

## **GALAPAGOS REPORT 2011-2012**

### **MARINE MANAGEMENT**

#### **HOW TO IMPROVE THE SPINY LOBSTER FISHERY OF SANTA CRUZ ISLAND**

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Photograph: Mauricio Castrejón

## How to improve the spiny lobster fishery of Santa Cruz Island

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### Introduction

The economic performance of the spiny lobster (*Panulirus penicillatus* and *P. gracilis*) fishery in Galapagos has been negatively affected not only by the decline in lobster abundance (due to over-exploitation) and the global economic crisis, but also by the strong fragmentation of the fishing sector, the constant presence of middlemen, and the near exclusive trading of lobster tails.

In early 2010, WWF's Galapagos program launched a research and development project focused on providing technical and scientific assistance to the Galapagos National Park Service (GNPS) and the local fishing sector to improve the management and marketing system of the spiny lobster fishery in the Galapagos Marine Reserve (GMR). One of the project goals was to strengthen the value chain of this fishery through marketing live lobster. Adopting a marketing system of this type can help to increase quality and add value to the product, given that its price and demand in the international market is significantly higher than those of frozen lobster tails. This could help to improve the socioeconomic condition of the fishers, without increasing harvest levels.

### Objectives

This paper presents the most relevant results obtained by Castrejón (2012) and Velasco *et al.* (2012). The first of these studies focused on developing a strategy to improve the value chain of the spiny lobster fishery, while the objective of the second was to determine the current and potential market for whole lobster. Both studies were carried out on Santa Cruz Island.

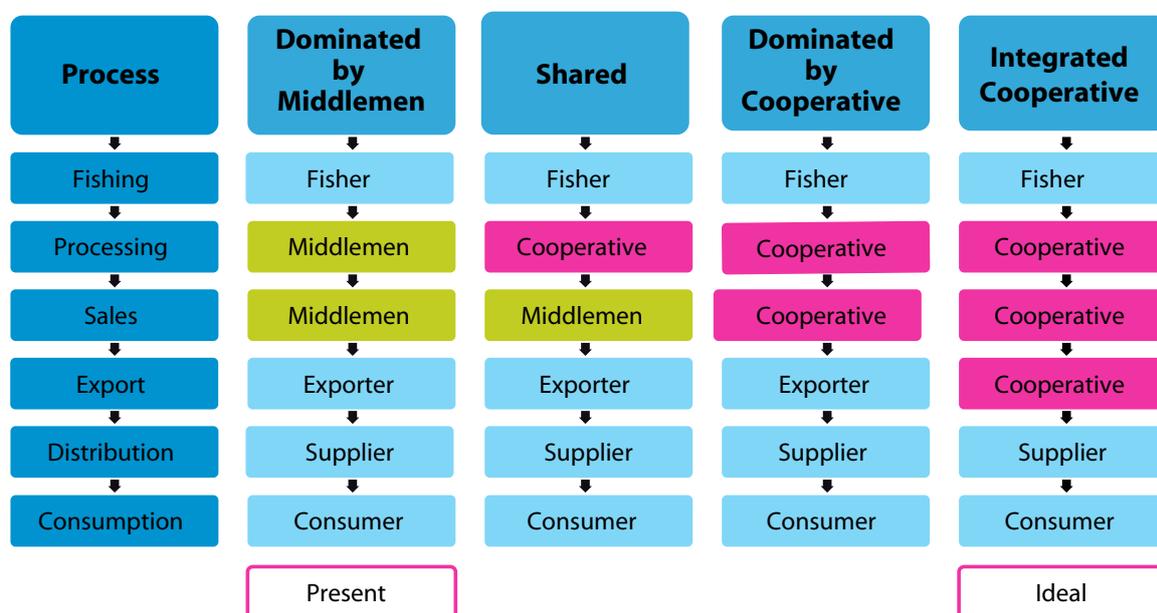
### Methods

The methods used to evaluate the value chain and market for the lobster fishery of Santa Cruz Island are described in detail by Castrejón (2012) and Velasco *et al.* (2012). Both studies were based on the collection of secondary data to understand the demographic, economic and social context on Santa Cruz with regard to the value chain and local lobster market. In addition, primary data were collected through interviews and surveys of fishers, middlemen, and exporters, as well as local consumers (hotels, restaurants and tourist boats).

Data collected by Castrejón (2012) were used for the development of an economic model whose main objective was to evaluate the impact of different marketing strategies on the income of fishers from COPROPAG (Cooperativa de Producción Artesanal de Galápagos), the only fishing cooperative on Santa

Cruz Island. The analysis included five lobster products (fresh and frozen lobster tail, fresh and frozen whole lobster, and live lobster), and four different value chains (Dominated by Middlemen, Shared, Dominated by Cooperative, and Integrated Cooperative; Figure 1, Table 1). The price of a kilogram of lobster tail (US\$/kg tail) was used as a standardized measure of comparison and was

estimated by dividing the whole lobster price per kg (US\$7.7/kg) by 0.33 (Table 1). This indicator was used to compare the costs and income generated by different types of products (e.g., lobster tail vs. whole lobster) in different value chains (e.g., Dominated by Middlemen vs. Integrated Cooperative).



**Figure 1.** Value chains evaluated in this study (Dominated by Middlemen, Shared, Dominated by Cooperative, and Integrated Cooperative). The first one represents the value chain that currently exists in Santa Cruz, while the remaining three represent hypothetical value chains, the latter being the ideal value chain, that is the value chain that would generate the greatest benefits for COPROPAG fishers according to the results of this study.

**Table 1.** Description of the value chains evaluated and the assumptions used for the economic model. For more details consult Castrejón (2012).

Value Chain	Description	Model Assumptions
Dominated by Middlemen	<ul style="list-style-type: none"> <li>Current value chain in Santa Cruz in which middlemen have all the bargaining power</li> </ul>	<ul style="list-style-type: none"> <li>Average weight of whole lobster: 1 kg</li> <li>Tail weight: 0.31 kg</li> <li>Tail represents 0.33 of total body weight (Reck, 1983)</li> <li>Operating costs were estimated by dividing the operating cost per day (US\$50) by CPUE (5.9 kg tail/diver/day); this equals US\$8.4/kg</li> <li>Operating costs of middlemen: US\$2.20/kg</li> <li>Operating costs of exporters: US\$2.52/kg</li> <li>Operating costs of fishers: US\$12.1/kg</li> <li>Price for lobster tail: US\$7/pound (equal to US\$15.4 /kg)</li> </ul>
Shared	<ul style="list-style-type: none"> <li>Hypothetical value chain</li> <li>It is assumed that all lobster production on Santa Cruz is sold through COPROPAG, which processes and sells it to merchants (i.e., local middlemen)</li> <li>Therefore it is assumed that the cooperative gains greater bargaining power</li> </ul>	
Dominated by Cooperative	<ul style="list-style-type: none"> <li>Hypothetical value chain</li> <li>It is assumed that COPROPAG takes over the role of middleman, indicating that in addition to processing the lobsters, the cooperative is also responsible for exporting the product and for its sale to exporting companies located in the mainland, which are then responsible for the sale to foreign importers (i.e., wholesalers)</li> </ul>	

	<ul style="list-style-type: none"> <li>It is assumed that COPROPAG gains a larger share of the profit, which will increase as it achieves and coordinates a single marketing channel with all fishing cooperatives of Galapagos</li> </ul>	<ul style="list-style-type: none"> <li>Price for whole lobster (fresh): US\$3.50/pound (equal to US\$7.7/kg)</li> <li>Price for whole lobster (in kg of tail): US\$23.33 /kg of tail; this was estimated by dividing the price of a whole lobster per kilogram (US\$7.70 /kg) by 0.33; this conversion was needed to have a standardized measurement (US\$/kg tail), from which to compare the costs and income generated by different types of products (e.g., lobster tail vs. whole lobster) in different value chains</li> </ul>
Integrated Cooperative	<ul style="list-style-type: none"> <li>Hypothetical value chain</li> <li>It is assumed that COPROPAG takes over the role of merchant and exporter</li> <li>It is assumed that using this value chain the cooperative will achieve the maximum value and the greatest bargaining power</li> </ul>	

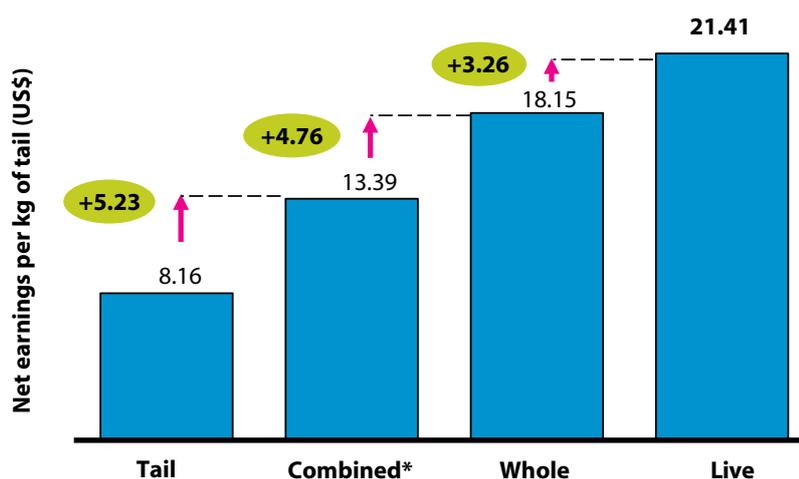
## Results and discussion

### Value chain

It was determined that the value chain of the lobster fishery of Santa Cruz can be improved in three ways:

**1. Sale of exclusive products.** The average income of fishers in the current value chain (Dominated by Middlemen) could be improved simply by selling new, higher quality products that command a higher price in the international market, such as whole lobster (fresh, frozen or live). The sale of live lobster will provide fishers the greatest earnings per kg of lobster tail (Figure 2). However, this type of product would also be the most difficult to implement due to materials and equipment needed to store and

transport live lobster. In addition, this option requires a significant change in the fishing, handling and transportation methods currently used by fishers in the Galapagos. An alternative and very attractive product from the economic point of view is frozen whole lobster. This product has the greatest demand in the international market (Figure 3) and does not require major changes in fishing and transportation methods. However, economic modeling indicated that the sale of a combination of different products (e.g., 47.5% frozen tail, 47.5% whole frozen lobster and 5.0% fresh whole lobster) is relatively simpler and faster to implement in the short and medium term. Simple changes in the type of products sold by COPROPAG could generate strong economic impacts throughout the value chain, which would benefit not only fishers but all of the economic actors involved, including middlemen.



**Figure 2.** Estimated average net earnings for the fisher (in US\$ per kg of lobster tail) in the current value chain of Santa Cruz (Dominated by Middlemen) if the type of products sold are changed.

\* The product "Combined" assumes that production consists of 47.5% frozen tail, 47.5% frozen whole lobster, and 5.0% whole fresh lobster.

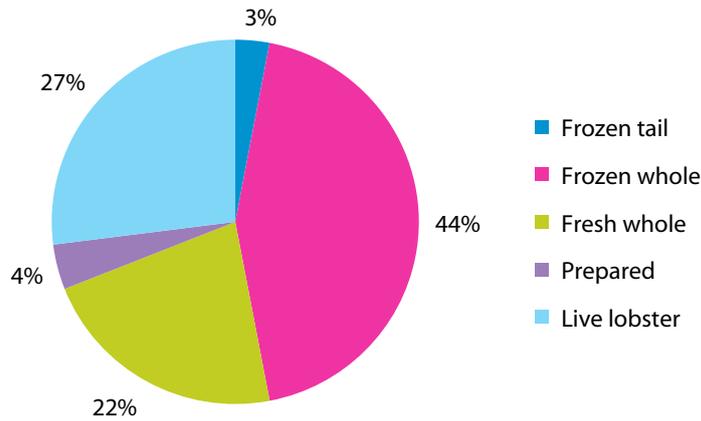


Figure 3. Importation of lobster worldwide by type of product during 2007 (Castrejón, 2012).

**2. Re-structuring the value chain.** The average income of the fishers could also be improved through a re-structuring of the value chain. The most cost effective option is the Integrated Cooperative value chain, which is estimated to generate earnings of US\$29.27 per kg of lobster for fishers (Figure 4). However, the implementation of this type of value chain would require a radical change in the organization and management system of the cooperative, as well as the role currently played by middlemen. Consequently, the adoption of an Integrated Cooperative value chain is not considered a viable option in the short and medium term. However, the Shared value chain is an alternative option that would generate significant profits for fishers. This would require strengthening

the bargaining power of COPROPAG by applying specific strategies (Figure 5).

It is estimated that a Shared value chain would generate earnings for fishers of approximately US\$13.05 per kg of lobster tail. This represents an increase of US\$4.89 over the current value chain, which has estimated earnings of US\$8.16 per kg of lobster tail (Figure 4). Thus, the net earnings for fishers would increase from 18 to 29% of the total value generated by the value chain (Figure 6). This is based on two assumptions: 1) the only product marketed is frozen lobster tail, and 2) income produced by COPROPAG, after covering operating costs, are shared equally among the member fishers.

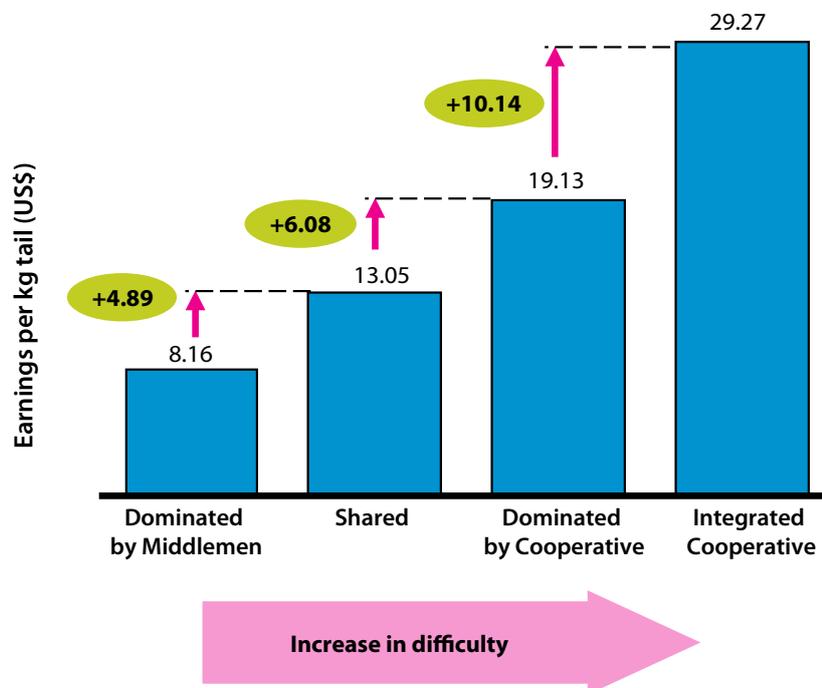


Figure 4. Estimated average earnings for the fisher (in US\$ per kg of lobster tail) in the different value chains evaluated; it is assumed that frozen lobster tail is the only product sold.

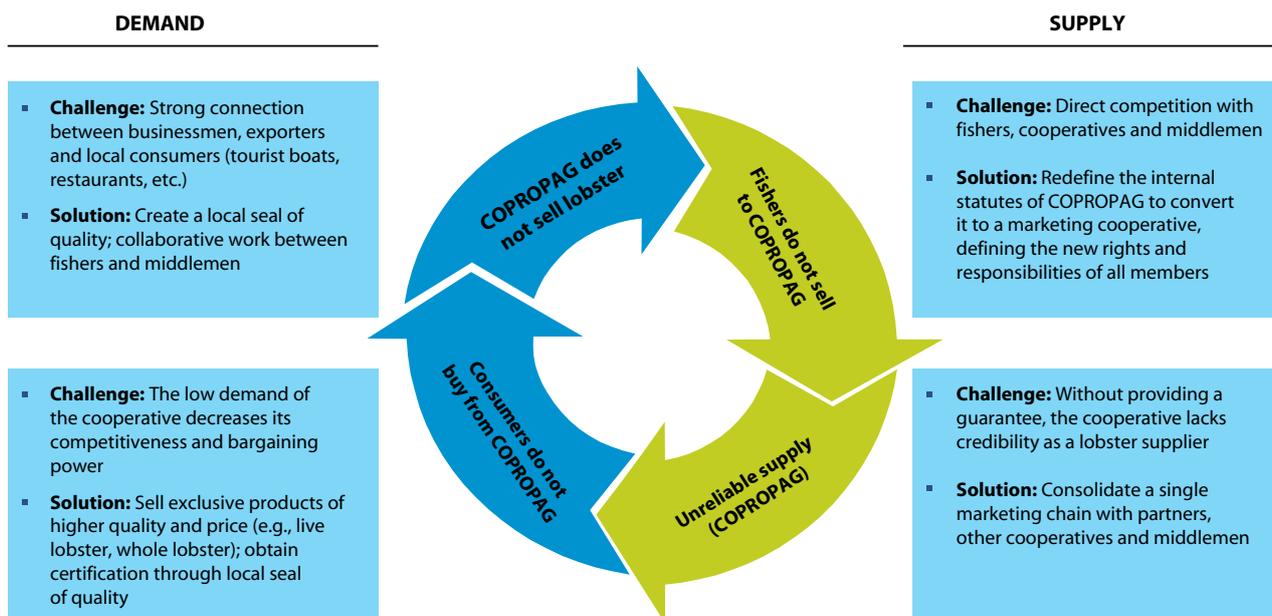


Figure 5. Challenges to and solutions for strengthening the role of COPROPAG within the value chain of the lobster fishery of Santa Cruz Island.

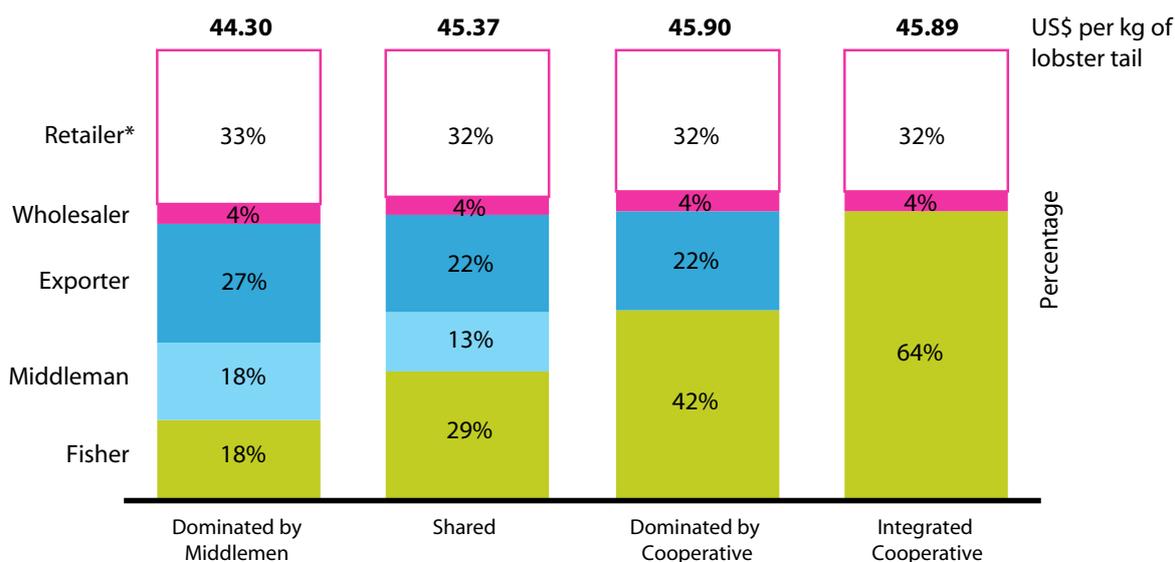


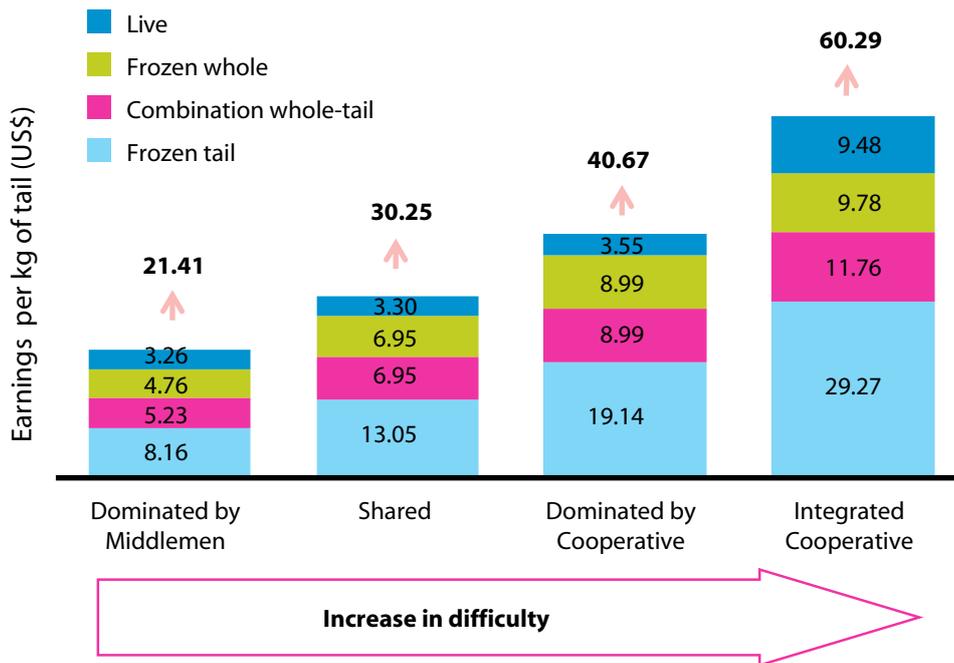
Figure 6. Total percent earnings estimated for each economic agent (in US\$ per kg of lobster tail) in each of the value chains evaluated, assuming: 1) the only product marketed is frozen lobster tail, and 2) COPROPAG earnings are distributed equally among the partner-fishers, after covering operating costs. \* Includes retail supermarkets and restaurants.

3. **Sale of new products and re-structuring the value chain.** The best way to maximize the earnings from the value chain of the spiny lobster fishery will be produced through a combined change in the products marketed and the adoption of a new value chain (Figure 7). The best option is to sell a combination of different products (e.g., whole lobster and lobster tail) and to adopt a Shared value chain, which would generate a total profit of US\$20 per kg tail. This value could increase gradually as COPROPAG sells a higher percentage of whole frozen lobster and/or live lobster.

### Current and potential market for whole lobster in Santa Cruz

Based on the recommendations outlined by Castrejón (2012), WWF funded the completion of a market study to assess the feasibility of whole lobster marketing in Santa Cruz (Velasco *et al.*, 2012). The most important results of this study are described below.

The demand for whole spiny lobster in Santa Cruz is primarily by affluent tourists coming mainly from North America and Europe. Based on this market, current and



**Figure 7.** Estimated average earnings per fisher (in US\$ per kg of lobster tail) through the combination of different types of products and value chains. Each rectangle represents the value added by the sale of a different product (frozen tail, whole lobster-tail combination, frozen whole lobster, and live lobster). The numbers highlighted in black show the estimated total earnings for each value chain by selling live lobster.

potential demand for whole lobster in Santa Cruz was estimated for the fishing season (September-December). The results revealed the following:

1. The target market consists of approximately 20,844 foreign tourists with high purchasing power and an average consumption of 1.28 pounds of whole lobster per tourist during their time in Galapagos (Figure 8).
2. The total potential demand for this market is 26,680 pounds (equivalent to 12,102 kg or 12.1 TM).
3. However, only 9.6% of the tourists who make up the target market consumes lobster (1991 tourists), resulting in a demand of approximately 2548 pounds of whole lobster (equivalent to 1156 kg or 1.1 TM; Figure 8). This implies that a large fraction of the target market is not yet fully exploited (24,132 pounds of whole lobster; Figure 8).
4. If 20,844 lobsters were sold at US\$17.18 per whole lobster (average price at the Pelican Bay dock), the gross income is estimated at US\$358,099 (Figure 8).
5. If the same amount of lobster was marketed as lobster tail at a price of US\$9.5 per pound, the gross income would only be US\$83,643 (Figure 8). This is based on the consideration that 26,680 pounds of whole lobster equals 8804 pounds of lobster tail (conversion factor of 0.33, according to Reck, 1983).
6. Targeting whole lobster would generate an additional earnings of US\$274,456 for the fishing sector of Santa Cruz.

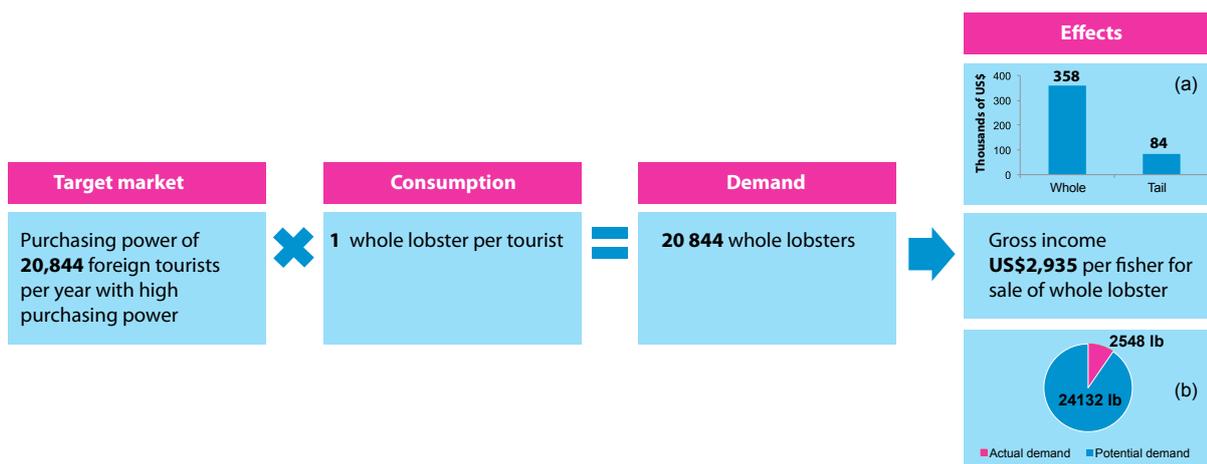
7. Given that the number of active fishers in Santa Cruz during the 2011 fishing season was 122 (Ramirez et al., 2012), the gross income per capita generated by the target market would be US\$2935 (Figure 8).

Based on these results we conclude: 1) marketing whole lobster would generate significantly higher incomes than the sale of lobster tail, and 2) there is a potential market in Santa Cruz for whole lobster that has yet to be tapped.

### Recommendations

To improve the economic performance of the lobster fishery of Santa Cruz, the following is recommended:

1. Implement a sequential strategy for the short, medium and long term to first develop the sale of frozen whole lobster at the local level, and then gradually the sale and export of live lobster at both local and international levels (Table 2). Use pilot projects to determine the optimum conditions for maintaining and transporting live lobster. Restructure the current value chain towards a Shared value chain; this would generate benefits to fishers in the medium term.
2. Promote the image of the spiny lobster through a special seal of quality for Galapagos, and through appropriate marketing tools, such as web pages, articles in specialized journals and/or airline magazines, brochures, posters, etc.
3. Promote the marketing of lobster in luxury tourist



**Figure 8.** Estimation of the current and potential demand of the target market for whole lobster on Santa Cruz and its likely economic effect: (a) estimated gross income (in US\$) that would be generated to meet the demand of the target market estimated by this study either as whole lobster or lobster tail; (b) current and potential demand of whole lobster on Santa Cruz. **Assumptions:** the weight of a whole lobster is 1.28 pounds and is priced at US\$17.18, while the price of the tail is US\$9.5 per pound. The conversion factor from whole lobster to tail is 0.33 (Reck, 1983).

boats (target market) by developing a proper marketing strategy that will unify the existing marketing channels and ensure a more equitable distribution of the revenues generated from the value chain of the fishery.

- Maintain a high quality product (freshness, size and color) by adopting appropriate harvesting and transporting methods to facilitate the delivery of a fresh and whole product on an established schedule agreed to with the buyer; this includes avoiding the use of a handheld hook or spike.

### Acknowledgments

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**Table 2.** Sequential strategy over the short, medium and long term to develop the capacity to sell and export live lobster and frozen whole lobster locally and internationally, and to adopt a new value chain.

Period	Product	Value Chain
Short term (6- 12 months)	<ul style="list-style-type: none"> <li>Analyze the viability of marketing frozen whole lobster with fishers, dealers and exporters</li> <li>Test market frozen whole lobster during the next fishing season</li> <li>Conduct a detailed market study of the Galapagos spiny lobster at provincial and national levels</li> </ul>	<ul style="list-style-type: none"> <li>Strengthen the role of COPROPAG in the value chain by redefining its internal statutes, finalizing the process of creating and establishing a local seal of quality, and establishing a free flow of market information (e.g., sign up to <a href="http://www.infopesca.org">www.infopesca.org</a>)</li> <li>Establish workshops and working groups between COPROPAG and dealers to analyze the feasibility of adopting a Shared value chain and determine in detail the potential increase in prices</li> </ul>
Medium term (1 – 5 years)	<ul style="list-style-type: none"> <li>Gradually increase marketing of whole lobster (fresh and frozen) by 80 to 100%</li> <li>In parallel, develop the necessary infrastructure and techniques for the capture, maintenance, transportation and export of live lobsters</li> </ul>	<ul style="list-style-type: none"> <li>Implement the Shared value chain</li> <li>Evaluate economic performance of the new value chain</li> <li>Continue the implementation of the improvement plan for COPROPAG</li> </ul>

	<ul style="list-style-type: none"> <li>• Determine optimum conditions for maintenance and transport of live lobster (e.g., temperature and time of packing)</li> <li>• Carry out pilot studies of live lobster sales at the local level</li> </ul>	<ul style="list-style-type: none"> <li>• Consolidate a single marketing channel for lobsters at the provincial level</li> <li>• Evaluate and comprehensively reform the structure and function of the current system of licenses (PARMA) and fishing permits to avoid the gradual reactivation of fishing licenses currently inactive (in case the profitability of the fishery recovers by the measures described in this study)</li> </ul>
Long term (> 5 years)	<ul style="list-style-type: none"> <li>• Export live lobster on a commercial scale (if feasible)</li> <li>• Achieve a local seal of quality certification and, if possible, from the Marine Stewardship Council (MSC)</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate feasibility of implementing the Dominated by Cooperative model and implement it when possible and appropriate</li> <li>• Acquire export certification for the cooperative</li> <li>• Adopt the Integrated Cooperative value chain</li> </ul>

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