

## Policy Brief

### Promoting small scale aquaculture in southern Chile: Targeting across time and location

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#### Background

Chile has a 6,345 km long coastline with a productive marine ecosystem. Coastal communities depend heavily on fish resources for their livelihood but resource depletion threatens those livelihoods. Local people have deep roots in their communities and lifestyles, which limits their willingness to change their work to non-marine activities. The development of small-scale aquaculture has been proposed as a means to generate new income opportunities.

#### *Biogeographic zones in Región de Los Lagos, Chile*



We explored the potential for small-scale aquaculture as an additional income-generating activity for coastal communities across the ecologically and socioeconomically diverse Región de Los Lagos in southern Chile. Based on stakeholder interviews, water quality data, and household surveys, we analyzed: (1) the perceptions of key stakeholders on opportunities and challenges for development of

diversified marine-based activities, (2) the degree of diversification and the specific activities in which coastal households engage, (3) the willingness of people to move to develop new marine-based economic activities, and (4) the availability of labor throughout the year and in different places.

#### Data and methods

To explore the potential of small-scale aquaculture as a source of alternative income, we conducted field stakeholder and key informant interviews, collected water quality

characteristics, and administered a survey to a sample of households. We performed 18 individual and group semi-structured interviews with artisanal fishers, leaders of fishers' unions, and government officials in many fishing villages of Región de Los Lagos and in the regional capital city, Puerto Montt. We met with regional and central government officials from the National Fisheries Service, Technical Service of Cooperation, and the Undersecretary of Fisheries and Aquaculture in Valparaiso. Based on those discussions, we developed and administered a survey to 316 individual households located in 73 fishing villages in eight municipalities. Analysis of these survey data characterizes the degree of diversification and the specific activities in which coastal households engage, the willingness of households to move to develop new marine-based economic activities, and the presence of labor slackness periods throughout the year and in different places. Last, we collected water samples in 38 locations to define water characteristics, including water temperature, salinity, and dissolved oxygen. Based on the results of the water characterization analysis, and considering the significant variations observed in the level of salinity, along with geographical characteristics of the coastal edge where sampled fishing villages are located (open ocean, estuaries, island, strait, bay, gulf), we identified eight biogeographic zones.



Photo: Interviews during fieldwork, northern Chiloe Island, April 2018.

## **Main results**

### ***Results from interviews.***

***Lack of regulation for development of small-scale aquaculture activities.*** Stakeholders acknowledged the absence of a unified set of rules (a law) for the development of small-

scale aquaculture. In particular, they cited the lack of a specific definition of small-scale aquaculture in terms of the included activities, rules of access, rights and responsibilities.

Since these interviews, however, law N° 21.183 has extended the procedures for relocation of aquaculture concessions of non-salmon farms such as mussels (mitilides), *pelillo* (a type of algae), and oysters. This law expands small-scale aquaculture rights by introducing a special permit for mussel seed collection outside of the concessions and TURFs/AMERBs (fishing rights). In addition, a proposal for Small-Scale Aquaculture Regulation (APE) that intends to facilitate access to this activity, while enforcing sanitary and environmental regulations, is in an early processing phase. This proposed regulation states that small-scale aquaculture activities can be developed in aquaculture concessions, private land, management areas (AMERBs), and coastal spaces of native people (ECMPO).

***Spatial planning.*** With considerable experience creating and allocating marine user rights, stakeholders see a need for more government marine spatial planning that will consider the biogeographical and socioeconomic setting, including reallocating current marine rights.

***Markets for marine products.*** The efficient functioning of markets is limited by a lack of connection with processors for both middlemen and producer cooperatives; limited market diversification; low levels of marketing to increase demand and to add value to marine resources through processing and creating new products; and a need for technical assistance.

***Quality/safety standards.*** Stakeholders call for better defined protocols for quality standards to ensure compliance with food safety standards. They also want support to help small producers address the costs of compliance.

***Monitoring and enforcement to deter poaching.*** Variation in productivity and profitability of marine activities in different places, and the exclusion of people without marine user rights, create incentives for poaching and the need for enforcement. Stakeholders describe the poaching threat as particularly critical for high value/highly productive sites, such as the “loco (wild abalone) fishery.”

***Motivation for diversification.*** Stakeholders report that their main motivation for diversifying marine productive activities is the observed trend of decline in wild fisheries, which has reduced profitability of fishing activities.

***Transition from traditional wild fishing to aquaculture.*** Stakeholders view the transition from fishing to aquaculture as a gradual process that may represent more of a diversification of activities rather than a full shift away from fishing.

***Adaptation to new jobs.*** Fishing activities create income right away (landing and selling fish) while aquaculture requires a production cycle with income generated at its end. Developing cultural awareness and knowledge of marine activities may facilitate the

transition to new marine activities. The most difficult part of the transition concerns a lack of familiarity with management, legal, and economic aspects of aquaculture production.

**Gender.** Women are more involved in small aquaculture activities than in wild fisheries. Overall, few women engage in fishing itself, although many are involved with marketing of fish. The cultural resistance to women fishers leaves women to pursue other income-generating activities, including small-scale aquaculture.

**Age.** Younger people appear more open to explore/try new activities, potentially including small-scale aquaculture. These people are also more willing to migrate out of the coastal zones for education or other work.

**Access/participation.** Access to new membership in established organizations holding marine user rights (TURFs and marine concessions) appears to be difficult or even impossible. People without such rights want to join these organizations to get access to marine resources, to reduce their effort in administrative activities, and to increase the chance of obtaining support from the government. Current members resist, or charge large fees, for new non-family membership, in order to maintain profitability.

### ***Results from Household Survey***

***Diversification of productive activities.*** We found significant diversification of marine-based income generation activities across households. The degree of diversification and the activities in which households are involved vary in different places, depending on the environmental and natural conditions and the institutional setting.

- 53% of the households report focusing on one income-generating activity and 43% of households report performing two or three activities.
- The most prominent individual activities are “fishing” and “extraction of benthic resources.” (Benthic species live at the bottom of the ocean.)
- Diversification of activities occurs across the biophysical zones, with higher proportions of households performing more than one productive activity in zone 2 (Maullín), zone 7 (Hualaihué-North) and zone 8 (Hualaihué-South) and higher proportions of households reporting only one productive activity in zone 1 (Estaquilla and Carelmapu), zone 3 (Ancud), zone 4 (Calbuco), and zone 5 (Puerto Montt).

***Low Propensity to Move.*** We observe low propensity to move to other locations, demonstrated in two ways. First, most household heads have lived in their current village for many years and were born in the region. Second, respondents to questions about willingness to commute and/or to move to undertake new small-scale aquaculture activities report a high reluctance to move, even when the alternatives generate high incomes. Most

of the respondents who were not interested in the possibility of moving argue that the main reasons were family connections and the desire to maintain their lifestyle.

***Variation in Hours of Work.*** Respondents report the highest levels of work as fishing boat crew members or in small-scale aquaculture during the spring (October to December), when they work two weeks per month in these activities on average, and less time spent in those activities in the summer. Collectors, divers, and boat owners report lower levels of time dedicated to those activities per month. Respondents also report significant variation in marine activities performed throughout the year. A labor slackness ratio – the fraction of the month that the household head and main household providers devote to marine activities – reveals that both the household head and the main workers of the household have spare labor time, especially during the winter months.

## Policy lessons

The results of the study have several policy implications:

- The challenges of using marine activities for economic development include increasing market opportunities and demand, dealing with the increasing competition for space and resources, and the need of enforcement to protect resources.
- The transition from fishing to aquaculture is a gradual process that requires cultural change management and is likely to offer a complementary income source for coastal households, rather than a substitution for traditional fishing activities.
- Households located in different biogeographical zones perform different activities based on the set of opportunities each location provides. For successful expansion of small-scale aquaculture and increasing incomes, policies and programs should be targeted and tailored to individual coastal communities based on the productivity characteristics of that zone.
- The lack of interest in moving underscores the need for geographically-targeted policies rather than region-wide policies.
- Targeting policies across the year to capture periods of relative labor availability could also increase engagement in new activities, increase diversification, and add to income levels.
- Overall, targeting and tailoring programs across both space and time will increase efficiency and generate a larger positive impact than uniform policies.



**Acknowledgements:** We gratefully acknowledge financial support for this research from the Environment for Development (EFD) Initiative under project MS-368 “Small scale aquaculture as a livelihood alternative with marine conservation benefits in coastal communities in Chile”. Chávez and Dresdner also gratefully acknowledge additional partial funding for this research provided by INCAR through CONICYT/FONDAP/15110027. Jaime Gutierrez and the team of enumerators provided valuable assistance for our fieldwork.

### **About this Brief**

This brief is based on “*Sustainability through diversification: Marine-resource based activities as livelihood alternatives for coastal communities in southern Chile*”, Albers et. al (2019); and from the results of the EFD research project “*Small scale aquaculture as a livelihood alternative with marine conservation benefits in coastal communities in Chile*” (Ref. #MS 368).

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