The Human Dimensions of Biodiversity Conservation: A Study of Conservation Governance, Tourism Growth and Livelihood Dynamics in the "Iconic" Galapagos Islands, Ecuador

By

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A thesis submitted to McGill University in partial fulfillment of the requirements of the degree of

Doctor of Philosophy

ABSTRACT

It has long been recognized that in order to meet biodiversity conservation objectives, it is necessary to address human development needs; however, how conservation and development can be effectively reconciled remains a challenge. This dissertation explores how recent developments in conservation and tourism growth have affected resource-based activities, particularly fishing and farming, in three populated islands of the Galapagos Archipelago—a UNESCO's World Heritage Site. The debate about reconciling conservation priorities and socio-economic development goals—or the 'parks versus people' debate—focuses on whether, or how, nature conservation interests can be made compatible with the needs and aspirations of people living in or near protected areas. Since biodiversity protection initiatives necessarily impose restrictions on local communities, and since decisions regarding the management of those areas are guided by myriad local and outside actors with different interests, agendas and power, there is an inherent potential for conflicts to emerge or escalate. Furthermore, since the point of conservation management initiatives is to alter human impacts on natural systems, the long-term sustainability of conservation areas may be compromised by local resistance. Therefore, to achieve long-term conservation outcomes, it is necessary to understand the complexities of the human dimensions of biodiversity conservation initiatives.

This study investigates human dimensions that affect and are affected by biodiversity conservation efforts by linking aspects of biodiversity conservation, marine conservation and management, public participation, tourism, and sustainable livelihoods. The Galapagos Islands presents a unique context for investigating the implications of increasing tourism and exclusionary regulatory approaches for biodiversity conservation. The research explores two overarching areas of concern: livelihood dynamics in response to changing conditions, and the decision-making processes used in marine conservation management and in local governance—particularly as perceived by local stakeholders. Specifically, this dissertation investigates: 1) livelihood changes in two resource-based sectors that have followed the imposition of stricter conservation regulations and the growth of tourism; 2) stakeholder engagement in environmental decision-making processes for marine conservation—using as a case study the 2016 spatial planning process for the conservation and management of the Galapagos Marine Reserve; and 3) perceptions underlying local resistance within the small-scale fisheries sector in response to recent marine zoning initiatives.

The overall study uses a multiple-case study approach, comparing three islands and two different resource-based sectors, fishing and farming. It draws on a combination of qualitative and quantitative methods. Three sampling techniques were used to identify respondents. In total, 294 questionnaire surveys were completed on the three islands, and 36 key-informant interviews were carried out. Both quantitative and qualitative analysis were used, with both inductive and deductive coding used for qualitative analysis. With respect to livelihood changes, the study found that despite push and full

factors, such as increasing regulations and opportunities for livelihood diversification driven by tourism growth, many surveyed farmers and about half of fishers are not interested in changing their resource-based activities. Regardless of the opportunities that people might have within tourism, or in other economic sectors, many respondents prefer to continue with their existing resource-based livelihoods for positive reasons. With respect to environmental decision-making processes, the study found that the marine zoning process is perceived by stakeholder groups as being rushed, non-consultative, and not consensus-based. There are concerns about the top-down designation of a large no-take conservation area within the new zoning, which intensified disagreements and distrust hindering the full-implementation of the new zoning, even four years after its official approval. With respect to the implications of exclusionary conservation initiatives on resource-based activities, qualitative assessment of small-scale fishers' response to the 2016 zoning process revealed common perceptions that underlie fishers' opposition to the new zoning. Most surveyed fishers claim the new zoning would make fisheries economically unsustainable, as several areas important for fisheries are designated as conservation sites. People express concerns about the future of the fishing sector and feelings of frustration, angst, despair and resentment towards the management of the marine reserve. Fishers from the three islands agree that socio-economic considerations of their livelihoods were not considered and integrated in consultations.

Findings of this research contribute to untangling the complexity of factors influencing the choices and decisions that people make regarding their resource-based livelihoods, particularly when increasing conservation regulations and tourism growth are key drivers of livelihood change in the context of islands in developing countries. Evidence of the causes, motivations and constraints for livelihood diversification and transitions will help assess management impacts and opportunities for sustainable development, and will help managers to propose and generate policies and alternatives that better fit the reality of local communities. The study also provides important information about the effects of shifting governance regimes in protected areas, where collaborative governance is replaced by top-down exclusionary approaches generating or intensifying social conflicts due to the lack of stakeholder engagement and its implications for resource-based activities. The research offers detailed information and insights about the perceptions of stakeholders in the Galapagos whose support or resistance may ultimately determine the success of conservation initiatives in the area. The findings also offer guidance for those involved in efforts to reconcile conservation and development in other biodiversity rich areas.

RÉSUMÉ

Il est communément admis depuis longtemps que pour atteindre les objectifs de préservation de la biodiversité, il est nécessaire de répondre aux besoins du développement humain. Cependant, la façon de concilier efficacement ces deux objectifs reste un défi. Cette thèse explore comment les récents développements en matière de conservation de la biodiversité et la croissance du tourisme ont affecté les activités basées sur les ressources, en particulier la pêche et l'agriculture, dans trois îles peuplées de l'archipel des Galápagos, un site classé au patrimoine mondial de l'UNESCO. Le débat sur la conciliation des impératifs de conservation et des objectifs de développement socio-économique - ou le débat « parcs contre population » - se concentre sur la question de savoir si et comment les intérêts relatifs à la préservation de la nature peuvent être rendus compatibles avec les besoins et aspirations des populations vivant dans ou à proximité des aires protégées. Étant donné que les initiatives de protection de la biodiversité imposent nécessairement des restrictions aux communautés locales et que les décisions concernant la gestion de ces zones sont guidées par une myriade d'acteurs locaux et extérieurs ayant des intérêts, des programmes et des pouvoirs différents, il existe un risque inhérent que des conflits apparaissent ou s'aggravent. Comme les initiatives de gestion de la protection de la nature visent à modifier les impacts humains sur les systèmes naturels, la durabilité à long terme des zones de sauvegarde peut être compromise par une résistance locale. Par conséquent, pour obtenir des résultats à long terme en matière de protection de l'environnement, il est nécessaire de comprendre la complexité des dimensions humaines des communautés locales qui interagissent avec les initiatives de protection de la biodiversité.

Les facteurs humains qui affectent et sont affectés par les efforts de conservation sont étudiés dans cette thèse en reliant les aspects de la gestion de la conservation de la biodiversité, de la conservation et de la gestion marines, de la participation du public aux décisions de conservation, les impacts du développement touristique et les dynamiques des moyens de subsistance locaux. Les îles Galápagos offrent un contexte unique pour étudier les implications de l'augmentation du tourisme et des approches réglementaires d'exclusion pour la conservation de la biodiversité. Deux grandes préoccupations sont explorées: les changements des conditions de vie en réponse aux réglementations de conservation et à la croissance du tourisme, et les processus décisionnels utilisés dans la gestion de la préservation marine et la gouvernance locale—en particulier tels que perçus par les acteurs locaux. Plus précisément, cette thèse porte sur l'étude de: 1) les changements des conditions de vie en réponse aux l'imposition de réglementations de conservation plus strictes et à la croissance du tourisme; 2) l'engagement des parties prenantes dans les processus de prise de décisions environnementales pour la conservation marine—en utilisant comme étude de cas le processus de planification spatiale de 2016 pour la conservation et la gestion de la réserve marine des Galápagos; et 3) les perceptions sous-jacentes à la résistance locale

développés par les pêcheurs en réponse aux initiatives récentes visant à la conservation de la zone marine.

Dans son ensemble, l'étude fait appel à une approche d'étude de cas multiples, mettant en contraste trois îles et deux secteurs axés sur les ressources, la pêche et l'agriculture. Elle s'appuie sur une combinaison de méthodes qualitatives et quantitatives. Trois techniques d'échantillonnage ont été utilisées pour identifier les personnes concernées. Au total, 294 questionnaires ont été remplis sur les trois îles, et 36 entrevues avec des informateurs clés ont été réalisées. L'analyse quantitative et l'analyse qualitative ont toutes deux étés utilisé, le codage inductif et déductif étant utilisé pour l'analyse qualitative. En ce qui concerne les changements dans les moyens d'existence, l'étude a révélé que malgré les pressions et l'ensemble des facteurs, comme l'augmentation de la réglementation et les possibilités de diversification des moyens d'existence découlant de la croissance du tourisme, de nombreux agriculteurs et pêcheurs interrogés sont peu enclins à modifier leurs activités axées sur la transformation de ressources. Indépendamment des opportunités que les gens peuvent avoir dans le tourisme, ou dans d'autres secteurs économiques, de nombreux répondants préfèrent continuer à utiliser leurs moyens de subsistance basés sur les ressources naturelles pour les bonnes raisons. En ce qui concerne les processus décisionnels en matière d'environnement, l'étude a révélé que le processus de zonage était perçu par les groupes d'intervenants comme étant précipité, non consultatif et non fondé sur un consensus. Des préoccupations ont été exprimées au sujet de la désignation par les autorités locales d'une vaste zone de conservation sans possibilités de prélèvement dans le nouveau zonage, ce qui a intensifié les désaccords et la méfiance, même trois ans après son approbation officielle, empêchant la pleine mise en œuvre de ce nouveau zonage. En ce qui concerne les répercussions des initiatives de conservation exclusives sur les activités axées sur les ressources, l'évaluation qualitative de la perception qu'ont les petits pêcheurs du processus de zonage de 2016 a révélé cinq récits qui portaient sur l'opposition des pêcheurs au nouveau zonage. La plupart des pêcheurs interrogés ont affirmé que le nouveau zonage rendrait la pêche non viable sur le plan économique, car plusieurs zones importantes pour la pêche ont été désignées comme sites de conservation. Les gens ont exprimé des inquiétudes au sujet de l'avenir du secteur de la pêche et des sentiments de frustration, d'angoisse, de désespoir et de ressentiment à l'égard de la gestion de la réserve marine. Les pêcheurs des trois îles ne sont pas d'accord sur le fait que les considérations socio-économiques de leurs moyens de subsistance n'ont pas été prises en compte et intégrées dans les discussions.

Les résultats fournis par cette thèse contribuent à démêler la complexité des facteurs qui influencent les choix et les décisions que les gens prennent concernant leurs moyens d'existence basés sur les ressources, en particulier lorsque l'augmentation des réglementations de protection et la croissance du tourisme sont des moteurs clés du changement des moyens de subsistance dans le contexte des îles des pays en développement. L'évidence des causes, des motivations et des contraintes de la diversification des moyens d'existence et des transitions aidera à évaluer les impacts de la gestion et les opportunités de développement durable, et aidera les gestionnaires à proposer et à générer des politiques

et des alternatives qui correspondent mieux à la réalité des communautés locales. L'étude fournit également des informations importantes sur les effets de l'évolution des régimes de gouvernance dans les aires protégées, où la gouvernance collaborative est remplacée par des approches d'exclusion descendantes générant ou intensifiant les conflits sociaux en raison du manque d'engagement des parties prenantes et de ses implications pour les activités basées sur ces ressources. Cette étude fournit des informations détaillées sur les perceptions des parties prenantes aux Galápagos dont le soutien ou la résistance peut en définitive déterminer le succès des initiatives de conservation dans la région. L'information tirée de l'expérience des Galápagos permettra également à ceux qui tentent de concilier conservation et développement dans d'autres zones riches en biodiversité de mieux comprendre la situation.

ACKNOWLEDGMENT

I would like to express my gratitude to my supervisor, Professor Thomas Meredith, for his guidance throughout my doctoral studies. I am very thankful for his reviews, patience, and support during all the different stages of my doctorate. His positive and balanced demeanor was a cornerstone that helped me overcome the obstacles I encountered during my studies. It has been a pleasure to have had the privilege of sharing all these years with a person of outstanding value.

I would also like to sincerely thank the members of my Supervisory Committee: Dr. Sarah Turner, Dr. Monica Mulrennan and Dr. Ismael Vaccaro, who encouraged me to learn through comments and observations that made me think more critically about the research and its meaning, and whose recommendations made a difference when it came to improving the quality of this thesis. I would especially like to thank Dr. Sébastien Breau (Director of the Graduate Studies Program when I started my doctoral studies) who has always been kind and has always encouraged and supported me; Dr. Oliver Coomes, former Director of the Graduate Program, for his support; and Dr. Margaret Kalacska, current Graduat Program Director, for her help with the final stages of my work.

I am grateful to my friends: Megan Wylie, Vijay Kolingivadi, Kate Reilly, Alicia Cavanaugh, Eranga Galappaththi, Fanny Amyot, Guity Nadjafie, Lili Azari, for being so generous with their time and for provide comments and suggestions to different sections of my thesis. I would also like to thank Aman Ghasemi for his help in editing the maps. I feel grateful for the wonderful people I have met during my years of study and with whom I shared courses and research interests that made me wonder more about different realities, and with whom I also shared non-academic activities that filled my heart with joy and laughter, making my experience in Montreal one of the most rewarding I have ever had. I am particularly grateful to my office colleagues for their unconditional support (Megan, Alicia, Yannick).

I would like to acknowledge the financial support received from the Secretariat of Higher Education, Science, Technology and Innovation (SENESCYT - Ecuador) and the funding provided by the McGill University through the Department of Geography. Also, I would like to thank the Galapagos Science Centre and the University of San Francisco de Quito for their support, which helped me obtain my research permit in Galapagos and provided me with a workspace in San Cristobal Island-Galápagos.

This thesis would not have been possible without the support of many people - in San Cristobal, Santa Cruz, and Isabela Islands - as data collection facilitators or as research participants; my sincere gratitude is for all of you (I will not give names here, but I have acknowledged their support face to face). I would particularly like to thank the fishermen and farmers who were extremely kind, and generous with their time and knowledge, and who opened the doors of both their homes and their lives to me so that I can see other realities and experiences. I would also like to thank the other participants from the science, conservation and management sectors who played a crucial role in the development of this study. Special thanks to the fishing cooperative COPROPAG on the island of Santa Cruz, the Galapagos National Park, and to the Ministry of Agriculture (MAG), in particular to the Eco. Juan Carlos Guzmán (former Director of the MAG - Galapagos) and members of the technical team of the islands mentioned above for the support provided during the data collection in the farming sector.

It would certainly not have been possible to enroll in a graduate program without the tremendous support of my beloved parents and sister. I am eternally grateful for their encouragement to follow my dreams. There has not been a single day that they have not been by my side with their generous and loving hearts sharing moments of happiness, celebrating moments of success, and patiently helping me to overcome stressful and frustrating experiences.

I am deeply appreciative of my partner for all the joy he brings to my life, especially for his support in the moments where I felt lost in what I call my “doctoral journey on Mount Everest.” *Gordi*, your warm, patient and generous heart have been important in the culmination of this chapter of my life (and I am sure it will be in the future). Thank you for filling my heart with love, hugs, and my ‘tummy’ with delicious food, you are the best!

A special thank you to my family and friends (from Quito and Montreal), who kept cheering me up to get me to the final line!

AUTHORS' CONTRIBUTIONS

Preparation of the Dissertation and Manuscripts for Publication

This research was conducted with the supervision of Dr. Thomas Meredith and the advice of Dr. Sarah Turner and Dr. Monica Mulrennan. The scope of the study, the research questions, and the conceptual and methodological approaches were determined by the author of the thesis in consultation with the committee. Data collection, processing and analysis were carried out by the author of the thesis, as well as drafting the three manuscripts for publication. During the preparation of the thesis, Dr. Meredith made important observations to the content and structure of the material. Dr. Mulrennan provided substantial recommendations and editing to Chapter 6, and is co-author of the manuscript. Dr. Turner provided valuable feedback to Chapter 5, and provided important recommendations for drafting the manuscript for publication.

Dissemination of the Thesis Findings in Academic Forums

Some of the results of this dissertation have been presented in the following international academic conferences and in a symposium at the study site.

Burbano, D.V. and Meredith, T.C. 2018. *Tourism as a 'pull factor' for resource-based livelihood diversification: a comparative assessment in the Galapagos Islands, Ecuador*. Annual Meeting of the Association of American Geographers (AAG). New Orleans, April 10-14, 2018.

Burbano, D.V. and Meredith, T.C. 2017. *The paradox of biodiversity conservation and development: public participation in the Galapagos Islands as a key strategy to reach consensus in an iconic marine protected area*. Annual Symposium of the Centre de la Science de la Biodiversité du Québec (QCBS). Montreal-Canada, December 11-13, 2017.

Burbano, D.V. and Meredith, T.C. 2017. *Medios de Vida Sostenibles: Dinámicas Contrastantes entre la Pesca y Agricultura en las Islas Galápagos*. II Symposium of Science Research and Conservation in the Galapagos Islands – Galapagos National Park and Galapagos Science Center. San Cristobal Island, Galapagos-Ecuador, July 10 and 11, 2017.

Burbano, D.V. and Meredith, T.C. 2016. *Assessing Resource-Based Livelihoods in the Face of Tourism Growth in the Galapagos Islands: a comparative analysis among populated islands*. Annual Meeting of the Association of American Geographers (AAG). San Francisco, March 29th to April 2nd, 2016.

Publications in Peer-reviewed Journals

- **Title:** Exclusionary Decision-Making Processes in Marine Governance: The Rezoning Plan for the Protected Areas of the 'Iconic' Galapagos Islands, Ecuador
    - **Authors:** Burbano, D.V., Meredith T.C., and Mulrennan, M.E.
    - **Journal:** Ocean and Coastal Management
    - **Status:** accepted for publication on November 21st and available online on December 12, 2019
      https://www.sciencedirect.com/science/article/abs/pii/S0964569119309354

- **Title:** Conservation Strategies through the Lens of Small-Scale Fishers in the Galapagos Islands, Ecuador: Perceptions Underlying Local Resistance to Marine Planning
    - **Authors:** Burbano, D.V. and Meredith T.C
    - **Journal:** Society and Natural Resources
    - **Status:** accepted for publication on April 9th and available online on May 20th, 2020
      https://doi.org/10.1080/08941920.2020.1765058

- **Title:** Effects of tourism growth in a Natural World Heritage Site: Livelihoods diversification in the Galapagos Islands, Ecuador.
    - **Authors:** Burbano, D.V. and Meredith, T.C.
    - **Journal:** Sustainable Tourism
    - **Status:** accepted for publication on September 28th, 2020
      http://dx.doi.org/10.1080/09669582.2020.1832101

STATEMENT OF ORIGINALITY

This study aspires to contribute to understanding how human dimensions can effectively be incorporated into conservation planning and management in a protected area context, and more broadly to understanding of human-environment interactions. This dissertation explores two overarching concerns: 1) understanding livelihood dynamics in a context where increasing conservation regulations and tourism growth have become key drivers of livelihood change, and 2) assessing how decisions-making processes used in marine conservation management and local governance have affected, and been interpreted by, local stakeholders. The Galapagos Islands present a unique context for exploring the interplay of biodiversity conservation initiatives, growing tourism, and social change within communities where resource-based livelihoods are considered important for the local economy.

Chapter 5 focuses on exploring recent patterns of livelihood diversification in response to increased conservation regulations and growing tourism. The approach of this study is unique because, to date, there has been no systematic analysis that compares pressures, opportunities, and transitions within two resource-based livelihoods in the three most populated islands of the Galapagos Archipelago. This study uses the sustainable livelihood approach to explore the effects of tourism growth in the diversification of livelihoods when tourism is promoted as a livelihood alternative intended to reduce pressure on protected natural resources.

Chapter 6 studies public participation in environmental decision-making by using as a case study the 2016 marine spatial planning process for the Galapagos Marine Reserve. This study examines for the first time, a process that was intended to advance conservation and management outcomes, but which was dramatically altered by exclusionary decision-making. The role of external agencies within the design, planning and implementation of conservation strategies was also explored, as were the negative and positive implications of using outside agencies in collaborative conservation management.

Chapter 7 studies the perceived impacts of exclusionary conservation approaches on small-scale fishing activities. While the impacts of marine protected areas on local communities have been studied through the lens of local stakeholders, this paper systematically identifies and analyzes local perceptions underlying resistance that has arisen in the fisheries sector in response to top-down decision-making processes adopted for the management of the marine protected area.

In general, the contributions to knowledge are both in providing a valuable record of transitions in this important conservation area, and in helping to build understanding of the human dimensions of biodiversity conservation, and the links with governance structures and with nature-based tourism.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

AIM	Inter-institutional Management Authority
BINGOS	Big Non-Governmental Organizations
CI	Conservational International
CBC	Community-Based Conservation
CBD	Convention on Biological Diversity
CBNRM	Community-Based Natural Resources Management
CDF	Charles Darwin Foundation
CDRS	Charles Darwin Research Station
CGREG	Governing Council of the Special Regime of Galapagos
COOTAD	Organic Code of Territorial Organization, Autonomy and Decentralization
GNP	Galapagos National Park
GNPS	Galapagos National Park Service
GMR	Galapagos Marine Reserve
GSL	Law of the Special Regime for the Conservation and Sustainable Development of the Province of Galapagos
ICDPs	Integrated Conservation-Development Projects
IUCN	International Union for the Conservation of Nature and Natural Resources
MAE	Ministry of Environment
MAG	Ministry of Agriculture and Cattle Ranching
MPAs	Marine Protected Areas
MSP	Marine Spatial Planning
NGOs	Non-Governmental Organizations
NTMPAs	No-Take Marine Protected Areas
NTZs	No-Take Zones
PAs	Protected Areas
PGR	Populations Growth Rate
PMB	Participatory Management Board
UCOOPEGAL	Union of Fishing Cooperatives of Galapagos
UNESCO	United Nations Educational, Scientific and Cultural Organization
UN-SDG	United Nations-Sustainable Development Goals
USAID	United States Agency for International Development
TNC	The Nature Conservancy
SESs	Social Ecological Systems
WTO	World Travel Organization
WWF	World Wildlife Fund
WCMC	World Conservation Monitoring Centre

The millions of species on land, in freshwater, and in the ocean have evolved over millennia and form the web of life that sustains the planet. Species and their populations are the building blocks of ecosystems, individually and collectively securing the conditions for life. They provide food, medicine and raw materials. They are the basis of soil formation, decomposition, water filtration and flow, pollination, pest control and climate regulation. They are the primary source of income and resources for hundreds of millions of people around the globe. Species are an essential part of the history, culture, tradition and folklore of every culture on Earth and their aesthetic values and spiritual roles provide comfort and inspiration as well as recreation.

The alarm has been raised repeatedly about the decline in biodiversity across the planet. By allowing this decline to continue, we erode the very foundations of our traditions, economies, livelihoods, food security, health, and even the existence of life worldwide.

The world's people must accept responsibility for this emergency and act now to ensure we pass on a rich natural heritage to future generations.

IUCN 2019

CHAPTER I: Introduction

1.1 General Introduction

As the world faces mounting concern about environmental deterioration, there is increasing pressure to protect biodiversity (Schulze et al., 2018; IUCN, 2019), but also increasing recognition that effective conservation strategies will have to reconcile biodiversity conservation goals with the socio-cultural and economic aspirations of local populations (Díaz et al., 2019). Incorporating human dimensions into conservation planning and management addresses the "parks vs people debate," that is, it addresses the barriers that arise where nature conservation interests are seen as being in competition with local community concerns about livelihoods, prosperity and security (Adams et al., 2003; Adams and Hutton, 2007; De Young et al., 2008; Charles and Wilson, 2009; De Santo et al., 2011; Charles, 2012; Brockington and Wilkie, 2015; Charles et al., 2016). This thesis aspires to contribute to understanding how human dimensions can effectively be incorporated into conservation planning and management.

Protected areas (PAs), such as national parks and marine reserves, are important tools for protecting biodiversity, but by limiting access to ecological resources and services, enforcing conservation regulations can have important social consequences (Lele et al., 2010; Mascia et al., 2010; Redpath et al., 2013; Bennett and Dearden, 2014a); consequences that may lead to conflicts and that may ultimately undermine the effectiveness of conservation efforts (West et al., 2006, Adams and Hutton, 2007; Holmes and Brockington, 2013; Oldekop et al., 2015; Charles et al., 2016; Bennett, 2018). As PAs inevitably exist within a social context, socio-cultural and economic considerations are acknowledged to be key factors for the success of these conservation initiatives (Mascia et al., 2010, Andrade and Rhodes, 2012; Cinner et al., 2014; Richmond and Kotowicz, 2015). Addressing the human dimensions of PAs requires integrating social and political elements into both the design and management of PAs (Chuenpagdee et al., 2013).

Multi-stakeholder participation in conservation planning offers a means to capture the spectrum of attitudes, interests and values within stakeholder groups (Christie et al., 2017; Day, 2017); in this way social-environmental conflicts arising from PAs regulations can be reduced and social acceptance of, and compliance with, conservation regulations can be enhanced (Pita et al., 2011; Voyer et al., 2015). Studies of the perceptions of resource users can provide insights

into the social-environmental impacts of conservation, the perceived legitimacy of environmental decision-making, and the social acceptability of management strategies (Pita et al., 2010; Leleu et al., 2012; Bennett, 2016). Several authors argue that it is resource users' perceptions that ultimately determine responses to conservation initiatives, and shape individual and community intentions, behaviors and willingness to support or confront conservation initiatives (Jones, 2008; Dimech et al., 2009; Gelcich et al., 2009; Suuronen et al., 2010). Failure to understand local perceptions and attitudes towards initiatives related to PAs management may undermine conservation strategies (Pita et al., 2011; Pita et al., 2020). Therefore, several authors bring attention to the need for more empirical studies aimed at examining resource users' beliefs, attitudes, and more broadly their perceptions, related to the conservation and management of PAs (Ward et al., 2018; McNeill et al., 2018; Pita et al., 2020).

The impact of conservation measures is particularly relevant to community stakeholders who depend on access to natural landscapes for their livelihoods (Leisher et al., 2013). When conservation regulations and restrictions impinge on local livelihood practices, tourism is often proposed as a 'win-win' solution (Stronza et al., 2019) to the social conflicts that arise (Redpath et al., 2013; Brockington and Wilkie, 2015). Tourism is promoted because it can simultaneously support biodiversity conservation, provide revenue to support PAs (Buckley et al., 2012), and offer livelihood opportunities for proximate communities (Leisher et al., 2013). However, unregulated tourism can have impacts on biodiversity (Krüger, 2005; Goodwin, 2015) and on livelihood practices, lifestyles and food security (Holmes and Brockington, 2013).

Economic development driven by tourism can negatively influence the configuration of local established economic activities (West et al., 2006) because, as tourism can open new and appealing income streams that contrast with income from established resource-based activities such as fisheries or agriculture, local communities can be drawn away from proven livelihood practices and come to depend on tourism (Tao and Wall, 2009; Anup et al., 2014). Attitudes and perceptions of local residents about the impacts of tourism are variable (Sirakaya et al., 2002), but scholars argue that recognizing the local perceptions is necessary to understanding the effects of tourism development in local contexts (Stronza and Gordillo, 2008). This understanding is essential to the formulation of management strategies aimed at achieving sustainable development (Muresan et al., 2016).

The Galapagos Archipelago is an iconic conservation site, often referred as a 'natural laboratory of evolution' because of its rich and unique biodiversity and its historic role in the development of Charles Darwin's theory of species evolution (Harpp et al., 2014). The metaphor was first used in 1933 by Harry S. Swarth—an American ornithologist—in his effort to persuade the Ecuadorian government of the need to protect the islands, and it has become established in the imagery of conservationists, scientists, managers, and the tourism industry (Hennessy, 2018); yet the image somehow obscures the fact that there are established human communities on the islands where resource-based livelihoods are practiced.

The promotion of tourism has produced what Quiroga (2009) describes as the 'Galapagos Paradox:' a *"process by which the very same conditions that cause the Galapagos to attract the attention of scientists, conservationists and of tourists, are being put at risk by the success of its reputation and the increasing number of residents and visitors."* (Pg. 139) The mounting tensions associated with this paradox make the Galapagos Archipelago an intriguing area for studying the interplay of biodiversity conservation initiatives, growing tourism, and social change. Four attributes made it particularly interesting for the study: 1) it is a world-renowned conservation area with both terrestrial and marine ecosystems with protected area; 2) conservation actors have promoted tourism as a means of creating alternative livelihoods to reduce pressure on protected species; 3) the growth of tourism has exposed a paradoxical situation; 4) an ostensibly progressive conservation management has been implemented to address concerns about the human dimensions of biodiversity conservation, specifically, a co-management approach for the marine reserve was proposed to recognize the archipelago as a "linked social-ecological system" (SES), and to incorporate the SES model into the archipelago's governance. These points are elaborated below.

1.2 The Context of the Study

The accelerating pace of environmental change in the Galapagos, due primarily to increasing tourism and associated population growth (Self et al., 2010), has led to increased attention being paid to the link between conservation objectives and the factors that drive social-ecological transformation (de Haan et al., 2019). In the Galapagos, global attention is focused on biodiversity conservation priorities, while local populations are concerned about the sustainability of their livelihoods and their own well-being.

There is a legacy of social and environmental conflict in the Galapagos arising from economic, political, and management actions that have influenced interactions between humans and the natural environment (Ospina, 2006; Quiroga, 2007; Grenier, 2007; Quiroga, 2009; Quiroga, 2013; Mathis and Rose, 2016). These conflicts are a result of tensions within and between different stakeholder groups at different geographic scales: groups and alliances on the islands, public and private institutions on the mainland, international conservation organizations, and actors in the global tourism market (Watkins and Cruz, 2007; Watkins, 2008; Wolford et al., 2013; Lu et al., 2013; Quiroga, 2013).

Paradoxically, increasing concerns of the international conservation community regarding the protection of the Galapagos have been the main driver of tourism development (Quiroga, 2009). Since the establishment of the Charles Darwin Research Station (CDRS) in 1964 and the advance of its conservation programs, more foreigners have been attracted to visit the islands, and the Research Station itself has become a tourist attraction (Heslinga, 2003). Tourism was initiated as a form of 'scientific tourism', which was used by the CDRS and the Galapagos National Park Service (GNPS) to promote their work and attract more investment and supporters to the conservation cause (Hennessy and McCleary, 2011; Hoyman and McCall, 2013). Nonetheless, scientists and conservationists at that time were concerned that uncontrolled tourism, even at a small scale, would quickly cause irreparable damage to the islands' ecosystems (Perry, 1970; Mountfort, 1970). They were concerned that the negative impacts of tourism would be part of the inevitable growth arising from increased regular flights by commercial airlines, which would start a self-reinforcing demand from tour operators for more facilities, and place further pressure on the government to promote more tourism (Mountfort, 1970).

Despite these early concerns, tourism has been permitted to grow continuously, intentions to cap visitors' number has not been strictly followed (Kelly et al., 2019). Conservation and tourism have been close allies since the establishment of the national park in 1959 as part of the revenues generated by visitor-entry fees goes to park management and conservation programs (Epler et al., 2007). Thus, nature tourism has emerged as a dominant economic activity, influencing both the conservation agenda and community development options (Espin et al., 2019). Continued successes in promoting the status of the islands as an acclaimed conservation site have made of tourism, the Galapagos' major economic driver (Quiroga, 2014). Reports have indicated that the

model of development operating in the Galapagos is pushing the populated islands toward an unsustainable state that will be disruptive to both ecological and social systems (cf. González et al., 2008; Gardener and Grenier, 2011; Mena et al., 2014; Schep et al., 2014).

Tourism in the Galapagos has clearly contributed to its conservation and has provided economic benefits for the local population (Quiroga, 2009); however, negative impacts of the advance of tourism have been social transitions due to shifted local economies (Quiroga, 2013) and the increasing pressure from infrastructure development and land-based services (Quiroga, 2014). Currently, tourism represents the primary driver of change in the Galapagos (de Haan et al., 2019): growing tourism intensifies the demand for goods and environmental services, and increases the number of new residents attracted to the islands in search of better jobs (Hoyman and McCall, 2013, Mena et al., 2014). These demographic changes alter cultural identities among residents, increasing the diversity and complexity of the Galapagos social context; as people move from mainland Ecuador, they bring lifestyle, cultural traditions, and productive and extractive patterns that alter social and resource-use practices on the islands (Ospina, 2001). The 'geographic opening' of the archipelago (Grenier, 2010), caused by its accelerating integration with the globalized world through numerous transport and communications networks, has also direct ecological consequences by increasing the number of invasive species, which are threatening the Galapagos' unique fauna and flora (Grenier, 2012; Toral-Granda et al., 2017).

Resource-based economic sectors, such as the agriculture and fishing have been most impacted by the processes described above (Quiroga, 2009). Agricultural practices have been in decline due to market constraints, and the increase of invasive species in agricultural land (Chiriboga et al., 2007; Khatun, 2018). This decline has gone relatively unnoticed (Guzmán and Poma, 2015) due to the fact that the islands import most of their food supply from the Ecuadorian mainland (Granda-León, 2016). The unsustainability of the agricultural sector poses a great challenge for managers in the Galapagos. The cessation of farming activities contributes to the spread of invasive plant species towards the areas of the national park (Guezou and Trueman, 2009; Laso et al., 2019), which affects the humid ecosystems of the highlands (Gardener et al., 2010). This also generates impacts on the availability of local produce with effects on the islands' food security (Guzmán and Poma, 2015). The fishing sector has also been directly affected as small-scale fishing activities have been the focus of much local and international conservation initiatives (Quiroga, 2009). An economic boom generated by a

profitable sea cucumber fishery due to demands from the Asian market, triggered the overcapitalization of the Galapagos' small-scale fishing fleet (Castrejón, 2011). This in addition to increasing pressure of industrial fishing activities, the growth of the tourism sector, and socio-environmental conflicts generated by the overexploitation of fishery resources, were key factors that fostered changes in the conservation of the Galapagos' marine resources (Castrejón 2018).

The recognition of the complex array of different interests and agendas within the archipelago's governance system (Macdonald, 1997) led to a move to increase public participation in the formulation of new regulations aimed to reduce social-environmental conflicts, and particularly, to ensure the conservation of marine resources (Zapata, 2005). This led to the creation of the Galapagos Special Law in 1998 and to the establishment of the Galapagos Marine Reserve with a co-management regime (Heylings and Cruz, 1998; Heylings et al., 2002; Castrejón, 2011; Reck, 2014). Through this new approach for the governance of the marine reserve, public participation was institutionalized, and stakeholder groups were assured an opportunity to voice their concerns (Zapata, 2005). However, despite this, social-environmental conflicts, in particular regarding the management of local fisheries, have persisted (Heylings and Bravo, 2001; Heylings and Bravo, 2007; Baine et al., 2007; González et al., 2008; Castrejón and Charles, 2013; Castrejón et al., 2014) since the establishment of regulations on fishing activities have become points of contention between managers of the marine reserve and the fishing sector (Ramírez, 2004; Ramírez, 2007; Castrejón, 2011; Jones, 2013; Castrejón et al,. 2014; Barragán-Paladines and Chuenpagdee, 2015; Barragán-Paladines and Chuenpagdee, 2017).

A shift in the governance regime of the marine protected area, from a unilateral top-down regime to a more inclusive bottom-up approach, moved conservation actions toward a new management direction, which envisioned the Galapagos as a 'complex social-ecological system' (SES) where human-environment interactions should be addressed in a holistic manner (cf. González et al., 2008; Tapia et al., 2008). This conceptualization of the Galapagos as a linked SES has been important for the management of the PAs and human activities, and has been integrated into the development of regulations and management guidelines to address social-environmental concerns (González et al., 2008; Tapia et al., 2008). Managing the Galapagos as an SES has helped to address social conflicts by encouraging adopting more integrative approaches to territorial planning, strengthening participative approaches, promoting

collaboration among stakeholders, and implementing adaptive co-management models for the governance of the PAs (González et al., 2008). Since then, some successes in conservation have been achieved, but despite progress in managing the PAs under an SES approach, persistent social-environmental conflicts warrant further research (Castrejón, 2018).

1.3 Research Scope and Specific Objectives

The Galapagos Islands represent an important context for exploring the interplay of biodiversity conservation initiatives, growing tourism, and social change within communities where resource-based livelihoods are considered important for the local economy. The islands have been under protection for 60 years since the establishment of the national park, and the marine reserve is one of the world's largest marine protected areas. In the interest of finding pathways to "win-win" outcomes to the 'park vs. people' debate, this dissertation examines how recent developments in biodiversity conservation and tourism growth have influenced resource-based activities in the three most populated islands of the Galapagos. Livelihoods are critical elements in finding win-win outcomes, and this dissertation addresses three concerns linked to this: the first is to understand livelihood dynamics in a context where increasing conservation regulations and tourism growth have become key drivers of livelihood change. The second is to examine decision-making processes as used in marine conservation management, given that conservation regulations may have important implications for local livelihoods. The third is to understand the perceptions of critical stakeholders in order to determine how those have been shaped, and what that implies for finding sustainable outcomes and achieving conservation goals.

To investigate these overarching concerns in the Galapagos, three specific aims were set: (1) to explore resource-based livelihoods diversification in the face of increased conservation regulations and growing tourism (Chapter 5); (2) to assess the record of stakeholder engagement in critical decision-making processes of marine conservation management (Chapters 6); and (3) to examine the perceptions of those most affected and to understand how these perceptions influence acceptance of, and implementation of, proposed conservation interventions (Chapters 7). To investigate these three aims and the specific objectives listed below, the study adopts a multiple-case study approach and uses a combination of review of secondary data, participant observation, questionnaire surveys, and key-informant interviews. The three aims are each explored in manuscript-style chapters within which original contributions to knowledge are highlighted.

The first manuscript, Chapter 5, explores livelihood diversification of people working in the resource-based sectors of agriculture and fisheries, two economic sectors that were dominant before the dramatic growth of tourism in the Galapagos, and which are still economically and culturally important. This study uses a multiple case study approach to explore perceptions, motivations and actions of those still active in the above-mentioned resource-based sectors in the three most populated islands.

To address the overall aim of this chapter, several specific objectives were defined:

- To determine how viable are existing resource-based livelihoods and what pressures jeopardize them.
- To identify perceived opportunities and limitations for existing resource-based livelihoods due to tourism growth, as well as for livelihood diversification and transitions.
- To identify what impediments exist to making adaptive, viable, sustainable and personally satisfying livelihood decisions.

The results contribute to untangling the complexity of choices and decisions that people make regarding their livelihoods in the face of increased conservation regulations and growing tourism. Conclusions outline principles that can be drawn from this case study that should be useful in understanding livelihood diversification in other areas where conservation, tourism and livelihood concerns intersect.

The second manuscript, Chapter 6, assesses stakeholder engagement in environmental decision-making processes of marine conservation management by using the 2016 re-zoning process of the Galapagos Marine Reserve as a case study. This study uses a mixed methods approach to explore the overall perception of three local stakeholder groups: the small-scale fisheries sector, the local scientific research community, and conservation advocates and managers.

To address the overall aim of this chapter, several specific objectives were defined:

- To identify events and challenges faced within the decision-making process of the rezoning plan for the Galapagos Marine Reserve.
- To identify the level of engagement for those in the small-scale fisheries sector within the decision-making of the rezoning plan.

- To assess the role that external agents play in shaping marine policy and protected areas management.

This study addresses the significance of stakeholder engagement within marine protected areas' designation and management; the role that large international conservation organizations have in driving the conservation agenda of protected areas, particularly marine protected areas; and concerns about a return to exclusionary biodiversity conservation.

Several scholars (cf. Pita et al., 2011; Bennett ,2016; McNeill et al., 2018; Ward et al., 2018; Pita et al., 2020) have stressed the importance of understanding the ideas, attitudes, and more broadly the perceptions, of those affected by marine conservation interventions. The third manuscript, Chapter 7, addresses this and uses a qualitative approach to explore more deeply the perceptions of those who were directly affected by the 2016 rezoning process. If the Galapagos is to be managed as an SES, it is essential that the perceptions that motivate actions and influence behaviours, and ultimately conservation outcomes, be understood. This study tries to understand the individual ideas about, interpretations and reactions of, the impacts and implications of exclusionary marine conservation planning.

To address the overall aim of this chapter, two specific objectives were defined:

- To understand the impacts and implications of the new marine zoning plan to resource-based practices from the point of view of a key stakeholder group of the Galapagos Marine Reserve, the small-scale fisheries sector.
- To determine how these perceptions coalesce into issues that should be understood and addressed by conservation managers.

The results highlight perceptions that underlie local resistance to the new marine zoning; resistance that delays conservation outcomes and questions the long-term viability of the marine conservation initiative. This study reveals consistent core elements of how conservation interventions are experienced by a stakeholder group that represents a key element in the islands' SES, and whose support is essential for managing for conservation.

1.4 Thesis Outline

Following this introductory chapter, the dissertation is structured as follows:

Chapter 2 – Conceptual Framework: presents the framework that guides the development of this dissertation and a review of relevant literature from five major academic fields (i.e., biodiversity

conservation, marine conservation and management, public participation, tourism, and sustainable livelihoods) that inform the studies presented in chapters 5-7.

Chapter 3 – Site Description: provides a description of the study site, bringing attention to the interaction of biodiversity conservation, tourism, and resource-based livelihoods in an area important for global conservation.

Chapter 4 – Methodology: contains a detailed description of the research design and methods of data collection and analysis, highlighting advantages and limitations of the methodological approach. Note that space limitations in published manuscripts prevent full discussion of all details related to methods. Those details are presented in this chapter.

Chapter 5 – presents the first manuscript that is entitled: *Effects of tourism growth in a Natural World Heritage Site: Livelihoods diversification in the Galapagos Islands, Ecuador.* It provides an assessment of drivers and inhibitors of livelihood diversification within the two resource-based sectors that sustained the island communities from the time of their settlement to the time that tourism came to dominate the island economy.

Chapter 6 – presents the second manuscript that is entitled: *Exclusionary Decision-Making Processes in Marine Governance: The Rezoning Plan for the Protected Areas of the 'Iconic' Galapagos Islands, Ecuador.* This provides an assessment of one event in the growing influence of conservation regulations and tourism development, that is, the process that led to new restrictive marine spatial planning in 2016. It provides a critical assessment of environmental decision-making processes.

Chapter 7 – presents the third manuscript that is entitled: *Conservation Strategies through the Lens of Small-Scale Fishers in the Galapagos Islands, Ecuador: Perceptions Underlying Local Resistance to Marine Planning.* This examines the perceptions of one stakeholder group affected by the increasing conservation regulations and by the growing domination of the tourism sector. This provides an exploration of one aspect of the human dimensions of conservation initiatives by synthesizing community concerns and by showing how those concerns underlie resistance to conservation initiatives.

Chapter 8 – Conclusion: provides a summary of key findings, examines the overall implications of the finding, and identifies contributions to knowledge that may help advance the understanding of the challenges of meeting conservation goals and social concerns. The chapter also provides policy recommendations, suggestions for further research, and concludes with a summary of "lessons learned" from this research.

CHAPTER II: Conceptual Framework

2.1 Introduction

This chapter provides an overview of literature that establishes the conceptual framework that guides the development of this dissertation, and it provides the context for the research elements described in Chapters 5 to 7. Five areas of scholarship were seen as being essential to this research, and within these, five themes were explored: 1) the broad dilemma of biological conservation and human interactions; 2) the approach to marine conservation through the implementation of protected areas; 3) the role of public participation in environmental decision-making; 4) tourism as a potential complement to biological conservation and community development; and 5) the factors that determine livelihoods dynamics (Fig. 2.1).

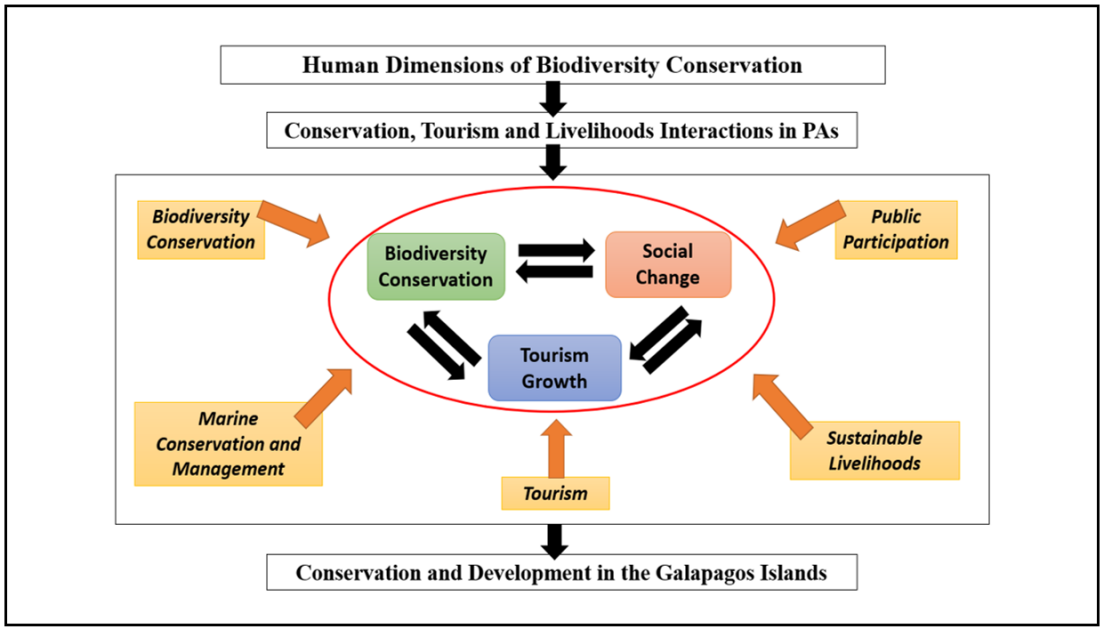

Fig. 2.1. The conceptual framework for this thesis. The exploration of the human dimensions of biodiversity conservation addressed in this thesis specifically examines the role of conservation regulations and growing tourism in shaping public responses to management initiatives and in mediating livelihood change. The study draws on five bodies of literature to explore aspects of conservation and development in the Galapagos Archipelago.

Within each of these five areas of scholarship, there are theoretical concepts, debates, and methodological innovations that have contributed to the understanding of conservation, tourism

and livelihoods interactions, and more broadly, to the human dimensions of biodiversity conservation and I bring these together to underpin my conceptual framework. Certain areas of focus are of particular concern for this research in the Galapagos (Fig 2.2.). These include:

- *Biodiversity conservation*, where the relationships among ecosystem function, conservation objectives, and human activities are explored in relation to the spectrum of approaches to conservation that influence both ecological and social outcomes.
- *Marine conservation and Management*, where marine protected areas (MPAs) are examined with reference to the establishment and impact of international conservation targets; the social-environmental conflicts that result from exclusionary forms of marine conservation; and the role that consideration of human dimensions plays in marine protection and planning.
- *Public participation*, where environmental decision-making is examined with a particular focus on elements that support or restrict stakeholders' engagement in the design, management, and implementation of protected areas.
- *Tourism*, which is explored in relation to conservation and the emergence of forms of nature-based tourism that follows the sustainable tourism approach. It assesses how effectively the economic dimensions and livelihood opportunities associated with tourism, specifically through ecotourism, can support ecological and socioeconomic objectives.
- *Sustainable Livelihoods*, where the main components of livelihood analysis are reviewed with particular attention to livelihood strategies and diversification. The section also reviews the application of what is called the "sustainable livelihoods approach" to understand how livelihoods are affected by conservation initiatives and tourism development.

The research based on these areas of focus is intended to provide information that contributes to effective conservation and sustainable development in the Galapagos Islands, but also, based on this case study, to contribute to the broader understanding of issues related to the human dimensions of biodiversity conservation in protected areas.

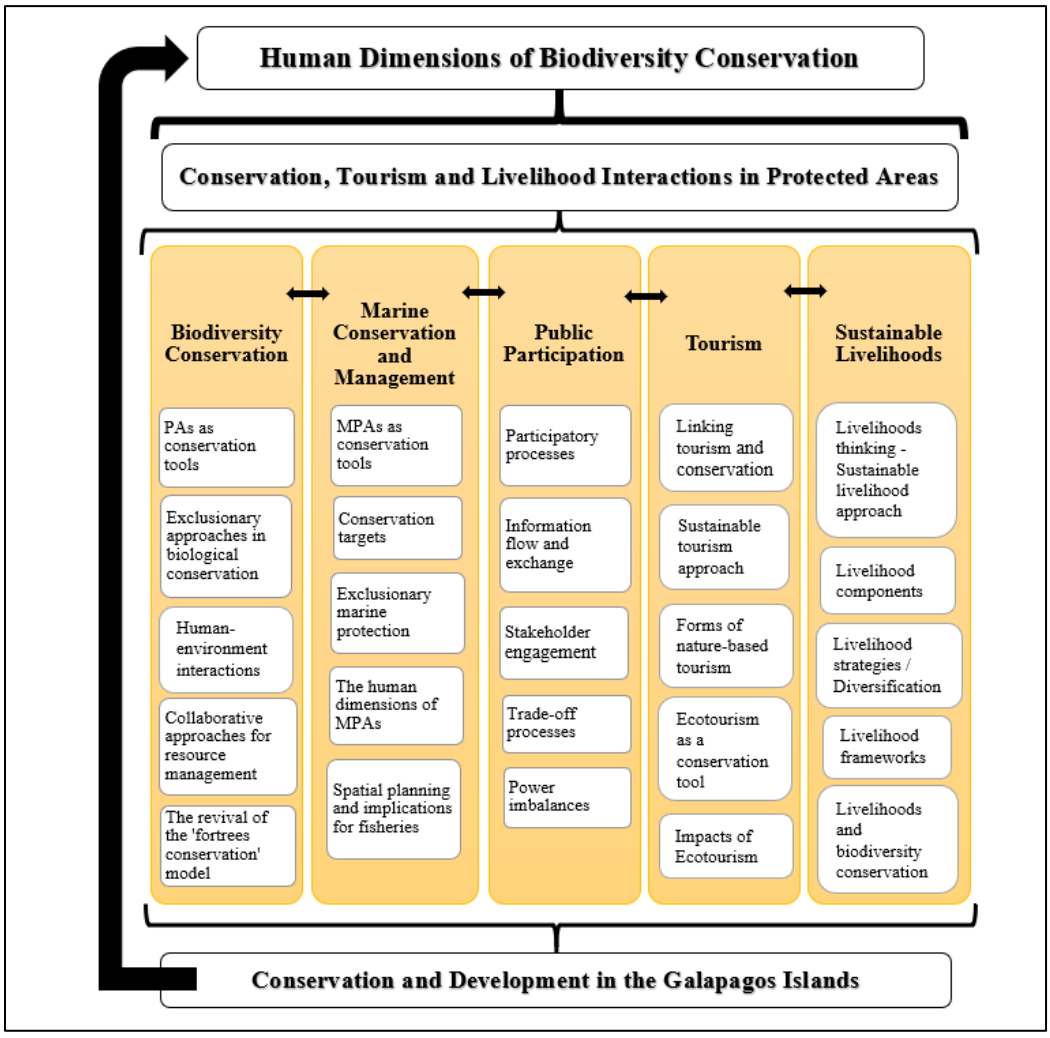

Fig. 2.2. Several key issues within each of the areas of literature were identified as being particularly relevant to the study of conservation and development in the Galapagos Islands. These are listed under the appropriate heading.

2.2 Linking Conservation, Tourism, and Livelihoods in Protected Areas

2.2.1 The Dilemma of Biological Conservation and Human Interactions

Anthropogenic effects, such as loss of biodiversity and habitat destruction, in particular in the tropics, have been major concerns for the international conservation community (Lele et al., 2010). The common strategy to counteract these effects on key biodiversity areas proposed by scientists and conservationists, and adopted by national governments, has been the establishment of protected areas[1] (PAs) such as national parks and reserves, which are mainly conceived as

[1] The term '*protected area*' was officially defined by the IUCN (1994) as "an area of land/or sea especially dedicated to the protection of biological diversity, and of natural and associated cultural resources, and managed

areas "where human use and presence is minimized or at least curtailed significantly" (Lele et al., 2010, 2). According to reports of the IUCN (2016), approximately 15 percent of the Earth's land and 10 percent of its territorial waters are covered by national parks and other forms of protection—in total 202,467 PAs, which represents almost 20 million km^2 of 14.7 percent of the world's land, not including Antarctica. Scientists at IUCN and UN Environment's World Conservation Monitoring Centre posit that this percentage "falls just short of the 17 percent target set for 2020" by the Convention on Biological Diversity under the Aichi Biodiversity Targets (IUCN, 2016).

Despite successes of PAs as a biodiversity conservation tool[2], there remains several problems that have put into question the effectiveness of their application (Lele et al., 2010). Problems around PA's design, implementation, and management have created significant conflicts that have limited their long-term success (Adams and Hutton, 2007). For example, the interaction of biological conservation and livelihoods in PAs is contentious because of management measures that restrict the access of natural resources to local communities that depend on them for their subsistence (Agrawal and Gibson, 1999; Brown 2002, 2003; Adams et al., 2004; Igoe, 2006; West et al., 2006, Adams and Hutton, 2007; Holmes and Brockington, 2013; Oldekop et al., 2015). This is particularly acute when conservation strategies are implemented through top-down approaches that neglect socio-cultural, economic, and political interactions intertwined in local contexts (Redpath et al., 2013).

Exclusionary and people-oriented approaches for biological conservation, as discussed by Miller et al., (2011), have produced two opposing debates that have permeated the history of PA implementation and management: the "classic conservation-preservation debate[3]" and the "parks vs. people debate[4]" (Pg. 948). The authors emphasize that conservation initiatives have been

through legal or other effective means" (quoted in Nursey-Bray, 2011, 4). These areas are designated to: (1) maintain essential ecological processes and life support systems, (2) preserve genetic diversity, (3) ensure the sustainable utilization of species and ecosystems (IUCN, 1994).

[2] Brooks et al., (2009) highlight that the implementation of PAs, although with mixed results, have lessen rates of deforestation, prevented species extinction, and conserved land and water resources.

[3] Promoted by '*nature protectionists*' who according to Miller et al., (2011) "defend PAs and conservation policies that strictly limit human presence and who advance biodiversity protection as the primary goal of international conservation efforts" (Pg. 948). See for example: Redford (1992); Kramer et al., (1997); Redford et al., (1998); Oates (1999); Terborgh (1999, 2000, 2004); Sanderson and Redford (2003).

[4] Promoted by '*social conservationists*' who according to Miller et al., (2011) "advocate various forms of sustainable use and privilege conservation-oriented development and welfare-oriented goals such as poverty alleviation and social justice" (Pg. 948). See for example: Chapin (2004); Roe and Elliot (2004, 2006); Brockington et al., (2006); West et al., (2006).

guided by the values and believes of the two broader groups that support each debate: the "nature protectionists", who embrace the strong preservationist view of the classic conservation debate, where PAs are seen as the only mechanism to protect biodiversity; and the "social conservationists", who view conservation as a way to attend socio-economic and political goals, such as poverty alleviation, economic development, and political participation (Miller et al., 2011, 949). This dichotomy of pro-nature versus pro-people is discussed below.

2.2.1.1 Exclusionary Approaches in Biological Conservation

Historically, the implementation and management of PAs with strict restrictions on land and resource use has been a defining feature of the conservation paradigm worldwide (Adams and Hutton, 2007). Conservation initiatives, based on the idea of 'nature separate from humans' posited by biologists who contend that PAs should be set aside from human use if the preservation of species is to be achieved (Adams, 2003), have imposed considerable burdens on local communities settled within or on the boundaries of national parks and reserves (Redpath et al., 2013). This idea dominated conservation thinking during the 20th century, "drawing in particular on the US idea of a national park as a pristine or wilderness area" (Hutton et al., 2005, 342) referred to as 'fortress conservation'[5] or 'fences and fines' approach (Wells and Brandon, 1992; Brockington, 2002).

This managerial approach was globally embraced but particularly applied by most governments in the developing tropics (Lele et al., 2010), and encompassed different forms of restriction, such as: (1) complete physical displacement or eviction (i.e., involuntary removal of people from their homes and homelands); (2) economic displacement[6] (i.e., restrictions that make it hard to pursue a livelihood); and (3) cultural displacement (i.e., restricted access to places of cultural and symbolic value (Brockington and Igoe, 2006; Brockington and Wilkie, 2015). However, by 1990s, the dominant "narrative of fortress conservation" started to be challenged by a "new community conservation narrative", which stressed the need "not to exclude local people, either physically from protected areas or politically from the conservation policy process, but to ensure their participation" (Hutton et al., 2005, 342).

[5] This type of conservation included the implementation of PAs, the exclusion of people as residents, the prevention of consumptive use and minimization of other forms of human impact (Brockington and Schmidt-Soltau, 2004).
[6] According to a review of Brockington and Igoe (2006) of eviction for conservation, the authors suggested that *economic displacement* is in fact a more widespread practice than eviction and is also less likely to result in appropriate compensation.

As a result of social and political implications of fortress conservation, critics called attention to consider the impacts of imposed restrictions that threatened people's rights and livelihoods (West and Brechin, 1991; Ghimire and Pimbert, 1997; Brosius, 2004; Wilkie et al., 2006; Mascia and Claus, 2009), and creating a "fortune vs. misfortune" dichotomy[7] by "allowing access for some people but excluding others" (Brockington and Wilkie, 2015, 1). Protectionist arguments used for strict conservation are underpinned by what Wilshusen et al., (2002) categorized as: 1) the central importance of PAs (i.e., PAs require strict protection); 2) the moral imperative of nature protection (i.e., biodiversity protection is a moral imperative); 3) the ineffectiveness of conservation linked to development (i.e., conservation linked to development does not protect biodiversity); 4) the mythical status of harmonious, ecologically friendly local people; and 5) the immediate need for strictly enforced protection measures (i.e., emergency situations require extreme measures).

At a more central level, Brechin et al., (2002) argued that exclusionary conservation ineluctably generates ethical and practical considerations by overlooking key elements of social and political process, such as "human dignity[8], legitimacy, governance, accountability, adaptation and learning, and nonlocal forces that interfere in conservation" (Pg., 43-44). These scholars suggest the adoption of core principles of 'social justice' (e.g., rights to equal participation, self-representation, and self-determination) in conservation interventions "to allow both nature protection and human development needs to be negotiated in context", which contributes to biological conservation in the long-term by avoiding putting into question the legitimacy of such interventions (Brechin et al., 2002, 54). They argue that "establishing a legitimate process by constructively working with people is the most feasible and morally just way to achieve long-term nature protection … [and] since conservation is a human

[7] Brockington and Wilkie (2015) voice concerns about how the legitimacy and desirability of PAs are "fueled by conflicting expectations of what parks and reserves can and cannot, or should and should not, do." (Pg. 4) These scholars contend that "honesty" should be an important value when determining benefits and costs associated to PAs conservation; and that compensation mechanisms should be set to compensate those who incur the conservation costs.

[8] Brechin et al., (2002) bring attention to elements of *human dignity* by posing questions of: who benefits from conservation interventions? And if should biodiversity be granted moral superiority relative to human welfare? And on what grounds? (Pg. 43) These scholars consider that issues of biodiversity conservation in terms of human dignity are related to the accountability of conservation initiatives for principles of ***Social Justice*** (Taylor, 2000). The ideal of social justice that Brechin et al., (2002) propose centers on three broad principles: "1) the right to participate at all levels of the policymaking process as equal partners; 2) the right to self-representation and autonomy; and 3) the right to political, economic, and cultural self-determination (sovereignty)." (Pg. 45)

organizational process, the goal of biodiversity protection depends on the strength and commitment of social actors" (Ibid., 51).

On the other hand, an important element of consideration within exclusionary conservation was publicly raised by Mac Chapin in 2004 through his publication *A Challenge to Conservationists*[9], regarding the role that big nongovernmental organization (BINGOs) have played in supporting, and even moving forward, protectionist conservation initiatives and programs. In an analysis carried out on three major NGOs—who have provided also substantial support to the design and implementation of PAs—Chapin (2004) emphasized the effects of their close involvement in processes that have disadvantaged already marginalized local groups[10], and criticized the alliances with large corporate interests that through their programs were promoting their political agendas.

Finally, as a response to the effects of long-applied exclusionary approaches in biological conservation—which have intensified social-environmental conflicts in many conservation areas worldwide (e.g., see Brockington and Homewood, 2001; Brockington and Igoe, 2006; Adams and Hutton, 2007; Redpath et al., 2013; Brockington and Wilkie, 2015), Lele et al., (2010) bring attention to whether complete exclusion of human activities is essential for conservation success and whether "pristine-ness" is a significant goal, given historical adjustments of these landscapes. They also underscore the marginalization of local communities through top-down approaches that have turned "potential conservation allies into adversaries" (Lele et al., 2010, 1).

2.2.1.2 Moving Away from Conventional Exclusionary Approaches

2.2.1.2.1 Human-Environment Interactions and Complexity

Globally, addressing both biological conservation and economic development remains a conflicting challenge. The general recognition of the failure of 'command-and-control' approaches for PAs management has pushed international agencies, researchers, managers, and

[9] Polemical article that criticized the role that three big international organizations—World Wildlife Fund (WWF), Conservational International (CI), and The Nature Conservancy (TNC)—have played in conservation, particularly in the tropics. Chapin (2004) denounced how programs implemented by these organizations, have been marked by growing conflicts of interest as "corporate and government money flow into the three big international organizations that dominate the world's conservation agenda" (Pg. 17). For example, the author brought attention on how these organizations were fostering a protectionist approach by neglecting "indigenous people whose land they are in business to protect" (Ibid., 17).

[10] Chapin (2004) refers to these groups as "indigenous and non-indigenous groups that are long-standing residents of wilderness areas" (Pg. 17).

national governments, to develop strategies to cope with the environmental and socio-economic cost of traditional management approaches (Holling and Meffe, 1996; Black et al., 2013). New paradigms in biological conservation that view nature linked with humans triggered a wave of integrated research, where "bridging fields" according to Berkes (2004), have given rise to "different combinations of natural- and social-science thinking. Each of them developed in response to needs or gaps in understanding the linkages between social systems and ecological systems. All provide insights relevant to the conservation dilemma." (Pg. 624)

To a great extent, conservation managers have ignored human agency on natural landscapes by overlooking how people's behaviour adapts to landscape changes driven by natural conditions or by environmental management (Barrett et al., 2001). The separation of people and nature, as noted by West et al., (2006), depends on "the different worldviews of actors who are involved in conservation and the narratives on sustainability in the global discourses." (Pg. 256) These worldviews are driven by national and international pressures over land (and sea) use and rights, which separate people and their environment in ways that undermine the potential for these areas to reach sustainable development (West et al., 2006).

Nonetheless, since the recognition of human agency in environmental change through the development of a "new ecological thinking" (cf. Zimmerer, 1994), the focus on human-environment interactions have become central to the conservation discourse (Scoones, 1999). Scoones (1999) noted that this way of thinking has repercussions on the way we understand the relationships between socio-economic and ecological processes. Therefore, he suggests that understanding the environment as both the product of and the setting for human interactions may help to explain the "complex intersection of social, political, economic, and environmental processes" that determine the sustainability of a society (Ibid., 491).

The growing development of interdisciplinary and transdisciplinary research is the product of an increasing interest in understanding the complex patterns and processes between human and natural systems, and how this interaction feeds backs on the natural environment and the societies that depend on their natural landscape (Pretty et al., 2009). This novelty line of research has produced a vast area of academic thinking interested in understanding the complexity between biophysical and ecological dimensions, socio/cultural and economic conditions, and institutional responses based on context-specific dynamics (Werner and McNamara, 2007; Alberti et al., 2011).

Human-environment research is rooted in the idea that socio-environmental issues are not limited to any specific discipline; therefore, these issues should be assessed by means of an integrated strategy that includes a variety of theoretical perspectives and methodological approaches that provide insights to integrated biological conservation (Liu et al., 2007; Hummel et al., 2012). Hummel et al., (2012) note there are several "normative development paradigms" that are compatible with the coupled human-environment approach: for example, *dynamic systems approach* (Pg. 10). This development paradigm, according to the authors, has contributed to the understanding of human-environment interactions by focusing on balancing the socio-cultural, economic, and ecological aspects of a specific context area; and on developing decision-making strategies and related mechanisms to avoid conflicts amongst different social and political interests. Also, normative development paradigms bring attention to people's diversity in relation to culture and livelihood choices, and how institutions contribute or undermine livelihood opportunities. These paradigms also assess power imbalances and how power inequality determines the use and control of natural resources.

Human-environment interactions form ***complex adaptive systems***[11] (CAS), where a constant learning process is determined by the shared and reciprocal interactions between the interlinked sub-systems and its agents (Levin, 1998). The ability of a system to form new interactions and develop new properties, increases the system's probabilities of adaptive change, and improves both human and environment resilience (Rammel et al., 2007). Consequently, the sustainable management of complex adaptive systems is continually challenged by the systems inherent characteristics, which are the different temporal, spatial and social scales, nested hierarchies, inevitable uncertainty, multidimensional interactions, and emergent properties (Rammel et al., 2007, 10). Understanding the complexity of socio-cultural and economic forces interlinked with the biophysical and ecological dimensions of a dynamic systems, as indicated by Alberti et al., (2011) is crucial to develop effective policies for achieving environmental and socio-economic sustainability.

[11]A ***complex adaptive system*** is defined as "complex behavior that emerges as a result of interactions among system components (or agents) and the environment. Through interacting with and learning from its environment, a complex adaptive system modifies its behavior to adapt to changes in its environment" (Potgieter and Bishop 2001 cited in Rammel et al., 2007, 10).

2.2.1.2.1.1 The Social-Ecological Systems Approach

The development of the social-ecological systems (SESs) approach (cf. Berkes and Folke, 2000) is the product of an increasing interest in understanding the complex patterns and processes amongst human and natural systems, and how this interaction feeds backs on the natural environment and the societies that depend on their natural landscape (Young et al., 2006). Liu et al. (2007) emphasize that although "disciplinary research continues to be important to advance disciplinary inquiries into many aspects of human and natural systems, it is not effective to study human and natural systems separately when addressing human-environment interactions." (Pg. 639) SESs tries to identify and understand from a holistic point of view, the interrelationships between different components of social and environmental systems (Berkes et al., 2003; Ostrom, 2009); as stated by the Stockholm Resilience Center (2007) in order to deal with environmental problems, it is necessary to realize that there are no "natural systems without people, nor social systems without nature. Social and ecological systems are truly interdependent and constantly co-evolving".

SESs studies have provided useful examples of the applicability of this approach, showing how the interactions between humans and natural resources are modifying the dynamics of the ecosystems (Berkes and Folke, 2000; Berkes et al., 2003; Anderson et al., 2008; Biggs et al., 2015). This approach uses the resilience[12] perspective to understand the dynamics of an SES, and emphasizes the presence of non-linear dynamics. At the same time, it deals with uncertainty and gradual changes in interactions across temporal and spatial scales within the ecosystems' dynamics (Folke, 2006). Governance dimensions are critical to both social and natural resilience: through the implementation of a governance system, a community can improve its capacity to manage its resilience in uncertain conditions of change (Lebel et al., 2006). Increasing the capacity of societies to manage resilience is crucial to sustainable development, and the capacity to manage resilience is related to the system's self-organization, adaptation, and learning (Olsson et al., 2004; Gunderson and Folke, 2005). The ability of a system to learn and adapt implies that the system can improve management objectives over time, and create new objectives when the system changes (Olsson et al., 2004).

[12] The resilience theory focuses on the capacity of a system to absorb shocks and still retain its function, and in this way maintain the capacity for renewal, re-organization and development, assuring its sustainability (Folke, 2006).

Consequently, understanding mechanisms of self-organization, adaptation, and learning are very important in attempting to reach conservation objectives, so it is necessary to understand the connections between the set of ecosystems' goods and services that exist within an environment, and the societies who depends on them (Lebel et al., 2006). This can identify actors who have different interests, technological development, economic systems, and decision-making power (Ibid.) and provide a better understanding of SES dynamics, and clearer paths to collaborative management.

2.2.1.2.2 Collaborative Approaches for Resource Management

Alternative approaches to biodiversity conservation, such as the Integrated Conservation-Development Projects[13] (ICDPs) of the late 1980s were followed, starting in the mid-1990s by more explicitly community-oriented and participatory experiments (Lele et al., 2010). These included, for example, community-based conservation[14] (CBC), collaborative or co-management, and community-based natural resources management (CBNRM) (Barrow and Murphee, 2001). Since the early 1990s, a body of academic literature emerged to examine the consequences of conservation regulations on the well-being of people living in and around PAs[15]; and since the turn of the 21st century, the literature became more detailed with empirical examples from across the globe (Holmes and Brockington, 2013).

Social-environmental conflicts represent a common concern in PAs management, and are related to the different attitudes, values, and perceptions within and between groups who draw on ecosystem attributes and services (Miller et al., 2011). These differences underlie conflicts that have proven difficult to overcome without shifting PA governance systems towards more inclusive management approaches (West et al., 2006; Reed, 2008; Lele et al., 2010); consequently new forms of governance have emerged to replace exclusionary top-down

[13] However, in the African context, according to Lele et al., (2010) local communities "were 'involved' more as recipients of concessions and development assistance than as part of conservation activities … the early ICDPs were just an extension of conservation by exclusion" (Pg. 2). Indeed, for example in a study of Struhsaker et al., (2005), the presence of ICDPs was not found to be correlated with conservation success in 81 percent of the 16 PAs sampled due to ICDPs contributed little to local livelihoods.

[14] Most CBCs, according to Lele et al., (2010) aim to provide both, poverty alleviation and participation in PAs governance by re-arranging the rules of engagement among state agencies and local communities, and by "providing financial subsidies, livelihood training, and building community institutions to regulate resource access and use." (Pg. 3)

[15] According to Holmes and Brockington (2013) "the real and important social impacts of PAs extend beyond economic and livelihood issues into matters of culture, identity and community." (Pg. 162)

approaches in PA conservation. *Collaborative Governance*[16] seeks to reconcile biodiversity conservation goals with social-economic concerns, and to promote greater compliance of resource user groups with PAs conservation strategies (Andrade and Rhodes 2012). This governance approach, "bring[s] multiple stakeholders together in collaborative forums with public agencies to engage in consensus-oriented decision-making" (Ansell and Gash, 2007, 1).

Collaborative governance has become an important approach to addressing conflicts and disagreements over the use of natural resources between PA managers and local users (Johansson 2018). It fosters greater levels of transparency, accountability, and legitimacy by facilitating mutual trust, mutual understanding and shared commitment (Emerson et al., 2011). Nonetheless, according to Ansell and Gash (2007) barriers that collaborative strategies encounter, arise from differences in power relations amongst stakeholders in decision-making processes, from the lack of real commitment to collaboration, and from distrust between authorities in public agencies and resource users.

2.2.1.2.2.1 Co-management of Natural Resources

Collaborative governance is often discussed using related terms, such as participatory management, co-management[17], collaborative management (Ansell and Gash, 2007). For more than twenty years, the concept of *co-management* (i.e., the sharing of power and responsibility between the government and local resource users) and its adaptive characteristic has produced relevant contributions to PAs conservation (Berkes, 2009, 1692). Berkes (2009) notes co-management allows knowledge generation at different scales, enables cooperation in the assessment of resources, brings together different actors to build trust amongst social groups, generates conflict resolution mechanisms, and facilitates networking. Management of SESs, according to the author might be more efficient when social learning and join-collaboration of several groups of actors and their networks occur (Ibid.).

[16] Defined by Ansell and Gash (2007) as "[a] governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets." (Pg. 2) The purpose of *collaboration,* according to Emerson et al., note (2011), is to produce desired outcomes together that could not be achieved separately.

[17] For example, Armitage et al., (2009) refer to collaborative governance strategies as co-management.

Adaptive co-management[18], according to Folke et al., (2002), is a process in which institutional arrangements and ecological knowledge is examined and revised continually, and in which stakeholders take and share managerial responsibilities to learn from previous decisions and actions. The authors explain that adaptive co-management requires, but also facilitates, a social context that is flexible enough to allow the development of a multi-level governance system, which enables continuous learning processes that contributes to generate capacity building (Folke et al., 2002). Core elements of adaptive management, continuous learning and flexibility, contribute to the governance of dynamic SESs (Armitage et al., 2009). Olsson et al., (2004) note co-management conditions can be created based on the role of key individuals and trust-building by fostering information flow and exchange of knowledge.

In biodiversity conservation, co-management is particularly appropriate when resource users whose livelihoods are affected by the regulations of a PA participate to determine how resources are allocated, and how management decisions are taken (Mikalsen and Jentoft, 2001). For example, in different contexts, the application of co-management has resulted in greater stakeholder engagement and empowerment, and increases in the legitimacy of regulations in the eyes of resource users improving the overall efficiency of regulatory programs over time[19] (Jentoft, 2000; Ayers et al., 2017).

Nonetheless, several researchers (cf. Jentoft, 2000; Béné and Neiland, 2004; Mikalsen et al., 2007) brought caution to see co-management as a "panacea for legitimacy" (Berkes, 2009, 1692). For example, Berkes (2009) explains that "co-management, and decentralizations in general, often lead to reinforcement of local elite power or to strengthening of state control." (Pg. 1693) Regarding "elite power", Berkes notes that the exclusion of stakeholders who are poor and politically weak may have negative impacts on equity and community welfare[20], and about "state control," the author argues that co-management can lead to "regulatory capture," where a governmental agency advances the economic or political concerns of elite groups, and thus extends the power of the state.

[18] ***Adaptive co-management***, according to Armitage et al., (2009), integrates the principles and practices of co-management and adaptive management (Pg. 95).

[19] For example, the co-management approach applied for fisheries management contributes to reduce disputes over resource use, generates equitable allocation of decisions and sharing power, increases legitimacy of regulations, and enhance the overall efficiency of PAs management over time (Ayers et al., 2017).

[20] Examples of this has been seen in fishery cases in Bangladesh, Cambodia, Indonesia and Philippines (e.g., Wilson et al., 2006).

2.2.1.3 The Revival of the 'Fortress Conservation' Model

Despite efforts to incorporate collaborative approaches in PAs governance, and wide acknowledgment of social-environmental conflicts of the fortress conservation model in the developing tropics, Hutton et al., (2005) bring attention to a "revival" of exclusionary approaches to biological conservation—promoted in part by shortcomings faced by community approaches—that are "significant in scale and scope" (Pg. 342). The "back to the barriers" movement, as it is called by these authors is underpinned in narratives in favour of a return to an "exclusive, protectionist approach" (Ibid., pg. 342). In additional, academic researchers in conservation biology and corporate and government funding have fueled this return through NGOs conservation programs and initiatives (Rodríguez et al., 2007; De Santo et al., 2011; Silver and Campbell, 2018).

Concerns about the dangers of a revival of exclusionary approaches, as posited by Hutton et al., (2005), are related to the effects that protectionist narratives can have on policy-makers, who "might conclude that ideas such as sustainable use, community-based conservation and co-management are so deeply flawed that they have no role in biodiversity conservation, natural resources management and, most especially, protected areas management." (Pg. 343). The authors have summarized in eight arguments, narratives that support the resurgence of conservation strategies based on exclusive PAs and which support the "powerful global narrative" of protectionist conservation; these are: 1) biodiversity can only be conserved in areas free of all human influence[21] (except science and limited ecotourism); 2) community approaches represent an abandonment of clear scientific analysis in favour of 'unscientific postmodernist influences'; 3) community-based conservation is based on romantic and unrealistic ideas; 4) the sustainable use approach is rarely, if ever sustainable; 5) people-oriented approaches have failed: 6) community approaches waste scarce conservation resources; 7) PAs have been proved to work; and 8) the scale of threat demands the 'strictest'[22] possible protection of PAs (Ibid., 347-348).

[21] Hutton et al., (2005) explains: "local communities may be pacified by investment in social infrastructure … and may even be engaged through some kind of local forum for information exchange, but they are excluded from decision-making processes about the management of the PA" (Pg. 347).
[22] In terms of closely policing marked boundaries, and application of appropriate sanctions (Hutton et al., 2005).

Some researchers and practitioners have eagerly supported completely exclusionary approaches in biodiversity conservation[23] (e.g., Terborgh, 1999; Oates, 1999; Kramer et al., 1997; Brandon et al., 1998; Terborgh et al., 2002; Brandon, 2002). However, Lele et al., (2010) indicate that although reasons differ, in general the absence of local support for conservation strategies condemns these strategies to failure (e.g., see Vermeulen and Sheil, 2007; Oldekop et al., 2015[24]). Moreover, apart from functional conservation consequences, displacing local communities without their consent is unethical, violates human rights, and magnifies the disadvantaged condition of already marginalized groups (Brechin et al., 2002; Wilshusen et al., 2002; Brockington, 2004; Klain et al., 2014).

2.2.1.4 Concluding Remarks

Increasing anthropogenic pressures amplify both the urgency and the complexity of protecting key biodiversity areas and the ecosystem services they provide (Aryal et al., 2018). PAs have been shown to be important tools for biodiversity conservation, and in the face of international calls to increase the spatial extent of PAs, there is growing pressure to find ways to address resultant social-environmental conflicts and to refine how PAs are being designed, implemented, and managed (Oldekop et al., 2015). The emergence of integrative approaches, such as those based on SESs and co-management, is a response to the need to improve management strategies so that they are more effective in addressing societies that inhabit managed landscapes. Adaptive management strategies and bottom-up approaches within the governance of PAs requires a collaboration of interested actors and stakeholders, including members of local communities. Central to this is the need to continue encouraging the use of models of governance that are more inclusive and that consider socio-economic considerations and elements of social justice (Lele et al., 2010; Miller et al., 2011; Klain et al., 2014; Charles et al., 2016; Bennett 2018).

[23] Regarding marine conservation, for example see Sala et al., (2013); Lubchenco and Grorud-Colvert (2015); Sala et al., (2018); Sala and Giakoumi (2017).

[24] This study presents a global review of conservation outcomes based on a meta-analysis on 16 PAs. Their findings suggest that PAs that enhance human well-being (by permitting sustainable use) also tend to be correlated with better conservation outcomes (Oldekop et al., 2015).

2.2.2 Marine Conservation through the Implementation of Protected Areas

The need for increased protection of the world's marine environment has encouraged the design, creation, and implementation of marine protected areas (MPAs) worldwide (Agardy et al., 2003). MPAs are one of several spatial mechanisms used by governments and local regulators to manage the myriad activities taking place in coastal and marine environments (Sowman et al., 2014). By definition, an MPA is "any area of inter-tidal or sub-tidal terrain, together with its overlying water and associated flora, fauna, historical, or cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment" (IUCN/WCMC 1994 in Kelleher and Kenchington, 1992). As MPAs have been implemented in different contexts and with different aims and purposes, a proliferation of different terms has emerged; for example, marine reserve, marine sanctuary, marine and coastal protected area, marine management area, no-take area, national marine park, marine conservation area, to mention some (Agardy et al., 2003). According to Agardy et al., (2003) as these strategies are often used indistinctly, this has caused confusion as "similar specialized terms are applied to management regimes with different objectives and temporal-spatial scales"[25] (Pg. 356).

MPAs are critical conservation tools for reversing degradation due to anthropogenic threats, such as overfishing, pollution, habitat destruction, and biodiversity loss, and are considered key instruments for promoting long-term conservation and sustainable use of marine resources (Crosby et al., 2000). Over the last years, the number and spatial extent of MPAs have increased considerably. Since 2000 there has been over a ten-fold increase in MPA coverage with 28,189,691 km^2 of the ocean being under a type of protection. Currently, eight per cent of the ocean is under protection (representing 16,927 MPAs) and it is expected that in the following years the protected coverage increases as MPA designation is undergoing a rapid and accelerated growth (Protected Planet, 2019). Since 2010, about 14 million km^2 of MPAs have been added driven in large part by the expansion of existing sites, and creation of very large new sites (IUCN, 2017).

[25] For example, the term 'sanctuary' has been applied in some contexts as a multiple-use MPA, but in others has also been applied as a strictly protected marine reserve (Agardy et al., 2003).

2.2.2.1 Marine Conservation Targets

The increase of ocean protection responds to international conservation commitments to guarantee the conservation of marine environments and the services they provide, as well as to their sustainable use. One of the most important commitments for marine protection is set by the Convention on Biological Diversity (CBD) through the Aichi Biodiversity Targets[26], agreed by Member States in 2010. This includes quantitative targets for the implementation of land and sea protected areas:

> By 2020, … at least 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitable managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape (Aichi Target No. 11 - CBD, 2010).

In 2015 the United Nations echoed calls for oceans' protection through the Sustainable Development Goals for UN Member Sates. Marine protection is addressed in Goal 14: "Conserve and sustainably use the oceans, seas and marine resources for sustainable development", specifically the goal is: "By 2020, conserve at least 10 percent of coastal and marine areas, consistent with national and international law and based on the best available scientific information" (Goal 14.5 – UN-SDG, 2015). So far, the marine protection coverage falls short of the 10 percent target agreed under the Aichi Targets and confirmed by the UN-Sustainable Development Goals.

On the other hand, Spalding et al., (2016) bring attention to the failure of such numeric targets to address critical factors such as the degree to which sites are being effectively or equitably managed, or the efficacy of such sites in achieving conservation outcomes. They point out, as do Agardy et al., (2016), that although international targets emphasize that these elements need to be considered, rushing or imposing the implementation of targets for spatial coverage, following pressures from the international conservation fora, can overlook effective conservation outcomes and can undermine long-term effectiveness of conservation goals. However, as De Santo (2013) stresses, critiques of PA targets are not new: several scholars have questioned the efficacy of conservation targets in terms of scope, applicability, and effects on marine environmental conservation (cf. Soulé and Sanjayan, 1998; Rodrigues et al., 2004; Locke and

[26] These targets also refer to the need to avoid overfishing and to reduce the negative impact of fisheries on stocks, species, and ecosystems (Aichi Target No 6 - CBD 2010).

Dearden, 2005; Wells et al., 2007; Wood et al., 2008; Lemieux et al., 2019). Notably, De Santo (2013) argues that focussing on global PA targets "risks undermining the achievement of sustainable long-term conservation objectives" (Pg. 137) in the sense that, for example the designation of increasingly large MPAs closed to any human use, may undermine social justice resulting in stakeholder distrust, which in turn can lead to future opposition to the designation of MPAs (De Santo, 2013).

Additionally, monitoring and enforcing conservation measures in large MPAs pose significant challenges as well (De Santo, 2013). For example, although MPAs managers use remote sensing technologies, such as vessel monitoring systems (VMS) or automatic identification systems (AIS) that can track vessel movements via satellite, these tools pose limitations for tracking illegal fishing vessels that lack satellite tags (Ibid.). De Santo notes that illegal shark fishing within large "shark sanctuaries" poses significant challenges of enforcement, and that for example, within the Galapagos Marine Reserve—a UNESCO World Heritage Site—illegal shark fishing has been documented[27].

2.2.2.2 Exclusionary Forms of Marine Protection

International conservation calls to improve outcomes on biological preservation and habitats protection have also encouraged the achievement of conservation targets by using forms of strict marine protection (Agardy et al., 2016). For example, the IUCN World Conservation Congress in 2016 recommended the goal of including 30 percent of the world's oceans in 'highly' PAs by 2030. As a result, more restrictive types of PAs have been implemented (Jones, 2006). In No-Take MPAs (NTMPAs) "the extraction of living and non-living resources is permanently prohibited, except as necessary for monitoring or research to evaluate effectiveness" (Jones 2006, 143). These areas have been advocated as the most effective way to restore and preserve biodiversity (Murray et al., 1999; Lubchenco et al., 2003; Sala and Giakoumi, 2017); it is suggested that "only strongly or fully protected[28]" areas will help achieve conservation targets (Sala et al., 2018, 11).

[27] Carr et al., (2013) report how in the Galapagos monitoring system, AIS devices are manipulated in small vessels to avoid been detected when illegally entering the marine reserve. They report how local authorities and several NGOs have caught, seized, and impounded numerous illegal shark catches within the boundaries of the Galapagos Marine Reserve.

[28] Some scholars such as Hilborn et al., (2004), Agardy et al., (2003) and Agardy et al., (2016) disagree with narratives that posit these areas as the best and only effective type of MPA. These scholars suggest to better use an

Commitments to conservation targets have also spurred the designation of MPAs within areas evaluated by marine scientists as a priority for biological conservation (i.e., areas of greatest biodiversity or hotspots[29] - Myers et al., 2000). For example, the Pristine Seas Project of The National Geographic Society launched in 2008, has promoted public awareness of marine issues and exploring what they consider "remaining wild ocean places" to encourage governments to support the establishment of marine reserves. In total they have successfully lobbied for the protection of 21 marine reserves, covering a total area of more than 5 million km^2 (The National Geographic, 2019).

Although oceans protection is urgent in the face of increasing anthropogenic effects on marine environments and species, several scholars have brought attention to the role that bilateral and multilateral donor organizations, and large international environmental NGOs play for governments to meet commitments on conservation targets (e.g., see assessments of De Santo 2012; Agardy et al., 2016; Berdej et al., 2015; Berdej et al., 2019). This particularly poses concerns when the expansion of MPAs is conducted through top-down decision-making processes that speed up MPA implementation, but create social-environmental dilemmas due to stakeholder alienation (Jones, 2002; De Santo et al., 2011; Agardy et al., 2016).

As with terrestrial PAs, some scholars and practitioners have argued caution on setting fixed proportions of conservation targets for MPAs, or even no-take zones (NTZs), as they may not represent optimal strategies for all ecological and socio-economic conditions[30] (Lauck et al., 1998; Agardy et al., 2003; Agardy et al., 2016). According to De Santo (2013), "no-take areas are by their very nature exclusionary" (Pg. 143), and represent the prevalent dilemma of "park versus people" amply discussed in the PAs literature (West et al., 2006; Adams and Hutton, 2007). Debates about this dichotomy and social justice implications of prioritizing nature conservation over human use, in the marine conservation context, have received less attention in comparison to land conservation (De Santo, 2013). Issues of *social justice* and *legitimacy*[31] are

integrated, multiple use perspective allowing some use of resources while protecting species under threat of overexploitation.

[29] Conservation International (CI) has promoted the concept of ***biodiversity hotspots***—areas of high species richness and endemism—and assesses MPAs coverage within these priority areas (Agardy et al., 2016, 11).

[30] For example, Agardy et al., (2003) indicate that some countries such as Ecuador with the Galapagos Island, are following the US lead in adopting this target, "without open objective discussion on possible shortcomings of doing so in all situations." (Pg. 361)

[31] Within the context of MPAs, De Santo et al., (2013) define ***Social Justice*** "as the fair allocation of adequate access to fishing or other activities that people depended on for their economic sustainability prior to the MPA's designation" and ***Legitimacy*** as "behavior or sets of circumstances that society defines as just, correct or

critical in marine conservation management as stakeholders' distrust of decision-making processes can affect the degree of compliance with regulations, and can generate resistance to future conservation initiatives and MPA designations (De Santo, 2013; Bennett and Dearden, 2014b; Arias et al., 2015).

Exclusionary forms of marine protection impose significant costs to local communities, most notably where resource users believe their livelihoods are negatively affected by regulations (Jones, 2002; Pita et al., 2011; Bennett and Dearden, 2014a). To avoid antagonistic positions in conservation initiatives, resource users' engagement in MPA design, implementation, and management is advocated[32] to strengthen users' support for the MPA (Chuenpagdee et al., 2013).

2.2.2.3 Human Dimensions in Marine Conservation

In the last 25 years there has been a significant shift in thinking about and approaches to marine conservation in terms of adopting more participatory, integrated, systems-oriented approaches to resource management, and more recently, to further addressing human-rights concerns (Sowman et al., 2014). International instruments[33] that highlight a more people-centred and human-rights-based approach to marine conservation and management have brought attention to the need for including social, economic and cultural parameters when deciding on the use, conservation and management of marine resources (Sowman et al., 2014). For example, international organizations such as FAO, have developed technical guidelines for the implementation of *responsible fisheries*[34], that is, fisheries managed in a holistic, integrative, participatory, and adaptive manner: addressing both the bio-physical conditions and the socio-economic considerations of fisheries (De Young et al., 2008).

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appropriate" (Pg. 143-144). Legitimacy is seeing within the context of MPAs as an indicator of genuine involvement of stakeholders in the discussions of protected areas management.

[32] Chuenpagdee et al., (2013) argue that the failure of many MPAs is mostly ascribed to factors related to their design and implementation: "reasons for lack of success must be sought in the process that leads up to their establishment, i.e., the initial stage when the idea was conceived, communicated, and discussed among stakeholders" (Pg. 234).

[33] Such as The United Nations Convention on the Law of the Sea (UNCLOS, held in 1994), The UN Fish Stock Agreement (UNFSA, held in 1995), UN FAO Code of Conduct (1995) – article 6.18, stresses the need to protect the rights of fishers, particularly those engaged in subsistence, small-scale and artisanal fisheries, to a secure and just livelihood as well as preferential access, where appropriate, to traditional fishing grounds and resources in the waters under their jurisdiction (Sowman et al., 2014, 347).

[34] See FAO Technical Guidelines: The Fisheries Management 2 - The Ecosystem Approach to Fisheries (FAO 2003), and The Ecosystem Approach to Fisheries - The Human Dimensions of the Ecosystem Approach to Fisheries (FAO, 2009).

There is strong support in the literature for this perspective: human considerations are of direct relevance to fisheries management (Charles, 1998). De Young et al., (2008) argue that as any conservation and management approach is a 'human pursuit;' the social, cultural, economic, and institutional dimensions that affect and are affected by marine conservation efforts should be addressed and understood for the success of MPAs (Davis, 2002; Pomeroy et al., 2004). Socio-political factors in MPA governance are also critical (Chuenpagdee et al., 2013). While there is recognition of the need for multi-stakeholder participation in environmental planning that acknowledges different attitudes and values among stakeholder groups (De Young et al., 2008; Day 2017), differences are amplified through power imbalances that determine the extent and effectiveness of stakeholder inclusion (Pollnac et al., 2010).

Charles and Wilson (2009) in their exploration of the human dimensions of MPAs, present "ten people-oriented aspects of MPA creation and implementation" that are considered necessary for the acceptance of, and therefore the success of MPAs (Pg. 6). These dimensions address: 1) objectives and attitudes; 2) "entry points" for introducing MPAs; 3) attachment to place; 4) meaningful participation; 5) effective governance; 6) the "people side" of knowledge; 7) the role of rights; 8) concerns about displacement; 9) MPA costs and benefits; and 10) the bigger picture around MPAs (Charles and Wilson, 2009). According to the authors, the interactions amongst elements in this "top-ten list" reflect the reality that MPAs are, in fact, complex social-ecological systems, and that managing MPAs will be easier to address if the underlying human dimensions of MPAs are understood (Ibid., pg. 13).

These concerns are reflected in other statements on addressing the human dimensions of conservation. Lockwood et al., (2010) suggest the consideration of principles that are designed to "provide normative guidance" for good natural resource management governance. According to the authors, these principles can be used "to direct the design of governance institutions that are legitimate, transparent, accountable, inclusive, and fair and that also exhibit functional and structural integration, capability, and adaptability" (Pg. 986). With respect to marine conservation, Bennett et al., (2017a) proposed the development of a "code of conduct" which, according to the authors, will promote "fair conservation governance and decision-making, socially just conservation actions and outcomes, and accountable conservation practitioners and organizations." (Pg. 412)

However, despite of progress made in articulating the importance of human dimensions of MPAs (cf. McConney and Charles, 2010; Charles et al., 2016; Gruby et al., 2016; Gray et al., 2017; Christie et al., 2017; Bennett et al., 2017b; Bennett, 2018); some researchers argue that conventional conservation and management are still widely applied and that biological considerations continue to be prioritized over human considerations (Christie et al., 2017). There are many cases where the failure to address local user needs or expectations in MPA planning and management has threatened the long-term sustainability of the MPA (Christie et al., 2003; Christie, 2004; Mascia, 2004, Hilborn et al., 2004; Mascia et al., 2010, Charles, 2012; Cinner et al., 2014). The following section discusses some of these threats.

2.2.2.3.1 Marine Spatial Planning and Implications for Fisheries

The spatial planning of an MPA—referred to in the literature as Marine Spatial Planning[35] (MSP)—partitions the marine environment in a way that limits and reduces the existing space for targeted resource extraction activities, while allowing or promoting other uses. MSP can thereby create or accentuate the dichotomy of 'winners and losers' in marine conservation (Cinner et al., 2014; Flannery and Ellis, 2016; Knol and Jentoft, 2016) and initiate counterproductive conflicts raising questions of justice, equity and power in MPA management (Jones, 2009; Richmond and Kotowicz, 2015; Jones et al., 2016; Flannery et al., 2018; Flannery et al., 2019).

The most restrictive category arising from most MSP processes is that of NTZs with MPAs, or even entire no-take MPAs. These can produce negative impacts on fishers' livelihoods and for food security due to the "reallocation of access away from fisheries to other uses"—e.g. the tourism sector (Charles et al., 2016, 169). Agardy et al., (2003) argue that these forms of strict marine protection have become problematic "as people rebel against what they view as elitist or exclusionary protected areas that provide safe havens for nature and tourists who can buy access, but at the same time provide no benefits to local residents" (Pg. 356). Fishers' displacement from their often-used fishing areas through zoning, has frequently resulted in opposition from fishers, with clear negative implications for MPA management—in terms of regulations enforcement and

[35] Marine Spatial Planning is defined by UNESCO as "a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives" (Ehler and Douvere, 2009).

compliance (Jones, 2009; Mascia et al., 2010; Cinner et al., 2014; Voyer et al., 2015; Kamat, 2018).

In conservation planning, a case is made that MPAs can be beneficial to resource users. During a MSP process resource users' support is often sought by advertising the potential benefits that no-take areas will generate for fisheries (e.g., yield enhancement due to spillover). According to Charles et al., (2016) fishers' gains from no-take MPAs "depend on many ecological and socio-economic considerations related to the system in which the protected area and its impact range will be operating" (Pg. 169). For example, the potential of spillover to increase fish yields is variable depending on the spatial context, species life characteristics, and habitats (Willis et al., 2003; Hilborn et al., 2004; Weigel et al., 2014). Therefore, fishers' support for marine conservation initiatives is undermined by promises made based on uncertain knowledge of future potential benefits (Smith et al., 2010), and due to failures to deliver expected benefits (Pita et al., 2011).

2.2.2.4 Concluding Remarks

On the face of continued challenges of marine conservation, several scholars have brought attention to the importance of examining governance and decision-making approaches related to MPAs and to the effects these have on users' rights, on the allocation of access to resources, and on the distribution of costs and benefits (e.g., see Jones 2009; McConney and Charles 2010; Bennett and Dearden 2014b; Sowman et al., 2014; Charles et al., 2016; Agardy et al., 2016; Jones et al., 2016). Calls have been made to incorporate human dimensions in MPA design, implementation and management (cf. Davis 2002; Pomeroy et al., 2004; De Young et al., 2008; Charles and Wilson 2009), as well as principles for good governance (cf. Lockwood et al., 2010) and a code of conduct (Bennett et al. 2017a). The inclusion of these considerations contributes to build social justice in marine planning and conservation, for both ethical and instrumental reasons (Bennett et al., 2018).

2.2.3 Public Participation in Environmental Decision-Making

Public participation is a critical component in decision-making concerning the use of a PA. It has been frequently used as part of top-down management processes that according to Brown (2002) "includes people in passive forms of cooption and consultation, rather than as active agents" (Pg.11). These forms of participation, according to Castro and Neilson (2001), do not address

power imbalances or underlying conflicts, but actually make them worse. Indeed, Brown (2002) has brought attention to how, through passive participatory approaches—responding to calls for community involvement in conservation planning—public involvement can be managed strategically "to avoid conflict and dissent and to actually exert control over knowledge and action" (Pg. 11) within PAs contexts.

On the other hand, decision-making processes that integrate participatory approaches, according to Webler and Tuler (2006), are effective ways to promote an integrative 'construction of knowledge' in complex environmental decision-making conditions. Inclusionary processes in PA management addresses power imbalances[36] among social groups, provide a secure space where contradictory points of views have an opportunity to be heard and for minorities to participate (Irvin and Stansbury, 2004; Adams and Sandbrook, 2013). Through participatory processes the aspirations and motivations of a wide range of social groups are considered to help develop a shared understanding about regulations and resource allocation (d'Aquino, 2007).

Participatory processes in environmental decision-making, according to Irvin and Stansbury (2004), allow shared responsibilities and increase the probability that policies will be designed based upon inclusionary debates where "improved support from the public might create a less divisive, combative populace to govern and regulate" (Pg. 55), and which in turn legitimizes the decisions made and the application of these decisions (Ibid.). Therefore, in PA governance, participatory decision-making facilitates the generation of legitimate management measures and increases compliance, empowerment, equity and justice within decision-making processes since local voices are integrated with managerial approaches (Irvin and Standbury, 2004; Berkes, 2009; Miller et al., 2011). Although De Santo (2013) acknowledges the advantages of stakeholder involvement in the decision-making of a PA, the author also argues that participatory planning is not a panacea as the highly "participatory nature" of these processes "can lead to situations of decision paralysis, where it becomes impossible to reconcile the positions of a multitude of stakeholders" (De Santo 2013, 144). Therefore, a planning process requires compromise and trade-offs among different users.

[36] According to Brown (2002) "different actors and interest groups, or stakeholders, have different access to power and can affect the decision-making and planning process differently" (Pg. 9). Power imbalances between conservation authorities and local communities mean that "local people's consent is not always a pre-requisite for successful conservation – powerful states can generally impose regulations on dissenting but weak citizens" (Brockington 2004, 169).

The lack of effective participation in environmental decision-making processes reduces the legitimacy of policy-making (Agrawal and Gibson, 1999; Smith, 2012). The effectiveness of participation is related to factors, such as the complexity of social and political relations, the positions of power between community members, the specific cultural elements of each stakeholder[37] group, lack of communication among social groups, the quality of information that is shared, and, above all, the real interest of stakeholders to be part of the information exchange (Webler et al., 2001; Webler and Tuler, 2006). In order to reinforce their adaptive management capacity, scholars have argued that PA managers should generate participatory processes that integrate participants' feedback as a means of fostering continuous learning processes and improving the governance of social-environmental interactions (Folke et al., 2005; Lebel et al., 2005).

2.2.3.1 Trade-off Processes in Environmental Decision-Making

Due to the social and ecological complexity of many PA contexts, conflict resolution mechanisms have been widely adopted (McShane et al., 2011). Webler et al., (2001) suggest these mechanisms enable information exchange between stakeholders and communities, and in turn, enhance a PA's performance by empowering local groups and considering different concerns on the use and control of its resources. 'Empowerment' is defined by Corbett and Keller (2005) "as a social process that helps individuals gain control over their own lives through some degree of personal development." (Pg. 96). It is experienced differently at different social levels throughout social learning processes[38], where knowledge and experience allow individuals to overcome negative conflicts by recognizing their capacity to influence decisions and the social structures that determine their well-being (Corbett and Keller, 2005; Reed et al., 2010; Raymond and Clearly, 2013).

Trade-off processes among different social groups in PA settings have helped to integrate social-economic and environmental goals, and thus, generate regulations that are accepted by a wide range of actors (Salafsky and Wollenberg, 2000; Salafsky, 2010). A trade-off process

[37] Smith (2012) defines the term ***stakeholder*** "as anyone who can influence, or can be affected by, the management process whether directly or indirectly." (Pg. 328)

[38] According to Reed et al., (2010), ***social learning*** provides several advantages in PAs management: it enhances the management of social-ecological systems, increases the trust between social groups, generates adaptive capacity, produces attitudinal and behavioral changes, creates participant empowerment, strengthens social networks, and so on.

involves win-win strategies, but Brown et al., (2002) posit that trade-off outcomes are difficult to achieve because the choices people make are influenced by socio-cultural and economic elements of the specific context in which their interests, values and preferences also influence the negotiation processes according to their levels of power.

Power imbalances determine people's inclusion or exclusion in conservation planning, and therefore, the representativeness of their voices and perspectives during trade-off processes (Redpath et al., 2013; Flannery et al., 2019). The level of local participation in the decision-making of a PA not only has social consequences for their livelihoods, but also affects the natural environment (West et al., 2006). Several scholars suggest that trade-off approaches in biological conservation are able to produce positive outcomes by recognizing the diversity of 'hard choices' within human-environment interactions (McShane et al., 2011; Miller et al., 2011).

2.2.3.2 Concluding Remarks

Stakeholders' engagement in environmental decision-making processes can add complexity and delays, but it has proven to be the most significant factor related to the level of compliance with the policies and regulations of a PA (Pollnac et al., 2001; Andrade and Rhodes 2012; Colvin et al., 2016; Reed et al., 2017). When successful, participatory processes in environmental decision-making create the necessary space for people to voice their needs and concerns, which therefore ensure that conservation initiatives are seen as legitimate by all interested parties (Reed 2008; Ayers et al., 2017; Reed et al., 2017). Public engagement is an effective way to promote cooperation and generate collaborative learning (Flannery et al., 2018). Local communities and resource users have been shown to be more willing to commit themselves to long-term conservation strategies when their knowledge and opinions are considered and integrated into the governance and management of PAs, and through their inclusion promote a sense of ownership (Flannery et al., 2016; Ayers et al., 2017; Reed et al., 2017). Yet, power imbalances clearly influence inclusion or exclusion of different voices in conservation planning (Flannery et al., 2019).

2.2.4 Tourism as a Complement to Biological Conservation and Community Development

2.2.4.1 Inception of the Concept of Sustainable Tourism

As long ago as the 1980's, increasing awareness of environmental and sociocultural impacts caused by tourism[39] produced a significant 'greening' of tourism activities (Carter and Goodall, 1992). Calls were made by the World Tourism Organization (WTO, 1988) for host governments and tourism developers and operators to incorporate principles for sustainable tourism. The concept of sustainable tourism emerged with the objective of reducing the negative effects of tourism activities on the environment and on local communities (Bramwell and Lane, 1993). The aim of sustainable tourism as stated by the WTO (1988) is to manage all resources in such way that "economic, social, and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity, and life support systems" (quoted in Goodwin 1996, 282). Butler (1993) defines 'sustainable tourism' as:

> *tourism which is developed and maintained in an area (community, environment) in such a manner* ***and at such a scale that it remains viable*** *over an infinite period and* ***does not degrade or alter the environment (human and physical) in which it exists to such a degree that it prohibits the successful development and well being of other activities and processes***.[emphasis added] (in Butler, 1999, 12).

The introduction of the concept of 'sustainable development' in the 1990s, according to Butler (1999) changed the nature of tourism[40], and worldwide the sustainable tourism approach to tourism development has been widely accepted and integrated. However, some scholars (cf. Butler, 1993; Wheeller, 1993; Wall, 1996) questioned that the use of the sustainable development approach applied to tourism will not resolve numerous of the negative problems that have resulted from the development of tourism. According to Butler (1999) the application of the sustainable tourism approach is "a form of ideology, a political catch phrase and, depending on the context in which it is being used, a concept, a philosophy, a process or a product." (Pg. 10)

Bramwell et al., (1996), in their review of principles and practice of sustainable tourism management, note that the different dimensions of sustainability encompassed in the concept of

[39] Environmental impacts of tourism encompass all sector of the industry: aircraft emissions and noise, hotel water consumption and waste, tourism litter and polluted beaches, in addition to alterations on vegetation, trail erosion, degrade coral reefs, and endanger of traditional cultures (Carter and Goodall, 1992).
[40] The tourism industry has continued to respond to changing market conditions and to the recognition of the need to guarantee the quality of the tourism experience (Goodwin, 1996).

sustainable tourism (e.g., environmental, cultural, political, economic, social, managerial and governmental) result in different interpretations of the concept by different actors. For example, Butler (1999) argued that for the tourism industry, conservationists, environmentalists and politicians, sustainable tourism means what is aligned to their own agenda and goals—i.e., for the tourism industry, it means that development is appropriate, and for conservationists, it means that principles articulated in traditional conservation "are once again in vogue" (Butler, 1999, 6).

Sustainable tourism and other types of tourism associated with conservation (e.g., nature-based tourism, ecotourism, conservation tourism[41]) were conceived under the sustainable development approach (Butler ,1999). Despite their focus on the concept of sustainability, Butler (1999) argued that it is hardly possible to have a form of tourism development that does not have impacts upon the area in which it occurs. In fact the author explained that "the naïve assumption that tourism which is nature-focused will automatically be sustainable may not only be incorrect but also harmful." (Pg. 12) Small-scale developments of tourism, according to Butler (1999) could reasonably be expected to have fewer and less severe impacts than large-scale developments, and thus be more sustainable. Nonetheless, Eagles et al., (2002) note that the danger falls when tourism operations adopt only in paper the approach of sustainable development, but they fail to address the core principles of sustainability in practice.

Tourism, like most forms or resource use, is based on the use of physical and human resources, and as such, can generate impacts upon human resources—e.g., social and cultural—as well on physical resources—e.g., wildlife and vegetation (Eagles et al., 2002). Many forms of alternative tourism such as ecotourism are located in hotspots of biodiversity conservation, which are in nature vulnerable to external influences, as such, some places cannot withstand even moderate levels of use (Goodwin, 2015). The resulting impacts may become serious because of the location in which they occur or because of their cumulative effects[42] (Williams and Lew, 2015). As alternative forms of tourism have become increasing dominant within the tourism market, scholars have brought attention to the likelihood that, for example, nature-based types of tourism are becoming forms of mass tourism; indeed, they consider many of these types are taking on such characteristics very rapidly as they expand (Butler, 1999; Goodwin, 2015; Theng et al., 2015).

[41] See Stronza et al., (2019) for a description of each and predicted impact on biodiversity.
[42] For example, Goodwin (2015) reviews environmental impacts of tourism-related development in the Galapagos Islands that have endangered the habitats and species of the national park.

2.2.4.2 The Emergence of Ecotourism as a Conservation Tool

There is a long history of the relationship between tourism and conservation in PAs. Tourism has provided the incentive for biological conservation through the establishment of national parks, which has resulted in a symbiosis between biodiversity conservation and tourism as it provides an economic value for the preservation of species and habitats (Buckley et al., 2012). In some areas, tourism has been extensively supported "as one of the primary strategies for environmentally benign development", and for the promise that "carefully managed tourism can provide significant economic returns from the low-impact to protected areas and can be less erosive than some alternative land [and sea] uses" (Goodwin, 1996, 283).

Despite the benefits attributed to tourism for PAs, scholars have argued that the risks associated with tourism are too great due to the effects of tourism on the environment—e.g., pollution and damage to flora and fauna (Goodwin, 1996). However, others have argued that in many cases, tourism has offered the economic justification necessary for biodiversity conservation and the establishment of PAs (Brandon, 1996). For example, in 1982 the IUCN affirmed that the 'tourism potential' of an area is an important factor in the selection of PAs, although recognized that the pursuit of tourism revenue may result in inappropriate development (Goodwin, 1996).

Within PA management, recognizing the need to integrate socio-economic considerations in conservation planning has led to a search for possible mechanisms to provide economic sustainability and social equity[43] (Zebu and Bush, 1990; Bowen and Riley, 2003; Adams et al., 2004; Leisher et al., 2013). Tourism has become one of the forms of sustainable use that, according to Goodwin (1996) "potentially enables protected area managers to allow local people to derive economic benefit from the park and to encourage local support for its maintenance" (pg. 285). Hence, 'ecotourism[44]', conceptualized as a form of nature-based tourism (Fennell, 2008), has been eagerly promoted by researchers and practitioners and supported by policy

[43] In 1992 at the IV World Congress on National Parks and Protected Areas, it was declared that tourism associated with PAs "must serve as a tool to advance their objectives for maintaining ecosystems integrity, biodiversity, public awareness, and enhancement of local people's quality of life" (IUCN 1993).

[44] ***Ecotourism*** is understood as "environmentally responsible travel and visitation to relatively undisturbed natural areas in order to enjoy and appreciate nature (and any accompanying cultural features – both past and present) that promotes conservation, has low negative visor impact, and provides for beneficially active socio-economic involvement of local populations" (Ceballos-Lascuráin 1996). The core principle of this type of tourism is to "respect the fragile balances that characterize many tourism destinations, in particular small islands and environmentally sensitive areas" (Goodwin, 1996, 284).

makers and managers, as a way to support conservation aims—i.e., maintaining ecological resource integrity through low-impact, non-consumptive resource use—while addressing communities economic aspirations—e.g., through employment, improved infrastructure, increased business[45] (Stem et al., 2003a; Buckley, 2009; Stronza and Durham, 2008; Boley and Green, 2016; Stronza et al., 2019). This type of tourism is considered as a low impact economic activity for a PA where the profits generated by increasing visitor numbers—through visitors' entrance park fees—generate important revenue that contribute to PA management and provide funds for conservation initiatives (Buckley et al., 2012). This dynamic often has generated close ties between tourism operators and PA's management (Wardle et al., 2018).

2.2.4.2.1 Impacts of Ecotourism

Despite benefits that ecotourism can provide for biological conservation and local communities, the impacts of this economic activity are controversial because of its negative direct and indirect effects on PA's natural resources and landscapes[46] (Wardle et al., 2018), in addition to long-term economic effects and social consequences through commodifying nature (Castree, 2003). Previous assessments argued that ecotourism "cannot be viewed as a benign, non-consumptive use of natural resources" (Jacobson and Lopez, 1994, 415) and that in fact, it is a "problem because it is not controlled and managed for the benefit of the protected area and its local population" (Goodwin, 1996, 287). Later studies in different settings have shown how ecotourism has failed to meet some of its fundamental principles (e.g., minimizing impact on species and natural landscapes, providing financial benefits and empowerment for local people and respect for local culture), and yet it persists as a strategy for conservation and development (Bookbinder et al., 1998; Stem et al., 2003a; Stem et al., 2003b; Buckley, 2008; Honey, 2008; Das and Chatterjee, 2015; Brandt and Buckley, 2018; Wardle et al., 2018).

[45] According to Wardle et al., (2018) ecotourism is often promoted for "its potential to act as a conservation mechanism by: mobilizing political, financial and social support for conservation; increasing environmental awareness; protecting sensitive ecosystems and threatened species; and proving an alternate income to land-intensive or consumptive practices (Pg. 1).

[46] For example, Brandon (1996) indicated how Ecuador's Galapagos Islands represents a notable example of the negative impact of ecotourism. In 1974 the Galapagos National Park Management Plan called for a limit of 12,000 tourists per year; however, limits to the number of visitors arriving to Galapagos have been surpassed each year. Indeed, the author bring attention to how in 1991, the Galapagos Tourism Management Plan dropped the overall maximum limits for tourism; thus, the large increase in numbers has resulted in erosion along sensitive trails, plant and animal disturbance, and a general decline in the quality of the tourism experience (Brandon, 1996).

Certainly, the tourism growth in PAs is producing complex environmental problems, such as increasing human immigration, air and water pollution, introduction of exotic species, habitat destruction due to infrastructure expansion, and changes in land/sea-use rights (Stem et al., 2003a). As well as negative impacts on local people's quality of life, in form of crowding, increased crime and cost of living, friction between tourists and residents, and changes in hosts' way of life. (Andereck et al., 2005; Almeyda et al., 2010). These effects are acute in particular in iconic conservation areas that present unique characteristics that attract greater number of tourists (Taylor, 2014).

2.2.4.3 Concluding Remarks

Ecotourism is considered as a low impact economic activity for PAs. The profits generated by visitors provide important revenue to support PA's management and funds for conservation programs (Buckley et al., 2012). On-going debates about the symbiotic relationship between biological conservation and tourism show mixed results dependent on specific contextual characteristics of the areas under evaluation (Goodwin, 2015; Wardle et al., 2018). Continuing discussions in academic forums bring attention to the dangers of tourism growth to key biodiversity conservation areas[47], and raise questions about whether tourism 'truly' support conservation (Goodwin, 2015). The impact on local communities as a result changes that tourism brings to their life-styles, livelihoods, food security and well-being, and ultimately to the sustainability of PAs landscapes (Spenceley and Meyer, 2012; Goodwin, 2015) is also a focus of attention.

2.2.5 Sustainable Livelihoods

2.2.5.1 Livelihood Thinking and The Sustainable Livelihood Approach

A number of early cross-disciplinary research efforts focusing on household and community studies and farming systems, were the work that informed and influenced development studies and livelihoods thinking (Turner, 2017). The livelihoods and sustainable livelihoods literature emerged in the mid-to-late 1980s as a way for academics and practitioners within the field of

[47] For example, see Goodwin (2015) who brings attention on the environmental impacts of tourism-related development in the Galapagos Islands that is putting in danger the national park and its habitats and species.

development to better analyze how an individual or household make a living within a specific sociocultural, economic and political context in a given geographical area (Ibid.).

Increasing attention to poverty reduction, people-centred approaches, sustainability in the political arena, and development theory and practices, resulted in the widespread adoption and adaptation of livelihood definitions, models, and frameworks (Scoones, 2009). Between the 1950s and the 1970s, people-centred approaches to development were emerging in response to the perceived shortcomings of bureaucratic, top-down, market approaches to development (Scoones, 1998). The Brundtland Report in 1987 from the World Commission on Environment and Development of the United Nations (WCED, 1987) foster the entrance of the term 'sustainability' into development discourse and policy discussions (Arce 2003). Between the 1990s and 2000s, poverty reduction became the rationale and main focus of much international development work (Brocklesby and Fisher, 2003). In the early 1990s the term 'sustainable livelihoods' was inserted into the development discourse (Chambers and Conway, 1992).

Chambers and Conway's (1992) seminal work on the concept of 'sustainable livelihoods[48]' became part of the development discourse with people-centred approaches and sustainability as the main components of sustainable livelihoods practice (Scoones, 2009). According to Chambers and Conway a livelihood is considered sustainable when

> *it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term.* (Pg. 6)

de Haan and Zoomers (2005) posit that livelihood sustainability is related to the flexibility (a key element of livelihood adaptation) of an individual or household to cope with endogenous or exogenous stress and shocks, which helps to increase its resilience and therefore reduce livelihood's vulnerability.

Progress in the academic field of livelihoods and sustainable livelihoods have produced a proliferation of theoretical and practical approaches in the area of sustainable livelihoods, and livelihoods enhancement and diversification as tools for rural development and poverty reduction (Turner, 2017). The livelihood approach has been amply adopted by a number of different

[48] The most often cited definition of ***Sustainable Livelihoods*** builds upon Chambers and Conway's earlier work and followed considerations on natural resource dimensions (cf. Scoones, 1998): "A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base." (Carney, 1998, 4)

organizations—e.g., bilaterals, multilaterals, NGOs, research institutes (Hussein, 2002), and livelihood definitions and frameworks have been produced and adapted to meet a wide variety of practical applications—e.g., in terms poverty alleviation, food security, climate change (Scoones, 2009) natural resource management and impacts of tourism (Ashley, 2000).

2.2.5.2 Components of the Livelihood Analysis

A livelihood comprises the *capabilities*, a set of tangible (stores and resources) and intangible *assets* (claims and access) which are combined in different types of capitals (natural, human, social, physical, and financial), and *activities* (or livelihood strategies) required for a means of living (Chamber and Conway, 1992). These capitals are interwoven, and therefore are determined by their linked interactions, where the access and use of one asset may depend on the ability to access or use other asset(s), or the restriction of them (Turner, 2017). Capabilities[49] (cf. Sen, 1985) is seen as the 'freedom' of individuals and households to choose livelihood pathways[50] and participate (or not) in activities that increase their quality of life (Turner, 2017). The access to assets and activities is mediated by institutions and social relations that together determine the living gained by individuals (Ellis, 2000). The role of institutions and organizations is determined by social rules and norms that can be interpreted by different actors in different ways, and which dynamically change over time (Scoones, 1998). Therefore, an array of institutions (at different scales), social relations (gender, cast, kinship, and so on), as well as economic opportunities shape individuals or household livelihoods (Ellis, 2000).

Livelihood strategies are constituted by a set of natural-resource and non-resource-based activities that, implemented together, have implications for livelihood security and environmental sustainability (Ellis, 2000); for example, getting involved in other productive activities, investment strategies, migration, and reproductive choices (de Haan, 2012). The choice of these strategies is mainly influenced by people's capabilities to access assets, and the social structures and processes that support or restrict access to these assets to achieve positive livelihood outcomes (Ellis, 1998; de Haan, 2012). One often used livelihood strategy is *livelihood diversification,* 'diversification' defined by Ellis (1998) as "the process by which

[49] The work of Amartya Sen (1985; 1987) form the basis for the inclusion of 'capabilities' within sustainable livelihoods thinking. The concept of capabilities refers to "being able to perform certain basic functioning, to what a person is capable of doing and being" (Chamber and Conway, 1992, 4).
[50] Turner (2017) notes that "livelihood pathways highlight the iterative process through which a livelihood is fashioned, with goals, preferences, and assets being continuously re-evaluated" (cf. de Haan and Zoomers, 2005).

[individuals or] families construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standards of living." (Pg. 4) Livelihoods diversification can occur at different scales—i.e., at the individual level one pursues a variety of activities, or at the household level its members specialize in particular activities but in aggregate—bringing together a diverse portfolio of livelihood strategies (Turner, 2017).

A *livelihood portfolio*, which is dynamic in its composition and application, is created by people's capacity to change or integrate new activities in response to needs and opportunities; the combination of several activities generates complexity due its multidimensional character (Turner 2017). Diverse livelihood portfolios are frequently considered as decisive elements of household economies (Tao and Wall, 2009). The potential of individuals to engage in several livelihoods, influences important decisions and choices related to leaving a specific livelihood activity and responding to policies, types of resource use regulations, and other forms of controls (Cinner et al., 2008; Cinner and Bodin, 2010).

There are various reasons individuals and households diversify their assets, incomes and activities (Turner, 2017). Determinants of livelihood diversification have been explored in terms of factors that 'push' and/or 'pull' individuals from their existent livelihood practices (Ellis, 2000). '*Push*' factors imply a *necessary* change in response to distressed conditions, '*Pull*' factors imply enticement (*voluntary and proactive*) towards new, better, or progressive opportunities (Ellis, 2000). These approaches have also been labeled "distress diversification" and "progressive diversification" (cf. Bouahom et al., 2004). Additionally, Turner (2007) suggests moving beyond the 'dualistic classification' of diversification mentioned above to integrate as strategy 'selective diversification', where individuals choose to diversify their livelihoods based on convenience, seasonality, and local and cultural norms, resulting in ephemeral, fluid and opportunistic engagement with various livelihood strategies at suitable periods of time (Turner, 2007). This approach acknowledges the adaptable characteristic of livelihood decisions and choices.

To understand livelihood strategies, Wright et al., (2015) suggest that it is necessary to move beyond the simple consideration of an individual's current portfolio of livelihood activities, and acknowledge that an individual's livelihood trajectory (or household) will be different. Some people will be 'hanging in', continuing with the same activities just to maintain their current standard of living while others will be 'stepping up', investing in and enhancing their current

activities or 'stepping out' by amassing necessary assets to transition into different activities (cf. Doward et al., 2009). Several scholar emphasize that ultimately, the strategy of any individual at any given time is determined by its goals and aspirations, stage in the demographic life cycle, assets, and restrictions imposed or opportunities provided by social and political structures (Niehof, 2004; Gough et al., 2007).

Key components of the livelihood analysis are also the *vulnerability context* and *transforming structures and processes*; these factors affect people's options and strategies for making a living (Turner, 2017). The context of vulnerability consists of exogenous effects (e.g., shocks, trends, and seasonal changes) on livelihood choices where people have little or no control; structures (e.g., public and private organizations) and processes (e.g., laws, policies, cultural norms, and institutions) consist of endogenous effects inherent to sociopolitical aspects that affect human interaction in a specific geographical area (Turner, 2017). Within the vulnerability context, people's livelihood decisions and choices are influenced by effects of human-induced or natural stresses (e.g., droughts, conflicts), trends such as variations of resource stocks and population growth, as well as changes in technologies and governance, whereas seasonality can affect production, prices, health, and employment opportunities (Ibid.).

The sustainable livelihoods approach (SLA) links inputs (capitals or assets) with outputs (livelihood strategies) to produce livelihood outcomes (Soones, 2009). *Livelihood outcomes* are what individuals or members of a household achieve through their livelihood strategies in terms of food and income security, health, well-being and asset accumulation; in terms of sustainability, livelihood adaptation, vulnerability and resilience are enhanced, as well more sustainable use of natural resource base (Scoones, 2009). Livelihood outcomes vary over time, and different livelihood strategies affect livelihood pathways or trajectories (Scoones, 2009). Analysis of livelihood pathways[51] or trajectories focus on understanding livelihoods complexity in terms of concepts, such as coping, adaptation, improvement, diversification and transformation; all of which lead towards livelihoods vulnerability or resilience (de Haan and Zoomers, 2005; Sallu et al., 2010).

[51] According to Scoones (2009), "analyses at the individual level can in turn aggregate up to complex livelihood strategies and pathways at household, village or even district levels." (Pg. 172)

2.2.5.3 Livelihoods Frameworks

A livelihood framework provides a conceptual tool for analyzing people's livelihoods to better understand the mechanisms used by and individual (or household) to make a living (Turner, 2017). Livelihoods analysis focuses on the interconnections among individual or household assets (owned, controlled, or claimed), the activities in which they can engage, and the social structures and processes that enable or hinder access to different assets and activities (Scoones, 1998). Different concepts from the livelihoods and sustainable livelihoods literature have been used within the design of different frameworks, which Turner (2017) indicates are 'analytical structures' used to explore "the complexities and components of livelihoods and how interventions might best be made." (Pg. 2)

Livelihood frameworks address socio-economic and environmental concerns at the micro-level, and the policies, institutions and processes that affect livelihoods at national and international level (macro-level) (Hussein, 2002). The most often used frameworks have been designed by the International Development Studies Institute, University of Sussex (Scoones, 1998), the United Kingdom's Department for International Development (DFID, 1999), and Frank Ellis (2000) (Turner, 2017). Other authors have offered their own definitions of sustainable livelihoods, conceived differently of assets and capitals, and have also created different models and frameworks (e.g., see Rennie and Singh, 1995, Hoon et al., 1997; Bebbington, 1999); however, Turner (2017) notes that the general core components of the livelihood analysis are quite similar. Livelihood frameworks, therefore, present a number of common components that are known to influence livelihood strategies and outcomes, but other elements have been added based on the academic field, research interests and considerations to the socio-cultural, economic, political, and environmental context where livelihoods perspectives are being applied to understand livelihood complexities (Turner, 2017).

There are numerous of contributions that the SLA has made to unveil the complex interaction of people's livelihoods, poverty, and the environment in different geographic contexts (Bennett, 2010), it has been particularly useful for: 1) the systematic and holistic analysis of poverty; 2) providing an informed view of development opportunities, challenges and impacts (Ashley and Carney, 1999); 3) the incorporation of people-centred focus to development work; 4) improving understandings of people's lives in contexts of poverty; 5) attention to micro and macro level considerations in poverty and development discourse (Carney ,2003); 6) increasing

intersectoral collaboration to address livelihood concerns (Hussein, 2002); 7) fostering interdisciplinary community development research; 8) understanding livelihood complexities from people's perspectives (Arce, 2003). Also to explore urban and rural locales, a diverse array of occupations, social differentiation, and livelihood directions and patterns (Scoones, 2009); 10) exploring livelihood interactions with land and sea conservation initiatives (e.g., Salafsky and Wollenberg, 2000); 11) assessing the impacts of tourism on local communities (e.g., Ashley 2000; Simpson, 2007; Carter and Garaway, 2014; Sene-Harper et al., 2019).

2.2.5.4 Critiques to the Sustainable Livelihoods Approach

Despite the important contributions that the SLA has provided for the understanding of livelihoods, there have been various critiques to the application of this approach to fully understand livelihood complexities (Turner, 2017). Some critiques summarized by Turner are: (1) there is no explicit mention of the concept of poverty within sustainable livelihood frameworks; (2) the focus is on capital accumulation by development practitioners; (3) there is little research across differing scales, which has reduced the possibility of making generalizable trends that can challenge or confirm theories; (4) the use of economic approaches and terminologies (e.g., the concept of capitals) can be a 'reductionist' means for understanding livelihood realities and decisions; (5) inadequate consideration is given to human and social capitals and their effects on shaping people's livelihood strategies and outcomes, as well on the negative effects of social capital when prevents others access to resources and opportunities; (6) the utility of the "asset pentagon"—which list different forms of capital—is reduced when assets/capitals are not understood in terms of how people use or relate to them in particular situations and contexts; (7) a failure to adequately address issues associated with governance, power relations, and rights; (8) too little attention paid to the role of cultural, historical and social forces that govern human action, and which influence livelihood decisions that cannot be only explained through people's agency; (9) a problematic integration of the term 'sustainability' within the SLA to truly understand short- and long-term livelihood goals that support or confront resource sustainability (Turner, 2017).

2.2.5.5 The Sustainable Livelihood Approach to Biodiversity Conservation

Terrestrial and marine PAs have shown to have a number of effects on communities that are located within or in the proximity of conservation areas (West et al., 2006; West and

Brockington, 2006; Mascia et al., 2010; Cinner et al., 2014). In terms of benefits for livelihoods, for example some are the provision of environmental services (e.g., increased fish catches, ecological integrity, restoration of degraded lands) and tourism development (e.g., increased income, employment) (Ellis and Allison, 2004; Naughton-Treves et al., 2005). In terms of costs to livelihoods, for example some are reduced access to resources, loss of support for traditional activities, conflict with wildlife, loss of employment options, shifts in land tenure, and limited and unequal distribution of benefits of tourism (West and Brechin, 1991; Bennett and Dearden, 2014b).

Biodiversity conservation initiatives that limit and restrict the use of natural resource have often come in conflict with local livelihood strategies (Naughton-Treves et al., 2005). It is amply acknowledged that the long-term success of biodiversity conservation programs, and the implementation of conservation tools, depend on the support of local communities (Christie, 2004; Mascia, 2004; Bennett and Dearden, 2014a). Close attention to the complexity of local livelihoods has been suggested as necessary during the design, implementation, and management of PAs to ensure long-term conservation outcomes (McConney and Charles, 2010; Charles, 2012; Chuenpagdee et al., 2013; Bennett and Dearden, 2014a; Berdej et al., 2015).

The SLA and frameworks have provided valuable tools to assess the effects of PAs on local communities, and to find ways to balance conservation goals with local development outcomes (Igoe, 2006; Richardson, 2008; Riddell, 2013). Bennett (2010) notes that the SLA specifically has been useful to look at the ways that conservation related policies, institutions, and processes are impacting local people. A livelihood-focused intervention often used to ensure the protection of natural landscapes in PAs has been the generation of alternative occupations (Wright et al., 2015). However, in terms of balancing conservation and communities' aspirations, scholars have brought attention to the effectiveness of interventions that aim to change the livelihoods of people (Salafsky and Wollenberg, 2000; Pugholm, 2009). For example, it is argued that incentives (i.e., designed to reduce reliance on natural resources) in the form of alternative livelihoods are not always effective in supporting biodiversity conservation (Wright et al., 2015). Indeed, interventions that have promoted substitution of livelihood practices have been criticized for having minimal or even adverse effects on biodiversity conservation when local realities are not well understood (Wright et al., 2015).

The fail of interventions that seek to generate alternative occupations that substitute resource-based activities, according to Wright et al., (2015) are underpinned mainly in the following wrong assumptions: 1) alternatives will reduce people's need and desire to exploit natural resources—trading short-term losses for long-term gain (Sievanen et al., 2005); 2) communities are homogenous, composed of similarly endowed households with common characteristics—it is assumed that alternatives implemented at the community level will have widespread uptake and reach the resource users of interest (Waylen et al., 2013); 3) targeting interventions at individuals will scale up to population-level reductions in impact on the natural resources of conservation concern—individual will influence a shift away from the environmentally damaging activity at the household level and shifts by individual households will then scale up to population-level change (cf. Wright et al., 2015).

To overcome the problematic application of alternatives based on the mentioned assumptions, Wright et al., (2015) suggest that promoted alternatives must align with the needs and aspirations of the people affected by conservation initiatives, and fulfill the same range of functions characteristic of the original activity. The proposed alternatives will also need to offer similar levels of job satisfaction (Pollnac and Poggie, 2008) as it has been showed in studies in different contexts, where people pursue a range of activities that go beyond the only purpose to make a living (Pollnac et al., 2001; Barrett et al., 2001; Carter and Garaway, 2014; Santos, 2015; Sene-Harper et al., 2019). Thus, Wright et al., (2015) suggest it is extremely important to develop a good understanding of why people engage in a particular activity, and its importance along a range of dimensions (i.e., social, cultural, historical).

Also, to be effective, alternatives need to generate benefits for the right people (i.e., those most heavily exploiting the target resource); then alternatives should target, or at least be accessible to the most vulnerable members of a community (Wright et al., 2015). Detailed understanding of the ways in which natural resources are used by different people, or households, is therefore essential (McConney and Charles, 2010; Charles, 2012; Wright et al., 2015; Bennett and Dearden, 2014a). Cundill et al., (2011) posit that dialogue with individuals and groups at various scales can help in understanding the changing nature of opportunities and risks from different perspectives, so that management approaches can be applied and adapted accordingly.

2.2.5.6 Concluding Remarks

The incorporation of the people-centred approach and the concept of sustainability to livelihood research has contributed to a better understanding of livelihood dynamics in rural and urban contexts, in developed and developing countries (Scoones, 2009). The SLA has been in particular key for exploring the impacts on communities settled within or in the boarders of national parks and marine reserves (Bennett, 2010; Charles, 2012). Livelihood strategies have been offered to local communities to tackle issues of poverty, and to reduce pressure on natural resources and landscapes, thus ensure conservation outcomes (Barrett et al., 2001; Ellis and Allison, 2004; Richardson, 2008; Riddell, 2013). Alternative occupations offered in tourism have produced mixed outcomes, in particular where ecotourism has been offered as a way to offset the costs of conservation interventions and their impacts on local livelihoods (Salafsky and Wollenberg, 2000; Kiss, 2004). Calls have been made to the fully consideration of the effects of alternative occupations, and to acknowledge the full range of factors that determine people's livelihood decisions (Wright et al., 2015).

2.3 Overall Conclusion

The five key bodies of conceptual literature that are discussed above each contribute insights that will help me to better understand to the interconnected processes that link conservation, tourism and livelihoods, and that drive change, in the Galapagos Islands.

In Chapter 5, I study recent trends of livelihood diversification within the farming and fishing sectors, and assess the role of factors linked with conservation and tourism growth. I draw on a key component of livelihood analysis, livelihood strategies, where people make decisions and choices regarding ways of making a living. I also draw on factors that are considered in the literature as determinants of livelihood diversification to identify how these interacting forces are shaping livelihood choices within the Galapagos' resource-based sectors.

Chapter 6 looks more deeply at one series of events that had a particularly significant impact on those in one livelihood sector, the fisheries. In this chapter I focus on public participation in a marine conservation planning process. This chapter draws on literature that debates the effects of rushing the implementation of conservation targets and the impact of exclusionary approaches to MPAs management that neglect stakeholder engagement in decision-making processes. It also uses literature that emphasizes the importance of including the human dimensions of MPAs in

the design, implementation and management of marine conservation areas; as well on literature that explores the advantages of using collaborative approaches for the long-term success of marine conservation.

Chapter 7 responds to calls for deeper understanding of the perceptions of stakeholders affected by MPAs. This chapter examines further stakeholder responses to events considered in Chapter 6, and draws on content analysis of questionnaire surveys and interviews to identify dominant stakeholder perceptions that have shaped those responses and impede progress in marine conservation. I draw on literature that explores the impacts of marine spatial planning and focus on identifying the critical issues that appear to influence stakeholder resistance to conservation initiatives.

Overall, this research draws on the particular events and conditions arising from conservation initiatives and development aspirations in the Galapagos Islands. The key elements are: the role of different actors in managing conservation in the archipelago; the role of public participation in environmental decision making; the role of tourism in supporting conservation but also initiating social change. These are elements that shape conservation and development in the Galapagos Islands; insights on these topics should contribute to effective management locally and should help to advance understanding of how the human dimensions of biodiversity conservation can more effectively be addressed.

CHAPTER III: Study Area Context

3.1 Characterization of the Galapagos Archipelago

The physical and ecological characteristics of the Galapagos Islands have made them a 'natural laboratory' for the study of biological, evolutionary and geological processes, but also for the study of strategies and mechanisms for conservation management (Quiroga, 2009). The natural science of the Galapagos' land and sea territories has been the subject of numerous studies and institutional reports[52], some of which are summarized in the following overview of the study area. However, the human dimensions within this 'natural laboratory' have been studied less, and the number of studies that address the islands' sociocultural, economic, and political conditions has been significantly smaller (Santander et al., 2009). Such studies are needed to improve resource management (Cedeño et al., 2016; Castrejón, 2018).

This study addresses that need by building upon, and adding to, research in the Galapagos that is focused on understanding the socioeconomic conditions within the fishing and agricultural sectors as they relate to, and are affected by, conservation policies and regulations, approaches to governance, mechanisms for public participation in decision-making processes, and the growth of tourism with its sociocultural and environmental impacts. This chapter establishes the context for the study by providing a general overview of the environmental and social conditions that characterize this 'iconic' conservation area.

3.1.1 Geophysical, Climatic, and Ecological Characterization

The Galapagos Archipelago is located along the Equator in the Pacific Ocean, about 1,000 km west of the South American Coast (89°14' to 92°00' W, 01°40'N to 1°24'S) (Fig. 3.1). It comprises 234 islands, islets and emergent rocks that are subject to change due to the dynamic nature of its geological processes which shape and reshape the archipelago's land (Baine et al., 2007). The total land area is approximately 7,985 km^2 and there is a coastal area of 1,167 km^2.

[52] Besides the scientific knowledge produced by international institutions and organizations, and researchers worldwide, there are a number of local public and non-governmental organizations that have been producing scientific knowledge about the Galapagos environmental and sociocultural, economic, and political conditions (e.g., institutional reports that communicate in Spanish and English research findings from organizations, such as the Galapagos National Park Service, the Charles Darwin Research Station, research generated by Galapagos Conservation, WWF and International Conservation Galapagos, and the Galapagos Science Center-San Francisco de Quito University, to mention some).

There are 13 islands with a surface of more than 10 km^2, five islands between 1 and 10 km^2, and 216 islets and rocks with a surface of less than 1 km^2 to a few square meters (GNPS, 2014).

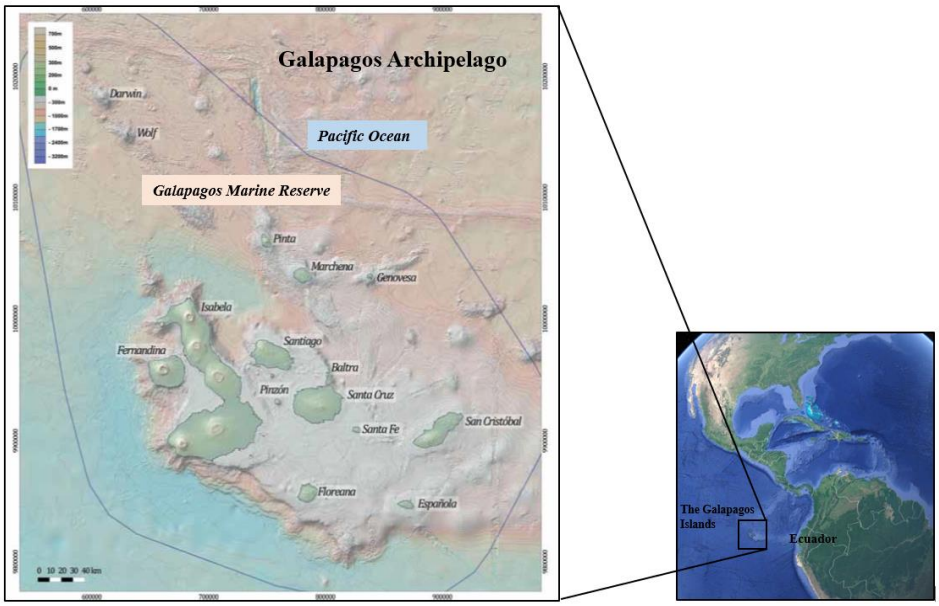


Fig. 3.1. Map of the Galapagos Archipelago. *Source:* Management Plan for the Protected Areas of Galapagos for Good Living (GNPS, 2014, 28).

The islands are volcanic and range in age from less than a million years to a maximum of 5 million years. The larger islands are the summits of underwater volcanoes, some of which rise over 3,000 m from the seafloor, the highest point in the archipelago being just over 1700 m above sea level (Baine et al., 2007). The volcanic activity results from the eastward movements of the Nazca tectonic plate. The youngest islands are located in the western part of the archipelago where volcanoes are still very active, whereas the islands toward the east are the oldest and least active (Baine et al., 2007). Fernandina and Isabela are the youngest islands and are still very active: the last eruption of their main volcanos, La Cumbre and Sierra Negra respectively, occurred in June 2018.

The climate in Galapagos is influenced by its latitude and its isolation in the Pacific Ocean, where it is at the confluence of four ocean currents (Fig. 3.2). The currents vary strongly in intensity and direction during the year creating a marked climatic seasonality in the archipelago as well as variations year to year as the balance of the currents change (Edgar et al., 2004). The *Panama current* is a warm-water, low-nutrient extension of the North Equatorial Counter

Current, which seasonally arrives in Galapagos from the north-east and possesses particular force during El Niño years. *The South Equatorial current* flows from east to west and receives warm tropical water from the north of the North Equatorial current through the Panama current. *The Peru current* is an extension of the Humboldt current, which deflects cool-sub Antarctic water up the western coast of South America. *The Cromwell Current* is a cool-water, high-nutrient current which flows from the central equatorial Pacific Ocean towards the east part of the Galapagos and the Ecuadorian coast below 100 m depth but is deflected upwards to the sea surface upon striking the west region of Galapagos Plateau (Edgar et al., 2004). These determinants of the local climate interact with the mountainous topography of the archipelago to create distinct microclimates on the islands, which are significant not only in influencing biodiversity, but also in defining land use and settlement options (GNPS, 2014).

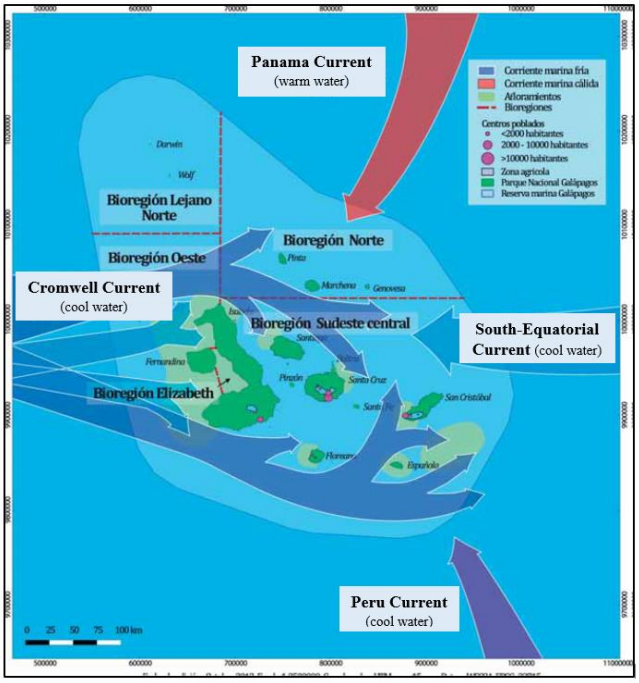


Fig. 3.2. System of oceanographic currents that influence the ecological characteristics of the Galapagos. *Source:* Management Plan for the Protected Areas of Galapagos for Good Living (GNPS, 2014, 37).

The origin of the Galapagos terrestrial and marine ecosystems is influenced by the particular geological and climatological characteristics indicated above. The interaction of these characteristics, in combination with its isolation, have contributed to the evolution of a unique fauna and flora, creating high levels of biological diversity and endemism within a very small

geographic area (Valle, 2013). The overall topography of the archipelago varies across and within islands—dry and rocky lowlands and humid highlands encompass a diversity of habitats and species (Baine et al., 2007). For example, the emblematic giant tortoise has evolved into 14 different forms inhabiting several islands, and 13 species of finches which were key for the development of Darwin's Theory of Evolution (Ibid.). There are 560 native plants of which approximately 33% are endemic and about 50% are critically endangered due to the introduction of exotic species (GCT, 2013). The marine realm also encompasses a diversity of ecosystem types (e.g. coral reefs, mangroves) that contain a richness of tropical species (e.g. corals, hammerhead sharks), temperate species (e.g. kelp and sea lion), and species more typical of sub-Antarctic seas (e.g. albatrosses and penguins)—due to the confluence of the marine currents mentioned above (Bustamante et al., 2000; Danulat and Edgar, 2002; Castrejón, 2011).

3.1.2 Human Dimensions

3.1.2.1 Settlement and Demographics

Human presence in the Galapagos can be traced back to the Spanish priest, Tomás de Berlanga who discovered the archipelago in 1535. Afterwards, the islands were occasionally visited by pirates, whalers and fishers who used them as a refuge and to get provisions of freshwater, food and other animal products (i.e., meat from giant tortoises, *Chelonoidis sp.*, and sea lions, *Arctocephalus galapogoensis*, which were also hunted for their skin and oil) (Latorre, 1992). The islands' physical and climatic conditions limited permanent human presence for several decades until 1832, when the government of the Republic of Ecuador annexed the archipelago to its domain. Since then, during the 19th century and at the beginning of the 20th century, there were several attempts of colonization that resulted in settlement of four islands: San Cristobal, Santa Cruz, Isabela, and Floreana (Latorre, 1997). The history of the Galapagos' first settlers has been marked by processes of adaptation and modification of the landscape of the inhabited islands, as well as modification of settlers' livelihood practices, as required to survive in the inhospitable landscape (Ibid.). Initially, people settled in the highlands of the islands that have humid conditions and better soil for agriculture (Maignan, 2007), but later some moved to coastal areas where fishing activities became important (Castrejón, 2011).

Naturalists, scientists and the tourism industry have portrayed the Galapagos as the 'pristine sanctuary of Darwinian nature' (Hennessy and McCleary, 2011), leveraging the visit of Charles Darwin to the islands in 1835 and the findings that supported the Theory of Evolution. This

promotion has increased the popularity of the islands as a destination for nature tourism, which has become a pivotal driver of socio-economic and demographic growth (Quiroga, 2014). Since 1974, the population growth rate (PGR) in the Galapagos increased from 4.4 percent to 5.9 percent (9,785 inhabitants) in 1990 as more economic opportunities were being created, attracting people from mainland Ecuador and abroad (see Fig. 3.3) (CGREG, 2015). In addition to this, political instability and natural events at the national level such as intense droughts, an earthquake and volcanic activities fostered migration to the islands (Ospina, 2006). The establishment of strict limits on migration has since led to a decrease in the population growth rate, which from 2001 to 2010 diminished to 3.3 percent, as the population rose to 25,244 inhabitants (INEC, 2015).

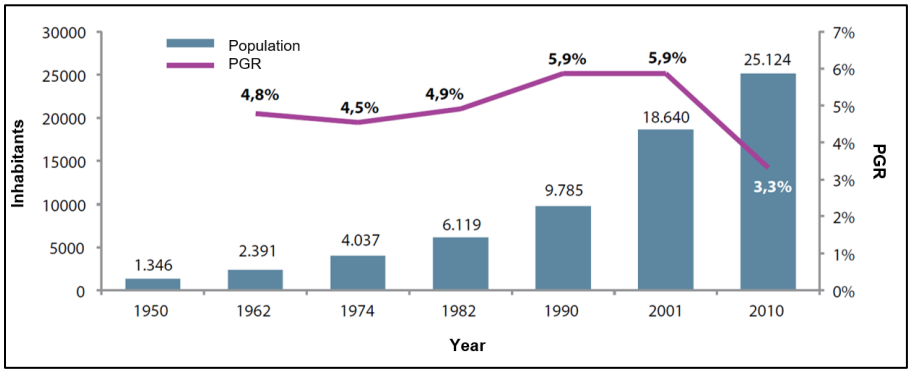


Fig. 3.3. Population and annual population growth rate for the Galapagos. *Source:* Plan for the Sustainable Development and Territorial Organization of the Special Regime of Galapagos 2015-2020 (CGREG, 2015, 55).

According to the last census in 2015, about 40 percent of residents were born on the islands, 45 percent came from five highland and coastal provinces of the Ecuadorian mainland—18 percent from Guayas, 12 percent from Tungurahua, 6 percent from Manabí, 5 percent from Pichincha, 4 percent from Loja—and the remaining 15 percent came from other Ecuadorian provinces or from abroad. The gender distribution of the population is: 48 percent male and 52 percent female (CGREG, 2015). Because the population is composed of people who have come from different places with different backgrounds, the dynamics of the communities that have evolved on each of the inhabited island have been distinctively shaped by inhabitants' particular interactions over time (Ospina and Falconí, 2007). However, more recently, ideological processes linked to the interests of conservation and the growing tourism industry have resulted in the 'island identity'

increasingly becoming a compound of images created by touristic, scientific and management activities (Ospina, 2001; Ospina, 2006; Grenier, 2011).

With the establishment of the Galapagos National Park, only 3.3 percent (263 km^2) of the land in the populated islands is designated for human activities (Fig. 3.4)—of which 96 percent (252 km^2) is zoned rural and only 4 percent is urban[53]. Of the total population, 61 percent is concentrated on Santa Cruz, 30 percent on San Cristobal and Floreana Islands, and 9 percent on Isabela. About 83 percent of the total population is settled in urban areas near the ports, while the rest inhabit rural areas (10.7% of people on San Cristobal, 22.2% on Santa Cruz, and 7.3% on Isabela), where most agricultural activities take place (GNPS, 2014).

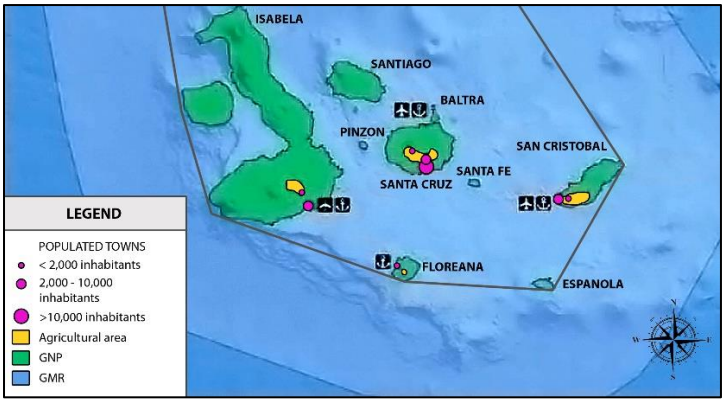


Fig. 3.4. Location of urban and rural settlements (pink spheres) and agricultural areas (in orange) within the populated islands. *Source:* Management Plan for the Protected Areas of Galapagos for Good Living (GNPS, 2014, 36).

3.1.2.2 Economic Characterization

Most economic activities in the Galapagos, directly or indirectly, function around tourism. The level of income in the Galapagos is higher than on the Ecuadorian mainland due to the expansion of the tourism sector, which between 1999 and 2005 generated an annual economic growth rate of +10 percent (GNPS, 2014). The economic sectors that concentrate the majority of the labor force, at the provincial level are commerce, public administration, and tourism—i.e., in particular accommodation and food services that between 2007 and 2010 grew the most: compound annual growth rate of 15.5 percent (INEC, 2010; CGREG, 2015). Commerce and tourism contribute the

[53] The total area of the urban zone is 1,085.7 ha., which represents 0.14 percent of the total area designated for human activities; and the rural zone is 25,235.4 ha., that represents the 3.16 percent (GNPS, 2014).

most to the Galapagos' economic system due to the increasing import of food and goods, and the steady increase of tourists (CGREG, 2015). This growth, and the financial and regulatory disincentives that have affected fisheries and agricultural activities, have been determining factors for locals seeking occupational opportunities in tourism and commerce (Brewington, 2013). Since 2010, wholesale and retail have become an important economic activity within local communities (i.e., producing 1,532 jobs which represents 12 percent of the labor force). Between 2001 and 2010 this activity increased by 41 percent mainly due to tourism growth (CGREG, 2015).

3.1.2.2.1 Tourism

With the establishment of the national park in 1959, the Charles Darwin Foundation (CDF) in 1960 and its research station in 1964, the interest of the international scientific community in the Galapagos grew, and with it, also the interest of the tourism industry (Quiroga, 2009). The Galapagos is a well-known tourist destination, where population and tourism have steadily grown (see Fig. 3.5).

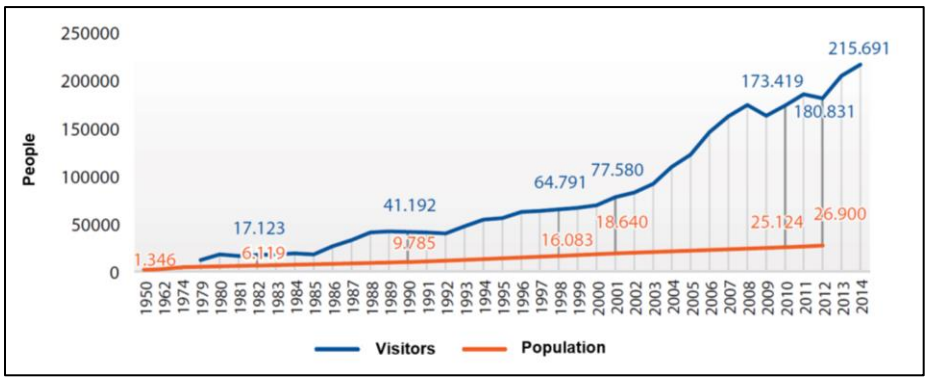


Fig. 3.5. Relationship between the number of visitors and population in Galapagos. *Source:* Plan for the Sustainable Development and Territorial Organization of the Special Regime of Galapagos 2015-2020 (CGREG, 2015, 91).

Large-scale touristic activities in the Galapagos were initiated in the 1960s with the implementation of a cruise-ship tourism model (Quiroga, 2009). International companies, and since late 1960s national enterprises, offer multiday cruises between three and seven days (Epler, 2007). This model of tourism was strongly supported by conservationists and scientists alike, to limit human presence and impact on the islands. As a result, it became the predominant type of tourism, but also due to limited touristic infrastructure and services in the populated towns

(Epler, 2007). However, since 2009, the number of tourists in cruise-ships has decreased while the number of tourists staying in the local communities has been steadily growing (Izurieta, 2017). By 2014, 65 percent (140,323 visitors) of total tourists stayed in hotels on the populated islands (see Fig. 3.6) (GNPS, 2014). According to information generated by the Ministry of Tourism in 2014, direct employment created by the tourism sector was 2,894 jobs of which 70.7 percent were located on Santa Cruz (2,046 jobs), 17.7 percent on San Cristobal (512 jobs), 11.1 percent on Isabela (321 jobs), and the rest on Floreana Island. Major sources of employment are cruise-ships (35%) and hotels (28%) (CGREG, 2015).

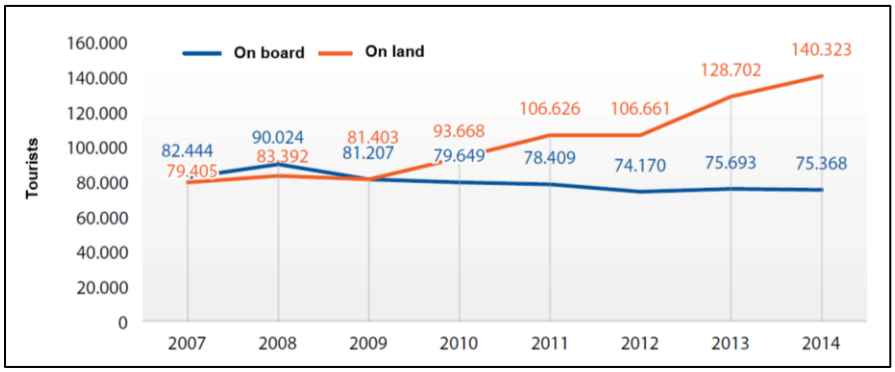


Fig. 3.6. Comparison of tourism growth by cruise-ship tourism and local-based tourism. *Source:* Plan for the Sustainable Development and Territorial Organization of the Special Regime of Galapagos 2015-2020 (CGREG, 2015, 91).

However, it is argued that the current dynamic of supply and demand in tourism, makes the Galapagos' tourism model an example of unsustainability with an increasing effect on social-environmental problems related to human settlements, land use change, transportation, and political and institutional processes (Mena et al., 2013; de Hann et al., 2019). The burgeoning tourism also increases the demand for water, energy, food, land, materials for construction and fuel for transportation (ECOLAP, 2012). As tourism continues growing, which results in increasing touristic infrastructure and the creation of more visitor sites and activities within and outside the protected areas (CGREG, 2015), calls have been made to control its continued expansion as there is evidence of its negative effects for the sustainability of the populated islands (Pizzitutti et al., 2017).

3.1.2.2.2 Resource-based Economic Activities

During the period of early settlement of the Galapagos Islands, the main livelihoods were based on agriculture and fishing (Latorre, 1992); these continue to be important sectors both economically and culturally on the inhabited islands (GNPS, 2014). A brief characterization of these resource-based sectors is presented below.

- **Fisheries**

The biology, population dynamics, and management assessments of fishery resources have been the focus of much research in the Galapagos[54] (Castrejón, 2018). In comparison, studies of the socio-economic conditions and human dimensions of the fisheries sector have been fewer (e.g., see Bustamante, 1998; Ben-Yami, 2001; Murillo, 2002; Ramírez, 2004; Avendaño, 2007; Hearn et al., 2007; Hearn, 2008; Castrejón, 2011; Castrejón, 2018).

Fishing activities in the Galapagos are varied, with some fishers who focus only on the sea cucumber and spiny lobster fisheries, others on coastal and high seas fisheries, and others who participate in all fisheries based on the fishing seasons as regulated by managers of the marine reserve (Castrejón, 2011). The white finfish fishery is the most traditional fishery as it started at the beginning of the 19th century as a subsistence activity (Reck, 1983). It is focused on coastal and demersal species (e.g., *Micteroperca olfax* and *Hyporthodus mystacinus*) and comprises approximately 68 species (Peñaherrera, 2007).

The white finfish fishery became commercial around the 1940s as a result of the establishment of the U.S. military base in Baltra Island, and due to increasing demand from the Ecuadorian mainland (Castrejón, 2011). The activities are classified as *fresco*—if the fish is intended to be sold fresh for local consumption—or as dried-and-salted—if it is primarily intended to be commercialized and sold on the mainland[55]. From the 1990s, fishing pressure increased due to tourism and population growth, which has triggered the overexploitation of two

[54] See Castrejón (2014) for a review of the origin and advances of fishery science in the Galapagos.

[55] This fishery is a traditional practice implemented mainly in San Cristobal Island. About 40 percent of fishers work in this fishery and use large fishing boats (8 to 18 m long) that go for trips of 15 to 18 days during the six months of the fishery. Using hand-lines as fishing gear, the fishery focuses on demersal finfish, principally groupers from the Serranidae family (e.g., the Galapagos grouper and Misty grouper). The fish is initially dried and salted during fishing trips, but sometimes this process is continued in land by fish traders before it is sold. The product is mainly taken to the Ecuadorian mainland, as the dried fish is an ingredient of a traditional dish eaten during The Holy Week before Easter (Burbano et al., 2014).

species: *Mycteroperca olfax* (locally known as “Bacalao”) and *Paralabrax albomaculatus* (Salinas de León et al., 2014).

Between 1960 and 1970, the spiny lobster fishery (*Panulirus penicillatus* and *P. gracilis*) was the focus of commercial fishing activities from Ecuadorian industrial fishing vessels in the Galapagos. This lasted until 1975 when the government banned lobster exportation (Castrejón, 2011). Then the fishery persisted at a smaller scale, but in 1980 tourism and population growth began to increase the level of exploitation and in 1995 fishing indicators began again to show signs of overfishing which continued at least to 2010 (Castrejón, 2011). Since 2014, ddue to management measures introduced by the GNPS, these species have shown signs of recovery (Ramírez-González et al., 2012; Szuwalski et al.. 2016).

The exploitation of the sea cucumber (*Isostichopus fuscus*) started in the early 1990s (Martínez, 2001). Due to increasing pressure on this resource, regulations for the sea cucumber fishery were implemented four years later restricting the fishing season for this species to only two months per year (Castrejón, 2011). Despite this restriction, the boom of this lucrative fishery intensified immigration to the islands and resulted in a dramatic expansion of the artisanal fishing fleet (Bremner and Perez, 2002). The lack of control and law enforcement, and the increasing demand of the Asian market triggered species overexploitation between 1995 and 1998 (Castrejón, 2011). As a result of socio-environmental conflicts created by this fishery, since 1999 fisheries in the Galapagos are regulated under a co-management regime. Nonetheless, despite management measures implemented during these years, sea cucumber stocks have yet to recover (Reyes et al., 2013).

The high seas fishery, which targets pelagic species such as *Thunus albacares*, *T. obesus*, *Xiphias gladius* and *Acanthocybium solandri*, was initiated in the Galapagos in 1930 by international industrial fishing vessels, and 1970 it began to be incorporated into Ecuadorian industrial fishing activities (Ramírez-González and Reyes, 2015). In 1998, industrial fishing activities were banned in the GMR, so the high seas fishery became small-scale, accessible only to local fishers (Castrejón, 2011). Since the lucrative sea cucumber and spiny lobster fisheries had become strictly regulated, the high seas fishery has increased in importance, and fishing effort by 2015 was five times greater than in 2000 (Ramírez-González and Reyes, 2015).

Each fishery uses a different method: the handline (*empate* for the white finfish fishery), the lure or drag (*señuelo* or *arrastre* for the high seas fishery), and hookah diving (*compressor* for

the sea cucumber and spiny lobster) (Castrejón, 2011). Fishing is carried out on small wooden or fiber glass boats of approximately 9.6 m length (equipped with outboard engines of 15 - 200 HP) and large wooden boats of 8 to 18 m length (equipped with inboards engines of 30 – 210 HP); larger fishing boats or "mother boats" are used to store the catch, for resting, and for towing the small fishing vessels during long trips between port and the fishing banks (Castrejón, 2018).

Within the group of fishers, only 38.7 percent of fishers own a fishing boat (33.5% are actively fishing and 5.2% are not), the rest work as manual laborers for the owners of boats or they rent a boat from other fishers (CGREG, 2015). Profits from fishing activities are unequally distributed, as the owners of fishing boats can access these fisheries more readily and more consistently than those who work as manual laborers or who may work only seasonally (Castrejón, 2018).

Fish products are traded locally either directly by a fisher, or indirectly by other fishers or merchants who sell the product to hotels, restaurants, or cruise-ships. Some fish are also sold to the fishing cooperatives, who are the only ones allowed to commercialize fish to the Ecuadorian mainland or to sell for export abroad (Castrejón, 2018).

The small-scale fisheries sector is divided into four fishing cooperatives (see Table 3.1) and represented at the national level by the Union of Fishing Cooperatives of Galapagos (UCOOPEGAL).

Table 3.1. List of fishing cooperatives by island.

Cooperative Name	Island	Year of start	Number of members
Cooperativa de Producción Pesquera San Cristóbal (COPESAN)	San Cristobal	1983	457
Cooperativa de Producción Pesquera de Productos del Mar (COPESPROMAR)	San Cristobal	1996	202
Cooperativa de Producción Pesquera Artesanal Galápagos (COPROPAG)	Santa Cruz	1993	351
Cooperativa de Pesca Horizontes de Isabela (COPAHISA)	Isabela	1995	299

Source: Fishing Records - Galapagos National Park Service (GNPS, 2016)

In 2016 the Galapagos National Park Service registered 1,309 fishers and 447 fishing boats operating within the marine protected area (GNPS, 2016). Historically, San Cristobal is the island with the most people involved in fishing activities (Castrejón, 2011), 49 percent of fishing

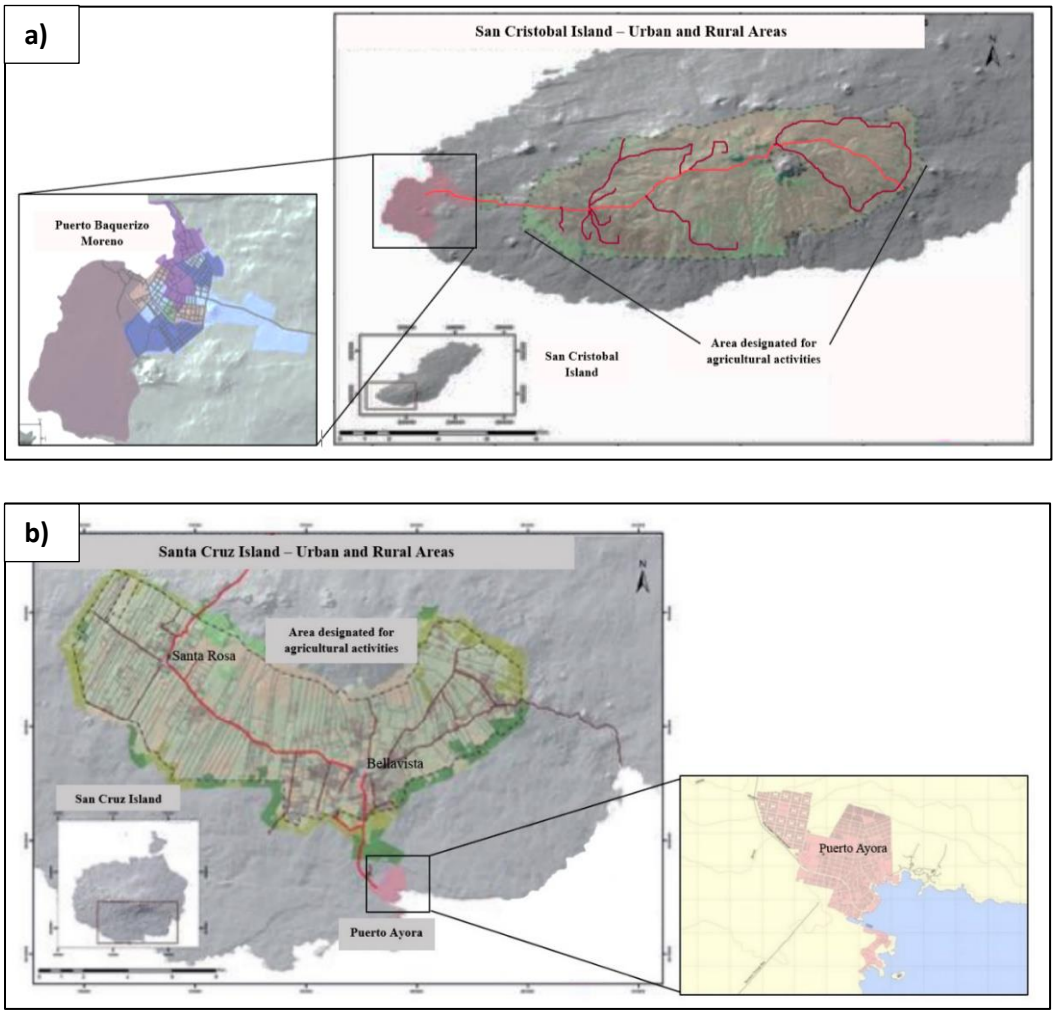
boats and 50 percent of the Galapagos' fishers are in this island, whereas Isabela has 26 percent of boats and 23 percent of fishers, and Santa Cruz has 25 percent and 27 percent respectively (CGREG, 2015). Calls have been made to revise the park's fishing registry, as well as the registry of members of the fishing cooperatives to have more accurate understanding of the fishing effort (Reyes et al., 2013; Castrejón and Charles, 2013; Ramírez-González and Reyes, 2015). This task will likely be challenging as being part of the fishing sector presents advantages that 'inactive fishers' will not want to lose—e.g., in terms of access to compensations due to the implementation of new regulations (Castrejón and Charles, 2013).

The majority of people within the islands' fishing sectors are between 30 and 45 years old, which indicates that new fishers are not being recruited (CGREG, 2015). New occupational opportunities have been created outside of the fishery in an effort to cause fishers to switch livelihoods, thereby reducing the number of fishers and the pressure on marine resources, while still improving the socioeconomic conditions for those involved; for example, through the creation of recreational fishing (i.e., known locally as PAV – Experiential Artisanal Fishing, cf. Zapata, 2006; Palacios and Schuhbauer, 2013; Engie and Quiroga, 2014; Engie, 2015; Quezada, 2016). The shift into tourism, in addition to the lack of interest from fishers' children to make fishing their main livelihood (Quiroga, 2013), means that in the coming years the sector will be characterized by older people, which will result in an eventual shrinkage of the fisheries sector, with possible implications for the islands' food security.

- **Farming**

Research related to the agriculture in the Galapagos has been focused on identifying issues such as land use/cover change in the rural area of the highlands (Villa and Segarra, 2010; McCleary, 2013; McCleary et al., 2013), land cover of agroecosystems (Laso et al., 2019), effects of pesticide use in agricultural practices (O'Connor et al., 2018), changes in soil properties (Gerzabek et al., 2019). In the last decade, there has been an increase in research focused on describing the food production system (Chiriboga et al., 2007; Salvador, 2015; CGREG, 2014; Granda-León, 2016; Viteri and Vergara, 2017; Sampedro et al., 2018; Puente-Rodríguez et al., 2019), and on generating management strategies that will make agricultural practices more sustainable, contributing both to biodiversity conservation and to local communities' sustainability (Jaramillo et al., 2015; Guzmán and Poma, 2015; Khatun, 2018).

Agriculture is practiced in the highlands of the populated Islands[56] (see Fig. 3.7 a,b,c). Of the 252 km^2 of land zoned as rural, agricultural production occupies 191 km^2 (76%), of which 145.8 km^2, roughly three quarters, is used as pasture, and 45.2 km^2 or one quarter is used for cultivation. Of a total of 755 farms, 47 percent are located in Santa Cruz, 34 percent in San Cristobal Island, 17 percent in Isabela, and the rest in Floreana. There are 112 farms that occupy less than one hectare, and all together they emcompass only 41 hectares; only 13 farms are larger than 200 hectares, together comprising 3,911 hectares (CGREG, 2014).



[56] For this study, I visited and collected information from farms that were located in the following rural sectors. In *San Cristóbal*: Goteras, El Chino, La Soledad, Cerro Verde, El Socavón, Tres Palos, Las Negritas, Cerro Gato. In *Santa Cruz*: El Casgajo, Media Luna, Santa Rosa, El Camote, Guayabillos, El Aguacatal, El Occidente, El Carmen. In *Isabela*: Los Tintos, San Joaquín, La Unión, Cerro Verde, Las Merceditas, Los Mellizos, Los Ceibos, El Cura y el Infernillo, La Esperanza.

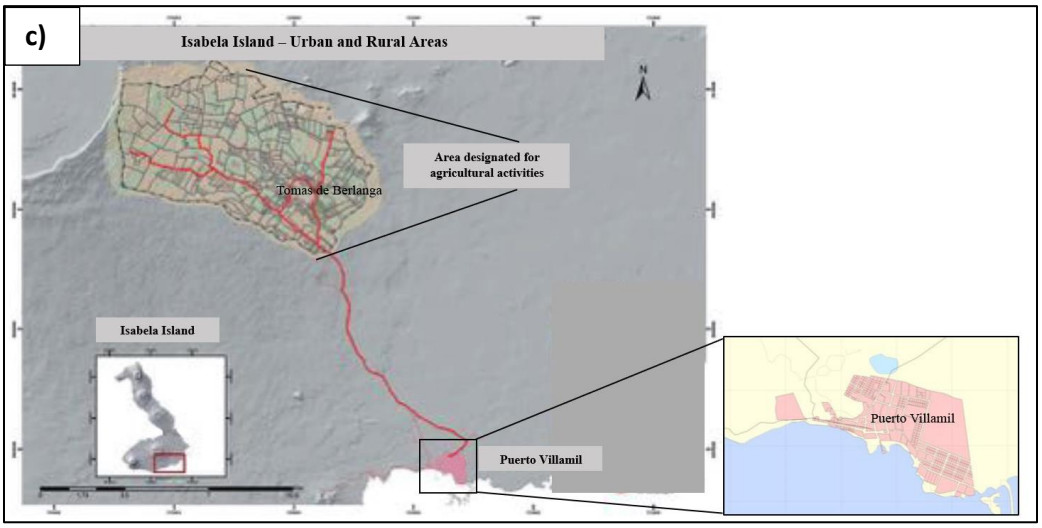


Fig. 3.7. Urban and rural areas of the three most populated Islands: *4a.* San Cristobal; *4b.* Santa Cruz; *4c.* Isabela. *Source:* Modified from Plan for the Sustainable Development and Territorial Organization of the Special Regime of Galapagos 2015-2020 (CGREG, 2015, 59-61).

Agricultural activities in the Galapagos are challenged by several factors. Most food is imported at low cost from the Ecuadorian mainland (Granda-León, 2016). Population and tourism growth increases local demand, but this is met primarily by increasing imports, not by drawing on local production (Sampedro et al., 2018). Moreover, as a result of decades of cultivation and cattle ranching activities, the natural landscape of the humid highlands has become severely degraded (Trueman et al., 2013). Landscape alterations and the abandonment of agricultural practices are contributing to the increased spread of exotic species—i.e., plants that were brought to the islands by colonizers (Chiriboga et al., 2007), which threatens the endemic flora of the humid ecosystems (Gardener et al., 2013; Toral et al., 2017).

Farm abandonment has fostered the spread of alien invasive species into neighboring farms and areas of the national park (Laso et al., 2019). This spread, in turn, affects the productivity and viability of the neighboring farms (Guzmán and Poma, 2015). Several controls have been established in ports and airports to limit the entry of these species, but the increasing importation of food, and increasing numbers of tourist arrivals, makes it more difficult to apply effective controls (Grenier, 2010). Additionally, in the inhabited islands, the expansion of rural and urban settlements, and changing economic activity including tourism, is intensifying travel between the lowlands and agricultural lands, which also increases the risk of further spread of invasive species. (Guyot-Téphany et al., 2013). Therefore, The Ministry of Agriculture and Cattle Ranching (office Galapagos), with support from the national park and local NGOs, has been

collaborating with farmers to improve agricultural production through outreach projects and funding programs intended to reactivate and improve the efficiency of the agricultural sector (Jaramillo et al., 2014; Guzmán and Poma, 2015).

3.1.3 Institutional and Regulatory Factors

The Galapagos archipelago is one of the 24 provinces of the Republic of Ecuador. It was established as a province in 1973 to consolidate the administrative structures required to manage its important ecological, biological, touristic and strategic assets (GNPS, 2014). The province is divided into three administrative districts (see Fig. 3.8): San Cristobal, with an administrative headquarter in Puerto Baquerizo Moreno, is the capital of the province and the district includes San Cristobal, Española, Genovesa, Santa Fé and Floreana Islands—total area of 848,5 km^2; Isabela with an administrative headquarter in Puerto Villamil, including Isabela, Darwin, Wolf and Fernandina Islands—total area of 5,367.5 km^2; and Santa Cruz with the administrative headquarter in Puerto Ayora, including Marchena, Pinta, Pinzón, Santiago, Seymour and Baltra Islands—total area of 415,5 km^2 (GNPS, 2014).

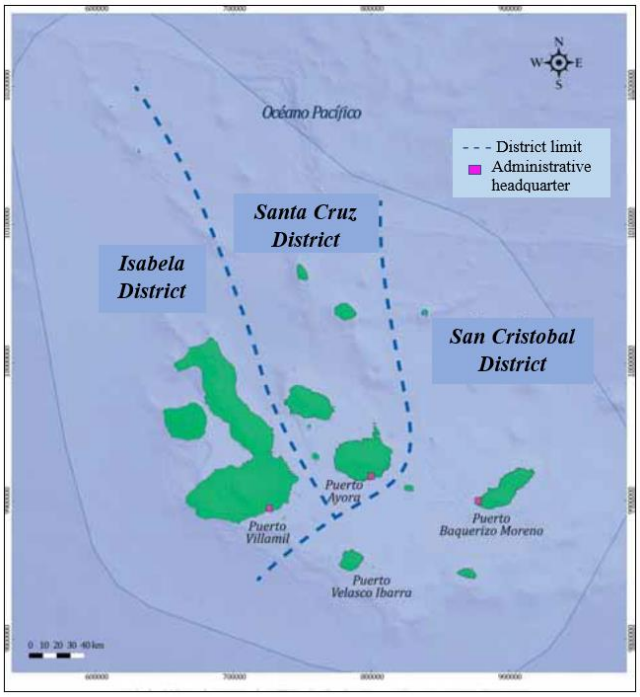


Fig. 3.8. Administrative districts of the Galapagos province. *Source:* Management Plan for the Protected Areas of Galapagos for Good Living (GNPS, 2014, 30).

The Galapagos' governance system[57] is characterized by interacting institutions which operate at different levels and have distinct administrative responsibilities and decision-making powers (Table 3.2). In 1979, the government established the National Institution of Galapagos (INGALA, Spanish acronym) to be responsible for the political administration of the archipelago. This operated until 2009 when it was replaced by the Governing Council of the Special Regime of Galapagos (CGREG, Spanish acronym) which is currently responsible for the administration, organization, and planning at the provincial level (CGREG, 2015).

Table 3.2. Main public institutions and private organizations that comprise the governance of Galapagos.

Central government	Ministry of Environment (National Environmental Authority – MAE) Ministry of Tourism Ministry of Strategic Sectors Ministry of Defense (national security) Ministry of Internal affairs (national security) Ministry of Education Ministry of Public Health
Regional government	Governing Council of the Special Regime of Galapagos (CGREG) Agency for the Regulation and Control of Biosecurity and Quarantine for Galapagos (ABG) Regional Directorate of Aquatic Spaces and the Coast Guard
Municipal government	Decentralized Autonomous Municipal Governments of San Cristobal, Santa Cruz and Isabela Decentralized Autonomous Parrish Governments of El Progreso, Floreana, Santa Rosa, Bellavista and Tomás de Berlanga
Some private, civil society and environmental non-profit organizations, and educational institutions	Union of Fishing Cooperatives of Galapagos (UCOOPEPGAL), Association of Farmers and Cattle ranchers of Galapagos (EL PORVENIR), Cooperatives of Marine and Terrestrial Transportation. Galapagos Chamber of Tourism (CAPTURGAL). Charles Darwin Foundation and Research Station, Galapagos Conservancy, International Conservation (CI), Wild Aid, World Wild Fund for Nature (WWF), Wild Conservation Society (WCS), Sea Shepherd, FUNDAR. Alliance San Francisco de Quito University (Gaias) – North Carolina Chapel Hill (GSC)

Source: Adapted from The Management Plan for the Protected Areas of Galapagos for Good Living (GNPS, 2014, 31).

[57] There are many institutions that have decision-making powers that influence management and conservation efforts in the Galapagos (see GNPS 2014 and CGREG 2015 for a detailed overview). In here, I refer as to environmental authority the two most significant organizations that have authority to control and manage the protected areas. The Governing Council of Galapagos (CGREG) who is responsible for the administration, planning, zoning at the provincial level; and the GNPS, representative of the Ministry of the Environment and who is responsible of the planning, conservation, management of the protected areas, as well as to provide environmental education for the local population (Watkins and Martinez, 2008).

In addition to the above-mentioned institutions there are many national and international private organizations that indirectly influence decision-making and management of the archipelago (Table 3.2). A large number of these are cooperatives, guilds, and associations that represent the interests of different groups from civil society. There are also, environmental nonprofit organizations and educational centers that support the conservation and management of Galapagos by providing scientific knowledge and technical support to local institutions (Watkins and Martínez, 2008). The level of influence and power of these conservation-focused organizations is related to their networks in the Galapagos, the availability of funds, and the period of time they have been involved in the conservation of the archipelago (Ibid.).

The regulatory framework of the Galapagos encompasses several laws, policies and management tools (Table 3.3) designed and implemented at the national and regional levels with the aim of organizing, managing, and controlling human activities in the populated islands, promoting sustainable development of the archipelago, and ensuring biological conservation (CGREG, 2015). The governance system in Galapagos is mainly determined by the *1998 Law of the Special Regime for the Conservation and Sustainable Development of the Province of Galapagos* (LOREG, by its acronym in Spanish). The Ecuadorian government, with the support of local institutions and international conservation organizations, approved this 'innovative legislation', and which changed the direction of the governance of the marine protected area towards a co-management regime (Heylings and Bravo, 2007; Castrejón, 2011). This law regulates immigration and allows locally-based institutions to design and implement management policies that control the use and conservation of natural resources, and that define the boundaries of the islands' socio-economic development (González et al., 2008). Also, there are several international conventions and mandates, and multilateral and bilateral organizations, that also influence the governance of the archipelago (Table 3.3).

Table 3.3. Regulatory framework for the governance of Galapagos.

Laws and Policies	Law of the Special Regime for the Conservation and Sustainable Development of the Province of Galapagos (GSL, 1998) National Constitution of the Republic of Ecuador 2008 National Plan for the Good Living 2013-2017 National Territorial Strategy (SENPLADES, 2013) Organic Code for Decentralization, Autonomy, and Territorial Organization (COOTAD) Organic Code for Planning and Public Finances (COP and FP)

Management Plans	Management Plan for the Galapagos Good Living 2014 (GNPS, 2014) Plan for the Sustainable Development and Territorial Organization of the Special Regime of Galapagos 2015-2020 (CGREG, 2015)
International Conservation Agreements	Convention on Biological Diversity (CBD) The Convention concerning the Protection of World Cultural and Natural Heritage (UNESCO) The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) The Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat (RAMSAR) Inter-American Sea Turtle Convention (IAC) The United Nations Convention on the Law of the Sea (UNCLOS)
Multilateral and Bilateral Organizations	ARAUCARIA XXI (*Agencia Española de Cooperación Internacional* - Spanish Government) United Nations Development Programme (UNDP) Global Environment Facility (UNDP-GEF) Japanese International Cooperation Agency (JICA)

Source: Plan for the Sustainable Development and Territorial Organization of the Special Regime of Galapagos 2015-2020 (CGREG, 2015) and Watkins and Martínez (2008).

The role that national and international institutions and organizations play in the Galapagos' governance is critical for biodiversity conservation and sustainable development (Jones, 2013). Several initiatives have been implemented with the aim of strengthening local institutions and organizations, clarifying areas of action, and reducing overlapping responsibilities to increase efficiency of management (González et al., 2008). Inefficiencies arise from the interaction of many actors, each operating at different scales and with distinct interests, but sharing power and demanding different management outcomes (Zapata, 2005; Watkins, 2008; Lu et al., 2013; Barragán-Paladines, 2015).

Weak leadership, political instability, lack of political support, incomplete representation of all stakeholders, recurrent political intrusion into technical decisions, lack of trust amongst stakeholders, short term planning, and lack of consistency in the application of norms and regulations are some factors that have limited human organization in the Galapagos governance system (Watkins and Cruz, 2007; Watkins and Martínez, 2008; González et al., 2008; Castrejón, 2011; Jones 2013; Castrejón and Charles, 2013; Barragán-Paladines and Chuenpagdee, 2015). Due to these factors, the public image of the institutional performance of key institutions, such as the GNPS and the CDRS is very low (Barber and Ospina, 2008); this reflects local discontent about decision-making processes of conservation management (Usseglio et al., 2014). Municipalities and The Galapagos Council on the other hand, have better local acceptance

because communities consider they have paid greater attention to citizens' well-being (Barber and Ospina, 2008).

The implementation of the Galapagos Special Law (GSL) in 1998 and the creation of a co-management regime (i.e. the implementation of this process is described in detail in the study area of Chapter 6) provided the political space for discussions among different stakeholder groups, each of whom have their own political agenda, interests, values, influence, and power (Macdonald, 1997; Ramírez, 2007). This move to increase citizen participation improved the trust and legitimacy of decision-making processes within the Galapagos governance system (Zapata, 2005; González et al., 2008).

3.1.4 Management of the Galapagos Protected Areas

Attempts to protect the Galapagos natural conditions were initiated in 1934, when the government of Ecuador declared the protection of some species and areas of the archipelago (Quiroga, 2009). The Galapagos National Park was created in 1959 encompassing approximately 8,006 km^2, which corresponds to 96.7 percent of the archipelago's land territory (Fig. 3.9). Twenty years later, the limits of the protected areas were officially defined. In 1998, with the establishment of the GSL those limits were ratified, and the remaining 3.3 percent was designated for human settlement.

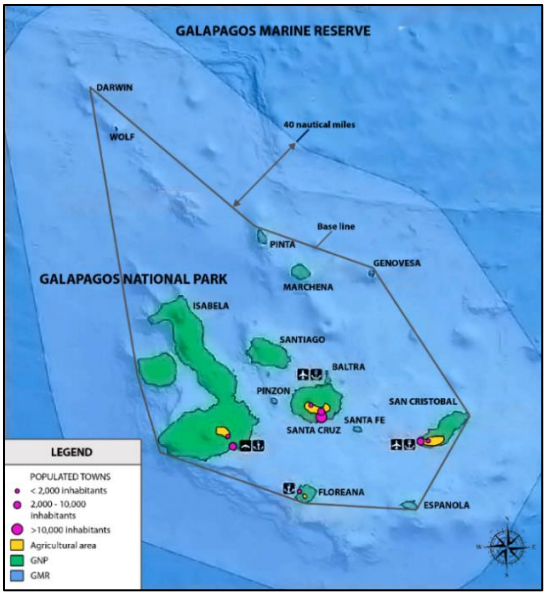


Fig. 3.9. Territorial representation of the Galapagos Archipelago: marine and terrestrial protected areas and urban and rural areas designated for human population. *Source:* Management Plan for the Protected Areas of Galapagos for Good Living (GNPS, 2014, 36).

In 1969, the Galapagos National Park Service (GNPS) was created to be the institution responsible for the conservation and management of the protected areas (GNPS, 2014). The Galapagos Marine Reserve (GMR) was established in 1998, and encompasses coastal and marine areas surrounding the islands with an extension of 40 nautical miles (Edgar et al., 2004) (Fig. 3.9). The GMR has an area of 137,975 km^2 of which 70,000 km^2 contain offshore waters and 1,753 km^2 are coastal areas (GNPS, 2014). This is a multiple use marine reserve that seeks to manage commercial activities, while ensuring the protection of marine species and ecosystems (Heylings et al., 2002).

Although the Galapagos Archipelago is renowned for the relatively undisturbed state of its natural heritage, during the 1990s several reports presented concerns about the development model that was taking the inhabited islands towards a path of unsustainability, putting at risk the archipelago's unique natural attributes (González et al., 2008). In June 2007, as a result of concerns presented by the international conservation community, UNESCO added the Galapagos to the *List of World Heritage Sites in Danger*. To deal with continued social-environmental problems generated by two opposing forces (i.e., one, attempting to protect the integrity of the natural ecosystems, led by local and international conservationists, and the other attempting to develop the islands' economy to meet local community aspirations, led by local residents and other local authorities) the scientific community proposed management alternatives, which were eventually supported and implemented by the local government (González et al., 2008).

Changes to the Galapagos' governance model was a collaborative effort between international and local researchers, and it aimed to facilitate a 'transition toward a more sustainable archipelago.' It introduced the concept of the Galapagos as a 'linked social-ecological system' – SES (i.e., to bridge social and biophysical sciences - sensus Berkes and Folke, 1998; Berkes et al., 2003; Liu et al., 2007) and stressed the importance of adopting complex systems thinking to analyze nature and human interactions at various scales (González et al., 2008, 2). The conceptualization of the Galapagos as a 'complex human-nature adaptive system' has been crucial for the management of the PAs and local human activities, and has been incorporated into the development of regulations and management guidelines to address human-environment interactions in a holistic manner (González et al., 2008).

Despite commitments made for the application of the SESs approach within the governance of the Galapagos, changes to national governance structures have produced changes to the

archipelago's governance system, and therefore, to the extent of the application of the SES model. From 1998 until 2014, human activities in the GMR were regulated and managed under a co-management regime determined by the 1998 GSL and a Special Regulation for Fishing Activities (REAP, Spanish acronym). Since June 2015, due to changes to the GSL—following national policies regarding territorial management—human activities are managed under a new regulatory framework determined by authorities of the national park, the Galapagos Governing Council, and the Inter-institutional Management Authority (AIM, Spanish acronym) (Llerena et al., 2015). This new approach took a consultative focus through the Management Advisory Council (PMAC, Spanish acronym), a structure that replaced the Participatory Management Board (JMP, Spanish acronym) where decision-making was based on consensus. Under the new governance approach, final decisions are taken by the National Environmental Authority (MAE) in coordination with The Galapagos Governance Council (CGREG, Spanish acronym) and other public institutions like the GNPS (Llerena et al., 2015).

3.2 Concluding Remarks

This chapter provided an overview of the study area by presenting key aspects of published research on the archipelagos' biophysical, human, and administrative conditions. The close-interaction of ecological processes and human activities has deepened the complexity of biodiversity conservation management in the Galapagos. The overexploitation of fisheries resources, social-environmental conflicts, increasing economic development driven by population growth and a thriving tourism sector, and deficient institutional processes challenge the islands' sustainability. As a response to these, new approaches have been considered to understand human-environment interactions. Adaptive responses from conservation managers have attempted to define management strategies that address both ecological and social processes. The most remarkable endeavor has been the adoption of the SES approach for the governance of the archipelago; however, although progress has been made to resolve social-environmental problems, the human dimensions of the populated islands require further research. This understanding will contribute to a more effective conservation management, which can therefore guide the Galapagos, towards a sustainable development path.

CHAPTER IV: Methodology

4.1 Research Design

This study is framed as *multiple case study research*, a methodological approach that had not previously been considered in exploring the human dimensions of conservation in the Galapagos Islands. I used a mixed-methods approach to explore resource-based livelihoods diversification in the face of increased conservation regulations and growing tourism, to examine stakeholder engagement in decision-making processes of marine conservation management, and to explore perceived impacts on fishing activities. Key advantages of using a mixed-methods approach, according to Wisdom and Creswell (2013), are that it compares quantitative and qualitative data, it reflects participants' point of view (i.e., participants of the study are given a voice, so the study findings are grounded in participants' experiences), it provides methodological flexibility (i.e., to adapt to many study designs), and allows the collection of rich, comprehensive data (Pg. 3).

Case study research, following Yin (2014) can be useful "to describe an intervention and the real-world context in which it occurred" (Pg. 19). A *case study* is defined by Yin (2014) as an "empirical inquiry that investigates a contemporary phenomenon (the "case") in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident." (Pg. 16). Baxter (2010) notes that case studies are valuable[58] because they generate "deep, concrete explanations of social phenomenon that are attentive to a variety of contextual influences at various scales." (Pg. 95) Case studies mostly focus on individuals, but a 'case' can also be entities where the units of analysis are small groups, communities, institutions, decisions, programs, and organizational, administrative or governance processes, and specific events (Yin, 2014). The advantage of case study research is that one can generate a more complete understanding of the entity under study, and can integrate direct observation and multiple sources of data. It is adaptive, meaning that questions can be changed as the case develops, and methods and data sources are flexible and can evolve to meet new or unexpected developments as the research progresses (Baxter, 2010). For these reasons, the case study approach was adopted for this research and was to select the methods of data collection.

[58] Baxter (2010) point out that "a carefully chosen and well-studied case can be used to produce very robust, credible, and trustworthy theoretical explanations. These explanations are generalizable, or transferable, in the analytical sense rather than in the statistical sense." (Pg. 96)

Because of the complexity of contemporary transitions in the Galapagos as it undergoes an intensification of biodiversity conservation efforts and a simultaneous acceleration of tourism growth, I utilize case study research to explore the nuances of the processes and responses affecting the three most populated islands. The aim of this chapter is to outline the steps and procedures used to collect and analyze the data. It presents an overview of the research methods, sampling procedure, and analysis of data employed in the study. It also gives details about limitations of the study and addresses research validity, ethics and positionality. This chapter presents a comprehensive overview of the methods used in the entire study; some parts are repeated in less detail in Chapters 5-7 as is required for publication.

4.2 Data Collection

A 'good' case study relies on information that comes from multiple sources of evidence that complement each other (Yin, 2014). Following Yin's reference manual, the most commonly used methods in case study research are document searches, interviews and surveys, and field observations. These methods of data collection were adapted to the local circumstances, where I initially faced factors of restricted access arising from overt mistrust of researchers (see Section 4.5.1). This entailed meeting the resistance with open conversations about conditions on the islands for those in resource-based livelihoods, and then explaining the purpose of my research and showing how the outcomes could be beneficial to the respondents. As trust was built, more formal and more structured assessments were made and, slowly, the network of those willing to engage in the study expanded.

Document searches help to corroborate and supplement evidence from other sources, as they contain specific information and details about the case (or topic) under evaluation. Interviews and survey interviews provide explanations as well as personal views of the persons under study (e.g., perceptions, attitudes, and meanings). Interviews are an important source of case study evidence because most case studies are about human affairs or actions. Field observations (direct and participant) cover actions in real time and can range from formal to casual data collection activities. Evidence gathered through observation can provide additional valuable information, particularly for understanding the context of the phenomenon being studied (Yin, 2014). Using multiple sources of evidence is the approach recommended to construct validity and reliability of the evidence in case study research (i.e., through data triangulation - information from different sources is used to corroborate the same findings, Patton, 2002). By using multiple sources of

evidence a case study has higher quality than those relied only in single sources of information (Yin, 2014).

4.2.1 The Case Study Design

This study used two types of design for case studies presented by Yin (2014): (1) an embedded case study which has multiple units of analysis; and (2) a holistic case study which has a single-unit of analysis; the units of analysis for each part of the study were determined in relation to the specific research questions, which were presented in Chapter 1. In Chapter 5 (an embedded case), the study is of the patterns of diversification of individuals within two resource-based sectors on three populated islands. In this study, each site (island) has two livelihood groups embedded as units of analysis: small-scale farming and fishing (Fig. 4.1). In Chapters 6 (a holistic case study), the study is of the administrative process leading to, and outcomes arising from, the 2016 rezoning for the Galapagos Marine Reserve (Fig. 4.2). This chapter presents a qualitative and quantitative exploration of the decision-making process associated with the development of the new zoning. Chapter 7 is based on a deeper qualitative analysis of the perceptions underlying stakeholders' responses to the new zoning, and it compiles results into dominant themes that should help build understanding required for targeted management responses.

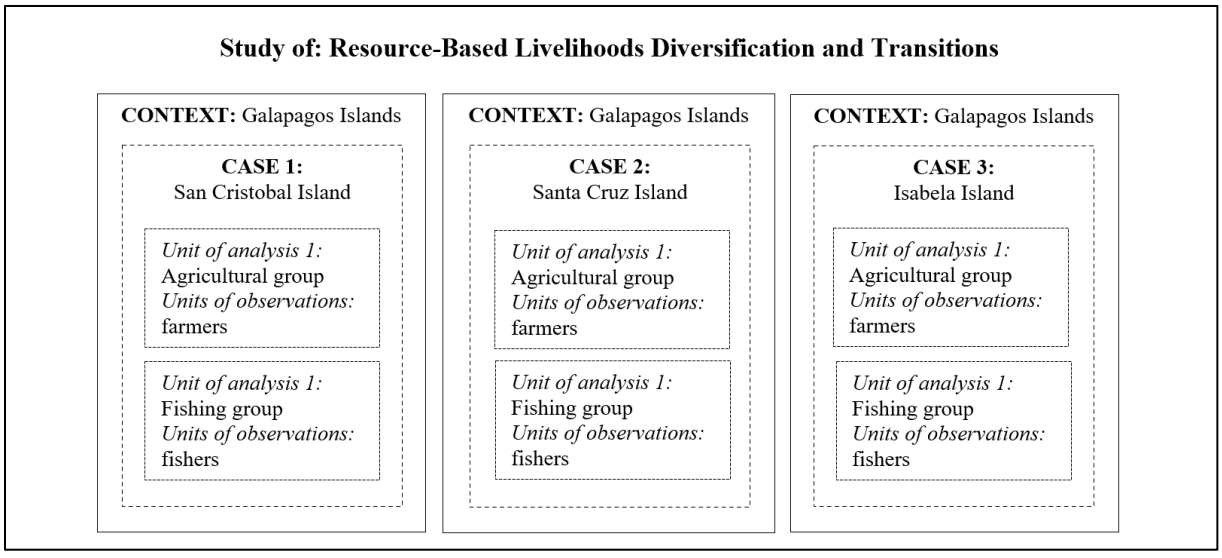


Fig. 4.1. Multiple-case (embedded) design for the assessment of patterns of livelihood diversification. *Note:* the dotted lines between the context and the case indicate that its boundaries are not likely to be sharp. *Source:* Adapted from Yin 2014, pg. 50.

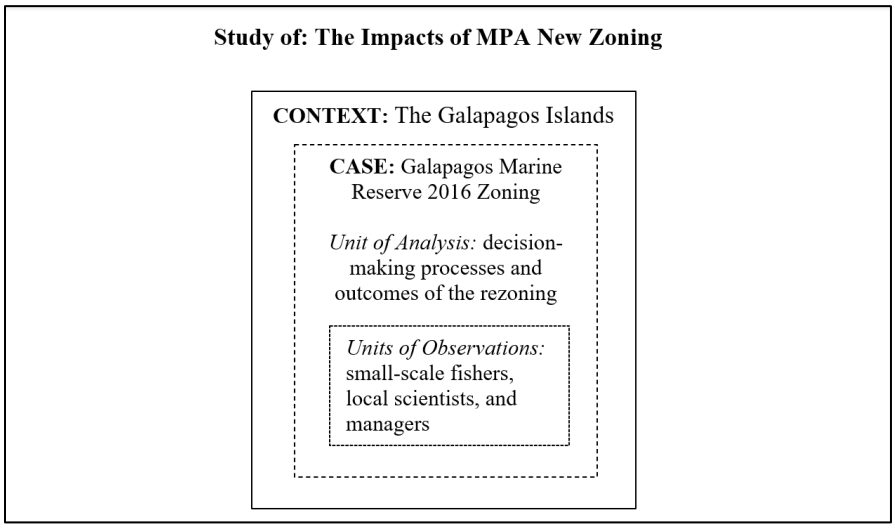


Fig. 4.2. Single-case (holistic) design for the assessment of the 2016 rezoning plan. *Source:* Adapted from Yin 2014, pg. 50.

4.2.2 Document Search and Analysis

The document search of published and unpublished governmental and non-governmental reports, academic publications, census data, and online sources was carried out in an iterative and cumulative way throughout the research process. The in-depth review of secondary data helped to expand my knowledge and understanding of the complexity of the study area, aided in focussing and adapting the research questions, and in triangulating information gathered by primary research methods (White, 2013). Through the review of secondary data, I gained a more comprehensive perspective of human-environment interactions in the Galapagos, and was able to identify gaps of knowledge regarding my research topic.

4.2.3 Field Observations

Participant observation—defined by Jackson (1983) as "conscious and systematic sharing, in so far as circumstances permit, in the life activities and, on occasion, in the interests … of a group of persons" (quoted in Kearns, 2010, 245)—is used to understand more fully the meanings of place and the contexts of everyday life (Kearns, 2010). Kearns (2010) explains that the goal of participant observation is "to develop understanding through being part of the spontaneity of everyday interactions" (Pg. 245). Yin (2014) remarks that in participant observation a researcher actually participates in the events and actions being studied, which allows a deeper understanding of a case study phenomenon.

Participant observations were carried out at different moments and places within the three islands. For example, observation was conducted at local meetings of the fishing cooperatives, meetings with reserve managers, public demonstrations, and various informal gatherings in the communities. Observation also occurred at the fish processing center in Santa Cruz; at the point of landing and processing of dried and salted fish in San Cristobal; where fish and agricultural products were being sold in local markets; at the site of visits by the Ministry of Agriculture and Cattle Ranching (MAG) intended to assist farmers with technical advice; and in the locations of various important agricultural, fisheries, and tourism-related activities (i.e. in sowing and harvesting activities and in daily tours and tour bay). Other aspects of daily life were observed by participating in social gatherings and public events.

4.2.4 Questionnaire Surveys

A questionnaire survey is defined by McLafferty (2013) as "a research method for gathering information about the characteristics, behaviours and/or attitudes of a population by administering a standardized set of questions, or questionnaire, to a sample of individuals." (Pg. 78) This is a useful method for gathering original data about people's perceptions, their behaviour, experiences and social interactions, attitudes and opinions, and awareness of events (McLafferty, 2013). McLafferty (2013) asserts that this method is "particular useful for eliciting people's attitudes and opinions about social, political and environmental issues" (Pg. 77).

Questionnaire surveys involve the collection of quantitative and qualitative data, and according to McGuirk and O'Neill (2010), these can be a powerful way to collect detailed qualitative data that can provide an essential framework for subsequent in-depth interviews, allowing key themes, concepts, and meanings to be teased out and developed (Ibid.). Indeed, the authors argue that one of the strengths of using questionnaires in qualitative research can be "their ability to identify variability in understanding and interpretation across a selected participant group" (McGuirk and O'Neill 2010, 214). Questionnaires used in qualitative research are likely to be applied "as a part of mixed-method research aimed at establishing trends, patterns or themes in experiences, behaviors, and understandings as part of analysis of a specific context, without seeking to make generalizable claims about whole populations" (McGuirk and O'Neill 2010, 205).

Questionnaire surveys were used at the beginning of data collection. The surveys (see Appendix A and B) were designed as a mixed-method questionnaire that combined closed

questions to gather participants' attributes (e.g., demographic characteristics and characteristics of their occupations and activities) and open-ended questions to capture in-depth responses about participants' ideas, attitudes and perceptions, beliefs and interpretations (i.e., participants' reality in their own words) of the explored key themes (McLafferty, 2013)

Key themes explored in Chapter 5 are: 1) status of resource-based livelihoods (i.e., in terms of level of profitability, occupational diversification); 2) perceptions of and engagement with related regulatory processes; 3) opportunities for livelihood diversification and transition; and 4) perceived links between resource-based livelihoods diversification and tourism growth. In Chapter 6, examined themes include: 1) the level of community engagement within planning, decision-making, and regulatory processes; 2) stakeholder access to information during those processes; 3) the extent to which local perspectives were incorporated into decision or planning outcomes. In Chapter 7, key themes explored are: 1) the perceived benefits and drawbacks of decision-making processes; 2) the level of agreement/disagreement with the marine zoning process and outcomes; and 3) the determination of dominant perceptions that shape community responses and which could help focus management responses.

To ensure consistency, I conducted all questionnaires and interviews personally, and they were always done orally to avoid issues of literacy (i.e., educational levels vary between individuals), to ensure that questions were fully and consistently understood, and to allow an immediate and active follow-up to open-ended questions. I began each interaction with the presentation of a cover letter explaining the purpose of my research, the intended use of the information, and the voluntary nature of participation. The letter explained the research topic, the way in which the obtained information was going to be used, the importance of informant consent and protections through confidentiality (i.e., the information provided by individuals would be presented only in aggregate form, or, where individual rare or unique circumstances were described, or where direct quotes were to be used, all information would be anonymized). The questionnaire was administered only after informed consent had been received. Questionnaires were conducted either at the moment of first contact or, if the participant did not have time immediately but was still willing to participate, at a pre-arranged time and location.

It is important to note that at the time the research was initiated, there was a strong resentment towards and suspicion of outside researchers (see Section 4.5.1, below). Participants for the questionnaire surveys were therefore selected using one of three methods (see Section

4.3, below). As the populations for the studies (small-scale farmers and fishers on each of the three islands) were of limited size, the objective was to generate a comprehensive overview of conditions and perceptions within the groups; therefore, the number of questionnaires was not fixed in advance, but, rather, sampling continued until it appeared that additional questionnaires revealed no new substantive information—i.e., until theoretical saturation and information redundancy was reached (Fusch and Ness, 2015).

4.2.5 Interviews

Research interviews are defined by Maccoby and Maccoby (1954) as "a face-to-face verbal interchange in which one person, the interviewer, attempts to elicit information or expressions of opinion or belief from another person or persons" (quoted in Dunn, 2010, 101). Interviewing allows for a 'people-oriented approach' which provides rich and informative data that assist in the exploration of people's perceptions, experiences, beliefs, subjectivities, attitudes, and ideas about a specific topic in people's own words (Valentine, 2005). According to Dunn (2010), interviews help "investigate complex behaviors and motivations" and "collect a diversity of meanings, opinions, [debates], and experiences" within a group, but they can also reveal consensus on other issues (Pg. 102). McGuirk and O'Neill (2010) point out that interviews provide a "particularly powerful way of uncovering narratives that reveal the motivations and meanings surrounding human interactions." (Pg. 215) Not only do interviews generate richly descriptive reports of individuals' perceptions, attitudes and beliefs, they can also prompt a discussion of respondents' views and feelings of certain events, their behaviors, and even the meanings and interpretations attributed to particular events and things (Dunn, 2010).

Respondents for interviews were identified in one of two ways. Some were selected because of their position, their role in the process under study, or their past activities; others were selected based on the results of participant observation or questionnaires, and were identified because of particular insights they were likely to have. Semi-structured interviews were conducted one by one, face-to-face, in a place chosen by the interviewee and according to their time availability. An interview guide was used to ensure that the key themes explored by the questionnaire survey were considered, but each interview was modified and tailored to the expertise and knowledge of the interviewee (Valentine, 2005). When conducting interviews, additional questions were added when necessary to check understanding, to go deeper on a theme, or to clarify ambiguous statements. Interviews were recorded with participants' consent. As with respondents for the

questionnaires, prior informed consent was obtained by informing interviewees of the purpose of the study and the intended use of the information when arrangements for the interview were being made. Oral consent was obtained for interviews, partly because of low levels of formal education of some members of the target population, but also because a significant legacy of suspicion and trust (discussed in sections 4.5.1 and 4.6) made respondents reluctant to sign formal papers.

4.3 Sample Selection

In case study research, Patton (2002) recommends that the selection of cases involves purposeful, non-random, selection. According to Fletcher and Plakoyiannaki (2010), sampling for case study research is about "appropriateness, purpose, and access to good information rather than representative and random/probability sampling, as with quantitative studies." (Pg. 4). According to these authors, "sampling in case study research is largely purposeful, that is, it includes the selection of information-rich cases for in-depth study. Information-rich cases are those from which the researcher can learn a great deal about issues of central importance to the purpose and investigated phenomena of the study." (Pg. 2) Case study research tends to use non-probability sampling (Yin, 2014), which can be used, according to Bradshaw and Stratford (2010), when the research does not aim to create generalizations pertaining to a large population beyond the site or group sampled, but rather aims to provide detailed information about the selected case. Likewise, McGuirk and O'Neill (2010) indicate that non-probability sampling is a more appropriate sampling technique for case study research than random sampling when "generalization to a broader population is neither possible nor desirable" (Pg. 205). In this research, the focus was on six relatively small groups (two livelihood sectors on each of three islands) and for reasons related both to accessibility (a legacy of resistance to researchers) and intent (which is clearly to "provide detailed information about the selected case") the study is based on non-probability sampling.

While the advantages of random sampling were considered, for the reasons outlined above, I used a combination of three non-probability sampling techniques: snowball sampling, convenience sampling, and purposive sampling. *Snowball (or chain) sampling*, "identifies cases of interest reported by people who know other people involved in similar cases" (Bradshaw and Stratford, 2010, 75). In this study, identified-key informants and previous participants led us to other individuals, and they in turn to others also engaged in the same sector. This was the main

technique used to recruit participants, however, because this opens some risk of gate-keeper bias, two additional sampling methods were also used.

Convenience sampling (or availability sampling), "involves selecting cases or participants on the basis of access [e.g., time, place, and willingness to participate]" (Bradshaw and Stratford, 2010, 75). For example, I approached potential participants at fishing docks, the fishing cooperatives, and at small shops or recreational sites where fishers gather socially, and at local markets, when visiting rural towns, or during visits organized by the technical team of the Minister of Agriculture and Cattle Ranching (MAG).

Purposive sampling is used "where sample selection is made according to some known common characteristic (e.g., be it a social category, a particular behavior, or an experience)" (McGuirk and O'Neill, 2010, 205). According to Patton (2005) "the logic and power of purposive sampling lies in selecting information-rich cases from which one can learn a great deal about issues of central importance to the purpose of the inquiry" (Pg. 2). This technique is commonly used in qualitative research and can generate higher response rates because it targets subjects with an existing interest in the research topic. It is important to note that in purposive sampling, sampling for proportionality is not the primary concern. Bradshaw and Stratford (2010) note that the purpose of sampling is more important than having the same number of participants in the chosen groups. Therefore, "the focus goes to the purpose of sampling and the predefined groups that the researcher is seeking to survey" (Pg. 75).

Purposive sampling was used to assist in the identification of key informants for semi-structured interviews. The rationale for selecting certain participants was based on their social representativeness, experience, and knowledge of the dynamics of their own sectors. Following Dunn (2010), informants for interviews were selected based on their likely knowledge of, or experience with, the key issues and themes under study. The initial identification of key informants was based on my previous knowledge of the study area and my previous work experience in the area. Additional key informants were identified when implementing the questionnaire surveys, and people with important experience or perspectives who were mentioned or encountered during the research process were also approached for follow-up interviews.

4.4 Data Analysis

Surveys provided quantitative data arising from closed questions (e.g., age, number of years in existing livelihood) and categorical data (e.g., education, level of profitability), and qualitative data arising from open-ended questions that provided attitudinal or opinion data. Numerical and categorical data were analyzed using the statistical software IBM SPSS Statistics v23 and were assessed for patterns of response and relationships between variables and across study sites (inhabited islands). The specific procedures used in different parts of the study are describe in chapters 5 through 7.

Qualitative information from surveys and semi-structured interviews was fully transcribed and later reviewed for key ideas and themes. This information was coded using the qualitative data analysis software, MAXQDA v2018. Following the guidelines of several scholars (e.g., Cope, 2010a, b; Saldaña, 2013; Miles et al., 2014), contextual words and phrases were identified to capture the content and essence of the information that was later grouped into categories, themes, and concepts. This analysis was used to expose a deeper understanding of perceptions, concerns and responses, as per McGuirk and O'Neill (2010), who note that "the power of qualitative data lies in its uncovering of a respondent's understandings and interpretations of the social world, and these data, in turn, are interpreted by the researcher to reveal the understandings of structures and processes that shape respondents' thought and action." (Pg. 213).

During the coding analysis specific themes from the questionnaires and previously identified key ideas were used as a *priori codes*. Recurrent ideas that emerged from the coding process were used as a *posteriori codes* (Cope, 2010a, b; Saldaña, 2013; Miles et al., 2014). During the first cycle of coding, a mix of coding methods was used to identify respondents' realities (e.g., in vivo coding, process coding, emotion coding, values coding, dramaturgical coding, focused coding, and theming coding) and explore respondent's actions and perceptions (e.g., I used a combination of descriptive coding, initial coding, versus coding, causation coding, and evaluation coding) (Saldaña 2013 and Miles et al., 2014). Codes and sub-codes grouped in major themes were continuously reviewed and revised for consistency and re-coded when necessary. The coding process helped to summarize, distill, and condense text data which allowed the identification of patterns of similarity, difference, frequency, sequence, correspondence, and causation (Saldaña, 2013). The iterative coding process carried out during data analysis helped to

identify respondents' voice, emotions, motivations, values, attitudes, beliefs, judgements, and conflicts. By reflecting upon code choices and their operational definitions, I was able to classify emergent patterns, categories, themes, concepts and connections between codes and sub-codes (Saldaña, 2013; Creswell et al., 2013).

Once all the qualitative information was coded, the coding system was manually reviewed in a second coding cycle. Saldaña (2013) indicates that the objective of this iterative process is to reorganize and reconfigure first cycle codes and associated coded data "to eventually develop a smaller and more select list of broader categories, themes, concepts, and/or assertions." (Pg. 207) The aim was to reduce and organize the data; for example, some codes were merged together because they were conceptually similar, infrequent codes were assessed for their utility in the overall coding scheme, redundant and marginal codes that were not considered relevant were dropped altogether (Saldaña, 2013). Through the second cycle of coding (i.e., by using pattern, focused, axial, and theoretical coding), the data were explored to develop a sense of categorical, thematic, conceptual and/or theoretical organization (Saldaña, 2013; Miles et al., 2014).

During the coding process, memos were written for codes and sub-code to ensure consistency through the analysis. These included a brief description and key ideas of the code (Saldaña, 2013). Once the coding system was consistent, extracts from coded themes were organized in different files (e.g., according to specific research questions – Chapters 5-7) and revised to extract key participant quotes for composing the narratives of the results sections (Saldaña, 2013; Miles et al., 2014). How often and persistent certain ideas and interpretations emerged in the analysis (frequency of coded occurrences) was also identified and indicated in the results section according to topic, to highlight how common these were within the sampled population.

In summary, quantitative information was used to provide a general description and characterization of the sampled populations, to identify trends in people's behavior (i.e., in terms of their economic activities), and to identify how common a determined perception was. Qualitative information was used to complement those findings because of the depth and richness of information it provided, and the importance of identifying and understanding people's attitudes, ideas, and interpretations of factors influencing those working in resource-based livelihoods as conservation regulations and tourism expansion continue to influence change.

4.5 Fieldwork Season

4.5.1 Encountered Advantages and Drawbacks

In the Galapagos it is well-known that there are sentiments of suspicion and mistrust within the local population towards scientists and managers of the protected areas, especially from the fisheries sector as it has been strictly regulated through policies and projects that rely heavily on scientific research. The general reluctance of those in the fisheries sector to participate in academic research is due to past experience with researchers who gathered information that later was used in the creation of policies and regulations that fishers considered as contrary to the needs and aspirations of their economic sector, and which ultimately negatively affected their livelihoods and the community at large. While testing the questionnaire surveys at the beginning of data collection, hostility and suspicion were evident from some respondents from the fisheries sector. This was due to active conflicts occurring at the time of the fieldwork season—which are explored in Chapter 6. Therefore, to reduce potential discomfort, the questionnaire was designed to start with a set of open-ended questions, contrary to what it is suggested in the literature[59]. The questionnaire sought to capture respondent perceptions on the key themes mentioned above and ended with a section of respondent's social and demographic data, as well as information regarding their economic activities.

The study aimed to gather people's perceptions, ideas and interpretations of topics that are deemed important for the local communities (these had been identified based on extensive review of secondary data and previous research experience). While there was at first resistance to discussing these sensitive topics with an outside researcher, I found that after I had won the confidence of some members of the community, and had explained the purpose of the research, people viewed their participation in this study as an opportunity to voice their concerns and views. By the time I started the last part of the questionnaire, I could see people were more relaxed and confident in their answers. However, I noticed that respondents, especially fishers, were uncomfortable providing detailed information about their economic activities (e.g., where they go fishing, type of target species, profits, expenses, etc.), so the questions in this section took a broader approach.

[59] According to McGuirk and O'Neill (2010), "open-ended questions are better placed towards the end of a questionnaire by which time respondents are aware of the questionnaire's thrust and may be more inclined to offer fluid and considered responses." (Pg. 201)

Data collection was carried out without research assistants. There was no need to have translators as my mother tongue is Spanish, and I felt that the complexity of the context and the sensitivity of the research topic (see Chapter 6) required direct involvement. I chose to carry out all the questionnaires and semi-structured interviews by myself. In this way, I was able to reduce interviewer-related bias, to further explore the information provided, to be aware of respondents' non-verbal gestures, and to have some grasp of respondents' attitudes, emotions, sensibilities, and understandings of the information they provided, all of which added depth to the data collected. Due to the issues of mistrust mentioned above, I used a 'letter of introduction' to the study, which was given to each participant. This letter was issued by my supervisor to formally communicate the nature of the study, as well as participants' rights (e.g., he/she was able not to respond any question or withdraw at any time from the study) (Dunn, 2010).

Finally, it is important to highlight that data collection with the agricultural sector had fewer obstacles as farmers were more willing to participate and provide information. Nonetheless, there were a few times when I encountered discomfort from potential participants who were reluctant to participate if the study was carried out by the Galapagos National Park or local NGOs. Some farmers mentioned that institutional support provided to this sector has not been enough to overcome the adversities of farming on the islands, and that there have been occasions when a farmer's success in agricultural activities has been used to support the public view of institutions despite the fact that there was no support provided to the farmer.

4.6 Limitations of the Study

Due to social conflicts generated by the regulatory process explored in Chapter 6, many fishers from the three islands were reluctant at first to participate. This was due distrust of researchers and scientists arising from the belief that information provided in "good faith" in previous studies had been used inappropriately by managers to impose targeted regulations on the resource-based practices. It was particularly difficult to find fishers willing to participate on Isabela Island. It is widely known among researchers doing fisheries studies in the Galapagos, that the fishing sector on this island is particularly difficult to approach in comparison to the other two islands. There is a history of tense relationships amongst managers of the marine reserve and the fisheries sector due to regulatory processes that have limited resource-based activities, and also perhaps due to the reduced presence of management institutions and organizations in this island.

A second limitation arises from the necessary focusing of the study. The current dynamics within the Galapagos social ecological system are complex, with many active issues within each of the major economic sectors, and many concerns about reconciling conservation interests, social development interests, and the interests of the tourism industry. As the research progressed, opportunities for further exploration and research presented themselves. In prioritizing study of responses to a particular marine zoning change, and of livelihood changes within resource-based economic sectors, it was evident that some aspects of interlinked processes in other sectors, or involving other stakeholders, or addressing other issues, would provide valuable insights. For practical reasons, not all avenues could be explored, thus limiting the overall scope of this study.

4.7 Measuring Research Validity

The reliability of empirical social research has been assessed in terms of concepts of 'validity', which are quality, rigor, and trustworthiness (Denzin, 1978). According to some scholars (Lincoln and Guba, 1985; Seale, 1999; Stenbacka, 2001; Davies and Dood, 2002; Golafshani, 2003) the incorporation of these concepts during research design, data collection, analysis and interpretation of research findings provides 'good quality research' (Eisner, 1991). While the terms 'Reliability and Validity' are essential criteria for assessing quality in quantitative research, Gubba (1981) proposed four criteria to ensure the 'trustworthiness' of qualitative studies; these are credibility, transferability, dependability, and confirmability. Research trustworthiness also incorporates issues of research reflexivity, integrity, and representation (Bradshaw and Stratford, 2010) which are addressed in section 4.8. In this section, I present a summary on how Gubba's four criteria for trustworthiness were integrated during the research process of this study (Table 4.1).

Table 4.1. Application of Gubba's four criteria for research trustworthiness.

Quality Criterion	Key Considerations	Application of key considerations within this study
Credibility[60]	Adoption of appropriate, well recognized research methods and line of questioning pursued in data gathering	Extensive review of employed research methods, and revision of literature that supported the rationality of the topics under study.
	Development of early familiarity with culture of participating groups	Prolonged engagement with the research topic, and in the study area that helped to establish relationships of trust with the target population.
	Random sampling of individuals serving as informants	As most qualitative research involves the use of purposive sampling, and case study research uses particularly, non-probability sampling, random sampling was not applied.
	Triangulation[61]	Use of different methods, different types of informants, and participation of informants from different sites (provides diversity of views).
	Tactics to help ensure honesty in informants	Data collection involved only those who were genuinely willing to take part of the study and prepared to offer data freely. Establishing rapport. Emphasizing the independent status of the research, and the right of participants to withdraw from the study at any point without further explanation to the investigator.
	Iterative questioning	Using probes to elicit detailed data, and by drawing attention within the research reports to discrepancies and offering possible explanations.
	Debriefing sessions	Presentations and discussions with supervisor and supervisory committee. There were continue discussions with supervisor about ideas and interpretations of the research findings and possible implications.
	Peer scrutiny of the research project	Through the peer-review process of academic journals where the article-chapters were submitted for publication, feedback offered during presentations in conferences, and by the revision of co-authors.
	Researcher's reflective commentary	Records of first impressions and of the research process during data collection, analysis, and interpretation of the findings.
	Background, qualifications, and experience of the investigator	Previous experience in the research topic and area of study.

[60] One of the most important factors in establishing trustworthiness (Lincoln and Gubba, 1985), which means to ensure confidence on the findings (Yin, 2014).
[61] Defined by Creswell and Miller to be "a validity procedure where researchers search for convergence among multiple and different sources of information to form themes or categories in a study" (2000:126).

	Member checks	Seeking verifications of research findings during data collection, analysis and interpretations, and application of member-checking on the research site.
	Thick description	Thick descriptions of the context area and sampled population.
	Examination of previous research findings	Integration of research findings to the corresponding body of knowledge, and assessment of the degree to which the results of this study are congruent with those of past studies or related studies.
Transferability[62]	Provision of background data to establish context of the study. Detailed description of the phenomenon in question to allow comparisons to be made.	Presentation of a detailed study area chapter, and contextual factors provided in the study area sections of chapters 5-7. The boundaries of the study were defined, as well as a presentation of the research groups (features of the target population), details of the sampling size and data collection methods, and time period of data collection.
Dependability[63] (or consistency)	Employment of overlapping methods and application of in-depth methodological description to allow study to be repeated.	Details of research design and implementation, data collection and analysis are provided in this methodological chapter, as well as in the method sections of chapters 5-7.
Confirmability (objectivity[64] or neutrality)	Triangulation Positionality	Use of triangulation to reduce the effects of researcher's bias.
	Recognition of shortcomings in study's methods and their potential effects.	Admission of researcher's beliefs and assumptions. Application of critical reflexivity during the research process and consideration of elements of research integrity.
	In-depth methodological description.	Detailed methodological description to allow integrity of research results to be scrutinized.

Note: The information provided in this table is based on the analysis of Gubba's four criteria for trustworthiness applied by Shenton (2004), but which has been widely used by numerous qualitative researchers.

[62] Transferability is "concerned with the extent to which the findings of one study can be applied to other situations." (Merriam, 1998 quoted in Shenton, 2004:69). Detailed information of the context of a research topic enable readers to compare instances of the topic described in the research report with other situations (Shenton, 2004).

[63] Dependability means "to show that the findings of a study are consistent and could be repeated" (Creswell, 2013:252). According to Creswell, having external audits is "an opportunity to summarize preliminary findings, to assess adequacy of data and preliminary results, to gather important feedback that can lead to additional data gathering, and the development of stronger and better-connected findings" (2013:252).

[64] According to Patton (1990), ensuring 'real objectivity' is challenging considering that for example questionnaires are designed by humans, thus the interference of the researcher's biases is inevitable.

4.8 Ethics and Positionality

Qualitative researchers especially must be aware of the ethical implications of their research[65]. This means being conscious of their position in the world, as well as the potential effects of a researcher's effects on the world around them. One can use the concepts of critical reflexivity, positionality, and research integrity as intertwined concepts that help to assess ethical considerations when dealing with human research, specifically to be aware of potential biases and impacts that may emerge in the research process. Critical reflexivity consists of declaring personal subjectivity and identifying the possible sources of biases, recognizing a researcher's background and the relationship to the research and potential participants (Dowling, 2010). Awareness of positionality ensures that at all stages of the process of analysis a researcher is mindful of engaging in critical reflexivity, especially when considering how his/her own frames of reference and personal positions shape the ways in which he/she proceeds with analysis (Dunn, 2010). Research integrity, honesty and accuracy can guide a researcher's interactions and position (as insider or outsider) in the researched area (Dowling, 2010).

As this study involved personal interactions with participants, to minimize disruption to participants' lives, a date and time for the questionnaire and interview was set according to each participant's schedule and the location was of their choosing. A critical process of auto-evaluation was carried out during the research process (i.e., during data collection, analysis, and writing of the thesis) to assess potential implications that research findings might cause to participants' lives, communities, and social conditions, and also to consider implications for conservation management policies and practices.

Societal norms, individual expectations, and relations of power that might influence the dynamic of work and my relationship with potential participants (Dowling, 2010) were considered at each research site. Although I am an Ecuadorian, in the Galapagos any non-resident is considered to be an outsider. However, I had a considerable advantage over foreign researchers who do not speak the language and for whom social integration might be difficult due to language and cultural barriers. There is no indigenous population in the Galapagos, and the population consists mostly of a mix of people who have migrated from different coastal and highland provinces on the Ecuadorian mainland. Being from the same country, and having lived

[65] This study meets all the standards required for research involving humans by the McGill Research Ethics Boards (REBs).

and worked in the islands previously, provided an advantage during fieldwork in that I was familiar and comfortable with societal norms.

I presented myself to the participants as a student, which helped to reduce tensions that other researchers have to face when doing social research in the Galapagos. As a student, it was easier to establish rapport with the participants as I was not related to research institutions that locals have some pre-existing prejudices toward due to their research and conservation agenda. I believe that due to my position as a student, people were more willing to participate and share their perceptions more openly. Moreover, as I had previously worked on the Galapagos for my master's thesis (it was about fisheries in San Cristobal Island), I had established trust with some local residents, who were instrumental in building bridges to other parts of the community.

Being female also helped to break some barriers. For example, on occasion, I saw how some fishers were more friendly and open to sharing information with female researchers than males. Despite that gender advantage, sometimes I was also exposed to inappropriate comments and behavior that would have been avoided had the researcher been male. Overall, I consider that being a female-Ecuadorian student put the participants at ease and allowed them to talk to me more freely.

Finally, an advantage of also being Ecuadorian, but an outsider to the Galapagos, was that people made an effort to clearly articulate and explain events, circumstances, and feelings. I recognize that my own characteristics (gender and social class) might have alternatively enhanced or restricted my relationships with certain participants, and also influenced the information I was given during the interviews. However, I believe my role as a student helped me better position myself to learn and integrate information through the study.

Clearly, the researcher's positionality and potential biases might affect the thoroughness of any study (Dowling, 2010). However, to account for this and deal with possible biases during data collection, analysis and interpretation, there are a number of "checks" that I incorporated into the research design. For instance, I confirmed evidence from several participants (member checking), maintained a detailed log throughout the research process complete with written notes with my own interpretations, questions, and understandings, and I cross-checked my results with other related research and secondary information. While my objectives, perceptions and modes of engagement have inevitably influenced the research process and outcome, I believe these checks, and the declarations of positionality, ensure the validity and utility of the results.

4.9 Concluding Remarks

The case study approach employed in this study provided geographically nuanced information that allowed for a comparative assessment of key issues related to conservation management and the growth of tourism on the islands. The comparative approach is especially useful (Baxter, 2010) as it allows understanding of how the historical and situational context of each of the populated island in the Galapagos can affect responses to the changing circumstances. In particular, the methods used provide rich information about resource-based livelihood dynamics facing increased conservation regulations and tourism growth, and commonalities and differences in stakeholder engagement in decision-making processes. The analytic approach provides information on how people who live and work under similar structures and processes of governance and in similar geographical conditions, can experience different outcomes arising from drivers of change, be they economic, regulatory, or environmental. The information is useful both to understanding the local conditions, but also to gaining insight into how the interaction of conservation interests and growing tourism can impact—positively or negatively—those who are engaged in resource-based livelihoods. The following chapters present results of the analysis and explore implications.

PREFACE TO CHAPTER 5

Chapter 5 explores the first overall aim of this dissertation, which is to investigate livelihood dynamics in a protected area setting, by assessing resource-based livelihood diversification in the face of increased conservation regulations and growing tourism. This chapter addresses this topic by determining: (1) the reported viability of existing farming and fisheries livelihoods and the pressures that jeopardize them, (2) the opportunities and limitations for existing resource-based livelihoods due to tourism growth, and (3) impediments to making adaptive, viable, sustainable and personally satisfying livelihood decisions.

More specifically, Chapter 5 examines the drivers and inhibitors of livelihood diversification, and explores how constraints imposed by conservation regulations, and economic opportunities linked to tourism growth have influenced diversification and transitions in the agricultural and fisheries sectors on the three most populated islands in the Galapagos Archipelago. There has been no systematic analysis that assesses and contrasts pressures and transitions between these livelihood groups across islands. This study addresses this gap using a mixed-methods approach to explore the perceptions, motivations and actions of those still active in these resource-based sectors.

Findings from Chapter 5 set the background for the exploration of the second and third aims of this dissertation, which are to explore in more detail one particularly significant factor influencing livelihoods, that is, engagement with stakeholders in important conservation decision-making processes (Ch. 6), and to understand stakeholder perceptions of one specific driver of change: increasing conservation regulations (Ch 7). Chapter 6 examines both the processes and the outcomes of decision-making for new marine zoning, and Chapter 7 examines perceptions of small-scale fishers that appear to underlie resistance to conservation measures.

This paper is published in the Journal of Sustainable Tourism (https://doi.org/10.1080/09669582.2020.1832101).

Appendix D. located at the end of this chapter includes a series of photographs taken during fieldwork that show the conditions of the agricultural sector in the three most populated islands in the Galapagos.

CHAPTER V: Manuscript 1

Effects of tourism growth in a UNESCO World Heritage Site: livelihood diversification in the Galapagos Islands, Ecuador.

Citation: Burbano, D.V., and Meredith, T.C. (2020). Effects of tourism growth in a UNESCO World Heritage Site: livelihood diversification in the Galapagos Islands, Ecuador. *Journal of Sustainable Tourism,* 1-20.

Abstract

In the Galapagos, as elsewhere, tourism is promoted as a means of reconciling biodiversity conservation interests with the economic aspirations of local populations. However, the rapid expansion of tourism has triggered concerns about both social and biophysical impacts that may threaten sustainable development of the islands. These concerns, coupled with mounting constraints imposed by conservation regulations, have particular significance for two locally important resource-based livelihoods: fishing and agriculture. This paper examines recent patterns of livelihood diversification within these two sectors, and explores reasons behind livelihood decisions that people make, either to maintain existing resource-based activities or to transition into emergent livelihood opportunities. We examine drivers and inhibitors of diversification, focusing particularly on opportunities associated with tourism growth. Through a mixed-methods approach, we explore the perceptions, motivations, and actions of those still engaged in farming and fishing on the Galapagos' three most populated islands. Results show that many are drawn to tourism, but there are notable differences in the appeal of, and the obstacles to, diversification. Considering the importance of both conservation and tourism in this iconic destination, these findings have significant implications for the role of sustainable tourism on the islands, and for the optimization of the conservation-tourism alliance elsewhere.

Key words: *Tourism Growth; Conservation; Resource-Based Livelihoods; Livelihood Strategies; Drivers and Inhibitors of Diversification; The Galapagos Islands*

5.1 Introduction

Natural World Heritage Sites are priority protected areas (PAs) and are deemed critical for biodiversity conservation (IUCN, 2016). However, protecting biodiversity has inevitable human dimensions; those most affected are people whose history, culture and livelihoods are grounded in land and sea resources in or near PAs (Holmes & Brockington, 2013). Tourism, notably ecotourism, has been identified as a means meeting both the conservation objectives of PA managers and the development aspirations of local communities (Bramwell & Lane 1993; Buckley, 2009). There is clearly a potential for a "sustainable symbiotic relationship" between ecotourism and conservation (Boley & Green, 2016), but, as is outlined below, innovation is required to optimize the synergies within a conservation-tourism alliance.

Sustainable tourism promotes such innovations by simultaneously recognizing social, economic and environmental imperatives (UNWTO-UNDP, 2017). In the Rio+20 Conference outcome document, *The Future We Want*, sustainable tourism is identified *"as a significant contributor 'to the three dimensions of sustainable development' thanks to its close linkages to other sectors and its ability to create decent jobs and generate trade opportunities"* (UN, 2012). The UN 2030 Agenda for Sustainable Development describes tourism as *"one of the world's fastest growing industries … being closely linked to the social, economic, and environmental well-being of many countries, especially developing countries"* and it cites sustainable tourism specifically with respect to employment generation (SDG 8), the promotion of local culture and products (SDG 12), and the sustainable use and conservation of marine and terrestrial PAs (SDG 14 and 15) (UN-SDGs, 2015).

However, the linkage of tourism with biodiversity conservation has not been without controversy (Kelley et al., 2019; Wolf, Croft, Green, 2019). Liburd & Becken (2017), for example, describe impacts on Natural Heritage Sites that have become important tourist destinations, and Goodwin (2015) and Hall (2019) note how uncontrolled tourism development can lead to negative unintended consequences. In PAs, tourism growth can create new values and social relations, and change local economies in ways that impact how local residents perceive and use their environment (Simpson, 2007; Williams & Lew, 2015). The economic allure of tourism-related activities relative to traditional activities, such as farming or fishing, can lead to shifts in livelihoods that create economic dependencies and reduce local autonomy (Tao & Wall, 2009). In a broad survey of the role of tourism in supporting conservation and sustainable

development in World Heritage Sites, Job et al., (2017) conclude that tourism planning needs improvements. Such concerns have led to research on new models for sustainable tourism (Font et al., 2019) and to recognition of the importance of understanding livelihood dynamics in conservation areas where tourism is actively promoted or continues to expand (Sene-Harper, Matarrita-Cascante, Larson, 2019).

Despite the wide use of the livelihood perspective in other areas of scholarship, there are relatively few studies in the tourism literature that use this approach to explore individual decisions and choices where tourism is presented as a means of reducing livelihood pressure on protected ecological resources (e.g., Ashley, 2000; Carter & Garaway, 2014; Sene-Harper et al., 2019). This study contributes to research in this area: a clearer understanding of livelihood dynamics will help to formulate targeted policy and regulatory interventions which should, in turn, contribute to conservation outcomes, to supporting sustainable community development, and to a clear role for sustainable tourism. The results should help in finding replicable models for sustainable conservation-tourism alliances.

This study explores recent patterns of livelihood diversification within the resource-based sectors of agriculture and fishing in three inhabited islands of the Galapagos archipelago, as residents respond to increasing conservation regulations and to growth within the tourism sector. The area is ideal for studies of a possible symbiosis between ecotourism and conservation because it is a renowned Natural World Heritage Site where tourism has been actively promoted. Since the establishment of the Galapagos National Park (GNP) in 1959, tourism has grown steadily: the first registry of tourists in 1979 reported about 11,700 visitors. Those numbers jumped to 41,200 by 1990; 77,600 by 2001; 173,400 by 2010, and 275,800 in 2018 (Galapagos Governing Council, 2015b; Observatory of Tourism, 2018). Tourism has become the main driver of the islands' economic growth but the promotion of tourism has produced what Quiroga (2009) describes as the 'Galapagos Paradox:' a *"process by which the very same conditions that cause the Galapagos to attract the attention of scientists, conservationists and of tourists, are being put at risk by the success of its reputation and the increasing number of residents and visitors."* (Pg. 139). This paradox has been identified elsewhere (McArthur & Hall, 1996) and reflects a challenge for sustainable tourism. By comparing land and sea-based livelihoods on three inhabited islands, this study contrasts factors influencing responses of people who make their

living in similar geographical contexts, under the same regulatory environment, but with different exposures to economic development forces, such as tourism.

The following section further explores the link between tourism, conservation and livelihoods in PAs and consider an analytic framework that incorporates drivers and inhibitors of livelihood diversification. We then provide some background on the selected study site and on three critical economic sectors in the Galapagos, the two resource-based sectors of farming and fishing, and the rapidly expanding sector of tourism. We then outline the methods employed in this study. The results section identifies the principal factors of diversification and perceived opportunities and expectations arising from tourism growth. The discussion and conclusion explore key findings and suggest implications both for local management and for the broader theoretical and practical efforts to make the conservation-tourism alliance sustainable.

5.1.1 Ecotourism, Conservation and Livelihoods

As the world faces mounting concern about environmental deterioration, there is increasing pressure to protect biodiversity (IUCN, 2019), but also to address human development goals (UNDP, 2011). International efforts to address environment protection and poverty eradication have supported the promotion of sustainable tourism, including ecotourism, "*as a tool for fighting poverty and promoting sustainable development"* (UNWTO, 2018). Ecotourism has been promoted on the grounds that "*carefully managed tourism can provide significant economic returns from the low-impact use of PAs and can be less erosive than some alternative land [and sea] uses*" (Goodwin 1996, 283). It can provide economic value to the preservation of species and habitats (Buckley et al., 2012; Boley & Green, 2016), and can be a form of sustainable use that PA managers use to build local support for conservation by demonstrating how local communities can benefit economically from a PA (Buckley, 2009; Wardle et al., 2018). Through ecotourism, PAs managers may address the need to provide economic sustainability and social equity (Leisher et al., 2013)

Sene-Harper et al., (2019) note the importance of understanding the complexity of local livelihoods during the design, implementation and management of PAs. The livelihood perspective assesses the mechanisms used by individuals to make a living within a specific socio-cultural, economic, and political context (Turner, 2017). The Sustainable Livelihood Approach, SLA (Ashley & Carney, 1999) provides a valuable framework to assess the effects of PAs on local communities, and to find ways to balance biodiversity conservation goals with local

development outcomes (Bennett, 2010). Central to the notion of a conservation-tourism alliance is the prospect of new livelihood options, particularly options that reduce demands on natural resources by shifting people away from resource-based activities (Wright et al., 2015). However, there are questions about the effectiveness of this strategy (Salafsky & Wollenberg 2000). For example, it is argued that the promotion of alternative occupations can have minimal or even adverse effects on biodiversity protection, especially when local realities are not well understood (Wright et al., 2015, Sene-Harper et al., 2019).

To overcome this problem, Wright et al., (2015) suggest that alternatives livelihoods must align with the needs and aspirations of the people affected by conservation initiatives, and must fulfill the same range of functions as any displaced activity. Alternatives also need to offer similar levels of job satisfaction (Pollnac and Poggie 2008). Thus, it is important to understand two facets of the relationship between resources and livelihoods: first, how natural resources are used and how related opportunities and risks are perceived (McConney and Charles 2010; Charles 2012); and second, why people engage in specific activities, and how those activities link to social, cultural, and historical dimensions (Wright et al., 2015). These insights are critical to designing effective management approaches, and can be better understood through understanding livelihood diversification as an element of the SLA approach.

5.1.2 Livelihood Diversification

Livelihood strategies represent one component of the SLA approach. These consist of activities which, implemented together, determine both livelihood security and environmental sustainability (Ellis, 2000). One common strategy is *livelihood diversification*, defined by Ellis (1998) as "the process by which individuals construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standards of living." (Pg. 4) Diversification is shaped by a variety of motivations and constraints, which vary between individuals and over time (Ellis, 2000). Motivations for livelihood diversification do not all reduce to economic measures but can manifest in factors such as lifestyle choices (Ateljevic & Doorne, 2000). The potential to engage simultaneously in different livelihood activities allows flexibility and adaptability in responding to perceived opportunities (Turner, 2017).

Determinants of livelihood diversification have been assessed through factors that 'push' or 'pull' individuals from established livelihood practices (Ellis, 2000). *Push* factors imply a *necessary* change in response to distressed conditions, *Pull* factors imply enticement (*voluntary*

and proactive) towards new and better opportunities (Ellis, 2000). The conceptual framework (Figure 5.1) that guide our analysis is based on push and pull factors as *drivers* of diversification, but we also incorporate *inhibitors* of diversification as barriers that limit or prevent change, and *factors of attachment* that support continuation in existing livelihoods. '*Selective diversification'* arises where individuals choose to diversify livelihoods based on convenience, seasonality, and cultural norms, resulting in ephemeral, fluid and opportunistic engagement with various livelihood strategies (cf. Turner, 2007). These selective responses are also included in our framework as they mediate the impacts of the drivers and inhibitors of livelihood change.

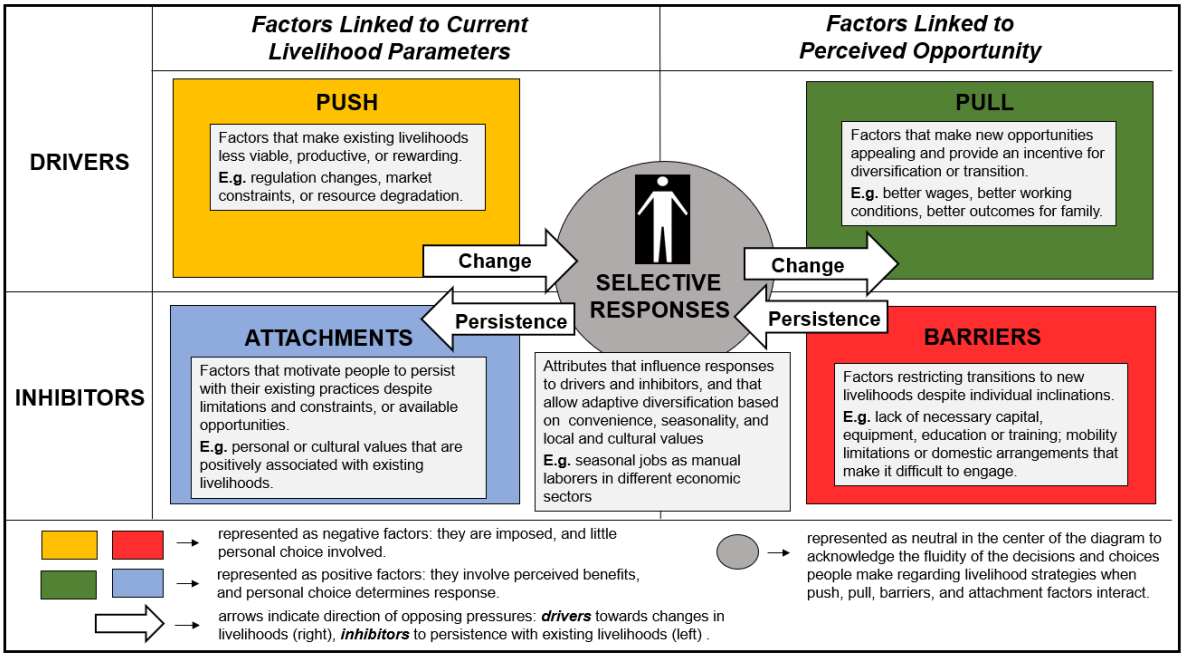


Figure 5.1. Adaptive Livelihood Diversification Framework (*Source:* by authors.)

5.2 Study Area: Livelihoods in the Galapagos

The Galapagos Archipelago is situated about 1,000 km off the coast of mainland Ecuador in the Pacific Ocean (Figure 2). The islands were discovered in 1535, but were visited only occasionally by sailors until the early 19th century when the first settlers arrived and practiced subsistence agriculture (Maignan, 2007). Over time, commercial opportunities drew people from agriculture into fisheries (Castrejón, 2011). Fishing expanded dramatically in the 1980s, and pressure on land and marine resources intensified in the 1990s as newcomers were attracted from the mainland by job opportunities (Ospina, 2006).

Agriculture is practised in the humid highlands of the populated islands (Figure 2) and is regulated by the Ministry of Agriculture and Cattle Ranching because the areas lie outside the national park. Only coffee can be exported from the islands, so most farm produce is sold to the local population and to the tourism sector (Galapagos Governing Council, 2015b). Fishing is regulated by the Galapagos National Park Service (GNPS), the institution responsible for management of the PAs. Only local small-scale commercial fishing is permitted within the Galapagos Marine Reserve (GMR). The number of fishers and fishing vessels is limited (Figure 2) and activities are regulated through limits on opening dates, quotas, species size, and fishing gear (Castrejón, 2011). Fish products are mostly traded locally, as GNPS imposes limits on what can be commercialized or exported.

Given their unique ecology, the islands are an important tourism destination (Quiroga, 2014). Tourism began during the early part of the 20th century with sailboats from offshore. In the 1960s the local population become involved, when a few fishers began to take occasional tourists to view native fauna (Quiroga, 2009). Strengthening markets drew cruise-ships which were managed by foreign or mainland companies and which made only short landings at specific visitor sites (Quiroga, 2014). This limited interaction with the local economy has resulted in the local population seeing tourism as ‘detached’ from the communities and not contributing to their well-being (Epler et al., 2007). In fact, only about 15% of the income generated by tourism enters the local economy, while the rest returns to the Ecuadorian mainland and to the international tourism market (Galapagos Governing Council, 2015b). Consequently, another type of tourism has grown in importance since the mid 1990’s: land-based tourism has become a major part of the economy of the populated islands (de Haan et al., 2019), and in 2010, the number of land-based visitors surpassed cruise-ship tourists (Figure 5.2).

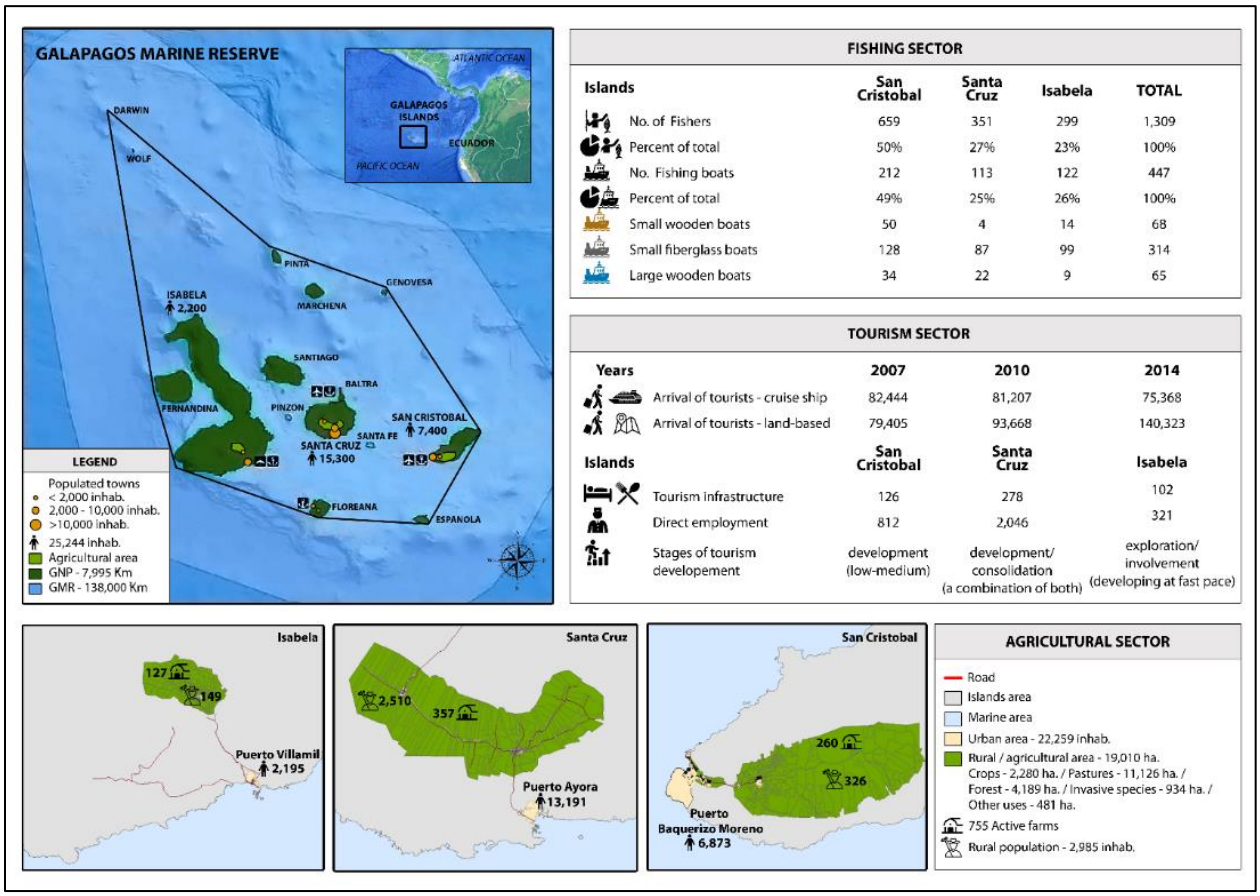


Figure 5.2. Location of the Galapagos Archipelago. (*Source:* Google Earth.) Maps in the bottom show the islands' agricultural areas (in green) and main towns. ***Source of data:*** Fishing sector - records of the GNPS (accessed April 2016). Agricultural sector - Galapagos Governing Council 2015a. Tourism sector - Galapagos Governing Council 2015b. ***Note:*** Tourism infrastructure includes also travel agencies, land and sea transportation services, cruise ship operations, and sightseeing tours.

5.3 Methods

5.3.1 Data Collection

Data collection was carried out between January and September 2016: January to April in San Cristobal, May to July in Santa Cruz, and August in Isabela. This study combined secondary data review, participant observation, and questionnaire surveys. Secondary data review included published and unpublished government and non-government reports, academic publications, and online sources. Participant observations of the fishing sector involved interacting with fishers at fishing co-ops; at the points landing, processing, and selling fish; and in tourism activities operated by fishers. For the agriculture sector engagement was with farmers selling produce in local markets; participating in technical meetings sponsored by the Ministry of Agriculture and Cattle Ranching (MAG); and when engaged in agricultural activities—e.g. such as sowing and

harvesting. Other aspects of daily life were observed in social gatherings and public events within both sectors.

Questionnaire surveys were administered verbally, in-person, to gather participants' demographic characteristics and explore perceptions about the status of resource-based activities, livelihood strategies, regulatory processes, and links with the tourism industry. In total, 290 surveys[66] were completed: 143 with farmers (42 in San Cristóbal, 75 in Santa Cruz, and 26 in Isabela) and 147 with fishers (67 in San Cristóbal, 63 in Santa Cruz, and 17 in Isabela). The sample was restricted to respondents who had been active in their sector for at least two years. They represented a range of age groups, type of agricultural or fishery activity, and degree of engagement. Two sampling techniques were used: "*snowball" sampling* where previous participants nominated other individuals (Bradshaw & Stratford, 2010), and "*convenience sampling*" (Etikan, Musa, Alkassim, 2016) where potential participants were engaged based on accessibility in public venues or at meetings of farmer or fisher organizations.

5.3.2 Data Analysis

Quantitative data from the surveys were analyzed using SPSS Statistics v23. We generated descriptive statistics of demographic attributes of sampled groups[67] and carried out crosstabs analysis of survey responses—Pearson Chi-square (Chi^2) and likelihood ratio (LR) to test for differences within variables, and Cramer's V (CV) to examine the strength of association. All differences discussed in the text are statistically significant at $p \leq .05$. Qualitative information from open-ended questions was transcribed, and then coded and analyzed using MAXQDA v2018 software. During the coding, previously identified key ideas were used as *a priori codes* while recurrent themes that emerged from coding were used as *a posteriori codes*; codes and sub-codes were continuously reviewed for consistency and re-coded when necessary (Miles, Huberman, Saldaña, 2014). Direct quotes from respondents (identified in this paper as P# and place [island: SL, SZ, IS]) were used to elaborate and support findings.

[66] The number of surveys was not fixed in advance, but, rather, data collection continued until no new insights were revealed—i.e., until data saturation was achieved (Fusch & Ness, 2015).
[67] A summary of selected demographic data and resource-based practices from surveyed farmers and fishers is available online as supplemental material.

5.4 Results

5.4.1 Livelihood diversification

To identify livelihood diversification, first we explored the level of engagement of our participants within their resource-based sectors (Table 5.1). We found differences between the group of farmers and the group of fishers: about 73% of surveyed farmers, but only 56% of fishers reported working full-time in their respective sectors (*$P < .001$). Differences were also in terms of engagement in other economic activities (**$P < .001$): fewer farmers (40%) than fishers (60%) having other income source.

Table 5.1. Level of engagement in resource-based activities and other economic sectors.

	Farmers (%)				Fishers (%)			
Islands / **Variables**	San Cristobal (n= 42)	Santa Cruz (n= 75)	Isabela (n= 26)	*Mean* (%)	San Cristobal (n= 67)	Santa Cruz (n= 63)	Isabela (n= 17)	*Mean* (%)
***Resource-based activities**								
Full-time	69	83	54	73.4	51	70	29	56.5
Part-Time	17	12	27	16.1	40	24	53	34.6
Occasionally	14	5	19	10.5	9	6	18	8.8
****Other economic activity**								
Yes	48	33	50	40.6	63	51	88	60.5
No	52	67	50	59.4	37	49	12	39.5

*LR value = 13.531, df = 2, $P = .001$, CV = 0.214

** Chi^2 value = 11.582, df = 1, $P = .001$, CV = 0.200

About 51% of respondents reported having other economic activity (Table 5.2), but there were differences between groups with respect to the sectors in which the other economic activity took place ($P < .001$). Tourism and retail are the most important sectors overall, accounting for 20% and 15% respectively, but the relative importance of these two sectors varies: for farmers, about 8% are in tourism and 17% in retail, while for fishers it is about 31% and 14% respectively.

Table 5.2. Engagement in other economic sectors.

Livelihood Diversification	**Sector of Other Economic Activity**					
Sector	None	Tourism	Local retail	Public sector	Others	**Total**
Farmers (No.)	85	11	24	18	5	143
	59.40%	7.70%	16.80%	12.60%	3.50%	100%

Fishers (No.)	58	46	20	7	16	147
	39.50%	31.30%	13.60%	4.80%	10.90%	100%
Total (No.)	143	57	44	25	21	290
	49%	20%	15%	9%	7%	100%

LR value = 39.606, df = 4, *P* = .001, CV = 0.360

The levels of engagement in the different sectors varied between islands. Few farmers engage directly in tourism except on Santa Cruz where 36% of farmers with alternative incomes are engaged in activities such as providing accommodation and/or food service on their farm, or by owning small hotels in the towns and cruise ship operations (Figure 5.3). This added income allows some farmers to subsidize farming investments; one young person managing his father's property explained: "*We continue doing cattle ranching activities with tourism profits. Our main goal is that the farm becomes more profitable to support itself. We have been working in both activities for 36 years*" (P76, SZ). Others have diversified into the public sector but most into the retail sector, which allows direct sale of farm produce (e.g. juice pulp, coffee, marmalade, and alcohol from sugar cane) both to local consumers and to the tourism market.

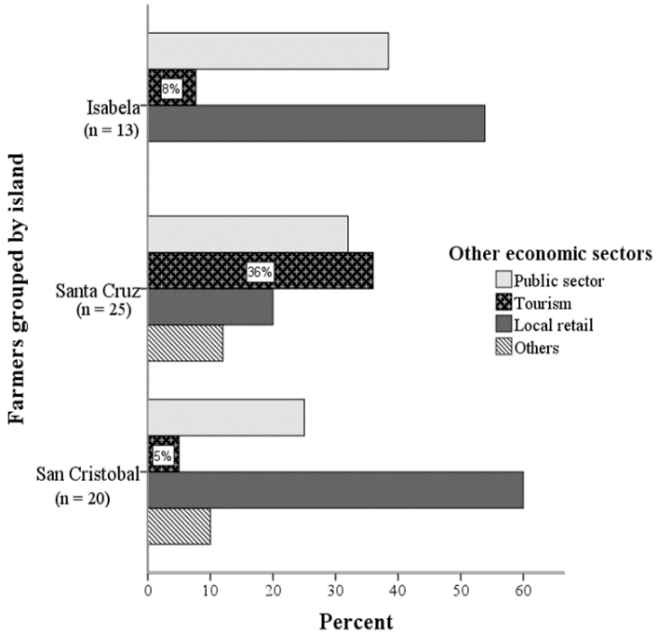


Figure 5.3. Livelihood diversification within the group of farmers.

Other economic activities for farmers.
Public sector: by providing services for local public institutions (i.e. Galapagos Governing Council, Municipality, Galapagos National Park, Parrish) as: concierge / messenger / park ranger / driver. Also as teacher in a public school
Tourism: accommodation / hospitality
Local Retail: owner of a grocery store for the sale of farm produce / products trade in local markets / selling coffee / in a butcher shop / as street food vendor
Others:
Business: rooms for rent / bakery / butcher shop / wood shop / street food seller
Transportation: unloading cargo ships and transporting goods to local towns and between islands / taxi and bus driver / fresh water supplier / gasoline provider
Construction: bricklayer / brick maker/ cabinet builder / carpentry
Services: housekeeper / electrician / research assistant (i.e. in local NGOs such as the Charles Darwin Research Station) / street sweeper / craftsman
Fishing: captain / fisher / helmsman

Diversification into the tourism sector is greater for fishers, particularly for those in Isabela (73%), where tourism is developing rapidly (Figure 5.4); respondents indicated that almost half

of those previously involved in fishing have transitioned to marine tourism activities (e.g., in sightseeing tours or in the 'experiential artisanal fishing'[68] – PAV, by its Spanish acronym). Fishers working in tourism noted that it provides better income stability. In San Cristobal, although tourism is increasing, fishers also found economic opportunities in retail, small businesses, and in construction and transportation. For fishers, diversification into the tourism sector is enhanced by the complementarity of some livelihood activities. For example, fishers can engage while waiting for a specific fishery to open (e.g., the lobster fishery or dried and salty fishery) or when a fishing boat is not available. The following quotes illustrate reasons for selective diversification: "*I like to keep myself busy. I always have something else to do when the fishing season is over*" (P67, SL); "*when I do not have a boat to go fishing, I work in tourism*" (P120, SZ). Conversely, people who rely solely on fishing resent competition from those who participate selectively in only the most profitable fisheries (e.g., notably for spiny lobster and sea cucumber), as a result, there is a smaller share of fisheries profits for those fishing full-time.

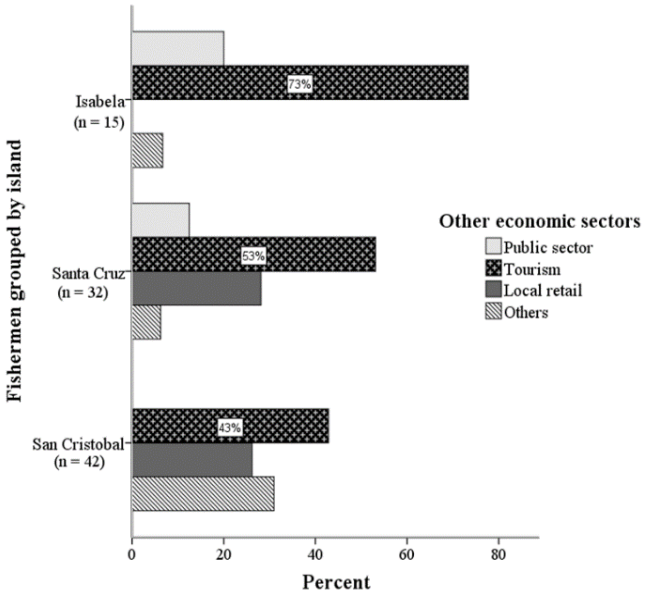


Figure 5.4. Livelihood diversification within the group of fishers.

Note: Figures show the corresponding number of respondents who answered ***yes*** to having ***other economic activity*** (Table 1), and the proportion of respondents within main economic sectors.

Other economic activities for fishers.

Public Sector: by providing services for local public institutions (i.e. Galapagos Governing Council, Municipality and Parrish) as: concierge, messenger, security guard (i.e. in a public hospital) / park ranger or fishing monitor assistant (i.e. in the Galapagos National Park)
Tourism: as captain, sailor, helmsman, cooker, or bartender in marine tourism operations (i.e. daily tour around the bay, daily diving tour, "island hopping", cruise ships) / scuba diving guide, tour land guide
Local Retail: grocery store / fish trade / mini-market / butcher shop
Others:
Business: rooms for rent / sport equipment rental shop for marine activities / laundry / Internet center / bakery / wood shop / tailor shop / hammock and fishing net maker / as owner of a: travel agency, diving center, hotel, restaurant, guest house
Transportation: unloading cargo ships and transporting goods to local towns and between islands / taxi driver / fresh water supplier / aquatic taxi / cabotage boat for inter-island transportation
Construction: bricklayer / brick maker/ cabinet builder / carpentry / carbon fiber boat builder and boat painter / house painter
Services: mechanic / boat hulls underwater cleaner /carbon fiber boat builder /craftsman /electrician / street sweeper
Agriculture: as manual labor for sowing and harvesting

[68] The 'Experiential Artisanal Fishing' was initially conceptualized as a fishing and tourism activity where a local fisher uses his boat and equipment to offer visitors the opportunity to engage in his activity and way of life. However, in practice, this activity has become sport fishing in disguise (Engie & Quiroga, 2014).

5.4.2 Drivers of livelihood diversification and transitions

5.4.2.1 'Push' factors: Changes in viability

Social, cultural, economic, environmental, and regulatory factors can all compromise the viability of people's livelihoods. The most frequently reported factor inducing livelihood diversification was the instability of income from resource-based activities (Table 5.3). The majority of farmers and fishers perceive their activities to be marginally profitable. We found differences between islands within the group of farmers (P = .046) and within the group of fishers (P = .002): low levels of profitability were particularly evident for farmers from Santa Cruz and fishers from San Cristobal. A fisher from San Cristobal with forty years' fishing experience noted: "*Fishing nowadays is not profitable. Before I had money to build my house and eat, give education to my children, and save some for hard times. Today we cannot save money, fishing profits are only to cover basic living expenses*" (P35, SL).

Table 5.3. Perceived profitability of resource-based livelihoods.

	Farmers (%)				**Fishers (%)**			
Islands / **Variables**	San Cristobal (n= 42)	Santa Cruz (n= 75)	Isabela (n= 26)	*Mean* (%)	San Cristobal (n= 67)	Santa Cruz (n= 63)	Isabela (n= 17)	*Mean* (%)
Perceived profitability Very Profitable / Profitable	38	23	46	31.5	28	59	50	43.8
Marginally Profitable / Unprofitable	62	77	54	68.5	72	41	50	56.3

Farmers: Chi^2 value = 6.150, df = 2, P = .046, CV = 0.207
Fishers: Chi^2 value = 12.809, df = 2, P = .002, CV = 0.298

Contrasting perceptions between farmers and fishers from Santa Cruz show that almost 60% of fishers see it as profitable or very profitable, while only 23% of farmers do. In general, people within the agricultural sector were concerned about the economic sustainability of agriculture and the abandonment of farms. An older farmer stated: "*Agriculture and cattle ranching are not profitable anymore. Many have abandoned their farms, and this is worrisome*" (P70, SZ).

According to our respondents, low levels of profitability that "push" people from their farming and fishing practices arise from several factors (Table 5.4). For farmers, the main perceived factors are *growing competition and climate variability*. Growing competition is cited because farmers must compete with local retailers who import low-cost produce from the

mainland. Climate variability is a concern, especially in Santa Cruz, as access to fresh water is limiting. In 2016, farmers faced severe drought conditions for more than eight months, resulting in lost crops and the loss of cattle as pastures dried. This forced some out of agriculture altogether. Additional concerns include the high cost of imported farm supplies, expensive and scarce labor, and the cost of local transportation. A female farmer reported: "*Farming used to be good. Today agriculture worth is nothing. Before I used to sell more, there was less competition, everything you produced was sold and the price was much better*" (P47, SZ).

For fishers, *increasing regulations* and *reduced market opportunities* are the main perceived factors influencing fisheries profitability. The majority of surveyed fishers noted the closure of their most productive fishing areas and restricted access to important coastal zones through new zoning plans. They believe that these obstacles have pushed people out of fishing. A person working in a hotel in Puerto Ayora, and fishing occasionally in the lobster fishery commented:

> *I left the fishing sector ten years ago because we started to have more problems. We had many restrictions … there were months that I was not working … my livelihood was not good. The cost of living in Galapagos is high, so I was forced to look for an alternative to support my family, this pushed me to get involved in tourism* (P131, SZ).

Market constraints are a concern: when the market is saturated, the price of fish drops, which is a problem particularly for San Cristobal, where there is less tourism. A young fisher explained: "*Here the price is low … If we do not sell our fish, we do not have a place to keep it fresh. When a fishery is opened, the price of the fish starts very low. It happens always, in all fisheries. Traders always set lower prices*" (P32, SL). Some fishers from San Cristobal and Isabela indicated that they may sell their catch in Puerto Ayora, which has better prices and higher demand due to population and tourism growth. Nonetheless they also explained that fish traders there are "opportunistic," as they keep prices low and delay payment. The majority of fishers complained that the price of the fish has remained low, despite increases in the price of food, fishing supplies, gasoline, and ice.

Table 5.4. Factors that are perceived influence the level of profitability of resource-based activities.

FARMERS				FISHERS			
Coded perceptions (proportion of respondents)	**San Cristobal** (n= 42)	**Santa Cruz** (n= 75)	**Isabela** (n= 26)	**Coded perceptions**	**San Cristobal** (n= 67)	**Santa Cruz** (n= 63)	**Isabela** (n= 17)
Growing competition (31%)	11	30	3	*Increasing regulations* (67%)	41	45	13
Climate variability (25%)	6	20	9	*Reduced market opportunities* (48%)	35	25	11
Increasing invasive species (22%)	11	20	0	*Changes in fish abundance* (8%)	9	3	0
Expensive and scarce manual labor (13%)	5	12	1	*More competition* (7%)	4	7	0
				Climate variability (5%)	2	5	0

In addition to the economic drivers, 35% of fishers and 27% of farmers cited non-economic push factors that affected generational shifts within the sectors. Farmers reported that increased education and access to better paid jobs meant young people had different aspirations and were less interested in agriculture. Farmers also noted the demands of their children's education (i.e. moving to urban areas to access better education), marital status (i.e. single females or widows find it hard to maintain farms), and health problems and aging. For fishers, primary concerns were linked to the work preferences of children, who pursue tourism-related activities or other occupations instead of fishing. Both farmers and fishers felt that in the Galapagos it is difficult to subsist with only one source of income because of the high cost of living, which increases with the burgeoning tourism industry.

5.4.2.2 'Pull' factors: Opportunities associated with tourism growth

Due to the role of tourism in the local economy, we asked farmers and fishers if they consider that increasing tourism will provide more opportunities for resource-based activities and for the community at large: many respondents believe it would do both, although farmers were more optimistic about benefits than fishers (Table 5.5). The following quotes provide a good illustration of people's perceptions: "*In Galapagos, we all live from tourism, when tourism*

decreases everything else does as well" (P102, SZ); "*Tourism is the true source of economic income of the islands. There are no other industries that can be implemented here and generate other sources of livelihoods*" (P96, SZ). We found differences between islands for the group of farmers (for their livelihoods, *P = .002 and for the community, ** P < .001): most farmers from Santa Cruz and Isabela perceived potential benefits for the agriculture while in San Cristobal, only about half of farmers reported positive outcomes; most farmers from Isabela also felt positive about opportunities for the community at large.

Table 5.5. Perceived opportunities and benefits from tourism growth.

	Farmers (%)				**Fishers (%)**			
Islands / **Variables**	San Cristobal (n= 42)	Santa Cruz (n= 75)	Isabela (n= 26)	*Mean* (%)	San Cristobal (n= 67)	Santa Cruz (n= 63)	Isabela (n= 17)	*Mean* (%)
***For resource-based activities**								
Yes	55	85	77	74.8	31	78	88	60.3
No	45	15	23	25.2	66	17	6	38.1
Maybe	0	0	0	0.0	3	5	6	4.1
****For the community in general**								
Yes	53	59	85	61.5	48	60	65	55.1
No	33	9	15	17.5	39	13	6	23.8
Maybe	14	32	0	21.0	13	27	29	21.1

*****LR value = 13.432, df = 2, P = .002, CV = 0.306

**LR value = 22.633, df = 4, P = .001, CV = 0.281

Within the group of fishers, more people from Santa Cruz and Isabela felt optimistic about benefits for their fishing practices and for the community at large, a sentiment shared by less than half fishers from San Cristobal. Expectations that tourism growth will improve the economic viability of the resource-based livelihoods are based on the prospect of increased demand for, and increased prices for agricultural and fish produce. For example, a young fisher commented: "*Tourism generates lots of things … if more tourists come, we can sell more. Benefits are not only for fishers, but farming will also improve by selling more at a better price*" (P126, SZ). However, respondents emphasized that it is land-based tourism that create this demand through hotels and restaurants. A middle-aged farmer noted that benefits come "*as long as tourism growth is local"* and remarked that *"lately tourists are more independent, and the number of hotels and hostels is increasing. This money stays in the towns, and for us, it is better*"

(P52, SZ). Despite this optimism, there is concern that farmers may not be able to capture the growing demand because of the challenges to profitability noted above. To address this, some farmers are diversifying their crops, installing green houses and irrigation systems, and some ranchers are investing in new cattle breeds to enhance production.

Those who responded that tourism growth will not generate opportunities for their resource-based activities or for the community at large (Table 5) expressed concerns about the low consumption of local products by cruise ships operations which purchase most food and hire most staff from the mainland. Other concerns raised include: tourist from the cruise ships do not spend much time in the towns, so less economic input is left in the community; increasing tourism encourages migration to the islands; the tourism sector is monopolized by companies from the mainland and the few local families that own tourism-related businesses (e.g., hotel, restaurant, cruise ship operation), which limits opportunities for the rest of the community; tourism only leaves garbage on the islands. Negative assessments among fishers were especially evident in San Cristobal. One respondent who has fished for over twenty years commented: "*Tourism here does not contribute in anything. Only a few can benefit.*" (P48, SL).

5.4.2.3 Transitions from resource-based livelihoods

In view of the push and pull factors associated with increasing tourism, we were interested in the willingness of people to transition out from resource-based sectors (Table 5.6). There are significant differences between the group of farmers and fishers ($P < .001$): the majority of farmers were not interested in leaving agriculture—in particular, farmers from Isabela—while fishers on all islands were interested in finding alternative occupations.

Table 5.6. Willingness to transition into other economic sectors.

	Farmers (%)				**Fishers (%)**			
Islands / **Variables**	San Cristobal (n= 42)	Santa Cruz (n= 75)	Isabela (n= 26)	*Mean* (%)	San Cristobal (n= 67)	Santa Cruz (n= 63)	Isabela (n= 17)	*Mean* (%)
Interest to transition								
Yes	45	31	23	33.6	66	62	65	63.9
No	55	69	77	66.4	34	38	35	36.1
If yes, which sectors?	(n= 19)	(n= 23)	(n= 6)		(n= 44)	(n= 39)	(n= 11)	
Tourism	21	22	33	22.9	52	46	82	53.2

Other	68	56	67	62.5	39	51	18	41.5
Unsure	11	22	0	14.6	9	3	0	5.3

Chi^2 value = 26.770, df =1, *P* = .000, CV = 0.304

For fishers willing to transition, tourism was the first choice, especially for those from Isabela. For those from Santa Cruz, where tourism is currently most developed, about half indicated non-tourism sectors as preferred alternatives, including fish commerce, business (e.g., grocery shop, restaurant), construction, transportation and, for a smaller number, the public sector and agriculture. For farmers willing to transition, tourism was not seen as the most attractive option; they expressed interest in other sectors, such as local retail (e.g., selling agricultural supplies or having a grocery store), transportation and construction. Those who were drawn to tourism expressed an interest in combining their current practices with tourism-related activities and promoting agrotourism. For example, in Santa Cruz, people who have coffee plantations want to implement '*La Ruta del Café*' [The Coffee Route]. A coffee farmer commented: "*I have ten hectares cultivated and landscape that tourists will like. They can learn how to process coffee and about many other products we produced in Galapagos!*" (P50, SZ). Despite this optimism, there is still a perceived lack of government support, as an old farmer from San Cristobal argued:

> *Farmers should have the opportunity to develop tourism. This might be a way for people to get out of poverty, but the authorities do not support us. They say that tourists do not come to see people and plants, they come to see animals and the landscape* (P12, 28/2/16).

5.4.3 Inhibitors of livelihood diversification and transitions

5.4.3.1 Barriers: factors that make change difficult

Lack of education, training, capital, and age are cited as barriers to livelihood diversification or transitions. In terms of age, an older fisher said: "*I will keep fishing as I cannot get another job, I am 50 years old. I will fish until I lose my strengths*" (P26, SL), and regarding education a typical comment was: "*I do not have education, so I must keep with agriculture even if it is not good … I was born in this and will get older on it*" (P54, SZ). Fishers noted that a secondary school diploma is required to take courses for the marine certification mandatory for work as a crew member in boat-based tourism activities. Among our respondents, about 60% had not finished their secondary studies, and some who had, cited lack of funds to complete the marine certification.

People wanting to start a marine tourism operation (e.g. in PAV) must ensure their boats meet standards set by local authorities, but this can be prohibitively expensive. A young fisher from Isabela, now working in tourism explained: "*The GNP has opened new visitor sites for fishers. But sometimes due to the lack of money and contacts, people feel reluctant to take the risk and change the activity. Getting back the money invested is not easy and it takes time"* (P138, IS). Fishers who do not have assets, capital, or access to credit, have opted to partner with national or international companies that can afford the investment, but respondents note that this has led to loss of control of their operation. Lastly, several fishers complained they have to compete for job opportunities within the tourism sector with people from the mainland. They explained that some tourism companies prefer to hire people from outside the Galapagos who accept lower wages.

Farmers noted that it would be difficult to leave farming because of the capital that is tied up in land; they explained that it is difficult to find buyers for land since foreigners are not allowed to buy properties in the Galapagos, and most locals lack the requisite funds. Regarding institutional barriers, many farmers are unable to participate in agrotourism because of the high investment that these operations require. A middle-aged farmer said: "*I applied for a loan of $10,000 dollars* [USD] *but I did not get it. Perhaps I will need to partner with someone that has the capital*" (P87, SZ).

5.4.3.2 Attachments: factors that preserve existing livelihoods

Regardless of the opportunities that people might perceive within tourism or other economic sectors, some cite positive reasons for persisting with their existing resource-based activities. With respect to the importance of lifestyle in livelihood choices, farmers and fishers alike indicated that their current occupation offers personal satisfaction, supports a passion that they want to retain even if profits are low, provides an occupation that gives enjoyment and pride, or preserves a livelihood inherited from parents. Several fishers indicated that fishing gives them autonomy to set their own schedules and be their own boss. A middle-aged fisher noted: "*I love fishing! I am my own boss. I do not have people telling me what to do or not. I do not depend on others*" (P128, SZ). Some farmers reported that as the population grows and tourism demand increases, retail farm sales will improve. For cattle ranchers, regulations restricting meat imports have helped boost profits. Few farmers also noted that being able to produce food for home consumption helps offset the costs of imported food from the mainland. A farmer commented: "*What I produce, I eat it. All the vegetables are expensive [in the Galapagos] and producing*

your own is very good" (P134, IS). Additionally, some respondents indicated they persist with their resource-based practices in order to protect their invested capital and the assets that have accrued over time.

5.5 Discussion

5.5.1 Drivers, inhibitors and selective responses

Resource-based livelihoods in the Galapagos are decreasing as diversification into the growing tourism sector advances. This has important implications for the protection of biodiversity resources that are the foundation of tourism activities, but also for the islands' food system, for social and economic aspects of island communities, and for individuals' well-being. The study showed how these factors varied by sector and by island, with results that should help managers in the Galapagos advance sustainable development on the populated islands and could provide guidance for management elsewhere where tourism and conservation interact.

As with other studies that explore livelihood diversification in coastal and island contexts in developing countries (e.g. Allison & Ellis, 2001; Lovelock, Lovelock, Normann, 2010; Fabinyi, 2010), we found that in the Galapagos, people are motivated to diversify livelihoods when facing income instability. Responses arise from the interaction of drivers and inhibitors that are mediated through factors such as, market conditions, management policies, ecological and environmental disturbances, availability of resources, personal or family changes, and individual circumstances. Lifestyle was identified as an important factor, but significantly, it had more to do with preserving existing livelihoods than with the 'lifestyle entrepreneurship' that leads to new activities based on lifestyle preferences (Ateljevic & Doorne, 2000).

The factors affecting profitability of resource-based activities that were most often cited by farmers was growing competition, and by fishers, increasing regulations and limitations of the market. In 2017, about 75% of agricultural produce was imported (Sampedro et al., 2018); while increased regulations implemented for the GMR restricted access to important fishing areas, causing concerns about the viability of livelihoods (Burbano & Meredith, 2020). Concerns about access to markets, precarious market conditions, opportunistic traders, and price variability and stagnation, have compounded problems for the fishing sector. The decline of profitability of fisheries has been a permanent concern for the fishing sector. According to Schiller et al., (2014) between 2000 and 2007 many fishers left the fishing sector due to diminishing profitability of

fisheries, representing a decrease of 65% in the total number of active fishers for this period. This trend has continued based on more recent data: studies from Palacios and Schuhbauer (2013) and Llerena et al., (2015) suggest that there may be no more than 400 commercially active fishers out of the 1,300 fishers that are registered in the fishing registry of the GNPS. This is a problem in San Cristobal and Isabela particularly, but less so in Santa Cruz where there are better market conditions linked to the strong tourism sector. Also, the fishing cooperative (COPROPAG) on this island is the only one with the infrastructure to process fish and the administrative capacity to commercialize fish products for sale nationally and abroad.

Many farmers and fishers believe tourism growth will improve their livelihoods. Farmers and fishers who inhabit islands with greater levels of tourism development, have positive expectations that tourism growth will generate better market opportunities for food sales to hotels and restaurants, and will stimulate marine and farm-based tourism. But that optimism is not universal: some respondents believe that tourism growth will neither provide benefits for their livelihoods nor for the communities at large, for example, it was often mentioned that cruise-ship operations bring most of their food supply from the mainland. Regarding farm sales, Granda-León (2016) found that between 2013 and 2014 only 17% of local production was sold to tour operators and restaurants. We found a common perception to be that tourism will be beneficial only if land-based tourism is supported. Since 2007, this sector has grown, such that by 2015, 68% of tourists visiting the Galapagos were land-based (Izurieta, 2017). The management implications of these findings relate to improving the perception of ways in which tourism can help sustain local resource-based activities. To do so, policies should attempt to strengthen demand for local produce from the tourism sector, but should also ensure that where the demand exists, its benefits are fully evident to local producers. This would help build support for new tourism models.

Our findings revealed that for both famers and fishers, those who have already diversified to some extent are more willing to continue transitioning. This could be a result of them having previously been forced to supplement their resource-based income (a strengthened push factor), and/or of their having had positive experiences with tourism-based alternatives (a strengthened pull factor). That fishers are more open than farmers to transitioning into tourism likely arises for two reasons: they have institutional support to do so, and they have skills and equipment that can be readily adapted to marine tourism. Nonetheless, Erazo, Casafont, Farías (2017) found that

several fishers who had transitioned into tourism were struggling, primarily due to a lack of knowledge and skills required to market and manage a competitive tourism business. In fact, similar measures to engineer livelihood transitions have had mixed results, not only in the Galapagos (cf. Engie & Quiroga, 2014) but elsewhere (cf. Ashley, 2000; Carter & Garaway, 2014; Sene-Harper et al., 2019).

Our results showed human, social, financial, and institutional barriers that can constrain successful transitions. For example, for fishers, a lack of capital or requisite skills are persistent barriers for accessing benefits from engagement in tourism. To address these barriers, fishers are aware of the option to partner with national or international investors, but they are also aware that while some individuals have succeeded with this, many have become mere figureheads (owners only on paper) or employees, rather than the direct beneficiaries.

The perceived barriers to transition are matched by positive attachment to existing resource-based activities. While some respondents noted that farming and fishing are more profitable than available alternatives, many referred to *lifestyle* considerations that support family cohesion and traditions, engender autonomy, pride and personal satisfaction, and reward acquired skills and inherited practices. These findings are consistent with research on livelihood transitions elsewhere that have found that resource-based activities are perceived as being very desirable for a broad range of reasons (Pollnac, Pomeroy, Harkes, 2001; Barrett, Reardon, Webb, 2001; Carter & Garaway, 2014; Santos, 2015; Sene-Harper et al., 2019).

5.5.2 Sustainable tourism, livelihoods and conservation

The paradox arising the success of tourism growth in the Galapagos is not unique: conservation areas in World Heritage Sites are attractive to tourists and vulnerable to degradation if not carefully managed (Wolf et al., 2019). As ecotourism has become increasingly dominant, concerns have been raised that it may transform to mass tourism (Goodwin 2015; Theng, Qiong, Tatar, 2015; Wardle et al., 2018). Promoting increased tourism, even through nature-based forms, should therefore be carefully evaluated (Hall, 2019). To optimise the conservation-tourism alliance in PAs, it will be necessary to ensure that principles of sustainability are at the core of tourism development, and to understand the articulation of the tourism industry with local livelihood dynamics.

The importance of respecting compatible resource-based livelihoods in advancing a conservation-tourism alliance is further illustrated by increasing global interdependencies. The

impact of the COVID-19 on the tourism industry exposes vulnerabilities that are compounded by linked challenges, for example in the heightened vulnerability of small-scale fishing communities (Bennett et al., 2020). Retaining a diversity of livelihood options within a vulnerable community will support adaptive selectivity, as outlined in our livelihood framework. This diversity should be protected to support long-term sustainable development.

In this study we have shown that there are people who want to pursue economic activities within the lucrative tourism sector, but there are also people who want to adhere to their existing livelihood practices. To optimize the capacity for adaptive diversification that contributes to both conservation and development, PAs managers must focus on mechanisms that facilitate livelihood transitions, but also on mechanisms that encourage pre-existing livelihood activities to be economically and environmentally sustainable (Sene-Harper et al., 2019). In the Rio+20 Conference, Member States recognized the need to "… improve the welfare and livelihoods of local communities *by supporting their local economies* and the human and natural environment as a whole. [emphasis added]"(UN, 2012) Sustainable tourism can help reconcile conservation and economic aspirations if livelihood complexities are explored and understood.

5.6 Conclusions

To address the conservation-tourism alliance in the Galapagos and elsewhere, new models for sustainable tourism are needed, where innovative strategies and management guidelines truly seek to reconcile social, economic and environmental considerations. Our analysis focused specifically on *livelihood diversification* as one metric of how social, economic and environmental factors influence, and are influenced by, individual efforts to improve well-being, to reduce vulnerability due to uncertain conditions, and to protect valued aspects of lifestyle.

Findings from this study clearly show that as tourism continues to thrive in the Galapagos (as in other conservation areas), it is important that managers design policies that incorporate at least three considerations related to livelihoods. The first is the centrality of livelihoods as mediating factors in the sustainable development of PAs. The second is the social and cultural importance of resource-based livelihoods in communities historically associated with PAs. The third is the interplay of the array of factors that shape adaptive livelihood responses—that is, the factors that drive or inhibit livelihood diversification and shape individual selective responses.

The conceptual framework developed through this study makes the interplay of drivers and inhibitors of livelihood dynamics explicit. This conceptualization should assist in strategic management in promoting sustainable tourism. For example, it would help in the formulation of compensation mechanisms, incentives, capacity building programs and institutional supports that better fit local realities and local management targets, be they for community development, environmental protection, or for both. By incorporating the concept of *selective diversification*, this study goes beyond "dualistic classifications of livelihood diversification" (Turner, 2007, 399) and incorporates the notion of selectivity as an important determinant of livelihood strategies. This conceptual framework can be applied in different contexts where researchers seek to untangle the complexity of factors influencing the decisions and choices that people make regarding their living, particularly when emergent occupational opportunities are driving change.

A limitation of this study is that patterns of livelihood diversification were studied only at the level of the individual; future research focussed on household livelihood strategies and the agency of other family members could reveal important synergies. It would also be beneficial to do a time-series analysis of livelihood outcomes as tourism grows to determine how perceptions and actions evolve.

The results of this study showed clearly that livelihood decisions and choices are a result of a complex array of perceptions, values, and abilities; of access to various forms of capital, and of institutional and governance factors. In the Galapagos, mutually supportive links between tourism and conservation will continue to be important, but working with tourism to manage PAs for conservation will require understanding the selective, dynamic, and idiosyncratic responses to push and pull factors, to barriers to change, and to factors of attachment to existing livelihood practices. With this understanding, sustainable tourism could build synergies within the conservation-tourism alliance, and thereby help ensure the protection of key biodiversity areas, while helping to fulfill the economic and social aspirations of local communities.

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APPENDIX C.

Table C1. Selected demographic data from surveyed farmers and fishers.

Islands / Variables	Farmers (%)				Fishers (%)			
	San Cristobal (n= 42)	**Santa Cruz** (n= 75)	**Isabela** (n= 26)	*Mean	**San Cristobal** (n= 67)	**Santa Cruz** (n= 63)	**Isabela** (n= 17)	Mean*
Age**								
15 – 35 years old	4.8	25.3	3.8	15.4	17.9	27.0	23.5	22.4
36 – 55 years old	33.3	40.0	46.2	39.2	62.7	52.40	70.6	59.2
≥ 56 years old	61.9	34.7	50.0	45.4	19.4	20.6	5.9	18.4
***Gender* (No. of respondents)**	F=16/ M=26	F=24/ M=51	F=7/ M=21		M=67	M=65	M=17	
Marital status								
Single	2.4	4.0	11.5	6.0	13.4	15.9	17.6	15.6
Married	61.9	80.0	80.8	74.2	52.2	46.0	58.8	52.3
Widowed	4.8	4.0	0.0	3.5	0.0	0.0	0.0	0.0
Separated	4.8	4.0	0.0	2.9	9.0	11.1	5.9	8.7
Divorced	7.1	1.3	0.0	2.8	4.5	6.3	11.8	7.5
Living common law	19.0	9.3	7.7	12.0	20.9	20.6	5.9	15.8
Number of children**								
No children	4.8	6.7	7.7	6.4	14.9	6.3	11.8	11.0
1 to 3 children	40.5	54.7	38.5	44.6	55.2	73.0	64.7	64.3
4 to 6 children	38.1	32.0	42.3	37.5	28.4	19.0	23.5	23.6
7 to 10 children	16.7	6.7	11.5	11.6	1.5	1.6	0.0	1.0
Economic support within the household**								
Respondent only	11.9	6.7	0.0	6.2	16.4	23.8	35.3	25.2
1 to 2 people	71.4	76.0	84.6	77.3	64.18	63.5	58.8	62.2
3 to 5 people	16.7	13.3	15.4	15.1	17.9	11.1	0.0	9.7
More than 6 people	0.0	4.0	0.0	1.3	1.5	1.6	5.9	3.0
Formal Education								
None	7.1	1.3	0.0	2.8	0.0	1.6	0.0	0.5
Primary incomplete	2.4	6.7	3.8	4.3	0.0	3.2	0.0	1.1
Primary complete	38.1	46.7	53.8	46.2	31.3	30.2	29.4	30.3
Secondary incomplete	26.2	18.7	11.5	18.8	23.9	30.2	35.3	29.8
Secondary complete	14.3	10.7	19.2	14.7	35.8	31.7	23.5	30.3
Bachelor/Technician	11.9	16.0	11.5	13.1	9.0	3.2	11.8	8.0
Born in Galapagos								
Yes	64.3	9.3	30.8	34.8	41.8	27.0	64.7	38.1
No	35.7	90.7	69.2	70.6	58.2	73.0	35.3	61.9
If No, Year of arrival**								
Before the 1970s (from the 1950)	2.4	12.0	7.7	8.4	3.0	0.0	0.0	1.4
Between 1970s – 1980s	4.8	16.0	42.3	17.4	16.4	31.7	5.9	21.7
After 1990s	2.4	30.7	11.5	18.9	14.9	15.9	29.4	17.0
Not specified	26.2	32.0	7.7	25.9	23.9	25.4	0.0	21.8
Place of birth								
Guayas	7.1	4.0	7.7	6.3	26.9	14.3	5.9	15.7
Manabí	0.0	4.0	0.0	1.3	7.5	34.9	11.8	18.1
Esmeraldas	0.0	1.3	0.0	0.4	6.0	4.8	0.0	3.6
Loja	7.1	40.0	7.7	18.3	7.5	1.6	5.9	5.0
Tungurahua	14.3	21.3	23.1	19.6	0.0	0.0	0.0	0.0
Sto. Domingo Colorados	0.0	9.3	19.2	9.5	1.5	1.6	5.9	3.0
Pichincha	4.8	2.7	0.0	2.8	1.5	4.8	5.9	3.4
Cotopaxi	0.0	4.0	0.0	2.1	1.5	1.6	0.0	1.4

Bolívar	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.7
Los Ríos	0.0	0.0	7.7	1.4	3.0	1.6	0.0	2.0
Santa Elena	2.4	0.0	0.0	0.7	0.0	0.0	0.0	0.0
El Oro	0.0	4.0	3.8	2.8	1.5	6.3	0.0	3.4
Zamora Chinchipe	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.7

*****The average percentage across Islands.

******A mean value was also calculated for the numerical variables of each group: **Farmers:** *Age* = 52.34; *Number of children* = 3.45; *Number supported within the household* = 3.37; *Year of arrival* = 1983. **Fishers:** *Age* = 45.59; *Number of children* = 2.57; *Number supported within the household* = 3.35; *Year of arrival* = 1986.

Table C2. Farm practices and ownership.

Islands / **Variables**	**San Cristobal (%)** (n= 42)	**Santa Cruz (%)** (n= 75)	**Isabela (%)** (n= 26)	Mean **(%)**
Practice				
Cultivation	64	57	54	58.7
Animal Husbandry	19	13	12	14.7
Both	17	29	35	26.6
Year of ownership farm/land**				
Before the 1970s (from the 1950s)	11	9	12	9.8
Between 1970s – 1980s	37	23	31	26.6
After the 1990s	9	12	11	10.5
After the 2000s	43	56	46	48.3
Not recalling	17	0	0	4.8
Farm size (hectares)**				
< 1 ha.	10	17	4	12.8
≥ 1 and 10 ha.	35	36	42	36.9
> 10 and 50 ha.	45	28	35	34.0
> 50 ha.	10	19	19	16.3
Number of plots**				
One	69	79	81	76.3
Two	29	19	15	21.5
Three	2	0	4	1.5
Four	0	2	0	0.7
Land tenure				
Inherit	33	13	27	23.1
Buy	62	67	73	66.4
Rent	5	20	0	10.5
Labor for farming activities				
By oneself	29	40	35	35.7
Family members	40	8	8	15.4
Locals	19	17	11	16.8
People from the mainland	12	35	46	32.2

******A mean value was also calculated for the numerical variables of the group: *Year of ownership farm/land* = 1984; *Farm size* = 25.08; *Number of plots* = 1.20.

Table C3. Fishing practices and ownership.

Islands / Variables	San Cristobal (%)	Santa Cruz (%)	Isabela (%)	Mean (%)
Starting year in fisheries*				
Before the 1970s (from the 1950s)	8	3	0	4.8
Between 1970s – 1980s	43	46	35	43.6
After the 1990s	30	27	47	30.6
After 2000s	19	24	18	21.1
Number of years in fisheries*				
<10 years	12	16	23	15.0
≥10 and <20 years	25	21	29	23.8
≥20 year and <30 years	27	27	24	26.5
≥30 years	36	36	24	34.7
Fishing boat ownership*				
Yes	21	38	44	34.3
No	79	62	56	65.7
Type of boat used*				
Small boats (5 to 9.6 meters with outboard engines of 15 - 200 HP)	60	96	89	81.7
Large boats (8 to 18 meters with engines of 30 - 210 HP)	40	4	11	18.3
Type of fishery**	**(No.)**	**(No.)**	**(No.)**	
Sea cucumber	33	32	5	
Spiny lobster	40	45	7	
Slipper lobster	8	10	2	
White finfish/High seas	31	65	9	
Dried and salted white finfish	50	14	2	

*****A mean value was also calculated for the numerical variables of the group: *Starting year in fisheries* = 1989 and *Number of years in fisheries* = 24.27.

******The year of reference for the information provided for variables *Fishing boat ownership*, *Type of boat*, and *Type of fishery where fishers participate* was 2015.

For the variable ***Type of fishery, values represent the frequency of mention as people were able to select all the fisheries where they participate.

APPENDIX D.

Note: This series of photographs show agricultural activities in San Cristobal Island. The first photo shows how members of the Ministry of Agriculture and Cattle Ranching (MAG) are helping a farmer to prepare the land for a new crop. The technicians provide support for the installation of a new irrigation system that will help to maintain the crop during the drought season. The following image shows the preparation of the plants (second on the left) and one on the right shows the effects of the eight months drought that affected pastures. The last photo shows a local market where local products are commercialized every Saturday in Puerto Baquerizo Moreno.

Note: These photos show agricultural activities in Santa Cruz Island. The first two photos show the process of cultivating tomato; two members of the technical team from MAG assess the quality of the product. The third photo (left) shows the plants in a greenhouse whereas the photo on the right shows a water reservoir built with the assistance of MAG for the provision of water during the drought season. The following two photos show the landscape of a farm located in the highland of the island, and a crop of pineapple (on the right). The last two photos show cattle ranching activities (left) and animal husbandry (right). Raising pigs is considered a lucrative activity as there is less competition and meat is not allowed to be imported to the islands.

Note: Local market in Puerto Ayora – Santa Cruz Island. This basketball field is transformed every Saturday for the sell of local agricultural products and the ones imported from the mainland. Local farmers bring their products from the highlands where most of the farms are located.

Note: The first picture shows a family of local farmers planting a new crop in the humid highlands of Isabela Island. The second photo shows a crop of corn. The third photo shows the cultivation of tomato (left), and the next one how farmers protect their crops from local birds (right). The last photo shows how local products are commercialized to the community and tourism in Puerto Villamil. Farmers come to towns every Saturday morning, but some have a spot in the local market and sell their products in a regular basis.

PREFACE TO CHAPTER 6

One finding from Chapter 5 revealed that the majority of surveyed fishers consider increasing regulations as the main factor affecting the viability of their fishing livelihood. They noted the closure of their most productive fishing areas and restricted access to important coastal zones. They believe that these obstacles have pushed people out of the fishing sector. Within this context, Chapter 6 seeks to examine the processes used in developing the new regulations for the fishing sector by assessing, specifically, the 2016 rezoning plan for the Galapagos Marine Reserve. As public participation is a mechanism for people to voice their ideas and concerns in decision-making for protected areas management, this chapter explores the record of stakeholder engagement in the planning process of the new zoning. In particular, the chapter aims to: (1) identify the level of participation in environmental decision-making processes by those still active in the small-scale fisheries sector, (2) identify critical events and challenges associated with the formulation of the new zoning plan, and (3) assess the role that external agents played in shaping the marine policy and protected areas management plans.

Through a mixed-methods approach this chapter contrasts the experiences and assessments of key actors in three stakeholder groups: the small-scale fisheries sector, the scientific research community, and the conservation management sector. This study illustrates challenges associated with rushed conservation initiatives that are promoted and supported by large external conservation NGOs, and it demonstrates how a return to exclusionary conservation can undermine acceptance of conservation practices and jeopardize the success of marine protected areas as conservation tools.

This paper is published in the Journal of Ocean and Coastal Management (https://doi.org/10.1016/j.ocecoaman.2019.105066).

Appendix E. located at the end of this chapter includes a series of photographs taken during fieldwork that show fishing activities in the three most populated islands in the Galapagos.

CHAPTER VI: Manuscript 2

Exclusionary Decision-Making Processes in Marine Governance: The Rezoning Plan for the Protected Areas of the 'Iconic' Galapagos Islands, Ecuador

Citation: Burbano, D.V., Meredith, T.C., and Mulrennan, M. E. (2020). Exclusionary decision-making processes in marine governance: The rezoning plan for the protected areas of the 'iconic' Galapagos Islands, Ecuador. *Ocean and Coastal Management,* 185, 1-15.

Abstract

The number of Marine protected areas (MPAs) has increased twenty-fold since 1993, and there are ambitious targets for further expansion set by international conservation agencies. This expansion has been accompanied by claims that only No-take MPAs can effectively ensure biodiversity conservation, and the international marine conservation community has become increasingly active and influential in promoting them. But No-take MPAs clearly have consequences for resource users whose livelihoods are impacted by restricted access to natural resources. Since these consequences can trigger social-environmental conflicts that impeded progress towards conservation goals, there have been concerted efforts to find collaborative and inclusive approaches to MPA planning and management. This paper assesses stakeholder engagement in decision-making processes related to marine conservation planning and management in the Galapagos Marine Reserve, and examines how these have been influenced by shifting narratives of biodiversity conservation in the lead up to, and the execution of, the 2016 rezoning process. A dramatic shift in 2016 to a "back to the barriers," top-down, declaration of a no-take MPA fostered conflicts that have delayed the full-implementation of the new zoning plan even three years after its official declaration. Through a mixed-methods approach we contrast perceptions, expectations and experiences of key actors in three stakeholder groups: the small-scale fisheries sector, the scientific research community, and the conservation management sector. This study illustrates challenges associated with rushed conservation initiatives, promoted, and supported by large external conservation NGOs, and it demonstrates how a "back to the barriers" approach to conservation can undermine acceptance of conservation practices and jeopardize the success of MPAs.

Keywords: *The Galapagos Islands; Marine Protected Areas; Stakeholder Engagement; No-Take Zones; Exclusionary Decision-Making; Governance.*

6.1 Introduction

Marine protected areas (MPAs) are an extensively used tool for marine conservation and fisheries management (Charles et al. 2016). As a result of their rapid proliferation in recent years (Gray, 2010; De Santo, 2013) it is expected that by 2020, a target of 10% of global marine areas under protection will be met, representing a twenty-fold increase since 1993 (CBD, 2017). Some scholars contend that only fully protected areas are effective to restore and preserve biodiversity (Sala et al. 2018, see also Costello and Ballantine, 2015 and Sala and Giakoumi, 2017), and government agencies, conservation organizations and private sector partners have become increasingly active and influential in promoting these areas (Gray, 2010; De Santo, 2012). In 2016, the IUCN World Conservation Congress recommended the goal of establishing 30% of the ocean as 'highly protected' areas by 2030 (Sala et al. 2018).

These recent and proposed increases in the number and spatial extent of MPAs clearly have implications for marine resource users, and concerns have been raised about setting fixed 'conservation targets' that might not be suitable for all ecological and socio-economic contexts (Agardy et al. 2003; Agardy et al. 2016). Rushing to meet MPA targets under pressure from the international marine conservation community can undermine long-term effectiveness of conservation goals (Agardy et al. 2016), may require top-down approaches that neglect resource users' rights (Gruby et al. 2016), and may create conflicts with local communities who rely directly on marine resources for their livelihoods (Mascia et al. 2010; Cinner et al. 2014).

These concerns mirror the evolution of practice in terrestrial conservation, where 20th century narratives of 'fortress conservation' based on 'fences and fines' (Brockington, 2002) aimed to separate humans and nature, and viewed national parks as 'pristine or wilderness areas' (Hutton et al. 2005). However, because this approach generated conflict by reallocating communities and denying access to natural resources, by the 1990s there was a shift towards integrated conservation and development projects (ICDPs) (Hughes and Flintan, 2001) and community based natural resource management (CBNRM) (Dressler et al. 2010) where local communities were not excluded "either physically from the protected area or politically from the conservation policy process" but were assured active participation (Hutton et al. 2005:342). The collaborative or co-management approach aimed to reconcile biodiversity conservation goals with socio-economic concerns by bringing "multiple stakeholders together in collaborative

forums with public agencies to engage in consensus-oriented decision-making" (Ansell and Gash, 2007:1).

Positive assessments of the evolution of ideas on inclusive management note that it helped to reduce disputes over resource use, to generate equitable decisions and power sharing, to increase legitimacy of regulations in the eyes of resource users, and to improve the overall efficacy of protected areas (PAs) management (Redpath et al. 2013; Weigel et al. 2014). Local communities or resource users are more willing to participate and commit themselves to long-term conservation strategies when their knowledge and opinions are included in decision-making, and when stakeholders are engaged directly—not merely consulted—by public agencies (Andrade and Rhodes, 2012; Day, 2017; Bennett, 2018). The approach also helps foster greater transparency and accountability in MPA governance by encouraging trust, mutual understanding, and shared commitment (Ayers et al. 2017).

However, despite obvious merits, the progress of collaborative approaches has not been unequivocal (Dressler et al. 2010). Hutton et al. (2005:346) described a 'back to the barriers movement', a return to exclusionary conservation which, in reaction to perceived shortcomings faced by collaborative conservation initiatives, seeks to go back to the "top-down, technocratic models of the 1970s" based on exclusionary and protectionist[69] aims. These ideas created a strong global narrative advocating that biodiversity conservation can only be achieved in areas with limited human impacts, such as from science and restricted ecotourism (Hutton et al. 2005). The idea of 'trade-offs' aims to functionally reconcile incompatibilities between ecological and social goals in conservation projects (Hirsch et al, 2011), but, in practice, the quest to identify win-win outcomes often leads to options that are at best 'win-settle' (Barrett et al. 2011). Christie et al. (2017) point out that there remains an 'astonishing insufficiency' of full engagement with human dimensions recommendations in conservation practice in general, and in MPA management in particular.

With respect to marine conservation, the return to exclusionary conservation emerges from a perceived need to reverse anthropogenic threats such as overfishing, pollution, biodiversity loss, and climate change (De Santo, 2012). This position is advanced by bilateral and multilateral

[69] Core elements of the "protectionist paradigm" elaborated by Wilshusen et al. (2002) are summarized and expanded by Hutton et al. (2005:347). Some core elements are: protected areas require strict protection; biodiversity conservation is a moral imperative; conservation linked to development does not protect biodiversity; harmonious, ecologically friendly local communities are myths; and emergency situations require extreme measures.

donor organizations and large international environmental NGOs which, according to De Santo, "are driving the political agenda of conservation and protected areas, and particularly marine protected areas, as 'diplomats' for an international conservation agenda that has broad global support" (De Santo, 2012:37).

As a UNESCO Natural Heritage Site, the Galapagos Islands have long been a priority for national and international conservation collaborations and interventions. Until late 1990s, exclusionary top-down conservation management created resentment and resistance among local people whose livelihoods depend on access to natural resources (Heylings and Cruz, 1998). Acknowledgement of the benefits of participatory governance supported innovation and cooperation, leading in 1998 to a commitment to new mechanisms of consultation (Zapata, 2005). However, in 2014, revisions to Ecuador's national policies regarding territorial organization and management (Llerena et al. 2015) allowed dramatic changes to the approach used to develop new zoning for the Galapagos protected areas in 2016.

The evolving marine conservation strategies in this iconic protected area represent a valuable opportunity for studying conservation through MPAs. This paper assesses stakeholder engagement in decision-making processes related to marine conservation planning and management in the Galapagos Marine Reserve (GMR) and examines how these have been influenced by shifting narratives of biodiversity conservation in the lead up to, and the execution of, the 2016 rezoning process. Our case study contributes to on-going discussions about the significance of stakeholder engagement within MPA creation and management by examining the mechanisms for stakeholder engagement in this re-zoning process, the role played in the process by international conservation actors, and the overall perception of the process by three key local stakeholder groups—the small-scale fisheries sector, the scientific research community, and conservation advocates and managers.

We begin with a description of the Galapagos, including an account of the history of its co-management regime and more recent changes in its governance. Following a description of our methods, we present detailed information about the participatory process adopted for determining the new zoning system, and about the events that followed. The final sections assess the commitment to, and the effectiveness of, stakeholder engagement in conservation planning and management; the apparent causes and consequences of emergent conflicts in the GMR; and opportunities for moving forward with inclusive marine governance.

6.2 Case Study Context

The Galapagos Islands are located some 1,000 km off the coast of mainland Ecuador (Fig. 6.1). About 97% (7,731 km^2) of the islands' land territory is designated as protected area, while the remaining 3% (264 km^2) is zoned as rural or urban, for the islands' 25,244 inhabitants (CGREG, 2015a). The archipelago was declared a protected area in 1959 with the creation of the Galapagos Nacional Park (GNP). Following the establishment of the Charles Darwin Research Station (CDRS) in 1960, the islands became the focus of national and international conservation strategies to protect the array of ecological attributes which had helped inspire Darwin's Theory of Evolution.

The Galapagos Marine Reserve (GMR), which was established in 1998, is one of the largest MPAs in the world, encompassing 137,975 km^2 of coastal and marine areas. Industrial fishing activities are prohibited inside the reserve, and the rights of local small-scale fishers are strictly regulated through fishing permits and licenses approved and managed by the Galapagos National Park Service (GNPS), the institution responsible for the archipelago's conservation management. In 1978 the Galapagos Islands were declared a World Heritage Site by UNESCO, and in 2001 the designation was extended to encompass the GMR.

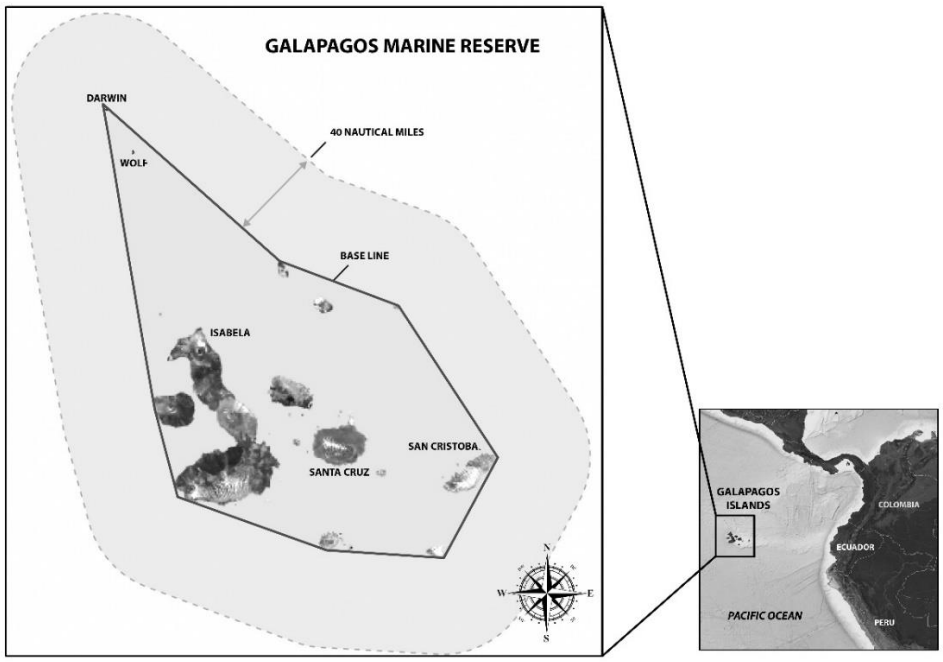
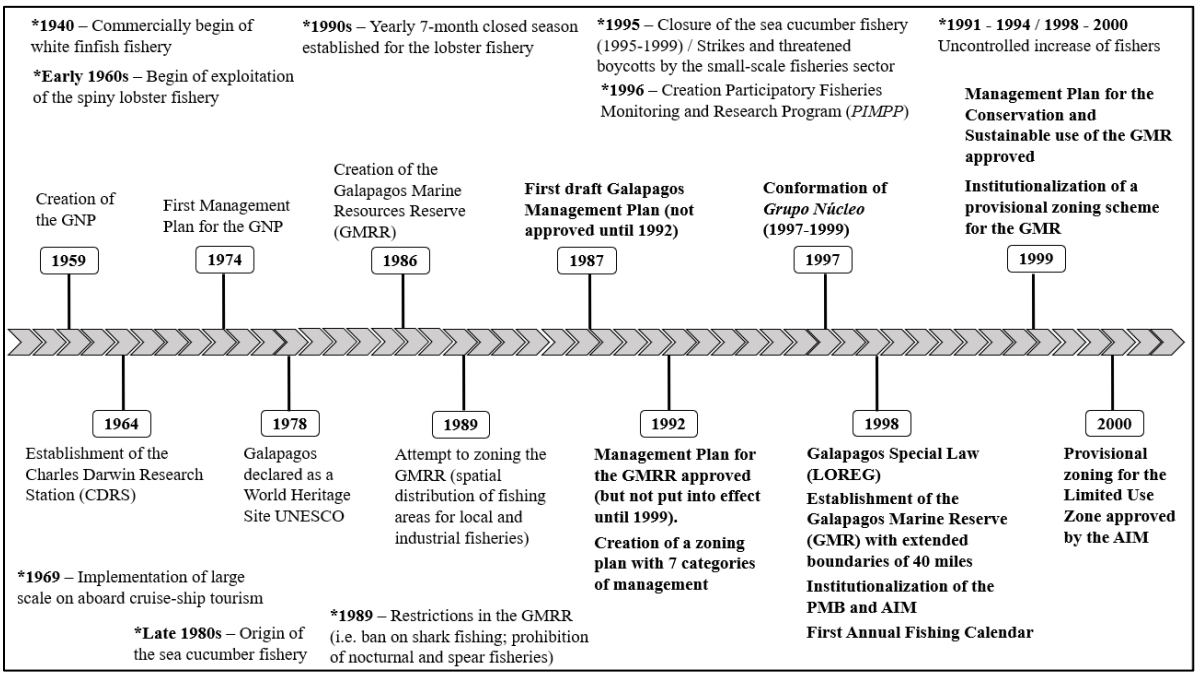


Fig. 6.1. Map of the Galapagos Islands and the marine reserve boundaries (Source: Google Earth and Heylings et al. 2002:22).

6.2.1 Evolving Conservation Management in the Galapagos

The history of conservation management in the Galapagos is complex, having been shaped by the interaction of actors with different objectives, interests, and levels of power. This section provides a summary of key regulatory interventions that are important to understanding the context of this study (Fig. 6.2).

Early conservation efforts (between 1930 and 1959) included the establishment and delimitation of the national park and later, in 1986, the first declaration regarding marine protection. These were implemented with little or no engagement of the local population and produced divisions between local users and the GNPS (Oviedo, 1999). The legacy of this exclusion triggered a host of social conflicts between advocates of conservation and those interested in resource use and economic development that were difficult to overcome, and which hindered management efforts (González et al. 2008). In the 1990s, issues related to the growth of the local fishing sector, decreasing catch per unit effort (CPUE), and overexploitation of important commercial species (e.g., sea cucumber and spiny lobster) intensified conflicts between the GMR managers and small-scale fishers (Oviedo, 1999). Additionally, restricted engagement of stakeholder groups in decision-making processes, and the limited attention payed by the GNPS to resource users' needs, interests, views and livelihoods, generated sentiments of exclusion and distrust, and an anti-conservation stand amongst fishers (Quiroga, 2009).



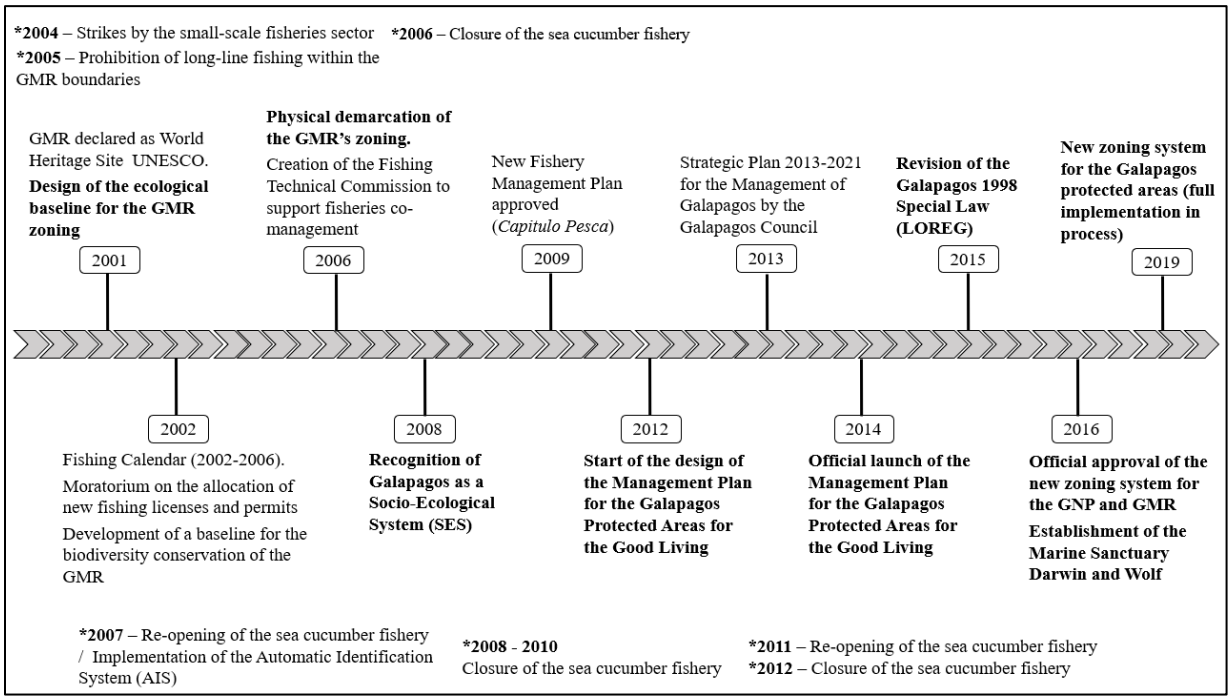


Fig. 6.2. Timeline of key regulatory processes that have determined the management of the GMR. Events that are discussed below are indicated in bold. Other important events within fisheries management are presented above and below the timeline in order to provide a more complete overview of management events.

This legacy informed recognition of a need for a change from top-down management, and in the 1990s, local authorities and conservation actors—in particular the GNPS and the CDRS—began to encourage a participatory management scheme (Zapata, 2005). This led to the adoption of a co-management regime, which has been widely studied (e.g., Macdonald, 1997; Heylings and Cruz, 1998; Oviedo, 1999; Heylings and Bravo, 2001; Altamirano and Cruz, 2006; Bravo, 2006; Baine et al. 2007; Heylings and Bravo, 2007; Castrejón, 2011; Llerena et la. 2015; Castrejón, 2018). This innovative approach has been lauded internationally for the positive contributions it has made to reducing conflicts and advancing conservation within the GMR (Baine et al. 2007; González et al. 2008). A brief account of the co-management regime is relevant context for assessing the 2016 rezoning.

In 1997, a core group called "*Grupo Núcleo*" was formed by the GNPS to promote local engagement and support for the management framework and regulations of the GMR (Reck, 2014). This group included key stakeholders, including the GNPS, fishers, scientists, and tour operators. Within this participatory forum, based on principles of collaboration and consensus, resource users and the environmental authority reviewed and revised the GMR Management Plan

of 1992—officially approved in 1999 (Zapata, 2005). The core group also contributed significantly to the text of the 1998 Galapagos Special Law (GSL): "*Law of the Special Regime for the Conservation and Sustainable Development of the Province of Galapagos"* and supported its approval by the National Assembly (Zapata, 2005). This innovative legislation extended the boundaries of the reserve from 15 to 40 miles (Fig.1), banned industrial fishing activities within the reserve, and established participatory mechanisms for managing the MPA (Heylings et al. 2002).

The GSL institutionalized the co-management regime by creating two linked governance bodies: the Participatory Management Board (PMB)—formerly *Grupo Núcleo*—where decision-making forums were local and consensus-based; and the Inter-institutional Management Authority (IMA), which ratified decisions made by the PMB by majority vote (Zapata, 2005). In 2000, the Management Plan was amended consensually to include a 'provisional zoning scheme' for the GMR, which included three classifications: multiple use zone, limited use zone, and the port zone (Castrejón and Charles, 2013). Under the participatory approach, a series of management tools (e.g., the Fishery Calendar [*Calendario Pesquero*] described agreements on permissible fishing species and gears, quotas, and fishing seasons) were also created for managing fisheries in a way that was thought to be socially, economically, and ecologically sustainable (Castrejón and Charles, 2013).

Despite its potential, the co-management regime has faced several obstacles that have hindered its effectiveness (see Table 6.1). As a result of these, and despite collaborative efforts, social conflicts related to resource use and management decisions persisted, and in June 2007, the UNESCO placed the archipelago on the List of World Heritage Sites in Danger (González et al. 2008). Improving management structures therefore became a priority for the Ecuadorian government and a new approach was adopted to the application of the 1998 GSL. This approach encouraged consideration of the archipelago as a 'social-ecological system' (SES), highlighting the complexity of linkages among different social and ecological components of the islands (see González et al. 2008; Tapia et al. 2008; Walsh and Mena, 2013). The SES approach shaped initiatives undertaken by alliances between public and private institutions and organizations to manage socio-political and environmental struggles. In July 2010, the Galapagos was removed from the UNESCO list, despite protests from the IUCN, which argued that the decision was premature and based largely on political pressure from the national government (IUCN, 2010).

Table 6.1. Attributes that favored and hindered the establishment of the co-management regime of the GMR.

Events that favored the GMR's co-management process	Factors that contributed to hindering the GMR's co-management process
1) International calls to implement co-management approaches in MPAs governance. 2) Recognition by the Galapagos authorities of the increasing agency of those in the fishing sector. 3) Decision by Ecuador's National Assembly to include the fishing sector amongst the groups designated to develop the Galapagos governance structure. 4) Recommendations to promote local participation as a mechanism to manage conflicts. 5) The strategic management approach for the Galapagos National Park Service recommended by the Charles Darwin Research Station.	1) Imbalanced power relationships. 2) Lack of trust between stakeholder groups and restricted information sharing that interfered with the legitimacy of participatory processes. 3) Heterogeneity of actors and the different interests they represent increased the complexity of decision-making processes. 4) Direct action applied by the fisheries sector as a recurrent strategy to deal with disagreements with the environmental authority and conservation actors. 5) Poor representation and organization within the fishing co-ops, and lack of social cohesion. 6) Alliances between tourism-management-conservation that resulted in compromised decisions that reduced the transparency of the participatory fora. 7) Lobbying efforts at high levels of authority that undermined principles of transparency and consensus in decision-making. 8) Recurrent political intrusion into technical decisions. 9) Instability in the leadership of major public institutions and lack of consistency in the application of norms and regulations. 10) Ineffective implementation and enforcement of management practices as a result of issues of control and surveillance. 11) Short-term vision within the leadership of local institutions that hinder adaptive management.

Source: Summarized from Zapata 2005; Heylings and Bravo, 2001, 2007; Watkins and Cruz, 2007; Watkins and Martínez, 2008; González et al. 2008; Castrejón, 2011, 2018; Jones, 2013.

In 2015, following major revisions by Ecuador's National Assembly to the 1998 GSL—as a result of a new Constitution adopted by the Ecuadorian government in 2008, and new policies regarding territorial organization and management (COOTAD[70] – Spanish Acronym) (Llerena et al. 2015)—changes were implemented to the co-management regime. The co-management body was reduced to consultative status, and final decisions were made exclusively by the Ministry of the Environment and related public institutions, such as the GNPS and the Governing Council of the Galapagos (CGREG, 2015b). The PMB was transformed into a Participatory Management

[70] Organic Code of Territorial Organization, Autonomy and Decentralization (COOTAD, 2010).

Advisory Council (PMAC), with a non-binding advisory role[71] (Llerena et al. 2015). In 2014, the GNPS released *The Management Plan for the Protected Areas of Galapagos for Good Living* (GNPS, 2014). Following the objectives and principles determined in this plan, GMR managers initiated a rezoning process aimed at managing and protecting the connectivity between land and sea territories, preserving key biodiversity sites, and ensuring the provision of ecosystem services.

6.3 Methods

6.3.1 Data Collection

The study used a mix-method approach that relied on review of secondary data (e.g., published, and unpublished governmental and non-governmental reports, academic publications, and online sources), participant observations, questionnaire surveys, and key-informant interviews. Field research was carried out over nine and a half months between January and October 2016. Four months were spent in San Cristobal (January to April), three in Santa Cruz (May to July), and one month in Isabela (August). Participant observations included: attendance at local meetings of the fishing cooperatives, meetings with reserve managers, public demonstrations, and various informal gatherings in the communities.

It is important to note that, for reasons that are discussed below, at the time of the study, there was heightened tension and mistrust between the fishing sector and the GNPS. This increased suspicion and even hostility toward anyone engaged in research of fishing activities, and some in this sector were reluctant to participate or contribute to the research. Data collection began on Puerto Baquerizo Moreno, San Cristobal Island, where the first author (an Ecuadorian with previous research experience in the community) had established contacts within the small-scale fisheries sector. The first two weeks were spent re-connecting and clarifying the purpose of the study. As the research progressed and trust was established with participating fishers, more people became willing to participate.

As a result of the tension, participants for surveys were recruited using two sampling techniques. “Snowball” sampling was used where identified-key informants and previous

[71] The 2015 Galapagos Special Law (LOREG, Spanish acronym) states that “the Advisory Council is an agency of citizen participation and non-binding advice for the administration and management of the marine reserve of the Galapagos province” (Llerena et al. 2015:110).

participants led us to other individuals, and they in turn to others also engaged in the same sector (Bradshaw and Stratford, 2010). To offset possible "gatekeeper bias" (Harrison, 2013), we also used "convenience sampling", which includes selecting participants in terms of access—e.g., time, place, and willingness to participate (Etikan et al. 2016) to engage potential participants at fishing docks, central parks, the fishing cooperatives, and at small shops or recreational sites where fishers gather socially. In total, 149 questionnaire surveys were conducted orally, face-to-face, by the first author: 67 in San Cristobal, 65 in Santa Cruz, and 17 in Isabela. Surveyed fishers have different age ranges, degrees of engagement with fisheries (fishing occasionally, half-time, full-time), type of fishery (spiny lobster, white finfish, or high seas fishery) and activity (as owner of a fishing boat or as a fisher). Although in the Galapagos there are women who hold fishing licences, we did not find women currently fishing. The surveys included questions on participant's demographic circumstances and fishing activities; and open-ended questions to gather people's attitudes, ideas, and interpretations (McLafferty, 2013; McGuirk and O'Neill, 2010) on the following core themes: 1) the level of community engagement within planning, decision-making and regulatory processes; 2) stakeholder access to information during those processes; 3) the extent to which local perspectives were incorporated in decision or planning outcomes; and 4) the perceived benefits and drawbacks of participation in decision-making processes.

Semi-structured key-informant interviews were carried out face-to-face by the first author to gather individuals' meanings and interpretations (Dunn, 2010) of the core themes. In total, 36 key-informants were identified and approached for interview on the islands, and two more interviews were carried out in Quito (October 2016). Participants were selected for being knowledgeable and/or for having a significant stake within the sectors of fishing (16), management and science/conservation (15), and tourism (5). Interviews lasted from 40 minutes to 2 hours and were recorded with the subject's permission. An interview guide was used to address core themes, but each was modified and tailored to the expertise and knowledge of the interviewee (Valentine, 2005). We conducted "participant or respondent validation" (Birt et al. 2016:1802) in Santa Cruz and San Cristobal Islands (September 2016) by asking key participants to confirm and clarify initial findings and check for gaps of knowledge on latest events.

6.3.2 Data Analysis

Quantitative data from the surveys was analyzed using the statistical software IBM SPSS Statistics v23. Information from the open-ended questions was fully-transcribed and later reviewed for key ideas and themes. This information was coded using the qualitative data analysis software, MAXQDA v2018. During the coding analysis, specific themes from the questionnaires and previously identified key ideas were used as *a priori codes*. Recurrent ideas that emerged from the coding process were used as *a posteriori codes* (Cope, 2010a, b; Saldaña, 2013; Miles et al. 2014). Codes and sub-codes grouped in major themes were continuously reviewed and revised for consistency and re-coded when necessary. Quotes are identified in the results' section as arising from a questionnaire respondent (F#, place [island: SC, Sta. C, I], date) or from key-informant (I#, [role/responsibility], date).

6.4 Results

6.4.1 Rezoning Process of the Galapagos Marine Reserve (June 2014 – March 2016)

The provisional zoning scheme of 2000—described in section 2.1 as a consultative and inclusive initiative—was initially implemented for management of the GMR. Following management directions provided in the 2014 Management Plan, the GNPS determined a new spatial zoning scheme intended to integrate management of marine and terrestrial areas in order to harmonize administration and management. Specifically, the objectives were to: 1) preserve the connectivity between land and sea territories; 2) protect key biodiversity sites to ensure the provision of ecosystem services; and 3) increase the percentage of marine conservation areas to 33% (GNPS, 2014).

6.4.1.1 A Four-phased Approach for Determining the New Zoning

The process for determining the new zoning plan was divided in four phases: 1) Stakeholder Involvement; 2) Data Collection; 3) Stakeholder Assessment; and 4) Dissemination of the new zoning (see Fig. 6.3). Overall, the process was intended to integrate the ideas and concerns of different user groups, to empower local people in the consultative process, and to ensure wide acceptance of stakeholders on the new zoning scheme (Table 6.2). It was designed to address "*a long history of local resentment toward the park. The resistance is strong, and it is not easy to break down this barrier, but it is a good way to start*" (I20, member of the zoning team, 14/7/16).

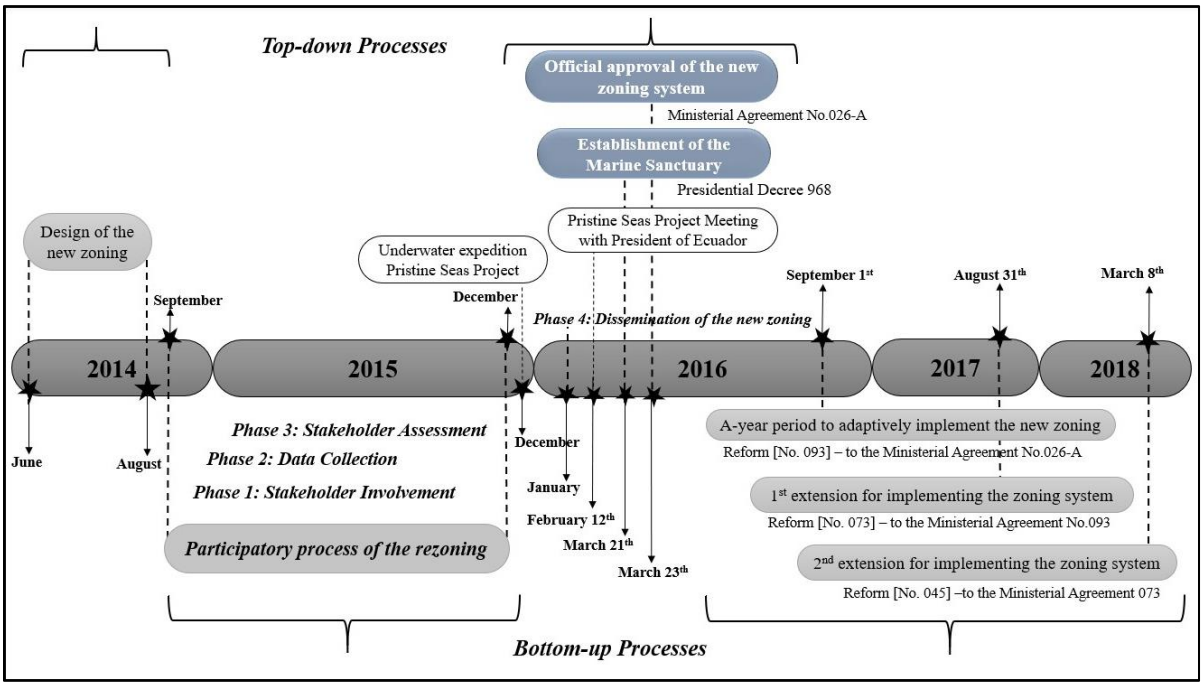


Fig. 6.3. Timeline of the process and events that occurred during the rezoning. These are classified as bottom-up (shown below the timeline) or top-down (shown above the timeline) based on the level of stakeholder engagement. See text for details.

Table 6.2. A four-phased process for determining the new zoning.

Phases	Objectives	Activities	Limitations
Phase 1: Stakeholder Involvement	1) To reduce uncertainty about the rezoning process and build trust in the GNPS. 2) To identify concerns about the rezoning and generate strategies to address doubts about the process and outcome. 3) To identify new opportunities the zoning will create for all user groups and community at large.	- Implementation of several workshops by the technical zoning team with different user groups from the four populated islands (Santa Cruz, San Cristobal, Isabela, and Floreana). - Application of a facilitation mechanism called "Doubts, Barriers and Opportunities (DBO)" during the first encounter with the participants.	- Recurrent changes in the leadership of key institutions: Ministry of Environment and the Galapagos National Park. - The participatory process was carried out with 11 user groups. Disagreement was showed by the small-scale fisheries sector and the group of loggers, but the most restricted group, in terms of access to areas, was the fishing sector.
Phase 2: Data Collection	1) To determine new conservation sites and assure connectivity between land and sea territories. 2) To verify main areas of fishing activities and compare those reported by fishers with the ones registered by the GNPS' monitoring system. 3) To identify the most important areas for fishing activities in order to prioritize them within the rezoning process.	- Use of a web-mapping tool for marine planning called *SeaSketch Platform*, which enables data collection and collaborative design of science-based ocean zones (SeaSketch, 2016). - Compilation of information from the GNPS data base and analyses provided by partners (WWF, CI, CDRS, SFG-Bren School, SeaSketch) to generate spatial analyses that integrate biophysical, economic, and social data. - Implementation of participatory mapping with user groups to corroborate the information generated by the park's monitoring system once possible conservation areas were delineated and requirements for connectivity between land and sea territories were established. - Twelve workshops were run with the fishing sector (three in each island). A total of 140 people was approached, but only 98 formally participated in the interviews to assess fishing areas. Participants were categorized by type of fishery (e.g., coastal or pelagic fishing) and by activity (e.g., boat owner, fisher, or captain). - Each participant drew on maps the areas of important for their fishing activities, and then assigned a relative-importance value to each polygon.	- The political force of the fishing sector influenced other fishers to draw their fishing areas as one (e.g., a marking around the whole marine reserve). - Important fishing areas as Darwin and Wolf were valued by some fishers with lower scores, and less important areas were valued with higher scores. - Fishing leaders deliberately assigned the same value for all their fishing grounds making it difficult to prioritize areas.

Phase 3: Stakeholder Assessment	1) To generate the zoning map. 2) To present a draft of the new zoning scheme to the user groups and assess the levels of agreement/disagreement.	- Assessment of the most 'critical' areas for fishing activities.	- Evidence of power imbalances as conflicts escalated between user groups (i.e. tourism operators were allowed greater access within the marine reserve, whereas fishers were banned from several areas). - Numerous areas for tourism activities were assessed to be closed, but none was later closed. - Competition for areas between active fishers and ex-fishers participating in the 'Experiential Artisanal Fishing' (PAV, by its Spanish acronym)—it is a fishing and tourism activity, in which a local fisher uses his boat and equipment to offer visitors the opportunity to learn about and engage in the fisher's culture and way of life (Palacios and Schuhbauer, 2013:109).
Phase 4: Dissemination of the rezoning scheme to stakeholder	1) To present the final zoning scheme to the GMR user groups	- The new zoning system was presented to the user groups only by members of the GNPS zoning team without the inclusion of supporting organizations (e.g., WWF, CI) involved in the previous three phases.	- Recurrent changes in the leadership of key institutions: Ministry of Environment and the Galapagos National Park led to inconsistency in planning, administration and access to authorities.

Note: Objectives, activities and limitations encountered in each participatory phase were summarized based on information provided during interviews with key actors who were part of the rezoning process. The information provided in here is only related to the process carried out with the fisheries sector.

6.4.1.2 Institutional Instability

Despite intentions to engage resource user groups, Phase 4, dissemination of the rezoning scheme to stakeholders, did not finish as intended. This was partly due to successive changes in leadership at the Ministry of Environment and the GNPS (Fig. 6.4) which caused institutional instability and intensified the complexity of rezoning (I34, ex-member of the PMB, 20/7/16). According to a member of the zoning team, this institutional instability created an opportunity for a "political game" between the fishing sector and park managers due to lack of continuity in their stances on negotiations and zoning adjustments. The process created misunderstanding and uncertainty about whether and which trade-offs between the GNPS and the fisheries sector were possible, and which were not (I20, 14/7/16). Eventually, the GNPS zoning team disseminated details of the new zoning scheme without the involvement of supporting organizations that had collaborated in the first three phases, and without the participatory principles and methodology that had been intended (I20, zoning team member, 14/7/16).

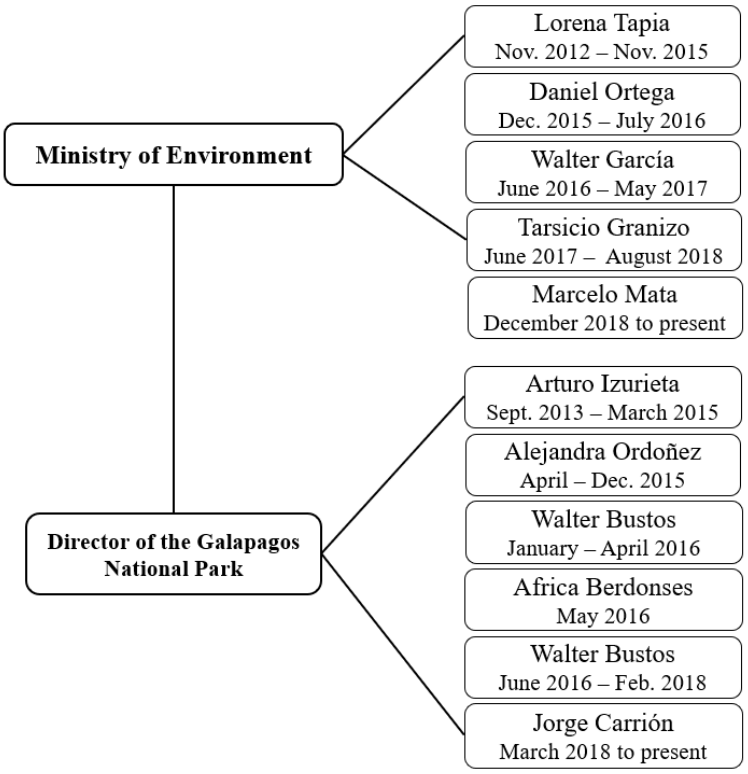


Fig. 6.4. Changes in the leadership of two key institutions responsible for the decision-making of the rezoning process. This turnover led to inconsistencies in the management of programs and policies.

6.4.1.3 Conservation Initiatives for Marine Conservation

The iconic status of the GMR has attracted interventions from many international conservation organizations which aim to advance efforts to protect the reserve from anthropogenic effects (e.g., local authorities and several NGOs have caught, seized and impounded numerous illegal shark catches within the boundaries of the GMR − Carr et al. 2013). The leadership of a local NGO, collaborating with two international conservation organizations (see Table 6.3) initiated a sudden and dramatic change of the rezoning process through two key events. The first event (see Fig 6.3), which began in December 2015, was a 21-day underwater expedition to explore the marine biodiversity of the archipelago. It was led by The National Geographic's Pristine Seas Project, in collaboration with the GNPS and the CDRS. The aim was to create a documentary film that showed the richness of marine wildlife and to raise awareness of the importance of protecting key marine ecosystems and species.

Table 6.3. Summary information of two projects that informed the rezoning of the GMR.

Marine conservation initiatives	Objectives
Organizations: Sustainable Fisheries Group (SFG) and Bren School of Environmental Science and Management, University of California Santa Barbara. **Project:** Marine Conservation in the Galapagos (2013)	To map the value of marine conservation in the Galapagos and assess the extension of no-take zones (NTZs) using a bioeconomic perspective with the goal of informing the new zoning. Specific objectives: 1) to determine the contribution of marine-based tourism to the Galapagos economy; 2) to indicate whether ecological variables influence and are important to the distribution of marine-based tourism in the GMR; 3) to identify areas within the reserve where protection should be prioritized to optimize ecological and economic benefits; 4) to determine the cost to stakeholders of expanded NTZs; and 5) to identify feasible options for offsetting fisheries losses and supporting the future sustainability of Galapagos fisheries." (SFG Sustainable Fisheries Group and Bren School, 2016).
Organization: The National Geographic **Project:** Pristine Seas (2008).	Largest initiative that the organization has for environmental preservation. The overall aim is to explore and ensure the conservation of what might be considered as the 'last wild places in the ocean' by carrying out marine expeditions around the world (The National Geographic, 2015).

The second event (see Fig. 6.3) took place on February 12th, 2016 when a key figure from Pristine Seas, along with a famous Spanish singer and conservationist who had previously supported some major marine conservation initiatives, had a meeting with the then President of Ecuador, to discuss the findings from the December expedition and the need for stronger

conservation measures. On March 21st, only six weeks later, using findings from the Pristine Seas Project and an economic assessment conducted by the SFG-Bren School (Lynham et al. 2015; Goldstein et al. 2016), the President of Ecuador declared the creation of the Darwin and Wolf Marine Sanctuary [Presidential Decree 968]. Two days later, the Minister of the Environment officially approved the new rezoning scheme by Ministerial Agreement 026-A [Official Record 760]. The new sanctuary is a No-Take Zone (NTZ) that encompasses 40,000 km^2 along the northern side of the GMR and includes waters surrounding Darwin and Wolf Islands contested by the fishing sector (MAE, 2016).

6.4.1.4 Dissemination of the New Zoning Scheme to Stakeholder Groups

When the original dissemination phase began in January 2016 (Fig. 6.3), the GNPS presented a zoning scheme to the fishing cooperatives of each island that included various limited used areas and a small NTZ around the islands of Darwin and Wolf (Fig. 6.5a). However, in a subsequent presentation in April of the same year—after the new zoning and the marine sanctuary were officially approved—the new zoning was dramatically altered (Fig. 6.5b). The new scheme aimed to protect 33% of the marine area and 59% of the land territory within the archipelago, encompassing four management zones: Fully protected (No-Use); Conservation (scientific research and some low-impact tourism permitted [for example, in the marine sanctuary where diving tourism is allowed]); Sustainable Use (general tourism and small-scale commercial fishing permitted); and the Zone of Transition (buffer zones near settled areas) World Wildlife Fund (WWF), 2016. The Conservation Zone includes the new marine sanctuary and “21 smaller conservation areas scattered through the volcanic archipelago, protecting over 47,000 km^2, or about one third of the water around the Galapagos Islands” (The National Geographic, 2016).

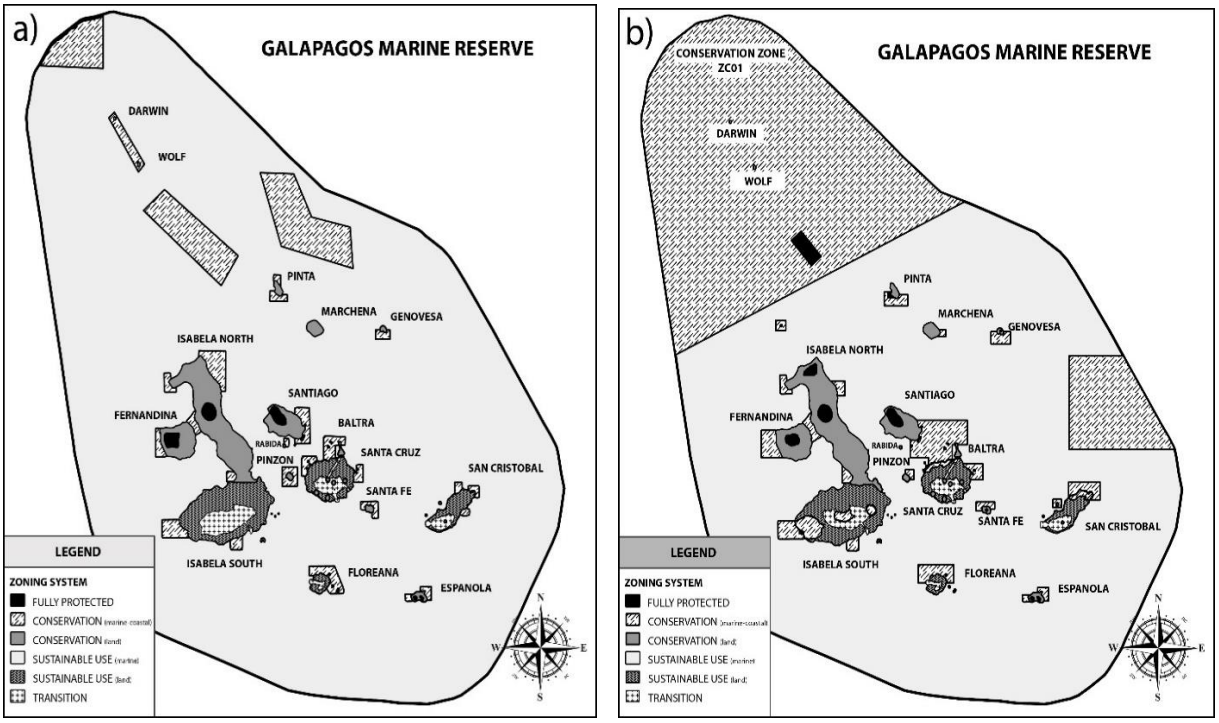


Fig. 6.5. Changes to the Proposed Zoning Scheme for the GMR. **Fig 6.5a.** The proposed zoning plan as presented during the dissemination phase. **Fig 6.5b.** The final official zoning plan, with dramatic increases to conservation areas (*Source:* adapted from the GNPS-MAE, 2016).

6.4.1.5 Challenges to the New Zoning Scheme

The inconsistencies between the two zoning schemes created confusion and uncertainty among fishers, later shared to a lesser degree by stakeholders from the other groups (I20, zoning team member, 14/7/16) and resulting in the total rejection of the zoning plan by the fisheries sector. An active fisher from San Cristobal commented:

> *At the beginning they* [GNPS] *presented a map that had a shape of a rectangle over the islands of Darwin and Wolf. Later they extended the conservation area almost to the Pinta Island. They play with us, and this is not fair. Now, they have almost taken half of the marine reserve and supposedly, it is part of the marine sanctuary, and with that, the fishing sector disagrees* (I36, 2/5/16).

A member of the zoning team recalled:

> *The zoning plan was already presented by the park to all the user groups including the fishing sector, but suddenly this proposal was presented again, this time including the marine sanctuary as a no-take zone. Fishers said, 'What happened here?' 'When was this decided?' 'We did not discuss this'. Well no because it was top-down, and then, the trust was broken. I do believe this prompted the following conflicts. By now we should have had the final zoning system without any problem, but we are still facing problems* (I22, 15/7/16).

In response to the release of the revised zoning scheme, the fishing sector re-organized its leadership, and fishing cooperatives sought more grassroots participation. In early March 2016, the leaders of the cooperatives organized meetings with all their members to gather support against what they called an "*imposed zoning system*". After the official declaration of the marine sanctuary and approval of the zoning system, direct action was taken by the fishing sector. A peaceful protest began on San Cristobal in early April 2016 (Fig. 6.6) with the support of families and the community in general. The protest continued there and spread to Santa Cruz at the beginning of August, when the fishing sector declared an indefinite strike.

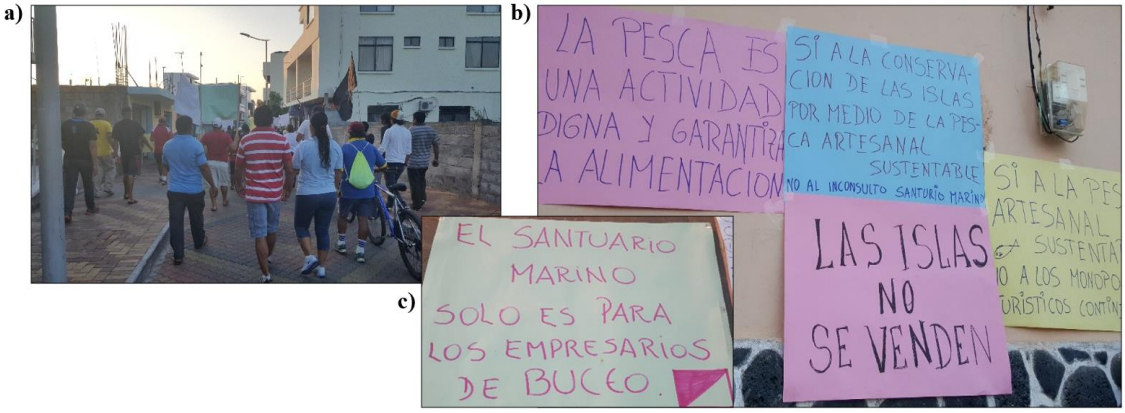
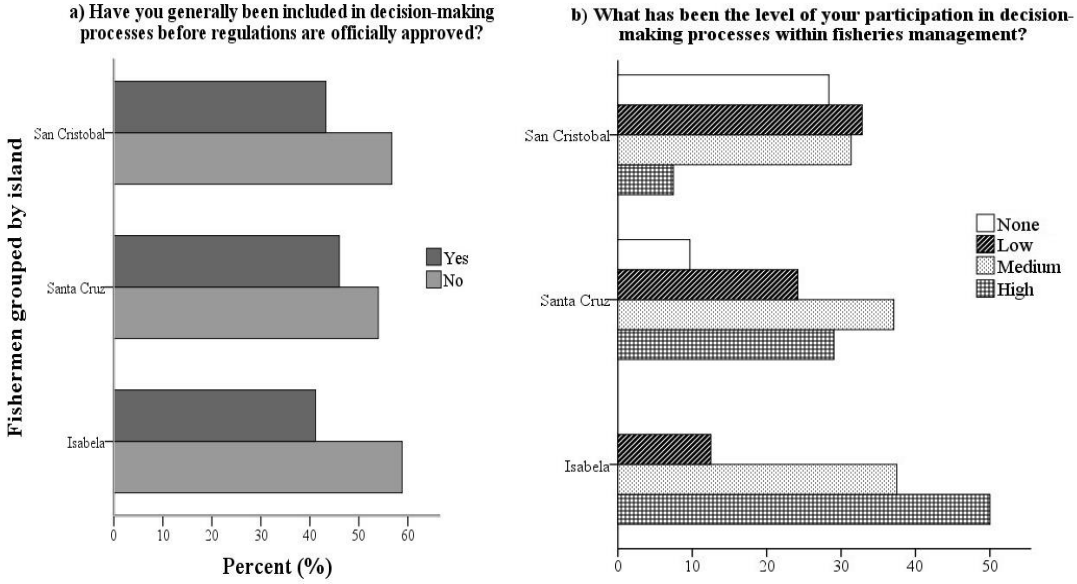


Fig. 6.6. Photographs of protest held by the small-scale fisheries sector in San Cristobal Island, taken by the first author. From left to right: 6**a**. People walking through one of the main avenues of Puerto Baquerizo Moreno town. 6**b**. "Fishing is a respectable activity and guarantees food security"; "We say 'yes' to the conservation of the islands through small-scale fisheries", "No to the imposed marine sanctuary"; The islands are not for sale"; "Yes to sustainable fisheries", "No to the touristic monopolies from the mainland." 6**c**. "The marine sanctuary is only for dive tourism entrepreneurs".

Despite the official agreement between the Minister of Environment, GNPS representatives and fishing leaders, at the grassroots level, fishers felt betrayed. They felt their representation had been inadequate and that their livelihoods would be impacted by the new zoning. Attempts by the government to resolve the conflict led to the establishment of a one-year moratorium—officially announced on September 1st, 2016—to allow further consultations and some adjustments (Fig. 6.3, bottom-up process). However, this process excluded consideration of the marine sanctuary (Conservation Zone ZC01) since it is under a different mandate. Continued political pressure and instability in the leadership of the Ministry of Environment and the GMR managers (Fig. 6.4) led to further delays in adopting the new zoning plan. A new deadline was set for mid-November 2017 (officially announced on August 31st) and then revised (on March 8th) for December 2018 (Fig. 6.3). At the time of writing this dissertation (October 2020), no resolutions have been made public about final decisions of the new zoning scheme.

6.4.2 Responses Within Marine Management Resulting from Exclusionary Decision-Making Processes

When the new zoning system was introduced, more than half of surveyed fishers reported that they had been excluded from decision-making processes (Fig. 6.7a), a sentiment reinforced by a history of antagonism between the environmental authority and the fisheries sector in the Galapagos. Their reported level of participation in fisheries management decision-making ranged from medium to low, although this varied among Islands (Fig. 6.7b): lower levels were reported for San Cristobal but higher levels for Santa Cruz, and highest for Isabela. Responses show that fishers felt that their ideas and concerns had not been incorporated within fishing management decisions, either by their representatives or by the environmental authority (Fig. 6.7c), and this appears consistent, regardless of the degree of participation. There were low levels of satisfaction regarding the effectiveness of decision-making processes (Fig. 6.7d), but, despite a shared sense that fishers' ideas had not been incorporated, it was clear that higher levels of participation correlated with higher levels of satisfaction (e.g., in Isabela Island). In the following sections we probe the responses of fishers from the three islands, and then those of key actors from the tourism, science, and management sectors, for a deeper understanding of the impact of the sudden abandonment of participatory commitments.



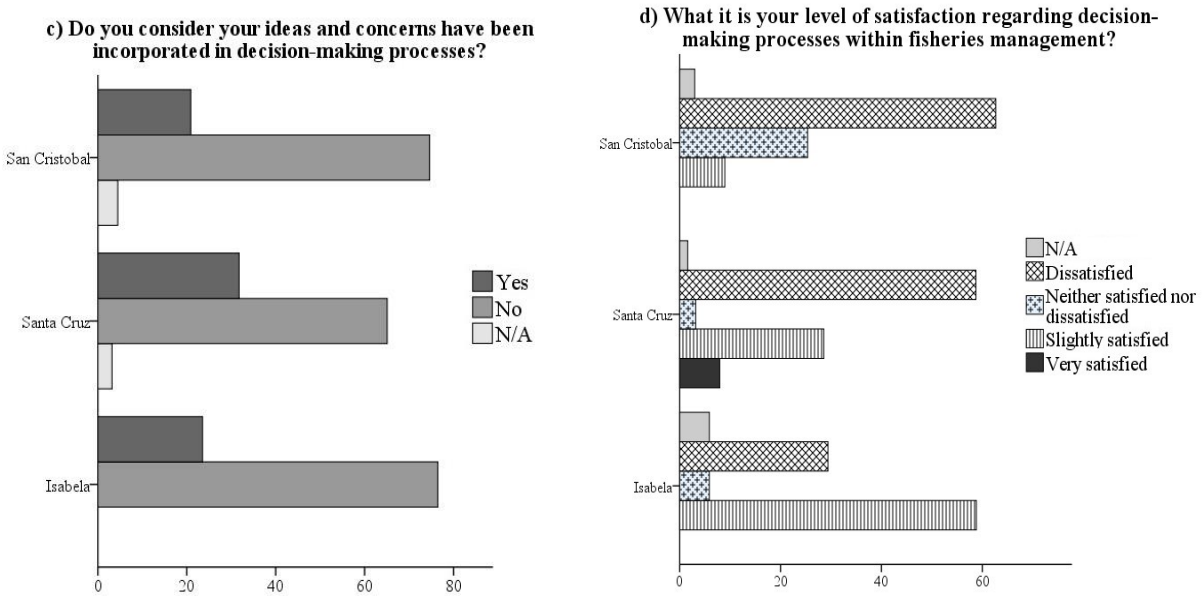


Fig. 6.7. Fishers' assessment of the fisheries management decision-making processes, percentage distribution by island (San Cristobal, *n* = 67, Santa Cruz, *n* = 65 and Isabela, *n* = 17).

6.4.2.1 Disagreements on the New Zoning Process: Views from the Fishing Sector

In classifying and coding the information provided through the open-ended questions and interviews, certain themes were clearly important. A common concern (134 coded respondents) was that the dissemination of the new zoning scheme was "*rushed,*" was "*mostly informative"* and was "*not consensus-based*". A fishing leader from Santa Cruz (I2, 28/7/16) noted that the presentation of the spatial distribution of the zones did not include specific details on the closed fishing areas (e.g., size of the areas, distance to the shore, geographic coordinates of the polygons, and other related measurements). Another person from the same island stated: "*The GNP called us to meetings to inform us what had already been decided. It is not for public participation, nor to reach consensus. The hardest part is to be told what has been already decided*" (F115, 28/6/16).

Statements reflecting sentiment of disappointment and frustration with the quality of engagement were also common (76 coded respondents): "*For the GNP it was important to highlight that the zoning process was determined in a participative way; although in practice, this participation ended before the zoning process was completed*" (F116, Sta. C, 28/7/16); "*We disagree with the new zoning…the process should have lasted longer. If the previous zoning lasted two years in discussions…can you imagine that they* [GNPS] *presented the final zoning in less than four months?*" (F024, SC, 15/4/16); "*The zoning should have been*

reached in consensus through an agreement between parties. It should not have been an imposition" (F142, I, 28/7/16).

At the grassroots level, the general feeling was a lack of "*real participation*" as only fishing leaders were informed about the new zoning system (F128, middle-aged fisher, Sta. C, 18/7/16). Many fishers expressed a desire to participate in the process despite being skeptical that effective inclusion would ever take place: "*I know that being part of the fishing management will never happen. The ones leading Galapagos are, in majority, conservationists*" (F140, I, 18/8/16).

Many fishers expressed their recognition of the need to protect fisheries resources but argued that their needs should also be considered and supported: "*The fisher is conscious about protecting the resources, but we also need to be supported*" (F35, SC, 7/3/16). Sentiments of mistrust towards the GNPS were also conveyed; one middle-aged active fisher commented: "*the GNP owns the decisions: we are told one thing, but something different to what had been discussed ends up being implemented*" (F94, Sta. C, 9/6/16).

In summary, the responses indicate that fishers wanted to be included in decision-making processes related to fisheries management and felt betrayed and disappointed when the zoning system was revised without their participation. Fishers believed that decision-making processes should be more inclusive, should consider their livelihood needs, and should allow more time for discussion and deliberation. Overall, fishers stated that the rezoning process did not include adequate engagement, and that the zoning plan should not have been imposed without appropriate consultation.

6.4.2.2 The Marine Sanctuary as Top-Down Decision-Making: Views from Other Actors

Concerns about including the marine sanctuary within the rezoning scheme without meaningful input from user groups were also prevalent. A former participant of the PMB observed: "*a decision-making process should be a collective construction that extracts solutions through debating the ideas and perspectives of different actors to reach consensus*" (I34, 20/7/16). Respondents felt the "imposition broke" the participatory process. A fisheries scientist stated:

> *The proposal to create a marine sanctuary hindered the zoning process that was already in place. I believe the problem originated from rushing the conclusion of the zoning process that was still ongoing. I believe they [GNPS] should have continued with the participatory process, identifying three good zoning scenarios, and then evaluated the economic and social implications to arrive at a final decision. I think the new zoning was*

> *developed without a clear understanding of the real impact this would have on the fishing sector* (I25, 8/7/16).

The representative of a public institution with responsibilities for fisheries echoed previous comments: "*The problem of the sanctuary is how this conservation measure was carried out and implemented. This top-down decision affected the work done by the technical zoning team, and thus, the park managers, who then had to integrate the order into the zoning process*" (I18, 22/7/16). This "top-down approach" intensified disagreements with the fisheries sector, triggered a feeling of betrayal and resentment, and undermined the level of trust gained in previous participatory phases. A zoning team member explained:

> *When we first communicated the results of the zoning, there were observations and questions from the fishing sector, there were points where they disagreed, but they were willing to discuss these to agree on a new zoning strategy. But now, they completely disagree with it, they ask to revert back to the previous zoning* [2000]. *It means they are totally closed in their position. The marine sanctuary came to disrupt the communication and how the results were to be presented to the people. It was previously working well, but the sanctuary broke the process, and above all, the trust was lost* (I22, 15/7/16).

A further issue of contention for local stakeholders was the ability of an international conservation agency to lobby and influence management measures, effectively silencing the voice and agency of local communities and authorities. A marine biologist who worked for several years in the Galapagos said:

> *It would be better if international organizations came along with local people and local stakeholders … We have to think that there are resource users in this area, and they should not be excluded from the decision-making. It* [the new marine sanctuary] *was a bomb that dropped in a place where a participatory process was being held. They turned into the opposite, to the imposition; to me, this was a big mistake* (I23, 4/10/16).

There were also complaints about the level of information sharing regarding technical support during the implementation of the sanctuary, as well as the assessment of possible social and economic implications for user groups. A representative from the private tourism sector pointed out:

> *I do not know how they came to establish that sanctuary. What was the technical and legal support? I do not know if any fisheries evaluations were done in that area, how much money fishers were making by fishing in those areas, who was fishing there, how this* [decision] *might be economically reflected or repaid to the community. Nobody has given us this information* (I28, 8/7/16).

The concerns raised during interviews focused on the failure of the top-down approach used in establishing the new marine sanctuary to take into consideration the local context or input

from resource users. This approach undermined the trust that had been established in earlier, more participatory, phases. The lack of inclusiveness in the decision about the sanctuary intensified disagreements both within the fishing sector and between fishers and managers, and deepened existing sentiments of resentment and betrayal.

6.5 Discussion

The adopting of a participatory approach to conservation governance in the Galapagos Islands was intended to ensure that social and ecological objectives were met. However, revisions to the GSL in 2015, reduced the level of local engagement, which in turn impacted the level of participation in the rezoning process of 2016. While the GNP hoped to empower reserve user groups in the new zoning process, several factors identified during the present study prevented this from happening: 1) restricted stakeholder engagement; 2) imbalanced power relationships; and 3) control of planning narratives. We discuss each of these below.

6.5.1 Restricted Engagement in Decision-Making Processes

During the period when a co-management regime was in place in the Galapagos, efforts were made to reach agreements through participatory processes. Zapata (2005) found, during his assessment of the first seven years of the participatory approach, that most stakeholders believed, regardless of disagreements between groups, that collaboration and teamwork resulted in successful resolutions. The level of success of agreements was subject to the degree to which concerns of local actors had been addressed (Heylings and Bravo, 2007; Llerena et al. 2015), although, Hennessy and McCleary (2011) point out that attempts at participatory management remained controversial due to perceived inequities and pre-determined policy decisions.

Public participation was purported to be a fundamental objective in the 2014 Management Plan, which identified *participation* and *transparency* as key principles within decision-making for the protected area (GNPS, 2014). However, as our findings show, the restricted level of engagement of stakeholders in the design of the rezoning scheme and in the implementation of the marine sanctuary limited the potential for exchanging ideas about the zoning process, and undermined efforts to establish a partnership between the MPA's management and the people whose livelihoods depend on access to marine resources. The abrupt cessation of the participatory process and the hurried dissemination of the new zoning plan generated feelings of frustration and mistrust that became difficult to overcome, and

which triggered conflicts that continue to hamper implementation. Complaints from the fishing sector and other actors within the rezoning process include: (1) the lack of inclusiveness in decision-making; (2) the lack of transparency within decision-making processes; and (3) the increase in regulations. As Bennett and Dearden (2014) and Christie et al. (2017) note, these can have consequences for conservation outcomes: they can undermine communities' trust and commitment in planning processes; they can reduce users' support for the protected area (Pollnac et al. 2001); and they can increase the challenges of enforcing compliance (Jones, 2006; Viteri and Chavez, 2007; Usseglio et al., 2014).

Arnstein (1969) introduced the notion of 'tokenism' in schemes of public participation that give little effective control or opportunity for input to intended targets. The concern persists (Innes and Booher, 2004). Flannery et al. (2018:33), describe 'tokenistic engagement' as "processes [that] create an appearance of involvement while enabling government agencies to meet participatory requirements without meaningfully engaging with the public". Our results indicate that fishers and some of the key informants involved as professionals felt that the way the zoning plan was presented was intended to eliminate dissent about the content of the plan by focusing only on how the zoning would ultimately be implemented. Earlier effective efforts at stakeholder engagement became tokenistic, with predictable consequences.

6.5.2 Imbalanced Power Relationships

Marine zoning initiatives have been characterized as often being 'top-down' (Jones et al. 2016) despite evidence that such approaches fail to provide a mechanism for dealing with differences of opinion (Gruby et al. 2016). A 'conservationist-driven planning' approach—fostered in this case by an international NGO and endorsed by celebrities and the Ecuadorian government—was used to design and propose the marine sanctuary. The process bypassed and undermined locally crafted and well-established participatory processes, and evidently abandoned the 'collaborative' principle endorsed by the NGO: Pristine Seas on their website write: "*Our partnerships with country leaders, business leaders, NGOs, and local governments* ***and communities are critical to our success. Our work with them*** [emphasis added] *has inspired the establishment of some of the largest marine reserves in the world*." (The National Geographic, 2015). Our findings suggest that the implementation of the marine sanctuary reflected a limited understanding of the islands' socio-political context and the ideas, beliefs, concerns, and histories of the very heterogeneous fisheries sector. This

underscores the need for attention to the increased role of environmental organizations and funding agencies in designating protected areas, and the particular implications of their role in marine conservation (De Santo, 2012).

The need to consider power and political dynamics in governance processes that precede the establishment of an MPA has been highlighted (Chuenpagdee et al. 2013). Power imbalances determine the extent and effectiveness of resource users' inclusion in conservation initiatives (Jones, 2009a; Holmes and Brockington, 2013). In the GMR, these inequalities have been evident and persistent in decision-making. The establishment of an MPA can intensify existing power inequalities "where more powerful voices protect their interests and promote their vision at the expense of the marginalized" (Cinner et al. 2014:1002). Heylings and Cruz (1998) noted that in the Galapagos there had been a "structural power asymmetry" between stakeholders' groups. The 'weaker' group consisted of marginalized, stigmatized local fishers while the 'stronger' group consisted of government agencies, conservationists with access to national and international alliances, and the economic and politically powerful tourism sector. From 1998 to 2016, local agencies attempted to build and strengthen stakeholder engagement in conservation planning and management and to recognize SES dynamics as essential to effective governance. Despite successes prior to 2016, our results show that in the Galapagos, small-scale fishers felt marginalized by the new zoning process and victimized by its outcome and believe that their voice in future planning and management will be further compromised.

6.5.3 Controlling the Planning Narrative

Power imbalances are, in part, manifest in the ability to control the information and understanding that shape policy and action, that is, to control the narrative. Flannery et al. (2019) note that actors will seek to ensure that their interpretation of an environmental problem becomes the dominant understanding because that will support some ways of acting, while impeding others. In this case, advocates of the marine sanctuary fostered their own particular narrative focused largely on the protection of iconic species such as sharks, but evidently neglecting the fact that sharks were already protected under existing regulations.

In support of their view, market-oriented assessments were used to justify conservation goals. Two studies compared cash returns from sharks through harvest and through tourism (Lynham et al. 2015; Goldstein et al. 2016), noting that marine tourism in Galapagos generates nearly $178,000,000 USD per year compared with roughly $5,000,000 generated

by fisheries (Goldstein et al. 2016). Using three main premises for assessment—marine-based tourism comprises 69% of all tourism revenue, ecological attributes drive the spatial distribution of diving tourism, and conservation can be achieved at little cost to stakeholders (Goldstein et al. 2016)—they extrapolated that while the fishing value per shark carcass in mainland Ecuador is about $158 USD, the average value of a shark to the tourism industry in the Galapagos is about $360,000, "since protected sharks can live for quite some time, they provide value as a tourist attraction for many years" (Lynham et al. 2015:9). These economic arguments are inaccurate as shark fishing in the Galapagos is, in fact, prohibited, so the relevance of a narrative based on the economic value of sharks, while powerful, is spurious. A lack of mechanisms for participation denied the local fishing community a voice to counter the dominant narrative or to present their own.

The use of top-down practices in marine conservation has become a 'wicked problem' worldwide (Jentoft and Chuenpagdee, 2009). Studies of no-take MPAs have uncovered issues of equity, justice and power that marginalize resource-user groups in decision-making processes and impede effective marine conservation, for example in UK (Jones, 2009b; Jones 2016), Australia (Kearney et al. 2012; Voyer et al. 2015); France (Leleu et al. 2012) and Tanzania (Kamat, 2018) to mention some. These issues have led to concerns about 'ocean grabbing'—a phenomenon that occurs when "rights and access to marine resources and spaces are frequently reallocated" through the marginalization of local people and non-transparent decision-making processes (Bennet et al. 2015:61). Spatial planning processes for MPAs are complex in themselves, but become more so when top-down strategies dominate (Jones et al. 2016; Flannery et al. 2016; Flannery et al. 2018) as these ignore the historical co-evolution of communities and coastal-marine systems (Berdej et al. 2015). Effective public participation in MPAs design and management has been shown to produce positive effects on conservation outcomes (e.g., in Philippines – Alcala and Russ, 2006; and Australia – Day, 2017). It is also essential the incorporation of human dimensions—particularly socio-political elements (Chuenpagdee et al. 2013)—within MPAs governance (Gray et. al. 2017). These are principles of good governance for natural resource management (Lockwood, 2010). The 2016 rezoning process for the GMR demonstrates how, even when there is a recent history of collaborative management efforts, a sudden shift involving new actors can create precisely the conditions that have been associated with exclusionary approaches to conservation. The latter have been adopted with limited stakeholder engagement, and despite being challenged

(e.g., see Bennett, 2018) for their known negative effects on the long-term sustainability of marine governance.

6.6 Conclusion

In the Galapagos, despite efforts made to adopt conservation strategies that incorporate principles of good governance, socio-environmental struggles persist. The recent management history of the GMR offers a valuable assessment of the consequences of a shift from participatory decision-making processes as a result of the interventions of international conservation agents. The experience demonstrates how a top-down exclusionary approach to marine conservation can undermine trust and hinder local acceptance of conservation measures, thereby compromising the long-term effectiveness of an MPA.

Our findings suggest that the social, economic and political parameters of the populated islands were not adequately considered in planning for the new zoning, that there were critical problems with communications about process, objectives and outcomes, and that there was inadequate attention paid to the real costs and benefits of the marine sanctuary—which represents about 30% of the total area of the GMR. No effort was made to reach a consensus that could have led to more effective community participation in conservation. From the standpoint of the small-scale fishers, the process failed to be fair, transparent, or inclusive of those impacted by the new regulations. These failings led to direct action by the fisheries sector that has delayed advances with the intended conservation initiative.

This case study supports fears that a return to exclusionary approaches to conservation persist, and that research that has supported the positive contributions of ICDPs, CBNRM and SES approaches to conservation management is not taken seriously by influential conservation actors, even when they pay lip-service to participatory practices in their promotional materials. So far, with respect to the new 2016 zoning, a ‘win-win’ outcome is not in sight, a sustainable and balanced trade-off has not been reached, and the path to even a ‘win-settle’ outcome will require either authoritarian interventions, or a return to the inclusive decision-making process that was central to the 1998 co-management and 2008 SES planning strategy.

To avoid ocean grabbing, Bennett et al. (2017) suggest the application of a ‘code of conduct’ within conservation initiatives to ensure they are both socially acceptable and ecologically effective, as well as based on decision-making processes that are fair and inclusive. These authors draw attention to the increasing use of crisis narratives—for

example, the threat overfishing—to justify interventions that are invoked for the good of marine conservation, but which may incite "unacceptable or unlawful actions [that] may undermine legitimacy and support, and jeopardize the long-term success and effectiveness of conservation efforts" (Bennett et al. 2017:411). It seems likely that, had this code of conduct been applied in the GMR, the outcome of the new zoning initiative could have addressed many of the impediments that now threaten its implementation.

It is currently unclear how the impasse regarding zoning in the GMR will be resolved. Three outcomes appear possible: 1) that the zoning will be revisited and redesigned in an inclusive, consultative and participatory way that addresses the concerns of resource users; 2) that the "imposed" rezoning will be ratified and enforced, but that some formal mechanism will be introduced to provide redress to those negatively affected; or 3) that the rezoning will be ratified and enforced, and the concerns of those negatively affected will simply be ignored, and their actions policed. This last option reverts to the 'fences and fines', top-down conservation model that scholars and practitioners—including those who piloted innovative SES-based programs in the Galapagos—have discredited on both ethical and functional grounds.

Protecting ecological resources, reconciling conservation trade-offs, and finding effective means of public participation are complex and challenging objectives. Clearly, well-resourced international conservation NGOs, large funding agencies, and specialized scientific organizations are essential allies for advancing conservation, but approaches must also be supportive of locally developed planning and management processes; and be responsive to social as well as ecological implications of conservation actions. Further research in the GMR to advance these capabilities could seek to identify trade-offs that might achieve both social and ecological goals, in addition to further exploring the role and effects that external agencies have in shaping marine conservation initiatives.

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APPENDIX E.

Note: These photos summarize the process of the dried and salty fishery in San Cristobal Island – Galapagos. The capture that fishers bring to the town at the end of each fishing trip is delivered to the fish trader who in addition to a supervisor from the Galapagos National Park and the fishing crew, weight the fishing caught, so they can be paid accordingly to what they have landed (the last photo on the left). Later the fish trader continues the process of drying the fish (the last photo on the right) before send the product to the Ecuadorian mainland.

Note: Preparation of fishing activities in the fishing port of Puerto Ayora in Santa Cruz Island. The photos in the second row show the process of packaging in the fishing cooperative COPROPAG (the specie in the photo is spiny lobster). The last two photo on the right shows where the fish is being commercialized for the local community and tourism, and the photo on the left shows how fishers prepare for the fishing trip of the next day by bringing ice from the fishing cooperative to keep the fish fresh until its final sell.




Note: These photos show fishing activities carried out in Isabela Island. The fish is brought to the town as the main buyers are restaurants and hotels. The last two images show the fishing caught of yellow fin tuna (photo on the right), and the other shows monitoring activity from the Galapagos National Park to lobsters caught during the fishing season to assess the size of the species (photo on the right).

PREFACE TO CHAPTER 7

Findings from Chapter 6 revealed that the 2016 rezoning process for the Galapagos Marine Reserve had restricted stakeholder engagement in decision-making demonstrated imbalanced power relationships amongst stakeholder groups. This restricted access appeared to emerge from increased outside pressures on the planning and decision-making processes; in many instances, external agents intervened to control the planning narrative, and ultimately, affected the overall outcome of the new zoning scheme. The interruption of participatory processes that had been established was due to various factors including institutional instability, inconsistencies of the new zoning plan, and the sudden prioritization of a large no-take area. This created confusion and uncertainty among fishers, and even within other stakeholder groups. Rushing the implementation of the new zoning using exclusionary forms of marine governance and restricting access to areas considered important for fisheries, led to greater opposition in the fishing sector.

Considering these consequences, Chapter 7 explores recurrent and contrasting perceptions among fishers from the three most populated islands by analyzing qualitative data from surveys and semi-structured interviews. Understanding the perceptions of these key stakeholders is important because it is these perceptions that underpin fishers' resistance to conservation actions. Fishers' perceptions were determined through a schematic process of content analysis where extracts of text from surveys and interviews were analyzed through a detailed and iterative coding process (for more details about this process see Chapter 4 in the thesis).

The study finds that perceptions converge in five principal themes that raise questions about the legitimacy, fairness, transparency and viability of the new zoning. This chapter provides further evidence of the strategic importance of incorporating human dimensions in marine conservation planning and, more specifically, of a deep understanding of social concerns that may critically impede progress on marine resource management.

This paper is published in the Journal of Society and Natural Resources (https://doi.org/10.1080/08941920.2020.1765058).

Appendix F. located at the end of this chapter includes a series of photographs taken during fieldwork that show demonstrations of disagreement from small-scale fishers towards the 2016 zoning process.

CHAPTER VII: Manuscript 3

Conservation Strategies through the Lens of Small-Scale Fishers in the Galapagos Islands, Ecuador: Perceptions Underlying Local Resistance to Marine Planning

Citation: Burbano, D.V., and Meredith, T.C. (2020). Conservation Strategies through the Lens of Small-Scale Fishers in the Galapagos Islands, Ecuador: Perceptions Underlying Local Resistance to Marine Planning. *Society & Natural Resources*, 33(10), 1-19.

Abstract

Spatial management tools are increasingly used in marine protected areas (MPAs). In the Galapagos Archipelago two zoning plans have been designed to advance resource management and protection: one in 2000, implemented through participatory processes under a co-management regime; the other in 2016, designed within a new regulatory framework and with strong input from international conservation advocates. The new zoning plan has been actively resisted by small-scale fishers. We analyze qualitative data from 149 questionnaire surveys and 16 key informant interviews to assess fishers' perceptions of the re-zoning process. The perceptions that underpin fishers' resistance to the new zoning plan converge in five principal themes that raise questions about the legitimacy, fairness, transparency, and viability of this management tool. This study provides further evidence of the strategic importance of incorporating human dimensions in MPA management and, more particularly, of understanding social concerns that may critically impede progress of marine resource conservation.

Keywords: *Local Perceptions; Marine Protected Areas Management; No-Take Zones; Environmental Decision-Making Processes; Stakeholder Engagement, The Galapagos Islands.*

7.1 Introduction

The Galapagos Marine Reserve (GMR) was officially established in 1998 and designated as a UNESCO World Heritage Site in 2001 due to its unique biodiversity. It encompasses 137,000 km2 of coastal and marine areas, which makes it one of the world's largest Marine Protected Areas (MPA). Marine spatial planning has been an important tool within the array of conservation strategies used to manage the marine reserve (Castrejón and Charles, 2013). Two zoning initiatives have been implemented. The first zoning, officially approved in 2000, was carried out through a participatory process aimed at reconciling conservation goals and resource-users' aspirations (Heylings, Bensted-Smith, Altamirano, 2002). In 2014, a process for re-zoning the protected areas of the Galapagos (land and sea) was initiated following adoption of new conservation and management guidelines (Galapagos National Park Service, 2014). The resultant zoning was officially approved in March 2016, but its full-implementation has been delayed for almost four years due to resistance from small-scale fishers to both process and outcome: they felt dissatisfied with the opportunities for engagement during planning, and betrayed by the sudden implementation of an expansive no-take conservation zone. This paper explores the perceptions of fishers that underlie resistance to the new zoning plan.

We begin with a review of relevant literature and a description of fisheries and conservation management in the GMR. Then we present a summary of the methods used to gather and analyze data. In the results section we present fishers' perceptions aggregated into five major themes. The discussion links observed perceptions to concepts and discussions provided in MPA literature. The conclusions highlight the relevance of the study findings to practical management in the Galapagos and, more generally, to the evolution of best practices for marine conservation.

7.1.1 Marine Conservation Initiatives and Implications for Local Fisheries

In recent decades, there has been an increased emphasis on MPAs as a preferred conservation tool (Gray, 2010). This increase responds to calls from international conservation fora concerning the intensification of anthropogenic effects on marine ecosystems (Charles et al., 2016). Ambitious targets have been set for marine protection through the implementation of no-take zones (NTZs) (Agardy, Claudet, and Day, 2016) with the hope that strict protection will effectively preserve key habitats and species (Sala et al., 2018). However, the

implementation of NTZs can generate controversy because of their consequences for human activities (Jones, 2006; Jones, 2009).

MPAs are increasingly recognized as being embedded in social-ecological systems (SESs) (Pollnac et al., 2010), where human dimensions (e.g., social, economic, cultural, political, and institutional) interact dynamically with ecological characteristics important for the provision of ecosystem services (Charles and Wilson, 2009; Gray et al., 2017). The importance of including social considerations in marine conservation management has been widely recognized (Bennett and Dearden, 2014; Charles, 2014; Christie, 2004; Mascia, 2004), yet there are widespread conservation practices that overlook them and use top-down planning and management approaches that delay or neglect stakeholder engagement (De Santo et al., 2011; Gruby et al., 2016; Richmond and Kotowicz, 2015). Conflicts result from how these areas have been conceived, designed, implemented, and managed (Berdej et al., 2019; Chuenpagdee et al., 2013; Jones, 2002), often because the conservation of biodiversity is prioritized over the needs of local communities who rely directly on natural resources (Cinner et al., 2014; Mascia, Claus, Naidoor, 2010).

Marine conservation strategies can impose significant costs on local communities, generating a 'winners and losers' dichotomy (Cinner et al., 2014; Flannery and Ellis, 2016) and raising issues of justice, equity, and power among stakeholders (Jones, 2009; Kamat, 2018). Exclusionary zoning illustrates this, and can generate local resistance to conservation regulations (Cinner et al., 2014; Mascia, Claus, Naidoor, 2010; Voyer, Gladstone, and Goodall, 2015) as this can be perceived by resource users as 'ocean grabbing' (cf. Bennett, Govan, and Satterfield, 2015).

Advocates argue that marine conservation strategies can generate benefits for local communities: during planning for MPAs, resource-users' support is often sought by advertising the potential benefits for fisheries, such as through yield enhancement due to *spillover*, an increased fish catch in areas adjacent to an MPA. However, results are variable depending on spatial patterns, habitat factors, and species' characteristics (Hilborn et al., 2004; Willis et al., 2003). Spillover benefits that MPAs might generate (e.g., increase in target species abundance, biomass, individual size, egg production and larval export – Russ et al., 2004) often do not offset the costs of closed areas, as those may only accrue over the long-term (Jones, 2008; Dimech et al., 2009; Stump and Kriwoken, 2006; Suuronen, Jounela, Tschenij, 2010); hence, fishers' support is undermined by the uncertainty of future potential benefits (Pita et al., 2011; Smith et al., 2010). To win local support for conservation

initiatives, Cinner et al., (2014, 995) point out that "*how fishers perceive the trade-offs between long- and short-term, direct and indirect benefits and costs, will be crucial for the legitimacy and acceptance [of conservation initiatives], compliance, and subsequently ecological success*." If perceived costs are excessive, it will trigger resistance to new management interventions (Salas and Gaertner, 2004).

Studies of the perceptions of local people—perceptions, defined by Bennett (2016, 585) as "*the way an individual observes, understands, interprets, and evaluates a referent object, action, experience, individual, policy, or outcome*"—can generate significant insights into the social-environmental impacts of conservation, the perceived legitimacy of environmental decision-making, and the social acceptability of conservation management strategies (Bennett, 2016; Leleu et al., 2012; Pita, Pierce, and Theodossiou, 2010). People's perceptions determine positive or negative responses to conservation initiatives, and shape individual and community intentions, behaviors, and willingness to support or confront these initiatives (Dimech et al., 2009; Gelcich et al., 2009; Jones, 2008; Suuronen, Jounela, Tschernij, 2010). Failure to understand local perceptions and attitudes towards initiatives related to MPAs may undermine management strategies (Pita et al., 2011; Pita et al., 2020); conversely, understanding human dimensions of MPA can be important to ensure conservation success (Bennett, 2018; Charles and Wilson, 2009). Obtaining social acceptance is therefore essential to the long-term sustainability of marine conservation management (Voyer, Gladstone, and Goodall, 2015).

There are clear norms and guidelines on how to encourage social acceptance by incorporating human dimensions into MPA management (cf. Bennett et al., 2017; Charles and Wilson, 2009; Lockwood, 2010) and yet, despite an increase in the literature on the human dimensions of MPAs, there is a need for more empirical studies aimed at examining fishers' beliefs, attitudes, and more broadly perceptions, related to the conservation and management of MPAs (McNeill, Clifton, Harvey, 2018; Pita et al., 2011; Pita et al., 2020; Ward et al., 2018).

Recent developments in the management of the GMR provide a valuable opportunity to explore how human dimensions could have been addressed. Through the analysis of qualitative information generated by questionnaire surveys and semi-structured interviews, we examine the perceptions of, and reactions to, marine planning from the points of view of a key stakeholder group within the reserve—the small-scale fishers.

7.1.2 Fisheries and Conservation Management in the Galapagos Marine Reserve

The small-scale fisheries sector comprises a heterogeneous group of individuals, with different origins, ages, interests, and motivations (Hearn, 2008). Local fishers have the sole right to fish within the GMR and are controlled by the Galapagos National Park Service (GNPS) through fishing permits and licenses. The size of the fishing sector is regulated through a limited-entry program, which sets restrictions on the number of fishers allowed to operate within the reserve (Castrejón, 2011). The national park fishing registry data base indicates that in 2016 (Access April 12/4/16) there were 447 fishing boats operating within the reserve, and 1,309 fishers with valid fishing licenses (PARMA, Spanish Acronym). However, not all licensed fishers are active, and studies suggest there might be fewer than 400 commercially active fishers (Llerena, Quisingo, Maldonado, 2015; Palacios and Schuhbauer, 2013).

In the 1990's the rapid expansion of the very lucrative sea cucumber fishery (*Isostichopus fuscus*) led to the imposition of regulations that triggered conflicts between the fisheries sector and managers of the marine reserve, thereby increasing the complexity of the GMR governance (Jones, 2013). This led to the adoption of management strategies intended to preserve marine species and habitats important for the provision of ecosystem services, while still allowing some extractive uses (Castrejón et al., 2014). As noted, two multiple-use zoning schemes have been officially approved. The first, in 2000, focused only on the marine area and excluded industrial fishing activities within the reserve's boundaries; it also coordinated activities of approved users through such tools as an Annual Fishing Calendar that outlined agreements on target fish species, allowable gear, quotas, and seasons (Castrejón, 2011). This zoning plan[72] was carried out under a participatory management regime, where both design and implementation were determined through consensus with the reserve's stakeholders (Zapata, 2005).

The second zoning plan, approved in 2016, marked a dramatic change. It was designed to manage both land and sea territories, ensure the protection of key habitats for the provision of ecosystem services, and expand marine conservation areas from 10% to 33% (Galapagos

[72] See Castrejón and Charles (2013) for a comprehensive assessment of the effectiveness of the 2000 GMR's zoning approach. The authors based their assessment on a set of evaluation factors seen as fundamental for achieving successful marine management (i.e. effective planning, implementation, monitoring, evaluation, and adaptation). The authors identify and discuss issues raised within the first marine zoning in terms of these factors, and provide recommendations to address issues encountered in marine spatial planning in the Galapagos and elsewhere.

National Park Service, 2014). This zoning was carried out under a regulatory framework that emerged as a result of the new constitution of Ecuador adopted in 2008, and which permitted the establishment of new interventions in territorial organization and management. This led to changes to the 1998 Galapagos Special Law (GSL), which had determined the governance of the GMR and had ensured public participation in conservation planning and management (Llerena, Quisingo, Maldonado, 2015). The new GSL, approved in 2015, allows for public consultation, but final decisions are made exclusively by the national and local government.

7.1.2.1 The 2016 Re-zoning Plan

The new zoning process began in June 2014 under the GSL's new regulatory framework. It was led by the GNPS with the support of public and private, local, and international, conservation organizations. It initially included some participatory processes open to stakeholders from within the GMR; however, these were interrupted due to instability of leading institutions and the involvement of representatives from an international NGO who lobbied at the highest government level for the establishment of a marine sanctuary[73] . As a result, the re-zoning plan was officially approved by Presidential Decree [968], and local consultation was terminated. The new plan included a large NTZ surrounding the Islands of Darwin and Wolf and 21 smaller no-take areas distributed through the archipelago. Overall, 47,000 km2, or approximately one third of the area, was lost to fishers.

The decision-making process of the re-zoning caused social conflicts and led to direct action by the fishing sector. A nonviolent protest was launched on San Cristobal Island early in April 2016, and continued in August in Santa Cruz Island, when the fishers called a strike that lasted for three days. Efforts by the government to settle the conflict led to a one-year moratorium—proclaimed on September 1st, 2016—to permit additional consultations and adjustments. The moratorium has been extended three times as managers of the GMR have faced sustained objections from the fisheries sector (Burbano, Meredith, and Mulrennan, 2020).

Representatives of three fishing cooperatives in the Galapagos—two from San Cristobal and one from Santa Cruz—requested the reserve managers to re-assess the new zoning as, according to them, "80% of their traditional fishing grounds have been compromised." (El

[73] The implementation of the Darwin and Wolf Marine Sanctuary was promoted by the Pristine Seas Project from The National Geographic Organization. By carrying out marine expeditions worldwide, this initiative aims to implement protected areas in places considered important for conservation (The National Geographic, 2015).

Universo, 2018) To avoid more conflicts with the fisheries sector and ensure their support, managers of the GMR opted to assess the new zoning plan in terms of socio-economic impacts the zoning might generate for the fishing sector. The directorate of the GNPS claimed that by the end of 2019 they would have the final draft of the new zoning plan generated with agreement of the fisheries sector; however, at the time of writing this dissertation, no resolution has been made public. Informal conversations with local fishers indicate (pers. commun. October 5, 2020) that they are still fishing with the previous zoning.

7.2 Research Methods

7.2.1 Data Gathering

Data collection was carried out between January and September 2016: from January to April in San Cristobal Islands, from May to July in Santa Cruz Island, and in August in Isabela Island. It is important to note that in the Galapagos, academics and scientific researchers are perceived negatively by small-scale fishers due to a long history of antagonism with the GMR management. As noted in our results, a common view amongst fishers is that prior cooperation with researchers led to misuse of information and to unfair regulation of their sector. To overcome suspicion of and resistance to further research, our work began in Puerto Baquerizo Moreno-San Cristobal Island, where the first author (who is Ecuadorian) had previously led a research project in the community and had earned the confidence of those in the fisheries sector. This link was essential to gaining trust on the other islands.

The study used a combination of participant observation, questionnaire surveys, and key-informant interviews. Participant observation was carried out at meetings between representatives of the local fishing cooperatives and GMR managers, at public protests, and at several informal gatherings in the communities. These unstructured observations allowed us to observe people in an informal setting, and to be part of events that shaped their perceptions (Laurier, 2010). For the surveys we used both "*Snowball sampling"* where initial respondents and key informants helped to identify others who could be approached (Bradshaw and Stratford, 2010), and "*convenience sampling*" where respondents were approached based on accessibility (Etikan, Musa, and Alkassim 2016) at predetermined times and locations such as fishing docks, central parks, the fishing cooperatives, and at places where fishers gather socially.

Face-to-face questionnaire surveys were carried out with a total of 149 respondents: 67 in San Cristobal Island, 65 in Santa Cruz, and 17 in Isabela Island. Surveys gathered

respondents' basic demographic information and characteristics of their fishing activity; and included open-ended questions to gather perceptions of the decision-making processes and of the impacts of conservation management on fishing activities. In addition, Semi-structured interviews were conducted with 16 key-informants who had been directly involved one or both of the zoning processes. Interviews took between 40 and 120 minutes and were recorded, always with the participant's consent. The interviews were guided by a checklist of key themes, which was modified and tailored to expertise and knowledge of the interviewee (Dunn, 2010). Participant validation (Birt et al., 2016) was subsequently conducted in the first two islands in September 2016 to verify and clarify initial findings and to update our knowledge of latest events.

7.2.2 Qualitative Analysis

Information from the surveys and semi-structured interviews was fully transcribed and reviewed to identify emergent concepts and recurrent themes. The software MAXQDA v2018 was used to code participants' responses and to conduct qualitative content analysis, which allows for systematic examination of text data (Smith, 2000). We used a combination of two content analysis approaches: manifest analysis—i.e. to describe what the respondents actually say—and latent analysis—i.e. to find the underlying meanings of respondents' interpretations (Bengtsson, 2016). The analysis of qualitative information can reveal "*a respondent's understandings and interpretations of the social world, and…the understandings of structures and processes that shape respondents' thought and action.*" (McGuirk and O'Neill, 2010, 213). In coding[74], key concepts and themes that guided the research were used as *a priori codes*, whereas *a posteriori codes* were developed from concerns and ideas that recurred frequently in the transcriptions (Miles, Huberman, Saldaña, 2014). This was an iterative process in which codes and sub-codes were continuously examined and were adjusted when necessary (Saldaña, 2013). We then used a quantitative content analysis approach to identify how persistent particular coded ideas were (Krippendorff, 2004). In the results section, we present the percentage of individuals whose responses included at least one statement coded to a particular theme; the actual number of individuals is presented in Figure 1.

[74] Details of the qualitative analysis used in this study are summarized in this chapter due to length restrictions in the published paper, but they are presented in greater detail in the methods chapter (Section 4.4 "Data analysis", pg. 82).

Quotes from the analyzed text are presented to illustrate the emergent themes; these were translated from Spanish by the authors and are anonymized, but the source is given an identifier and some basic attributes (e.g., for fishers: F#, place [island: SL, SZ, IS]; or for key-informants: I#, place). In addition to the systematic coding process, we applied Gubba's four criteria (i.e. credibility, transferability, dependability, and confirmability) to ensure the 'trustworthiness' of qualitative studies (see Shenton, 2004). Ethical considerations and research positionality were a fundamental part of data collection and analysis; this study was conducted with requisite approvals from the McGill University Research Ethics Boards (REBs).

7.3 Results

This section presents the results of the analysis of fishers' comments on both the process that led to the rezoning, and their concerns about the impact of the zoning on their fishing activities. We have aggregated fishers' perceptions into five main themes (Figure 7.1); each is discussed below.

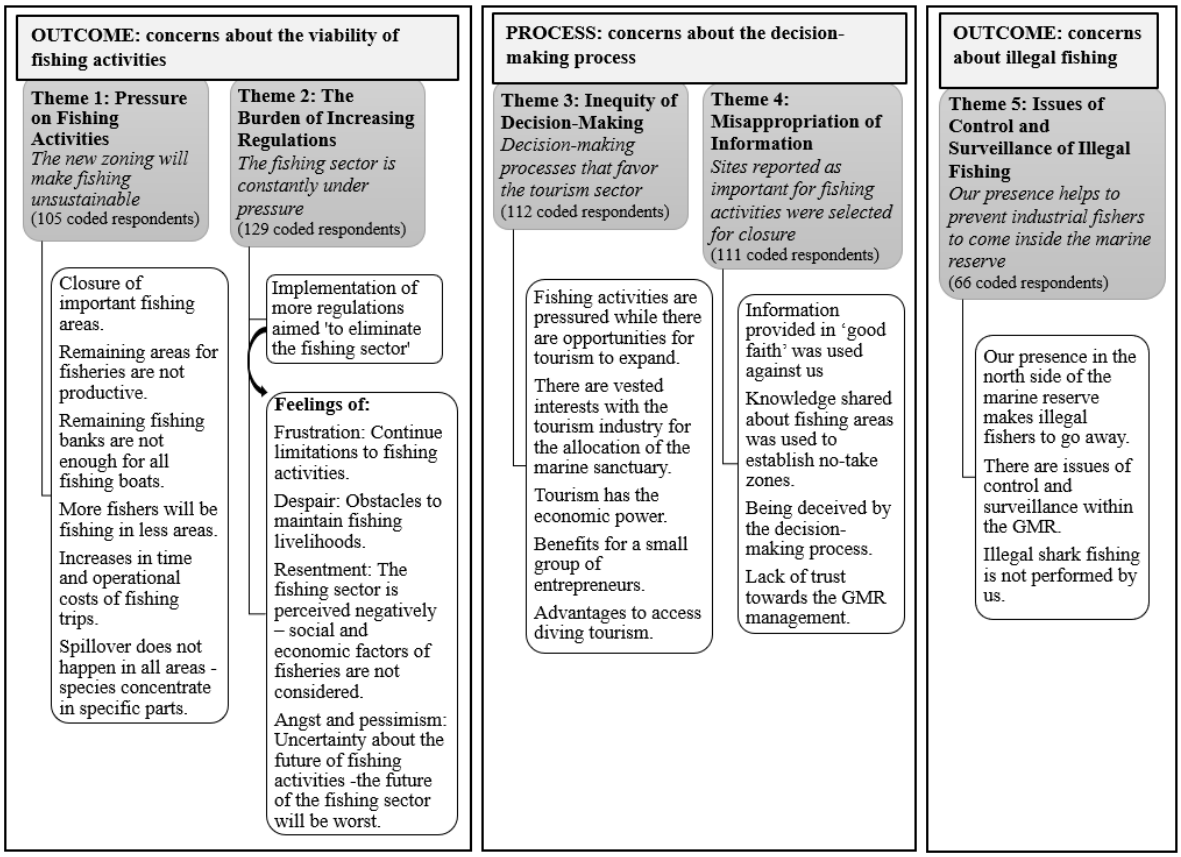

Fig. 7.1. Narratives of resistance regarding the 2016 rezoning process. *Note.* Each narrative includes a summary of key coded perceptions, which are discussed in the text. Black arrow indicates the link between a coded cause and cited responses.

7.3.1 Fishers' Perceptions Underlying Resistance

7.3.1.1 Theme 1: Pressure on fishing activities

About 70 percent of fishers expressed the idea that "the new zoning plan will make fishing unsustainable". This theme included five sub-coded concerns: the most productive areas are closed; the zoning does not reflect the diversity of areas fished for different species; the concentration of fishers in approved areas will be excessive; the distance traveled to approved fishing areas will be more costly and time consuming; the benefits of spillover will not compensate for losses.

The closure of sites important for fishing activities was the main concern expressed by fishers from all islands, but in particular from San Cristobal. Fishers indicated how specific areas they use for each fishery have been closed (e.g. some coastal areas where fishers usually catch bait, and areas for the lobster fishery). A middle-aged fisher noted: "*They [GNPS] are closing the fishing areas that we use the most. They are sending us to fish in areas where fish are scarce*" (I4, SL).

They also remarked that since species are not found everywhere, even if they were given access to the entire marine reserve, they would still concentrate their fishing effort in the same areas. For example, a person with thirty years fishing experience explained: "*In the region of the South there are deep-water fish, such as Mero [Misty grouper] and Brujo [Pacific Spotted Scorpionfish], but these species are not found in the North part, where instead there are mid-depth species such as Blanquillo [Caulolatilus affinis]and Norteño [Epinephelus cifuentesi*]". (I36, SL).

Some fishers' comments indicated that with new zoning plan, the designated fishing banks will be insufficient for all fishing boats, so more boats will be concentrated in smaller areas. This increase in fishing intensity may have an adverse effect on the ecosystem. A middle-aged fisher from San Cristobal Island expressed: "*I believe all fishers will be concentrated in the same fishing areas, but these sites are smaller, therefore will be depleted faster. From experience I tell you that the environment will be affected*." (F40, SL). Some people noted about increases in competition as more fishers will be working in reduced areas. A fisher working for twenty-three years in fisheries commented: "*I believe in few years fishing activities will not be profitable anymore. We all are going to be fishing in the same areas. They [GNPS] wants to protect the environment, but this will damage it. The fishing areas left are smaller, so will be exploited faster. There will be 400 fishers working on those areas*" (F124, SZ).

Respondents also showed concern about possible increases in the time and operational costs of their fishing trips. A person fishing for twenty years explained that: "*Fishers have always fished close to shore. Now with the new regulations, they [GNPS] want to make us fish farther away*" (F61, SL); and a young fisher similarly noted: "*Closing fishing areas affects us a lot! We will have to spend more days away to bring a good catch*" (F120, SZ).

Another person, who had worked in fisheries since the 1980s and who was concerned about the extra distance to open fishing zones, claimed: "*It is okay to be regulated, but now they are doing it too much! They are taking me to bankruptcy as there are more expenses, more use of gasoline, more ice. We have to invest more, but we earn less*" (F123, SZ). A young fisher added: "*About 40% of the fishing catch is for us, the rest belongs to the owner of the boat. We must pay for food, education and other expenses, so there will not be enough [revenue]*" (F114, SZ). Facing these concerns from the fishing sector, GMR managers have countered fishers' claims by emphasizing the benefits of no-take zones and the expected 'spillover effect'; however, this rationale is not accepted: "*spillover effect does not happen as they say, fish are not the same in all areas*" (F117, SZ).

7.3.1.2 Theme 2: The burden of increasing regulations

About 87 percent of surveyed fishers expressed that there are too many regulations for the fishing sector. Three concerns emerged: increased regulations threaten the viability of fishing; regulations aim to "eliminate" the fishing sector so the future of the fishing sector is uncertain; regulations will have a negative effect on local culture and economy. First, respondents indicated that the closure of fishing areas and the implementation of other strategies for fisheries management (e.g., allowable fishing seasons, species, gears, boat license and fishing permit) have had excessive impacts on fishing activities. These regulations are seen as threats to the viability of their fishing livelihoods. A younger fisher expressed: "*The new zoning … will affect the economy of my family as 60% of fish extraction during the season is done in areas that are to be closed*" (P140, IS); another person added to this comment: "*not all fishers have other economic activities, my living income comes only from fisheries*" (F57, SL).

Most people believe that increasing regulations are deliberately intended to "eliminate the fishing sector" and that in few years only tourism activities will be allowed within the marine reserve. A young fisher noted: "*They want to get rid of us, little by little they are reducing the fishing sector.*" (F92, SZ); and an ex-fisher from San Cristobal working in tourism

supported this claim: "*I see the fishing sector is not doing well. Currently they want to take fishers out of the reserve. It is difficult to reach mutual agreement between authorities and fishermen*" (F29, SL). The perceived burden of regulations causes people to feel uncertain about the future of fisheries. The following comments exemplify their concerns: "*The future of the fishing sector will be to disappear … Each year we have more regulations*" (F146, IS). "*The fishing community lives in uncertainty because we do not know clearly if we will be able to keep fishing. We feel hopeless, our current situation will not improve*" (F117, SZ).

Expressions of angst, despair and resentment were evident amongst fishers from the three islands. These sentiments are intensified by the fact that fishers consider new regulations will affect the fishing sector culturally (loss of traditions and culture) and economically (reduced income, which will force them to transition to other livelihoods). Moreover, they consider their activities to be important local community well-being as the money generated by fisheries is invested locally: "*The fishing sector influences a lot in the local economy of this island… It is sad to see how regulations are ending a livelihood that has existed for more than 50 years. It is true that today there is more tourism, business, and jobs in public institutions, but there are still families who are still fishing*" (F43, SL).

7.3.1.3 Theme 3: Inequity of decision-making

About 75 percent of surveyed fishers showed discontent about the establishment of the Darwin and Wolf Marine Sanctuary in the far-northern area of the GMR. It was perceived that its implementation is further proof of how only fishing activities are regulated while the tourism is given more opportunities to expand. Two young fishermen explained their concerns: "*the park each year creates more regulations. Why do they close areas only for the fishing sector and not also for the tourism?*" (F125, SZ); "*inequality has been persistent here, not only with the fishing sector, but also with agriculture…Here, I repeat again and again, the jewel in the crown is tourism because it supports conservation… but I am not sure if it is the other way around*" (F130, SZ).

People believe that the establishment of the marine sanctuary seeks to benefit a small group of tourist entrepreneurs who have diving operations in that area: "*The marine sanctuary benefits only five millionaires, big entrepreneurs that are using that area. If it is a "sanctuary", then it should not allow the presence of anyone*" (F108, SZ). An ex-fisher who owns a tourist diving cruise ship operation, managed by an international tourism agency, indicated: "*I carried out diving activities in the area of the sanctuary, so for me it is better now. I believe that area will now*

have more value for us as tourists come to dive there to see sharks. It is because of this, they come here" (I35, 31/5/16).

7.3.1.4 Theme 4: Misappropriation of information

Concerns expressed by 74 percent of surveyed fishers were about the "misapplication of information" provided when they participated in prior consultations regarding fisheries management: in the new zoning plan, most sites reported as being important for fishing activities were designated as NTZs. People felt deceived and claimed they were betrayed by the GMR managers as they were told that areas important for fishing activities were going to be prioritized during the spatial planning. A respondent from the fishing sector who participated in the re-zoning process expressed: "*Now the park wants to find a solution to the abuse they committed with their miscommunication, because we are restricted to our fishing areas in the new zoning. For example, if during the data collection phase I said, 'I fish from A to B, this is my area of most extraction,' then in the zoning plan, A and B were classified as conservation zones*" (I2, SZ). A person fishing for over thirty years remarked: "*Later we realized that of all the areas that we said where fishing sites, all are now closed*" (F18, SL). This process exacerbated mistrust of the GMR management and heightened resentment toward the GNPS. The following comment add to previous claim: "*Had I known that this was going to affect to our activities, I would not have reported my fishing areas"* (F103, SZ).

The gap between the fishing sector and the GMR managers seems to have increased as negative experiences have accumulated through time: "*The fishing sector has collaborated in good faith, unfortunately the information has been used against us. Now, it turns that the most productive fishing areas are closed. The fishing sector disagrees with the new zoning and marine sanctuary, not because we are not aware of what Galapagos represents and the importance of its conservation. No! We disagree with the imposition of what they want to do through the zoning*" (I33, IS).

7.3.1.5 Theme 5: Issues of control and surveillance of illegal fishing

Regarding the establishment of the marine sanctuary, about 44 percent of fishers argued their presence in the far-northern region helps prevent illegal industrial fishing. A person from San Cristobal Island recalled: "*About two months ago, there were about 14 fishing boats from Manta fishing in Wolf Island, but when we arrived there, they fled! Now, there is freedom for them*" (F67, SL). A respondent from Santa Cruz echoed the comment: "*When we are there, they [illegal fishers] leave because they do not want trouble. Our presence helps to control illegal fishing inside*

the reserve. But now, Darwin and Wolf belong to them" (F86, 6/6/16). The GNPS has explained that an Automatic Identification System (AIS) assists the control and surveillance of the marine reserve by identifying any vessel that gets inside the protected area (I14, GNPS). However, fishers contend that there are ways to deactivate AIS devises. Two individuals explained: "*Now that they [industrial fishing] have the satellite control device, they stay outside the reserve close to the border while sending small fishing boats of 7 to 8 meters to fish inside*" (F50, SL); "*The patrol boat from the park takes two days and half to get to Darwin and Wolf Islands; thus, when they get there, illegal fishing boats are already out*" (F42, SZ). An ex-fisher from Isabela also added: "*even cruise ships have found illegal fishing boats over there, but they cannot intervene as it is dangerous. Some have tried to cut their lines and push them away, but there is nothing else they can do*" (F147, IS).

On the other hand, several fishers refuted statements made by some conservationists claiming that local fishers are also involved in illegal shark fin fishing. A person who has extensive experience within the fisheries sector expressed: "*In Galapagos, we do not do shark fin fishing anymore. They [GNP] must tell us if they have caught anyone fishing sharks. The galapagueño [how locals are known] is not doing this activity anymore. All are fishing boats from Manta [a fishing port in the coast of Ecuador]. They are the ones that take [shark fins]*" (F18, SL). Fishers also noted that improved markets for spiny lobster and yellow fin tuna, especially for fishers in Santa Cruz, have contributed to better incomes from legal fisheries: "*I did shark fishing a long time ago, when we did not have good opportunities, but now, I prefer to catch tuna or to catch other type of fish to sell to tourism. This gives me more money in fewer days of fishing*" (F116, SZ).

7.4 Discussion

The five themes presented above represent the most recurrent perceptions of small-scale fishers regarding the 2016 re-zoning process of the GMR. The exploration of local perceptions presented in this study raises questions about the legitimacy, fairness, transparency, and viability of this particular management strategy. We focus our discussion on some of the key arguments expressed by fishers and contrast those with findings from the literature.

7.4.1 Arguments that Entrench Opposition

Concerns about the balance of cost and benefits of closing productive fishing areas during marine zoning, and limitations of spillover effect, are not unique to the Galapagos case study

(e.g. see Goñi, Badalamenti, and Tupper, 2011; Hilborn et al., 2004; Pita et al., 2011; Voyer, Gladstone, Goodall, 2014). In the Galapagos, surveyed fishers expressed that even if they had the entire reserve open to them, fishing activities would be preformed only in specific areas; thus, closing those areas will intensify impacts on both fishing costs and yield. Moity (2018) observed in his evaluation of NTZs in the GMR 2000 zoning plan that although most of the GMR was open to small-scale fisheries, most fishing activity occurred in specific high-value areas (i.e. near coastlines for benthic and demersal species, in shallow seamounts (called "*bajos*") for pelagic species; and in the far-northern region that contains the Darwin and Wolf islands). These are the areas which are now closed.

Furthermore, it is perceived that the closure of what fishers claim are their most productive fishing areas will result in changes in their fishing effort. While some studies have shown that conservation zoning is not always the major factor determining spatiotemporal variation of a fishing fleet fishing (Castrejón and Charles, 2020), it is clear that in this case fishers perceive it as very significant. Perceived costs of displacement included: increased distance of fishing trips that incur more expenses (e.g., extra fuel and ice, higher labour costs); fishing in unfamiliar ground means increasing search time; extra risks for boats and people arise as fishers are pushed to fish farther; and increased competition results when there are more fishers in the remaining fishing areas. These concerns were also found in other areas where fishers similarly faced displacement due to MPA implementation (Jones, 2009; Kamat, 2018).

The expressions of angst, despair, disappointment and resentment evident in our study, were also expressed in other contexts where fishers were facing displacement by MPA regulations (Jones, 2009, Jones, 2016; Kamat, 2018; Voyer, Gladstone, Goodall, 2014). The perceptions also reveal a sense of vulnerability, as fishers believe that reserve managers and conservationists overlook the needs and aspirations of local people, pushing them away from their fishing livelihoods. As Agardy, Claudet, and Day (2016) note, in many cases of MPAs implementation, conservationist often seem unconcerned about how displacement could inadvertently prompt social conflicts and reduce profitability.

Fishers' perceptions of the new zoning are also rooted in what is seen as an inequitable distribution of costs and benefits of marine regulations. Fishers note that restrictions were imposed for the fishing sector, but not for tourism. Mascia and Claus (2009) demonstrated that as fishing is extractive, at least in the short run, fishers' livelihoods can be highly impacted by conservation-driven regulations, whereas tourism interests are often compatible

with, or benefit immediately from conservation. Fishers in our study, however, felt that small scale fishing was as compatible with conservation goals, as was tourism. Barragan-Paladines and Chuenpagdee (2017) in their exploration of the creation of the GMR, found that decisions were strongly influenced by national and international interests that promoted nature-based tourism as an area of economic expansion. The Galapagos Islands are known as one of the world's top-ten diving sites (Forbes Magazine, 2017), and advocates of the marine sanctuary promote it as a must-visit site due to the abundance of sharks; this is a key attraction for people who can afford the high prices charged by the few companies permitted to operate within the marine sanctuary.

Notably, some have argued that the tourism sector has not been strictly regulated (Grenier, 2007; Schep, Ruesen, Luján-Gallegos, 2014), and that its direct and indirect environmental impacts in the Galapagos surpass the effects of, for example, the reduced fisheries sector (Benitez-Capistros, Hugé, ad Koedam et al., 2014). The apparent alliance between conservation management and the tourism sector in the Galapagos, has led to suspicion and resentment from the fishing sector. Some important tourism enterprises that have cruise ship operations and hotels in the Galapagos provide funding to conservation initiatives. For example, the international tourism company Lindblad Expeditions, which has been offering multiday cruises in Galapagos since the 1960s, represents a significant revenue stream for the Galapagos conservation (Epler, 2007). This company supported the National Geographic's Pristine Seas Project, providing $500,000 USD between 2014 to 2018 (LEX-NG Fund - Lindblad Expeditions, 2019).

On the question of feelings of trust, Voyer, Gladstone, Goodall (2014, 455) note the dangers of "*encouraging fishers to nominate their favorite fishing sites in planning processes as this might facilitate or feed feelings of betrayal*." Fishers contend that during the participatory process to assess potential conservation zones, they reported their most productive fishing areas that later were allocated as NTZs. This generated feelings of betrayal amongst participant fishers and intensified the distrust towards the reserve management as it is perceived that information they provided "in good faith" has been "used against them" (e.g., in the establishment of new regulations).

Regarding issues of control and surveillance of illegal fishing, fishers claim that their presence in the far-northern region of the marine reserve—through their fishing activities—has helped prevent illegal fishing in that area and thereby advance the interests of conservation. They argue the exclusion is not only inequitable, but also harmful to

conservation interests. Since the new marine sanctuary was established, the GNPS rangers and local NGOs have caught and confiscated illegal shark catches within the reserve (Carr et al., 2013); for example, in August 2017, a year after the declaration of the Darwin and Wolf Marine Sanctuary, 300 tons of shark fins were found in a Chinese vessel illegally fishing inside the protected area (Galapagos Conservancy, 2017). The reserve is constantly under pressure due to industrial fishing vessels concentrated along its border threatening to trespass; this threatens the interests of both fishers and conservationists.

7.5 Conclusion

The perceptions identified under the five themes above, provide insights to the local resistance to conservation initiatives. They suggest concerns about legitimacy and fairness in decision-making processes and threats to local well-being based on power imbalances. Clearly, if conservation managers are to win the support of the fishing community, they must understand and address the perceptions listed above. A thorough consideration of the norms and guidelines on incorporating human dimensions into MPA management (cf. Bennett et al., 2017; Charles and Wilson, 2009; Lockwood, 2010), and a return to the participatory management practices that were in place in the Galapagos through the first zoning exercise, could have addressed the conflicts that occurred and expedited advancement of an effective conservation agenda.

Our exploration of the 2016 re-zoning process was not undertaken to question whether or not the designation of NTZs in the Galapagos would contribute to marine conservation and fisheries sustainability, nor to question the importance of establishing the Darwin and Wolf Marine Sanctuary, but rather to highlight the implications of new management strategies that had been adopted in this important conservation area. The examination of local perceptions presented in this study, provides information that is valuable at two scales: 1) at the local scale – the identification of ideas and interpretations that underpin fishers' resistance to marine planning could help managers in the Galapagos to address concerns and to work towards a reconciliation that would address both conservation and social concerns; 2) at a more general scale—given that research on fishers' attitudes and perceptions is considered important for the success of MPAs (Pita et al., 2020), the results of this study should contribute to the understanding of social acceptance as an essential element for the long-term sustainability of conservation management strategies (Voyer, Gladstone, Goodall, 2015).

The complications that have arisen in the Galapagos following the ambitious new zoning plan should help conservation planners elsewhere deepen their commitment to addressing the human dimensions of conservation. As is evident from this study of resistance to imposed changes in marine planning, failure to include fishers' perceptions and concerns in the rush to achieve conservation outcomes, only led to the erosion of trust and, ultimately, to delays in implementing the zoning plan.

As the process to reach an agreement on the new zoning advances, it will be important to determine how discussions between the fishing sector and managers of the GMR have evolved, and to identify the trade-offs that have taken place since this research was conducted. This will show whether, or how, fishers' perceptions have altered the approach to conservation and governance in the GMR, and whether resultant changes will improve the prospects of compliance with new zoning.

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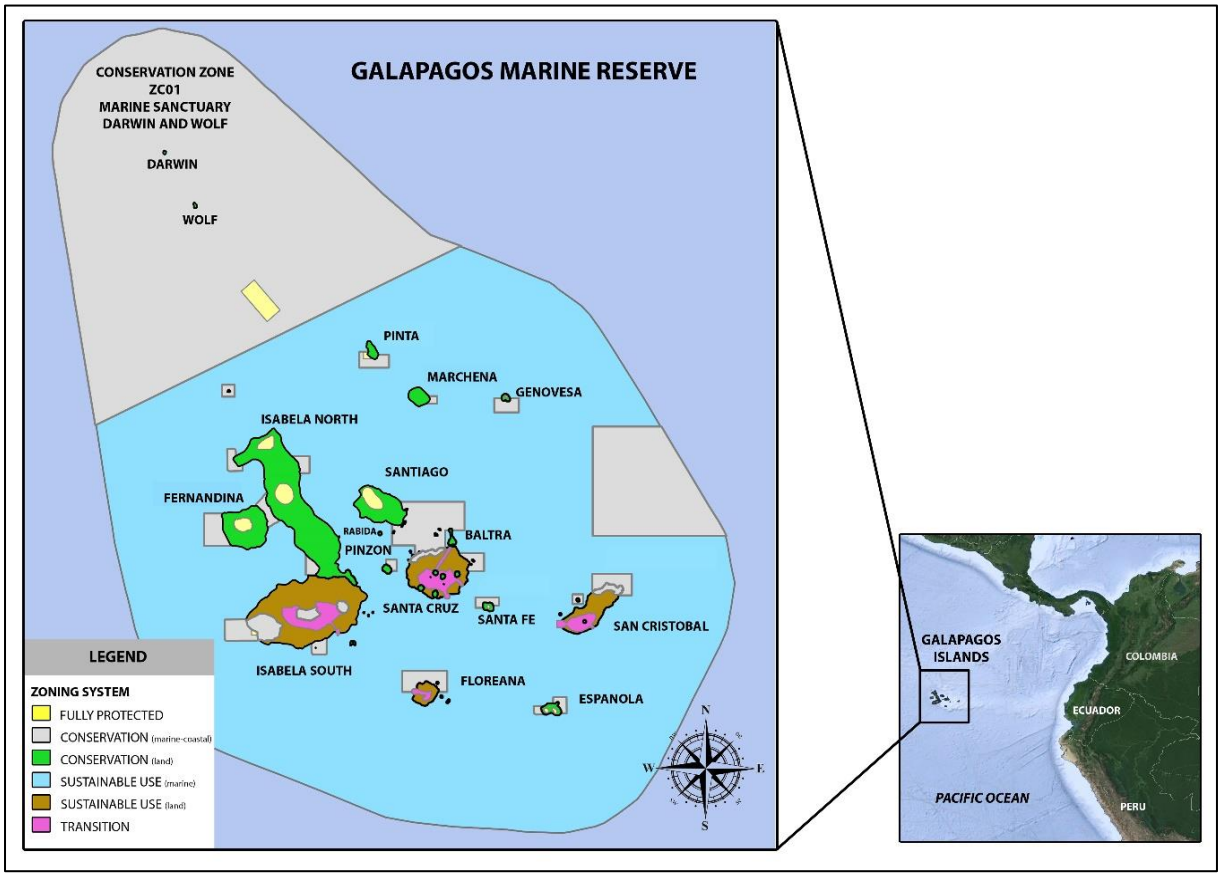
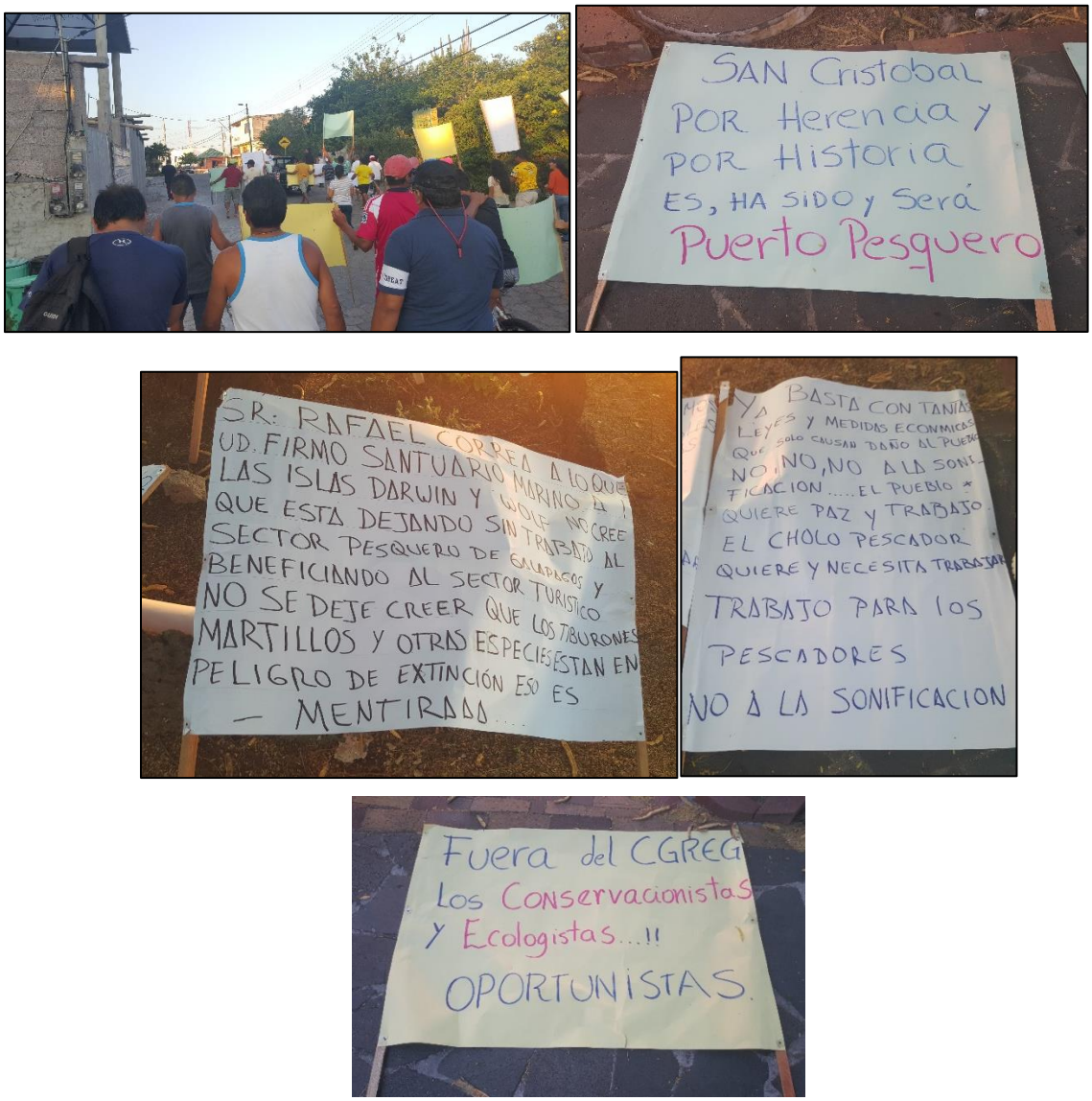
SUPPLEMENTAL MATERIAL



Map of the 2016 rezoning plan for the GMR. It includes four management zones: Fully protected (No-Use); Conservation (scientific research and some low-impact tourism permitted [e.g., the marine sanctuary where diving tourism is allowed]); Sustainable Use (general tourism and small-scale commercial fishing permitted); and the Zone of Transition (buffer zones near settled areas).

APPENDIX F.



Note: These photos were taken during protests held by fishers in Puerto Baquerizo Moreno - San Cristobal Island in early April 2016. The first photo on the right "San Cristobal by inheritance and history is, and will be a fishing port". Photo in the second row on the left "Mr. Rafael Correa, what you have signed as a marine sanctuary in the Darwin and Wolf Islands is leaving without work to the fisheries sector of Galapagos and benefits the tourism sector. Do not let them to convince you that sharks and other species are in danger of extinction, this is a lie". Photo in the second row on the left "Enough with so many regulations and economic measures that are affecting the people. No, no, no to the zoning. People want peace and work. *El Cholo pescador* (as fishers are called locally) needs and wants to work. Work for the fishermen. No to the zoning. The last photo "Out from the Galapagos Council all the opportunist conservationists and ecologists".

CHAPTER VIII: Conclusion

8.1 Summary of the Study and Contributions to Knowledge

The overall aim of this dissertation was to explore the interplay of biodiversity conservation initiatives, growing tourism, and social change in a region where established resource-based livelihoods have been important to both the local economy and to local culture. As outlined in the literature review (Chapter 2), this interplay has important implications for success reaching conservation goals while meeting community development aspirations. Against this background, the dissertation examined two overarching concerns: the first was to understand livelihood dynamics in a context where increasing conservation regulations and tourism growth have become key drivers of livelihood change; the second was to focus on one particularly important element of the processes driving change, that is, how decision-making procedures used in conservation management and in local governance affect, and are interpreted by, local stakeholders.

The area selected for study was the Galapagos Archipelago, an important conservation area where innovations in management are actively being sought in response to the "*Galapagos Paradox*"—that is, the fact that tourism has grown so dramatically that it threatens the ecological resources that attract both conservationists and tourists (Quiroga, 2009). This issue has become a major concern for conservation managers, for those in the tourism sector, and for members of the local community. Given the broad concerns about conservation and community development, findings based on the Galapagos case study are of value not only to local management challenges, but also to other conservation areas facing comparable transitions, and to the scholarly theories, models and methods that are used to explore such transitions.

The research used a multiple-case study approach, and drew on literature from five major academic fields: biodiversity conservation, marine conservation and management, public participation, tourism, and sustainable livelihoods. Within these bodies of literature, it drew from theoretical concepts, debates, and approaches that have contributed to the understanding of conservation, tourism and livelihoods interactions, and more broadly, to the human dimensions of biodiversity conservation where this dissertation aims to make contributions (see Fig. 8.1).

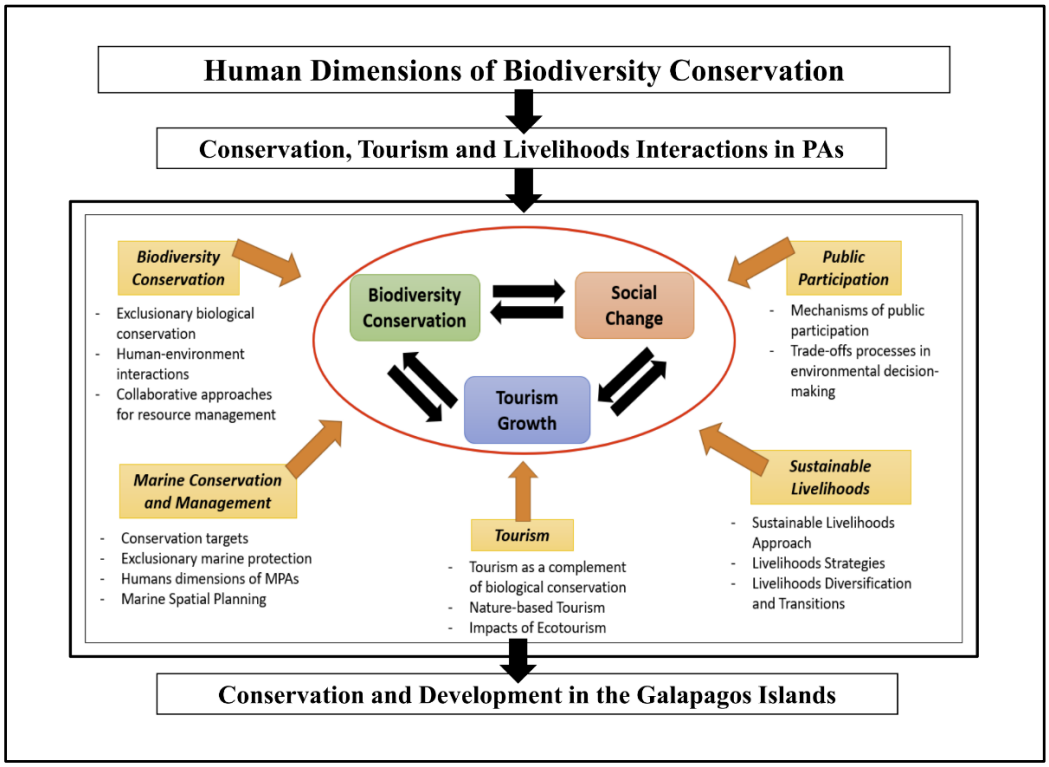


Figure 8.1. Conceptualization of the overall aim of this research and the relation to the academic fields that inform and frame the development of this dissertation.

To address the thesis overarching concerns, three specific objectives were determined:

1. To explore resource-based livelihoods diversification in the face of increased conservation regulations and growing tourism (Chapter 5).
2. To assess the record of stakeholder engagement in critical decision-making processes of marine conservation management (Chapter 6).
3. To examine the perceptions of those most affected and to understand how these perceptions influence acceptance of, and implementation of, proposed conservation interventions (Chapters 7).

Regarding research objective one, *chapter 5* explores recent patterns of livelihood diversification within the resource-based sectors of agriculture and fishing in three inhabited islands as they respond to increasing conservation regulations and tourism. Research objective 2, *chapter 6* assesses stakeholder engagement in marine conservation planning from the point of view of three key stakeholder groups of the marine reserve: the small-scale fisheries sector, the scientific research community, and the conservation management sector. In terms of research objective 3, *chapter 7* qualitatively explores the perceptions of small-

scale fishers from three inhabited islands regarding the marine spatial planning impacts and implications for local fisheries.

The following sections present, for each of the results chapters (5-7), a summary of key findings and a discussion of contributions to knowledge at the local level and to the above-mentioned academic fields that frame this research. Finally, an overall discussion is presented on how research findings contribute, more broadly, to research on human-environment interaction.

8.1.1. Chapter 5: Drivers and Inhibitors of Livelihood Diversification

This chapter presents empirical findings from a multiple case study research that explores the perceptions, motivations and actions of those still active in the resource-based sectors of agriculture and fishing. In particular, this study explores the reasons behind the decisions that people make to diversify their livelihoods or to transition into new occupations when emergent opportunities are available. The study revealed that in the Galapagos, livelihood diversification is a dynamic process, with people moving in and out of different economic activities based on the contextual conditions of their own island; the conditions of their main livelihoods as they shift over time; the perceived opportunities available to diversify income sources; the capability for accessing those opportunities; the barriers that are determined by a complex array of social, economic, environmental, and regulatory conditions; and by personal factors that influence aspirations and attachments.

Livelihood diversification and transitions respond to ‘push’ factors, such as market constraints, increasing regulations, and climatic variability; however, the pressure to switch is also driven by the increasingly high cost of living that has resulted from tourism growth. Transitioning from the resource-based sectors is also linked to ‘pull’ factors generated by the growth of tourism development, which varies across the islands. Tourism’s relatively high levels of profitability draw people from resource-based activities, especially on islands with greater tourism development (e.g., people in Puerto Ayora, Santa Cruz Island). Diversification strategies also respond to the ‘selective’ nature of decisions and choices in terms of convenience, seasonality, and social values. Livelihoods diversification widely-used mechanism has become a common adaptive strategy in the communities of the Galapagos. Both the agricultural and the fisheries sectors are in decline as people diversify activities, but particularly as young people prefer to work in other sectors, notable in tourism or other economic activities that are perceived as more profitable. This decline may be seen as a

positive outcome from the standpoint of biodiversity conservation if it reduces pressure on fish stocks, and if agricultural land is converted to uses that do not exacerbate the invasive species problem, but it does have implications for the sustainability of the established resource-based sectors that support the islands' communities, and for the autonomy of the islands' food system.

To the extent that livelihood transitioning is seen to be beneficial—either to reduce pressure on the resource base or to meet local development aspirations—it is clear that managers will need to be aware of the balance of drivers and inhibitors. Access to the full array of capital assets (i.e., including access to finance, but also network connections, knowledge and skills, health, education, and capacity to work) will support or restrict successful and beneficial livelihood diversification. Programs that specifically target training or subsidies may help ensure that desirable transitions are possible, that they are successfully adopted, and that intended consequences follow.

To illustrate the point, alternative livelihoods within the tourism sector, created by managers of the marine reserve specifically for fishers, are not accessible for the majority as the economic investment and requirements are difficult to meet. Fishers seek for partnerships with foreign investors to access opportunities; however, in many cases as outside investors absorb most of the benefits, the fisher becomes a dependent employee or a token local partner-of-convenience. Fishers' educational level and lack of technical training are also important barriers for accessing job opportunities within tourism. For farmers, on the other hand, entry-barriers for diversification are linked to their economic capacity to invest in agrotourism, and to the limited institutional support they receive. While the potential is seen to exist, it has so far been difficult for farmers and fishers to adapt to new opportunities.

Personal satisfaction with current livelihoods and lifestyle is an important determinant of quality-of-life, and these factors clearly enter into decisions about transitioning. Moreover, there are some in the resource-based sectors whose operations are seen to be more profitable that available alternatives. For farmers and fishers who have neither the desire nor intention to stop their resource-based activities, there is a natural, persistent and important concern about imposed limits on, and challenges to their livelihoods. Successful management of resource-based livelihoods will require understanding the selective, dynamic, and idiosyncratic responses to push and pull factors, the barriers to change, and the factors of attachment to existing livelihood activities.

8.1.1.1. Contributions to Knowledge

The conceptualization and development of this study present several contributions to knowledge. At the local level, the study provided valuable information about livelihoods dynamics. Agricultural and fishing livelihoods have different socio-cultural, economic, political, and environmental factors that influence them, yet findings from this study provide important insights about how differently people who depend on access to natural resources respond to specific opportunities and constraints, and how they react to the islands' regulatory environment, and to the main economic driver of change, tourism.

The site-specific comparison shows for example, differences on the level of engagement in resource-based activities across islands, the availability to diversify their livelihoods and which sectors are more appealing, different levels of profitability and opportunities associated to the level of tourism development of the island where they inhabit, and ultimately the level of interest to transition away from current livelihood practices. By identifying these differences between islands, managers in the Galapagos can create alternative livelihoods or develop programs that better fit the reality and aspirations of local communities. Each inhabited island in the Galapagos represents a social-ecological system by itself, where the complexity of human-environment interactions is determined by local factors that are unique to each island, and by contextual factors that are shared: basic biophysical conditions and geographical location, the same regulatory environment, and the same exposure to economic development forces.

By exploring livelihood diversification of land and sea-based livelihoods together, different perspectives became evident in terms of the specific factors that push people out from current practices or foster diversification, the pull factors associated to tourism development (i.e., opportunities created by market conditions or by regulatory institutions as they respond to the conservation agenda), barriers associated not only to access to financial capital but to social and human capitals that are important when opportunities are created, and the factors of attachment that are often neglected by managers of the PAs. As this study shows, resource-based activities are differently prioritized within the islands' communities, so the effects of increasing regulations and tourism growth generate different impacts on their livelihood strategies.

Apart from the study by Engie (2015)[75] there has been little research on livelihood diversification in the Galapagos. These perspectives on local responses to changed circumstances are valuable not only to understanding the islands, but also to formulating targeted management, policy and regulatory interventions which should contribute to conservation outcomes, and supporting sustainable community development in this important conservation area. Likewise, this study would be of value to biodiversity conservation and development debates elsewhere, as livelihood dynamics determined by the interaction of drivers and inhibitors, as explored in this study, make more explicit the complexity of factors that influence livelihood strategies, and therefore, livelihood outcomes which are expected to support the sustainable use of natural resources, the well-being of local populations, improve food security, and reduce vulnerability.

In terms of conceptual contributions, the framework designed to guide the analysis of this study provides a clear visualization of interacting factors that determine livelihoods diversification. This framework shows more explicitly the interaction of drivers and inhibitors of livelihoods change. While, of course, factors that work against push and pull factors are discussed in much of the work on livelihood diversification, it became apparent in this study that the inhibitors of change warranted as much attention as the drivers. This conceptualization may help identify value-based elements of livelihood adjustments (e.g., factors of attachment with existing livelihood practices), and help highlight structural barriers to adjustments (e.g., educational or financial limits to transition).

Additionally, the conceptual framework acknowledges the 'fluidity' of individuals decisions, and the selectivity of responses when determining livelihood strategies. By incorporating the concept of *selective diversification* proposed by Turner (2007), this study goes beyond "dualistic classifications of livelihood diversification" (cf. Turner 2007, 399) to include the notion of selectivity as an important determinant of livelihood strategies. Studies of livelihood diversification elsewhere could benefit from the application of this framework by focusing on the specific interaction of drivers and inhibitors of diversification and selective responses. This knowledge can be used in the formulation of compensation mechanisms or livelihood alternatives that can provide positive outcomes for both, biodiversity conservation and people's well-being.

[75] Engie presents an analysis of labor mobility in the fisheries sector of San Cristobal Island. Her study is based on data collected in 2012.

This study contributes to research on livelihood studies in the field of tourism. Calls have been made by scholars for greater attention to the complexities of livelihoods (e.g., see Ashley, 2000), including daily decisions and tradeoffs people make regarding livelihood strategies, and the wide range of tourism impacts, all of which reflect people priorities and realities. Despite the wide use of the livelihood perspective in other areas of scholarship, there are relatively few studies in the tourism literature that use the livelihood approach to explore individual decisions and choices linked with tourism, particularly when tourism is presented as an alternative to reduce pressure on natural resources in a PA context (cf. Ashley, 2000; Fabinyi, 2010; Carter & Garaway, 2014; Sene-Harper et al., 2019). This study provides a conceptual framework for advancing such studies, and an example of the utility of such studies.

Lastly, tourism is constantly promoted as a means to reconcile conservation objectives with the economic aspirations of communities that inhabit areas within or adjacent to PAs; however, the ecological and socio-cultural impacts of tourism have generated concerns about the sustainability of tourism activities. Nature-based forms of tourism have emerged to attempt to ensure the achievement of both conservation and sustainable development goals; this has produced what is, in some cases, a 'symbiotic relationship' between ecotourism and conservation (Boley & Green, 2016). For the tourism-conservation alliance to be more sustainable in the Galapagos and other Natural World Heritage Sites that are important tourist destinations, innovation has to occur to ensure the protection of natural resources and landscapes, while still addressing sustainable development concerns (Job et al., 2017; Font et al., 2019). Findings from this study make evident the effects of the interplay of the conservation-tourism alliance with local resource-based livelihoods, and show how increasing tourism drives social change. This study contributes to research and management studies on the potential role of sustainable tourism in supporting conservation outcomes while meeting community development aspirations.

8.1.2 Chapter 6: Legitimacy of Decision-Making Processes of Marine Conservation Management

This chapter presents empirical findings from a case study research that assesses stakeholder engagement in the decision-making process of the 2016 rezoning plan for the GMR. Through a mixed-methods approach perceptions, expectations and experiences of key stakeholder groups from the marine reserve were compiled and discussed. Although some level of

stakeholder engagement was encouraged during the elaboration of the new zoning, institutional instability and the top-down implementation of a marine sanctuary within the GMR promoted by external actors, were factors that fostered the sudden abandonment of stakeholders' engagement and events that caused social conflicts within the re-zoning process.

Disruptive elements encountered during the decision-making process were the following. Recurrent changes in the leadership of the institutions in charge of the management and conservation of the PAs led to inconsistency in planning, administration and access to authorities. Major disagreement with the small-scale fisheries sector, which was the most restricted group in terms of access to areas. Issues in determining the relevance of fishing areas during the development of the zoning plan due to the reluctant position of fishers because of mistrust. Political pressure from representatives of the fishing sector to avoid limitations. Power imbalances between stakeholder groups that compete for space and resources. Rush to approve the new zoning caused that the dissemination of the zoning plan was not held within the same participatory platform, principles, and methodology. Taken together, these created conflicts and obstacles to effectively negotiated trade-offs, to a sense of inclusion, and to an outcome that could be considered, in any sense, "win-win". It negatively impacted local fishers, and undermined implementation of what was presented as an important conservation initiative.

Different actors from the GMR presented similar concerns about rushing the declaration of the marine sanctuary and its inclusion within the new zoning plan without previous discussions with resource user groups. Findings from this study suggest that the top-down approach intensified disagreements and distrust among the fisheries sector and the GMR managers, and affected the legitimacy of the zoning process. Also, a further issue of contention for local stakeholders was the ability of an international conservation agency to lobby and influence management processes, successfully silencing the voice and agency of local communities and authorities.

The failure to successfully engage local actors within the governance of the GMR have had negative implications for the 2016 rezoning plan, where the zoning concluded with a top-down approach, and stakeholder engagement ended up being a demonstration of 'tokenistic' participation. A return to exclusionary decision-making intensified distrust between fishers and managers of the GMR, triggering feelings of betrayal and resentment, and undermining the level of trust gained at the beginning of the process for establishing the new zoning

scheme. The history of antagonism between the GNP and the fishing sector continues and keeps affecting decision-making processes of marine conservation and management with implications on the sustainability of the marine reserve.

8.1.2.1 Contributions to Knowledge

This study provides an original assessment of the Galapagos' 2016 re-zoning process in terms of stakeholder engagement. At the local level, the exploration of the new zoning process is valuable as it exemplifies challenges associated with rushed conservation initiatives that are promoted and supported by large external conservation NGOs. More broadly, this case study demonstrated how a return to exclusionary conservation, can undermine acceptance of conservation practices and jeopardize the effectiveness of MPAs management. Also the study makes evident the negative impacts of no-take MPAs that arise when these are implemented by external actors, with power to lobby at the highest hierarchical level of governance, and who rush to meet their conservation agenda without recognizing or incorporating local actors. In an area where a co-management regime was implemented, and where there are commitments to an SES approach to governance, exclusionary forms of marine conservation management are clearly counterproductive. These results are of wider interest, as exclusionary conservation is occurring worldwide, with implications for the long-term effectiveness of biodiversity conservation (e.g., see Jones, 2016; Kearney et al., 2012; Leleu et al., 2012; Voyer et al., 2015; Kamat, 2018).

Given the urgency of states to comply with international commitments of marine conservation, this study empirically brings attention to the negative effects of rushing the implementation of conservation targets through the establishment of no-take MPAs, particularly when these are associated with growing narratives that follow a protectionist mandate (Agardy et al., 2003; De Santo et al., 2011; Agardy et al., 2016). Some scholars argue that only fully PAs are effective to preserve biodiversity (Costello and Ballantine, 2015; Sala and Giakoumi, 2017; Sala et al., 2018); nonetheless, other academics have challenged the effectiveness of no-take zones as the only form of marine protection (Jones, 2002; Jones, 2006; Hilborn et al., 2004; Castrejón and Charles, 2020). Regarding the GMR, studies have shown there are different human and climatic drivers that influence pressure on marine resources, so caution has been made to "the interpretation of no-take zones effectiveness" (Castrejón, 2018:189, see also Castrejón and Charles, 2020). Moreover, scholars have brought attention to the social conflicts these areas pose when socio-cultural,

economic and political factors are not considered (e.g., see, Jones 2006; Jones, 2009). This study contributes with empirical information to these discussions.

Insights from this study, also contribute to academic discussions that question the effectiveness of marine conservation interventions that marginalize resource-user groups in decision-making processes (e.g., see Chapin, 2004; Lele et al., 2010; Cinner et al., 2014; Jentoft , 2017). Despite wide acknowledgement that long-term successes of biodiversity conservation depend on the incorporation of 'social dimensions' within the design and planning of PAs (e.g., Mascia et al., 2010; Charles, 2012; Bennett and Dearden, 2014), this case study shows that commitments to integrate local voices in the Galapagos' marine planning were overlooked. The assessment of the new zoning process support calls for the need to consider human dimensions in marine conservation to ensure long-terms conservation outcomes (cf. De Young et al., 2008; Charles and Wilson, 2009; Charles, 2014; Christie et al., 2017; Gray et al., 2017; Bennett et al., 2017b)—in particular, socio-political considerations in the design and the process that leads up to the establishment of MPAs (Chuenpagdee et al., 2013).

It has been amply argued that stakeholder engagement is key for the success of environmental conservation management[76] (Webler et al., 2001; Webler and Tuler, 2006; Reed, 2008), in particular throughout the development of any fisheries management strategy (Gutiérrez et al., 2011). Findings from this case study contributes to the literature of public participation by supporting calls on the decisive role local actors play in the planning and management of PAs. The level of engagement of local actors in the rezoning process is an example of what it is considered 'tokenistic participation' (cf. Flannery et al., 2018). Local actors are encouraged to 'participate' in the Galapagos to respond international calls for community involvement in conservation planning (i.e., and as a response to the co-management regime for the GMR); nonetheless, stakeholder engagement during the re-zoning process was a form of 'passive' participation where local actors became agents of consultation rather than 'active' agents of conservation planning (Brown, 2002; Reed et al., 2017).

This study also contributes to discussions about the effects of top-down conservation management as this reduces the legitimacy of policy-making (Jentoft, 2000; Smith, 2012). The use of top-down exclusionary approaches in the Galapagos has caused and intensified

[76] However, it is also recognized that this adds complexity to decision-making processes due to the different actors that are involved (Andrade and Rhodes, 2012; Colvin et al., 2016; Reed et al., 2017).

social conflicts (González et al., 2008; Castrejón and Charles, 2013; Castrejón et al., 2014). Findings from this study bring attention on how the GMR governance has failed to address continue exclusionary interventions for marine conservation, and exemplifies the negative effects of shifting governance regimes—i.e., from a co-management approach to one that reduces the level of stakeholders involvement within the decision-making of the marine reserve.

Finally, the top-down implementation of the Darwin and Wolf Marine Sanctuary, exemplifies a case of "ocean grabbing" (cf. Bennett et al., 2015); a phenomenon that is understood as the 'capture of control' by powerful actors of key decision-making processes of marine conservation, where these actors decide how (e.g., through government or private sector initiatives) and for what purposes marine resources are used, conserved and managed, resulting in different impacts on local resource user groups (Bennett et al., 2015; Brent et al., 2018).

8.1.3 Chapter 7: Perceptions Underlying Local Resistance to Marine Planning

This chapter addresses the need cited by several scholars (e.g., Pita et al., 2011; Bennett, 2016; McNeill et al., 2018; Ward et al., 2018; Pita et al., 2020) to understand the ideas, attitudes, and more broadly the perceptions, of those affected by marine conservation interventions. It presents findings from the qualitative exploration of fishers' ideas and interpretations about impacts and implications of the GMR marine spatial planning. Recurrent perceptions were identified using content analysis, and were grouped within five dominant themes. By exploring claims and concerns of a key stakeholder group from the GMR in response to conservation regulations, this study identified key reasons that underlie opposition, which is shared by fishers across the three inhabited islands. The fishers' concerns are visually represented in a word cloud (Fig. 8.2) .

Fig. 8.2. Fishers' perceptions underlying resistance to marine zoning. The relative frequency of each concern is shown by the size of the font used to print it. (*Source:* R Project for Statistical Computing v4.0.3., R word cloud package).

The study of fishers' perceptions and interpretations presented in this chapter provide an understanding of the assessments outlined in Chapter 5 and 6 in terms of effects of increasing regulations to their livelihoods. Findings from this study raise important questions about the legitimacy, fairness, transparency and viability of the new zoning plan. Resistance to marine planning outcomes is rooted in what is perceived as an inequitable distribution of costs and benefits of marine conservation management; with the rezoning plan, restrictions were imposed for the fishing sector, but not for tourism. The closure of what fishers' claim are their most productive fishing areas was perceived will impact fisheries profitability. Fishers' comments show degrees of uncertainty and pessimism about the future of the fishing sector. They fear that reasons to increasing regulations is to reduce fisheries, and eventually allow only tourism activities within the GMR. These factors directly impact the adoption and eventual success of conservation initiatives, and certainly indicate the extent to which an SES approach to management would have to adapt to hearing these voices.

Expressions of angst, despair, disappointment and resentment were evident among fishers from the three islands. There was a sense of vulnerability from fishers' comments as it is believed that the reserve managers and conservationists overlook the needs of local people. Fishers consider new regulations push them away from their fishing livelihoods. Although most interviewed fishers expressed similar concerns about the implications new regulations

will have on fisheries, results suggest that the effects will be greater in San Cristobal Island: fisheries are more relevant in the local economy of this island than tourism.

A persistent problem for the management of the GMR is existing issues of trust between stakeholder groups. Outcomes from the re-zoning process worsened mistrust towards the reserve's management. The way the marine sanctuary was implemented heightened resentment toward managers of the GMR and conservation-allied institutions. The continued opposition from the fishing sector has hampered zoning implementation for more than four years. Advancing past the "fences and fines" approach of fortress conservation will require that these issues of trust, legitimacy and transparency be addressed.

8.1.3.1 Contributions to Knowledge

This study brings attention to the value of understanding local perceptions of conservation management, as these detailed assessments can provide significant insights into the social impacts of conservation strategies, the legitimacy of decision-making processes, and the level of social acceptability of management strategies. The understanding of local claims and concerns is considered by several scholars as key for the effective implementation of MPA's policies (e.g., see Pita et al., 2010; Pita et al., 2011; Leleu, 2012; Bennett, 2016; McNeill et al., 2018; Ward et al., 2018; Pita et al., 2020). This study provides empirical evidence of the strategic importance of assessing social concerns that can critically impede advancement on marine conservation management.

The study shows that heightened resentment and issues of mistrust within stakeholder groups can undermine the effective implementation of marine planning strategies necessary for both for the preservation of species and habitats and for the provisions of environmental services. Ultimately, it is stakeholder's perceptions that shape actions, and actions that shape impacts and outcomes. Consequently, in dealing with stakeholders from resource-base economic sectors such as fishing, it is critical to grasp the perceptions.

The perceptions explored in this study come from fishers at the grassroots level, these views are often neglected during decision-making processes. These findings make it evident to the conservation community what the impacts and implications of exclusionary marine planning are. If the SES approach that has been so praised locally and internationally is to be implemented effectively, the detailed perceptions of under-represented stakeholders will be critical. The five themes presented in this study show that fishers, even though living on different islands, shared similar expectations and frustrations. These perceptions must be

recognized and addressed to promote stakeholder support for conservation objectives and to minimize conflicts over enforcement of new regulations. Winning support and avoiding conflict may be essential for the long-term sustainability of marine conservation management in the Galapagos.

Effective stakeholder engagement processes can arise from fair and effective consultation processes, or from genuine participation in decision-making. The decisions that shape practical conservation management, conservation planning, and conservation policy should recognize the nuances of, and variations within, the perceptions of stakeholders who rely on the ecological resources of protected areas (Bennett and Dearden, 2014a; Bennett, 2016). Fishers' displacement from their most-used fishing areas through zoning has frequently resulted in resistance to new regulations, which in turn poses negative implications for the long-term effectiveness of marine conservation strategies (e.g., see Jones, 2009; Mascia et al., 2009; Cinner et al., 2014; Kamat et al., 2018; Flannery et al., 2018). This is particularly true when MPAs are designed, implemented and managed through exclusionary approaches (e.g., see Charles and Wilson, 2009; Mascia et al., 2010; De Santo et al., 2011; Charles, 2012; Chuenpagdee et al., 2013; De Santo, 2013).

The detailed assessment of perceptions presented in this study offer insights into the variety of issues that underlie resistance: for example, respondents in this survey had a wide array of concerns about factors that would increase the costs or reduce the viability of their operations, with potential impacts to their livelihoods. Only with this understanding can managers target effective responses. Another example, the fishers' perception that their presence in the northern part of the archipelago may actually enhance conservation by contributing to the surveillance of illegal industrial fishing within the marine reserve is something could only be understood by allowing the voices of fishers to be heard. With that information, technical managers—or scientific researchers—could explore the implications and perhaps work towards a mutually beneficial trade-off.

To optimize conservation outcomes and encourage social justice in marine protection, attention must be paid to the balance of 'winners and losers' of conservation initiatives to generate fair and equitable outcomes for all stakeholder groups (Cinner et al., 2014; Flannery et al., 2016). This study supports concerns about the impacts that arise when biodiversity conservation is prioritized over human use, without considerations of the socio-economic impacts for local communities. These costs are greater when there is an inequitable distribution of costs and benefits amongst resource user groups (Mascia and Claus, 2009).

Tourism interests are often seen as being compatible with, or as benefiting from conservation, but, as this study shows, the conservation-tourism alliance can raise questions of power imbalances in decision making, and can create conflicts that raise ethical questions when nature is commodified to serve the interests of a conservation-tourism alliance.

Overall, this study support calls for managers, scientists, and local communities to work collaboratively to reach agreements on the scope of protection and use of a conservation area, which under no circumstances should be done by excluding local resource users (De Young et al., 2008; Charles and Wilson, 2009; Charles, 2012; Chuenpagdee et al., 2013; Bennett and Dearden, 2014a). It supports recommendations for the urgent incorporation of the 'human dimensions' of MPAs (cf. Charles and Wilson, 2009), for adoption of the 'principles of good governance' (cf. Lockwood, 2010), and the application of a 'code of conduct' for researchers, managers, practitioners and policy makers (cf. Bennett et al., 2017). The detailed study of perceptions of stakeholders shows the added value that scholars (including Pita et al., 2011; Bennett, 2016; McNeill et al., 2018; Ward et al., 2018; Pita et al., 2020) advocated, and provide local managers with insights that can be used to identify possible trade-offs, and provide an understanding that may help marine conservation managers elsewhere avoid the barriers encountered here.

8.2 Contributions to Human-Environment Research

By exploring the interplay of biodiversity conservation initiatives, growing tourism, and social change in the Galapagos' three most populated islands, findings from this research contribute to building understanding on how human dimensions can effectively be incorporated into conservation planning and management in the archipelago, and elsewhere, by bringing attention to: 1) the effects of individual livelihood decisions and choices on PAs conservation when regulatory factors and tourism growth interact; 2) the role of public engagement in the design, implementation and management of a PA to ensure the effectiveness of conservation strategies; and 3) the importance of considering local attitudes and perceptions that motivate actions and influence behaviors, which ultimately support or challenge conservation actions. This empirical exploration of human dimensions in the Galapagos Archipelago will enhance understanding of the social system, and thus, will contribute to a better understanding of social-ecological interactions. By exploring biodiversity conservation, tourism, and livelihoods interactions in a PA setting, findings from this research contribute more broadly to human-environment interactions research (Fig. 8.3).

The SESs model applied for the governance of the Galapagos has been transformative in the management of the PAs, as well to address conservation and development demands. Broadly, this research support the continued application of the SESs model, which recognizes the importance of addressing both natural and human systems (González et al., 2008). Through the exploration of human dimensions, knowledge of the Galapagos SES can be increased by ensuring feedback mechanisms (stakeholder input in environmental decision-making), adaptive capacity (learning from and responding to evolving circumstances), cautious about power imbalances (big NGOs that lobby at higher levels of governance), and most importantly, the application of SES has to be not just promises but adhered to. Successful conservation management in the Galapagos will require the application of collaborative governance approaches and the successful implementation of the SES model that address concerns found through this research. Communities that have conservation policies that consider at the same time both natural and social-economic dimensions can have a greater capacity to respond to systems changes in a sustainable way.

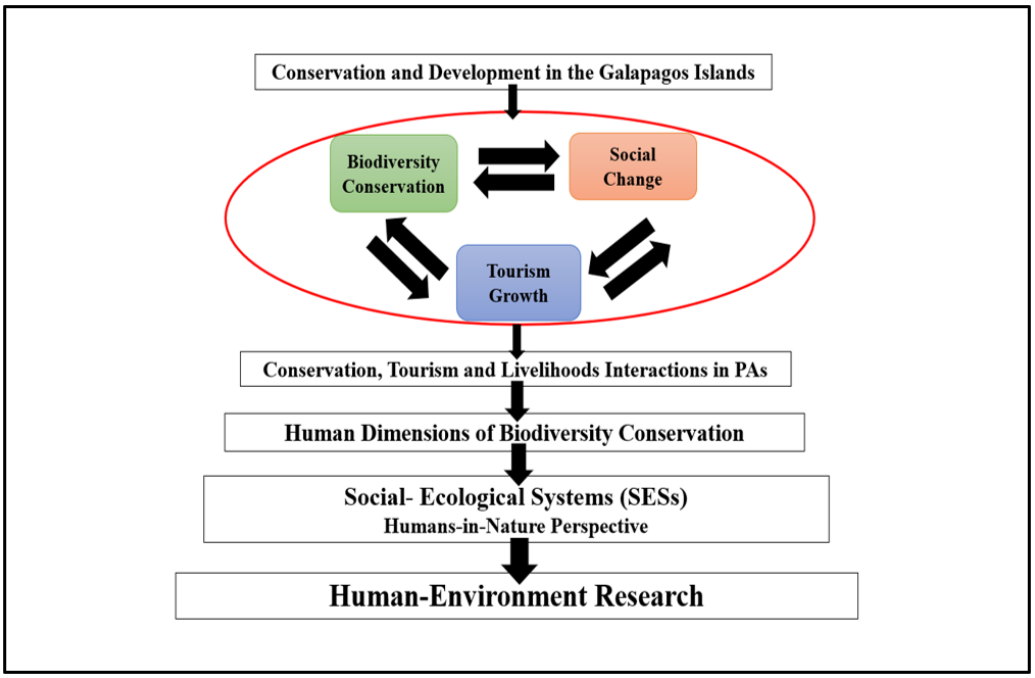


Figure 8.3. Conceptualization of how this research contributes in a broader sense to the academic field of human-environment interactions research, through the nested research areas that defined the terms of reference for this study of the interactions of conservation, tourism and social change.

The Galapagos Islands presented an interesting context for examining the human dimensions of conservation in a setting where: a) there are internationally recognized biodiversity assets

that are targeted by conservation programs; b) there are resource-based livelihoods that are seen as a threat to conservation objectives; c) tourism has played an important planned role in efforts to encourage transitions away from resource-based livelihoods; and, d) where progressive conservation managers have recognized and made efforts to engage in inclusive, collaborative, SES-based management. These conditions provided an opportunity to explore the effectiveness of management strategies, most notably, to determine how effective engagement strategies have been and how the livelihood alternatives presented by tourism have influenced transitions within the communities.

Studying the three most inhabited islands, each with important fishing and farming sectors, allows comparisons of the complexities of SES dynamics. These complexities were made evident in the differences reported and discussed in the results: Chapter 5 contrasting sectors and islands, Chapter 6 and 7 showing differing reactions to decision-making processes and different perceptions of impacts. Some aspects of the differences can be represented in word clouds (Fig. 8.4), a qualitative analysis tool that allows the relative importance of attributes to be visualized. For example, using the date from the livelihood assessment (Chapter 5) it is clear that both farmers and fishers consider that tourism generates opportunities for their own resource-based activities, and the majority feel it provides opportunities for the community at large. Lower profitability of their own sector is a concern to both groups. However, the record of livelihood diversification and the willingness to transition is much more evident for fishers than for farmers.

Group Farmers

Group Fishers

Fig. 8.4. Livelihood perceptions for farmers and fishers. Word clouds for data used in the study of livelihood diversification. The relative frequency of each variable is shown by the size of the font used to print it. (*Source:* R Project for Statistical Computing v4.0.3., R word cloud package.)

If the responses are broken down by island (Fig. 8.5), it becomes evident that there are considerable and important contrasts between them. These data are analysed and discussed in Chapter 5, and the point here is not to repeat that assessment, but rather to emphasize the complexity of SES variations by showing this visual representation. To the extent that the word clouds reveal characteristics of the "social" part of the SESs on the respective islands, it is clear that they cannot be considered as homogeneous. This poses challenges for conservation management. These visualizations of differences in priorities between sectors and amongst islands indicate the real challenge of effective and inclusive conservation management: each community and each affected sector has a distinct prioritization of concerns and a distinct response to perceived circumstances. The apparent failure of the consultation process – the failure to find "win-win" outcomes – in the marine zoning initiative indicates that once the expectation of inclusion is proffered, as the SES model of management in the Galapagos did, then resistance will mount when the expectations are not met. What the variability in the word clouds suggests is that effective SES approaches to conservation will require a nuanced engagement process that recognizes variance within the social system. Of course, the adage about the challenges of "pleasing all the people all the time" is pertinent, and may always be frustrating to those attempting to advance conservation

interests in a socially just manner: communities are not homogeneous and, in many cases, consensus may be impossible to achieve.

Yet, in the decades since conservation and community development began to be considered together, significant innovations have taken place; fortress conservation and community displacement are no longer widely supported, and myriad strategies have emerged for incorporating human dimensions into sustainable conservation strategies. The evidence from the research presented in this dissertation suggests that remarkable progress has been made in the Galapagos in articulating and adopting SES-based management; that a sense of urgency drove a new initiative that drew on international support but which, in its momentum, breeched commitments made to local stakeholders; and that reconciling the conservation imperative with local SES demands will require a reconsideration of the complexity of livelihoods and livelihood transitions.

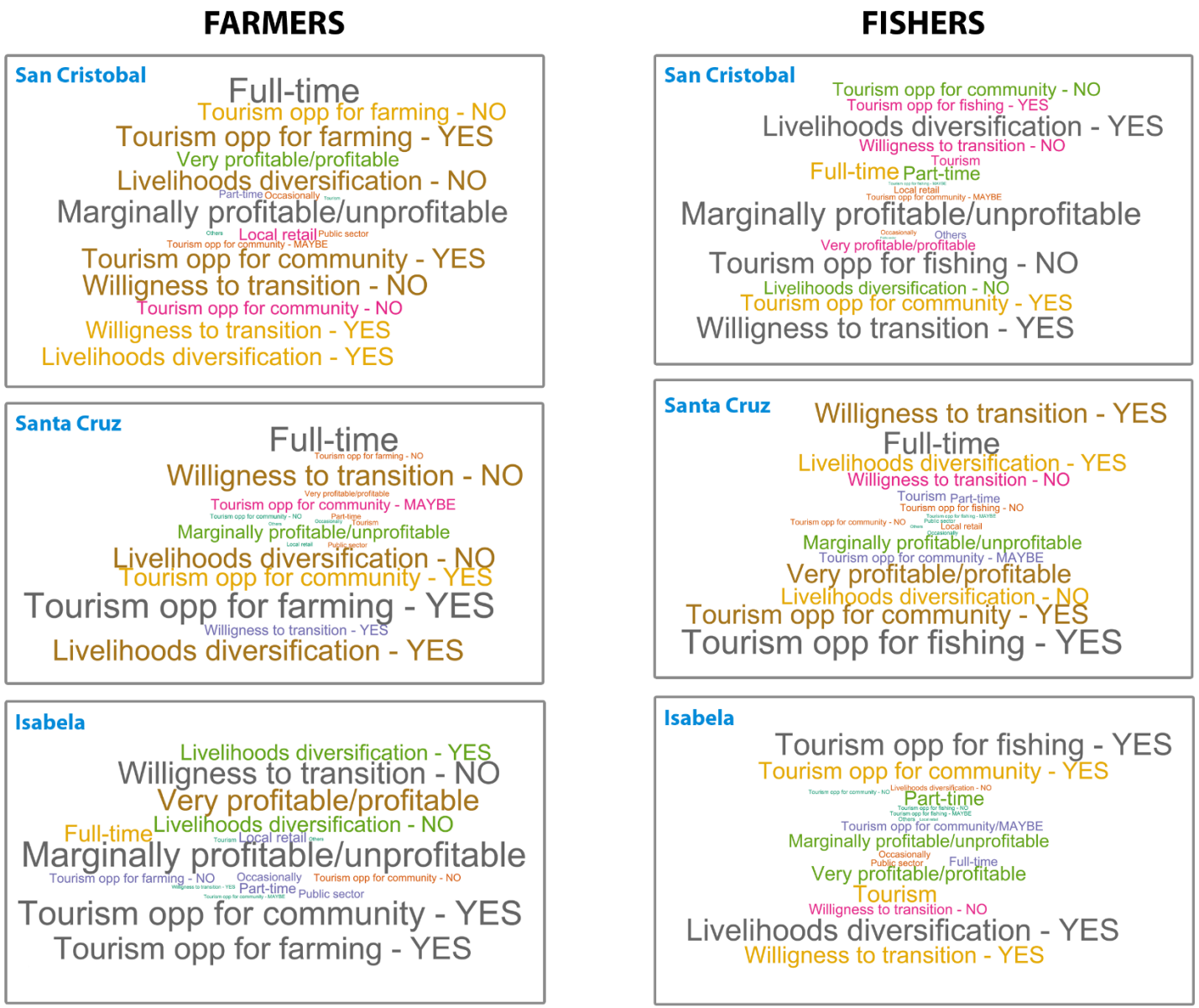


Fig. 8.5. Livelihood perceptions for farmers and fishers amongst islands. (*Source:* R Project for Statistical Computing v4.0.3., R word cloud package.)

8.3 Policy Recommendations

8.3.1 Conservation Management in the Galapagos and Livelihood Considerations

It is important that in the Galapagos, the design of conservation regulations truly acknowledge the significance of resource-based livelihoods, and the factors that shape activities within those livelihoods in practice. Livelihood diversification choices and transitions are a result of a complex array of perceptions, values and capabilities; but also, of institutional support. Managing a PA through tourism, will require understanding the selective, dynamic and idiosyncratic responses to the push and pull factors, as well as the barriers to change and the factors of attachment to existing resource-based activities. In the Galapagos, and elsewhere, conservation strategies formulated to reduce pressure of natural resources should not be done in isolation of what people consider are their real struggles or aspirations to achieve economic sustainability and community well-being.

Although in the Galapagos, tourism may have initially been seen as a benign economic activity, in terms of environmental impacts, its uncontrolled growth has driven the populated islands towards a path of unsustainability (in particular to Santa Cruz Island). While tourism does not rely on consumptive use of resources, and while it unquestionably can open opportunities for livelihood diversification and economic development, its negative effects have been recognized as creating significant social and ecological changes. Uncontrolled tourism development it is seen to have impacts that extend to the archipelago as a whole (de Haan et al., 2019). Given these contrasting impacts, there should be an immediate and thoughtful reflection about the path of tourism development in the Galapagos. In particular, attention should be paid to the volatile nature of the tourism market, and the effects on local communities that depend on a service economy. Local economies based solely on tourism are vulnerable to stressors and shocks such as environmental events, climatic variability, political and economic instability, or market constraints. The Covid-19 pandemic, for example, is showing the level of socio-economic impact that the Galapagos' communities are facing due to the complete cessation of tourism activities (Gozzer, 2020; Díaz-Sánchez and Obaco, 2020).

The power that representatives from the tourism sector have to lobby for their own benefit within the decision-making of the Galapagos is dangerous. Setting strict policies to regulate the size of the industry and the nature of tourism activities is imperative, especially as more people are transitioning into the tourism sector. Local livelihoods, such the ones explored through this research, but in particular fishing, are being impacted by tourism growth, regardless of the potential benefits tourism might generate for these livelihoods. In

the Galapagos (or elsewhere), tourism should not be considered as the panacea for conservation conflicts or as the only strategy to reduce pressure on protected natural resources. Supporting local livelihoods—such as the resource-based livelihoods explored in this study—to be economically and environmentally sustainable, could generate more positive outcomes for conservation and sustainable development in the Galapagos, as it has been seen elsewhere (cf. Sene-Harper et al., 2019).

Occupational opportunities created within the tourism sector, such as the *experiential artisanal fishing* (PAV) initiative—initiated by managers of the GMR to generate alternative livelihoods for local fishers, for example has provided some economic benefits for the few fishers that have been able to successfully transition into this new occupation. However, for many this has simply represented the loss of their rights: they have become employees of big national and foreign tourism companies or are struggling to maintain their businesses within a very competitive market (cf. Palacios and Schuhbauer, 2013; Engie and Quiroga, 2014; Erazo et al., 2017). Moreover, PAV has not contributed to reduced fishing intensity within the marine reserve as was expected (cf. Schuhbauer & Koch, 2013).

Experimental initiatives such as the PAV provide evidence of the complexity of winning local support and reducing conflict. This underscores why it is important that managers, researchers, practitioners and policy makers alike, recognize the research that advocates the incorporation of human dimensions of MPAs (cf. De Young et al., 2008; Charles and Wilson, 2009), and considerations of principles of good governance (cf. Lockwood et al., 2010) and codes of conduct (cf. Bennet et al., 2017a) within conservation management. Several of these principles were incorporated in management initiatives that followed González's et al., (2008) study that conceptualized the Galapagos Islands as a SES; however, these were not considered in the establishment of regulations explored in this study. The SES approach that had the potential to be transformative in the governance of the islands, it appears has not been truly integrated in the mindset of the many people working and managing conservation in there. The application of the SES approach in the Galapagos seems to be more rhetorical than applied in the practice. Principles of good governance and codes of conduct must be embedded in the institutions and organizations that support conservation and management in the Galapagos and adhered to.

The intervention of international NGOs that pursue their own agendas, and which exclude local socio-economic and political considerations—despite the putative commitment

in their own governance and publicity material—must be avoided, otherwise social-environmental conflicts will persist. In the Galapagos, as in other many conservation areas, a change is needed in the paradigm of conservation. This will require continued evolution of the attitude of individuals working and directing PAs and other public institutions to achieve, finally, a sustainable balance of both social and environmental goals.

Finally, findings from this thesis encourage the application of local perspectives research in the Galapagos as a way to incorporate local actors in decision-making processes of biodiversity conservation and management. As the case under study in this dissertation has shown, negative perceptions of conservation initiatives generate negative responses to new management interventions, reducing the level of cooperation necessary for the long-term success of PAs. The fishers' perceptions presented in this study become a part of the discourse that representatives of the fishing sector use to oppose new regulations. Most dramatic and significant of these are the beliefs that managers of the GMR seek to "eliminate" fishers from the marine reserve; that the alliance of tourism and conservation that "always" favor tourism development; that information provided in "good faith" for fisheries management has been appropriated and misused for exclusionary marine zoning; and that the "increasing regulations" primarily based on scientific studies do not recognize or fully-incorporate fishers' knowledge (e.g., in this regard see Usseglio et al., 2014). These are perceptions that are powerful in influencing behaviours within the complex SES of the Galapagos Archipelago, and they must be understood and addressed through collaborative and adaptive management. Ethical and just conservation actions should be put in place to de-root claims that hinder progress of marine conservation. Understanding local claims and concerns when conservation initiatives and programs are designed and implemented, will ensure that factors that undermine conservation outcomes are addressed in a timely, effective and sustainable way.

8.3.2 Policy and Management Recommendations Beyond the Galapagos Case Study

Based on findings from the studies in this thesis, Table 8.1 presents several policy and management recommendations that are applicable to conservation areas elsewhere.

Table 8.1. Policy and Management Recommendations with applicability beyond the Galapagos Archipelago.

Chapter 5: Drivers and Inhibitors of Livelihood Diversification	
Contributions to Knowledge	**Policy and Management Implications**
Local • Valuable information about livelihood diversification and transitions across two resource-based sectors and three islands. • Perspectives of local responses to livelihood changes are valuable to formulating targeted management, policy and regulatory interventions which should contribute to improved conservation and sustainable community development.	• Work with local representatives of the different livelihood sectors – farmers, fishers, and those with part time engagement in other sectors – will help identify livelihood dynamics within the community, and thereby help support an SES-based approach to conservation and sustainable economic development. • In order to advance the effectiveness of PAs as conservation tools, it is important that managers and policy makers truly acknowledge within the design of conservation regulations, the significance of resource-based livelihoods for local communities and the factors that shape activities within those livelihoods in practice.
General • Livelihood dynamics determined by the interaction of drivers, inhibitors and selective responses as explored in this study, show more explicitly the complexity of factors that influence livelihood strategies and therefore, livelihood outcomes.	• Regardless of the area, if there are human communities involved in or affected by conservation initiatives, identifying and understanding the drivers and inhibitors of livelihood change, as well as the array of selective responses, will improve the prospects of finding "win-win" outcomes that serve conservation interests while supporting community needs and aspirations. • Conservation strategies formulated to reduce pressure on natural resources should not be done in isolation from what affected stakeholders consider are their real struggles or aspirations to achieve economic sustainability and community well-being.
• Findings from this study make evident the interplay between the conservation-tourism alliance and resource-based livelihoods and provides further evidence of how increasing tourism drives social change.	• Given the contrasting impacts of tourism as an alternative livelihood intended to reduce pressure on natural resources, there should be an immediate and thoughtful reflection about the path of tourism development in areas that are hotspot for biodiversity conservation. • Tourism should not be considered as the panacea to resolve social conflicts in PAs or as the only strategy to reduce pressure on protected natural resources. Supporting resource-based livelihoods to be economically and environmentally sustainable could also generate positive outcomes for conservation and sustainable development.
Conceptual • The Adaptive Livelihood Diversification Framework provides a visual representation of interacting factors that determine livelihood strategies in a PA context.	• Using the Adaptive Livelihood Diversification Framework for analyses in other areas may help develop a systematic understanding of livelihood dynamics, and thereby help provide solid data for planning and management initiatives.
• This study contributes to research on livelihood interactions in the field of tourism by exploring individual decisions and choices when tourism is presented as an alternative to reduce pressure on natural resources.	• Careful attention should be paid in the generation of alternative livelihoods for resource-based livelihoods in PAs, as new livelihood alternatives such as tourism-related activities, can represent the loss of rights and jeopardize people's well-being. • Attention should be paid to the volatile nature of the tourism market, and the potential consequences for local communities that depend on a service economy. Local economies based solely on tourism are vulnerable to stressors and shocks, such as environmental events, climatic variability, political and economic instability, or market constraints.

Chapter 6: Legitimacy of Decision-Making Processes of Marine Conservation Management	
Contributions to Knowledge	**Policy and Management Implications**
Local • This study provides an original assessment of local stakeholder engagement of the 2016 re-zoning process for the GMR. • This case study exemplifies how a return to exclusionary conservation management can undermine acceptance of conservation practices and jeopardize the effectiveness of MPAs management. **General** • This study provides empirical evidence of the negative effects of rushing the implementation of conservation targets, particularly when these targets are associated with narratives supported by powerful external actors. • This study supports calls on the decisive role local actors play in the design, planning, and management of PAs. **Conceptual** • Contributes to academic discussions: o That question the effectiveness of marine conservation initiatives that marginalize resource-user groups in decision-making processes. o That bring attention to the effects of top-down conservation management and the impacts of the reduced legitimacy of policy-making. • Contributes to discussions about the effect of "ocean grabbing" for the long-term sustainability of conservation initiatives.	• Reviewing the process used to design the zoning, and contrasting it with the SES-based processes that had been under development on the islands, will illustrate trade-offs in management approaches and the merits of alternative approaches to public participation in environmental decision making. The inefficiencies and conflicts of the current situation may be resolved by addressing about engagement processes. • The lessons learned from this case show the risks of rushed and top-down decision making, and the merits of ensuring open dialogue and honest communication in conservation planning processes. • Provides information about the importance of trust relationships in conducting conservation research, and the consequences – for both researchers and managers – of a failure to meet norms in research ethics. • Due to the amounting effects of anthropogenic impacts on PAs, there is an increasing need to reshape the paradigm of conservation. This will require continued evolution of the attitude of individuals working and directing PAs and local institutions to achieve a sustainable balance of both social and environmental goals. • The interface between those engaged in scientific research and concern for protecting "global heritage" biodiversity resources and those whose established livelihoods are tied to exploitation of biodiversity resources must be addressed. Ocean grabbing simply fails to recognize evolved and adapted human relationships with marine resources. Research into marine conservation must recognize that and work with it.

Chapter 7: Perceptions underlying local resistance to marine planning	
Contributions to Knowledge	**Policy and Management Implications**
Local • This study provides local managers with qualitative insights that can be used to identify possible trade-offs and provide an understanding that may help marine conservation managers overcome the barriers that have stalled management strategies. • The results give voice to those who have felt marginalized and who believe their trust had been exploited. **General** • This study provides empirical evidence of the strategic importance of assessing social concerns that can critically impede	• These perceptions underlie the narratives of current resistance to the new zoning proposals. Understanding them, and addressing them systematically could be the most direct path to a satisfactory, stable, sustainable management plan. • The extra time required to record and document perceptions of those affected by conservation plans can identify a priori concerns which, if ignored, could needlessly halt or delay important conservation actions. Clearly, such detailed assessments should be integral to conservation planning, even when, or especially when, there is a sense of urgency and/or when opportunities arise to engage powerful, outside actors as allies or sponsors of new initiatives. • It is important to encourage the understanding of the human dimensions of MPAs and the analysis of local perceptions of

advancement on marine conservation management. • Findings provide significant insights into the social impacts of conservation strategies, the legitimacy of decision-making processes, and the level of social acceptability of management interventions. • This provides further evidence that to optimize conservation outcomes, social justice concerns must be addressed. This requires that attention be paid to the balance of 'winners and losers' in conservation initiatives in order to generate equitable outcomes that address all stakeholder groups. **Conceptual** • Overall, this study support calls for managers, scientists, and local communities to work collaboratively to reach agreements on the scope of protection and uses within a conservation area. • It supports recommendations for the urgent incorporation of 'human dimensions' in MPAs management, for adoption of the principles of good governance, and the application of a 'code of conduct' for researchers, managers, practitioners and policy makers.	conservation management. Local perceptions are powerful in influencing behaviours within complex SESs, and therefore, they must be understood and addressed through collaborative and adaptive management. • Ethical and just conservation actions should be put in place in order to forestall claims that generate resistance and ultimately hinder progress of PAs conservation. Understanding local claims and concerns when conservation initiatives and programs are designed and implemented, will ensure that factors that undermine conservation outcomes are addressed in a timely, effective and sustainable way. • Conservation initiatives within an SES necessarily involve identifying and balancing stakeholder interests. Trust is an essential element in that. Giving voice to those whose livelihoods are implicated is a step to building trust. Researchers working in conservation should address issues of engagement and trust. • It is important that managers, researchers, practitioners and policy makers alike, recognize research that advocates the incorporation of human dimensions of MPAs (cf. De Young et al., 2008; Charles and Wilson, 2009), that addresses considerations of principles of good governance (cf. Lockwood et al., 2010) and that respects codes of conduct (cf. Bennet et al., 2017a) within conservation management. Commitment to the 'code of conduct' for researchers from all disciplines whether in social science, natural science, or management studies, will help establish trust.

8.4 Recommendations for Future Research

This study engaged in a complex and dynamic area that has been the focus of an enormous amount of natural science research, and an increasing amount of social science research. Conservation science draws on both, and the Galapagos as a "natural laboratory" will continue to warrant study over a broad range of topics. Future studies in these areas might focus on investigating the nuances of livelihood transitions and, specifically, on whether the continued growth of tourism has, over time, actually improved the lives of people who have survived within resource-based livelihoods, and whether the transitions within or from those livelihoods have actually helped achieve specific conservation goals.

Regarding the 2016 rezoning plan, it will be important to determine how discussions between the fishing sector and managers of the marine reserve have evolved during the three years after its official declaration; and to identify the trade-offs that have taken place since this research was conducted. This will show whether, or how, changes in fishers' perceptions have altered dominant narratives regarding this conservation measure, and whether the trade-

offs have improved the levels of satisfaction and the prospects of compliance with new zoning.

8.5 Overall Conclusion: Untangling Issues of Conservation and Development in the Galapagos Islands

Decision-making processes of marine conservation and management, as well as livelihood dynamics in a PA setting described and explored through this dissertation, took place under a changeable governance regime driven by institutional instability within the two institutions responsible for conservation and sustainable development of the archipelago—the Galapagos Governing Council and the National Park Service. Undoubtedly local and international conservation efforts have produced positive outcomes for the preservation of species and habitats in the Galapagos despite the continuous threat of anthropogenic effects. Likewise, certainly the tourism industry has supported conservation aims and has stimulated the local economy. However, the "Galapagos Paradox" persists, and it may be that the archipelago is, indeed, in continue peril. This dissertation supports calls to apply adaptive management based on empirical evidence as management advances. As this research shows past lessons are not being truly integrated in the management of the Galapagos' PAs, in particular in the management of the GMR.

The GMR has been recognized as an 'outstanding' MPA with a Blue Park Award designation, indicating that the reserve meets highest science-based standards for marine life protection and management; however, it is evident that this achievement has not considered social conflicts resulting from a return to exclusionary conservation practices, with implications for the long-term effectiveness of marine conservation. Likewise, this new recognition to the management of the GMR, ironically, has not considered the effects of management interventions on local livelihoods that are under the continue pressure of increasing regulations where elements of social justice, equity, transparency, accountability and legitimacy in decision-making processes are continuously overlooked.

There is no question that actors in the international conservation community are well aware of the need to address the human dimensions of biodiversity conservation, and conservation practitioners, policy analysists and scholars have all contributed to advancing the understanding of what must be done. Yet, faced with the urgency of action and the operational power of some of the large international conservation actors, it is clear that in

some instances there is a failure to adequately address the complexity of local situations. An integrated academic approach to the study of the human-environment relations that draws on natural and social sciences, can help identify adaptive and collaborative approaches and improved procedures that will help ensure sustainable conservation and development outcomes.

The thesis begins with a statement from the IUCN's Abu Dhabi Call for Global Species Conservation Action: "*The millions of species on land, in freshwater, and in the ocean have evolved over millennia and form the web of life that sustains the planet…The alarm has been raised repeatedly about the decline in biodiversity across the planet.* ***By allowing this decline to continue, we erode the very foundations of our traditions, economies, livelihoods, food security, health, and even the existence of life worldwide*** [emphasis added]**.** *The world's people must accept responsibility for this emergency and act now*." The Galapagos Archipelago is counted as one of the richest parts of this heritage, and a strong commitment has been made to "accepting responsibility" for protecting it, but human-environment research is a critical part of the required response. The continued exploration of social-ecological interactions will help advance conservation science.

This thesis, with its focus on livelihood dynamics and environmental decision-making in the Galapagos has helped to give voice to some of those who have been sustained by the rich biodiversity of the archipelago, but who are now called upon to collaborate with those working for conservation. Addressing the concerns of local farmers and fishers, re-establishing the lines of communication for stakeholder engagement in planning, and examining the drivers and inhibitors of livelihood transitions may help identify a pathway to success, and thereby to proving that an SES approach to conservation can succeed. It is hoped that this work will help identify necessary trade-offs and help promote an inclusive and sustainable approach to managing the islands, one that recognizes both the ecological uniqueness of the area, but also the dynamic human dimensions.

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APPENDIX A.

CUESTIONARIO - SISTEMA DE SUBSISTENCIA ISLAS POBLADAS DE GALAPAGOS PESCADOR ARTESANAL

Universidad McGill, Montreal - Canadá
Proyecto: Tesis de Doctorado en Geografía

Consentimiento de participación en la encuesta y uso de la información

Muchas gracias por participar voluntariamente en este estudio, respondiendo el siguiente cuestionario que aproximadamente durará entre 30 a 45 minutos.

El objetivo de este estudio es conocer desde su perspectiva sobre su principal actividad económica, la pesca, puntualmente conocer el estado actual de su actividad pesquera; qué oportunidades ha tenido, o tiene, para diversificar sus medios de subsistencia con otras actividades económicas, y principalmente el turismo con base local; existencia de oportunidades o limitaciones para acceder, o no, a estas oportunidades; su nivel de participación en la toma de decisiones; acceso a información relevante a su medio de subsistencia; y su nivel de satisfacción con la estructura y procesos de gobernanza.

Este estudio busca generar una oportunidad para Usted para expresar sus percepciones, motivaciones y aspiraciones sobre sus medios de subsistencia y su participación en la toma de decisiones en relación al contexto de la isla donde Usted habita.

Según las regulaciones éticas de mi universidad, la información recopilada gracias a su colaboración será utilizada únicamente con fines académicos. La información será codificada de manera que su identidad no será expuesta. La información proporcionada no será discutida con otros participantes. De esta manera le aseguro confidencialidad.

	1ª visita:	*2ª visita:*
Fecha		
Hora que empezó		
Hora que termino		

Si Acepto participar.

NOMBRE:

_____

A. RESTICCIONES A LA ACTIVIDAD PESQUERA

1. *¿Qué tipo de regulaciones considera Usted han causado mayor impacto en su actividad pesquera durante el tiempo que lleva pescando? ¿Cuál es el objetivo/propósito de éstas?*

_____

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_____

_____

_____

2. *¿Piensa Usted que estas regulaciones limitan oportunidades en sustento de vida?*
SI _____ **(continúe) NO _____ (pasa a la pregunta 5.)** ***2.1*** *¿Me podría indicar cómo?*

_____

_____

_____

_____

_____

3. *¿Los pescadores fueron consultados cuando las regulaciones fueron desarrolladas?*
SI _____ **(indique como) NO _____ (pasa a la pregunta 5.)** **3.*1*** *¿Me puede indicar cómo?*

_____

_____

_____

_____

_____

4. *¿Ha recibido algún tipo de asistencia técnica/capacitación?* SI___ NO___ **(pase a la 5)**

4.1 *¿Cómo cuáles?* ***4.2*** *¿Cuál cree Usted fue la intención de la asistencia provista?*

_____

_____

_____

_____

_____

5. *¿Cuál es su nivel de participación en la toma de decisiones de la actividad pesquera?*

1. Alto_____ 2. Medio_____ 3. Bajo_____ 4. Ninguno _____ **(Pase a la pregunta 6)**

5.1 *¿Podría decirme en qué forma ha participa, o participa, y qué lo motiva a hacerlo?*

_____
____

_____
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_____
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6 *¿Según su percepción cuales son las oportunidades para el sector pesquero de participar en el manejo de la RMG?*

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7. *¿Cree Usted que sus opiniones han sido escuchadas e integradas sobre el manejo pesquero y la RMG?*

SI _____ NO ____ **(pasa a la pregunta 8.)** **7.*1*** *¿Me puede indicar cómo?*
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8. *¿El pescador (como individuo) y sector pesquero (como grupo) tiene acceso a información generada respecto a su actividad pesquera y regulaciones y documentación sobre el manejo de la RMG?*

SI _____ (**indique cómo)** NO _____ **(pasa a la pregunta 9)**
_____

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9. *¿Está satisfecho con regulaciones tomadas y políticas generada por los responsables del sector pesquero (como grupo) y por la autoridad ambiental con relación al manejo del sector pesquero?*

1. Mucho_____ 2. Regular _____ 3. Poco _____ 4. Nada_____ 5. Neutro _____

¿Por qué?___-
_____

_____
____

_____
____

_____
____

_____
____

B. PERCEPCIÓN SOBRE CAMBIOS EN LA ACTIVIDAD DE PESCA

1. *¿Comparando hace 10 años y ahora qué tan rentable es la actividad pesquera?*

1. Muy rentable _____ 2. Rentable _____ 3. Poco rentable _____ 4. Nada rentable _____

¿Por qué?
_____

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2. *¿Ha considerado algún momento dejar de pescar y cambiarse de actividad?*
SI____ **(pasa a la pregunta 3)** NO____ **(pasa a la pregunta 4)**

3. *¿Qué sector consideraría y por qué?*
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_____
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4. *¿Qué piensa Usted se podría mejorar/cambiar del sector pesquero como actividad?*

_____
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_____
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5. *¿Qué otra actividad a parte de la pesca realiza?* ***(tres principales)***

1 sector público	
2 sector turístico	*Bar____ Hotel_____ Casa hospedaje_____ Discoteca_____ Restaurante _____ Tienda Suvenires_____ Capitán _____ Marinero _____* ***En:*** *Pesca vivencial_____ Tour de bahía_____ Tour de buceo _____ Cocinero (embarcación turística) _____*
3 comercio-servicios	
4 transporte	
5 construcciones	
6 otro	
7 ninguna	

5.1. *¿Qué le motiva realizar esta actividad?*

_____
_____

_____
_____

_____
_____

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_____

6. *¿Cree Usted que el crecimiento de turismo genera oportunidades para el sector pesquero? y para la comunidad en general?*

_____
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7. *¿Cree Usted que el crecimiento de turismo genera oportunidades para la comunidad en general?*

_____
_____

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_____

8. *¿Según su percepción de que manera contribuye el sector pesquero a la economía local de esta isla?*

_____

_____

_____

_____

_____

9. *¿Cambios en el sector pesquero se deben a alguna de las siguientes razones?* ***(seleccione las 3 más importantes)***

1. Crecimiento turístico

_____

_____

2. Regulaciones y restricciones (falta de apoyo)

_____

_____

3. Organización del sector pesquero (conflictos internos)

_____

_____

4. Falta de oportunidades en su propio sector

_____

_____

5. Falta de capacitación

_____

_____

6. Otro

_____

_____

10. *¿Comparando ahora y hace 10 años, cambios en el clima y el mar afectan su actividad pesquera?*

_____
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11. *¿Cómo imagina será el futuro del sector pesquero en esta isla de aquí en 5 años?*

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12. *¿Cómo imagina será el futuro del sector turístico de esta isla de aquí en 5 años?*

_____
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C. PARTICIPACIÓN EN LA ACTIVIDAD PESQUERA

1. *¿En qué año comenzó a pescar?* ***2.*** *¿Qué edad tenía cuando aprendió a pescar?* _____**años** ***3.*** *¿Cuánto tiempo lleva siendo pescador?* _____**años**	***4.*** *¿Quién le enseño a pescar?* 1 Abuelo 2 Padre 3 Hermano 4 Amigo 5 Solo 6 Otro **(especifique)**_____ ***5.*** *¿Cuánto tiempo pesca?* 1 tiempo completo 2 medio tiempo 3 eventual
6. *¿Qué tipo de pesquerías realizó el año anterior 2015?* 1____ pepino de mar 2 ____langosta 3____ langostino 4 ____ pesca blanca (fresco) 5 ____ pesca de altura 6 seco salado: Lisa____ Bacalao (mezclado) _____	***7.*** *¿Qué tipo de actividad desempeña en la pesca?* 1 armador 2 capitán 3 panguero 4 pescador 5 buzo 6 cocinero ***8.*** *¿En qué tipo de embarcación trabaja?* 1 bote 2 fibra 3 panga de madera
9. *¿Es dueño de la embarcación?* SI _____ **(bote o fibra)** _____ NO_____	***10.*** *¿Con quién sale a pescar regularmente?* 1 padre 2 Hijo 3 abuelo 4 amigo pescador 5 otra persona _____

11. *¿La siguiente tabla muestra información sobre su actividad en la pesca del año 2015, por favor complétela?*

Tipo de pesca	***# de viajes/ o pesca al diario***	***# días por viaje/ o # días por semana***	***Pesca promedio por viaje o a la semana (lb. o qq.)***	***Buena pesca (B) Mala (M) Regular (R)***
Langosta				
Langostino				
Pepino de mar				
Bacalao (seco salado)				
Pesca blanca (fresco)				
Pesca de lisa salada				
Otro				

D. PERFIL DEL PESCADOR

1. *¿Cuál es su edad en años cumplidos?* _____ ***2.*** *¿Cuál es su estado civil?* 1. soltero___ 2. casado___ 3. viudo___4. Separado ___ 5. divorciado___ 6. unión libre _____	***3.*** *¿Tiene hijos/as?* SI____ NO ____ ***4.*** *¿Cuántos hijos/as _____ tiene?*
5. *¿Qué año de educación formal tiene?* 0. ninguno 1. primario completo 2. primario incompleto 3. secundario completo 4. secundario incompleto 5. Técnico/Universitario 6. Postgrado	***6.*** *¿Cuántas personas normalmente viven en su casa, incluyendo a usted?* _____ personas. ***7.*** *¿Cuál es la relación de parentesco?* 1. Esposo/a 2. Hijo/a 3. Padre/madre 4. Hermano/a 5. Otro _____
8. *¿Las personas que viven en su casa, dependen económicamente de Usted?* SI ___ **(pase a la pregunta 11)** NO____ **(siga a la 9.)**	**9.** *¿Cuántos miembros del hogar aportan económicamente?* _____# ***10.*** *El aporte económico es por cuenta propia _____o salario_____*
11. *¿Nació aquí en Galápagos?* SI___ (**pase a la sección E.)** NO___ (**pase preg. 12.)**	***12.*** *¿En qué año vino a vivir aquí?* _____
13. *¿De qué provincia vino?* 1 Pichincha 2 Manabí 3 Cotopaxi 4 Guayas 5 Los Ríos 6 Santa Elena 7 Esmeraldas 8 Loja 9 El Oro 10 Tungurahua 11 otro _____	***14.*** *¿A qué se dedicaba antes de venir a Galápagos?* 1 agricultura 2 pesca 3 ganadería/cría de animales 4 comercio 5 servicios 6 otro_____
15. *¿Cuál fue el motivo porque dejó su lugar de residencia?* 0 N/A infante 1 familiares 2 desempleo 3 bajos ingresos trabajo 4 falta de tierra 5 Otro_____	***16.*** *¿Por qué eligió Galápagos en lugar de ir a otro lugar?* 1 posibilidad de tener tierra 2 tenía familiares 3 servicio militar 4 oportunidades trabajo, **sector**_____ 5 otro _____

E. CAPITAL SOCIAL y HUMANO

1. *¿Pertenece a la cooperativa de pesca? SI _____ NO_____* ***2.*** *¿Recibe algún apoyo/beneficio de la cooperativa de pesca?* SI _____ NO _____ **(pase a la pregunta 4)** 1 acceso a mercados _____ 2 precio garantizado _____ 3 acopio _____ 4 permisos _____ 5 sociales (unión sector) _____ 6 Otros_____	***3.*** *¿Cuáles son sus habilidades a parte de la pesca?* 1 carpintero 2 enfibrador 3 pintor 4 constructor 5 marinero 6 capitán 7 otro _____
4. *¿Cómo evaluaría Usted su estado de salud actual?* ____Excelente ____Bueno _____Regular _____Malo	***5.*** *¿En su actividad pesquera ha sufrido algún accidente que ha afectado a su salud?* SI ___ **(pase a la pregunta 5.1)** NO____

5.1 ¿Cómo le ha afectado?

_____
____

_____
____

_____
____

_____
____

F. CAPITAL FÍSICO y ECONÓMICO

1. *¿Por favor indique cuál de los siguientes elementos posee?* *1. carro/motoneta* *2. casa propia* *3. casa alquilada* *4. terreno* *5. bote* *6. fibra* *7. panga de madera* *8. servicios básicos* *9. servicios de comunicación* *10. otros*	***2.*** *Al momento cuenta con alguno de los siguientes:* *SI____ (**marque con una X cuál)** NO ____ *1. ahorros 2. Créditos 3. Pensión 4. ayuda social del gobierno* ***3.*** *¿Tiene alguna otra fuente de ingresos que no sea generada por su trabajo pesquero?* *0. ninguno 1. pensión jubilado 2. renta 3. no responde* *4. otro _____*

……
…

¡Muchas Gracias por su tiempo y colaboración!

COMENTARIOS:

APENDIX B.

CUESTIONARIO - SISTEMA DE SUBSISTENCIA ISLAS POBLADAS DE GALAPAGOS AGROPRODUCTOR

Universidad McGill, Montreal - Canadá
Proyecto: Tesis de Doctorado en Geografía

Consentimiento de participación en la encuesta y uso de la información

Muchas gracias por participar voluntariamente en este estudio, respondiendo el siguiente cuestionario que aproximadamente durará entre 30 a 45 minutos.

El objetivo de este estudio es conocer desde su perspectiva sobre su principal actividad económica, la agricultura, puntualmente conocer el estado actual de su actividad agrícola-ganadera; qué oportunidades ha tenido, o tiene, para diversificar sus medios de subsistencia con otras actividades económicas, y principalmente el turismo con base local; existencia de oportunidades o limitaciones para acceder, o no, a estas oportunidades; su nivel de participación en la toma de decisiones; acceso a información relevante a su medio de subsistencia; y su nivel de satisfacción con la estructura y procesos de gobernanza.

Este estudio busca generar una oportunidad para Usted para expresar sus percepciones, motivaciones y aspiraciones sobre sus medios de subsistencia y su participación en la toma de decisiones con relación al contexto de la isla donde Usted habita.

Según las regulaciones éticas de mi universidad, la información recopilada gracias a su colaboración será utilizada únicamente con fines académicos. La información será codificada de manera que su identidad no será expuesta. La información proporcionada no será discutida con otros participantes. De esta manera le aseguro confidencialidad.

	1ª visita:	*2ª visita:*
Fecha		
Hora que empezó		
Hora que termino		

Si Acepto participar.

NOMBRE: _____

A. PERCEPCIÓN SOBRE CAMBIOS EN LA ACTIVIDAD AGROPECUARIA

1. *¿Comparando hace 10 años y ahora qué tan rentable es la actividad agropecuaria?*

1. Muy rentable _____ 2. Rentable _____ 3. Poco rentable _____ 4. Nada rentable _____

¿Por qué?

_____

_____

_____

_____

_____

_____

_____

2. *¿Ha considerado algún momento dejar la agricultura/ganadería y cambiarse de actividad?*

SI____ **(pasa a la pregunta 3)** NO____ **(pasa a la pregunta 4)**

3. *¿A qué actividad se dedicaría y por qué?*

_____

_____

_____

_____

_____

_____

_____

4. *¿Existe algo que lo desmotive del sector agropecuario como actividad?*

_____

_____

_____

_____

_____

_____

_____

5. *¿Qué otra actividad a parte de la agricultura/ganadería realiza?* ***(tres principales)***

1 sector público	
2 sector turístico	*Bar____ Hotel_____ Casa hospedaje_____ Discoteca_____ Restaurante _____ Tienda Suvenires_____*
3 comercio-servicios	
4 transporte	
5 construcciones	
6 otro	
7 ninguna	

6. *¿El crecimiento de turismo genera oportunidades para el sector agropecuario?*

_____

_____

_____

_____

_____

7. *¿El crecimiento de turismo genera oportunidades para la comunidad loca?*

_____

_____

_____

_____

_____

8. *¿Según su percepción de que manera contribuye el sector agropecuario a la economía local de esta isla?*

_____

_____

_____

_____

_____

9. *¿Cambios en el sector agropecuario se deben a alguna de las siguientes razones?* ***(seleccione las 3 más importantes)***

1. Crecimiento turístico

2. Regulaciones y restricciones (falta de apoyo)

3. Organización del sector agropecuario (conflictos internos)

4. Falta de oportunidades en su propio sector

5. Falta de oportunidades en otros sectores

6. Falta de capacitación

7. Otro

10. *¿Comparando ahora y hace 10 años, cambios en el clima afectan su actividad agropecuaria?*

11. *¿Cómo imagina será el futuro del sector agropecuario en esta isla de aquí a 5 años?*

12. *¿Cómo imagina será el futuro del sector turístico de esta isla de aquí a 5 años?*

B. RESTICCIONES A LA ACTIVIDAD AGROPECUARIA

1. *¿Qué tipo de regulaciones considera Usted han causado mayor impacto en su actividad agropecuaria durante el tiempo que lleva pescando? ¿Cuál es el objetivo/propósito de éstas?*

2. *¿Piensa Usted que estas regulaciones limitan oportunidades en sustento de vida?*

SI _____ **(continúe) NO _____ (pasa a la pregunta 5.)** ***2.1*** *¿Me podría indicar cómo?*

_____
_
_____
_
_____
_
_____
_
_____
_

3. *¿Han existido incentivos económicos o de otro tipo para el sector agropecuario?* SI_____ NO_____ **(pase a la 6.)**

3.1 *¿Cómo cuáles?* ***3.2*** *¿Cuál cree Usted fue la intención de estos incentivos?* ***3.3.*** *¿Fueron consultados para esto?*

_____
_
_____
_
_____
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_____
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_____
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_____
_

4. *¿Cuál es su nivel de participación en la toma de decisiones de la actividad agropecuaria?*

1. Alto_____ 2. Medio_____ 3. Bajo_____ 4. Ninguno _____ **(Pase a la pregunta 7.)**

4.1 *¿Podría decirme en qué forma participa y qué lo motiva a hacerlo?*

_____
_
_____
_
_____
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_____
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_____
_

5. *¿Cree Usted que hay ventajas para el productor agropecuario de participa en el manejo de la actividad?*

_____
_
_____
_

_____
_
_____
_

6. *¿Cree Usted que sus opiniones han sido escuchadas e integradas sobre el manejo agropecuario?*

_____
_
_____
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_____
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_____
_
_____
_

7. *¿El productor (como individuo) y el sector (como grupo) tiene acceso a información generada respecto a su actividad agropecuaria y regulaciones concernientes a su actividad?*

SI _____ (**indique cómo)** NO _____ **(pasa a la pregunta 8)**

_____
_____
_
_____
_
_____
_
_____
_

8. *¿Está de acuerdo con las actividades realizadas por el MAGAP?*

1. Mucho_____ 2. Regular 3. Poco _____ 4. Nada_____ 5. Neutro _____

¿Por qué?_____
_____
_
_____
_
_____
_
_____
_

C. PARTICIPACIÓN EN LA ACTIVIDAD AGROPECUARIA
(Encierre las respuestas en un círculo o marque con una X cuando corresponda)

1. *¿Qué tipo de actividad desarrolla en su finca?* 1 solo ganadería ***(sección E)*** 2 solo agricultura ***(sección D)*** 3 agricultura y ganadería ***(secciones D y E)***	***2.*** *¿Su terreno es:* propio____ heredado_____ alquilado____ ***2.1.*** *¿En qué año adquirió la finca?* _____ ***2.2 (si el terreno fue heredado)*** *¿Conoce Usted en que año su padre/madre compró la finca?* _____
3. *¿Cuánto tiempo lleva manejando la finca?* ___ ***años*** ***4.*** *¿Cuándo adquirió la finca era monte?* SI___ **(pase a la preg. 5.)** NO___ **(pase a la preg. 4.1.)** ***4.1*** *¿Qué tipo de cultivos ya existía?*	***5.*** *¿Cuántas hectáreas tenía la finca cuando la compro?* _____***Ha.*** ***5.1*** *¿Cuántas hectáreas tiene la finca ahora?* _____***Ha.*** ***5.2*** *Indique el motivo por el que* ***disminuyó de tamaño*** *la finca*
6. *¿Quién le enseño sobre la actividad agropecuaria?* 1 abuelo 2 padre 3 hermano 4 amigo 5 solo 6 otro_____ ***7.*** *¿Qué edad tenía cuando aprendió sobre esta actividad?* _____***años***	***8.*** *¿Qué tipo de agricultor/ganadero se considera?* 1 tiempo completo 2 medio tiempo 3 eventual ***9.*** *¿Cuántas personas ayudan en la finca, de ellos, cuantos se contratan y cuantos son familiares?*
10. *¿Cuántos terrenos posee?* _____ ***10.1*** *¿En qué sector están ubicados?*	***11.*** *¿Alquila Usted su terreno a otra persona?* SI _____ NO _____ **(pase a la siguiente sección)**
12. *¿Por qué motivo alquila parte de su terreno?* 1 ganar dinero 2 manejarlo solo no es rentable 3 no tengo tiempo de manejarlo 4 estoy enfermo 5 otro _____	***14.*** *¿Tiene disponibilidad de fuentes de agua en su finca? SI_____* ***(indique cuáles*** *NO_____* ***15.*** *¿Tiene disponibilidad de árboles maderables en su finca? SI_____* ***(indique cuáles)*** *NO_____*

D. SOLO AGRICULTURA (*Encierre las respuestas en un círculo o complete la pregunta según corresponda)*

1. *¿Cómo es la distribución de su finca con relación a sus cultivos?* ***(completar la tabla)***

o	***TIPO DE CULTIVO***	***% para auto consumo***	***% para venta directa***
0			

2. *¿Cuáles son los principales motivos para la pérdida de sus cultivos?* ***(elegir los dos más importantes)***

1 lluvia 2 sequía 3 plagas _____ 4 enfermedades _____

3. *¿Cuál es la distancia de su casa a los cultivos?*

_____

4. *¿Si realiza actividades ganaderas y agrícolas, ¿cómo es la distribución de su finca para cultivos y potreros?*
Cultivos _____ % # cultivos _____ Potreros _____% # potreros _____

5. *¿Cuántas veces al mes comercializa sus productos agrícolas?*	***5.1*** *¿Dónde comercializa sus productos agrícolas?*
6. *¿Cómo transporta sus productos agrícolas para la venta?* carro propio _____ carro alquilado _____	***6.1*** *¿Cuánto le cuesta el transporte?* $_____

E. SOLO GANADERÍA ***(Encierre las respuestas en un círculo o complete la pregunta según corresponda)***

1. *¿Indicar la siguiente información sobre su actividad pecuaria?*

o	***TIPO DE PASTO (especificar las variedades de pasto)***	***TIPO DE GANADO (especificar si es ganado vacuno, porcino, caprino, caballar***	***# de cabezas***	***PRODUCCION (carne o leche)***	***OTROS ANIMALES asno, mula, cuy, conejo, o aves de corral***	***# de animales***

2. *¿Ha cambiado la variedad de pastos en los últimos 10 años? NO_____ SI_____ (¿por qué?)*
_____
_
_____
_
_____
_
_____
_

3. *¿Quién cuida el ganado?* 1 Usted mismo 2 Un familiar 3 Otra persona_____	***4.*** *¿Cómo transporta el ganado en pie para la venta?* propio transporte_____ transporte alquilado_____ ***4.1*** *¿Cuál es el costo del transporte?* $_____
5. *¿Dónde se comercializa la carne producida?*	***6.*** *¿Dónde se comercializa los litros de leche producidos?*

F. MANO DE OBRA ***(Encierre las respuestas en un círculo o marque con una X según corresponda) y*** **ASISTENCIA TÉCNICA**

1. *¿Requiere mano de obra para trabajar su finca?* SI ___ **(continúe)** NO ___ **(pase a la pregunta 8.)** ***2.*** *¿Cuántas personas se necesitan para cuidar la*	***4.*** *¿Cómo es la disponibilidad de mano de obra para actividades agropecuarias?* Buena _____Mala _____Regular _____

finca? _____ ***# personas*** ***3.*** *¿De dónde proviene la mano de obra?* Familiar ____ ¿Quién? _____ Local_____ De continente _____	***5.*** *¿Cuál es el tiempo promedio anual que trabaja la mano de obra contratada en la finca?* _____***meses*** ***6.*** *¿Cuál es el costo mensual del jornalero?* _____ ***$***

7. *¿Recibe algún apoyo/asesoría técnica en el desarrollo de su actividad agropecuaria?*
NO_____ (pase a la sección G) SI_____ **(continúe)**

7.1 *¿Qué organización/institución?*
_____

7.2 *¿En qué forma?*
_____
_____
_
_____
_
_____
_

G. CAPITAL SOCIAL, HUMANO, ECONOMICO Y FISICO ***(Encierre las respuestas en un círculo o marque con una X cuando corresponda)***

1. *¿Cuál es su edad en años cumplidos?* _____ ***2.*** *¿Cuál es su estado civil?* 1. soltero___ 2. casado___ 3. viudo___4. Separado ___ 5. divorciado___ 6. unión libre _____	***3.*** *¿Tiene hijos/as?* SI____ NO ____ ***4.*** *¿Cuántos hijos/as _____ tiene?*
5. *¿Qué año de educación formal tiene?* 0. ninguno 1. primario completo 2. primario incompleto 3. secundario completo 4. secundario incompleto 5. Técnico/Universitario 6. Postgrado	***6.*** *¿Cuántas personas normalmente viven en su casa, incluyendo a usted?* _____ personas. ***7.*** *¿Cuál es la relación de parentesco?* 1. Esposo/a 2. Hijo/a 3. Padre/madre 4. Hermano/a 5. Otro _____
7. *¿Las personas que viven en su casa, dependen económicamente de Usted?* SI ___ **(pase a la pregunta 11.)** NO____ **(siga a la 9.)** **8.** *¿Cuántos miembros del hogar aportan económicamente?* _____# ***9.*** *El aporte económico es por cuenta propia* _____*o salario*_____	***10.*** *¿Nació aquí en Galápagos?* SI_____ (**pase a la sección 17.)** NO_____ (**pase a la pregunta 12.)** ***11.*** *¿En qué año vino a vivir aquí?* _____ **12.** *¿De qué provincia vino?* 1 Pichincha 2 Manabí 3 Cotopaxi 4 Guayas 5 Los Ríos 6 Santa Elena 7 Esmeraldas 8 Loja 9 El Oro 10 Tungurahua 11 otro _____
13. *¿A qué se dedicaba antes de venir a Galápagos?*	***14.*** *¿Cuál fue el motivo porque dejó su lugar de residencia y vino a Galápagos?* 0 N/A infante 1 familiares 2 desempleo 3 bajos

1 agricultura 2 pesca 3 ganadería/cría de animales 4 comercio 5 servicios 6 otro_____	ingresos trabajo 4 falta de tierra 5 servicio militar 6 oportunidades trabajo, **sector**_____ 7 Otro_____

15. *¿Forma parte de alguna asociación de agricultores/productores ganaderos?*

SI _____ (**pase a la pregunta 15.1)** NO_____ **(pase a la pregunta 18.)**

15.1 *¿Cuál?*

_____

16. *¿Cómo evaluaría Usted su estado de salud actual?* ____Excelente ____Bueno _____Regular _____Malo	***16.1*** *¿Ha sufrido algún accidente que ha afectado a su salud por su actividad agropecuaria?* SI ___ **(pase a la pregunta 16.2)** NO____
16.2 ¿Cómo le ha afectado?	
17. *¿Por favor indique cuál de los siguientes elementos posee?* *1. carro/motoneta 2. casa propia 3. casa alquilada* *4. reservorio de agua 5. Invernadero 6. tractor* *7. fumigadora 8. despuladoras* *9. galpón aves_____ cerdos _____ otros animales___* *10. establo caballos___ ganado____* *11. servicios básicos* *12. servicios de comunicación* *13. otros*	***21.*** *Al momento cuenta con alguno de los siguientes: SI____ (**marque con una X cuál)** NO ____* *1. ahorros 2. Créditos 3. Pensión 4. ayuda social del gobierno* ***22.*** *¿Tiene alguna otra fuente de ingresos que no sea generada por su trabajo agrícola/ganadero?* 0. ninguno 1. pensión jubilado 2. renta 3. programa social gobierno 4. otro _____ 5. no responde

……..

¡Muchas Gracias por su tiempo y colaboración!

COMENTARIOS: