scale fishers and divers in response.

3. Methodology

Data on Chilean small-scale fishers and divers were collected through two in-person surveys between January and March 2013. One hundred people participated in the first survey and 122 people participated in the second survey (some participated in both); data and results reported herein are only a subset of the data obtained through the surveys. Surveys were conducted in nine Chilean communities along 200 km of coast in Region V (directly west of Santiago).

Participants were recruited on syndicate-operated beaches where fishers conduct a variety of activities including landing their catch, administration, small business, and seafood processing. Convenience sampling was used. Caleta memberships ranged in size from 76 members (Los Molles) to 188 (Pichicuy), and were situated in rural as well as more urban areas.

Surveys included basic demographic questions, as well as enquiries into respondents' perceptions of the future of artisanal fisheries and the desire for their offspring to carry on artisanal fishing as a livelihood. In addition, survey respondents were given the opportunity to explain and elaborate on the reasons for their perceptions. These qualitative