

The Natural Environment and local
perceptions of poverty, well-being and justice
in a Mexican fishing community

*Gaps and bridges between local perceptions
and national metrics*



Karen Jossuely Wong Pérez

*Department of Geography
Churchill College
University of Cambridge*

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Declaration

This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in the Preface and specified in the text.

It is not substantially the same as any that I have submitted, or, is being concurrently submitted for a degree or diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text. I further state that no substantial part of my dissertation has already been submitted, or, is being concurrently submitted for any such degree, diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text

This dissertation does not exceed the prescribed word limit of 80,000 words, including the summary and excluding footnotes, diagrams, appendices, bibliography and acknowledgements.

Abstract

The Natural Environment and local perceptions of poverty, well-being and justice in a Mexican fishing community. *Gaps and bridges between local perceptions and national metrics*

Karen J. Wong-Pérez

Although the 'right to enjoy a healthy environment' is granted by the Mexican Law of Social Development, the environmental dimension is missing in the current national measures of multidimensional poverty. This doctoral research aims to understand the implications of this absence by understanding the local meanings, perceptions and lived experiences of poverty; what contributes to a flourishing, worth-lived life and justice; and the nexus between the natural environment. For this purpose, an integrated 'Justice and well-being pipeline' conceptual framework, inspired in the capabilities approach, was designed to examine in a holistic way the processes contributing to shape the dynamics of social exclusion. Research was undertaken in the municipality of San Felipe, a fishing community of Yucatán, México between summer 2016 and spring 2017. The research adopted a mixed data collection and analytical methods including Q-methodology and network analysis. A geographically systematic sampling approach was used to collect data through semi-structured interviews and purposive sampling for Q methodology. Research findings suggest that the absence of national indicators to measure progress towards the social right to a healthy environment hides the detrimental and corrosive effects of an unhealthy environment and the disproportionate negative effect on vulnerable groups, especially low-income, the elderly and those who do not benefit from social protection mechanisms provided by the community. Understanding social exclusion dynamics emanating from the experience of environmental injustice is essential to understand the processes that perpetuate social disadvantage. The empirical research provides evidence of the centrality of the natural environment as an enabler of a wide array of valuable life functionings. Based on this evidence, the thesis proposes a hybrid approach that encompasses the incorporation of a set of *Environmental Primary Goods* (EPGs) within the current multidimensional poverty measure and the creation of an *environmental enabling conditions dashboard* focusing on making visible key environmental enabling conditions.

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To my Mum, Martha Pérez Lucio

To my Daughter, Imaltzin Santander Wong

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Chapter 1. Introduction

*“Our statistics and accounts reflect our aspirations, the values that we assign things...
By treating them as objective data, as if they are external to us, beyond question or dispute,
we begin to create a gulf of incomprehension between the expert certain in his knowledge and the
citizen whose experience of life is completely out of synch with the story told by the data.
This gulf is dangerous because the citizens end up believing that they are being deceived.
Nothing is more destructive of democracy.”*
(Stiglitz et al., 2010, p.viii)

1.1. Background

In 2009, the by-then president Nicolas Sarkozy asked Joseph Stiglitz, Amartya Sen and Jean-Paul Fitoussi to set up a commission to better align the metrics of well-being with what actually contributes to quality of life, and in doing so, to help direct efforts to those things that really matter. The next year, in 2010, México took an important step to better align metrics to reflect ‘what really matters’ and adopted a multidimensional approach for the measurement of poverty, becoming the first country in the world to have an official multidimensional poverty measurement (CONEVAL, 2009; OPHI, 2018). The multidimensional measure includes indicators that are paired to social rights granted by the General Law of Social Development. Although the ‘right to enjoy a healthy environment’ is one of the rights granted by the Law, the environmental dimension is one of the rights that are missing in the current poverty measure. This research is designed to closely inspect this aspect.

The need to pay attention to the quality, accuracy and policy relevance of the measures that are used to reflect reality is highlighted by the Commission on the Measurement of Economic Performance and Social Progress. It states that “in an increasingly performance-oriented society, metrics matter. What we measure affects what we do. If we have the wrong metrics, we will strive for the wrong things” (Stiglitz et al., 2010, p.xvii). Metrics that are not normatively aligned to societal aspirations and do not accurately reflect the lived experience of people, especially the reality of the individuals and groups who are systematically overlooked or left behind, increase the risk of informing decisions that are short-sighted, ineffective or that perpetuate dynamics of social exclusion.

These are the reasons why I believe that a holistic multi-scalar examination of the underlying normative approaches, the metrics, the lived experiences and the dynamics of social exclusion is needed. A short-sighted, isolated examination of only one of these elements would provide partial insights. Several interconnected questions at different analytical domains arise from this context. From the policy-level domain, relevant questions include: Does the reality portrayed by the current poverty measure accurately reflect the lived experience? (Accuracy); What are the implications of not including environmental considerations in the current poverty measure? (Outcomes); Is the poverty measure providing the right and timely information for policy and decision-makers to design effective interventions? (Policy relevance), If not, how to improve it?

From the theoretical domain, in order to understand whether poverty and social development measures accurately reflect the lived experience, more fundamental questions are needed. These include: What does poverty mean and how is it experienced in the ground? What is the meaning of a 'fully human' (Nussbaum, 2013), flourishing life? What dynamics of social exclusion are reducing individuals' and groups' opportunities to achieve the life they value?

At the core of this research are the following ideas. Firstly, the idea that in increasingly performance-oriented societies, *metrics matter* for policy and decision making (Stiglitz et al., 2010). Thus, the ways in which reality is portrayed by metrics of social development, affect not only the type of institutional responses, but also define what is made visible and what remains hidden as societal aspirations. Secondly, the idea that *justice matters* (Martin, 2017). Lived injustice not only affects the experience of well-being but shape dynamics of social exclusion that affect individuals' behaviour and social feedbacks (Pascual et al., 2010a; Dawson et al., 2018). Thirdly, in order to 'calibrate' the measures reflecting social reality, they must effectively recover the lived experience and perceptions of those living such reality.

1.2. Motivation

The opening paragraph of *Opinions about happiness* of Book I of Aristotle's *Eudemian Ethics* (1214a, 30) says that "it would be a waste of time to examine all the opinions about happiness held by different people. Children, invalids, and lunatics have many views, but no sane person would trouble himself about them... We do not need to consider the opinions of the multitude, who speak at a venture on almost every topic and especially on this one. On this topic, at least, only the opinions of philosophers need to be taken into account, for it is absurd to offer reasoning to those who need not reasoning but chastisement" (trans. Kenny, 2011, p.5)

What troubles me about this quote from ~384-322 BC is not its message, but it's actuality. If we change the word 'philosophers' to 'statisticians' then it seems we would be describing the current state of affairs in how decisions are made about aspects that have to do with poverty, well-being and justice. This research emerges from a personal conviction that the only way to improve things for everyone, without leaving anyone behind, is to hear all the voices, especially the voices of those who have even forgotten they had a voice or how to use it.

This research proposal started with an academic interest in filling a practical gap in the Mexican poverty measurement context and steadily evolved to a growing interest on inspecting more ambitious societal aspirations beyond poverty, such as notions of a worth-lived life and justice and their nexus to the natural environment. This shifting concern is rooted on the basal belief that justice and fairness are goals with intrinsic value worth pursuing and being understood. During my research, the guiding research questions related to poverty measurement that were clearly defined at the beginning, appeared closely related to matters of justice. This was evidenced during fieldwork, when accounts of environmental injustice were closely linked to dynamics of social exclusion.

1.3. Research relevance and value

This research aims to provide conceptual contributions to increase societal ambitions beyond poverty and towards justice and a 'fully' human development (Nussbaum, 2000). From a practical perspective, it aims to provide local evidence-based insights on how to enhance current poverty metrics so that they can provide more accurate and timely information to improve decision and policy making.

First, from the practical dimension, this study aims to cover an identified research gap in Mexico and contributes to the discussion of how to ensure that the granted right to a healthy environment is adequately tracked and suggests alternatives to incorporate environmental considerations into the Mexican multidimensional poverty measure. Second, from a conceptual dimension, this study embraces the production of knowledge as a collective endeavor. This research aims to contribute to knowledge by recovering research needs that have been identified by previous studies (Table 1-1).

Table 1-1. Research needs identified by previous studies

Quote and Author	Research need identified
<i>“The limited use of the poverty concept in the existing literature was particular source of disappointment. Here we suggest that there are significant missed opportunities, and a more expanded notion of poverty is likely to result in much greater analytical traction for an understanding of the biodiversity-poverty nexus” (Vira and Kontoleon, 2013)</i>	Need to expand the notion of poverty
<i>Referring to an empirical approach to studying justice... “ It might be interesting to know whether the arguments made in real world conservation struggles resonate with the kinds of principles we find in normative theories” (Martin, 2017, p.10)</i>	Empirical approach to studying justice and paired analysis with normative theories
<i>“Although the most widely-known measure of human development includes income, longevity, and education, many have argued that people’s values, and consequently multidimensional poverty, extends beyond these domains. In order to advance these multiple areas, it is at times necessary to conduct empirical studies using individual or household-level data on multiple dimensions of poverty” (Alkire, 2007, p.1)</i>	Empirical studies to uncover dimensions of human development
<i>“If the natural environment is to be considered as constituent element of wellbeing or poverty, this will require a careful appraisal of ways to empirically measure these relationships” (Schleicher et al., 2018, p.18)</i>	Empirical ways to measure the relationships between wellbeing and poverty

1.4. Research focus

This research is focused at two scales. The first scale is focused on understanding local context-based individual meanings and lived experiences of poverty, a flourishing life and justice. The second scale is focused on understanding normative approaches and measures of poverty and social development in Mexico.

To examine the ‘lived experience’ this study joins the line of the long list of efforts to understand philosophical questions that have intrigued humans since ancient times: What is the meaning of a good, flourishing life? What is justice? Which are the sources of injustice? These questions have been answered by many disciplines, from psychology, political philosophy, welfare economics, health studies, human geography and law.

For this reason, the research is conducted with insights from disciplines such as Political Philosophy, Development Economics, Psychology and Welfare Economics. However, it is located within the realm of Human Geography due to its focus on examining the relationships between humans and the natural environment; and within Political Ecology, due to the study of the relationships between political, economic and social factors with environmental issues and changes, that is included as part of the conceptual framework that has guided the research.

This thesis has two main arguments that run in parallel but have implications at different scales. From one side, the thesis argues that poverty and social exclusion dynamics are better understood by adopting an integrated approach in which the processes involved in shaping life outcomes and justice dimensions are incorporated.

From the other side, it argues that the absence of national indicators to measure progress towards the social right to a healthy environment hides the detrimental and corrosive effects of an unhealthy environment. To support this argument, the research uses a case study to uncover the nexus of the natural environment and ideas of poverty, a flourishing life and justice in a Mexican fishing community and provides evidence of the centrality of the natural environment as an enabler of a wide array of valuable life functionings.

Research was undertaken in the municipality of San Felipe, a fishing community of Yucatán, México between summer 2016 and spring 2017. A geographically systematic sampling approach was used to collect data through semi-structured interviews that was analysed through network analysis. Purposive sampling was used to conduct Q methodology. Based on the evidence collected, this study provides inputs to current definitions of poverty, a flourishing life and environmental justice.

1.5. Research questions

The research aims to answer three specific questions:

- 1) How is the natural environment represented in normative approaches and **metrics** that shape institutional responses of poverty reduction/alleviation?
- 2) How does the natural environment interact with local **perceptions** of poverty, a flourishing life and justice in San Felipe, a Mexican fishing community? and,
- 3) How to **calibrate** national metrics of poverty with **local perceptions** to better reflect social reality?

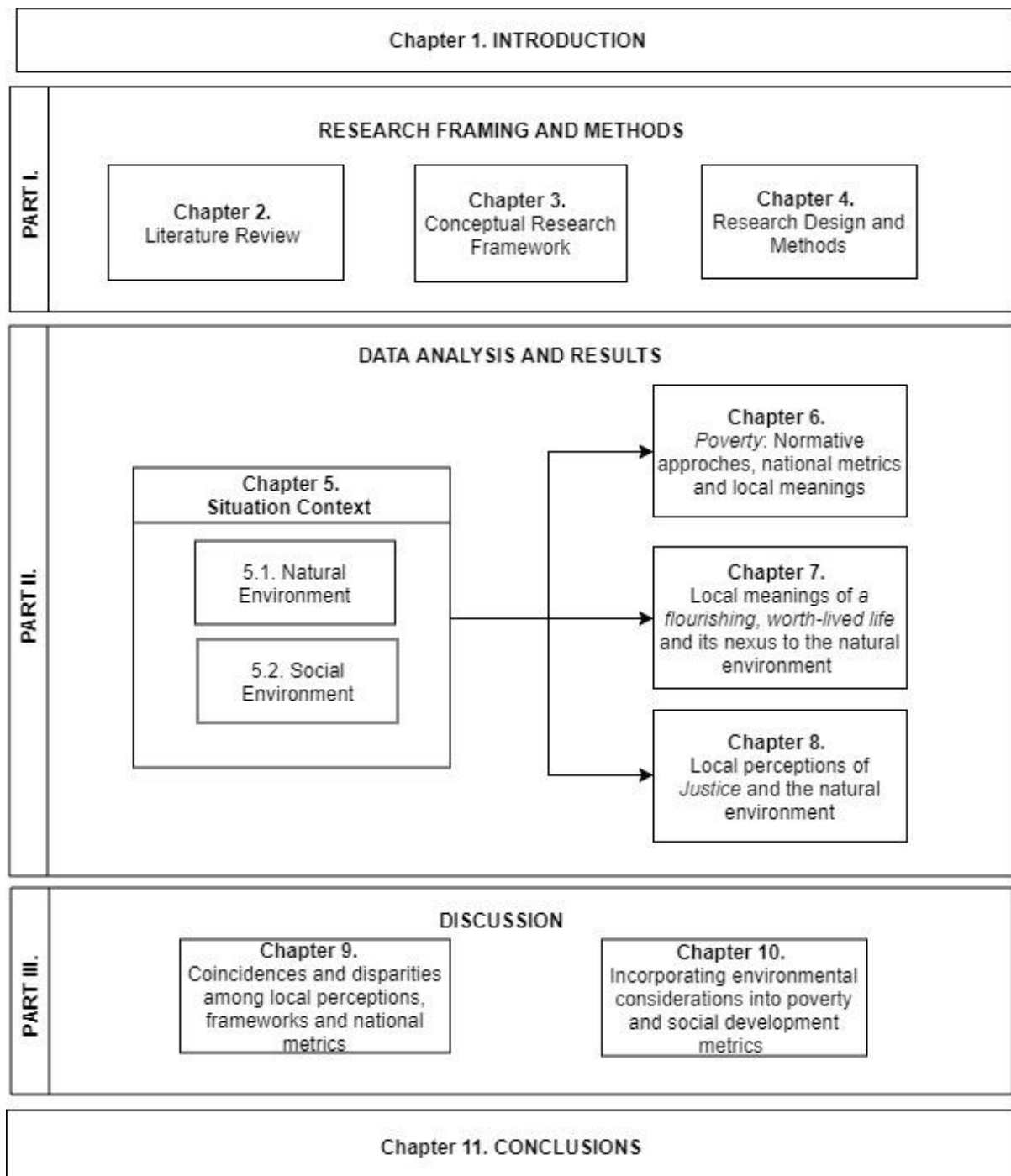
1.6. Structure

To answer the research questions, this dissertation is organised in three parts and ten Chapters. The visual illustration of the structure is shown in Figure 1-1. The first part is the *Research framing and methods* and is composed of three chapters. *Chapter 2* summarizes the literature review focusing on understanding the different ways in which the notions of well-being/flourishing life, poverty and justice have been examined through different disciplines and approaches. *Chapter 3* summarizes the analytical frameworks that have been used to examine the interlinkages of the natural environment with the notions of well-being/flourishing life, poverty and justice. After a description of the most relevant frameworks, the chapter presents the integrated Justice and Well-being Conceptual framework that has guided the research for this dissertation. *Chapter 4* details the research methods, including data collection and analytical methods that are used to answer the research questions.

The second part of the thesis presents the *Data Analysis and Results* and is composed of four chapters. *Chapter 5* provides a detailed description of the dynamics of the natural and social environment in San Felipe Yucatán, the research site. *Chapter 6* includes a section focused on Mexico's societal aims and its related metrics and a section that presents the gender-disaggregated results of the qualitative analysis of local meanings and reasons of poverty. *Chapter 7* presents the results of the qualitative and network analysis of the local meanings of a flourishing life disaggregated by gender and age. *Chapter 8* presents the results of the qualitative and Q analysis of the local perceptions about Justice in relation to Natural Resources. The results are based on the analysis of the data collected through semi-structured interviews and Q methodology.

The third part of the thesis corresponds to the *Discussion* and is composed of two chapters. Chapter 9 discusses the coincidences and disparities among local perceptions and frameworks, normative approaches and national metrics. Based on the evidence collected in Chapters 6, 7 and 8, Chapter 10 proposes a way to incorporate environmental considerations into Mexican social development measures.

Figure 1-1 Structure of the thesis



1.7. Closing remarks

This Chapter has introduced the research, providing a description of the context that sustains its relevance, and detailing the research focus, introducing the questions and presenting the structure followed to answer them. In a nutshell, there are two main arguments that run in parallel in this thesis but have implications at different scales. From one side, the thesis argues that poverty and social exclusion dynamics are better understood by adopting an integrated approach in which the processes involved in shaping life outcomes and justice dimensions are incorporated.

From the other side, it argues that the absence of national indicators to measure progress towards the social right to a healthy environment hides the detrimental and corrosive effects of an unhealthy environment. To support this argument, the research uses a case study in the Mexican fishing community of San Felipe, Yucatán, to uncover the nexus of the natural environment and the ideas, perceptions and lived experiences of poverty, a flourishing life and justice.

The next Chapter summarizes the literature review focusing on understanding the different ways in which the notions of well-being/flourishing life, poverty and justice have been examined through different disciplines and approaches.

Chapter 2. Literature Review

The meaning and metrics of a flourishing life, poverty and justice and their links with the Natural Environment

Simonides poem, quoted in Plato's *Protágoras* (Greek Lyric. Stesichours, Ibycus, Simonides, and others, trans. 1991, pp. 435)

'It is difficult for a man to be truly good,
 Foursquare in hands,
 In feet and in man,
 Fashioned without flaw...'

But for me that saying of Pittacus doesn't ring true
 Although it was spoken by a wise man.
 He says: "It is difficult for a man to be truly good,
 —*perfect* in hands, feet, and mind, built *without a single flaw*; only a god could have that prize;
 but a mere man cannot avoid being bad, when he is in the grip of irresistible misfortune.
 When his luck is good, any man is good; when it is bad he is bad;

For me, ... I am not a fault-finder. I am satisfied with the man who is not bad.
 Nor too shiftless;
 One who understands the justice that helps the city,
 A sound man.
 I shall not find fault with him;
 For the generation of fools is numberless.
 a man's good enough as long as he's not lawless,
 and if he has the common sense of right and wrong that does a city good
 The way I see it, if there's no great shame in it, it's all right.

And so I shall never throw away my span of life on an empty, vain hope in quest of the impossible:
 the completely blameless man among all of us who win the fruit of the wide Earth.
 When I find one I shall tell you.
 No, I commend and love any man who of his own will does nothing shameful.
 Against necessity not even the gods fight'

Simonides poem very accurately reflects the conflicting views of what a good person is, he describes what he considers virtuous behaviour closely intertwined with justice and civility and reflects upon the effects of misfortune and luck in the character of any man. In a few paragraphs Simonides touches aspects of a good life, misfortune and justice while simultaneously showing the diverging ideas concerning those concepts. This Chapter aims to do a similar thing, probably not expressed as beautifully as Simonides, but it aims to closely inspect the notions of a good, flourishing life, poverty and justice, with the novelty of inspecting these concepts in relation to the natural environment.

The Chapter is organised in three sections. The first section presents the four key terms of this dissertation and provides a brief discussion of the decisions involved in the use of these terms and not others which are similar. The second section presents the literature review focused on the analysis of the questions, the methods and the disciplines used to examine the meanings of a good, flourishing life. The third section presents the literature review focused on the analysis of three normative theories of justice: Amartya Sen's Idea of Justice, John Rawls' Theory of Justice (TJ), and Martha Nussbaum's theory of justice.

2. 1. Definitions

2.1.1. A flourishing, worthwhile life

Many words are used to describe a *good, flourishing, happy, just, worthwhile* life. Some words -usually nouns- describe the end state in which one find oneself as a result of having this kind of life, such as *well-being, happiness, satisfaction, pleasure, good quality of life*. And some others, usually denoting actions, describe the process needed to achieve such states, such as *human development, capabilities expansion, or fulfilment of needs*.

In this dissertation, I use the word *flourishing, worth-lived life* to recover the meaning of dignity and worthiness that characterised Aristotle's account of a flourishing life and which has been the base for other accounts of well-being and justice. In Aristotle's account, a good, flourishing life, is described as *eudaimonia*, which is a word that entails action through the full exercise of reason and civic behaviour, to constitute a life of dignity. Martha Nussbaum refers to this idea of human worth or dignity when she distinguishes a 'human life' and a 'truly human' life following Aristotle's and Marx's ideas. In her account of capabilities, she describes a threshold that marks the level at which a person's capability becomes "truly human", or worthy of a human being. In her words, "this idea contains a reference to an idea of human worth or dignity" (Nussbaum, 2001, p.97).

The idea of a worth-lived life entails individual agency, dignity and action, but also a notion of self-control guided by the sense of justice and collective responsibility. In this idea transcendental purposes are important for the definition of a good life. The reason for the selection of this word rather than other similar words is that talking about a worth-lived life opens the possibility of building bridges between the notions of a good life and justice.

2.1.2. Poverty

In this dissertation the meaning of Poverty is explored empirically in order to discuss the coincidences and disparities with the current definition of poverty measured by global poverty metrics, such as the Multidimensional Poverty Index (MPI) and Mexican national poverty metrics. Alongside, the links with the natural environment and the perceptions regarding the causes of poverty are inspected.

2.1.3. Justice

This research explores the term 'Justice' by examining it through a geographical perspective drawing attention to dimensions of justice that have been recognized as closely intertwined, such as Distribution, Recognition and Procedural. From the geographical perspective, the notion of justice is explored by thinking how differences in ecological, cultural, economic, political and social conditions get produced (Harvey, 1996). In this sense the meaning of justice takes a relativistic approach recognizing that spatial and ecological differences shape meanings.

In English, the term Justice is sometimes used interchangeably with Fairness. In Spanish, the language used to collect all the empirical data for this research, there is no equivalent word for Fairness, that can denote the subtle difference in meaning between Justice and Fairness. To maintain coherence with the word used in Spanish for data collection, I use the word Justice instead of fairness.

2.1.4. Natural Environment/ Landscape

In this research the term *natural environment/landscape* denotes all living and non-living things occurring naturally. It encompasses the interaction of all living species, climate and natural resources. The use of the term was selected instead of *Ecosystem Services*, *Natural Resources* or *Nature*. The decision not to use the word *Ecosystem Services* and *Natural Resources* for data collection comes from the observation that, usually, when asked about ecosystem services local people needed further explanation about the concept and after this, the natural environment was reflected upon as provider of services in an instrumental way. This instrumental notion was also highlighted when using the word *Natural Resources*. The decision not to use the word *Nature* comes from the local idea of nature as a pristine, usually protected area. By alluding this meaning, I considered that ideas such as clean air, or water quality in the dwelling would be pushed out as viable answers to questions aiming to understand the links between a flourishing life and Nature.

2. 2. The meanings and metrics of a flourishing, worthwhile life

The search for the meaning of a ‘good life’ is not new, it is a matter that has intrigued philosophers, psychologists, theologians, economists and policy makers for centuries; however, the circumstances, the questions, the methods, the disciplines and the paradigms under which these definitions have been explored have varied, thus influencing the kinds of answers obtained. This section provides a review of how the ideas of a good life have been understood and shaped by the questions, the methods and the disciplines used to examine. The review includes concepts (e.g. eudaimonia, human values); normative frameworks (e.g. MDGs, SDGs); ways of measuring that carry on normative definitions of well-being and concrete lists of well-being domains (e.g. basic needs or quality of life).

In 2002, Alkire (2002) compiled lists produced in 39 approaches to identify what constitutes a flourishing life over the years 1938 – 2000. In this section, rather than working in a strict chronological way, which would have been unfeasible given that the meanings have evolved in an organic way not in discrete steps, the literature review is organised by highlighting the following aspects: 1) The questions used to answer what is a good, flourishing, meaningful, worthwhile life?, 2) the inquiry method used to explore the question, 3) the discipline, and 4) the meaning of a good, flourishing life and its components, resulting from the question and method used to examine it.

2.2.1. Aristotle’s *Eudaimonia*

Aristotle (~ 384 B.C), in his *Nicomachean Ethics*, was driven by the question of *What is the End at which all human actions aim*, thus, giving shape to his idea of *Eudaimonia* (*Nicomachean Ethics*, Book I. iv.2-4). The Greek word *eudaimonia* has been usually translated as ‘Happiness’; however, one key difference with the traditional modern meaning of *happiness*, which usually resembles a psychological state, is that for Aristotle, *Eudaimonia* is an activity and implies action. Aristotle explores the meaning of *Eudaimonia* by examining what the common people and the wise people think. Using concatenated questions, Aristotle starts with questioning of *What is the Definition of the Good*, following to the questions of *What seems to be the Ultimate Good, at which all human actions aim, and which is pursued as an end in itself*. To this question, he answers that this Ultimate Good is *Eudaimonia*.

“Eudaimonia above all appears to be absolutely final in this sense, since we always choose it for its own sake and never as a means to something else” (Nicomachean Ethics, I.vii.4) and “Eudaimonia is the End at which all actions aim” (Nicomachean Ethics, I.vii.8).

After this, he asks *What constitutes Eudaimonia?* And, again, by using his characteristic method of inquiry (*endoxa*¹), he points out that, in order to explore this, one is first required to answer *what is the typical activity that characterise human beings?* (the '*ergon*'²). To this puzzle he concludes that the activity that characterises human beings is to possess reason and exercise thought (Nicomachean Ethics, I.vii.15) (Aristotle, trans. 2009). Then, he observes that the "Good of man is the active exercise of his soul's faculties in conformity with excellence or virtue" (Nicomachean ethics, I.vii.15) (Aristotle, trans. 1934), and notes that it can be attained through study or effort.

Aristotle reflects that *Eudaimonia* depends on the ability of individuals to participate in noble activities and the active exercise of reason in conformity with virtue and excellence. Aristotle's concept of a fully flourishing life is then, associated with virtue and excellence of action driven by the exercise of reason and thought. This concept seems to fit harmoniously in the *polis* of the Golden Age, which, in order to function well, requires citizens who are driven by reason and who actively engage in public life and decision-making processes and who are expected to act virtuously, observing the laws.

Aristotle's account has been highly influential to subsequent endeavours in the search of what a good life is. For example, Amartya Sen attributes to Aristotle's writings the philosophical basis of his capability approach (Sen, 1995, p.39), particularly his interpretation of *ergon* as 'functions' of a man, which he conceptually frames as '*functionings*' that are constitutive of a person's being.

Table 2-1. Summary of Aristotelian Eudaimonia

Year	~384 B.C
Question used to explore the meaning of a flourishing life	<ul style="list-style-type: none"> • What is the Definition of the Good? • What seems to be the Ultimate End at which all human actions aim and which is pursued as an end in itself? • What constitutes <i>Eudaimonia</i>? • What is the typical activity that characterise human beings ('<i>ergon</i>')?
Method of inquiry	<i>Endoxa</i> (method that consists on examining the question under study by considering the 'beliefs of the many and the wise')
Discipline	Philosophy
Definition of a full and flourishing life/ Dimensions of a flourishing life	<p>"Human good turns out to be an activity of the soul exhibiting virtue, and if there are more than one virtue, in accordance with the best and most complete" Nicomachean Ethics, I.vii.15. (Aristotle, trans. 2009, p. 12)</p> <p>"The Good of man is the active exercise of his soul's faculties in conformity with <i>excellence</i> and <i>virtue</i>" Nicomachean Ethics, I.vii.15 (Aristotle, trans. 1982, p. 33)</p>

¹ *Endoxa* derives from the *doxa* meaning "beliefs", "opinions", "the beliefs of the many and the wise" (Karbowski, 2013, p.331).

² There is a debate about the meaning of the term '*ergon*', which has been translated as 'function'. Some authors have interpreted the word as a 'function' or purpose of man and have then concluded that Aristotle was talking as if humans have a function to achieve, whereas other authors argue that what Aristotle meant by searching about the '*ergon*' was 'what is the typical activity that characterise human beings'

2.2.2. *Human Values or Human Goods* as a way to understand the Reasons for action in life

John Finnis' Natural Law and Natural Rights: The search for intrinsically-valued Reasons for Action

Influenced by Christianity, especially by Thomas de Aquinas' theory of human action, research into values began in the 1930s. Aquinas' theory of human action is prompted by asking what the reasons for human action are. Aquinas was highly influential for John Finnis' theory of the good (Finnis, 2011; Grisez et al., 1987). Like Aquinas, Finnis asserts that there are absolute or universal values that are the point of human action, and that these universal values represent absolute ends for human beings. In order to search for these universal values or human good(s), Finnis uses a methodology based on a process of critical self-reflection that uses a sequential inquiry approach. Finnis method relies on the use of practical reason to answer the question: *Why do you do what you do?* (reason for action) in a sequential way, until reaching the final, intrinsically-valued reason for action, which is the 'basic human good'. Finnis suggests that "this question, when asked repeatedly by any individual as a reflection on, or recovery of, her previous experiences of practical reasoning leads to the recognition of a discrete heterogeneous set of most basic and simple reasons for acting which reflect the complete range of kinds of valuable human states and actions" (Alkire, 2002, p.93).

Using this method, Finnis et al. put together a list of basic human goods, (which has been revised more than once), that answers the question of what are the most general reasons for action (Grisez et al., 1987; Finnis, 1980, 2011). In the second edition of his book *Natural Law and Natural Rights*, Finnis (2011) includes a list of eight basic reasons for action: 1) Life itself (its maintenance and transmission/health and safety); 2) Knowledge; 3) Play and Work; 4; Aesthetic Experiences; 5) Sociability (friendship); 6) Practical reasonableness; 7) Religion and 8) Self-integration.

Table 2-2. Summary of Finnis' Natural Law and Natural Rights (Finnis, 1980)

Year	1980
Question used to explore the meaning of a flourishing life	What are the basic reasons for action?
Method of inquiry	Critical self-reflection that uses a sequential inquiry approach to answer the question: Why do you do what you do? until reaching the final, intrinsically-valued reason for action.
Discipline	Moral philosophy
Definition of a full and flourishing life or Dimensions of a flourishing life	<ol style="list-style-type: none"> 1. Life itself - its maintenance and transmission / health and safety 2. Knowledge 3. Play and Work 4. Aesthetic experience 5. Sociability (friendship) 6. Practical reasonableness 7. Religion 8. Self-integration

2.2.3. Well-being as the satisfaction of basic needs

Basic Needs Approach (Galtung, 1978; Galtung and Wirak, 1977)

Galtung (Galtung, 1978; Galtung and Wirak, 1977) explored from a theoretical approach what it takes to have a good life not by asking what is a fully developed human being³ but by asking what it is not to be developed as a human being? To this question Galtung answers that it is ‘when basic human needs are not satisfied’ (Galtung, 1978, p.4). The fundamental question of this approach is *what are the basic human needs that need to be satisfied?* As a result of this framing, development is seen as a progressive process to satisfy basic human needs, where the word ‘progressive’ means that more and more needs-dimensions are satisfied at higher and higher levels (Galtung, 1978).

The typology of Basic Human needs advanced by Galtung (Galtung, 1978; Galtung and Wirak, 1977) includes: 1) Security needs (survival needs – to avoid violence); 2) Welfare needs (Sufficiency needs) – to avoid misery; 3) Identity needs (needs for closeness) – to avoid alienation; 4) Freedom needs (freedom to; choice, option) – to avoid repression.

Table 2-3. Summary of Basic Needs Approach (Galtung, 1978; Galtung and Wirak, 1977)

Year	1977
Question used to explore the meaning of a flourishing life	What it is not to be developed as a human being? What are the basic human needs?
Method of inquiry	Theoretical research
Discipline	Development Studies
Definition or dimensions resulting from the question	Typology of Basic Human needs: Material/ Non-material Dependent on actors / Dependent on structures Security, Freedom, Welfare, Identity

Max-Neef’s Fundamental Human Needs: Existential and Axiological Needs Matrix (Max-Neef et al., 1991)

Manfred Max-Neef and others (1991) developed the *Human Scale Development*, which is based on the pillars of human needs, self-reliance and ‘organic articulations’⁴. It is a framework of human needs and the pathways to satisfy them. It includes a matrix composed of two axes of needs: existential needs (being, having, doing and interacting) and axiological needs (subsistence, protection, affection, understanding, participation, leisure, creation, identity, and freedom). On the intersections of the axes Max-Neef places various “satisfiers” (Max-Neef et al., 1991). Their method is novel because it allows articulations of people with nature and because it was designed to challenge the top down approaches

³ Galtung (1978, p. 4) considers that the expression ‘a fully developed human being’ may have no precise meaning.

⁴ By ‘articulation’ Max-Neef et al. (1991) mean the construction of coherent and consistent relations of balanced interdependence among given elements. These ‘organic articulations’ refer to the links between people with nature and technology, of global processes with local activity, of the personal with the social, of planning with autonomy and of civil society with the state)

for decision making by allowing people to reflect upon their own needs and satisfiers. The Human Scale Development consists of a matrix that can serve for purposes of diagnosis, planning, assessment and evaluation and through regular dialogue processes, can enable groups to become aware of their deprivations and potentialities.

Max-Neef et al. assert that “the best development process will be that which allows the greatest improvement in people’s quality of life” (Max-Neef et al., 1991, p.16). Their approach is guided by the questions: *What determines people’s quality of life?* To this, they affirm that quality of life depends on the possibilities people have to adequately satisfy their fundamental human needs, and *What are those fundamental human needs, and/or who decides what they are?* To answer this, they use a matrix of existential and axiological needs.

Table 2-4. Summary of Max-Neef’s Fundamental Human Needs	
Year	1991
Question used to explore the meaning of a flourishing life	Which are the fundamental human needs?
Method of inquiry	Participatory exercise based on public dialogue for the identification of needs and satisfiers.
Discipline	Interdisciplinary (Economics, Sociology, Psychiatry, Philosophy, Political Science, Geography, Anthropology, Journalism, Engineering and Law) (Economics, Sociology, Psychiatry, Philosophy)
Definition or dimensions resulting from the question	Matrix of combinations of needs according to 4 existential categories (Being, Having, Doing and Interacting) and needs according to 9 axiological categories: 1) Subsistence, 2) Protection, 3) Affection, 4) Understanding, 5) Participation, 6) Idleness, 7) Creation, 8) Identity and 9) Freedom.

Doyal and Gough’s Theory of Human Need (Doyal and Gough, 1991)

Doyal and Gough developed their *Theory of Human need* from a naturalist point of view. In opposition to relativist, ethnocentric views of needs, which they consider incorrect and immoral (L. Doyal and Gough, 1991, p.21), they frame their question from the basis that universal human needs exist because human nature sets boundaries to human needs: “Our mammalian constitution shapes our needs for such things as food and warmth in order to survive and maintain health. Our cognitive aptitudes and the bases of our emotionality in childhood shape many other needs – for supportive and close relations with others, for example” (L. Doyal and Gough, 1991, p.37).

Their driving question is “Which are the preconditions for social participation which apply to everyone in the same way (universal needs)? In opposition to relativism, they defend a universalistic view arguing that all people share one universal need: *to avoid serious harm*, and in turn, this universal need generates two basic needs: Physical health to continue living and to be able to function effectively; and Personal autonomy, necessary to make informed choices. In turn these basic needs require the

satisfaction of intermediate needs: adequate nutritional food and water, adequate protective housing, a non-hazardous work environment, a non-hazardous physical environment, appropriate health care, security in childhood, significant primary relationships, physical security, economic security, safe birth control/childbearing and basic education.

Doyal and Gough's theory rejects individualist conceptions of human need which abstract people from their social and historical location and it embraces both individual and societal needs and they argue that the two are dependent on each other for overall success. Anchored in their universalistic approach, Doyal and Gough (L. Doyal and Gough, 1991) argue that basic human needs exist and that individuals have a right to the optimal satisfaction of these needs and that human liberation should be measured by assessing the degree to which such satisfaction has occurred.

Table 2-5. Summary of Theory of Human Need (Doyal and Gough, 1991)

Year	1991
Question used to explore the meaning of a flourishing life	<ol style="list-style-type: none"> 1) Which are those needs that are set by human nature given our mammalian constitution and our cognitive aptitudes? (Universal needs) 2) Which are those needs that need to be satisfied in order to allow individuals to continue living and to be able to function effectively? (Basic needs) 3) Which needs are required to satisfy the basic needs? (Intermediate needs)
Method of inquiry	Theoretical research
Discipline	Psychology
Definition or dimensions resulting from the question	<p><i>Two universal individual "basic needs":</i></p> <ol style="list-style-type: none"> 1. Survival/Physical health 2. Autonomy/Learning <p><i>Societal Universal needs:</i> Production, Reproduction, Culture/Communication and Political authority</p> <p><i>Eleven "intermediate needs"</i></p> <ol style="list-style-type: none"> 1. Nutritional food/water 2. Protective housing 3. Work 4. Physical environment 5. Health care 6. Security in childhood 7. Significant primary relationships 8. Physical security 9. Economic security 10. Safe birth control/childbearing 11. Basic education

2.2.4. Quality of Life (QoL) domains: the measurement of subjective well-being

In parallel to the Basic Needs Approach, during the 1970s, the concept of *Quality of Life* emerged from the Health and Care area (Pennacchini et al., 2012). It emerged in the medical discipline in a context where metrics centred in biological outcomes dominated health care (Schallock, 2004). Framed by the increasing recognition that subjective perceptions of well-being are an important component of an improved life, aspects related to family, community, society, values, and environmental conditions started to call the attention not only of the health community, but also of philosophers, economists and social scientists. Thus, the *QoL* framework developed beyond the original focus of biological outcomes.

In 1996, Robert Cummins (1996) noted that, in order to respond to the need of ‘listening to the voice of the patients’ at the time of evaluating medical interventions, there were two basic approaches. One entirely based on the respondent’s perception of her life satisfaction framed as a single question “How do you feel about your life as a whole?” with respondents using a Likert scale of Life satisfaction/dissatisfaction (Cummins, 1996) and the other option based on breaking down the Quality of Life concept into constituent domains. For Cummins, the former option has a limited utility for smaller group comparisons, since it provides only a global measure of perceived well-being. As a result, Cummins explored which domains of life should be used by employing an empirical and theoretical approach which consisted on reviewing 1,500 articles that concerned the topic of life quality. After the application of certain criteria, a total of 32 studies were considered and 173 different terms used to describe domains of life satisfaction where classified into seven domains: 1) Material well-being, 2) Health, 3) Productivity, 4) Intimacy, 5) Safety, 6) Community and 7) Emotional well-being. The survey used to collect data asked respondents to indicate which domains of life are important to them.

Table 2-6. Summary of Quality of Life (QoL) domains (Cummins, 1996; Cummins et al, 1997)

Year	1997
Question used to explore the meaning of a flourishing life	Which are the constituent domains of Quality of Life?
Method of inquiry	Empirical and theoretical research
Discipline	Health Care
Definition or dimensions resulting from the question	1) Material well-being 2) Health 3) Productivity 4) Intimacy 5) Safety 6) Community 7) Emotional well-being

2.2.5. Human Development as the expansion of Capabilities

Amartya Sen's Capabilities Approach: A flourishing life through the expansion of what people are able to be and do.

During the 1990s, the meaning of a good life was highly influenced by the concept of *Human Development*. The Capabilities Approach (CA), developed gradually by Amartya Sen since 1980 (Sen, 1980, 1995, 1999, 2003, 2010), is the underlying theoretical base of *Human Development*. The CA is a “broad normative framework for the evaluation of individual well-being and social arrangements, the design of policies and proposals about social change in society” (Robeyns, 2003). In this approach, a flourishing life is the expansion of capabilities, understood as what people are effectively able to be and to do. The CA contrasts with other approaches that concentrate on subjective metrics of life satisfaction or on the fulfilment of basic needs. A person's capability to live a good, flourishing life is defined by asking what real options people have (capabilities) to achieve a set of valuable ‘beings and doings’ (functionings). According to Sen, in a good theory of well-being,

“account would have to be taken not only of the primary goods the persons respectively hold, but also of the relevant personal characteristics that govern the *conversion* of primary goods into the person's ability to promote her ends” (Sen, 1999, p.74)

The question to define the notion of a good life used by Sen's Capabilities approach could be framed as *What real options/freedoms people have (capabilities) to achieve a set of valuable 'beings and doings' (functionings) after social difference (i.e. gender, ethnicity, access to resources, etc.) convert the resources available to them? Given that the definition of well-being is focused on the expansion of freedoms, Amartya Sen argues that the right space of measurement is the actual ability that people have to be and to do what they value and have reason to value (capabilities).*

Amartya Sen has insisted in the connection between the capabilities approach with democracy and social justice. In *Development as Freedom* (Sen, 1999), he emphasizes democracy as the exercise of public reason. Sen argues that public reasoning and discussion have an intrinsic value and it's the way to define the set of capabilities that should be considered in a specific context and for different purposes (varying from poverty evaluation to the assessment of human rights or human development). This is the reason that he has been disinclined to suggest a fixed list of capabilities to go with his capabilities approach (Sen, 2004). In Sen words, “it would be a mistake to build a mausoleum for a ‘fixed and final’ list of capabilities usable for every purpose and unaffected by the progress of understanding of the social role and importance of different capabilities” (Sen, 2004, p.77).

As an evaluative framework, the capabilities approach provided an adequate alternative to narrow economic metrics such as GDP or single-dimensional metrics. As a result, the United Nations Development Programme (UNDP) adopted it as the core of the newly coined concept of *Human Development*. In this context, in 1990, the UNDP launched the first annual Human Development Report (HDR), coordinated by the Pakistani economist Mahbub ul Haq. In the first of these Reports he wrote:

“People are the real wealth of a nation. The basic objective of development is to create an enabling environment for people to enjoy long, healthy and creative lives. This may appear to be a simple truth. But it is often forgotten in the immediate concern with the accumulation of commodities and financial wealth” (UNDP, 1990, p.9)

The Human Development Report stated that the purpose of development is enlarging people’s choices, in clear reference to the capabilities approach, and promoted a holistic vision of a people-focused strategy and brought the central message of the inadequacy of measuring people’s well-being and poverty by income-based indicators.

Table 2-7. Summary of the Capabilities Approach (Sen, 1980, 1995, 1999, 2003, 2010)

Year	1980, 1995, 1999, 2003, 2010
Question used to explore the meaning of a flourishing life	What real options/freedoms people have (capabilities) to achieve a set of valuable ‘beings and doings’ (functionings) after social difference (i.e. gender, ethnicity, access to resources, etc.) convert the resources available to them?
Method of inquiry	Public reasoning and discussion
Discipline	Development Economics
Definition or dimensions resulting from the question	Definitions of well-being are Context and individual-specific

Martha Nussbaum’s Central Human Capabilities as Universal Entitlements

Martha Nussbaum developed her own version of the capabilities approach after a period of collaboration with Sen at the World Institute for Development Economics Research in 1986, to provide an ethical foundation for international development policy. In her book *Women and Human Development*, she articulates an account of “how capabilities, together with the idea of a threshold level of capabilities, can provide a basis for constitutional principles that citizens have a right to demand from their governments” (Nussbaum, 2001, p.12). This is a clear difference with Sen’s view of the central role of the capabilities approach as a tool for the exercise of deliberative democracy and public reasoning and his unwillingness to use the capabilities approach in a prescriptive way.

In contrast with Sen’s view, Nussbaum advances a notion of a threshold of central capabilities rather than a notion of capability equality. Even though both agree on the need for universal norms in the development policy arena, it is Nussbaum who has produced explicit arguments against relativism and in line with universal norms. Aligned with this view, Nussbaum produced a list of capabilities organized

according to three types: basic, internal and combined. She articulates a list of central capabilities that are “not just instrumental but which have value in themselves, in making the life that includes them fully human” (Nussbaum, 2001, p.74). By identifying these central capabilities, Nussbaum argues that the list provides the foundation of basic political principles that can be embodied in constitutional guarantees” (Nussbaum, 2001, p.70). In this sense Nussbaum treats basic capabilities as universal entitlements and describes a threshold that marks the level at which a person’s capability becomes “truly human”, or worthy of a human being. In her words, “this idea contains a reference to an idea of human worth or dignity” (Nussbaum, 2001, p.97).

This is the central distinction between Sen’s and Nussbaum’s approach. While Sen’s approach has been adopted by UNDP as the theoretical backbone for the *Human Development Reports* as a comparative measure of ‘Human Development, Nussbaum’s list of central capabilities is developed as the building block of a normative theory of social justice, in which capabilities are closely linked to the idea of universal positive entitlements that the State has the duty to secure.

The central question asked by the capabilities approach is *What are people actually able to do and to be?* Nussbaum, taking a stand for political purposes, develops a working list of functions that would appear to be of central importance in human life and asks: *Is the person capable of this, or not?* Nussbaum’s Central Human Functional Capabilities include: 1) Life; 2) Bodily Health, 3) Bodily Integrity, 4) Senses, Imagination, and Thought, 5) Emotions, 6) Practical Reason, 7) Affiliation, 8) Other Species, 9) Play and 10) Control over One’s Environment, in a Political way and in a Material way (Nussbaum, 2001, pp.79–80).

Table 2-8. Summary of the -Ten Central- Capabilities Approach (Nussbaum, 2001, 2011)

Year	2001, 2011
Question used to explore the meaning of a flourishing life	What real options/freedoms people have (capabilities) to achieve a set of valuable ‘beings a doings’ (functionings) after social difference (i.e. gender, ethnicity, access to resources, etc.) convert the resources available to them?
Method of inquiry	Theoretical
Discipline	Political Philosophy
Definition or dimensions resulting from the question	Ten Central Capabilities 1) Life; 2) Bodily Health, 3) Bodily Integrity, 4) Senses, Imagination, and Thought, 5) Emotions, 6) Practical Reason, 7) Affiliation, 8) Other Species, 9) Play and 10) Control over One’s Environment, in a Political way and in a Material way

2.2.6. Dimensions of Well-being

Voices of the Poor study

In 2000, the World Bank published a three-part study entitled *Voices of the Poor* also known as the *Consultations with the Poor*, which is based on an effort to gather the views, experiences and voices of more than 60,000 self-defined poor men and women from 60 countries. The first part of the series, titled *Can Anyone Hear Us?* recovers the voices of over 40,000 poor people from 50 countries from studies conducted in the 1990s. *Crying Out for Change*, includes the results of comparative fieldwork conducted in 1999 in 23 countries with over 20,000 people. The final volume of the series, titled *From Many Lands*, highlights country case studies and regional patterns (Narayan, Schafft, et al., 2000; Narayan, Chambers, et al., 2000)

Similarly to the origins of the concept of Quality of Life, the origins of this study lie in the conviction that any policy document on poverty should be based on the experiences, reflections, aspirations and priorities of poor people themselves (Narayan, Chambers, et al., 2000). As a result, unlike other large-scale poverty studies, *Voices of the Poor* used participatory and qualitative research methods that allowed the understanding of the realities experienced by self-described poor people. Through these methods, the study was guided by questions such as *How do poor people view poverty and wellbeing? What are their problems and priorities? What is their experience with the institutions of the state, markets, and civil society? How are gender relations within households and communities?*

In the study, the meaning of wellbeing and illbeing (poverty) was to be defined as experienced by poor people. The starting question posed by researchers to participants was: *How do you define well-being or a good quality of life, and illbeing or a bad quality of life?* In this sense, “the terms well-being and illbeing were chosen for their open-ended breadth, so that poor people would feel free to express whatever they felt about a good life and a bad life” (Narayan, Chambers, et al., 2000)

The study concluded that poor people’s ideas of a good life are multidimensional, and that they cluster around five themes: 1) Material wellbeing, 2) Physical wellbeing, 3) Social wellbeing, 4) Security and 5) Freedom of choice and action. On the contrary, ill-being is experienced as material deprivation, physical ill-being, bad social relations, vulnerability, worry and fear, low self-confidence and powerlessness, helplessness and frustration (Narayan, Chambers, et al., 2000, p.22).

Table 2-9. Summary of Dimensions of well-being through the Voices of the Poor (Narayan, Schafft, et al., 2000; Narayan, Chambers, et al., 2000; Schafft and Rademacher, 2007)

Year	1999, 2000, 2007
Question used to explore the meaning of a flourishing life	How do poor people experience and define well-being or a good quality of life, and illbeing or a bad quality of life?
Method of inquiry	Participatory and qualitative research in large-scale poverty analysis in 60 countries with 60,000 people.
Discipline	Public policy
Definition or dimensions resulting from the question	<ol style="list-style-type: none"> 1. Material Well-being: Having enough 2. Bodily/Human well-being 3. Social well-being 4. Security 5. Freedom of choice and action 6. Psychological well-being

2.2.7. Global normative frameworks

The Millennium Development Goals (MDGs)

In September 2000, at the Millennium Summit held in New York, 189 UN member states reflected upon the purpose of the UN in the 21st century. At this meeting, the UN member states agreed to help citizens in the world's poorest countries to achieve a better life by the year 2015, so the driving question for the MDGs can be framed as *How to help citizens to achieve a better life?*

The framework for this shared goal derived in the Millennium Declaration (Resolution 55/2), which consists in eight goals (Figure 2-1) set to be achieved by 2015. The input for this document came from a first draft by the Organization of Economic Cooperation and Development (OECD) followed by a two-year consultation process with representatives of over 1,000 non-governmental organizations. The Declaration states that every individual has dignity and the right to freedom, equality, a basic standard of living that includes freedom from hunger and violence and encourages tolerance and solidarity (UN, 2000). The goals were divided into 21 targets with 60 indicators against which progress was tracked. The backbone strategy of the MDGs was the fight against poverty, defined in a multidimensional way, encompassing Goals 1, 2, 3, 4, 5, and 6.

Figure 2-1. Millennium Development Goals (MDGs) Source: (SS-SCSD, 2016)



Table 2-10. Summary of the Millennium Development Goals (MDGs)

Year	2000
Question used to explore the meaning of a flourishing life	How to help citizens to achieve a better life?
Method of inquiry	Goals drafted by OECD and then two-year consultation process with representatives of over 1,000 NGOs
Discipline	Public policy/ Development
Definition or dimensions resulting from the question	<ol style="list-style-type: none"> 1. Eradicate extreme poverty and hunger 2. Achieve universal primary education 3. Promote gender equality and empower women 4. Reduce child mortality 5. Improve maternal health 6. Combat HIV/AIDS, malaria and other diseases 7. Ensure Environmental sustainability 7. A global Partnership for development

The Sustainable Development Goals (SDGs)

In 2012, the UN Conference on Sustainable Development (Rio+20) launched an intergovernmental process to define the Sustainable Development Goals (SDGs) to advance the UN development agenda beyond 2015. One of the results of this Conference was the establishment of an Open Working Group (OWG) composed by 30 members that included representatives nominated by Member States from the five UN regional groups. The UN Secretary-General provided the initial input to the work of the group in consultation with national governments (UN, 2012). This initial input was based on the synthesis of questionnaire responses of 63 member States, including European Union members selecting a list of priority areas to be addressed through the SDGs. The OWG met in eight sessions that covered a broad range of social issues⁵ and submitted a proposal for the SDGs to the 68th session of the UN General Assembly (UN Women, 2017). The driving question for this process can be framed as *How to advance human well-being that is equitable across individuals, populations and generations and that achieves universal human development while respecting the Earth's ecosystems and critical life-support systems?*

On September 25, 2015, the Sustainable Development Goals (SDGs), officially known as the 2030 Agenda for Sustainable Development, were adopted as the new UN International Development Agenda. The SDGs include 17 goals shown in Figure 2-2.

⁵ Poverty eradication, food security, water and sanitation, employment, health, macroeconomic policy questions, means of implementation, sustainable consumption and production, human rights, gender equality, conflict prevention and post-conflict peacebuilding.

Figure 2-2. Sustainable Development Goals (SDGs). Source: (UN, 2015)



Table 2-11. Summary of the Sustainable Development Goals (SDGs) (SDSN, 2014; UN Women, 2017; UN, 2012)

Year	2015
Question used to explore the meaning of a flourishing life	How to advance human well-being that is equitable across individuals, populations and generations and that achieves universal human development while respecting the Earth's ecosystems and critical life-support systems?
Method of inquiry	Goals drafted by the UN Secretary-General and process of consultation with national government led by an Open Working Group
Discipline	Public policy/ Development
Definition or dimensions resulting from the question	<ol style="list-style-type: none"> 1. No poverty 2. Zero hunger 3. Good health and well-being 4. Quality education 5. Gender equality 6. Clean water and sanitation 7. Affordable and clean energy 8. Decent work and economic growth 9. Industry, innovation and infrastructure 10. Reduced inequalities 11. Sustainable cities and communities 12. Responsible consumption and production 13. Climate action 14. Life below water 15. Life on land 16. Peace, justice and strong institutions 17. Partnerships for the goals

2.2.8. Metrics matter: Alternative societal aspirations

Measuring the things that matter: The Commission on the Measurement of Economic Performance and Social Progress

In 2008, the Commission on the Measurement of Economic Performance and Social Progress (Stiglitz et al., 2009), argued that metrics affect what we do because “our development and growth measures reflect the value we assign to things and depend on our vision of the world” (Stiglitz et al., 2009, p.1) and “the theories we construct, the hypothesis we test and the beliefs we have are all shaped by our

systems of metrics” (Stiglitz et al., 2010, p.xix). As a result, metrics shape our beliefs and inferences. The Commission questioned the use of Gross Domestic Product (GDP) as a proxy measure of development and social progress and recommended the construction of a set of metrics that captures not only market activity (GDP), but also, current level of well-being and environmental sustainability (Stiglitz et al., 2009).

A key conviction of the Commission is that the statistics and accounts reflect aspirations and the values assigned to things, and they are inseparable from our vision of the world. Consequently, they propose a new way to measure economic performance. The driving question of the Stiglitz-Sen-Fitoussi Report is *How to better align the metrics of well-being with what actually contributes to quality of life, and in doing so, to help all of us to direct efforts to those things that really matter?* (Stiglitz et al., 2010)

The Commission was composed by experts from universities, governmental and intergovernmental organizations in the United States, France, United Kingdom and India. The members conducted research on social capital, happiness and health and mental well-being and produced a report with recommendations for shifting emphasis from measuring economic production to measuring people’s well-being (Stiglitz et al., 2010, p.10). The Commission defines well-being as multidimensional and identifies eight key dimensions of well-being: 1) Material living standards (income, consumption and wealth), 2) Health, 3) Education, 4) Personal activities including work, 5) Political voice and governance, 6) Social connections and relationships, 7) Environment (Present and future conditions) and 8) Insecurity, of an economic as well as a physical nature. According to the Commission, the question of sustainability and environment is complementary to the question of current well-being or economic performance and must be examined separately. Trying to combine these two dimensions into a single indicator leads to confusing messages. Recommendation 1 was that Sustainability assessment requires a well-identified sub-dashboard. Recommendation 2 points out the need for indicators that tell us the change of different factors that matter for future well-being.

In addition, the Commission stated that each dimension of quality of life requires appropriate measures of inequality, with each of these measures being significant in itself and none claiming absolute priority over others. “Inequalities should be assessed across people, socio-economic groups and generation”(Stiglitz et al., 2010, p.94). The Stiglitz-Sen-Fitoussi Report was produced during the 2009 financial crisis, at a time when politicians were more interested on economic recovery than on expanding the dashboard of development and socially meaningful indicators (Vira, 2015) and as a result, the uptake of the recommendations provided was overshadowed and interrupted by the urgent need of financial recovery.

Table 2-12. Summary of the Commission on the Measurement of Economic Performance and Social Progress/ (Stiglitz, Sen, Fitoussi, 2010)

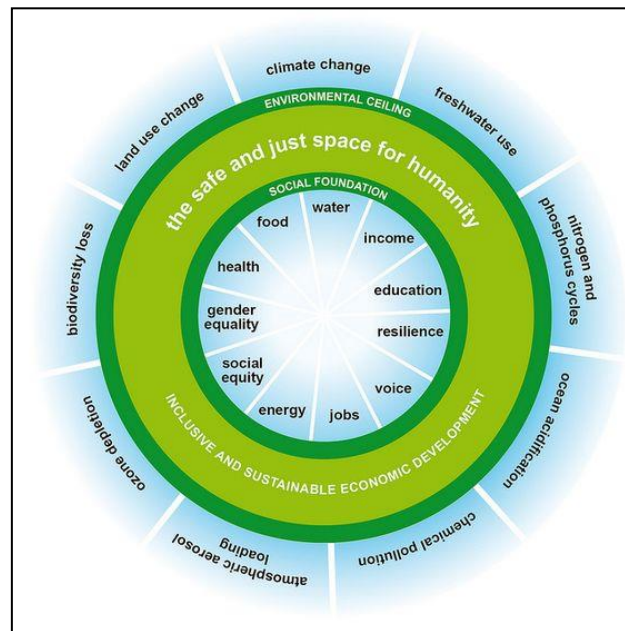
Year	2010
Question used to explore the meaning of a flourishing life	How to better align the metrics of well-being with what actually contributes to quality of life, and in doing so, to help all of us to direct efforts to those things that really matter? What measures should be used to monitor and assess the sustainability of the global economy and human well-being?
Method of inquiry	Research on social capital, happiness, and health and mental well-being
Discipline	Public policy/ Development
Definition or dimensions resulting from the question	<ol style="list-style-type: none"> 1. Material living standards (income, consumption and wealth) 2. Health 3. Education 4. Personal activities, including work 5. Political voice and governance 6. Social connections 7. Environment (present and future conditions) 8. Insecurity (of economic and physical nature)

The Doughnut: Kate Raworth's Social foundation of Human Well-being and ecological ceiling of planetary pressure

In 2009, a team from the Stockholm Resilience Centre led by Johan Rockström, proposed a framework of “planetary boundaries” designed to define a “safe operating space for humanity”. The Planetary boundaries framework attempt to quantify the limits of humanity’s load on the planet by defining boundaries for the biophysical processes that determine the Earth’s capacity for self-regulation. (Rockström, 2009). The UN High-Level Panel on Global Sustainability and NGO’s such as Oxfam and WWF embraced the planetary boundaries hypothesis. However, the framework has been criticized not only for the way in which the boundaries are set, but also for the little evidence to support the claim that transgressing any of the six boundaries would have a negative effect on human welfare (Nordhaus et al., 2012).

Building on Rockström’s planetary boundaries framework (Rockström, 2009), in 2011, Kate Raworth, Oxfam’s Senior Researcher, extended Rockström’s “Safe space for humanity” framework to the “Safe and Just Space for humanity”, by adding a social dimension to Rockström’s framework. Raworth’ framework (Figure 2-3) combined the ‘environmental ceiling’ beyond which lies unacceptable environmental degradation and a social foundation, below which lies unacceptable human deprivation. The driving question for this framework could be framed as: *Which aspects constitute the essential social foundation for all people to lead lives of dignity and opportunity?*

Figure 2-3. The Safe and Just Space for Humanity Framework (Raworth, 2017)



Her definition of the minimum of every human’s claims is based on human rights as “the essential social foundation for all people to lead lives of dignity and opportunity” (Raworth, 2012, p.9). She uses the universalistic focus of Human rights instead of the mainstream relativistic focus of the capabilities approach, used by the United Nations to measure human development. The social dimension of Raworth’s framework includes indicators for water, food, health, education, income and work, peace and justice, political voice, social equity, housing, networks and energy. The planetary boundaries include numerical boundaries for seven parameters: climate change, ozone depletion, ocean acidification, biodiversity, freshwater use, the global nitrogen and phosphorus cycles, and change in land use (Raworth, 2012).

Table 2-13. Summary of the Doughnut: Social foundation of human well-being and ecological ceiling (Raworth, 2012, 2017)

Year	2011	
Question used to explore the meaning of a flourishing life	Which aspects constitute the essential social foundation for all people to lead lives of dignity and opportunity?	
Method of inquiry	Theoretical	
Discipline	Development Economics	
Definition or dimensions resulting from the question	<p><i>Social Foundation</i></p> <ol style="list-style-type: none"> 1. Water 2. Food 3. Health 4. Education 5. Income and work 6. Peace and justice 7. Political voice 8. Social equity 9. Housing 10. Networks 11. Energy 	<p><i>Planetary Boundaries</i></p> <ol style="list-style-type: none"> 1. Climate change 2. Ocean acidification 3. Chemical pollution 4. Nitrogen and phosphorus loading 5. Freshwater withdrawals 6. Land conversion 7. Biodiversity loss

2.3. Niti and nyaya: two lines of reasoning about Justice and the empirical study of justice from a geographical perspective

Two distinctive lines of reasoning about justice have crystalized in the works of John Rawls's *A Theory of justice* (Rawls, 1971) and Amartya Sen's *The idea of Justice* (Sen, 2010). Amartya Sen exemplified the difference between his theory of justice and John Rawls's by using two words which stand for justice in classical Sanskrit: *niti* and *nyaya*. *Niti* relates to organizational respectability and individual behavioural correctness. *Nyaya* stands for a comprehensive concept of realized justice and relates to the particular lives that people are actually able to lead (Sen, 2010).

With these two concepts, Sen exemplifies the 'social contract' tradition and the 'social choice' tradition. The social contract tradition resembles the *niti* concept, in which attention is paid to both, institutions and individual behaviour. In this tradition, a key question to answer is how institutions and individuals of a just society are or, in other words, what 'social contract' would be accepted by everyone unanimously from a fair and impartial point of view (the original position). The 'social choice' tradition takes a more realistic point of view and starts a pragmatic analysis by identifying real societal arrangements with real individual behaviour and requires relative comparisons of justice and injustice among these to then focus on the removal of manifest injustice. Table 2-1 presents key distinctive characteristics of both approaches.

2.3.1. John Rawls' Theory of Justice (TJ) (Rawls, 1971, 2001)

The contractarian approach to justice, embodied by Rawls' Theory of Justice (TJ), is grounded on the idea of legitimacy of political authority and of moral norms. For this approach, legitimate authority of government must derive from the consent of the governed, and in turn, this consent must derive from the idea of a mutual agreement or "social contract". Similarly, for this approach, the normative force of moral norms derives from mutual agreement (Cudd and Eftekhari, 2017)

In line with this idea, Rawls (Rawls, 1971, 2001) proposes a political conception of justice⁶ in which the most reasonable principles of justice would be those arising from a mutual agreement (social contract) reached by persons under fair conditions. The most fundamental idea in this conception of justice is "the idea of society as a fair system of social cooperation over time from one generation to the next" (Rawls, 2001, p.5) (See Figure 2-4).

⁶ In *Justice as fairness* Rawls explains that his theory of justice as fairness should be understood as a political conception of justice rather than as part of a comprehensive moral doctrine.

Table 2-14. Two lines of reasoning about justice

	Social contract tradition	Social choice tradition
Precursors	Thomas Hobbes, John Locke, Jean-Jacques Rousseau, Immanuel Kant	Adam Smith, Marquis de Condorcet, Jeremy Bentham, Mary Wollstonecraft, Karl Marx, John Stuart Mill
Adherents	John Rawls, Thomas Nagel	Amartya Sen, Martha Nussbaum
Conceptual frame used by Amartya Sen	Transcendental institutionalism Arrangement-focused approach	Realization-focused comparative approach
Conceptual frame used by political philosophers	Deontological approach Contractarian approach	Consequential approach Utilitarian approach ⁷
Key question	What 'social contract' would be accepted by everyone unanimously in the original position?	How to make the world less unjust?
Focus of attention	Identification of ideal social arrangements of a 'Just society'	Realization-based comparisons of justice and injustice
How would justice be advanced?	By having just institutions adhering to socially-agreed principles of justice and by members of society observing the rules set by just institutions (compliance with right behavioural rules)	By identifying and removing manifest injustice.
Requirement	Identifying principles of justice guiding perfectly just institutions	Identifying manifest injustice
Characteristic	Ideal theory	Realist theory
Focus of inquiry	The nature of 'the just' and the principles of justice guiding perfectly just institutions and the norms of right behaviour	Comparisons of justice and injustice based on actual institutions and actual behaviour of people
Primary subject of justice	"Basic structure of society": Institutions and the exercise of individual duties and responsibilities	Individuals' functionings and capabilities

⁷ Utilitarian tradition focuses on producing 'the most good summed over all its members, where this good is a complete good specified by a comprehensive doctrine' (Sen, 2010)

In this conception, the principles of justice that define the fair terms of cooperation are set by agreements reached by free and equal citizens. The reason Rawls give to this is the following:

“Given the assumption of reasonable pluralism⁸, citizens cannot agree on any moral authority, say a sacred text or a religious institution or tradition. Nor can they agree about a moral order of values or the dictates of what some view as natural law. So what better alternative is there than an agreement between citizens themselves reached under conditions that are fair for all?” (Rawls, 2001, p.15)

To avoid unequal bargaining power during the process of defining principles of justice, Rawls rely on the image of free and equal persons⁹ taking an impartial point of view, who jointly agree upon and commit themselves to principles of justice (Freeman, 2016). In Rawls’ conception, once established the principles of justice, a well-ordered society is a society in which everyone (citizens, and political and social institutions) follow the same principles of justice (Rawls, 2001).

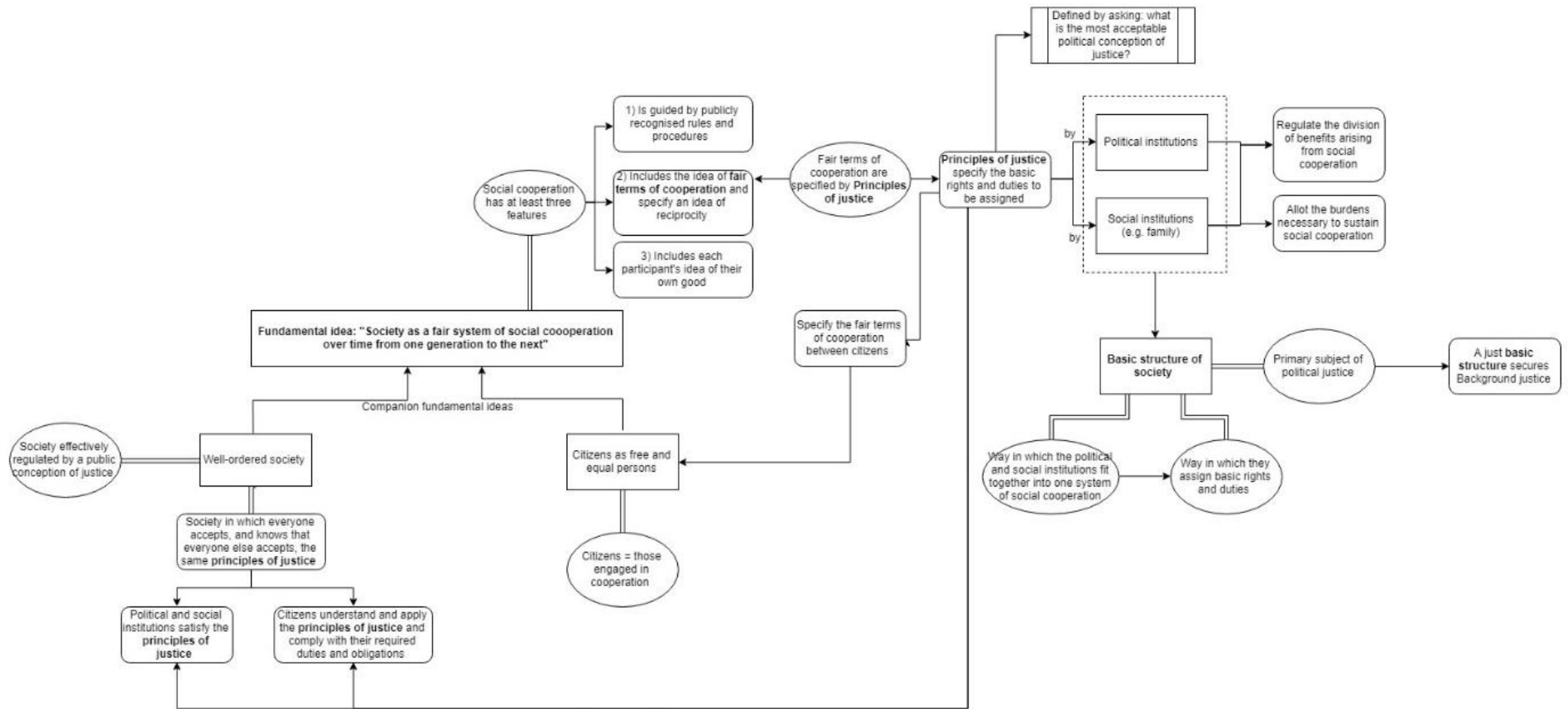
For Rawls, the primary subject of -political- justice is the basic structure of society, defined as the way in which the institutions (social and political) fit together into one system of social cooperation. Institutions are expected to adhere to the principles of justice and to assign basic rights and duties to free and equal citizens. This creates a just basic structure which secures background justice on which these free and equal citizens can lead their lives according to their own conceptions of the good. Synchronously, citizens are expected to understand and adhere to the principles of justice of the well-ordered society. The conceptual relationship between key arguments and features of Rawls’ Theory of Justice (Rawls, 1971, 2001) is visually depicted in Figure 2-4.

A glossary of the Rawlsian terms developed to read Rawls’s work is shown in Appendix F.

⁸ The fact that various comprehensive doctrines, religious, philosophical and moral usually have their own ideas of reason and justification

⁹ This aspect resembles the Recognition dimension, key constituent of the Environmental Justice

Figure 2-4. Visual representation of Society as a fair system of cooperation (Rawls, 2001)



Rawls criticized the capability approach as used by the UN's Human Development Reports by arguing that it entails a comprehensive notion of the good, in contrast to the political liberalism of justice as fairness (Robeyns, 2009, p.110). Rawls suggests that the capability approach with a specified list of capabilities relies on a particular conception of the valuable ends in life, and therefore does not respect the many comprehensive views of the good life that citizens of a plural society might endorse. Political liberalism, in contrast, endorses principles of justice that citizens with diverse and conflicting comprehensive notions of the good can endorse as the result of an overlapping consensus (Rawls, 1988, p.456)

In Rawls' *Theory of Justice*, (Rawls, 1971) primary goods are presented as the "things that every rational man is presumed to want" and are the common base for the unanimous selection of justice principles. Thus, according to a Rawlsian rationale, the space of measurement of justice is primary goods. Unlike other approaches, John Rawls' *Theory of Justice* is driven by a series of concatenated questions, starting with *How can we select unanimous principles of justice?, What are those things that every rational man is presumed to want no matter their conception of a good life?*

Rawls' two principles of justice state that:

- a) "Each person has an equal right to a fully adequate scheme of equal basic liberties which is compatible with a similar scheme of liberties for all"; and
- b) "Social and economic inequalities are to satisfy two conditions: First, they must be attached to offices and positions open to all under conditions of fair equality of opportunity; and Second, they must be to the greatest benefit of the least advantaged members of society"(Rawls, 2011, p.291).

A Rawlsian notion of society's well-being, therefore, is one in which "social welfare is said to be equal to the well-being of society's least well-off member" (Stanton, 2007, p.9). Rawlsian theory's application has been explored in different spheres. For example, in education (through the Difference Principle) (Terzi, 2008; Roderick and Stephens, 1979), in health care (Shevory, 1986) and in finance (SPI, 2016) .

2.3.2. Amartya Sen's Idea of justice (Sen, 2010)

Opposing to the contractarian approach to justice, Sen argues that justice inquiry "need to focus on actual realizations and accomplishments, rather than **only** on the establishment of what are identified as the right institutions and rules" (Sen, 2010, p.10). Essential attention must be paid to the word "only", as after the widespread use of Sen's capabilities approach and its adoption as the theoretical framework for measuring well-being, development and justice, most of the metrics (e.g. Human Development Index, Multidimensional Poverty Index) have excluded the role of institutions, rules and citizens' behavior. What Sen proposes (Sen, 2010, p.10) is to focus the analysis of justice, **not only**, on judging

institutions and rules, but also on *posteriori*, a time in which the consequences or *realizations*, have been produced as a result of the diversity of personal characteristics confronted with a determined arrangement of institutions and a particular observance of duties from individuals.

Dissimilar to Rawls' approach of 'justice as fairness', in which justice is a matter of institutions and where justice is defined by allocating rights and duties (Rawls, 1971), Sen's approach of justice is defined "in terms of the lives and freedoms of the people involved" (Sen, 2010, p.xii). Sen's critique of the Rawlsian approach covers two arguments. The argument of *feasibility* and the argument of *redundancy*. For the former, Sen claims that the Rawlsian idea of agreeing on principles of justice through an impartial process (the idea of the 'original position') is unfeasible. For this, Sen argues that "there may be no reasoned agreement at all, even under strict conditions of impartiality and open-minded scrutiny" on the nature of the 'just society'" (Sen, 2010, p.9). For the issue of *redundancy*, Sen argues that "an exercise of practical reason that involves an actual choice demands a framework for comparison of justice for choosing among the feasible alternatives and not an identification of a possibly unavailable perfect situation that could not be transcended" (Sen, 2010, p.9).

Following this idea, Sen argues that the identification of fully just social arrangements, such as the Rawlsian ideal conception of a 'well-ordered society', is neither necessary nor sufficient. Instead of seeking the perfectly just, Sen argues for a realization-focused perspective that helps to prevent manifest injustice. In Sen's view, the subject of justice is not about trying to achieve a perfectly just society, but about avoiding manifestly severe injustice (Sen, 2010, p.21). Sen defends the idea that an appropriate understanding of social realization must take the comprehensive form of a process-inclusive broad account.

To advance his argument, Sen gives the example of the abolition of slavery in the eighteenth and nineteenth centuries, in which society claimed that slavery was totally unjust. In Sen words:

"it was the diagnosis of an intolerable injustice in slavery that made abolition an overwhelming priority, and this did not require the search for a consensus on what a perfectly just society would look like" (Sen, 2010, p.21).

A glossary of terms used by Amartya Sen in his capabilities approach is shown in Annex G.

2.3.3. Martha Nussbaum's Frontiers of Justice: Reconciling *niti* and *nyaya* (Nussbaum, 2007)

Martha Nussbaum argues that most theories of justice in the Western tradition have been “inattentive to women’s demand for equality and to the many obstacles that stood, and stand, in the way of that equality” (Nussbaum, 2007, p.1). Attending the problem of gender justice would require to move away from considering the family as a “private sphere” immune from justice to consider it a political institution. In addition, Nussbaum’s theory of justice aims to focus on three unsolved problems of social justice: 1) the problem of doing justice to people with physical and mental impairments; 2) the problem of extending justice to all world citizens; and 3) the issue of justice in our treatment of nonhuman animals. Nussbaum argues that the social contract tradition cannot solve these problems and advances a version of the capabilities approach that deals with issues of transnational justice and questions of justice involving nonhuman animals. She argues that Rawls’ theory, grounded on the social contract tradition, suggests a contract for mutual advantage among equals, and this is why it cannot address questions of social justice posed by unequal parties (Nussbaum, 2007).

Like Rawls’, Martha Nussbaum’s theory of justice covers a distributive theory. Whilst Rawls defends the *primary goods* as the *distribuenda*, Martha Nussbaum agrees with Sen in that it’s capabilities. For Nussbaum, what justice requires is a certain distribution of capabilities that are considered as entitlements (rights) with duties to secure those entitlements; and not as Rawls has argued, a set of primary goods, such as income and wealth (Holst, 2010)

Drawing on the capabilities approach, Nussbaum proposes a capability theory of justice which entails a specification of a threshold of capabilities entitlements that seems inherent in the idea of people’s human dignity. The Ten Central Capabilities presented in Section 2.2.5 are the specification of that notion. Nussbaum argues that the list of central capabilities refers to the idea of duties and that we are all (all citizens of the world) under a collective responsibility to fulfill that goal. Nussbaum points out that the central capabilities she has identified have intrinsic value; however, she recognizes that some starting points are more productive than others. She uses the idea of *fertile functionings* used by Jonathan Wolff and Avner De-Shalit (Wolff and De-Shalit, 2007) to define those capabilities that have the ability to ramify out and cause the presence of others (Nussbaum, 2013).

2.3.4. The empirical study of justice

From a geographical perspective, the notion of justice is explored by thinking how differences in ecological, cultural, economic, political and social conditions get produced (Harvey, 1996). In this sense the meaning of justice is not universalistic but recognises that spatial and ecological differences shape meanings and therefore there can be no universal conceptions of justice. Then sense of justice is produced historically and geographically. Harvey argues that “radically different socio-ecological circumstances imply quite different approaches to the question of what is or is not just” (Harvey, 1996, p.6) and therefore, “there can be no universal conception of justice to which we can appeal as a normative concept to evaluate some event. There are only particular, competing, fragmented and heterogeneous conceptions of and discourse about justice which arise out of the particular situations of those involved” (Harvey, 1996, p.342). Then, the task in the exploration of justice meaning is to reveal how all discourse about justice hide power relations.

2.4. Closing remarks

The search for the meaning of a flourishing, worthwhile life has been driven by a broad range of questions that have influenced the answers obtained. The type of questions used to explore the meaning of a good, flourishing, meaningful life has defined the type of conceptualizations about a good life. Asking about basic human needs (Galtung, 1978; Galtung and Wirak, 1977), fundamental needs (Max-Neef et al., 1991) and universal needs (L. Doyal and Gough, 1991) led to the development of typologies of human needs. Asking about basic reasons for action (Finnis, 1980), basic goods (Grisez et al., 1987) and human values (Schwartz, 1992) led to the examination of intrinsically-valued reasons for action. Asking about local definitions of well-being (Narayan, Schafft, et al., 2000; Narayan, Chambers, et al., 2000) led to the development of dimensions of well-being. These conceptualizations of a good life have shaped the way in which the links between well-being and the natural environment have been explored.

The capabilities approach, which has been widely adopted by international development agencies, uses two core questions: What real freedoms or opportunities to achieve different *beings* and *doings* a person has? (capabilities) and What do people achieve in terms of beings and doings? (functionings). The capabilities approach is a key framework which has influenced the definition of human development adopted by UN entities, mainly the UNDP through the publication of the Human Development Reports¹⁰ (UNDP, 2010) and the World Bank (WDR, 2012). It has also influenced the

¹⁰ In UNDP Human Development Reports, Human Development is defined as the expansion of people’s freedoms to live long, healthy and creative lives; to advance other goals they have reason to value; and to engage actively in shaping development equitably and sustainably on a shared planet.

definition of poverty adopted by OECD (OECD, 2013) and the design of measures recommended by the Sustainable Development Solutions Network (SDSN) for the SDGs. The flexibility of Sen's approach to the capability theory, which refuses to provide a fixed list of human capabilities, has made it a flexible approach that can be easily adopted.

Despite the indisputable value of the capability approach to provide conceptualizations of human development that respond to geographical and historical differences, it is important to remember that the capabilities approach, as proposed by Amartya Sen, is an *evaluative approach*. Amartya Sen argues that, in order to evaluate different social arrangements, the adequate evaluation space is what people are in fact able to be and do (i.e. their capabilities or functionings), and not their resources or outcomes, which hide the dissimilar conversion rates that go along with dissimilar social conditions. For Sen, social difference, social diversity, is a main challenge for evaluating social arrangements because different persons have different conversion rates from resources to outcomes according to their particular life circumstances, which makes it difficult for policy makers to understand how a same bundle of resources will be converted into outcomes by a highly heterogeneous group.

By asking *What are people actually able to do and be?* one is examining what a person X in a defined context Y in time Z is able to be and do. As an evaluative tool is excellent because it provides first-hand information about human realisations; however, as a tool to examine the idea of what a good life means, this question has the risk to narrow the potential answers by bringing down to earth the ideas of what a good, flourishing, meaningful life would be. A noteworthy element of the capabilities approach, which is a key difference with other approaches, is the incorporation of the idea of human agency, which conceives people not only as passive recipients with needs to be secured, but as active agents in shaping their own lives. That is why the element of choice is central to this approach.

Section 2.3 summarizes three influential theories of justice. They were studied to strengthen the analysis of the empirical study of justice in relation to natural resources. This review provides conceptual inputs for the selection of the methods to explore the meaning of a flourishing, worthwhile life and to examine the empirical results from a multidisciplinary way.

Chapter 3. In search of an integrated framework to examine the notions of poverty, a flourishing life and justice through the lens of the natural environment

Human beings have a natural tendency to pursue happiness; but, in addition, there's a natural tendency to pursue justice. This natural appetite for justice is a tendency to obey the moral law no matter what the consequences may be for own welfare. Human freedom consists in the power to weigh in the balance the conflicting demands of morality and happiness"

Scotus

3. 1. Introduction

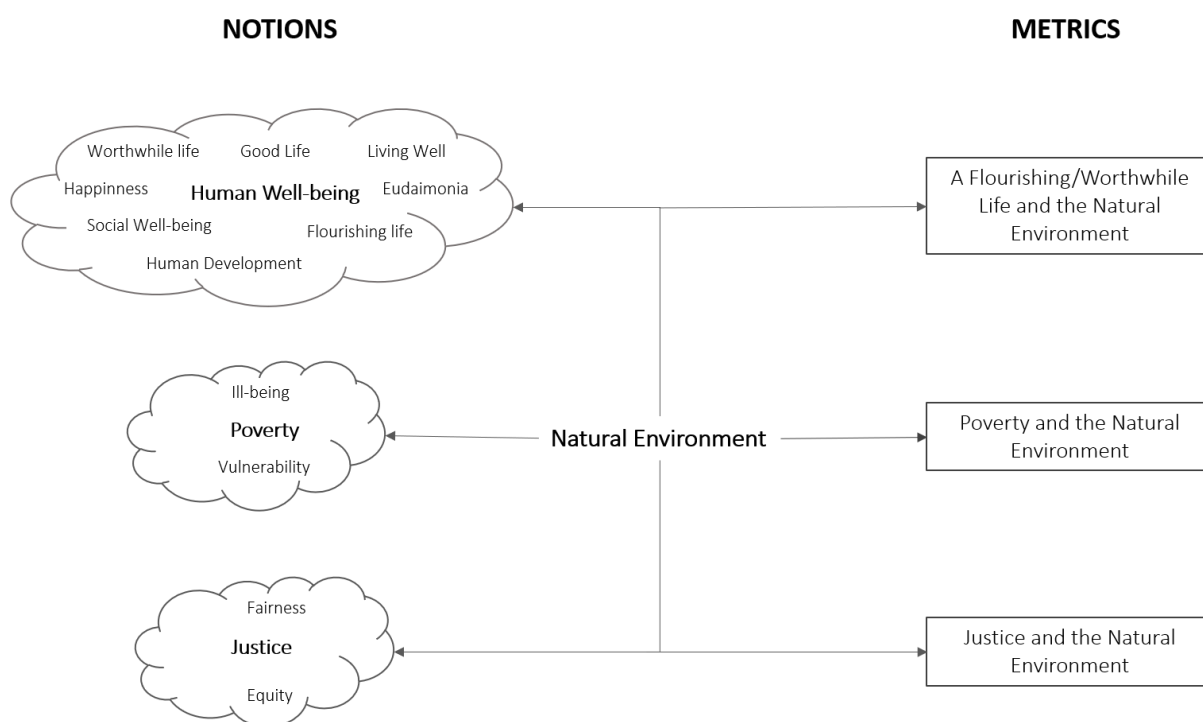
John Duns Scotus was an influential philosopher-theologian in the Middle Ages who agreed with Aristotle and Aquinas that human beings have a natural tendency to pursue happiness; but in addition, he postulated a natural tendency to pursue justice. In denying that human seek happiness in all their choices, Scotus challenged the long tradition of eudaimonistic ethics with roots going back to Aristotle (Kenny, 2007). Scotus' quote serves as a pertinent introduction to this chapter, which aims to bring together the conceptual frameworks that have been used to analyse the links between the natural environment with the ideas of poverty and wellbeing, and the links between the idea of justice and the natural environment. After a summary of these frameworks, the outcome of this chapter is the proposal of the Conceptual and Analytical Research Framework that has guided this research.

This Chapter is divided in three sections. First, it starts by presenting a diverse array of conceptual and Analytical Frameworks that have been used to explore the links between Poverty, Wellbeing, Justice and Environment. The second section presents the research questions and pairs them with the proposed Conceptual Framework. The third section describes the elements of the Conceptual Framework and the justification of each of its elements.

3. 2. Conceptual and Analytical Frameworks used to explore the links between Poverty, a Flourishing life and the Natural Environment

The purpose of this research is composed of two nested aims. Firstly, it aims to explore the interlinkages between the natural environment and human well-being, poverty and justice notions in San Felipe, a Mexican fishing community (Notions); Secondly, based on these interlinkages, it analyses the pertinence and operativity of measuring human well-being, poverty and justice incorporating an environmental dimension (Metrics). The left side of Figure 3-1 depicts the variety of concepts that have been used to explain the meanings of well-being, poverty and justice. The cloud shapes represent the lack of tangible borders between each of these related concepts and their contested meanings. The right side of the figure represents the way in which the links between the natural environment and these concepts are made tangible and measurable in such a way that can be used to make comparisons over time and across geographies.

Figure 3-1. Notions and Metrics



The breadth of approaches, frameworks, theories and models used to understand the linkages between these concepts is very vast. Fiona Nunan (2015) collates a range of frameworks and approaches that can be used for the exploration of the context and nuances of poverty-environment relationships. Dilys et al. (2013) explore the evidence for links between biodiversity and poverty alleviation. Fisher et al. (2013) review conceptual frameworks that can support research on the nexus between ecosystem

services and poverty alleviation and present an analytical framework for understanding the contribution of payments for ecosystem services to wellbeing. Schleicher et al. (2018) present conceptual frameworks that deal with human wellbeing or poverty with or without an explicit focus on the natural environment that were considered the most influential and have been adopted in relevant international policy circles. Thiry et al. (2018) review widely recognized frameworks addressing poverty, environment and natural resources that could allow inspection of the linkages with multidimensional poverty.

The literature review of the frameworks characterising nature-people interlinkages has been guided by using the selection criteria presented in Table 3-1.

Table 3-1. Criteria for the review of conceptual frameworks

Understanding the interlinkages between the natural environment and human well-being, poverty and justice	
Natural Environment, Human Well-being and Poverty	<p>I. Descriptive Conceptual Frameworks</p> <p>Selection Criterion:</p> <p>The framework facilitates the analysis of the linkages between the natural environment and concepts of human well-being and poverty (including similar concepts shown in Figure 3-1.)</p> <p><i>(Helps to understand 'What is?')</i></p>
Natural Environment, Justice and Well-being	<p>II. Descriptive Conceptual Frameworks</p> <p>Selectin Criterion:</p> <p>The framework facilitates the analysis of the linkages between the natural environment and concepts of justice (including similar concepts shown in Figure 3-1.) and human well-being</p> <p><i>(Helps to understand 'What is?')</i></p>

The section summarizes eight influential Conceptual Frameworks that have been used to examine the interlinkages between the Natural Environment and Individual or societal well-being. Each of them has a way to interpret what the broad terms *Natural Environment* and *Individual or societal well-being* mean. For analytical purposes, the frameworks were classified according to their explicit focus of analysis: a) Systemic Analysis, b) Livelihoods, c) Needs, Assets, Entitlements and Capabilities; d) Well-being, and e) Ecosystem Services and Nature's Contributions to People.

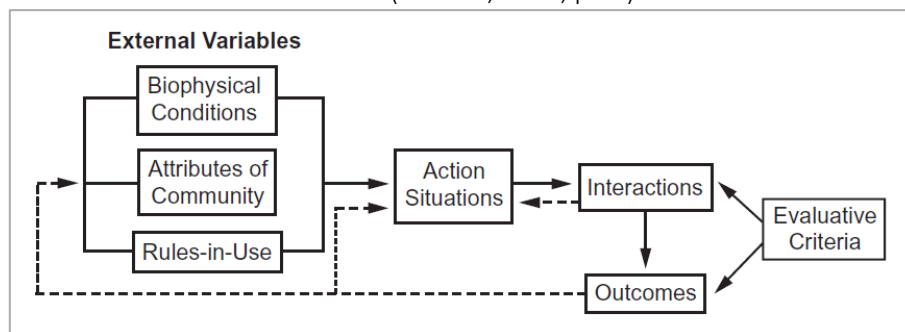
3.2.1. Systemic Analysis

The Institutional Analysis and Development (IAD) and the Social-Ecological Systems (SES) Framework

Systemic Analysis puts together all the elements needed to create an understanding of a whole, it organizes the elements in a structured way and defines sets of relationships among the elements. Examples of systemic analysis include the Institutional Analysis and Development (IAD) Framework (Ostrom, 2011), the Social-Ecological System Framework (SES) (McGinnis and Ostrom, 2014) and the Embedded Economy model (Raworth, 2017).

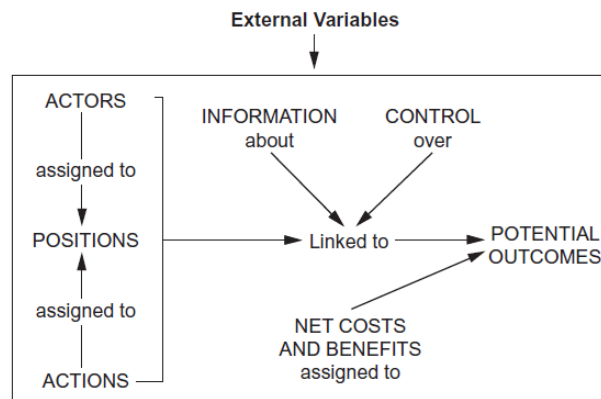
The IAD Framework (Figure 3-2) was developed by Elinor Ostrom and others in 1985 and is a precursor of the SES Framework, which is a more complex framework for the analysis of social-ecological systems. The IAD and the SES Frameworks are multi-tier conceptual maps that connect the “social world” and the “biophysical world” and allow the inspection of the role of institutional arrangements in managing natural resource systems. The SES Framework was developed because of the criticism from ecologists that the IAD Framework unpacks very well all the variables of the social world but all the variables relevant for analysing ecological systems were packed together into one variable – “biophysical conditions”.

Figure 3-2. The Institutional Analysis and Development (IAD) Framework.
Source: (Ostrom, 2011, p.10)



According to Ostrom et al. (2011, p.11), the key part of both the IAD Framework and the SES Framework is the identification of an Action Situation, which is a conceptual unit (Figure 3-3) that represents the “social spaces where individuals interact, exchange goods and services, dominate one another or fight”.

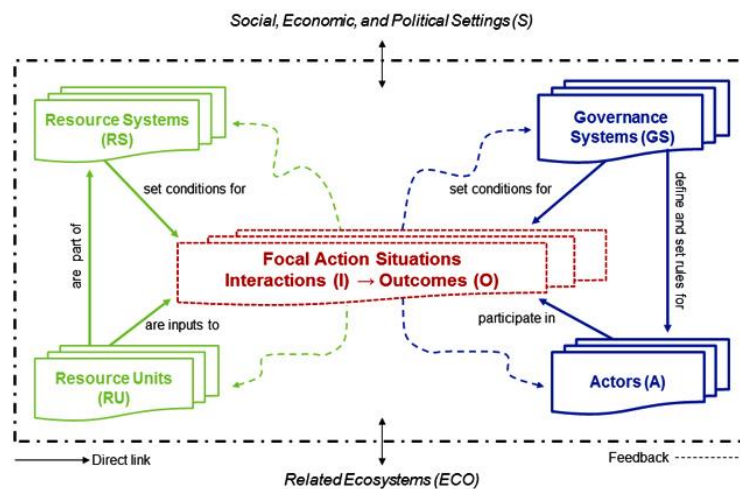
Figure 3-3. The Internal Structure of an Action Situation.
Source: (Ostrom, 2011, p.12)



The Action Situation (Figure 3-3) (Ostrom, 2011, p.12) guide the analysis by directing the attention to the following: a) The set of actors: Who and how many individuals withdraw resource units (e.g., fish, water, fodder) from the resource system?; b) The positions: What positions exist?; c) The set of allowable actions: What types of harvesting technologies are used?; d) The potential outcomes: What geographic region and what events in that region are affected by participants in these positions? What chain of events links actions to outcomes?; e) The level of control over choice: Do appropriators take the actions on their own initiative, or do they confer with others?; f) The information available: How much information do appropriators have about the condition of the resource itself? and, g) The costs and benefits of actions and outcomes: How costly are various actions to each type of appropriators and what kinds of benefits can be achieved?

The SES is a broader framework that encompasses the action situation as a core part of the analysis. It was originally designed for application to situations dealing with common-pool resources. It allows the analysis of the complex relationships between components of a social-ecological system by “digging deeper” within each of the four subsystems of the framework, namely, Resource Systems (RS), Resource Units (RU), Governance Systems (GS), and Actors (A) embedded in larger or smaller Social, Economic, and Political Settings (S) and Related Ecosystems (ECO)(McGinnis and Ostrom, 2014). Each of these systems are in turn composed by variables (second tier) which in turn are composed by a number of variables (third tier), creating multiple tiers that allow analysis of the complex relationships among variables in social-ecological systems.

Figure 3-4. The Social-Ecological Systems (SES) Framework
Source: (McGinnis, 2011)



As noted by (Nunan, 2015, p.76), the IAD and SES Frameworks are very flexible and allow taking different entry points depending on the question being asked. For example, the SES Framework could allow analysis of the nexus poverty-environment by inspecting the position and role of poor people in defining outcomes and how rules, biophysical conditions and community attributes influence how people interact and with what outcomes.

3.2.2. Livelihoods

The Sustainable Livelihoods Framework (SLF)

The Sustainable Livelihoods Framework is a proposal developed by Chambers and Conway (1991) as a response to what they call “an industrialised country imprint” and a reductionism for ease of measurement. According to Chambers and Conway, the industrialised country imprint consists in adopting three conventional narratives: 1) *production thinking*, where problems such as hunger or undernutrition are theoretically solved by producing more food without considering the access or entitlements that people have to food (Sen, 1981); 2) the *employment thinking*, where social problems are solved by creating jobs and 3) *poverty-line thinking*, in which deprivation is defined by a poverty-line based in income or consumption terms.

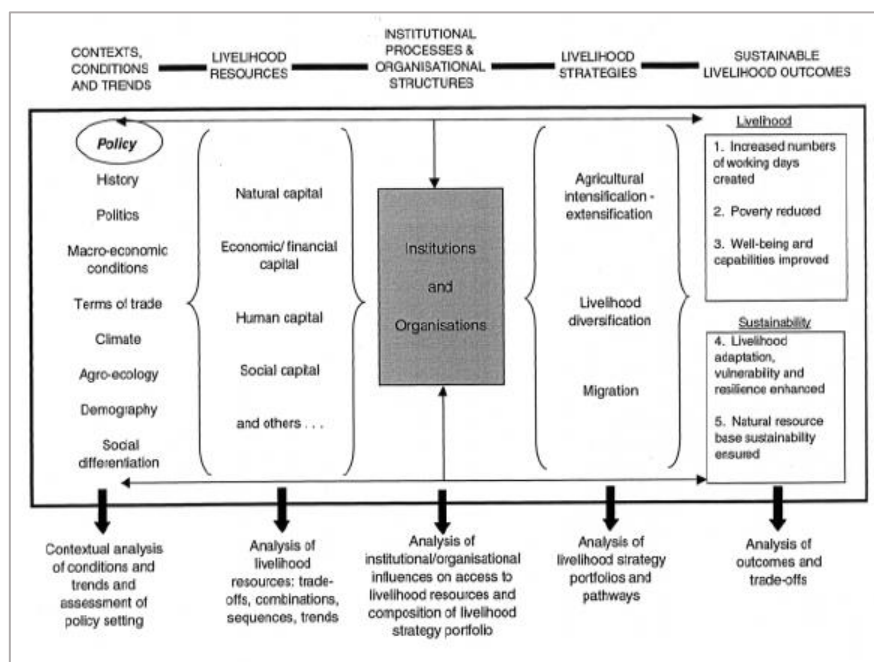
As an alternative, Chambers and Conway (1991) adopt Sen’s notions of Capabilities and Entitlements (Sen, 1981, 1980, 1995) and propose the concept of sustainable livelihoods as a combination of three linked concepts: capability, equity and sustainability, which they argue, are both end and means. In their words:

“A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which 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” (Chambers and Conway, 1991, p.6)

In 1998, Ian Scoones drew on the concept of Sustainable Livelihoods to develop a framework for the analysis of Sustainable Rural livelihoods. The framework (Figure 3-5) shows that given a particular *context*, sustainable livelihoods are dependent on the access to a range of *livelihood resources* (natural, economic, human and social capitals), which are combined in the pursuit of different *livelihood strategies*, which are mediated by the presence of *institutions and organizations* which influence *Sustainable Livelihood outcomes* (Scoones, 1998).

Scoones also adopts Sen’s notion of capability for his definition of well-being, however the notion of Equity that was essential for Chambers and Conway’s framework is absent in Scoone’s SLF Framework. The relationship Nature-People depicted by this framework is visible insofar the Natural Environment contributes to the achievement of Livelihood outcomes, and the importance of conserving the natural resource base is justified as a way of ensuring the long-term provision of livelihood resources.

Figure 3-5. Sustainable Rural Livelihoods. A framework for analysis.
Source: (Scoones, 1998, p.4)



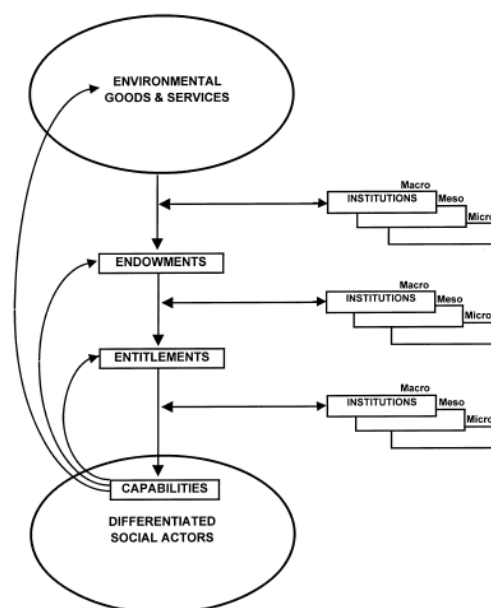
3.2.3. Entitlements, Capabilities

During the 1990's the Sen's concept of Capabilities and Entitlements continued to spread, catalysed by the increased scepticism of the conventional portrayal of poverty as lack of income/consumption. Sen's seminal work on poverty and famines (Sen, 1981) highlighted the relevance of access to resources rather than availability or production. The introduction of these two concepts, capability and entitlements, influenced the way in which the frameworks developed after the 1990s represented the relationships between well-being and nature.

The Environmental Entitlements Framework

The *Environmental Entitlements Framework* (EEF) (Figure 3-6) was developed by Leach, Mearns and Scoones (1999). Similar to Ostrom's approach (McGinnis and Ostrom, 2014), the EEF highlights the central role of institutions in mediating environment-society relationships. The Framework adopts Sen's entitlement analysis to explore how differently positioned social actors command environmental goods and services that are instrumental to their well-being (Leach et al., 1999).

Figure 3-6. The Environmental Entitlements Framework.
Source: (Leach et al., 1999)



Leach et al. (1999, p.233) define *endowments* as 'rights and resources that social actors have', for example land, labour, skills, and so on; and *environmental entitlements* as 'alternative sets of utilities derived from environmental goods and services over which social actors have legitimate effective command and which are instrumental in achieving well-being'.

Examples of environmental entitlements include direct uses of natural resources, such as food, water or fuel; the market value of those resources and the utilities derived from environmental services, such as pollution sinks or properties of the hydrological cycle. In turn, environmental entitlements enhance people's capabilities (what people can do or be). The Framework intends to guide an analysis focused on the dynamic process that underlie each of the relationships among the elements, and which are mediated by various forms of institutions operating at different scales, from the macro to the micro

In this Framework nature is portrayed as a provider of goods and services through the differentiated access of differently positioned social actors and mediated by institutions at different scale. These goods and services from the environment are in turn influenced by the actions prompted by the capabilities of the social actors. In this sense, Nature is conceptualised in an instrumental way. The notion of justice is not explicit, however aspects of recognition, decision-making (procedure) or distribution might be considered in the analysis of how institutions mediate access to socially differentiated social actors.

3.2.4. Wellbeing

Wellbeing in Developing Countries (WeD) and Social Wellbeing

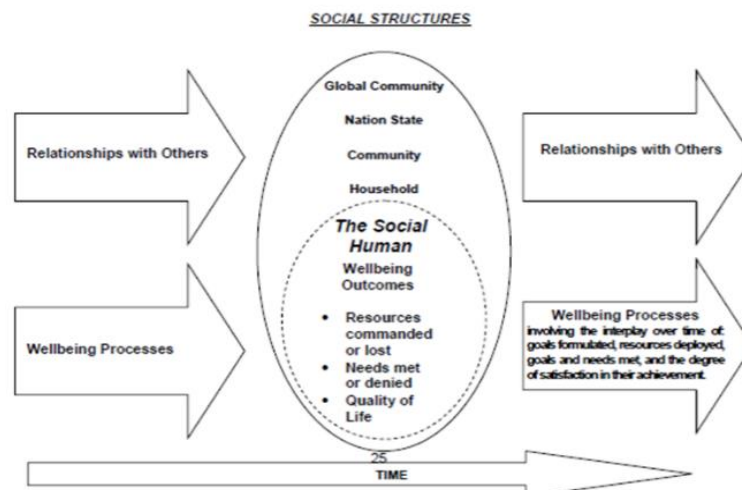
The Wellbeing in Developing Countries (WeD) Framework (Fig 3-7) was developed by a multidisciplinary research group at the University of Bath funded by the ESRC. The WeD Framework is an integrated model of wellbeing that is intended to serve as a tool to conduct empirical analysis of wellbeing in developing countries. According to McGregor (2006, p.4), wellbeing is defined as an interplay between "the resources that a person is able to command; what they are able to achieve with those resources and the meanings that drive their aspirations and strategies".

The WeD Framework draws on Doyal and Gough's *Theory of Need* (L Doyal and Gough, 1991) which sets out eleven 'need satisfiers'¹¹ (See Chapter 2) and proposes a theory of human wellbeing based on five ideas: the centrality of social human being; harm and needs; meaning, culture and identity; time and processes; resourcefulness, resilience and adaptation (McGregor, 2006). The integrated model consists of six components grouped into three pairs: *Outcomes* (needs met, resources commanded, and Quality of Life achieved), *Structures* (Social structures, such as the Global community, Nation State, Community and Household) and *Processes* (involving the interplay of needs, resources and meanings).

¹¹ Adequate nutritional food and water, protecting housing, a non-hazardous work environment and physical environment, safe birth control and child-bearing, appropriate health care, secure childhood, significant primary relationships, physical security, economic security and appropriate education

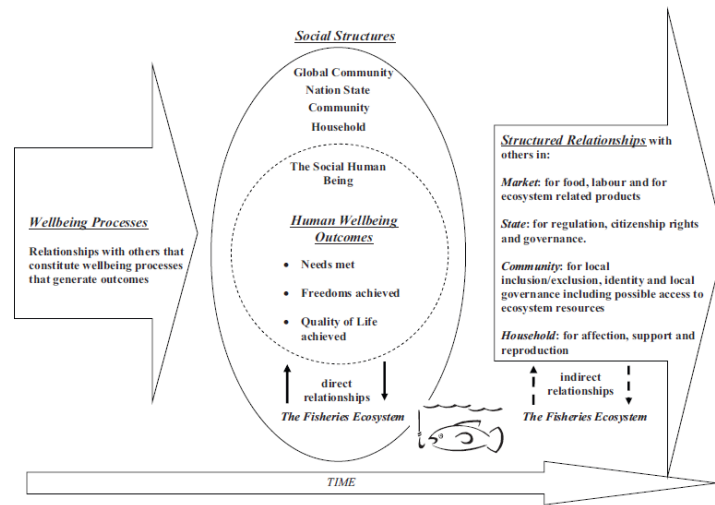
In line with Goyal and Dough's *Theory of Need* (1991), the conception of wellbeing is a combination of both objective circumstances and a subjective perception (See Chapter 2). In this way, wellbeing is conceived as a combination of what a person has, what they can do with what they have and how they think about what they have and can do (McGregor, 2006). The Framework places the social human being at the centre of the analysis. Social humans interact with each other in pursuit of their own wellbeing goals and also in the constitution of society. This focus on the social and cultural construction of wellbeing is characteristic of the WeD Framework. The role of Nature portrayed by the WeD framework is that of a Satisfier of needs, both individual and social. The notion of justice, equity or duties is absent in this framework, as well as the presence of links that recognise the effects that the command of resources have on the environment.

Figure 3-7. WeD's Wellbeing Framework. Source: (McGregor, 2006, p. 25)



In 2011, Coulthard et al., drawing on the WeD Framework, developed a framework for the analysis of the global fisheries crisis (Figure 3-8). They propose the use of the social conception of human wellbeing to improve fisheries, policy and governance. The competing interests in fisheries can be better understood by making visible the values, aspirations and motivations that constitute subjective wellbeing and the wide range of social relationships that are essential for achieving social wellbeing. This framework makes visible both the mutual direct relationships between the human wellbeing outcomes, the mutual indirect relationships between the social structures, and the fisheries ecosystem.

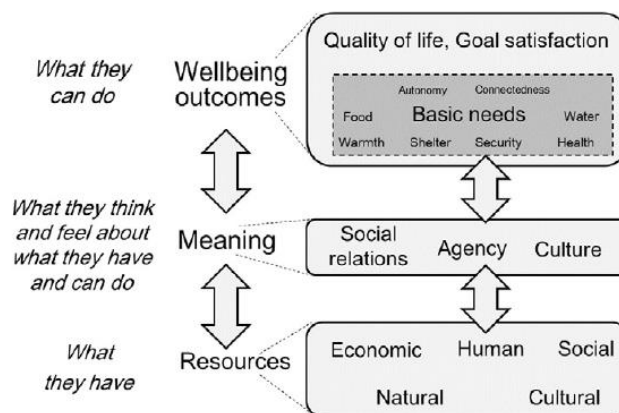
Figure 3-8. A social wellbeing framework for fisheries. Source: (Coulthard et al., 2011)



Ecosystem Services and Human Wellbeing (Dawson and Martin, 2015)

Dawson and Martin (2015) propose a framework (Figure 3-9) that allows the analysis of the complexity inherent in social-ecological systems in the context of ecosystem service research. The framework is a response to five ‘instances of socio-ecological reductionism’ that limit ecosystem service analysis, namely, 1) failure to consider different types of values, 2) aggregation of people, 3) oversight of power relations, 4) focus on single land use type and 5) lack of attention to changes and their drivers at multiple scales (Dawson and Martin, 2015 p. 62-63). The framework draws on the WeD approach and the definition of wellbeing proposed by McGregor et al. (2007, p. 110) “wellbeing arises from what a person has, what they can do and how they think and feel about what they both have and can do”.

Figure 3-9. Conceptual framework for multidimensional wellbeing. Source: Dawson and Martin, 2015, p. 64 (adapted from Gough and McGregor, 2007)



The framework was applied to a case study of three sites adjacent to native tropical forest in western Rwanda. It is composed of three elements, *Resources* constitute “what a person has” and are grouped according to the categories described in the Sustainable Livelihoods Framework (Scoones, 1998). *Wellbeing Outcomes* refer to ‘what people can do’ and are composed of basic needs, represented along the lines of Doyal and Gough’s (1991) basic needs. The third element is the subjective element represented by ‘what people think and feel about what they have and can do’ and draws on McGregor et al. (2007) to represent the meaning that groups and individuals attach to resources and associated opportunities. This meaning is not only derived from individual agency but is also socially constructed by social relations and culture.

3.2.5. Ecosystem Services, Nature’s Contributions to People (NCP)

Millennium Ecosystem Assessment Framework (MA)

The Millennium Ecosystem Assessment (MA) was launched in 2001 and the report was published in 2005. The Assessment was based on a Conceptual Framework that shows the links between ‘Ecosystems and Well-being’ (Figure 3-10) (MA, 2005a) and which, after decades, has played a pivotal and influential role in defining the way in which the interlinkages between the natural environment and people are characterised. The Framework draws on the World Bank’s *Voices of the Poor* study which characterises human well-being as a multidimensional experience that has multiple constituents, including Security, Basic Material for a Good Life, Health and Good Social Relations which, combined, expand person’s freedom and choice.

The conceptual framework (Figures 3-10 and 3-11) places human well-being as the central focus for the assessment and assumes a dynamic interaction between people and ecosystems that take place across different geographical and time scales. Aligned with its goal of measuring the impact of the changes in ecosystem in human well-being, the Framework tracks drivers of change to ecosystem services, both indirect (such as demographic, economic, science and technology, among others) and direct (e.g. changes in local land use, species introduction, technology adaptation, among others).

Figure 3-10. Millennium Ecosystem Assessment Conceptual Framework. Source: (MA, 2005, p. 9)

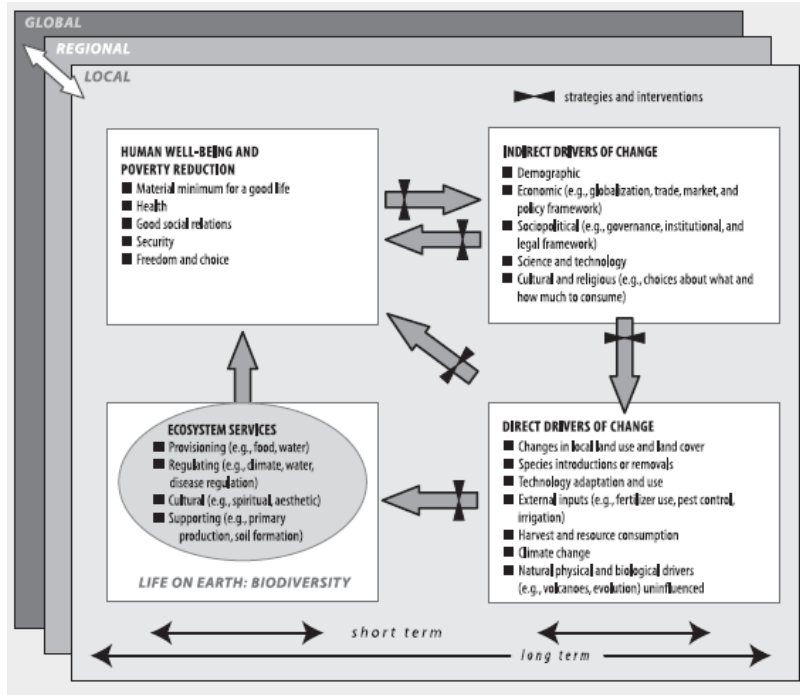
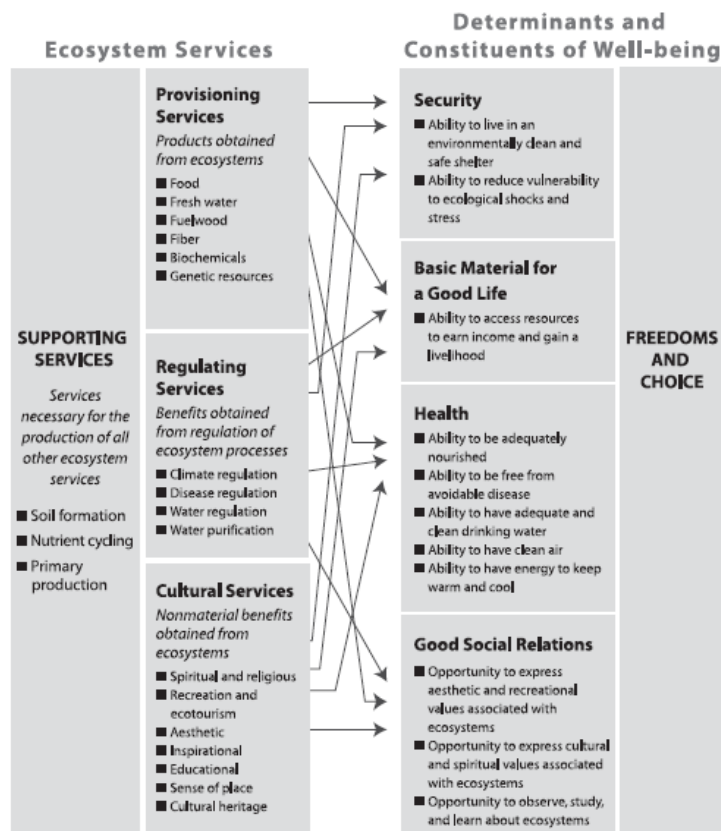


Figure 3-11. Ecosystem Services and their links to Human Well-being. Source: (MA, 2005, p.5)



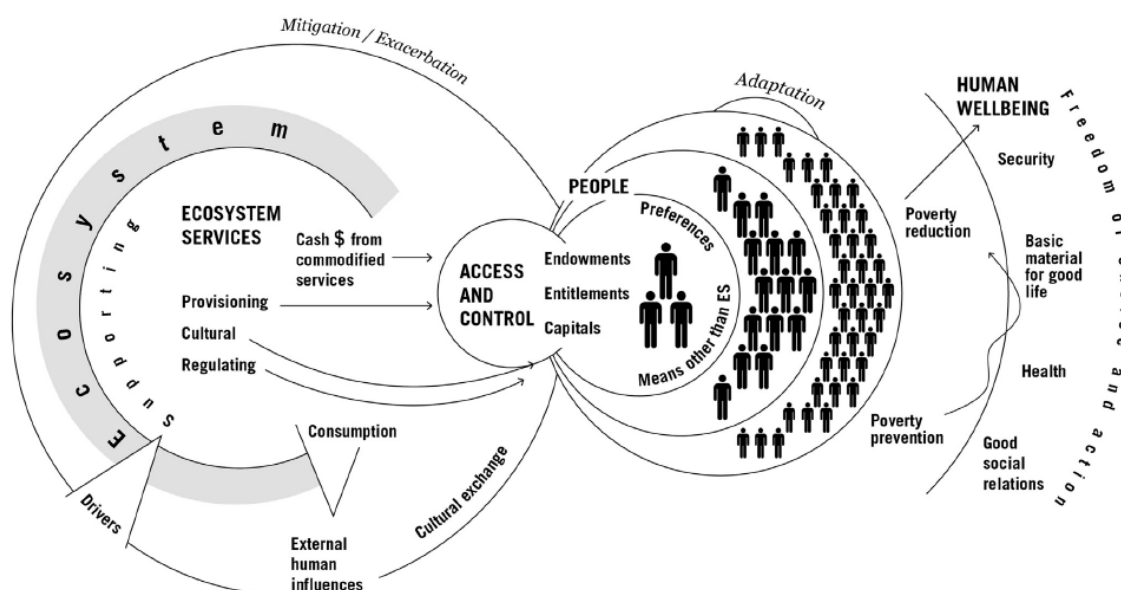
ESPA Framework (Fisher et al., 2014)

The Ecosystem Services and Poverty Alleviation (ESPA) Framework was developed in 2014 as an analytical tool for understanding the contribution of payments for ecosystem services to wellbeing (Fisher et al., 2014). The framework adopts the taxonomy of ecosystem services proposed by the Millennium Ecosystem Assessment (MA, 2005a); recovers the notions of endowments, entitlements and access to resources of the Sustainable Livelihoods Framework (Chambers and Conway, 1991; Leach et al., 1999; Scoones, 1998) and the components of human well-being of World Bank's *Voices of the Poor* study (Narayan, Schafft, et al., 2000).

The ESPA Framework (Figure 3-12) is composed by an Ecosystem which provides a diverse array of ecosystem services (MA, 2005a) which are used by people to support different components of wellbeing, which, by a combined presence, allow people freedom of choice and action (Narayan, 1999; Narayan, Schafft, et al., 2000; MA, 2005a). It distinguishes different types of poverty alleviation strategies, poverty prevention and poverty reduction, which leads to increased wellbeing and incorporates access and control as a representation of the social and political dynamic through which people interact with ecosystem services. Processes that influence ecosystem changes are characterised by the Drivers, while Consumption represents the removal of ecosystem services by external human influences (Fisher et al., 2014).

Figure 3-12. Ecosystem Services and Poverty Alleviation (ESPA) Conceptual Framework.

Source: (Fisher et al., 2014, p.36)



The ESPA framework incorporates elements of human response to adaptation and mitigation in response to environmental change and adds considerations of social differentiation by allowing analysis of whether people can access services. In this way, the ESPA framework tackles one of the criticisms made to the MA Framework, which was considered to fail to acknowledge social differentiation. Another innovative feature is the portrayal of *People* not only as the recipient of well-being components, but as an active and complex actor with different preferences, means, endowments, entitlements and capitals which, in this way, actively interact with the ecosystem in a differentiated way defined by characteristic personal attributes.

IPBES Framework

The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) is an independent intergovernmental body that was established in 2012 with the goal of ‘strengthening the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development’ (Díaz et al., 2015). A distinctive feature of the IPBES Framework is the participatory way in which it was constructed and its explicit consideration of diverse scientific disciplines and knowledge systems, including indigenous and local knowledge. This recognition to diversity has posed challenges to the adoption of Western-based single set of narratives or concepts, for example, the concept of ecosystem services or human well-being. The solution that IPBES adopted in 2013 was the inclusion of a range of similar concepts, that were represented in the framework by different colours¹² (See Figure 3-13) (Díaz et al., 2015, p.5).

The IPBES builds on the ecosystem service concept mainstreamed by the Millennium Ecosystem Assessment (MA, 2005) however, the IPBES has been critical of the portrayal of people-nature relationships as a stock-and-flow of services because, they argue, this representation “has largely failed to engage a range of perspectives from the social sciences”. As a response, in 2017, the IPBES adapted its framework to make it “more inclusive, both in terms of the strands of knowledge incorporated and representation of worldviews, interests and values” (Díaz et al., 2018, p.270). Figure 3-14 shows the evolution of the concept of ecosystem services adopted by the IPBES Framework from the taxonomy proposed by the Millennium Ecosystem Assessment (MA, 2005) towards a more culturally-dependent concept of Nature’s Contributions to People (NCP) (Díaz et al., 2018; Pascual et al., 2017).

¹² Black font was used to represent inclusive categories that should be intelligible and relevant to all stakeholders; green, to represent categories of western science and, blue, to represent similar categories according to other knowledge systems

The IPBES Conceptual Framework adopted in 2013 (Figure 3-14) is composed by six interlinked elements representing the natural and social systems: nature, the benefits that people derive from nature, anthropogenic assets, institutions and governance systems and other indirect drivers of change, direct drivers of change and a good quality of life. Intrinsic values of nature are represented by a blue oval inside the *Nature* box.

Recently, IPBES advanced a new framework: the IPBES Nature's Contributions to People Framework (Figure 3-15) which aims to explicitly recognize that a range of views exist that respond to the diversity of worldviews, interests and values (Context-specific perspective) but also highlighting those flows from nature to people that are universally applicable (Generalizing perspective).

Figure 3-13. Evolution of Nature's Contributions to People (NCP) Framework.
Source: (Díaz et al., 2018, Fig. S1)

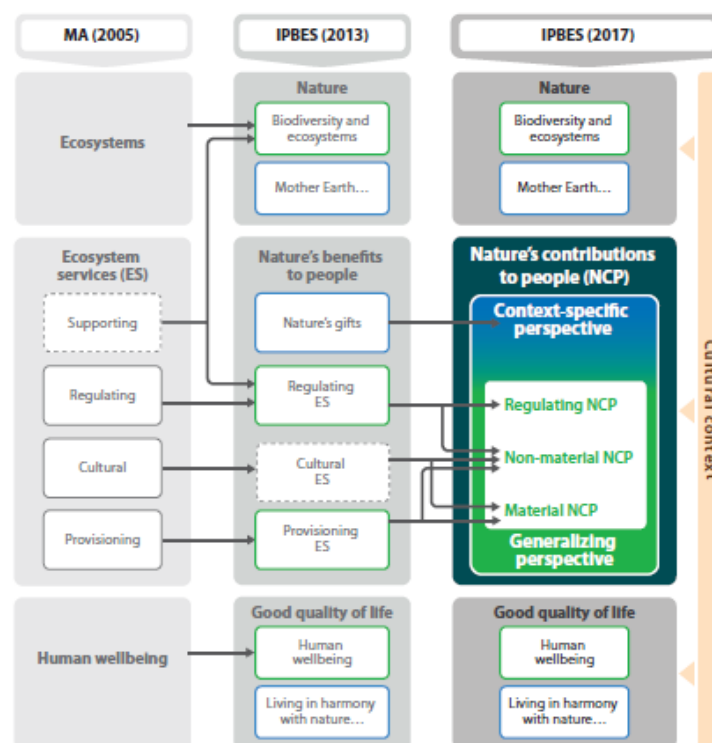


Figure 3-14. IPBES Conceptual Framework. Source: (Díaz et al., 2015, p.5)

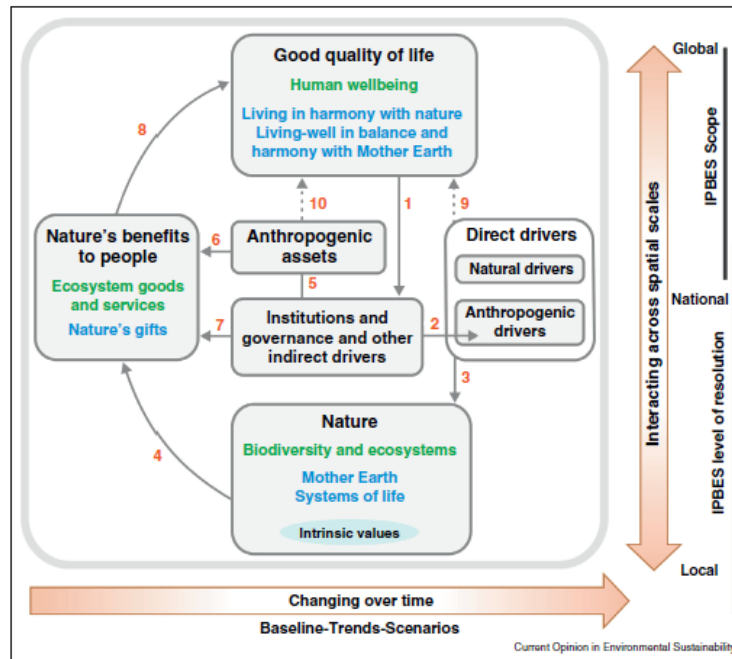
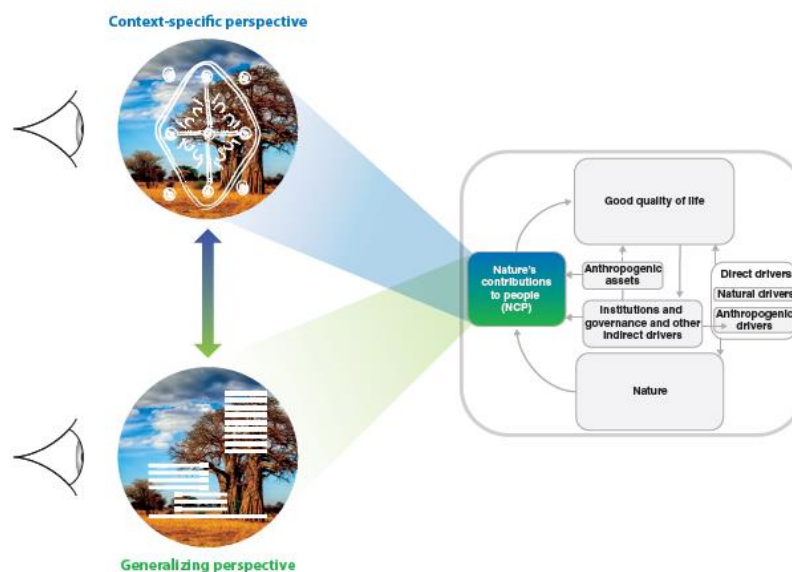
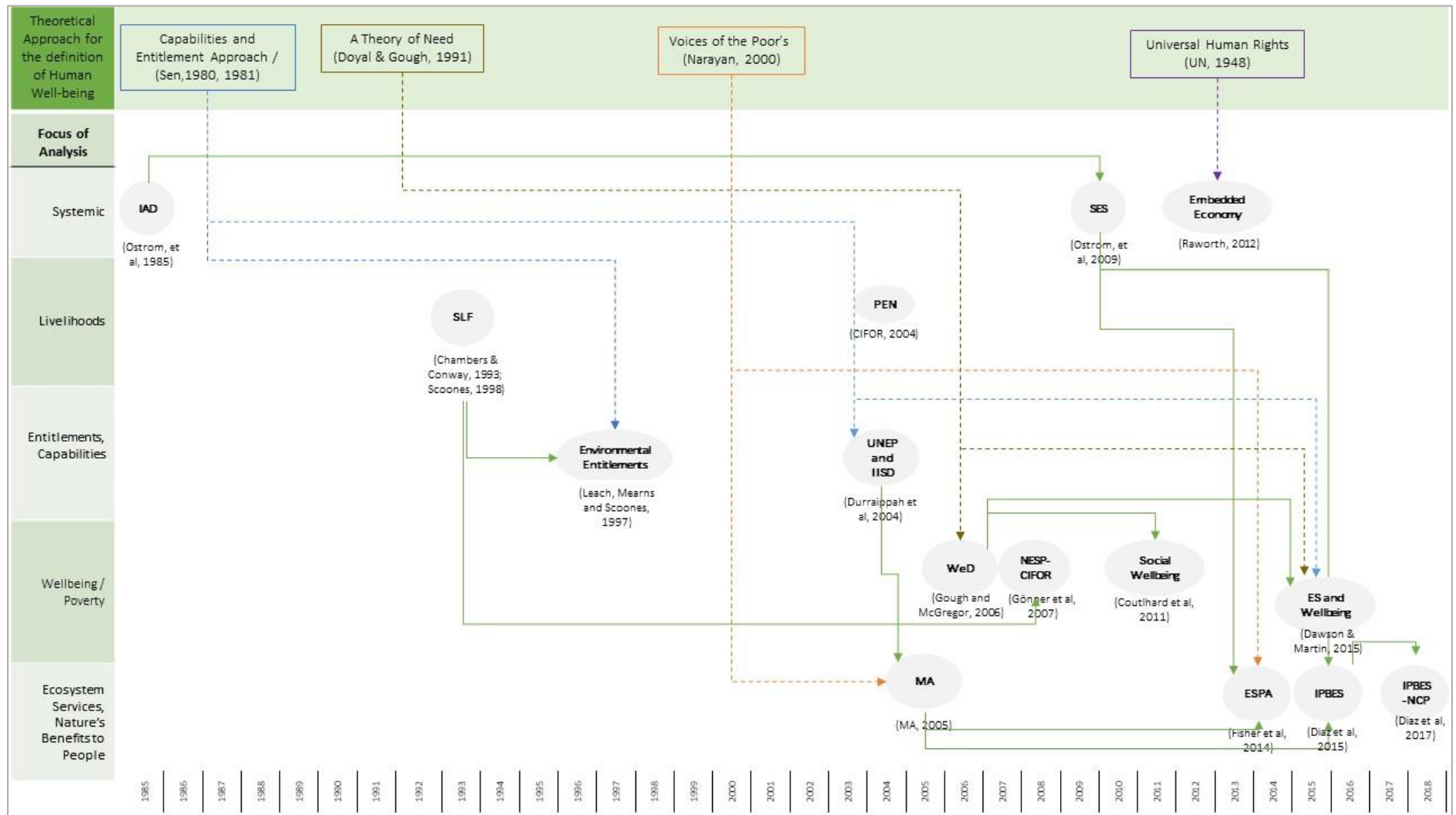


Figure 3-15. Nature's Contributions to People (NCP) Framework. Source:(Díaz et al., 2018, p.Fig. S2)



As a summary, Figure 3-16 visually represents the frameworks described in this section and some others, displaying them in a chronological order and classifying them according to the focus of analysis, namely: systemic analysis, livelihoods, entitlements/capabilities, wellbeing, poverty and ecosystem services/Nature's contributions to people. The dotted arrows show the theoretical foundations that shape the way in which well-being or justice is conceptualized. The green arrows represent the influence the framework has explicitly recognized from other frameworks

Figure 3-16. Descriptive Conceptual Frameworks to examine the interlinkages between the Natural Environment and People



The dotted arrows show the theoretical foundations that shape the way in which well-being or justice is conceptualized. The green arrows represent the influence the framework has explicitly recognized from other frameworks.

3.3. Conceptual Frameworks to examine the interlinkages between the Natural Environment and the notions of Justice

This section briefly presents selected frameworks that have been used to explore the interlinkages between the natural environment and the notion of justice and similar concepts, such as equity and fairness. The nine frameworks summarized in this section were organized according to their focus of inquiry: Ecological Justice, Fairness, Equity, Environmental Justice and Integrated Human Well-being/Justice frameworks.

3.3.1. Ecological Justice

Dialectic of Justice and Nature

Low and Gleeson (1998) use a political ecology approach to explore the linkages between justice, society and nature. They argue that the struggle for justice is shaped by the politics of the environment which has two relational aspects: the justice of the distribution of environments among peoples (environmental justice), and the justice of the relationship between humans and the rest of the natural world (ecological justice).

Low and Gleeson (1998) introduce their dialectical process by describing that justice is a contested idea that doesn't deliver a single perspective on which everyone agrees, and it is precisely the disagreements that arise what makes the process of 'finding justice' a dialectical one in which many people struggle to find the truth about justice. In their words:

"Dialectic, thus concerns the play of opposing ideas, opposing social agencies and opposing natural forces... We seek to answer two main sets of questions about our human relationship with the rest of the natural world.

First, do humans have a claim to fair shares of the particular good which 'an environment' provides? What is environmental justice?

Second, does non-human nature, or at least aspects of nature, have a claim on justice? What is ecological justice?" (Low and Gleeson, 1998, p.21)

The Dialectic of Justice and Nature approach is composed by two levels of political justice that interact *ad infinitum* in a dialectical process (Figure 3-17). It starts with the political question: who (and what) gets what and where? To answer these questions, we reflect on the current state and also on alternative distributions. By comparing both scenarios, we make judgements like 'better' or 'worse' and we can then reflect on what makes one distribution better than another. So we arrive at criteria which are the bases of justice (Low and Gleeson, 1998, p.196). Once decided that one kind of distribution is

better, the second step considers how the *system* in which we live can deliver that kind of distribution. This is the criteria of *political* justice. Thus, the first level of political justice contains conceptual systems for resolving conflicts about distributions between humans and humans, humans and non-human nature.

The second level of political justice contains concepts for resolving disputes about first-level political systems (Low and Gleeson, 1998, p.197) and is defined by dealing with the fact of difference, in which we encounter the fact that other humans, differently placed, arrive at different conclusions about the distributions regarded as better or worse outcomes. This is the process of finding justice as an open-ended dialectical process. The dialectic is an evolving debate about the bases of justice in deserts, rights and needs.

For the second level of political justice, Low and Gleeson (Low and Gleeson, 1998, p.199) argue in favour of the right to the need satisfaction, including *environmental* need. They propose an institutional transformation at the global level. As a first step they propose a World Environmental Council and an International Court of the Environment and four principles to govern it: the ecological justice principle¹³, the principle of autonomy¹⁴, the principle of uncoerced discourse¹⁵, and the principle of consent¹⁶.

The dialectic of justice and nature was developed at a time when the dominant approach to human wellbeing was the satisfaction of needs (See Chapter 2), when Sen's introduction of the Capabilities approach was only recently published (Sen, 1980), when collective response and awareness about global issues were increasing (WCED, 1987; UNDP, 1990), and when the concept of ecosystem services was not yet introduced.

¹³ The *Ecological Justice principle* states that 'every natural entity is entitled to enjoy the fullness of its own form of life' and extends the right to respect and dignity to all non-human nature. The second ecological justice principle is that 'all life forms are mutually dependent and dependent on non-life forms' (Low and Gleeson, 1998, p.199)

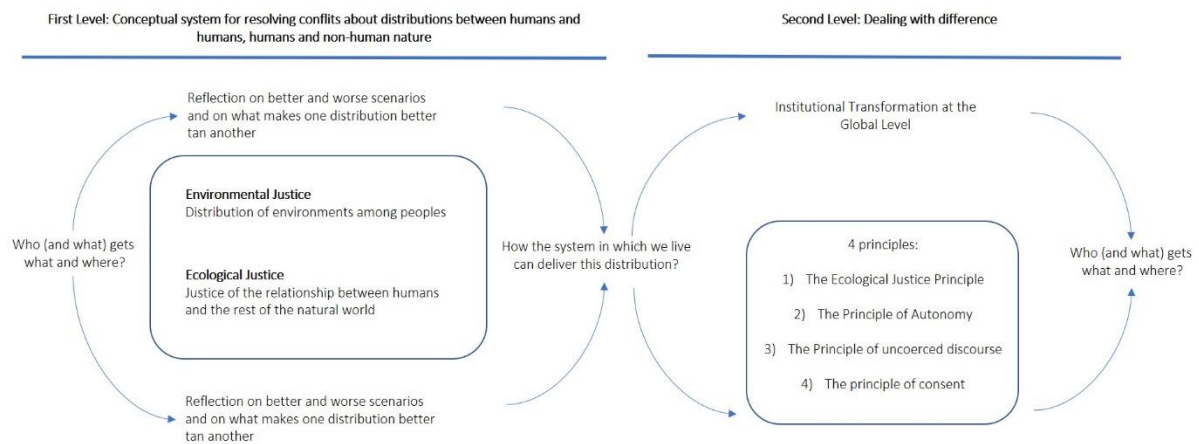
¹⁴ The *Principle of Autonomy* states that 'Persons should enjoy equal rights, and accordingly, equal obligations in the specification of the political framework which generates and limits the opportunities available to them; that is they should be free and equal in the determination of the conditions of their own lives, so long as they do not deploy this framework to negate the rights of others' (Held, 1995 as cited by Low and Gleeson, 1998, p.200). The 'rights of others' extends the frontier of the human.

¹⁵ The *Principle of uncoerced discourse* states that given that the dialectic process depends on the idea of discursive democracy, this principle states that the people involved in making a decision should not be under any coercion whatsoever, including the observance of freedom of information. This includes not only public access to information but freedom to produce information and knowledge about the environment. (Low and Gleeson, 1998, p.202)

¹⁶ The *Principle of Consent* draws on the idea that discourses of justice are embedded within cultures and relates to the adequate recognition of cultural difference, acknowledging the validity of the cultural context of others (Low and Gleeson, 1998, pp.203–204).

Low and Gleeson's Dialectic of Justice is included in this review for three noteworthy aspects. First, it introduces the conceptual difference between environmental and ecological justice to describe just distributions between human communities and between humans and non-human communities, respectively. This conceptual difference is adopted by different authors afterwards (Schlosberg, 2007; Baxter, 2005, 2007; Bosselmann, 2015). After this distinction, *Environmental Justice* has remained as a concept with a focus on human communities.

Figure 3-17. Dialectic of Justice and Nature. Graphic representation based on Low and Gleeson, 1998.



Second, Low and Gleeson's framework adopts Harvey's relativist and geographical approach to justice inquiry -and also his fascination for the dialectical process- (1996) by stating that justice is a contested term that adopts different meanings depending on times and places and that it is precisely this characteristic that makes dialectical process the flexible and dynamic framework that allows the close examination of environmental and ecological justice.

Third, it incorporates a normative element in the framework, characterised by the four principles. Notably, the principle of autonomy describes the dimension of procedural justice and the principles of uncoerced discourse and of consent describe the dimension of recognition (Low and Gleeson, 1998, pp.199–204).

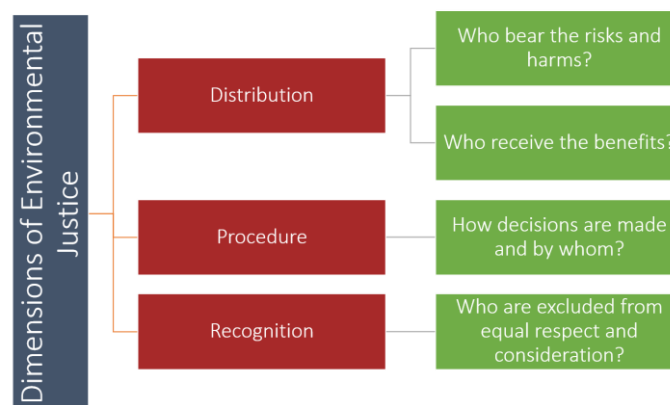
3.3.2. Environmental Justice

Three Dimensions of Environmental Justice (Schlosberg, 2007)

During the 1970's and 1980's, grassroots activities and academics in sociology were conducting the first analyses of the phenomena of the unequal distribution of environmental hazards, such as the location of toxic waste plants, or air pollution, disproportionately affecting minority populations (Pulido, 1996, 2000; Holifield et al., 2018). The collection of evidence of this phenomenon was framed as environmental inequity, environmental injustice and environmental racism, to highlight the relationship between race and the distribution of solid waste sites (Anderton et al., 1994; Pulido, 2000, 1996).

In the late 1990s and early 2000s, the terms environmental racism and environmental justice were mainly used by activists trying to highlight and remediate social injustice produced by the asymmetric distribution of environmental burdens and hazards disproportionately affecting vulnerable and marginalized individuals and groups (Pulido, 2000, 1996). In this context, Schlosberg began the examination of the meaning of environmental justice in environmental movements. His research was focused on answering what do activists and movements mean when they employ the term environmental justice? And what is meant by justice in discussions of both environmental and ecological justice? (Schlosberg, 2007). He argues that "rather than insisting on a singular, overarching and static definition of justice... we need a plurality of themes to apply to particular cases as the context requires" (Schlosberg, 2007, p.9). The framework that Schlosberg envisions combines different justice concerns into a broad approach to justice. This composite framework (Figure 3-18) includes not only distributional concerns but also concerns about recognition and procedural justice. *Distributional* concerns focus on how and what gets distributed in the construction of a just society.

Figure 3-18. Dimensions of Environmental Justice. Graphical representation based on Schlosberg, 2007



The concern about recognition is theoretically underpinned by Iris Young's *Justice and the Politics of Difference* (Young, 1990) and strengthened by Nancy Fraser and Axel Honneth's work (Fraser, 1998; Fraser and Honneth, 2003). Justice as recognition put emphasis on the underlying causes of maldistribution and exclusion and is based on understanding who, what groups are systematically left out of distributive consideration or are not considered as entitled to the same rights as others. Recognition is conceived in terms of who is given respect and who is and isn't valued (Walker, 2012), and which voices are legitimately recognized or left-out from consideration in decision-making processes and also in knowledge production (Martin et al., 2013, 2016).

In recent years, there has been a call to increase attention to the Recognition aspect with the argument that this is the least well understood aspect of environmental justice and yet highly relevant because of its concern with respect for local knowledge and cultures (Martin et al., 2016; Martin, 2017). The Recognition dimension has been defined in terms of valuing different knowledge systems and cultural differences (Martin et al., 2016). With this definition, the call to highlight the *Recognition* aspect of environmental justice is rooted in multiple documented cases of injustice in which cultural differences, differences in value-systems, asymmetrical power relations originated from the way in which knowledge is created and the way in which social reality is framed and understood, have led to asymmetrical power relations and unequal access to decision-making processes, consequently generating unequal distributions of benefits and burdens, and perpetuating dynamics of social exclusion.

Some claims for recognition are associated to identity politics, specifically embodying claims for the recognition of cultural differences (Fraser, 1998), knowledge production and value systems (Martin, 2017) which maintain the field of recognition focused on humans. Charles Taylor and Axel Honneth, for example, understand recognition as a matter of human self-realization and misrecognition as a source of psychological damage (Fraser, 1998; Schlosberg, 2007). Nancy Fraser considers recognition as a matter of justice arguing that misrecognition is an injury to the social status of individuals and not merely a source of psychological damage. On this view, misrecognition is morally wrong because it denies individuals and groups the possibility of participating with others in social interaction (participation parity) and produces a *status injury*. According to Fraser, *status injury* is created by three processes of misrecognition: 1) the practice of cultural domination and oppression; 2) a pattern of non-recognition equivalent to be considered invisible; 3) disrespect or being mal-recognized in stereotypical public and cultural representations (Preston, 2015; Fraser, 1998). Misrecognition fueled by *status injury* limits the capabilities of individuals and communities and leads to ineffective participation (procedural injustice) and to inequalities in distribution (distributive injustice) (Preston, 2015).

Other authors expand the concept of recognition within the environmental justice field to include non-human nature (Schlosberg, 2007; Preston, 2015; Dobson, 1998) and future generations (De-Shalit, 1995) by defining recognition as concerning with who is given respect, and who is (and is not) valued or not considered to be entitled to the same -environmental- rights (Preston, 2015). Regarding 'Recognition' Schlosberg (2007, p.131, 138-40) reflects that if the community of justice were extended, the status injury approach could be applied to individual organisms and groups of organisms (populations) and also to systems such as ecological communities and ecosystems. Similarly, Preston (2015, pp.39–40) argues that "institutions of the state can address misrecognition by enabling meaningful involvement of non-human nature in policy and decision-making, and distributions with proper regard to the needs, interests, vulnerabilities and integrity of non-human nature". Baxter (2005, p.4) argues that we must do right by other life-forms by recognizing their claim to a fair share of the environmental resources which all life-forms need to survive and flourish".

Procedural justice is defined as fair and equitable institutional processes of a state (Schlosberg, 2007) and concerns decision-making processes, specifically how decisions are made, who is involved and who has influence (Walker, 2012). It is promoted by giving access to environmental information, to participate in decision-making and to access procedures to challenge decision-making (Preston, 2015, p.23). Inclusive and democratic procedural justice is considered as a precondition for distributive justice (Preston, 2015) and in turn, recognition is considered a precondition for procedural justice (Schlosberg, 2007).

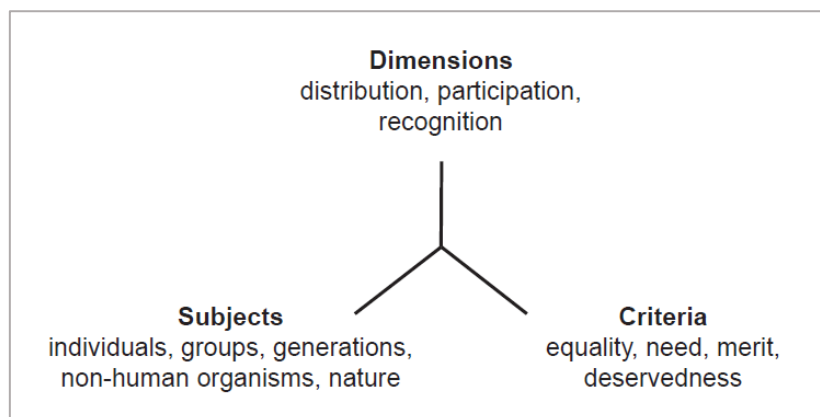
Schlosberg's framework depicting the three dimensions of justice (graphically represented in Figure 3-20) has been pivotal for the development of a variety of adapted frameworks suited for different purposes, including the assessment of equity in Payment for Ecosystem Services Schemes (McDermott et al., 2013); the empirical research of environmental justice (Sikor et al., 2014); the examination of the ways in which concerns about justice are being articulated in the planning and implementation of urban climate change policy and projects (Bulkeley et al., 2013) or the examination of climate justice at the urban scale (Bulkeley et al., 2014)

Empirical Analysis of Justice in Ecosystem Governance (Sikor, 2013; Sikor et al., 2014)

Sikor et al. (2014) draw on the Environmental Justice triad to introduce an empirical approach to the analysis of justice to be used by conservation scientists to apply it to ecosystem services-based governance. The introduction of different forms of ecosystem governance affect the distribution of benefits and duties among stakeholders. Sikor et al (2014) argue that ecosystem governance should not only be effective and efficient but also just. They claim that justice matters in this circumstances because “the environmental behaviour of stakeholders is likely to depend on how they perceive the legitimacy and fairness of ecosystem governance” (Pascual et al., 2010; Muradian et al., 2013, as cited in Sikor et al. (2014) pp. 525).

The empirical approach to justice in ecosystem governance consists of two lines of inquiry. First, recognizing the plurality of definitions about justice which are shaped by the particular political and historical settings and by the kinds of resources and responsibilities to be shared, and second, investigating how certain notions of justice find support in public discourse, how they may become dominant and how they may lose support again (Sikor et al., 2014). To assist the empirical approach, Sikor et al. (2014) suggest three factors that help to understand stakeholders’ notions: dimensions, subjects and criteria (Sikor, 2013a) (Figure 3-19).

Figure 3-19. Conceptual framework for characterizing notions of justice.
Source: (Sikor et al., 2014, p. 525 based on Sikor, 2013)

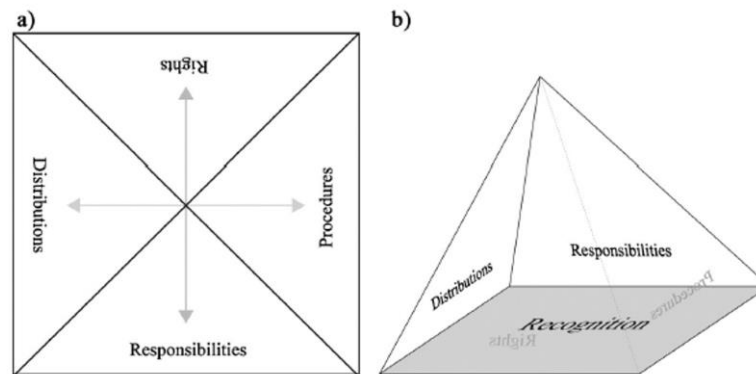


Dimensions refer to how notions emphasize concerns about distribution, participation or recognition (Schlosberg, 2007). *Subjects* are the stakeholders considered to possess rights or bear responsibilities, have a role in decision making, deserve recognition or are deserving of care from other stakeholders, *Criteria* refers to decision-making guidelines that organize the relationship between subjects (Sikor et al., 2014, pp.525–526).

Climate justice at the urban scale framework (Bulkeley et al., 2014)

Contributing to the debate about climate justice, Bulkeley et al. (2014) draw on the triad of Environmental Justice to propose a conceptual framework shaped as a pyramid, in which the faces are distributions, procedures, rights, responsibilities and recognition (Figure 3-20).

Figure 3-20. Three-dimensional climate justice pyramid as viewed from directly above (a) and obliquely below (b). Source: Bulkeley et al., 2014, p. 34



This framework is used for the examination of climate change interventions (Bulkeley et al., 2014). A noteworthy element of this framework -besides its pyramidal shape- is the incorporation of rights and responsibilities as part of the conceptualization of justice. These two elements are present in justice conceptualizations in political philosophy (Rawls, 1971, 2001; Dworkin, 1977) but mainly absent in the Environmental justice discourse, in which rights and duties are absent as explicit justice demands. The framework accurately depicts the interconnection among the different facets of justice. Bulkeley et al. (2014, p. 34) explain the shape of their framework by noting that “visualising climate justice as a pyramid is particularly useful because it provides a metaphor of the connections between different facets of justice where each is connected to all the others, and the viewpoint from one facet is always necessarily refracted through the others, even where this goes unnoticed”

3.3.3. Equity

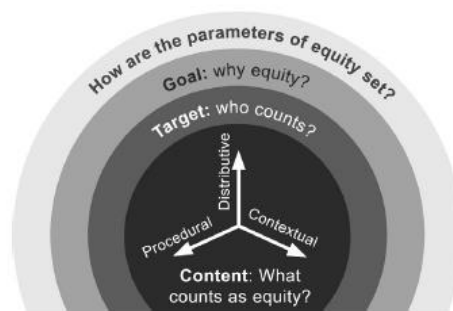
Conceptual Frameworks adopting the terms of equity and fairness expanded at the end of the 1990s, when neoliberal discourses framed markets as an efficient solution for biological conservation. At least two global processes¹⁷ have catalysed reiterated calls for attention towards equity and fairness concerns (Wilson and Howarth, 2002; Brown and Corbera, 2003; Corbera, Brown, et al., 2007; Corbera, Kosoy, et al., 2007; Timko and Satterfield, 2008; Börner et al., 2010; Muradian et al., 2013; Pascual et al., 2010a; Pinto and McDermott, 2013; McDermott et al., 2013).

¹⁷ At least the reduction of greenhouse gas emissions, and global conservation efforts through market-based instruments, such as Payment for Ecosystem Services

Multidimensional Framework for assessing equity In Payments for Ecosystem Services (McDermott, 2013; McDermott et al., 2013)

The multidimensional framework for assessing equity (McDermott et al., 2013) is designed to examine how local equity is affected as the value of ecosystem services changes. It includes four guiding questions: the *what*, the *who*, the *why* and the *how*. The content (the *what*) of equity is composed by three dimensions: distributive, procedural and contextual equity. The distributive aspect addresses the distribution of benefits and costs. The procedural aspect refers to decision-making processes. The contextual equity incorporates pre-existing conditions that influence people's access to resources, benefits and decision-making processes. The *who* asks who counts as a subject of equity? The *why* allows reflection about the framing of goals with respect to equity and the *how* allows reflection about the decisions regarding the content, target and aims of equity are taken (McDermott et al., 2013, p.416) (Figure 3-21).

Figure 3-21. Equity framework. Source: McDermott et al., 2013, p. 420)



This framework embraces the idea that the meaning of equity/justice is socially constructed and requires the analysis of the historical context in which access and entitlements got established. McDermott et al. (2013) explain the selection of the term *equity* rather than *justice* or *fairness* by arguing that the term equity “involve evaluating change in the relative situation of particular groups in society” (McDermott et al., 2013, p. 417).

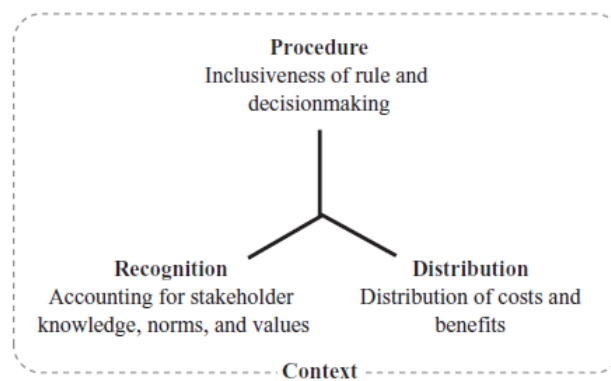
The authors note that from the political theory tradition, justice has been defined in terms of *rights*, or in terms of adherence of a moral right. In this sense, the authors understand the term *justice* as holding a more universalistic and static meaning. By contrast, they argue “equity is comparative; it is principally concerned with relationships between people and with their relative circumstances” (McDermott et al., 2013, p. 417). To metaphorically explain their rationale about the difference between *justice* and *equity*, the authors refer to the common depiction of Justice as a blindfolded woman holding scales and a sword who ensures equal treatment for all. They argue that “If Justice is blind, Equity has her eyes wide open” (McDermott, et al, 2013, p. 418). Constance McDermott (2013) applied this equity framework to compare four environmental and social certification schemes.

Equity Dimensions and Social Positive and Negative Feedbacks (Pascual et al., 2014)

Pascual et al. (2014) draw on the McDermott's Multidimensional Equity Framework to show how equity impacts of PES can create positive and negative feedbacks that influence ecological outcomes, and caution against equity-blind PES which ignore these relationships as a result of a narrow focus on economic efficiency only (Pascual et al., 2014, p.1024).

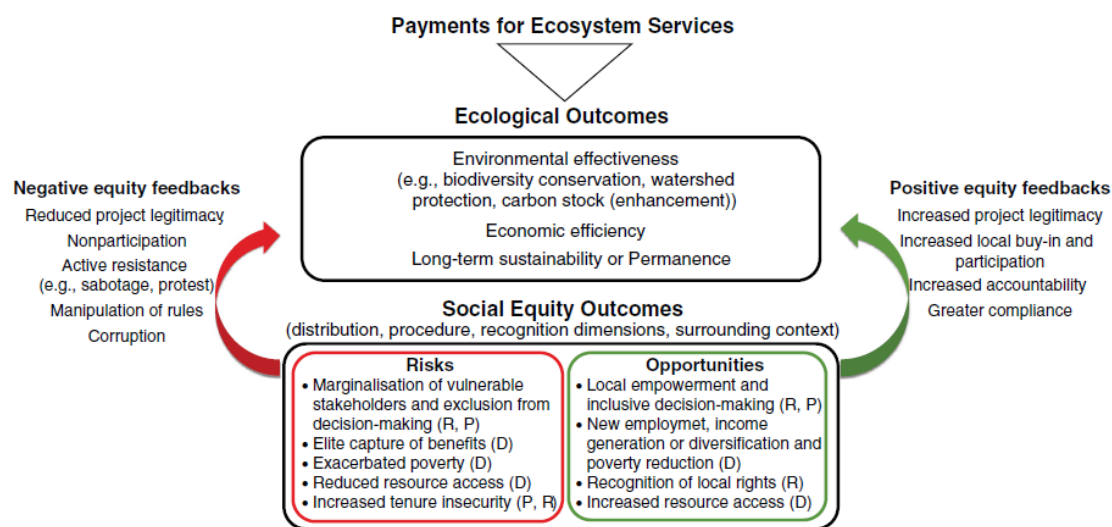
Pascual et al. (2014, p. 1028) define equity in four dimensions: "(1) Procedure: the degree of involvement and inclusiveness in rulemaking and decisions around land management or conservation programs; (2) Distribution: the distribution of costs, benefits, burdens, and rights derived from land management or conservation actions or programs; (3) Recognition: the respect for knowledge systems, values, social norms, and the rights of all stakeholders in the design and implementation of conservation programs; and (4) Context: the surrounding social conditions (e.g. power dynamics, gender, education) that influence the actors' ability to gain recognition, participate in decision-making, and lobby for fair distribution" (Figure 3-22).

Figure 3-22. The four dimensions of social equity. Source: (Pascual et al. (2014) p. 1028)



Pascual et al. (2014) argue that social equity outcomes produced by the interaction of the four equity dimensions (distribution, procedure, recognition and surrounding context) produce risks and opportunities (social equity outcomes) that have the potential to catalyse negative and positive equity feedbacks that directly affect ecological outcomes (Figure 3-23). Notably, similar to Ostrom (2009), Pascual et al. (2014) portray people as active agents, whose behaviour respond to contextual factors and have a power to influence and interact with their surroundings, and not only as passive recipients of wellbeing inputs or subjects to just or unjust situations.

Figure 3-23. PES schemes affect social equity outcomes which represent risks and opportunities for ecological outcomes. Source: Pascual et al. (2014) p. 1029



Equity for Protected Area Conservation (Schreckenberg et al., 2016)

The Equity for Protected Area Conservation Framework (Schreckenberg et al., 2016) is developed in the context of biological conservation. It responds to a variety of calls to ensure equity in Protected Areas conservation and management, both from normative approaches¹⁸ and from instrumental reasons¹⁹.

The *Equity framework* (Figure 3-24) was designed using four steps that combined secondary research, workshops and field validation²⁰. The resulting framework combines a descriptive approach and a normative approach. For the descriptive approach, it draws on the three dimensions of environmental justice: recognition, procedure and distribution. For the normative approach, it associates each of the dimensions with a set of equity principles or desired outcomes (Table 3-2). The framework also identifies enabling conditions in which the three dimensions are embedded.

¹⁸ From the normative ground, the Convention on Biological Diversity's 2004 Programme of Work on Protected Areas' goal 2.1, calls for the promotion of "equity and benefit sharing", and goal 2.2. calls for enhancing "involvement of indigenous and local communities and relevant stakeholders". Similarly, the Aichi Biodiversity Target 11 in 2010, requires that protected areas should be "effectively and equitably managed" (CBD, 2010, as cited in Schreckenberg et al., 2016, p.11).

¹⁹ From the instrumental ground, some authors point out that empowered local people, reduced economic inequalities, and maintained cultural and livelihood benefits increase the likelihood of positive conservation outcomes (Oldekop et al., 2016) and similarly, that the sense of injustice can trigger significant conflict that affect conservation outcomes (Lele et al., 2010).

²⁰ Field validation was conducted in three sites in East Africa and discussions with participants at the IUCN World Conservation Congress in September 2016.

Figure 3-24. The three dimensions of equity embedded within a set of enabling conditions. Source: Schreckenberg et al. (2016, p. 14) (Adapted from McDermott et al. (2013) and Pascual et al. (2014))

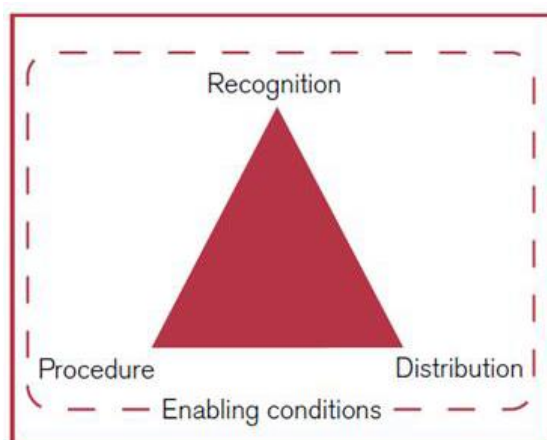


Table 3-2. Equity principles and Enabling conditions. Reproduced from: (Schreckenberg et al., 2016, p. 15) based on (Franks et al., 2016)

RECOGNITION

1. Recognition and respect for human rights.
2. Recognition and respect for statutory and customary property rights.
3. Recognition and respect for the rights of Indigenous peoples, women and marginalized groups.
4. Recognition of different identities, values, knowledge systems and institutions.
5. Recognition of all relevant actors and their diverse interests, capacities and powers to influence.
5. Non-discrimination by age, ethnic origin, language, gender, class and beliefs.

PROCEDURE

7. Full and effective participation of all relevant actors in decision-making.
8. Clearly defined and agreed responsibilities of actors.
9. Accountability for actions and inactions.
10. Access to justice, including an effective dispute-resolution process.
11. Transparency supported by timely access to relevant information in appropriate forms.
12. Free, prior and informed consent for actions that may affect the property rights of Indigenous peoples and local communities.

DISTRIBUTION

13. Identification and assessment of costs, benefits and risks and their distribution and trade-offs.
14. Effective mitigation of any costs to Indigenous peoples and local communities.
15. Benefits shared among relevant actors according to one or more of the following criteria:
 - Equally between relevant actors or
 - According to contribution to conservation, costs incurred, recognized rights and/or the priorities of the poorest.
16. Benefits to present generations do not compromise benefits to future generations.

ENABLING CONDITIONS

1. Legal, political and social recognition of all protected area governance types.
2. Relevant actors have awareness and capacity to achieve recognition and participate effectively.
3. Alignment of statutory and customary laws and norms.
4. An adaptive, learning approach

3.3.4. Integrated Human Well-being – Justice Frameworks

Analytical Framework for Environmental Justice and Wellbeing (Martin et al., 2015)

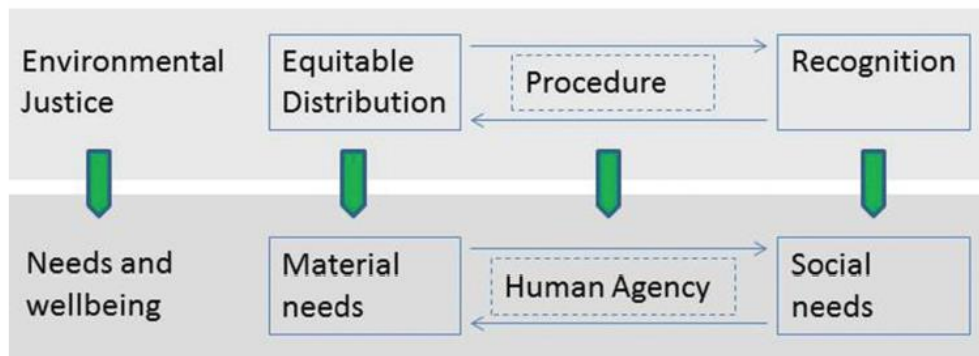
Martin et al. (2015) develop an integrated human well-being and justice analytical framework in the context of biological conservation. The authors argue that the conservation community needs to take justice issues seriously and, accordingly, ways of assessing justice impacts of conservation interventions. Drawing on insights from the capabilities approach (Sen, 1999; Nussbaum, 2011), the theory of human need (L Doyal and Gough, 1991) and the value plurality endorsed by the three-fold classification of environmental justice (Schlosberg, 2004; Sikor, 2013a; Walker, 2012), they integrate capabilities and needs and relativistic and universalistic approaches.

In contrast with Nussbaum's stance that justice is a matter of reaching *thresholds for 10 central capabilities* (Nussbaum, 2000, 2011), the authors draw on a variation of rights-based thinking that "frames justice in terms of meeting *thresholds of basic needs* that enable individuals (and also communities) to pursue ends that they value". Taking an intermediate position from Nussbaum's normative 'thick' (universalistic) approach and Sen's abstract 'thin' (relativistic) approach, Martin et al. (2015, p. 170) construct their integrated framework by combining the needs and capabilities approaches and "associate justice with meeting the threshold conditions for living a dignified life".

They adopt a context-based approach that embraces value plurality to note that the "determinants of wellbeing and dignity might vary across individuals and communities". They reconcile a relativistic view with an universalistic view that recognises that, at some level, there are "some common freedoms or capabilities that are necessary requirements for people to have adequate life choices to pursue these plural ends" and that these essential capabilities cover both material and social entitlements (Nussbaum, 2011; L. Doyal and Gough, 1991; Brock, 2009).

Figure 3-25 shows the elements of the analytical framework. The material needs are associated with distribution of environmental benefits and harms (*Equitable distribution*) and social needs are associated with recognition of different knowledge systems and cultural attachments to nature. The distribution of environmental benefits and harms contributes to the material conditions for a good life (material needs). These needs are context-dependent and variable. In turn Recognition is considered a contributor to the basic social conditions for wellbeing (social needs), including autonomy (Martin et al., 2015, p. 171). The framework draws on Brock (2009) to represent human agency as intertwined with material and social aspects.

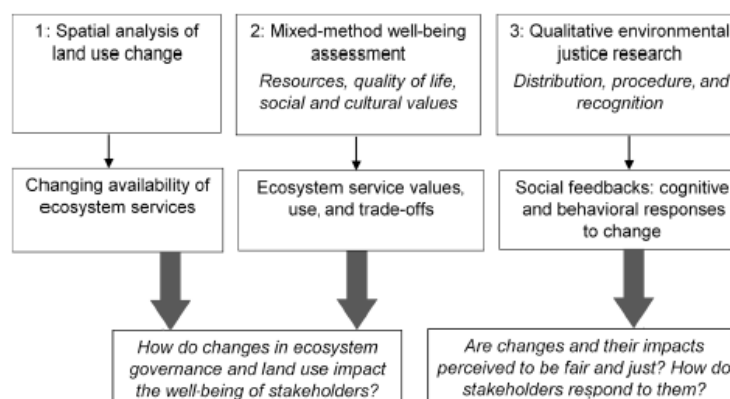
Figure 3-25. Environmental justice and wellbeing. Source: (Martin et al., 2015, p. 169)



Integrated Environmental Justice and Well-being Approach (Dawson et al., 2017)

In the context of ecosystem service trade-off research, Dawson et al. (2017) recover the concept of “social feedbacks” highlighted by Pascual et al. (2014) to propose an integrated approach to ecosystem services research and environmental justice to examine potential (positive or negative) responses to ecosystem governance. The integrated environmental justice and well-being approach shown in Figure 3-26 was used to guide the empirical study conducted in three villages adjacent to a Protected Area in northern Laos using mixed-methods: (1) Spatial analysis to quantify landscape changes in the wake of protected area demarcation; (2) Mixed-methods including focus groups and individual semi structured interviews to assess local people’s well-being and changes over the previous 10 years; and (3) semi-structured interviews to explore views expressed by local people about protected area governance, in terms of the three environmental justice dimensions (distribution, procedure, and recognition) (Dawson et al., 2017).

Figure 3-26. An integrated environmental justice and well-being approach. Source: Dawson et al., (2017, p13).

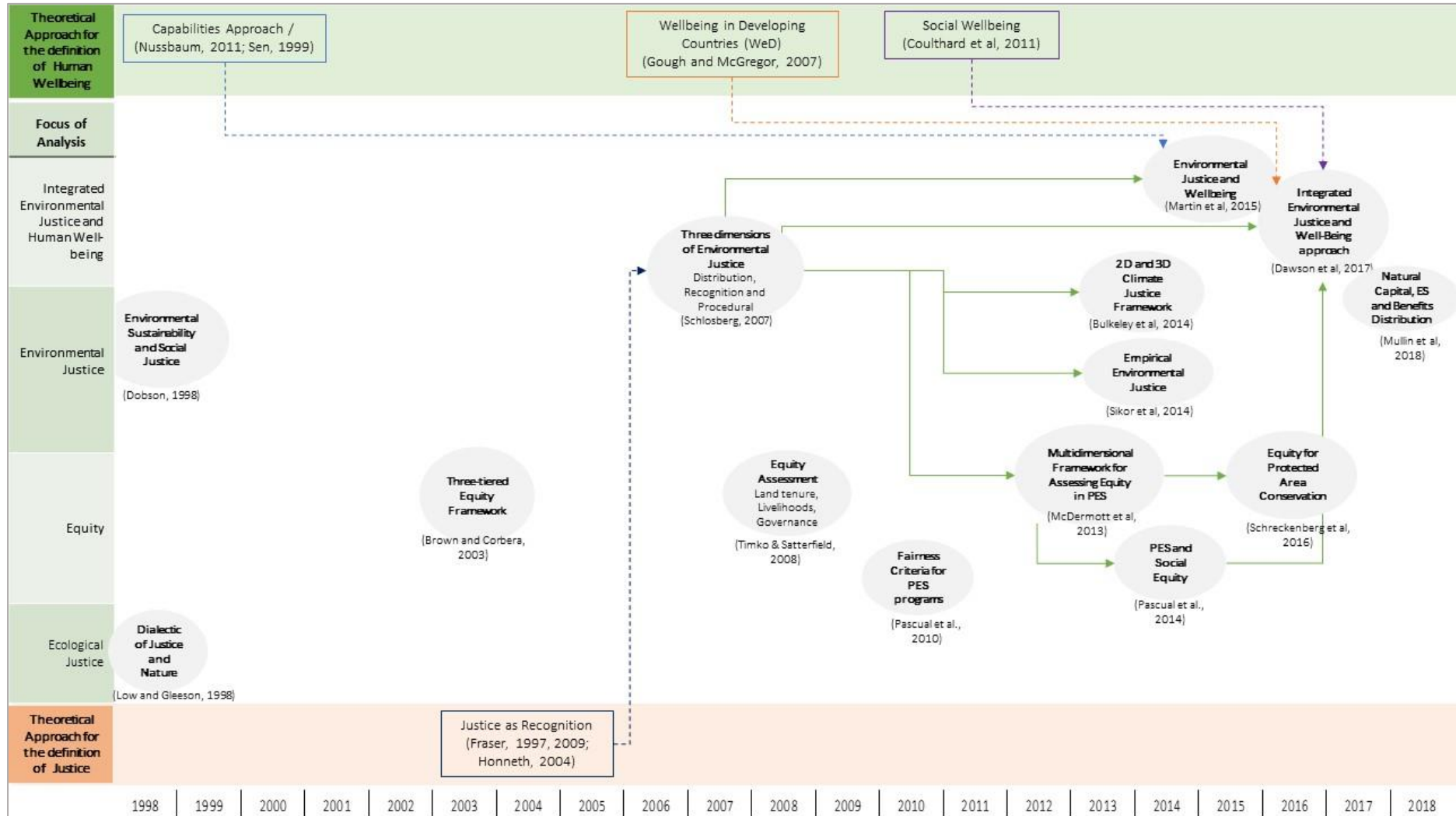


The authors conclude that the combination of both, well-being research and environmental justice research can provide complementary information. From one side, well-being research provides information about the diverse attachments to natural resources and from the other side, the environmental justice research provides information about local perceptions that can help to understand behavioural responses to ecosystem governance (social feedbacks).

A noteworthy element of this approach is that it recovers the notion of people as active agents and, similar to other authors (McGinnis and Ostrom, 2014; Pascual et al., 2014) portray people as active agents, whose behaviour respond to contextual factors and with the power to influence and interact with their surroundings; not as passive recipients of wellbeing inputs or subjects to just or unjust situations.

As a summary for this section, Figure 3-27 presents the nine conceptual frameworks presented and some others in chronological order, where the dotted arrows show the theoretical foundations that shape the way in which well-being or justice is conceptualized. The green arrows represent the influence the framework has explicitly recognized from other frameworks.

Figure 3-27. Descriptive Conceptual Frameworks to examine the interlinkages between the Natural Environment, Justice and Well-being



The dotted arrows show the theoretical foundations that shape the way in which well-being or justice is conceptualized. The green arrows represent the influence the framework has explicitly recognized from other frameworks.

3. 4. Conceptual Framework and Analytical Methods

As described in the introduction of this Chapter, conceptual frameworks allow the examination of the study topic by highlighting elements that influence it in some way. The architecture principle of ‘form follows function’ is visible in the design of conceptual frameworks: their structure and composition respond to their intended purpose. Similarly, the conceptual framework guiding this research (the form) is aligned with its purposes (the function).

Unlike similar integrated human well-being and environmental justice frameworks that have been developed to systematically identify social impacts of conservation (Martin et al., 2015), or to improve ecosystem services research (Dawson et al., 2017), this research is centred in examining the closeness of social development metrics, specifically human development and poverty metrics, to the local experience and definition of a good life and justice. This is the reason why the framework does not include pre-defined conceptualizations of well-being and justice. It is intended that the framework allows to empirically uncover local conceptualizations of both well-being and environmental justice.

3.4.1. Conceptual inputs

The proposed conceptual framework draws on diverse inputs from the frameworks presented in the previous section. It is intended to be a tool for empirical research rather than to adhere to normative approaches. In this sense, it doesn't include an explicit pre-defined meaning of well-being, poverty or justice. These context/time-specific definitions are expected to result from the application of the framework.

The framework (illustrated in Figure 3-28) draws on elements presented in the visualisation of the core concepts of capabilities approach (Robeyns ,2017, p. 83); the systemic approach adopted by the IAD and SES Frameworks (Ostrom, 2011; McGinnis and Ostrom, 2014) and their conceptualization of individuals/actors as interacting characters who, through actions, influence different potential outcomes. It also draws on Kate Raworth's embedded economy's model (Raworth, 2017) to visually capture the idea of the natural environment as the basis for development (*Context*). It captures the dynamic flow of the WeD Framework by incorporating the element of time and the interaction between processes generating wellbeing and social structures (McGregor, 2006; Coulthard et al., 2011) (*Enabling/Disabling conditions*). It draws on Dawson and Martin (2015) to incorporate elements that highlight what a person has and what a person can be and do and the idea that the construction of meaning is a process dependent on social relations, culture and agency, and embraces the five

‘instances of socio-ecological reductionism’²¹ identified by Dawson and Martin (2015) (*Context, Social Difference, Meanings, Capabilities/Functionings*).

In line with the recent IPBES’s Nature’s Contributions to People approach (Díaz et al., 2018; Pascual et al., 2017), the framework moves away from the conceptualization of the natural environment as a provider of services and incorporates the notion of context-specific perspectives to examine time-specific and geographically-located experiences and perceptions around the interlinkages between the natural environment and people. Subsequently, it also aims to capture Kai Chan’s notion of relational values (Chan and Satterfield, 2007; Chan et al., 2016). As a result, the interlinkages between the Natural Environment and People are conceptualized in broad terms as *Resources*, which are composed by Enabling and Disabling Conditions (*Resources*).

The three dimensions of Environmental Justice, *Distribution, Procedure and Recognition*, are included in the framework as dynamic processes that originate from relationships between the individuals and groups with dynamic political/institutional, socio-cultural and economic processes at different scales. *Distributional* concerns can arise from the interaction between individual/groups and State-institutions (for example State-led decisions regarding the location of toxic waste facilities) or from the interaction with NGO’s implementing a new PES scheme, or from the interaction from local institutions such as fishing cooperatives mediating fishing access. In the same line, *Procedural* concerns can arise from the interaction between individuals/groups with decision-making processes (social dynamics) made by institutions at different scales. In line with McGinnis and Ostrom (2014), Pascual et al. (2014) and Dawson et al., (2017), the framework portrays individuals and groups as active agents, whose behaviour respond to contextual factors and who have a power to interact with their surroundings through their actions and to influence potential outcomes (Actors’ feedbacks) (*Actors’ Feedbacks*).

3.4.2. Description of Conceptual Research Framework

The framework (illustrated in Fig.3-28) is composed of three domains of analysis, namely: *Situation, Societal aims and responses* and *Actors*. Each of these domains is composed of interrelated elements which in turn are composed of interrelated elements. The elements are shown in Table 3. 3.

²¹ 1) Failure to consider different types of values, 2) Aggregation of people, 3) Oversight of power relations, 4) Focus on single land use type and 5) Lack of attention to changes and their drivers at multiple scales (Dawson and Martin, 2015 p. 62-63).

Figure 3-28. Integrated pipeline framework of capabilities and justice dimensions

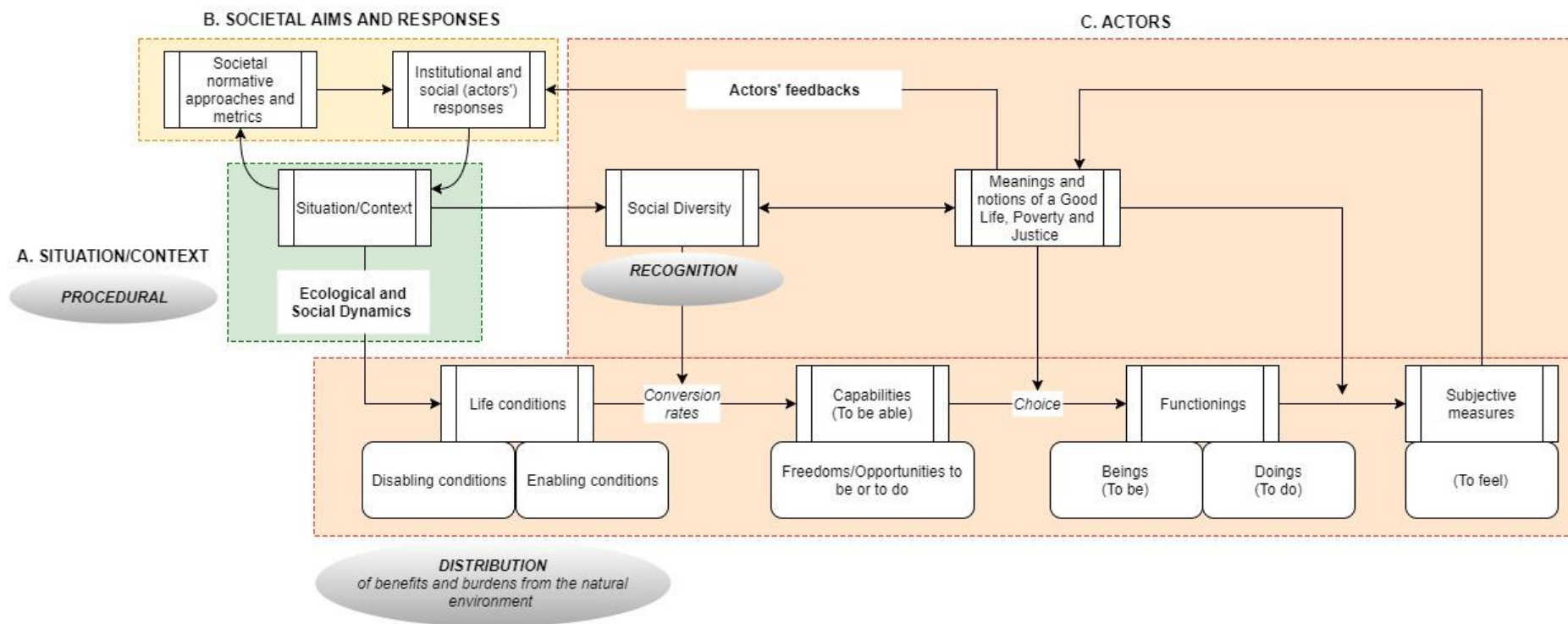


Table 3-3. Nested elements of the Conceptual Research Framework

Domain of Analysis	Layer 1	Layer 2
A. Situation/Context	Natural Environment	<ul style="list-style-type: none"> • Ecological Dynamics: Landscape attributes, drivers of change and pressures at different scales.
	Social Environment	<ul style="list-style-type: none"> • Institutional/Political Dynamics • Demographical Dynamics • Socio-cultural Dynamics
	Life conditions (Enabling and disabling conditions)	<ul style="list-style-type: none"> • Enabling conditions • Disabling conditions
B. Societal aims and responses	Normative Approaches and Metrics	<ul style="list-style-type: none"> • Good Life, Well-being, Worthwhile Life • Poverty • Justice
	Institutional feedbacks	<ul style="list-style-type: none"> • Management and Policy Responses.
C. Actors	Social diversity	<ul style="list-style-type: none"> • Social difference <ul style="list-style-type: none"> ○ Innate personal characteristics (Demographics) ○ Acquired personal characteristics ○ Access to resources (endowments, entitlements, capitals) ○ Access to decision-making processes
	Meaning/Notions	<ul style="list-style-type: none"> • Long term aspirations and current perspectives <ul style="list-style-type: none"> ○ Good Life, Well-being, worthwhile life. ○ Poverty ○ Wealth • Justice
	Capabilities	<ul style="list-style-type: none"> • Freedoms and opportunities to be or to do which depend on the resources a person has (enabling and disabling conditions) and the personal characteristics (personal attributes, access to resources and position in society)
	Functionings	<ul style="list-style-type: none"> • Set of <i>Beings</i> and <i>Doings</i> that are considered valuable and pursued. This set depends on the freedoms and opportunities that a person has combined with the personal choices a person makes, which are in turn defined by the personal meanings of what is worth pursuing in life (meanings of a good, flourishing, life, justice).
	Subjective measures	<ul style="list-style-type: none"> • Feelings of life satisfaction, happiness.
	Social (actors') feedbacks	<ul style="list-style-type: none"> • Personal and collective attitudes and behavioural Responses towards the Natural Environment

A. Situation/Context

Situation/Context is the first domain of analysis and focuses in the geographical context in which the study is situated. It includes the inspection of the ecological dynamics of the Natural Environment at different scales (landscape attributes and their interaction with drivers and pressures) and its relationship with the Social Environment, which includes Institutional dynamics, demographical and socio-cultural dynamics. Institutional dynamics include decision-making processes affecting both the social and natural environments. The *Procedural* dimension of Environmental Justice is visible in this element because it entails the analysis of how decisions are made regarding the natural environment. The procedural dimension of Environmental Justice influences the way in which enabling and disabling conditions are distributed.

The interaction of both, the Natural and the Social Environment, produces a series of enabling and disabling conditions for a flourishing life. Enabling conditions include external satisfiers of needs, while disabling conditions include elements from the Natural or social environment which increase vulnerability or interfere with the capacity of individuals or groups to achieve a life they value. Disabling conditions also include the identification of Corrosive disadvantages, defined as social conditions that have the consequence of 'eating up' enabling conditions and capabilities (Nussbaum, 2007; Wolff and De-Shalit, 2007). The conceptualization of an integrated Natural and Social Environment is aligned to Political Ecology research approaches, where environmental conditions are inspected through a lens that include socio-economic dynamics at different scales. The *Distributional* dimension of Environmental is visible in this element, as it pays attention to how benefits (enabling conditions) and burdens (disabling conditions) are distributed in a specific context.

B. Societal aims and responses

The analytical domain of *Societal aims and responses* put emphasis on what is pursued at the societal level, how it is measured, and which societal responses result from the metrics used. Theoretically, this domain draws on the idea that normative approaches and metrics matter. As argued by Engle et al. in the book *The Quiet power of indicators* (Engle et al., 2015, p.138), "indicators in the development field create not only realities, but also identities, as by promoting a determined development discourse they also promote the categories embedded in it". This analytical domain focuses on understanding which normative approaches are adopted in a given geographical context, specifically, what do human well-being, poverty and justice means from a normative perspective? What is desired as a society? What do progress mean? And, derived from these conceptions, what kind of metrics of social progress are adopted to inform policy and management responses?

C. Actors

The analytical domain of *Actors* examines individuals and groups: what they have, how they are, what they think about a good, worthy, dignified life, poverty and justice, what they aspire and how they respond. It inspects power dynamics among groups and how social differences interact with (enabling and disabling) conditions available in a specific geographical context (*Situation/Context*). Social difference influences the capacity of individuals and groups to convert the conditions available to them, enabling and disabling conditions from the specific geographical context (*Enabling/Disabling conditions*) into a series of valuable beings and doings (Sen, 1999) (*Functionings*). Social diversity includes not only personal characteristics, but also differentiated access to resources (endowments, entitlements, capitals) (Leach et al., 1999; Sen, 1981) and differentiated access to decision-making processes resulting from the lack of recognition (Fraser, 1998; Martin et al., 2016). Thus, this element is linked to the *Recognition* dimension of Environmental Justice.

The adoption of different life meanings, alongside with what people are in fact able to be and do (*Capabilities and Functionings*) result in subjective measures, such as Happiness, Life satisfaction and a sense of having a worthy, dignified life. The group of *Resources (enabling/disabling conditions)*, *Capabilities/Functionings* and *Subjective measures*, represent the three main approaches to measure well-being. *Resources (enabling/disabling conditions)* recovers the Resourcist, Welfarist, approach, in which well-being is measured by a series of enabling conditions, such as income, consumption and primary goods.

The *Capabilities/Functionings group* recovers the notion of the Capabilities Approach (Sen, 1999; Nussbaum, 2011) and visually represents the concept of capability as a combination of internal characteristics (*Social Diversity*) and a set of external factors (*Enabling/disabling conditions*). In this way, what people can be and do, depends not only on the external factors available to them, but also on their personal capacity to convert inputs into functionings (*Conversion rates*), which depend on personal differences.

Subjective measures combine the Hedonist/Preference Satisfaction approaches, which focus their attention in metrics based on happiness and feelings of satisfaction. Conceptualizations of Well-being, Poverty, Wealth and Justice also define the kind of personal responses, attitudes and behaviour towards the natural environment and the life situation. The element *Actors' feedbacks* recovers the notion of Social feedbacks (Dawson et al., 2017; Pascual et al., 2014) to portray people as active agents, whose behaviour respond to contextual factors and have a power to influence and interact with their surroundings, and not only passive recipients of wellbeing inputs or subjects to just or unjust situations.

Table 3-4 shows the elements of the conceptual framework with their corresponding guiding questions and the links to justice dimensions.

Table 3-4. Elements of conceptual framework with their corresponding guiding questions

		GUIDING QUESTION	LINK TO JUSTICE DIMENSION
A. SITUATION/ CONTEXT	Natural and Social Environment	How does the Natural Environment interact with institutional, demographics, socio-cultural dynamics?	<i>Procedural Justice:</i> How does institutional dynamics, including decision-making processes affect the distribution of disabling and enabling conditions?
	Societal normative approaches and metrics	What is socially pursued and how is it measured?	
B. SOCIETAL AIMS AND RESPONSES	Institutional and social (actors') feedbacks	Which are the institutional (management and policy) responses derived from the normative approaches and metrics; and which are the social (actors') feedbacks derived from meanings and notions of a good life, poverty and justice?	
	Resources (Enabling/Disabling conditions)	What enabling and disabling conditions are available for people in a specific context?	<i>Distribution:</i> How are benefits (enabling conditions) and burdens (disabling conditions) from the natural environment distributed?
C. ACTORS	Social Diversity	How do social diversity interact with the enabling and disabling conditions available in a specific context?	<i>Recognition:</i> How does social diversity affect the access to disabling and enabling conditions?
	Meanings and notions of a Good Life, Poverty and Justice	What do people understand by a good, flourishing life, poverty and justice?	
	Capabilities and Functionings	What set of capabilities (freedoms to be and do) and functionings (beings and doings) constitute a flourishing, worth-lived life?	
	Subjective measures	What set of subjective measures constitute a flourishing, worth-lived life?	

3. 5. Closing remarks

This Chapter summarizes influential conceptual frameworks that have been used to examine the interlinkages between the natural environment and poverty, a good life and justice. Drawing from diverse conceptual inputs from the reviewed frameworks, an integrated conceptual framework is designed to examine both, the perceptions of poverty, a flourishing life and justice in relation to the natural environment, and the normative approaches and metrics that define aspirational societal aims.

The first section of the Chapter summarizes eight influential frameworks that have been used to examine the interlinkages between the Natural Environment and Individual or societal well-being. For analytical purposes, the frameworks were classified according to their explicit focus of analysis: a) Systemic Analysis (Ostrom, 2011), b) Livelihoods (Scoones, 1998), c) Needs, Assets, Entitlements and Capabilities (Leach et al., 1999); d) Well-being (McGregor, 2006; Gough and McGregor, 2007; Dawson and Martin, 2015); and e) Ecosystem Services and Nature's Contributions to People (MA, 2005b; Fisher et al., 2014; Díaz et al., 2015; Pascual et al., 2017; Díaz et al., 2018).

The second section of the Chapter summarizes nine frameworks used to examine the interlinkages between the natural environment and justice and two frameworks that integrate human well-being, justice and the natural environment. These frameworks were classified according to their focus of analysis: a) Ecological Justice (Low and Gleeson, 1998); b) Environmental Justice (Dobson, 1998; Schlosberg, 2007; Sikor, 2013b; Sikor et al., 2014; Bulkeley et al., 2014); c) Equity (Brown and Corbera, 2003; McDermott et al., 2013; Pascual et al., 2010a; Schreckenberg et al., 2016) and d) Integrated approaches (Martin et al., 2015; Dawson et al., 2017).

The third section of the Chapter presents the integrated conceptual framework that was used for the research, describing the conceptual inputs from other frameworks and its three main elements: A) Situation/Context; B) Societal aims and responses and C) Actors. The Distribution, Recognition and Procedural dimensions of justice are highlighted in the framework. The proposed Conceptual Framework represents a dynamic well-being pipeline that flows from a specific situation in which a geographic area is sustained by its characteristic ecological dynamics and which allows a series of socio-cultural, institutional, financial dynamics to produce a series of enabling or disabling conditions. This element includes *Resources* (enabling and disabling conditions). *Social diversity* interacts with the enabling/Disabling conditions in differentiated ways to face disabling conditions (coping mechanisms) and to take advantage of enabling conditions. This aspect embraces the concept of *Conversion rates* of the capability approach, which helps to understand why the same resources are converted into capabilities and functionings in dissimilar ways depending on social differences.

Different individual's and groups' identities are shaped by different ideas of what a flourishing, worth-lived life is. In turn, the opportunities people have *to be* and *to do* are defined by the context-defined enabling and disabling conditions mediated by social differences. What people are able *to be* and *to do* (Functionings) also depend on the choices people make. Finally, subjective feelings of happiness, life satisfaction and life worth-lived is a wellbeing outcome that also depends on the perceptions of a flourishing life.

The framework was adjusted and augmented after the data analysis was completed. Key differences between the before and after include the following: 1) the inclusion of a typology to classify the enabling/disabling conditions, capabilities, functionings and subjective measures; and 2) the inclusion of *Rights* and *Duties* as a separate dimension of Justice. The augmented framework and the detailed explanation of the conceptual additions is provided in Chapter 10.

Chapter 4. Research Design and Methods

What does a good life mean to you? What is that, without which you feel your life would be worthless? The old lady stopped balancing in her hammock, put her feet on the ground and stared at the floor for a long time. After that, she calmly told me: 'No one has ever asked me that before. Not even myself' Research Diary. Entry March 22, 2017. San Felipe, Yucatán.

Drawing on the Research Questions and Conceptual Framework presented previously, this Chapter describes how the research was designed and conducted. It is structured in eight sections. The first and second sections describe the philosophical approach underpinning the research and details how the research was designed by pairing the research questions with research methods. The third section presents the data collection stages. The fourth section describes the construction of sampling frames for the collection of data through semi-structured interviews and Q-sets (for Q-methodology). The fifth section describes the fieldwork process conducted in San Felipe municipality, including general fieldwork observations, the way to get informed consent, the process followed to build rapport and the key role of critical reflexivity during fieldwork. Finally, the sixth, seventh and eighth sections, present the research methods used to examine the nexus of the natural environment to local meanings of poverty, a flourishing life, and justice, respectively.

4.1. Research Approach

Ontologically, the research aims to reconcile universalistic views of the notions under study and relativistic views based on the examination of the local meanings of the same notions. Epistemologically, the research follows a transformative paradigm (Mertens, 2010, 2007, 2012), characterized as placing central importance on the knowledge, lives and experiences of marginalized groups, such as women, ethnic/racial minorities, people with disabilities, and those who are poor. The transformative paradigm is embodied in the research by creating spaces for the self-examination of own ideas of what a flourishing life entail. In this sense, the voices, opinions and conceptions of all participants are recognised as equally valuable, setting up a scene where all the voices, opinions and suggestions of how to live together are equally heard and recognised. This approach has the intention to send a message of equal recognition, in which all the voices, knowledge systems and life conceptualizations matter equally, regardless of the different positions held in society.

4.2 Research Design to examine perceptions of a flourishing, worth-lived life, poverty and justice and their links to the natural environment

The research design adopts a mixed-methods approach which is guided by the research questions and is aligned to the Conceptual Framework. As detailed in Chapter 1, the research questions follow two lines of inquiry: (i) the understanding of *Metrics* and (ii) the understanding of local *Notions*. The first line of inquiry follows a top-down approach and relies on secondary data collection and analysis to explore the normative approaches and metrics adopted by the Mexican State and institutions affecting social life in the research area. The bottom-up approach uses a combination of methods, including qualitative analysis of semi-structured interviews and network analysis of the definitions of a flourishing life. Q methodology is used to examine the perceptions of justice and natural resources. Table 4-1 shows the links between the research questions and the research methods.

4.3. Site selection and Data Collection Stages

4.3.1. Site selection

The research was conducted in the municipality of San Felipe, México. This municipality was selected as the study site for its adequacy and access. The selection followed safety considerations and Marshall and Rossman's (2006, p. 62) criteria to identify 'realistic sites', meaning that 1) entry is possible; 2) there is a rich mix of processes, people, programs, interactions and structures of interests and, 3) the study can be conducted and reported ethically. The rich mix of processes and structures is evidenced by the fact that San Felipe is located in an important area for biodiversity (Chapter 5) and combines three different types of protected areas²² managed by different environmental governance mechanisms. In addition, San Felipe has different types of access to fishing resources, including men and women fishing cooperatives, owners of fishing enterprises, and free fishers. Focusing the research in San Felipe municipality allows an in-depth, systemic and multi-scalar analysis that can present an holistic and historical analysis of the processes shaping ; but it also presents research limitations; for example, the fact that the site is not representative of the Yucatán municipalities makes the research results not generalisable.

4.3.2. Data Collection stages

The data collection of empirical data was conducted in two phases. During the first phase (from July to September 2016), 80 semi-structured interviews about perceptions of poverty/wealth and justice were collected in San Felipe. During the second phase (from February to April 2017), 90 semi-structured

²² Federal Biosphere reserve, State Reserve and community-managed fish refuge

interviews about perceptions of a flourishing life were collected and 20 Q sorts were completed as shown in Figure 4-1.

Figure 4-1. Data Collection Stages

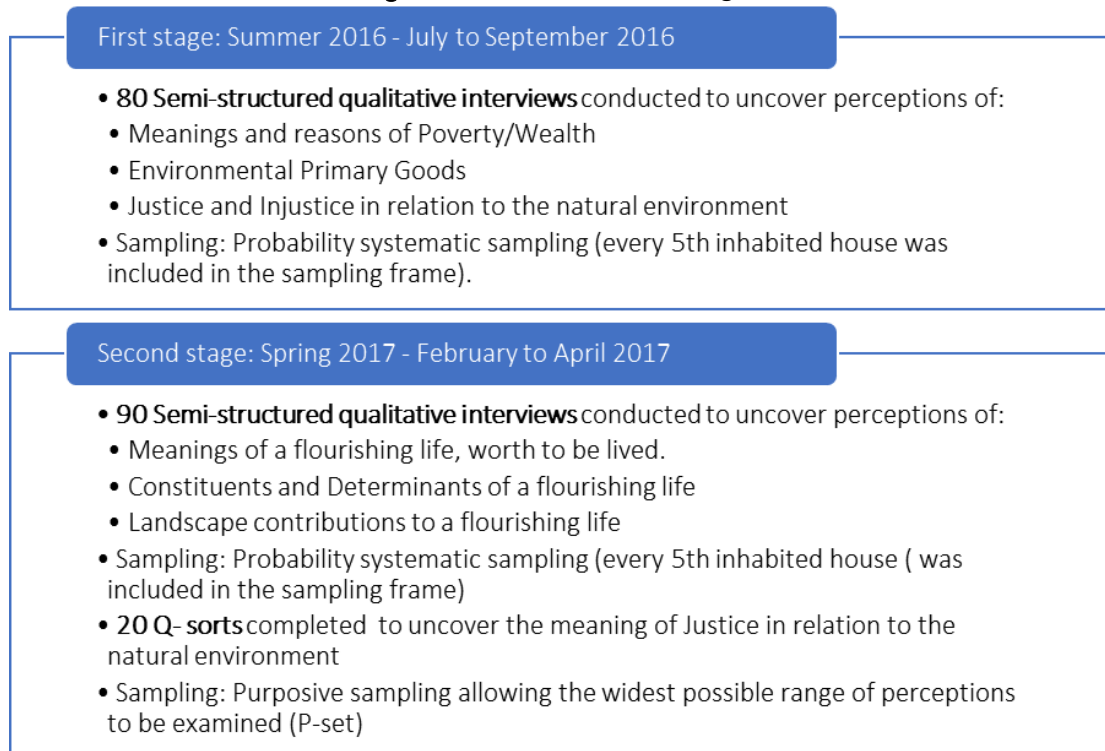


Table 4-1. Matrix of Research Questions and Research Methods

Line of inquiry	Research Questions	Research Methods	Data Collection Methods	Analytical Methods
<p>A. METRICS</p> <p>How is the natural environment represented in normative approaches and metrics that shape institutional policy and management responses?</p>	<p>1) How is the natural environment represented in normative approaches that shape institutional definitions of poverty, well-being and justice?</p> <p>2) How is the natural environment represented in metrics used to represent social reality and inform management and policy interventions?</p>	<p>Top-Down Research Approach</p> <p>Secondary data Collection and Analysis</p>	<p>Secondary data: Normative approaches and metrics adopted by the Mexican State to define and measure poverty, human well-being and justice/equity.</p>	<p>Secondary data analysis</p>
<p>B. MEANINGS</p> <p>How do the natural environment interact with local perceptions of well-being, poverty and justice in San Felipe, a Mexican fishing community?</p>	<p>3) Which are the local perceptions of well-being, poverty and justice?</p> <p>4) How do these meanings interact with the natural environment?</p> <p>5) What is the role of social differences and the specific context (natural and social environment) in shaping local meanings of poverty, well-being and justice?</p> <p>6) How do local meanings of well-being, poverty and justice influence behavioural responses to the natural environment and social environment?</p>	<p>Bottom-Up Research Approach</p> <p>Qualitative Methods (Semi-structured interviews) and Q-Methodology</p>	<p>Poverty and Well-being: Semi-structured interviews (80 interviews)</p> <p>Poverty definitions (80 interviews)</p> <p>Flourishing, worth-lived life definitions (90 interviews)</p> <p>Perceptions of justice and injustice (80 interviews)</p> <p>Justice Q Set (40 statements -20 Q sets)</p>	<p>Poverty definitions: Qualitative Analysis using N-Vivo 11 software for coding and analysis</p> <p>Flourishing, worth-lived life definitions: Network Analysis</p> <p>Justice definitions: Q Analysis</p>
<p>C. CALIBRATING MEANINGS AND METRICS</p> <p>How to calibrate metrics of poverty and well-being to better reflect the role of the natural environment and allow a fully flourishing life in a just society?</p>	<p>7) How to calibrate metrics to better reflect social reality?</p>	<p>Data analysis using a dialogue between information collected from lines of inquiry A and B.</p>		

4.4. Sampling frames

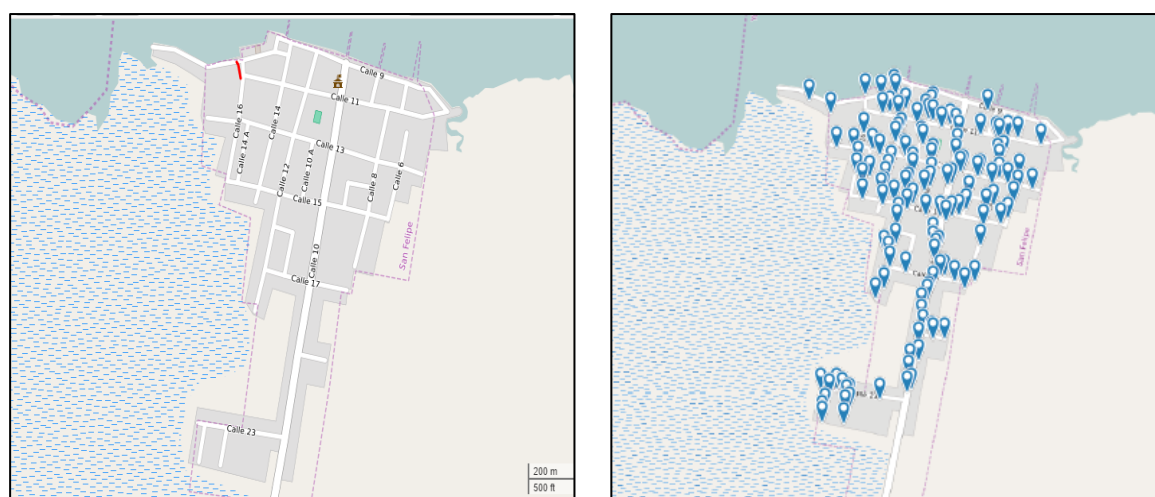
4.4.1. Sampling frame for semi-structured qualitative interviews

For the semi-structured qualitative interviews, probability systematic sampling with a sampling ratio of 0.2 was used to guarantee that every household has an equal opportunity for selection. For a total population of 1875 inhabitants, and assuming 5 persons per household, for a confidence level of 95% and margin of error of 9%, the minimum sample size was 80 households. During the first stage 80 interviews were completed and 90 interviews were completed during the second stage.

Given that the official census map was being updated and was not yet available to be shared, I used a map from GAIA GPS software. For the first stage of data collection, the house of 'Don Chep' the oldest man in San Felipe (107 years old) was selected as the first point, after which, I mapped every 5th inhabited house. Holiday houses, stores, offices (governmental, cooperative or other offices), parks, the bullring, schools and the medical centre were not counted. For the second stage of data collection, the contiguous house of 'Don Chep' was counted as the first house.

There was a decision to be made regarding whether the multiple buildings used as temporary homes for foreign fishermen should be counted. After reflecting the type of information that would be missed, I decided to include the temporary houses of foreign fishermen in the sampling frame. With the support of my research assistant, holiday or abandoned houses were excluded, and the 'hidden' houses behind the same door, or families who share different rooms in the same area were included in the sample. Using the GAIA GPS software, I mapped the sampling frame, which is shown in Figure 4-2. In total 150 waypoints were mapped and included in the sampling frame.

Figure 4-2. Streets of San Felipe, Yucatan (left) and Sampling frame for semi-structured interviews (right)



4.4.2. Sampling frame for Q-methodology: Selecting respondents covering a wide variety of viewpoints

Defining a sample for Q-methodology (P-set) involves the selection of respondents who need to be diverse to truly capture the heterogeneity of perspectives about the topic of interest. Thus, the sample is a representation of the population diversity rather than a representative sample of the population. This purposive sampling allows uncovering patterns that may not be detected otherwise (Zabala, 2015). For this study, individuals with viewpoints of justice were identified from the 221 individuals who participated in the study. To allow maximum-variability sampling, 25 individuals were shortlisted using variables such as occupation, age, gender, ethnicity, schooling, religion, self-defined social strata and whether they were native to San Felipe. From those selected (25), two didn't accept the invitation to participate, two were not located and one stopped sorting the statements during the Q-sorting process. The P-sample was composed by 20 individuals whose characteristics are shown in Table 4-2.

Table 4-2. P-set

Respondent ID	Occupation	Gender	Age	Years of Schooling	Self-defined Ethnicity	Native to San Felipe (Y/N)	Religion	Self-defined social-strata
1	Tourism (Unemployed)	Female	45	3	Mayan	Yes	Catholic	2
2	House work	Female	59	5	Non-Mayan	No	Catholic	3
3	Fishing - Member of Cooperative 1	Male	65	4	Non-Mayan	Yes	Catholic	2
4	Fishing - Non-member of Cooperative	Male	25	16	Non-Mayan	yes	Catholic	3
5	Fishing - Member of Cooperative 2	Male	43	12	Mayan	No	Catholic	4
6	House work	Female	35	9	Non-Mayan	No	Adventist	2
7	Restaurant owner and Ranching	Male	44	6	Mayan	Yes	Catholic	4
8	Fishing business	Female	50	9	Non-Mayan	No	Catholic	4
9	Fishing and Tourism (Non-member of Fishing Cooperative)	Male	40	9	Non-Mayan	Yes	Catholic	3
10	Previously (staff of local government)	Female	45	10	Non-Mayan	Yes	Catholic	3
11	Current staff of local government	Female	29	12	Non-Mayan	No	Catholic	4
12	Fishing - Non-member of Cooperative	Male	22	9	Non-Mayan	Yes	Catholic	4
13	Fishing - Member of Cooperative 2	Female	23	10	Non-Mayan	Yes	Catholic	2
14	Staff of local school	Female	38	12	Non-Mayan	Yes	Catholic	2
15	Staf of Protected Area	Male	61	9	Non-Mayan	No	Catholic	3
16	Restaurant owner	Male	42	6	Non-Mayan	Yes	Catholic	3
17	Retired (Previously, military)	Male	67	3	Non-Mayan	No	Catholic	2
18	Harbor captaincy	Male	43	12	Non-Mayan	Yes	Catholic	3
19	Fishing - Member of Cooperative 2	Male	40	9	Non-Mayan	Yes	Adventist	3
20	Nurse	Female	33	12	Mayan	No	Catholic	4

4.5. Fieldwork

4.5.1. Fieldwork observations

The first week of my stay in San Felipe municipality, I lived in one of the rooms in the main street (Calle 10) which are usually offered to fishermen from other regions during the fishing season. The offer of this kind of rooms has increased since 2012, in parallel with the increased demand of sea cucumber. As will be described in the next chapter, the demand of sea cucumber has introduced a series of social, institutional and social changes in San Felipe. After the first week, I moved to a room in the house of a young fisherman and his wife. Water is not drinkable, but it can be used for washing and showering.

The first week of my arrival overlapped with San Felipe's summer fair. People were gathered in different activities for children, dances, concerts and even a bullfighting. During the first days of my arrival people started noticing my presence. At first, I noted that they were suspicious and asked me who paid me and whether I worked for the government. I took the first week of fieldwork to randomly talk to people, introduce myself and talk about the reasons why I was there. Most of them seemed very open to talk and when I mentioned that I was planning to conduct interviews, people recommended me to talk to "Don Chep", the oldest man (107 years old) in San Felipe. I decided to start the interview process with Don Chep and then follow the planned random systematic sampling.

4.5.2. Informed Consent

Prior the interviews I read and showed respondents a short information sheet introducing myself and describing the research goals, activities, and the potential uses. It stated clearly that their participation was voluntary and that they could withdraw, skip questions and request more information before, during or after the interview. In the research site people felt intimidated by my request of a written signature and the incipient trust seemed to be affected by my request. As a result, I decided to accept their consent without signature, and when people allowed me to record the interviews, their oral acceptance was recorded. I always asked permission to record the interviews and most of the interviewees accepted to be recorded.

4.5.3. Building rapport

Besides the goal of securing a process of trust-building with authorities and key stakeholders, the preliminary introduction meetings sought to understand the historical context of San Felipe, particularly focusing on those aspects that would be covered by the in-depth interviews, namely, the links between environment and health, security, a good life, well-being.

The first day in San Felipe I introduced myself with the Mayor and the Secretary of San Felipe. In a meeting with both, I shared the introduction letter from the University, and handed out a brief description of my research. The Mayor shared San Felipe's Development Plan for the period 2015 – 2018, his priorities for the municipality (which includes the development of a tourism plan) and kindly offered his support for my research. I asked permission to conduct the interviews and requested an official map of San Felipe's households. He offered the support of someone to accompany me for the interviews, which I kindly rejected because it could interfere with the neutral positionality that I sought. As for the map, he suggested to contact the local doctor, given that the health services have the most updated household maps.

Through a local community member, I found my research assistant, who used to work as a nurse in town and who has a good knowledge of the community and people's relations. With her help it was relatively easy to start the process of trust-building with potential interviewees. She seemed to know many of the power relations between people, families and about the history and recent changes in San Felipe's social life.

The introductory talk with the community doctor had two main goals. First, to request the most updated map of households and second, to gather preliminary information about risks to health derived from environmental conditions. I couldn't get the map because it was being updated. I, then, requested information about the main death and illness causes. The doctor has lived in the community for 10 years. When questioned about the four most frequent illnesses in the community he mentioned: 1) Acute Respiratory Infections (mainly during the tropical storms season in October and during the north winds in January and February), 2) Acute Diarrheal Diseases; 3) Dermatitis and 4) Cancer. Interestingly, the local doctor attributed both the Acute Diarrheal Diseases and Dermatitis to the low water quality. He mentioned that San Felipe's tap water comes from plastic, old-pipes that are filled with oxide that makes the water turn brownish-red.

“The water is not clean. Is a constant risk of acute diarrheal diseases. I have tried to lobby for the construction of a deep well away from the coast to improve water quality”. (Interview on August 3, 2016)

When asked about the most important death causes in the community, he identified decompression sickness as the main cause of mortality in fishermen, especially divers working on the octopus catch. Given that the community does not have a hyperbaric chamber and the distance between San Felipe and the nearest place with a hyperbaric chamber, the mortality due to decompression is relatively high. The second most important death cause is diving disorders (oxygen toxicity, burst lung) and the third, Cancer, especially pulmonary, gastric, cervical and breast cancer.

The introduction with the harbourmaster had the goal of collecting information about natural disasters that had affected San Felipe throughout its history and about his perception regarding the links between environmental changes and natural disasters and vulnerability and human risks. He mentioned the importance of wetlands and the Ria Lagartos Biosphere Reserve in reducing the risk of impact of potent hurricanes.

During the first interviews, I noticed that the worry of parents regarding the absence of the math teacher and the proximity of the end-of-year exams was a recurrent concern. Many of them were about to take an algebra exam that would define whether they should repeat the same academic year or continue to the next one. I offered to give tutorials some days in the afternoons to help them. Initially I thought that very few students would show up to the tutorials, so I was extremely surprised when 36 students showed up. With this, the need became evident and I extended the number of algebra tutorials and the range of topics covered. After two weeks of giving tutorials, I realised that it was easier for people to accept my request for an interview. My initial perceived identity changed from the unknown woman who knocks at the door and asks odd questions about a flourishing life to be identified as a school teacher. During the interviews, I clearly presented my research, its goals and my own perceived identity as a PhD student. Giving tutorials was a way to express my deep gratitude to a community that kindly welcomed me and took the time to share their life stories with me.

4.5.4. Critical Reflexivity

One of the main ethical values underpinning my fieldwork is the principle of 'Do no harm' to avoid physical and/or psychological harm to both participants and I. To avoid putting myself and others at risk, I followed critical reflexivity, a process of constant examination of my engagement with my own research work and of self-scrutiny to analyse my own situation and the perceptions of others towards the research process that lead to to risky situations or to results' bias. I adhere to a self-critical ethical conduct, aiming to constantly ponder the ethical implications of my activities. To support the critical reflexivity process, I kept a research diary, where I collected reflexive observations, thoughts and ideas about the research process, its social context and my role in it, including also the influence that the research was also having in my own notions of justice and a good, worth-lived life.

Asking about poverty and injustice had a dual effect in others and in myself. By sharing current challenging life conditions, some people started asking whether or how could I help them. This aspect required me to be emotionally aware and empathetic but at the same time very honest about my own limitations and the scope of my research. I offered support that was on my reach and I was careful of not committing to anything that I was unable to fulfil. But all this process didn't happen instantaneously, it was filled with ethical dilemmas and in some occasions it had deep emotional effects on myself.

Mertens' transformative paradigm describes researchers as actors not just as observers (Mertens, 2007). After a couple of months living in San Felipe, I felt that the community 'adopted' me. Soon I was being greeted by most of the peasants, or moto-bikers, while I walked. I spent months living in a community where good social relations are vital for a 'flourishing life'. During my fieldwork, money started to lose the instrumental value it has in the UK. Money didn't allow me to eat well, for example, as there were not many restaurants, nor stores. The best way to eat fresh food (usually seafood) was to be invited to have lunch with a family. In this way, I was constantly fed by respondents who shared with me their personal, childhood, love, hope stories, their sorrows and losses, and the memories that have shaped their lives.

4.6. Research Methods to examine the local meanings and reasons of poverty and the interlinkages to the natural environment

4.6.1. Examining poverty/wealth and the nexus to the natural environment through semi-structured qualitative interviews (80 interviews)

The process of uncovering the local meanings of poverty is inspired in the World Bank's global research study *Voices of the poor* (Narayan, Schafft, et al., 2000; Narayan, Chambers, et al., 2000) in its interest to uncover how do people understand and experience poverty. In contrast to the World Bank study, the empirical research uncovers the perspectives of poverty not only from self-defined poor people, but from the whole population sample.

Qualitative semi-structured interviews were selected as the research method to capture participant's viewpoints about poverty and the interlinkages to the natural environment because they allow participants the freedom to express their views in their own terms. The questions used were: *What does poverty mean? How is it experienced? How do you recognise someone is poor? and, what are the causes of poverty?* However, during the first interviews, I noticed that people felt intimidated or shy when asked about the meaning of poverty, as if I was telling them that they were poor. To ease the reception of the question, I included a previous question about the meaning of 'wealth'. In this way, people were able to balance their ideas on both concepts, as it seemed easier for them to answer both questions without feeling judged. In addition to the meaning of 'poverty' and 'wealth', I asked about their perception of the reasons why people are poor or wealthy. The inspection of the meanings and reasons of *wealth* and its interlinkages to the natural environment was not originally included in the research design; however, during fieldwork, it became evident that by asking first about wealth and then about poverty, people gave answers without feeling that I was implying that they were wealthy or poor. I realised that both concepts could be analysed together and add value to the data analysis. The interview protocol is shown in Appendix A. The results presented in Chapter 6 include both concepts.

4.6.2. Analytical methods to examine local perceptions of poverty/wealth: meanings and reasons

The qualitative semi-structured interviews designed to collect data about the meanings and reasons of poverty/wealth were analysed using qualitative data analysis. The interviews were thematically coded using N-Vivo 11 Software. The interviews that were recorded were analysed using the audio files, whilst the ones that were not recorded were transcribed, organised in an Access database and imported to N-Vivo 11 as text files. The codes used were the following: a) Meanings of poverty, b) Reasons of poverty; c) Meanings of wealth; and d) Reasons of wealth. After completing the coding, the information was analysed using Excel and Tableau to present gender-disaggregated data in a visual way.

4.7. Research Methods to examine the local meanings and reasons of a flourishing, worth-lived life

4.7.1. Examining the meaning of a flourishing life through semi-structured qualitative interviews (90 interviews)

To examine the idea of a flourishing life, five sequential open-ended-questions were used. The interview protocol is showed in Appendix B. The questions were designed to capture ideal personal definitions of a good life, personal transcendental aspirations (life-long aspirations), including constituents and determinants and the interlinkages among them and to the natural environment. The first open-ended question: *What is the meaning of a 'flourishing life' for you? (Flourishing life)* was expected to capture the comprehensive meaning of a good life without previous questions that could prompt the answer.

The second question: *What is the dream of your life? (Lifelong motivation)* added a temporality aspect to the answer, prompting respondents to think about their personal motivation (or values) in a lifetime temporal scale.

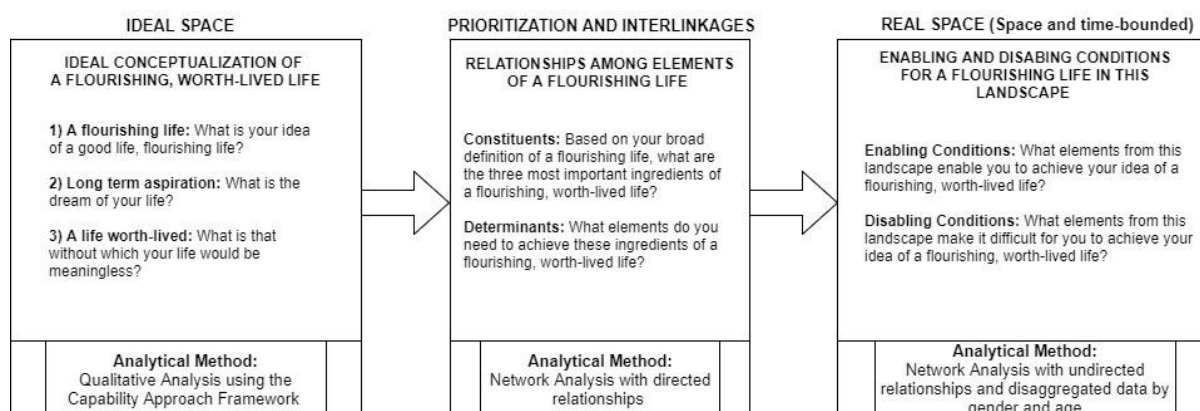
The third question: *What makes your life worth living?²³ (Transcendental driver)* is inspired in the Aristotelian question to define *eudaimonia*. The question aims to capture the 'meaningful' element of a flourishing life, rather than focusing only on needs satisfaction. It's intended to prompt answers that go beyond minimum requirements. The fourth and fifth questions: *What are the three most important constituents of a 'flourishing life' (Constituents of a 'Flourishing Life')* and *What aspects help you to get those three constituents of a 'flourishing life'? (Determinants of a 'Flourishing life')* were designed to

²³ The question is Spanish was: "Piense por favor en aquello sin lo cual su vida parecería que no tiene sentido. Para usted, ¿por qué vale la pena estar vivo?"

identify the interlinkages among elements to identify those with an intrinsic and those with a mainly instrumental value. The directed relationships were recorded.

To examine the interlinkages to the specific landscape, the third segment was designed to understand the real experience and how the landscape either enable or disable them to achieve their own ideas of a good life. The visual representation of the data collection process is illustrated in Figure 4-3.

Figure 4-3. Visual representation of sequential questions to examine local definitions of a flourishing life and its links to the Natural Environment



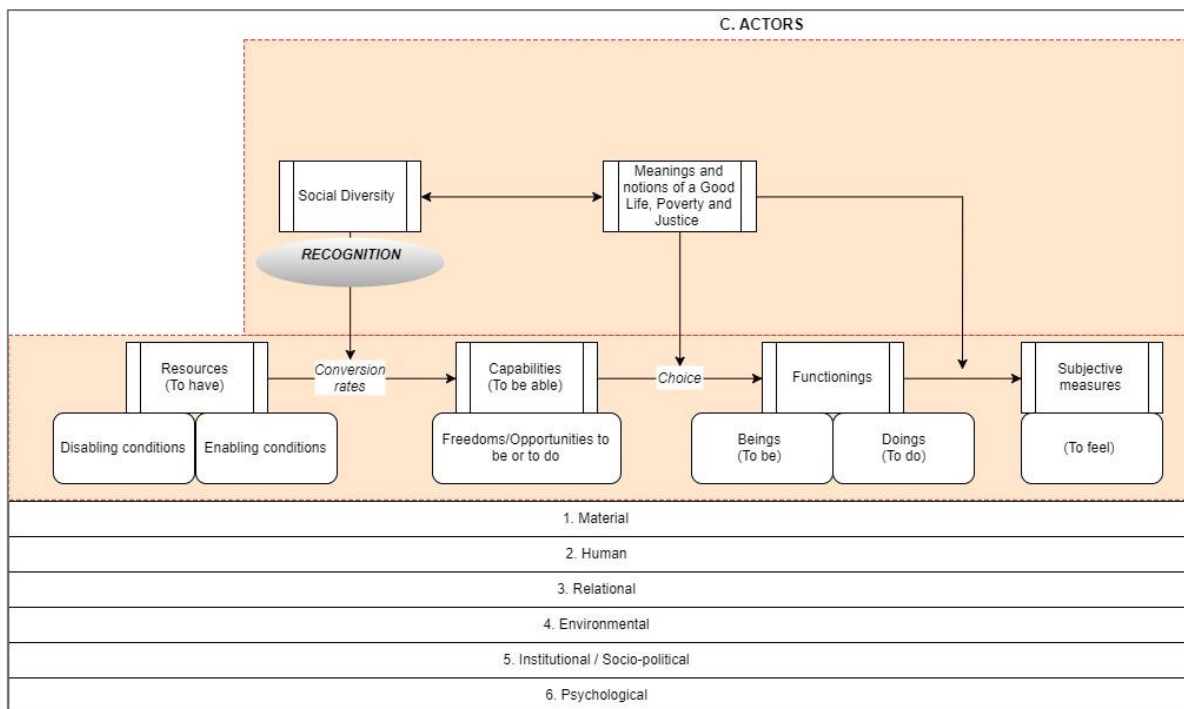
4.7.2. Analytical methods to examine perceptions of a flourishing, worth-lived life

Qualitative data analysis

For the analysis of perceptions of a flourishing, worth-lived life, the collected data was qualitatively analysed in N-Vivo 11 using two groups of codes. The first group of codes corresponds to the elements of the Conceptual Framework (Figure 4-4), namely: *Resources* (Enabling and Disabling conditions); *Capabilities* (Ability to be and to do); *Functionings* (Beings and Doings) and *Subjective measures* (Feelings). The second group of codes uses the typology that emerged from the empirical study *Voices of the Poor* (Narayan, Chambers, et al., 2000; Narayan, Schafft, et al., 2000; Narayan, 2005) plus the category *Environmental*, which was added to the framework. Thus, the second group of codes include: *Material, Human, Relational, Environmental, Institutional/ Socio-political* and *Psychological*, as shown in Figure 4-4. After the qualitative analysis, the results were graphically represented using Excel and the data was organised to be analysed with Network analysis.

As an example of the decisions made during the qualitative analysis, the mentions of *Having income* without linking it to another life functioning were left as a *Resource*, whereas when income was mentioned linked to a capability of a functioning then, both elements were coded. So, when the participant answered that a flourishing life is “*To have income to send my children to school*”, then, both elements (*Resource and Capability*) were coded and a directional relation was identified from Income to Children’s education. These directional relations were analysed using Network analysis.

Figure 4-4. Sub-section of Conceptual Framework showing only element C. *Actors* and typology used for data analysis



Selfless aspirations as descriptors of a flourishing life

During the analysis, the new element of *Selfless aspirations* was included. Originally, all the Relational elements that define a flourishing life as relations with others (e.g. to have a family, to be with my friends, etc). were grouped together. However, it was evident that there was a distinction between definitions based on relational self-interest and altruistic aspirations. Let's compare two answers that were originally placed as Relational elements. 'To be part of a cooperative' and 'For my children to have access to social security' were both placed under the Relational category. However, the first statement values a relationship because it can unfold a series of further benefits (social protection, access to fishing subsidies, etc). In the second statement, the respondent shifts the focus of concern from herself to others, and defines a flourishing, worthwhile life not in terms of the self or in any expression of self-interest, but in terms of others' wellbeing. The recurrent encounter of definitions of a flourishing life that opposed to self-interest, hedonistic or desire-fulfilment categories and at the same time expressed a wish to the future of others, unravelled the need for a new category where non-self-interest, selfless aspirations statements were placed. It is noteworthy that most of the 'selfless' answers described life functionings of family members, so it raises the question of where are the boundaries of one's self identity and whether we should consider one self-identity as an extended concern to family members. The criteria to code elements in this category was to evaluate who was the actor of the action described (having, doing, being, being able to, feeling). If the subject of the action was different from the self, then it was coded as *Selfless aspirations*.


Network Analysis: the inspection of interlinkages among elements of a flourishing life

The links between *Constituents* and *Determinants* of a Flourishing Life and the *Enabling* and *Disabling* conditions found in the landscape were analysed using Network analysis. Network analysis derives from network theory, which is the study of graphs as representations of relations between discrete objects. Network theory has applications in many disciplines including statistical physics, engineering, economics, ecology and sociology, among others. The reason why I chose this analytical method is that it allows the analysis of interactions, mapping and measuring of relationships between discrete elements, facilitating the understanding of interdependency among factors. In addition, the measures used in network analysis give insight into the various roles and groupings in a network; for example, it allows the identification of connectors, bridges, isolates; and also the elements that cluster together. In addition, network analysis allows the inspection of both individuals and variables. Therefore, it is a method suitable for exploring the effect of social difference in subjective definitions. The fact that individuals don't hold the same perceptions of what a good life is makes network analysis particularly suitable because it allows the analysis of both respondent's characteristics' and the multiple meanings in a systematically and disaggregated way.

Inspection of Constituents and Determinants of a flourishing life using Network Analysis

Following the questions designed to inspect the ideal concept of a flourishing, worth-lived life, respondents were asked to keep in mind the comprehensive idea they conceptualized to prioritize and mention the three most important elements of their own idea of a good life. Constituents of a flourishing life were recorded. After this, I asked what elements would enable them to secure these constituents of a flourishing life. These elements were recorded as determinants with a link to the constituents identified. A matrix with the determinants in rows and constituents in columns was constructed (See Figure 4-5) identifying the number of mentions of a Determinant x linked to a constituent y.

Figure 4-5. Example of adjacency matrix constructed for the network analysis of Constituents and Determinants of a flourishing life

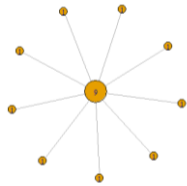
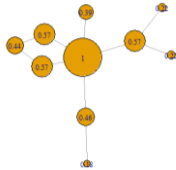


	Constituent 1	Constituent 2	Constituent 3	Constituent y
Determinant 1		1	2	2
Determinant 2				3
Determinant 3				
Determinant x	1			

This matrix was then analysed using a directed adjacency matrix (Figure 4-5) in which the relationships have directionality (from Determinants to Constituents). The software R (R Core Team, 2018) was used

to run the network analysis with the package *igraph* (Nepusz, 2006). The measures of network analysis were inspected at a micro level (ego measures), focusing on each of the nodes that compose the network; at the intermediate level, focusing on the clusters that groups of nodes form; and at the macro level, focusing on the composition of the entire network. A brief description of each of the network analysis measures used is presented in Table 4-3.

Table 4-3. Description of measures of Network Analysis

Ego Measures	Definition
Number of vertices	<ul style="list-style-type: none"> Number of nodes or dots
Size of graph= number of edges	<ul style="list-style-type: none"> Number of lines connecting two vertices. A directed edge is an ordered pair of nodes that can be represented graphically as an arrow drawn between the nodes. An undirected edge disregards any sense of direction and treats both nodes interchangeably.
Degree Centrality: 	<ul style="list-style-type: none"> Number of connections a node has. It allows the identification of those elements that are connected to the widest varieties of conceptions of a good life, in other words, the elements that enable the most varied conceptions of a good life. Range: 0 to n-1
Out-degree measures (to examine 'fertile capabilities')	<ul style="list-style-type: none"> The number of edges leaving a vertex. Range: 0 to n-1
In-degree measures (to examine intrinsically-valued elements)	<ul style="list-style-type: none"> <i>In degree</i>: The number of edges entering a vertex Range: 0 to n-1
Eigenvector centrality 	<ul style="list-style-type: none"> Measure of the influence of a node in a network. It assigns relative scores to all nodes in the network based on the concept that connection to high-scoring nodes contribute more to the score of the node in question than equal connections to low-scoring nodes. Natural extension of degree in which a node is important if it's connected to important nodes. Range: 0 to 1.
Intermediate level measures	
Cohesive blocks	<ul style="list-style-type: none"> Hierarchical nesting of cohesive blocks. Number of nodes that would disconnect the group if removed. Clustering Coefficient is the measure of the degree to which nodes in a graph tend to cluster together
Macro level measures	
Diameter	Distance between the two most distant nodes in a connected graph
Density	Ratio between actual and potential edges in a graph
Average Path Length	Average number of steps along the shortest paths for all possible pairs of network nodes.

The measures of network analysis used to interpret the data were *degree centrality* measures, including out-degree and in-degree; and *cohesive blocks* (an intermediate-level measures). The out-degree is a measure that counts the number of edges leaving out from a node. This measure denotes the extent to which a node enables other conditions of a flourishing life. The higher the out-degree measure, the more central to catalyse other valuable resources and functionings. The concept of '*fertile capabilities*' used by Wolff and de-Shalit (2007) suits this measure very well because it defines those elements that play a central role in enabling other capabilities to arise. The in-degree measure is the number of edges entering a vertex. This measure is useful to identify those elements which are catalysed by other factors. Thus, the *in-degree* measure allows the examination of those elements that are highly-valued as end in themselves rather as means to achieve other things.

Cohesive blocks represent the hierarchical nesting of clusters and are calculated by *cohesive blocking*, which is "method of determining hierarchical subsets of graph vertices based on their structural cohesion (or vertex connectivity). Thus, a hierarchy of vertex subsets is found, within the entire graph at its root" (Moody, J; White, 2003). Cohesive blocks were calculated with the software R (Nepusz, 2006) and the package *igraph* (Nepusz, 2006). In network theory, the clustering coefficient '*c*' is the measure of the degree to which nodes in a graph tend to group together in 'cliques' and represent the number of nodes that would disconnect the group is removed. According to Watts and Strogatz (Watts and Strogatz, 1998), in most real-world networks, nodes tend to create tightly intertwined groups with relatively high density of ties. Thus, the largest the clustering coefficient the most tightly knit the cluster is.

4.8. Research Methods to examine the local meanings of justice and the interlinkages to the natural environment

4.8.1. Examining the perceptions of justice and injustice in relation to the natural environment through semi-structured interviews (80 interviews)

The interview (Protocol in Appendix B) was designed to collect two types of data. First, perceptions about *Environmental Primary Goods* and second, perceptions of Justice and injustice in relation to the natural environment. By doing this, I tried to reconcile two philosophical lines of reasoning about justice: *niti* and *nyaya* (detailed in Chapter 2, Section 2.3). The *niti* follows the 'social contract' tradition and adopts a deontological approach by asking questions of what 'social contract' would be accepted by everyone unanimously? In this line, the questions around *Environmental primary goods* were designed to understand what elements from the natural environment would be accepted by everyone unanimously as elements of justice. In Rawlsian terms, primary goods are defined as collective goods that everyone would like to have no matter their own conception of the good, their social position or

their value-judgements and are the common base for the unanimous selection of justice principles. Using this term, the interview collected information about perceptions of those elements *from the natural environment* that everyone would need independently of their own ideas of what a good life is? (Rawls, 2001). These elements are conceptualised as *Environmental primary goods*.

The *nyaya* follows the 'social choice' tradition, which focuses its attention to the realization-based comparisons of justice and injustice and where justice is advanced by identifying manifest injustice. Inspired by this tradition, the interview questions were designed to uncover *perceptions of Justice and Injustice in relation to the natural environment*, including ideas of the benefits and burdens of the Protected Areas.

To explore the local definition of Justice in relation to Natural Resources, a comprehensive list of definitions was collected from the semi-structured interviews. During the interviews, people were asked about their perceptions of justice and injustice in relation to the natural environment. Most of the answers expressed viewpoints about fisheries, the wetland management and water sources ('sink-holes'). The statements were selected to represent the variety of views expressed and the different dimensions of justice identified during the literature review and interviews. The concourse was then reduced to a representative selection of 40 statements describing viewpoints of what was considered just. These 40 statements were used as data inputs for Q analysis. The statements covered different perspectives of what was identified by participants as just and unjust.

4.8.2. Examining perceptions of justice and its nexus to the natural environment through Q - methodology

This research method follows the qualitative data collected during the semi-qualitative interviews where viewpoints about justice and injustice in relation the natural environment were collected. Q-Methodology allows the exploration of first-view perspectives in a constructivist way, allowing the 'voices' (interpretations, perspectives and feelings) of those participating in the study, to be systematically analysed in a quantitative way. It is predominantly a qualitative methodology in the construction of the perspectives which is grounded on quantitative data analysis through a sequence of equations (Zabala, 2015). Q is particularly useful to understand all the breadth of 'truths' (perspectives, feelings, interpretations) around the study issue and to find commonalities in the way in which different groups of people relate to the study issue.

The way in which Q works is that the shared perspectives between different groups are recognised by identifying commonalities in the internal structure of the viewpoints. As a result, it uncovers shared patterns of thinking about the topic of interest. Q is extremely useful when the issue being studied is complex and its meaning is a matter of social contestation and conflict because it questions the clarity and consensus of concept definitions (Watts and Stenner, 2012). The outcome of a Q study is a set of factors that reflects common patterns of response across individuals regarding an issue (Addams and Proops, 2000).

Q Methodology used for environmental research and Environmental Justice studies

This is not the first time Q methodology is used to explore the links between environment and justice. In 2002, Debra Salazar and Donald Alper (2002) used Q methodology to understand environmental activists' discourses around the meaning of social justice and democracy in British Columbia's Environmental Movement. In 2009, they used Q to describe and classify the political perspectives of environmental activists in the Pacific Northwest (Salazar, 2009; Salazar and Alper, 2011). Q was considered particularly suited to these studies because of its appropriateness for examining shared views and discourses and because the analysis begins with the language of participants, rather than "imposing the researchers' concepts a priori" (Salazar and Alper, 2011, p.768).

Kaufmann (2012a, 2014) used Q methodology to conduct a comparative analysis of the local meanings of the concepts *Environmental Justice* and *Sustainable Development* in Brazil's Amazon. He argued that environmental policymaking cannot succeed as long as particular local discourses about justice and development are not discovered and considered. Kaufmann noted that, compared with other ethnographic methods, Q has the advantage of providing replicable data and the possibility of replicating the study to then compare results over time (Kaufmann, 2012b). Theoretically underpinned by the environmental sociology field, Kaufmann used 19 statements for each concept from interviews and literature and conducted 22 interviews on Algodual-Maiandeuá, a Natural Protected Area in Brazil. He found that the *sustainable development* concept had less degree of discourse difference than the *environmental justice* concept.

In 2016, Howard et al. conducted an empirical analysis of plural notions of fairness in Fairtrade Carbon Projects using Q methodology (Howard et al., 2016). Arguing that the meaning of 'fairness' is socially constructed, the authors justified the use of Q based on its ability to analyse subjectivity in an "open, yet structured and statistically interpretable form"; its suitability to identify a range of voices, accounts and understandings (Barry and Proops, 1999) and its "potential to catalyse reflexivity in policy-making processes, facilitating dialogue and enhancing policy implementation processes" (Howard et al., 2016, p.101).

Jacobsen and Linnell (2016) used Q methodology to investigate perceptions of justice regarding the carnivore conflict in Norway among sheep farmers, environmentalists and indigenous reindeer herders. Q methodology was considered adequate for this study given its suitability to study strongly contentious issues “where conflict is based on competing interests, competing beliefs, or both” (Durning, 2006; Mattson et al, 2006 cited by Jacobsen and Linnell, 2016: 199).

Compared with previous studies that have used Q Methodology to explore environmental justice and fairness issues this research differs in two main aspects. First, it aims to explore the range of local definitions of justice, from a normative perspective, in relation to natural resources that were locally considered essential to achieve a ‘flourishing life’. Second, it aims to include the breadth of viewpoints of the local population, not only from one sector of it.

Suitability of Q Methodology to explore local perceptions of Justice and the Natural Environment

Views about what is just are highly contested and respond not only to personal experiences but also to social and cultural practices that shape what is considered acceptable and what is not. Considering that the concept *Environmental Justice* is socially constructed, it requires a method that can uncover the wide range of viewpoints without the risk of disregarding the less dominant ones or of imposing the researcher’s views. It also requires a method that can examine shared views about justice that can allow analysis of discourse similarities. These characteristics are satisfied by Q methodology.

Watts and Stenner (Brown, 2008) point out that one major advantage of Q is its ability to produce holistic data and capture “the whole story” (Brown, 1980; Watts and Stenner, 2012). They argue that this holism is a major advantage of Q in comparison with other methods with a first-person and/or qualitative focus, because Q allows the whole -and the relationships between themes- to be seen and appreciated (Stephenson, 1935). In this way, Q allows the inspection of individual’s perspectives in a holistic way, in contrast to Likert and other scales where items are measured independently (Zabala, 2015). In addition, Q methodology is regarded as pertinent for the study of complex issues whose meaning is a matter of social contestation and conflict (Barry and Proops, 1999; Jacobsen and Linnell, 2016). It has the potential to uncover shared views that exist on the topic of interest in a constructivist way, by using the language of participants, rather than imposing the researcher’s concept a priori (Salazar and Alper, 2011, p.768). It is focused on mapping the plurality of perspectives around the topic of interest without disregarding the voices of marginalised groups (Zabala, 2015). It can be replicated over time to understand the evolution of perspectives over time (Kaufmann, 2012b; Zabala, 2015) and it has the “potential to catalyse reflexivity, facilitating dialogue and enhancing policy implementation processes” (Howard et al., 2016, p.101).

Limitations of Q Methodology

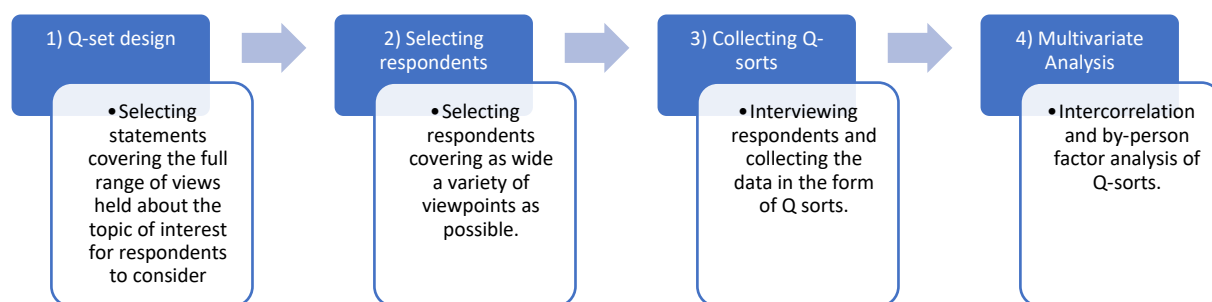
There are some other characteristics of Q that must be recognised to understand the limitations and scope of the methodology. For example, in contrast with other quantitative methods, Q does not need large samples and thus, the results are not generalizable and statistical inferences cannot be made to the larger population.

One of the most mentioned advantages of the use of Q is its potential to uncover the plurality of viewpoints around the topic of interests. This potential can be catalysed or repressed by the quality of the entry data (Q statements). *If* the list of Q statements truly reflects the full range of first-person viewpoints, including those of the less predominant perspectives, then the Q analysis will indeed be able to uncover the plurality of shared viewpoints that exist. *If not*, there will be a risk of research bias. To reduce this bias, Q methodology can be used in combination with other qualitative methods to ensure that the initial set of statements cover a wide range of perspectives. With these considerations, Q methodology was used to explore the local perspectives of what is just and unjust in relation to the natural environment.

Stages of Q Methodology

Q methodology comprises four main phases (illustrated in Figure 4-6): 1) selecting statements covering the full range of views held about the topic of interest for respondents to consider (Q-set); 2) selecting respondents covering as wide a variety of viewpoints as possible; 3) interviewing respondents and collecting the data in the form of Q sorts; 4) conducting a multivariate analysis to identify how many different perspectives there are and what those perspectives are (Watts and Stenner, 2012).

Figure 4-6. Stages of Q Methodology



Design of Q-set: selecting statements about Justice and Natural Resources

A Q analysis starts with the collection of statements (Q-set) that are broadly representative of the range of views held about the topic of interest. This stage is one of the most important because the possibility of obtaining the benefits of the methodology, (i.e. exploring the richness and plurality of viewpoints in a structured manner) depends on the heterogeneity and quality of the Q statements from which the analysis start. The Q-set is a “representative sample of the *concourse*: the whole set of possible expressions on a topic, gathered from all possible points of view” (Zabala, 2015, p.161). This set is created by collecting a large number of statements from interviews, reviews of literature, expert consultation, etc. (Zabala, 2015) which is then reduced to a representative selection of statements (Watts and Stenner, 2012).

Data Collection: Collecting Q-sorts

Collecting Q-sorts involves presenting respondents with the set of statements about the topic of interest (known as the ‘Q set’) and asking them to order these statements based on the extent to which they agree or disagree with the statements, using a specially designed grid (shown in Table 4-4).

Table 4-4. Q grid

Disagree most		-4	-3	-2	-1	0	1	2	3	4	Agree most	

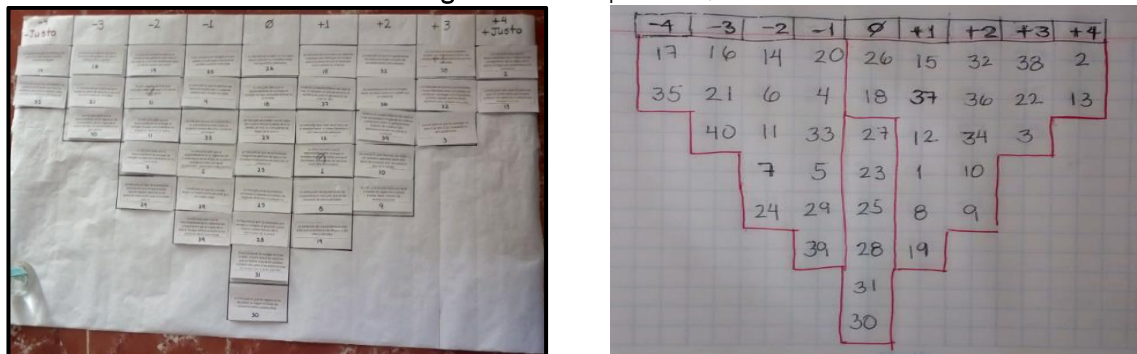
The result of this ordering constitutes the Q sort. A Q sort is a collection of statements which are sorted by a participant according to a subjective dimension, in this case “agreement/disagreement”. The Q sort constitutes a model of the individual viewpoint on the issue under study (Thomson, 1935). Twenty Q-sorts were completed by respondents. Each Q-sort took one hour approximately. Statements were printed in cards and respondents were asked to sort the cards in a paper Q-grid. One by one, I read aloud each of the statements printed on the cards and let the respondents to think and give their own perspective about it. After this reflection moment they decided to place the card on a pile on the right of the Q-grid, if they agreed to it; to the left, if they disagreed and, on the centre, if they were neutral or undecided. In some cases, their agreement with the statement was so strong, that they decided to place the card immediately in the level expressing *Most agreement*. After this, statements were placed in the grid by making trading-off decisions. Images of the Q-sorting process are shown in Figure 4-7.

Figure 4-7. Images of the Q-sorting process



After completion of the Q-sort, a picture was taken, and it was copied in a notebook, identifying with a red line those statements that were identified as Neutral. An example of a completed Q-sort is shown in Figure 4-8.

Figure 4-8. Completed Q-Sort



Analytical methods in Q- Methodology: Standard and bootstrapped analysis

Q analysis involves the correlation of individuals' responses to identified shared patterns between them. The process uses Principal Component Analysis (PCA) or centroid factor analysis (CFA) to reduce the data to a few shared patterns of response. Differently from regular PCA and FA, in which the variables are correlated, Q correlates respondents in order to identify relationships between them. After a set of analytical steps specific to Q methodology, the final results consist of a small number of factors (sorted statements) that are different from each other and summarise the existing perspectives (shared response patterns) of the respondents (Zabala, 2015).

The statistical analysis of this study was conducted using two softwares: PQMethod (Schmolck, 2017) and a Q-package programmed in R statistical language by Zabala (2014). PQMethod (Schmolck, 2017) allowed the examination of the results using centroid factor analysis (centroid FA) and Principal Component Analysis (PCA), whilst the package 'qmethod' developed by Zabala (2014) was used to compare the results and run a bootstrap using the method developed by Zabala and Pascual (2016). The Q bootstrap was run with 1,600 repetitions using Principal Component Analysis (PCA) for factor extraction and varimax rotation. The bootstrap was used to obtain additional measures of accuracy because it yields improved estimates of values and SEs, provides measures of variability for results that the standard analysis does not, and is less strict with violations of parametric assumptions (Zabala and Pascual, 2016).

The interpretation of shared perspectives is based on the statements' magnitude of z-scores (salience) and their stability (distinctiveness) measured by the SE of the z-scores. The z-scores define the relative position to each other on the Q-grid (z-scores) for each factor. Statements with significantly different scores across factors (and therefore different position on the Q-grid) are distinguishing statements and they represent clear disagreement across the viewpoints. Statements with lowest differences in scores share a similar position on the Q-grid and represent consensus viewpoints.

Appendix C presents a detailed description of the decisions made in each step of the Q Analysis.

4.9. Closing remarks

This Chapter details the way in which the research was designed and conducted. It details how each of the research questions was tackled by specific research data collection and analytical methods. The Chapter describes fieldwork observations and reflections, the reasons why specific methods were chosen, and the steps taken to collect and analyse the data. Methodological innovations include the use of network analysis for the examination of relational data (Section 4.7) and the bootstrapping to Q results to improve the accuracy and interpretability of Q results (Section 4.8). This Chapter closes the first part of this dissertation, which presented the research framing and methods. The next Chapter initiates the second part of this dissertation, in which results are presented in the order defined by the Conceptual Framework.

Chapter 5. Situation/Context

Description of the Research Area: San Felipe, Yucatán, México



This chapter corresponds to the analysis of the Situation/Context, which is the first analytical domain depicted in the Conceptual Framework. It focuses on the description of the geographical context in which the study is situated. It includes the inspection of the ecological dynamics of the Natural Environment at different scales and its relationship with the Social Environment, which in turn, includes institutional dynamics, socio-cultural dynamics and financial dynamics. Essentially, the Chapter aims to answer how does the natural environment interact with institutional, political, socio-cultural, financial and technological dynamics and is based on fieldwork observations and the analysis of secondary data collected from 2015 to 2018 in San Felipe, Yucatán, México.

5.1. Location of San Felipe

San Felipe is a fishing port town located about 200 km northeast of Mérida, the capital city of Yucatán, México (Coordinates: 21°34'N 88°13'W) (Figure 5-1). Traveling through the only access road which then converts to Calle 10 -the main street in San Felipe- (Figure 5-2), one starts noticing its distinct beauty, its calmness and the colourfulness of its wooden houses. It lies within the polygon of the Ria Lagartos Biosphere Reserve, a Federal Protected Area and to the West it adjoins with Dzilam de Bravo State Reserve (Figure 5-1).

Figure 5-1. Location of San Felipe, the case study area

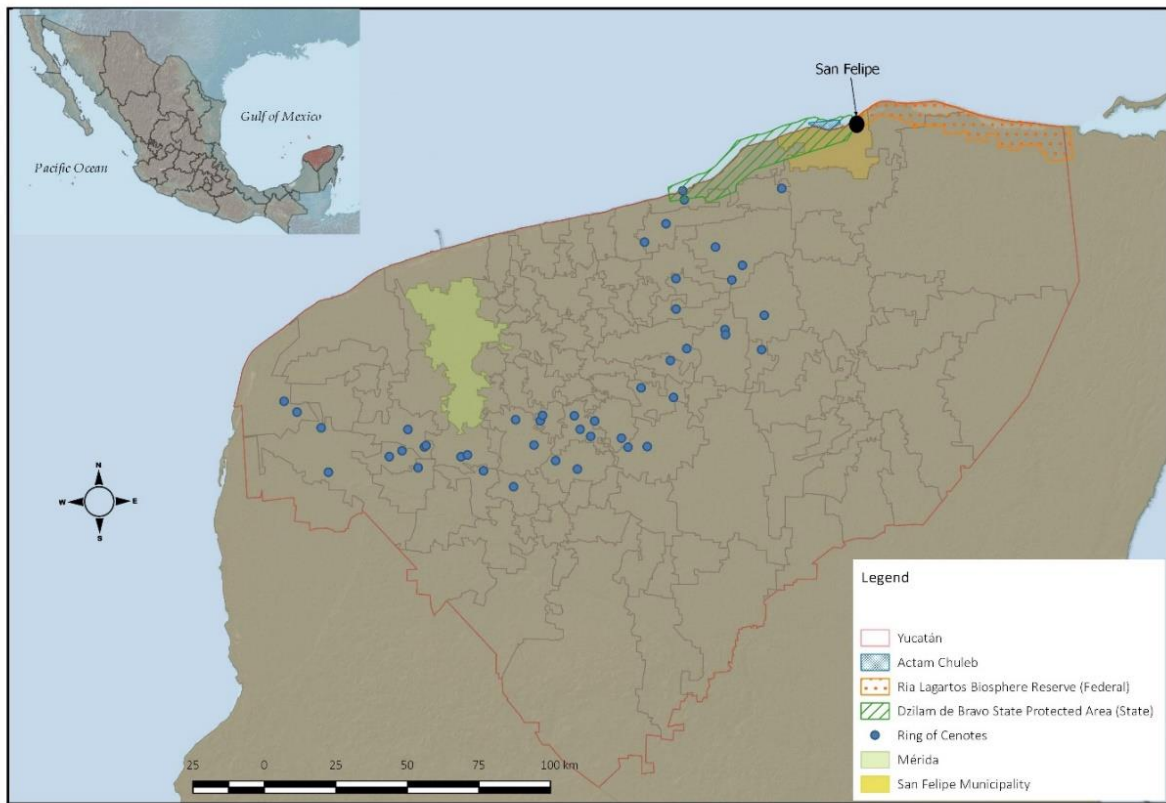
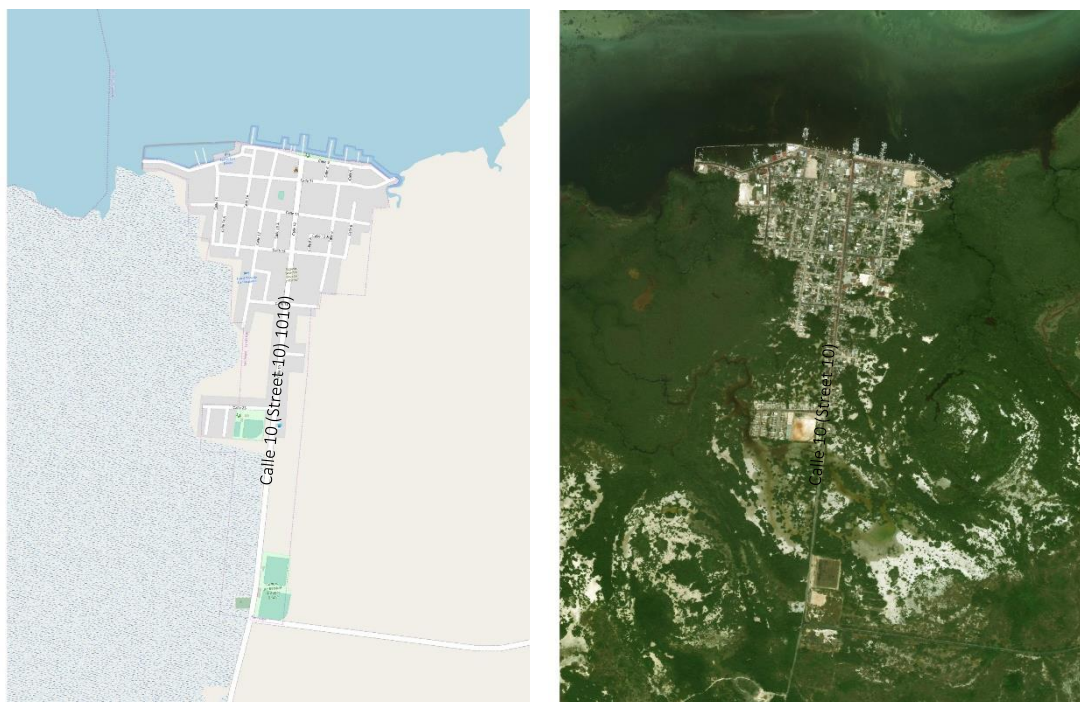


Figure 5-2. Street view of San Felipe (Source of data layers: ESRI Satellite and OSM Standard)



5.2. The Natural Environment of San Felipe, Yucatán.

San Felipe is settled in mangrove swampland, where the streets and houses have been built by filling the wetland with a mixture of rocks, sand and gravel. The coastal areas of San Felipe are mainly surrounded by mangrove forests in the wetland area and by submerged vegetation, such as seagrasses, in the coastal lagoons (Chuenpagdee et al., 2002). These ecosystems, as well as the rocky bottom structure in some parts of the bay, are important habitats and nursery and feeding grounds for many juvenile fish and crustaceans, particularly red groupers, shrimps, lobsters, and octopus, that are economically important for the community (Chuenpagdee et al., 2002, p.184).

5.2.1. Protected Areas

Ría Lagartos Biosphere Reserve

The Ría Lagartos Biosphere Reserve is a Natural Protected Area managed by the Federal Government through the National Commission for Protected Areas (CONANP). It comprises a longitude of 74 km along the coast, which represents 19.6% of the whole Yucatán State coastline. It is part of the Terrestrial Priority Region 146 Dzilam- Ría Lagartos – Yum Balam; the Marine Priority Region 62 Dzilam-Contoy; and the Hydrological Priority Region 102 – Ring of Cenotes (CONANP, 2007).

The area of the Reserve comprises 60,347.82 ha of terrestrial surface (SIMEC, 2010)²⁴. There are six core areas designated according to the degree of disturbance, ecological vulnerability and land use. The buffer zone encompasses restoration areas, salt extraction areas, farming and human settlements and two types of management practices, restricted use and moderate use of natural resources (UNESCO, 2007).

Table 5-1. *Ría Lagartos Biosphere Reserve Timeline (Source: Fraga, 2006)*

1979 – *Ría Lagartos is declared a Fauna Refuge Zone.*

1982 – *Ría Lagartos is placed under administration of the Sub-Secretariat of Ecology.*

1986 – *The Reserve is placed on the International List of Important Wetlands of the International Waterfowl and Wetland Research Bureau (IWRB) and the World Conservation Union (WCU). The Reserve is included in the Ramsar list of wetlands of international importance.*

1988- *The Reserve is redesignated as Ría Lagartos Special Biosphere Reserve.*

1992 – *The Reserve is placed under administration of the Secretariat of Social Development (SEDESOL)*

1995 - *The Reserve is placed under the Secretariat of the Environment, Natural Resources and Fisheries (SEMARNAP)*

²⁴ Core area: 23,681.55 ha and Buffer zone: 36,666.28 ha

A historical timeline of the Ria Lagartos Biosphere Reserve is presented in Table 5-1.

The Reserve includes coastal areas and wetlands designated under the Ramsar Wetlands Convention (Site 332). The main ecosystem types are tropical dry or deciduous forest, wetlands and mangrove forests. Grasslands and reed beds serve as nesting sites for marshland and sea birds (UNESCO, 2007). The beaches are also important nesting sites for marine turtles and the area is recognized as one of the main zones of arrival of the hawksbill turtle (*Eretmochelys imbricate*), and the only one in the State of Yucatán for the green sea turtle (*Chelonia mydas*) (UNESCO, 2007).

1996 – Some resolutions in the General Law of Ecological Equilibrium and Environmental Protection (LGEEPA) are changed and the “Special” qualifier of the Reserve is eliminated.

1999- The Reserve is declared a Biosphere Reserve.

2000 – The Reserve is placed under the administration of the newly created National Commission of Protected Areas (CONANP), a decentralized undersecretary of the Secretariat of the Environment and Natural and the Reserve’s Management Plan is published.

2004 – The Reserve is designated a UNESCO MAB Biosphere Reserve

UNESCO reports the presence of 2,477 species, 98 varieties of vascular plants (UNESCO, 2007) and 122 species listed in the Mexican Official Norm NOM-059-SEMARNAT²⁵ (CONANP, 2007) and 97 species listed in the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES). It contains the only nesting population of pink flamingos in México, 300 resident and migratory bird species who use the area as a wintering habitat; 41 mammal species, 56 reptiles, 10 amphibians, 16 fish, 50 species of crustaceans, gastropods and bivalves and 98 plant species (Fraga, 2006). The most important commercial species of invertebrates are the octopus (*Octopus maya* and *O. vulgaris*), the lobster (*Panulirus argus*) and the shrimp (*Penaeus sp.*). The horseshoe crab (*Limulus Polyphemus*), sometimes -illegally- used as a fishing bait, is an endangered species with limited distribution in Mexico’s beaches.

The main reported threats for the Reserve’s vegetation are deforestation and habitat fragmentation, unregulated fishing, wildlife poaching, highway and wave break construction, estuarine pollution, overharvest of palms, negative impacts on marine turtles, disturbance of the flamingos and other birds and hurricanes human activities, particularly agriculture and livestock raising, and practices that let to the destruction of vegetation (Parks Watch, 2004; UNESCO, 2007).

The Reserve is home of four coastal communities: San Felipe, Río Lagartos, Las Coloradas and El Cuyo, who live in the buffer zone. Following the creation of the Reserve, a series of regulations and restrictions

²⁵ The Mexican Official Norm NOM-059-SEMARNAT lists the species that fall under different risk categories according to the assessment of the risk of extinction of wild species in Mexico.

were imposed to the communities, including the prohibition of cutting down trees and guano palms used for construction (Audefroy and Sánchez, 2017).

Dzilam State Reserve

Dzilam Natural Reserve is managed by the State government through the Ministry of Ecology. It was decreed in 1989 as a Biosphere Reserve by the Yucatán State. However it remained as a “paper reserve” until its management plan was published in 2006 (Fraga and Jesus, 2008). It encompasses a total area of 69, 039.29 ha, including a marine area of 17, 512.697 ha and a core zone of 21,935.072 ha (SE, 2006). It is located to the north of Yucatán State at one end of the ‘ring of cenotes’ (sink-holes).

The Reserve includes both terrestrial and marine areas (30.79%) which comprise a diverse range of tropical vegetation: coastal dune, mangroves, petenes (circular islands of semi-perennial tropical forest), low flooded forest, and deciduous forest (SE, 2006) . The Reserve’s ecosystems are home to 590 reported species of fauna, including 15 endemic species and 55 species listed in the Mexican Norm NOM-059 with different risk categories.

The main threats identified by the Management plan are similar to those identified by the Ria Lagartos Biosphere Reserve, namely: overfishing, wildlife poaching, habitat fragmentation due to agriculture and livestock raising; soil and water pollution with pesticides and agrochemicals, unregulated tourism; overharvest of mangrove vegetation and deforestation. Interestingly, the Dzilam State Reserve identifies the lack of economic and productive alternatives also a threat to the area (SE, 2006).

A historical timeline of the Dzilam State Reserve is presented in Table 5-2.

Actam Chuleb Marine Reserve – Fish Refuge

Actam Chuleb (“water area where the birds drink” in Mayan) is a marine reserve/fish refuge that was established in 1995 by the community of San Felipe through the support from the fishing cooperative, the municipal government and other community groups to respond to fisheries decline (Salas et al., 2014). The area, designated as a fish refuge, intended to provide protection to spawning and nursery sites to commercially important species such as lobster (*Panulirus argus*).

A historical timeline of the Actam Chuleb Marine Reserve is presented in Table 5-3.

Table 5-2. Dzilam State Reserve Timeline

1989 –Dzilam State Reserve is decreed by the Yucatán State.

2000 –Dzilam State Reserve is designated a Ramsar Site.

2006 – The Management Plan is published, including the Fish Refuge Actam Chuleb as a Zone of Special Extraction (Subzona de Aprovechamiento Especial, SAE)

In a context where the marine reserve designed to protect these important spaces (Dzilam State Reserve) was a ‘paper park’ with the subsequent lack of surveillance and enforcement mechanisms and where the open access to fisheries in Yucatán attracted not only people from the area but from other regions, the local community aimed not only to protect the fisheries on which their livelihood depend, but also, as Bjorkan (2009) argues “to take some authority back from the State by turning Actam Chuleb into a local commons”

The area partially overlapped with the marine portion of the Dzilan State Reserve, which, by the time was a ‘paper reserve’, with no management plan nor enforcement institutional structures. The community, including all the entities who proactively set up the municipal reserve, collectively agreed on rules, regulations and fees for those who don’t comply²⁶ (Fraga and Jesus, 2008). The agreement was signed by local authorities (mayor, harbour master, a delegate of the regional Federation of Fishing Cooperative Societies and a delegate of the Secretariat of Fisheries) (Fraga and Jesus, 2008, p.43)

The notable characteristics of this community-based conservation initiative attracted the attention of researchers and NGOs, (Aguilar et al., 2012; Bjørkan, 2009; Salas et al., 2014; Chuenpagdee et al., 2004; Fraga and Jesus, 2008; Chuenpagdee et al., 2013, 2002; Jentoft and Chuenpagdee, 2015; Martins de Jesus, 2007) who, since early stages of the initiative, accompanied and empowered the process of the community to manage their own resources through participatory research approaches.

Table 5-3 Actam Chuleb Marine Reserve / Fish Refuge Timeline.

1995 – The Actam Chuleb (AC) MPA is locally established by the San Felipe fishing cooperative, municipal authorities and the community to work as a fish refuge (‘an area for the bad times’). Rules, fees and regulations are agreed, and the San Felipe fishing cooperative manages and enforces the MPA.

1997 – Five members of the fishing cooperative are trained in natural resources management by an environmental NGO.

1998 – The AC MPA receives funding from UNDP. The Management plan is developed. The area is delimited with marker posts, basic patrolling equipment is acquired.

2000 – The five trained members establish their own NGO, called Actam Chuleb.

2003 – UNDP provides funding for a restoration project of the Actam Chuleb MPA after the passage of the Hurricane Isidore.

2004 – The fishing cooperative splits up and the management and enforcement of the Actam Chuleb MPA falls under the recently established Actam Chuleb NGO.

2006 – After years of negotiations, the Yucatán State government recognises the Actam Chuleb MPA and includes the area as a Zone of Special Extraction within the Dzilam State Reserve.

2007 – The Yucatán State Secretary of Ecology and the Actam Chuleb NGO agree on a five-year co-management partnership for the conservation of natural resources in Yucatán.

²⁶ Fraga and Jesus (2008, p. 44) report that the entities who set up the municipal reserve agreed that whoever violated the agreement would have to pay a fine of about US\$651 to the municipality.

It took eleven years for the State Government to recognize the locally-managed fish refuge and include the area as a Zone of Special Extraction in the Dzilam State Reserve Management Plan, published in 2006. This management plan was the first published for the State Reserve since its declaration in 1989, so it took 15 years for Dzilam State Reserve to have its own management plan. A series of events influenced the outcomes of the Actam Chuleb fish refuge, which could have been a prominent example of community-based management of the commons given the support the community received from international funders and prominent interdisciplinary researchers teams who followed participatory approaches (Salas et al., 2014; Chuenpagdee et al., 2004, 2002; Jentoft and Chuenpagdee, 2015; Salas et al., 2019; Fraga and Jesus, 2008; Fraga, 2006; Martins de Jesus, 2007).

In 2000, the National Action Party²⁷ (PAN) won for the first time the national presidential election, ending a 71-year ruling period of the 'state-party' Institutional Revolutionary Party²⁸ (PRI) (from 1929 to 2000). In 2003, the PAN won, also for the first time, the municipal election in San Felipe, breaking the political homogenous community into two: those supporting PAN and those supporting PRI. Political differences permeated into the well-organized community institutions, such as the fishing cooperative and the community council '*Fuerzas Vivas*' (translated 'Alive forces') which had the power to take decisions on any community matter.

In 2004, the fishing cooperative split into two, each one aligned with different political party (PRI and PAN) and, as a result, lost control of the Actam Chuleb fish refuge management and enforcement. Fraga and Jesús (2008, p.44) report that the '*Fuerzas Vivas*' council stopped gathering to resolve compliance problems after a conflict between the fishing cooperative and the municipality, apparently due to partiality shown during patrolling and in the granting of some sanctions, and also because Actam Chuleb MPA didn't have the legal framework authorising it to collect fines.

In the period from 2016 to 2017, when I conducted fieldwork in San Felipe, the Actam Chuleb fish refuge was not been patrolled by the community or the authorities and the respondents reported that it was not working anymore. When I asked about the reasons, they described a situation in which the increasing presence of foreign fishers, mainly attracted by the sea cucumber fishing season, surged the pressure on Actam Chuleb, which was not adequately patrolled nor enforced by the reserve authorities.

²⁷ The National Action Party (PAN) was one of the three main political parties in Mexico. PAN is a conservative, right-winged party, which, since the 1980's has been an important political party winning local, state and national elections. In 2000, after 71 years of uninterrupted period of PRI government, for the first time a PAN candidate, Vicente Fox, was elected for a six-year Presidential term.

²⁸ The Institutional Revolutionary Party (PRI) was founded in 1929 and held power uninterruptedly for 71 years, from 1929 to 2000. The PRI is not considered a social democratic party in the traditional sense. The PRI is the largest political party in Mexico according to membership. It could be considered a "state party" because it was characterised by its non-competitive history and the close connection between the party and the Mexican State.

Seeing that foreign fishers were fishing in the Actam Chuleb refuge, the locals started too to ignore the regulations in a ‘tragedy of the commons’ rationale described as “One looks after the refuge and they take advantage of it” (Personal interview) (“*Uno lo cuida y ellos se aprovechan*”).

The establishment of the Actam Chuleb fish refuge intuitively followed the seven mechanisms that were identified by Elinor Ostrom in enduring, self-governing common-pool resources (CPR) institutions. For example, (i) *clearly defined boundaries* (the fish refuge was clearly delimited); (ii) *congruence between appropriation and local conditions* (the refuge restricted fishing access to allow fish spawning and there was a provision rule that allowed extraction during “bad times”); (iii) *collective-choice arrangements* (which is closely related to procedural justice in that it establishes that most individuals affected by the operational rules can participate in modifying them); (iv) *Monitoring* (the communities had reached monitoring agreements); (v) *Graduated sanctions* (established by the community council), (vi) *Conflict-resolution mechanisms* (through the community council) and (vii), *Minimal recognition of rights to organize* (the rights of the appropriators to devise their own fish refuge was not challenged by external governmental authorities). The changes in environmental governance at the municipal level seem to have shattered the mechanisms of successful common-pool resources management introducing instead Hardin’s model of the tragedy of the commons.

5.2.2. Fisheries Dynamics in San Felipe municipality

The main economic activity in San Felipe is fishing. The fishing resources in Yucatán include close to 60 species (Bennett, 2017), but the local economy mainly rely on octopus (*Octopus maya* and *Octopus vulgaris*), lobster (*Panulirus argus*), grouper (*Epinephelus morio*) and, recently, sea cucumber (*Isostichopus badionotus* and *Holothuria floridana*).

Most fishers in Yucatán are small-scale, using fiberglass fishing boats of up to 12 m with outboard motors. According to Salas and others (2011), the fishing sector in Yucatán generates about 15,000 direct jobs. Fishing market plays an important role in fishing dynamics. The increase in market demand has boosted competition in the coastal areas and increased the number of newcomers from other regions into the fishing activity. Some authors associate the declining catches with factors such as increased fishing pressure, habitat deterioration and ineffective management practices. Also, a surge in frequency and intensity of hurricanes and red tides has added pressure to fisheries (Fraga et al., 2008; Salas et al., 2011).

A historical timeline of the Fisheries Dynamics in San Felipe municipality is presented in Table 5-4.

Fraga and others (2008) note that the concentration of the fishing effort in a limited number of species responds to the increased international market demands, which act as pressure forces for fisheries (Fraga et al., 2008; Salas et al., 2011).

Institutions influencing fishing dynamics in San Felipe, Yucatán

There are at least three ways in which small-scale fishers in Yucatán engage in the fishing activity: (i) as members of fishing cooperatives; (ii) as owners of fishing enterprises who employ people either as fishers or for fish processing and, (iii) as 'free' fishers who operate independently and individually and who don't have any organizational affiliation (Salas et al., 2011). Free fishers operate legally, when they have legal access to specific fisheries through fishing permits granted by the National Fisheries Commission (CONAPESCA) or illegally, when they operate without having the legal fishing permit.

Salas and others (2011) link these forms of organizational strategies with different coping capacities in case of crises. Cooperatives provide support in times of crisis for their members, thus, palliating the effects of unexpected circumstances and strengthening their coping capacity. According to primary data collected by Salas and others (2011), owners of fishing enterprises have developed more proactive (*ex ante*) coping strategies that include lending money to cooperative or free fishers, which provides them with future bargaining power, and, in addition, they have their own savings. Free fishers are the most vulnerable, as they are basically on their own when a crisis hit.

Table 5-4. Fisheries dynamics timeline. National and local level

1917 – The Mexican Constitution is promulgated. Article 27 states that the Nation is the original owner of the lands and waters within the boundaries of the national territory.

1924 – The Fisheries Law is published, defining the legal instruments to access fisheries.

1933 – The General Law of Cooperative Societies supports the creation of fishing cooperatives.

1947 – Cooperatives are granted exclusive access to commercially valuable species, such as lobster, octopus, shrimp, oyster, totoaba, abalone, mullet.

1970 – The first fishing cooperative in San Felipe is established ('Unidos de San Felipe'). The cooperative is granted exclusive access to lobster fishery.

1990 – The federal government announces the fisheries development bank BANPESCA bankruptcy.

1992 – Amendments to Article 27 of the Constitution granting private fishing permits through processes of competitive bidding. The Fisheries Law is modified, eliminating cooperatives' exclusive access to commercially-valuable species.

1994- The General Law of Cooperative Societies reduces the minimum size of cooperatives to just five members.

2000 – Political alternance (PAN party wins federal election for the first time)

2001 – The Fisherwomen Cooperative 'Working women of the Sea' is formed

2003 – National Action Party (PAN) wins the municipal election

2004 – The 'Unidos' Fishing cooperative splits up and the 'Fuerzas Vivas' community council stop gathering to solve compliance problems.

2005 – The fishing cooperative 'Legitimate Fishermen of San Felipe' is formed by ex-members of the 'Unidos' fishing cooperative.

In San Felipe, the majority of fishers belong to a fishing cooperative (Salas et al., 2011). There are two main fishing cooperatives in San Felipe: 'United Fishermen of San Felipe' (*'Pescadores Unidos de San Felipe'*, currently with 119 members), established in 1970 and 'Legitimate Fishermen of San Felipe' (*'Pescadores Legítimos de San Felipe'*, currently with 83 members), established in 2004 shortly after the National Action Political Party (PAN) won the municipal election. In 2001, the women-only fishing cooperative 'Working women of the Sea' (*'Mujeres trabajadoras del mar'*) was set up by 14 fisherwomen, focusing on species that serve as a bait for the octopus' fishery (Audefroy and Sánchez, 2017).

Cooperatives provide members with valuable benefits which include medical and life insurance, a bonus at the end of the year, and funerary expenses in case of death (Salas et al., 2011). In addition, members of cooperatives can get loans in case of unexpected circumstances (such as illness). These benefits counteract the fact that they get less money for their catch. Unlike cooperatives, which require collective decision-making and action, in fishing enterprises, as in patron-client relationships, individual fishers engage in informal contracts with patrons who possess fishing boats, fishing gear and legal access to fisheries through fish permits. In return, fishers are required to land all of their catch with the patron (Bennett, 2017).

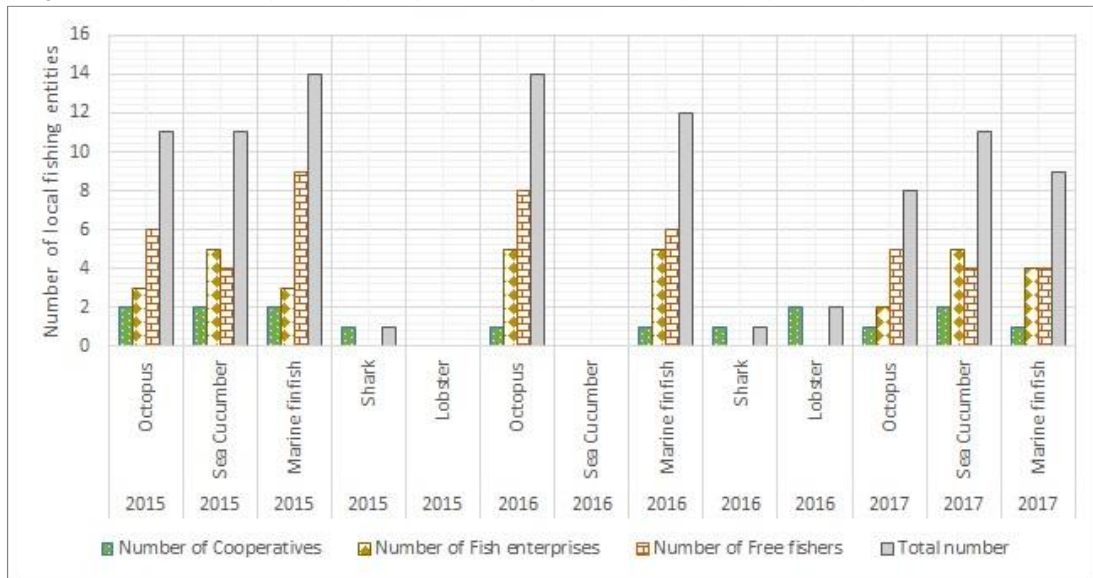
During the period from 2015 to 2017, a total of 32 local fishing entities were granted fishing permits of the main commercial species in San Felipe (CONAPESCA, 2018). Among these, two are the established cooperatives, nine are fishing enterprises and twenty-one are free fishers (Figure 5-3). Whilst access to the lobster²⁹ and shark fishery is still exclusive for cooperatives, one of the recurrent concerns expressed during the interviews was the increase in the number of fishing enterprises with legal access to other commercial fisheries. This observation is sustained by the official data (Figure 5-4), which shows higher number of fishing permits³⁰ for marine finfish in 2015 and 2017.

Different authors have documented remarkable efforts advanced by the fishing cooperative to conserve their fishing resources, for instance, the self-imposition of a minimum legal size for capturing lobsters, the agreement with the neighbouring fishing cooperative of Rio Lagartos to set a closed season for fishing lobster and octopus (Chuenpagdee et al., 2004; Doyon and Sabinot, 2014); the respect of fishing ban seasons (Huchim-lara et al., 2016), and the establishment of the Actam Chuleb marine reserve to prevent the decline in fisheries (Aguilar et al., 2012; Chuenpagdee et al., 2002, 2004; Martins de Jesus, 2007; Salas et al., 2014; Fraga and Jesus, 2008)

²⁹ For the lobster fishery each cooperative has their concession fishing zone and those fishermen who don't belong to a cooperative cannot fish for lobster.

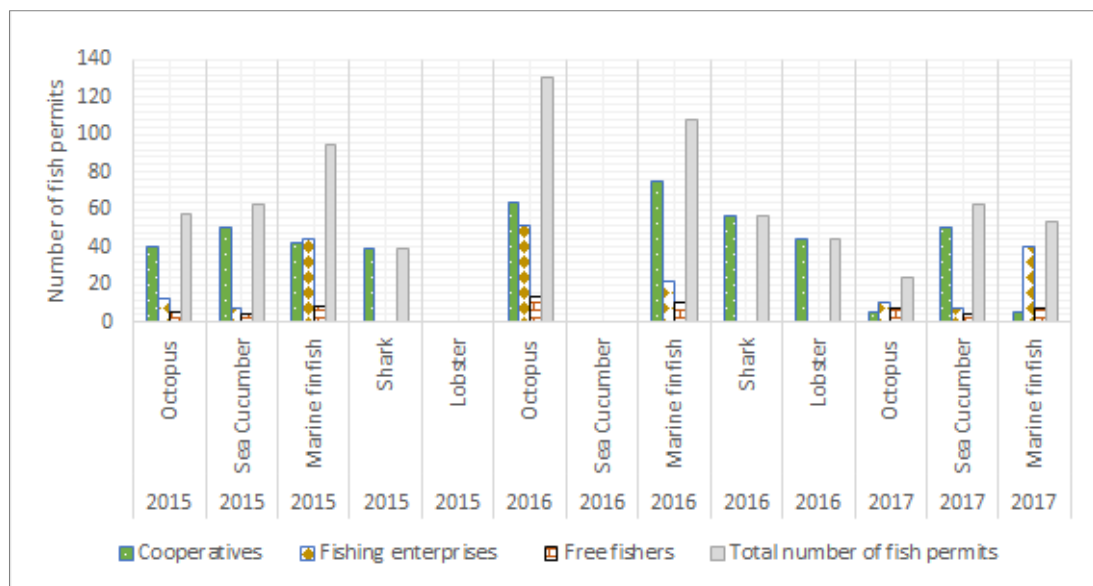
³⁰ Fishing permits have a duration of 2 to 4 years, period after which they must be renewed.

Figure 5-3. Number of local fishing entities granted with fishing permits from 2015 to 2017



Raw data source: CONAPESCA, 2018

Figure 5-4. Number of fishing permits granted in San Felipe from 2015 to 2017



Raw data source: (CONAPESCA, 2018)

5.2.3. Hydrology

San Felipe is located within the estuarine lagoon system called Ria Lagartos which is protected by the Ria Lagartos Biosphere Reserve. Ria Lagartos Management Plan highlights the threats of water over extraction, the change in water flows and the pollution of subterranean water flows (CONANP, 2007, p.12). Polanco Rodríguez and others (2015) note that the karstic nature of the landscape makes groundwater very vulnerable to pollution and constitutes an important flow for the transport of pollutants. This is aggravated by the deforestation rates that have promoted soil erosion, easing filtration of agrochemicals to groundwater. This represents a risk factor, given that there are over 3000 sinkholes which are often the only water drinking source for local communities.

Polanco-Rodríguez et al. (2015) argue that the Northeast and East of the Ring of Cenotes³¹, precisely where the study area is located, is a livestock area highly vulnerable to the persistent organochlorine pesticide (OCP) pollution due to the high permeability to the groundwater (Polanco-Rodríguez et al., 2015) and the increased vulnerability of the area due to intensive farming and agricultural activities. In line with the Stockholm Convention, OCPs have been banned in many high-income countries; however, they are still in use in Mexico and other low-income countries.

In 2011, Polanco and others reported that women with cervix uterine cancer in 18 Yucatán municipalities showed high levels of pesticides in the blood, including banned OCPs such as endosulphan, aldrin, DDD and heptachlore (Polanco et al., 2011). In a further study, Polanco (2015) report the presence of 14 OCPs³² and their metabolites in water samples taken from cenotes in concentrations above the established by the Official Mexican Norm. The spatial pattern of pesticides concentrations shows high concentrations of heptachlor and lindane in the municipality of Dzilam, which is the discharge zone of the Ring of Cenotes and which is located.

Polanco-Rodríguez et al. (2005) found evidence that banned chemicals are excessively handled by farmers in agricultural activities and by women in backyard crop production, and that people are neither aware nor concerned about the exposure to toxic agents and that “it seems that farmers do not realize that the effects of chronic exposure to a contaminant may occur years later in the form of cancer, birth defects or as neurological damage” (Polanco-Rodríguez et al., 2015). These studies suggest a latent hazard linked to the presence of OCPs not only to human health but also to the aquatic and terrestrial biodiversity of the area (Polanco-Rodríguez et al., 2015).

³¹ The Ring of Cenotes is recognized as a Ramsar site (No. 2043) (Ramsar Convention, 2012) and is a National Priority Hydrological Region (No. 102)

³² α -endosulfan, β -endosulfan, dieldrin, 4,4'DDE, 4,4'DDD, endrin, endrin aldehyde, endosulfan sulphate, 4,4'DDT, heptachlor, α -lindane, β -lindane, γ -lindane, δ -lindane (Polanco et al, 2015)

In the municipality of San Felipe there are five cenotes (sink-holes): Rancho San Diego, Santa Cruz, San José, Santa Teresa and Kambul Nah (Municipio San Felipe, 2015). The only available treatment for drinking water, which comes from a nearby cenote, is chlorination for the biological control of pathogens, but not for pesticides. By the time when this study was conducted, respondents mentioned that the chlorination plant was not working properly, and the piped water was not used for drinking purposes. It usually has a reddish-brownish colour which the local inhabitants attribute to oxide in the pipes which have not received appropriate maintenance.

5.3. The Social Environment

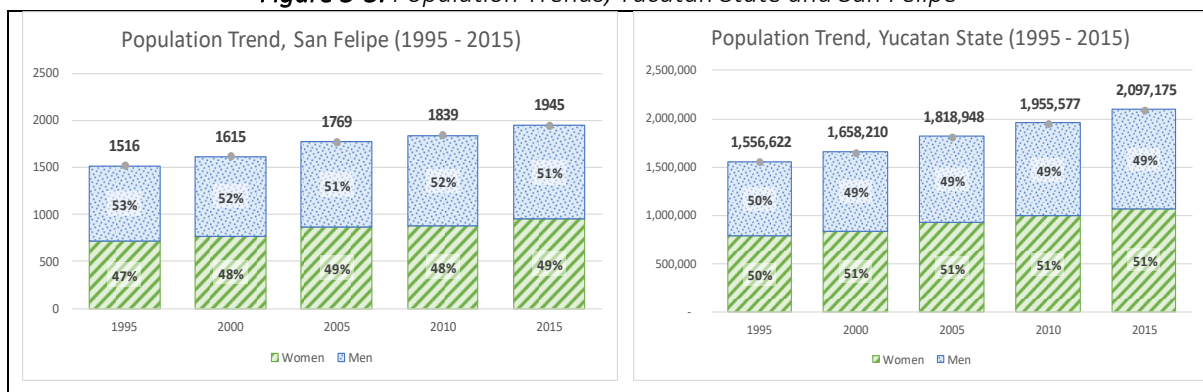
5.3.1. Demographic attributes: San Felipe municipality

The demographic analysis presented in this section is based on the analysis of secondary data from the last three census, conducted in 1990, 2000 and 2010 (INEGI, 1990, 2000, 2010) and the last three intercensal surveys, conducted in 1995, 2005 and 2015 (INEGI, 1995, 2005, 2015).

Population

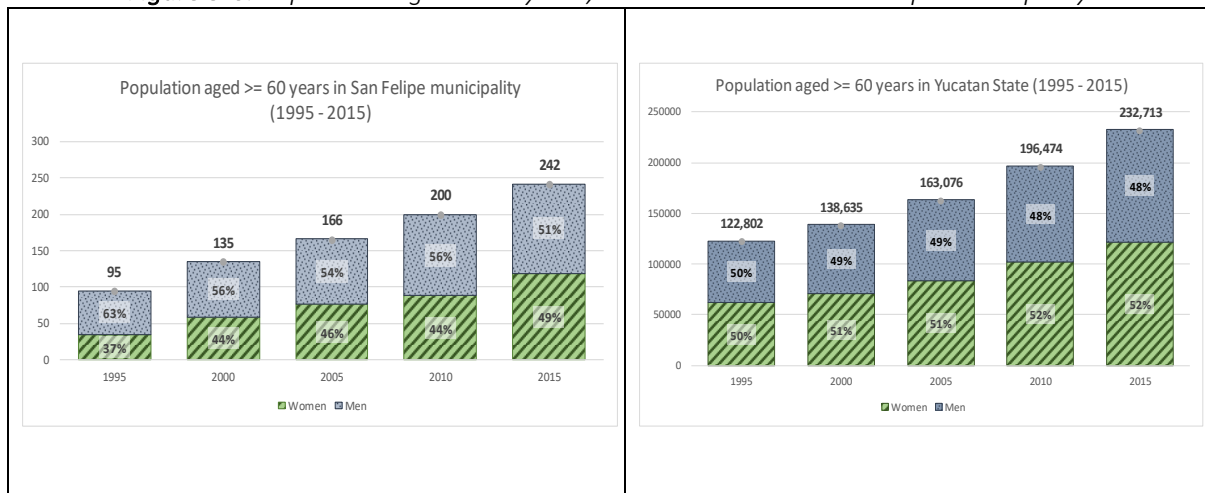
According to the last intercensal population survey (INEGI, 2015), in 2015, San Felipe had a population of 1945 inhabitants, 51% male, and 49% female. Over the years, San Felipe has shown a relatively constant growth with an average net increase of 24 people per year (Figure 5-5). In comparison with Yucatan State, San Felipe has a lower proportion of women than men. One of the reasons might be the higher longevity of men, most noticeable in 1995, and progressively improving for women over the years (Figure 5.6). In relation to the total San Felipe population, the percentage of people aged 60 or more has increased from 6.27% in 1995 to 12.44% in 2015.

Figure 5-5. Population Trends, Yucatan State and San Felipe



Data retrieved from INEGI Databases (INEGI, 1995, 2000, 2005, 2010, 2015)

Figure 5-6. Population aged >=60 years, Yucatan State and San Felipe municipality

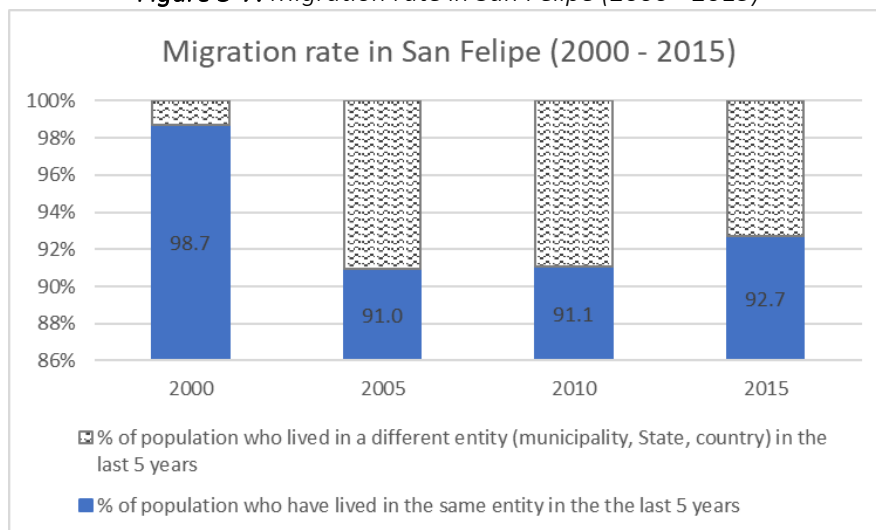


Data retrieved from INEGI Databases (INEGI, 1995, 2000, 2005, 2010, 2015)

Migration

During my fieldwork, at every different stage, one recurrent concern expressed by San Felipe inhabitants was the increase in the number of people from other Yucatan municipalities and other Mexican states, mainly seasonal fishers (considered outsiders), who year after year arrive to the coast town during the octopus and sea cucumber fishing season. The data from the censuses show an increase in the proportion of people who lived in different entities, mainly arriving from Quintana Roo, Veracruz and Campeche. This increase is particularly noticeable during the period from 2000 to 2005 and has remained stable since then (Figure 5-7)

Figure 5-7. Migration rate in San Felipe (2000 - 2015)



Data retrieved from INEGI Databases (INEGI, 1995, 2000, 2005, 2010, 2015)

Different authors have reported different flows of labour migration into coastal communities in both western and eastern Yucatán. One of these flows corresponds to the 1970s, when inland communities in Yucatán suffered the consequences of the State decision of cutting the subsidies for the henequen industry, which was such an important agricultural crop that made Yucatán one of the wealthiest states in Mexico (Bennett, 2017). After most henequen fields ceased to operate, newly unemployed agricultural workers, encouraged by the Integral Program for Rural Development, a new economic policy designed to promote the diversification of economic activities, migrated to western coastal towns to become coastal fishermen (Solís et al., 2015). Bennet (2017) notes that fishing towns in eastern Yucatán, such as San Felipe, whose inland communities were largely dedicated to ranching were to some extent shielded from this migration wave.

Bjørkan (2009) identifies another migration wave to the Yucatan coast in 1992, after the amendments of Article 27 of the Constitution, granting private fishing permits through processes of competitive bidding and the modification of the Fisheries Law, eliminating fishing cooperatives' exclusive access to commercially valuable species. Bjørkan (2009) argues that it was mainly landless farmers who migrated, stimulated by the idea of entering newly open-access fisheries such as the octopus fishery.

However, when expressing their concerns about increased migration, research participants were not referring to these two migration waves. They consistently described an escalation of seasonal fishers, intensified by the opening of the sea cucumber fishery. This could be considered as a third migration wave, which differs from the previous ones in that it is not a permanent migration but marked by the annual arrival of seasonal fishers during the octopus and sea cucumber fishing seasons. The increase in the seasonal human migration has been catalysed by the commercialization of sea cucumber into export markets.

Bennet and Basurto (2018, p.59) report that in 2006 and in 2010 through 2012, the National Fisheries Commission (CONAPESCA), permitted harvests of sea cucumber (*Isostichopus badionotus* and *Holothuria floridana*) "under fishery development permits to evaluate the commercial and ecological viability of the fishery". After this evaluation, in 2012, the National Fisheries Institute (INAPESCA) determined that there were commercially viable populations of *I. badionotus* but not *H. floridana*, and the first commercial fishing permits were issued for four short seasons in April – May and November – December, 2013 and February – March and April, 2014. The possibility of entering to this high-value fishery context favoured the expansion of individual entrepreneurs (patrons) who own fishing capital and provide access to fishing livelihoods to individuals who are not members of a cooperative or who lack the needed fishing capital (e.g. fishing permits, vessels, fishing gear) (Bennett and Basurto, 2018, p.59). In this way, Yucatan coast towns where high-value commercial fishing species are found (e.g. sea

cucumber, octopus), such as San Felipe, have seen the seasonal arrival of fishers from other regions during fishing seasons. For example, in Celestún, an eastern Yucatan coast town, Bennet and Basurto (2018) report that 81 patrons employed a total of 2013 fishers, while the three active cooperatives employed a total of 31 members.

The local inhabitants ascribe many social changes to this seasonal human migration. These complaints have been documented by different researchers (Bjørkan, 2009; Salas et al., 2014). During my fieldwork, local inhabitants mentioned that after the opening of the sea cucumber fishery and the associated arrival of seasonal fishers, there is more competition for the fishing resources, there are more fishing vessels, and there are people who are not members of the community, *outsiders*³³ who try to catch as much as possible, not abiding the traditionally well-observed fishing rules (such as respecting minimum size and bans). Local inhabitants complain that they have looked after their fishing resources, have established minimum fishing sizes, have respected fishing bans, have established the fish refuge (Actam Chuleb MPA), and now newcomers and outsiders are taking advantage of their well-conserved resources (*“Uno lo cuida y otros lo sacan”*).

In addition to the problems associated with the fishing activity, local inhabitants report that *outsiders* (*“foráneos”* as they call them) do not follow the same social norms, such as keeping the streets clean and maintaining the local order, and because *outsiders* are not considered members of the community, they are excluded from the support and the solidarity networks of the community. The fact that there are people who are not considered members of the community increases the feeling in the local inhabitants that the community is not as cohesive and homogeneously supportive as it was in the past.

During my interviews, there was a constant idealization of the time before the sea cucumber fishery. San Felipe inhabitants are very proud of the natural beauty of their town; of the colourful wooden houses that distinguishes the cleanness of their streets; of the quality of the air, and, above all, of the social cohesion and the strong trust and support networks they have. *“No one dies of hunger here”* (*“Nadie muere de hambre aquí”*). *“Everyone helps each other in case of need”* (*“Todos se ayudan en caso de necesidad”*). These statements were repeated by the respondents, as an example of the high level of community support and solidarity.

Social cohesion in San Felipe faced a first challenge after the political alternance in 2000, where the ruling political party (PRI) lost the election and opened the door to PAN as a ruling power. However, respondents described that, during this time, even when the members of the community had acute

³³ Locally, the term *outsider* (*“foráneo”* in Spanish) includes mainly fishers from other Mexican entities, such as Veracruz, Quintana Roo and Campeche, and in a second place to fishers from other Yucatán municipalities.

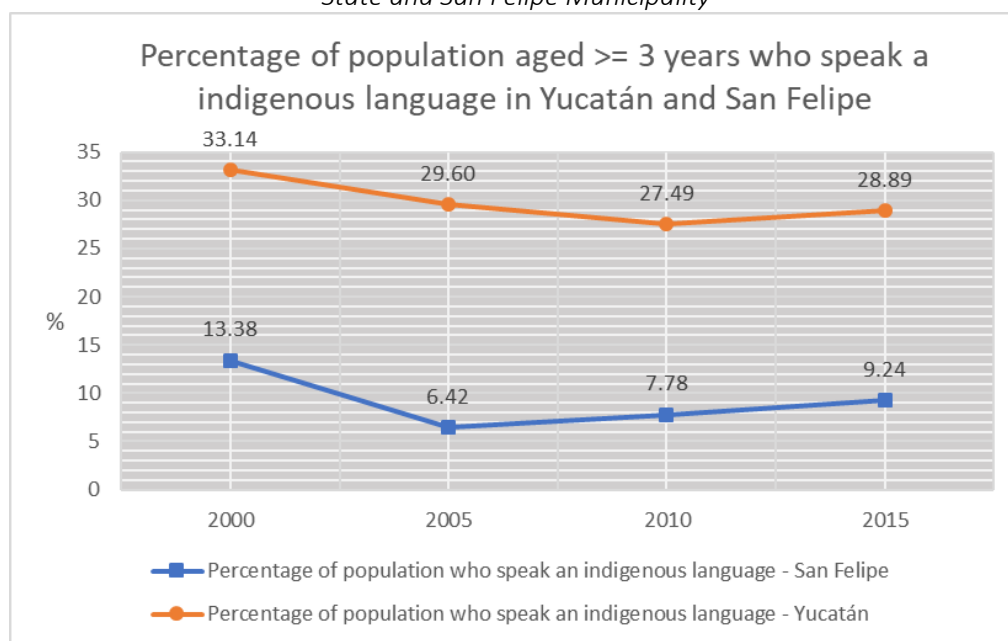
political differences, the community could overcome the political divisions when faced by challenges and need. A story that I heard multiple times is the way in which community members help each other in case of illness or need. If someone is ill or in need, everyone collects money to help. If the ill person is elderly or alone, the neighbours cook and bring food.

In 2016, during one of my fieldwork trips, I witnessed this activity once. While I was conducting an interview, someone knocked at the door and asked for help for someone who had fallen ill and needed to go to the hospital in Mérida. Without asking, the elderly woman went for her purse and donated money to help.

Ethnicity and indigenous languages

According to INEGI (1995), Mayan language represents 99.75% of the language spoken by those who speak an indigenous language in the State of Yucatán³⁴. Consistently, in San Felipe the only indigenous language is Mayan. The proportion of people who speak Mayan in San Felipe decreased from 13.38% in 2000 to 9.24% in 2010. However, in both, Yucatán State and San Felipe, the last years have shown slight increase in the proportion of people who speak an indigenous language.

Figure 5-8. *Percentage of population aged >= 3 years who speak an indigenous language in Yucatán State and San Felipe Municipality*



Data retrieved from INEGI Databases (INEGI, 2000, 2005, 2010, 2015)

³⁴ The other languages spoken to a much lower extent are Chol, Chontal of Tabasco, Huichol, Mayan, Mayo, Mazahua, Mixe, Mixteco, Náhuatl, Totonaca, Tzeltal, Tzotzil and Zapoteco.

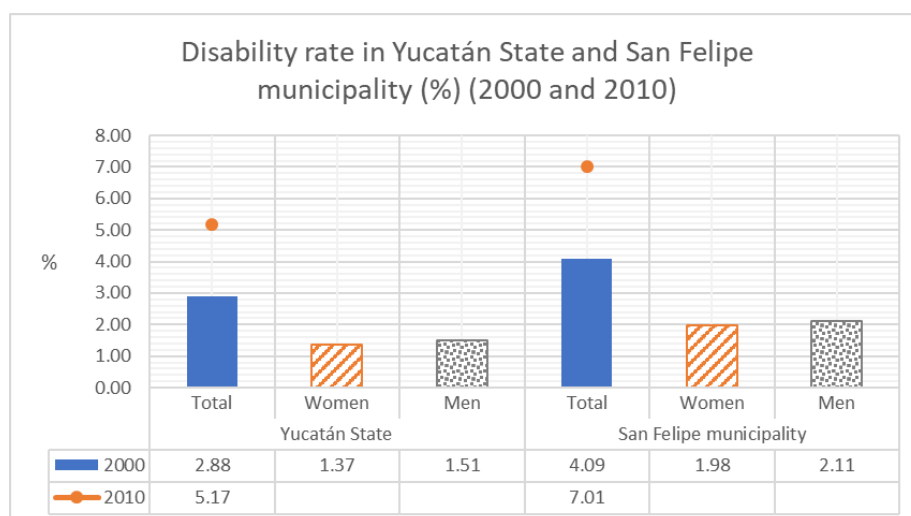
The 2005 and 2010 census data show that 20% and 18%, respectively, of the population who speak Mayan in San Felipe municipality live in localities of one household that are scattered in the municipality and don't live within the area of any town. It is important to note that the census databases disaggregate data for localities of only one household only in the years 2005 and 2010, which makes it difficult to track the historical trends of demographic characteristics and social exclusion of these households (Figure 5-8).

Until 2015, ethnicity was measured through household surveys collecting information about the number of people who speak an indigenous language. In 2015, the intercensal questionnaire was modified to collect information regarding self-described ethnicity in addition to the ability to speak an indigenous language. Therefore, the data from 2015 intercensal survey shows that, interestingly, while only 9.24 % of San Felipe inhabitants speak Mayan, 81.6% self-define as Mayan (INEGI, 2015).

Disability rate

Gender-disaggregated data about disability in San Felipe was only found in the 2000 census database. The 2010 census data includes disability rates but is not gender-disaggregated. Figure 5-9 shows that in 2000, in San Felipe municipality 4% of the population (1.98% women and 2.11% men) had a physical disabling condition (mobility, visual, hearing, language, learning impairments or mental health difficulties), and in 2010 the rate raised to 7%. In comparison with Yucatan State figures, disability rates are higher in San Felipe municipality. In 2000, for example, the disability rate (total) at the Yucatán State level was 2.88 whereas for Yucatán was 4.09. In 2010, the disability rate increased to 5.17% at the State level, but was still lower than in San Felipe, where the disability rate raised to 7%.

Figure 5-9. Disability rate in Yucatán State and San Felipe municipality (%) (2000 and 2010)

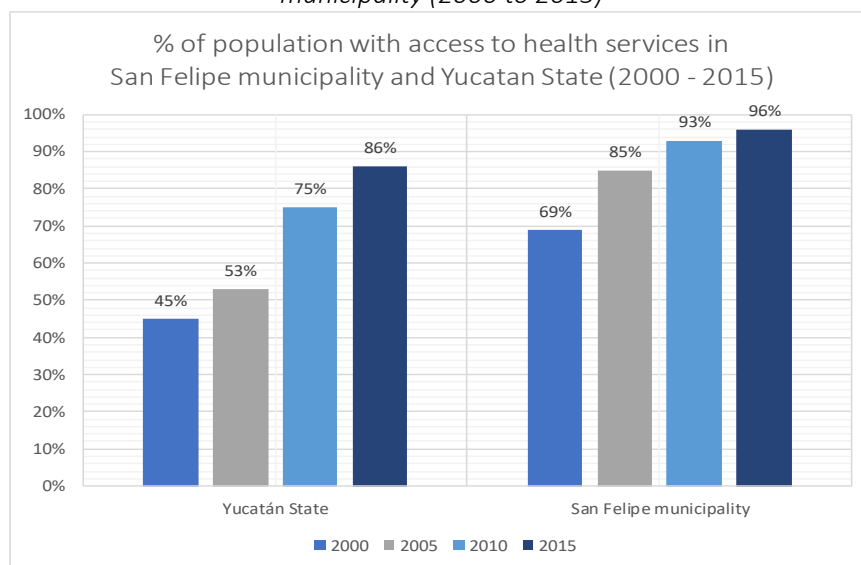


Data retrieved from INEGI Databases (INEGI, 2000, 2010)

5.3.2. Access to health services

In San Felipe, there are two health units: one provided by the Popular Health System, and the other provided through the State health system, IMSS. According to censuses data, over the years, the access to health services has increased from 45% in 2000 to 86% in 2015 in Yucatán State, and from 69% to 96% in San Felipe municipality (Figure 5-10).

Figure 5-10. Percentage of population with access to health services in Yucatán State and San Felipe municipality (2000 to 2015)

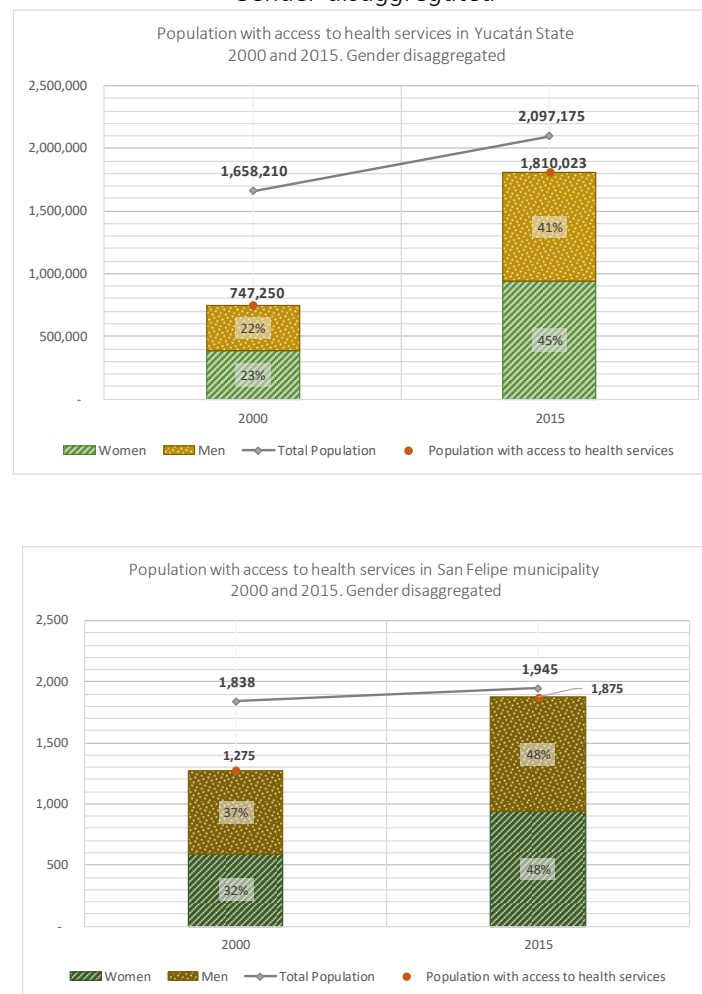


Data retrieved from INEGI Databases (INEGI, 2000, 2005, 2010, 2015)

Gender-disaggregated data of access to health services is only available for 2000 and 2015. In San Felipe, the trend shows a slightly higher access to health services for women (37%) than for men (32%) and a balanced access (48%) for both groups in 2015 (Figure 5-11). In comparison with Yucatán, official figures show that San Felipe has better access to health services. This could be explained by the fact the State-level figures include the poorest and most marginalized municipalities of Yucatán.

As mentioned earlier, disaggregated data showing access to health services of localities of only one household is only available in the census of 2005 and 2010, which shows that, in 2005, 17% of those without access to health services live in these scattered households. In 2010, the lack of health services access was reduced to 9% in these households. The local perceptions regarding health access adds depth to the story told by the national figures. While respondents in San Felipe recognize the positive aspect of the increased access to the Popular Health System, they rather put attention on the quality of the service and the actual delivery of the health service.

Figure 5-11. Access to health services in Yucatán State and San Felipe municipality. 2000 and 2015. Gender-disaggregated



Data retrieved from INEGI Databases (INEGI, 2000, 2015)

Regarding quality, respondents consider the Popular Health System insufficient, as the number of doctors is limited, the medications are not always available, and the medical equipment only cover very basic conditions. For urgent or grave health matters, they must travel either to Tizimín or to Mérida, where specialized medical equipment is available.

A better perception of quality is regarded to the health service offered by the IMSS, which is the health service provided as a social benefit in the fishing cooperatives. However, it shares the same problem of having limited medical equipment to treat urgent or grave conditions, and therefore, people must often travel to Tizimín or Mérida. To help with the cost of transport, the municipal authorities offer to travel in the municipal ambulance paying a reduced price (\$50 pesos in 2016) in comparison with the normal bus and “combi”³⁵ services.

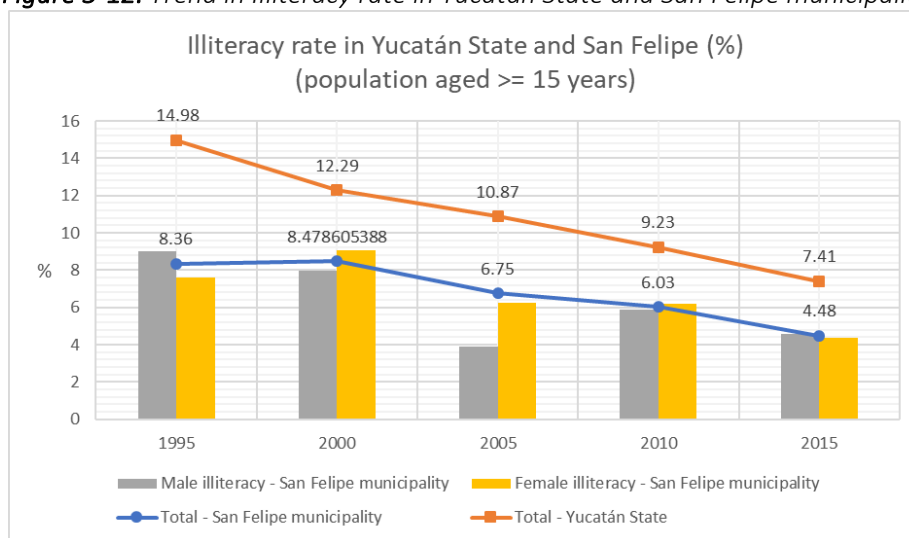
³⁵ A “combi” is the local term to refer a passenger’s van.

In fishing towns, especially those that use diving as a fishing technique, such as San Felipe, an essential emergency medical equipment is a hyperbaric chamber to treat decompression sickness, which is the main cause of death in young people in San Felipe, according to the local doctor of the Popular Health System (personal communication).

5.3.3. Literacy and access to education

Since 1995, illiteracy rates have halved in Yucatán State and San Felipe Municipality (Figure 5-12).

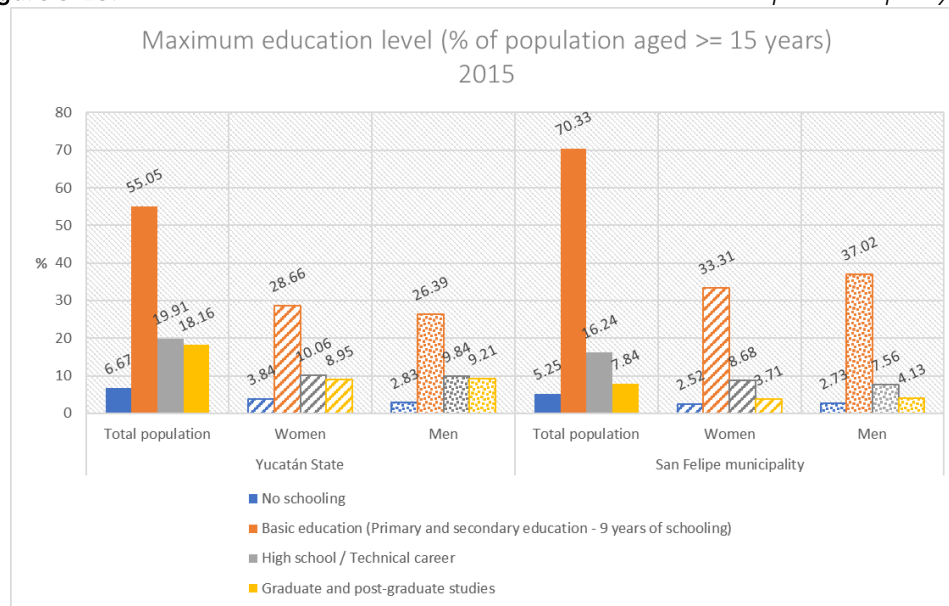
Figure 5-12. Trend in Illiteracy rate in Yucatán State and San Felipe municipality



Data retrieved from INEGI Databases (INEGI, 1995, 2000, 2005, 2010, 2015)

San Felipe has one pre-school, one elementary school (6 years of schooling) and one secondary school (3 years of schooling). Together, pre-school, elementary and secondary school, constitute the mandatory basic education which is offered as a public service by the State, as required by Article 3 of the Constitution. The largest proportion of school-educated population in San Felipe (70.33%) has reached a maximum education level of elementary and secondary school (basic education). This proportion is larger than for Yucatán State, in which larger proportions of school-educated population reach high school (19.91% compared to 16.24% in San Felipe) and graduate and post-graduate studies (18.16% compared to only 7.84% in San Felipe) (Figure 5-21).

During my interviews, I asked the reasons for not continuing school-education. The answers have in common the fact that there is no high-school in San Felipe and people must travel to Rio Lagartos, Panabá or Tizimín if they want to continue their education. This implies additional travel time and travel and food expenses, if they decide to attend to the nearest town Rio Lagartos, when they can commute every day. If they aim to go to Tizimín, the larger city with more school options, then they must add accommodation expenses.

Figure 5-13. Maximum education level in Yucatán State and San Felipe municipality (%)

Data retrieved from INEGI Databases (INEGI, 2015)

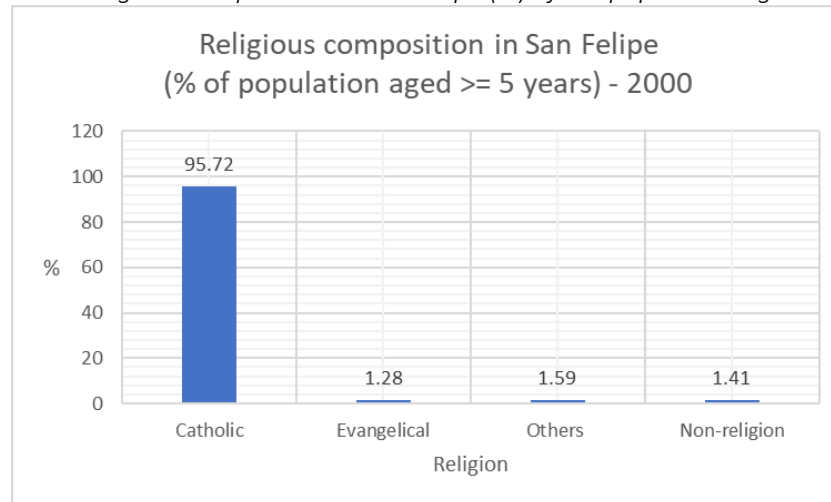
The geographic location of the high-schools and universities represents a challenge for the local population who do not cope with this challenge homogeneously. Some female respondents who expressed they would have wanted to continue their education told me that their parents/grandparents didn't see the case to spend additional funding for their education. In one case, I met a woman, very bright and clear minded, who perfectly understood each of my interview and ranking questions and who asked me the kind of questions of a person who has not only understood the issue but has already found her own opinion. She wanted to become a doctor and she described with a sense of despair the moment when she won one of the five scholarships offered by the State in her hometown Tabasco to continue studying high-school. She didn't get the scholarship because her grandfather refused to sign the acceptance form with the argument that she was needed to work in the agricultural fields.

In most cases, the reason mentioned for dropping out of school was plainly the lack of money. But this decision is made in a context where the opportunity cost to continue studying is very high. Most fishermen start bringing their children to fish with them when they are in secondary school and the young kids start earning money and contributing to the family income. Even when the interviews reflect that most of the fishermen don't want their children to become fishermen, the alternative options are still very vague for them. In addition, in San Felipe, higher education does not always represent better possibilities to improve life quality or to improve income. Most respondents considered education as a mean to access alternative economic activities and fewer considered academic education important to "understand things" or to be intrinsically valuable.

5.3.5. Religious composition

Religious composition in San Felipe is quite homogenous, with 96% of the population identified as Catholic (Figure 5-14). Some authors identify this religious homogeneity and San Felipe's close kinship relations, as some of the reasons for its high social organization (Martins de Jesus, 2007), especially before 2003, when the community split up in two groups, when the National Action Party (PAN) won the municipal elections.

Figure 5-14. Religious composition in San Felipe (%) of the population aged ≥ 5 years



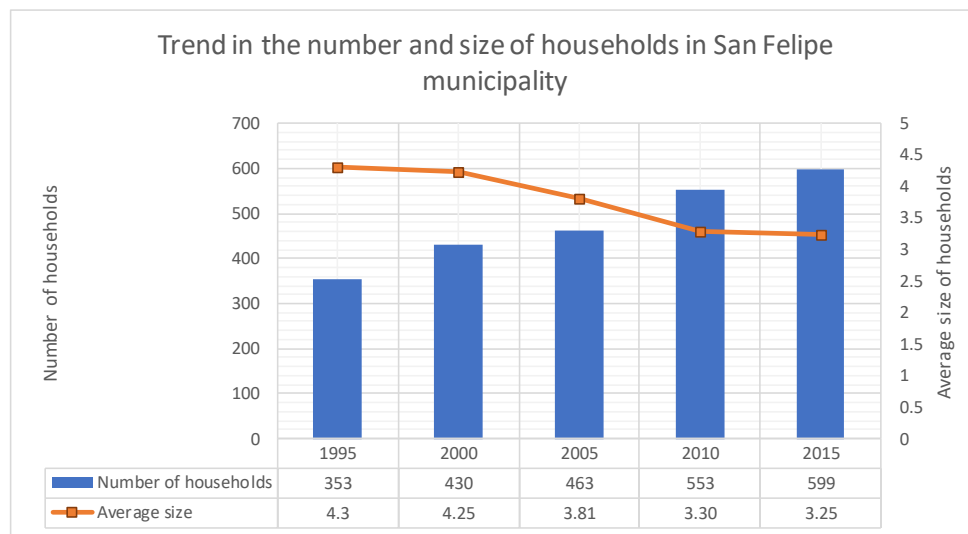
Data retrieved from INEGI Databases (INEGI, 2000)

During the interviews, some people agreed with this observation, describing that, “before the political differences started” (pers. comm) people attended mass on Sundays, where the whole community met and greeted each other, and after mass, they gathered to talk or have lunch together. It was this moment when shared collective and individual challenges were identified and discussed (pers. comm.)

5.3.6. Households

The number of households in San Felipe municipality has increased from 353 in 1995 to 599 in 2015. In 2015, 31 households were isolated, scattered households outside localities with more than two households (Figure 5-15).

In 2005, a state-program for affordable housing, through the federal institute for workers' housing INFONAVIT, built a housing development in the edge of San Felipe and provided a subsidy program for young couples without housing. This might partially explain the reduction on the average size of households during the period from 2005 to 2010. It is important to note that, as described in Section 5.2.1, San Felipe's urban growth is prohibited by the Ria Lagartos Biosphere Reserve's Management Plan. Consequently, the growth slope is lower than for Yucatan State. During the interviews, this restriction was considered highly unjust, as will be detailed in Chapter 8.

Figure 5-15. Trend in the number and size of households in San Felipe municipality (1995 – 2015)

Data retrieved from INEGI Databases (INEGI, 1995, 2000, 2005, 2010, 2015)

In a similar way to the case of education, the available options to cope with the challenge of the lack of housing highly depends on the characteristics of different groups. Respondents report that influential individuals can overcome the restrictions imposed by the authorities and it was clear that they have very specific examples of who and where influential people were destroying the wetland to build their houses without any kind of restriction. They also mentioned examples of community members who did the same and who were imposed unpayable fees, had their construction equipment and materials taken away and their house officially closed.

For community members who own a house, a common, but regarded as a non-ideal solution, to overcome the lack of available housing is to split up the parental house to allow younger families to live there. So, it was frequent to find that, behind a house door, two or three different families live. From the research perspective, this posed a challenge for the original standardized sampling frame which was based on interviewing every fifth house. My research assistant, Lulú, helped me to identify the number of differentiated households that live behind one door, thus, allowing me to include all of them in the sampling frame. For community members who don't own a house, a common strategy is to move out of San Felipe to the nearest town of Panabá, which is also regarded as a non-ideal solution because Panabá is not a fishing town, but the rents are cheaper there.

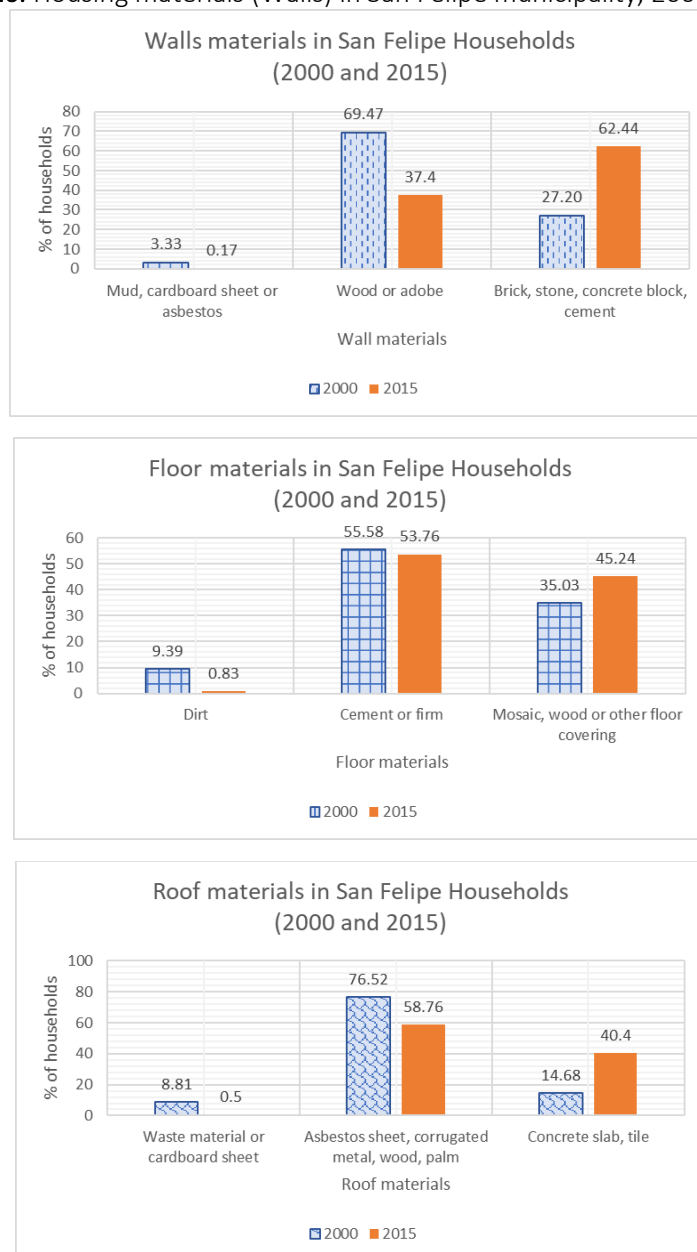
Household characteristics

Household materials

The census data only show disaggregated data for localities of one household in 2005 and 2010, and during those years, the census data didn't include information about housing materials. The available data show that from 2000 to 2015, the percentage of households in San Felipe with dirt floors decreased from 9.39% to less than 1%, whereas the flooring made with mosaic, wood or another floor covering increased from 35% to 45%. In addition, it shows a reduction of the proportion of houses with wood or adobe walls (from 69% in 2000 to 37% in 2015) and more than a twofold increase in the proportion of houses with brick, stone or concrete walls (from 27% to 62% in 2015) (Figure 5-16).

The official story tells that this represent an improvement in housing conditions. Information collected during my interviews show that local perceptions assign more value to houses made of wood, which is regarded as more useful to keep the housing cool and fresh in times of very hot weather and is more resistant to salty conditions than brick and concrete walls. Audefoy and Sánchez (2017, p.236) report that "local inhabitants, despite being aware that wooden houses are more comfortable to live in and better adapted to the tropical heat, think about rebuilding them with concrete blocks and roofs". Concrete walls, despite being highly susceptible to salt residues can better cope with the threat of hurricanes. In addition, insurance companies do not insure wooden houses. During my interviews, this fact was mentioned with some tribulation because, as mentioned earlier, San Felipe inhabitants are very proud of the characteristic colourfulness of the wooden houses in their town, and it still seems a hard choice to make between the comfort provided most of the year by a locally-considered beautiful, ventilated and resistant-to-salty-conditions housing and the strength and resistance-to-hurricanes provided in few occasions by the brick and concrete houses.

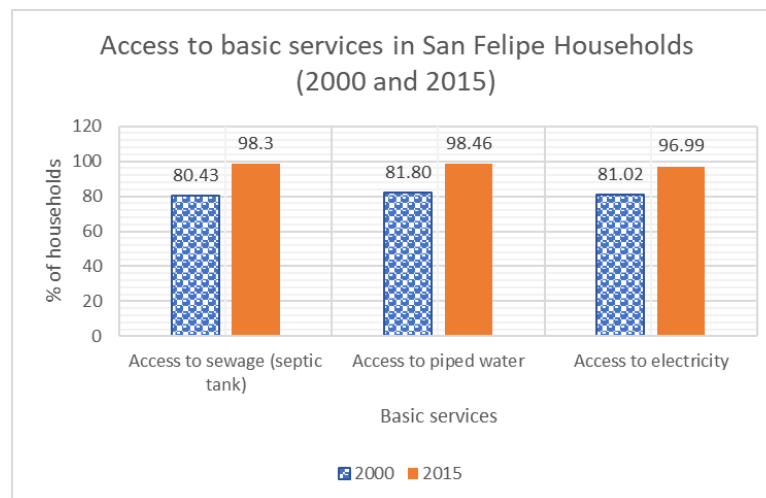
Another characteristic feature in San Felipe's traditional housing is the asbestos sheet roof, which, according to the local doctor is a health risk factor for the local population. The local population seem to be unaware of the risks posed by asbestos. The proportion of asbestos roofs have decreased from 76% in 2000 to 58% in 2015 (Figure 5-16). This trend could be partially related to the construction in 2005 of the State-subsidized housing which used brick and concrete materials rather than the traditional wooden walls and asbestos sheet roofs.

Figure 5-16. Housing materials (Walls) in San Felipe municipality, 2000 and 2015.

Data retrieved from INEGI Databases (INEGI, 1995, 2000, 2005, 2010, 2015)

Access to basic services

As shown in Figure 5-17, according to census data, the proportion of households with access to sewage, piped water and electricity has increased from 2000 to 2015. However, it's important to note that the lack of disaggregated data of those scattered households in the municipality which lay outside the communities might hide some marginalized conditions. For example, the 2010 census data, which includes disaggregated data, shows that 90% of the households without access to electricity are in these localities of one household (17 households out of 19). In addition, they represent 76% of the households without sewage (16 out of 21) and 90% of the households without water in the dwelling (19 out of 21) (INEGI, 2010).

Figure 5-17. Access to basic services in San Felipe (2000 and 2015)

Data retrieved from INEGI Databases (INEGI, 1995, 2000, 2005, 2010, 2015)

The story told by official figures differs from the lived experience of access to water in the dwelling. The water available in the households is not used for drinking. In some cases, it is used for washing the dishes and for taking showers. It has a brownish, tarnished colour which the local inhabitants attribute to the oxide accumulated in the pipes. Others attribute the low quality of the water to the lack of maintenance of the pipes and the chlorination plant. Few others mentioned the risks of pesticides used in the fields and the pollution of the cenote (sink-hole), which supplies water to the community.

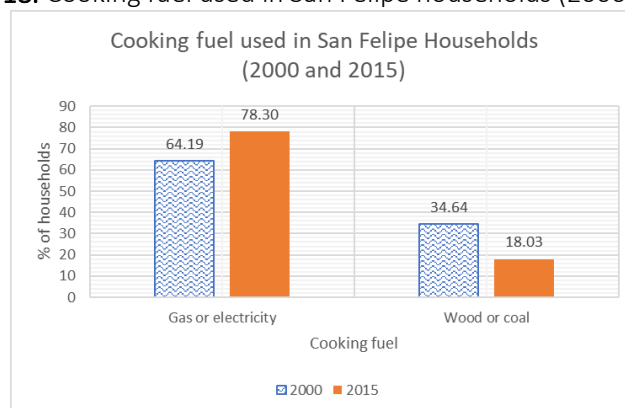
Coping strategies to overcome the challenge of low-quality water also varies. There are three different types of bottled water available. The most expensive (\$28) comes from Mexico City and uses a purification plant based there. The local doctor has advised local inhabitants who suffer from kidney stones or renal insufficiency (which are very common diseases in San Felipe), to only drink this brand of bottled water. Another water bottled brand comes from Mérida (\$23), and the cheapest, and most popular one, comes from Tizimín (\$12).

The great majority of people in San Felipe drink bottled water. The quality of water consumed depends on many factors, such as the economic possibilities and the presence of illness. I met families who bought different types of water bottles, reserving the most expensive for ill people and infants. During the second stage of fieldwork, I collected information (through the 90 semi-structured interviews) of the number and brand of the bottled water consumed in the household per week.

The results show that in average, households spend MX\$21.5 per week per person in bottled water (MX\$86 monthly/person). Compared to the monthly minimum wage for 2016³⁶ (when the data collection was conducted), the bottled-water expenses correspond to 4% of the minimum wage for 2016 for a single-person household and 16% of a 4-person household.

According to census data, from 2000 to 2015 the use of gas has increased from 64% to 78%, while the use of wood or coal has reduced from 34% to 18% (Figure 5-18).

Figure 5-18. Cooking fuel used in San Felipe households (2000 and 2015)



Data retrieved from INEGI Databases (INEGI, 2000, 2005)

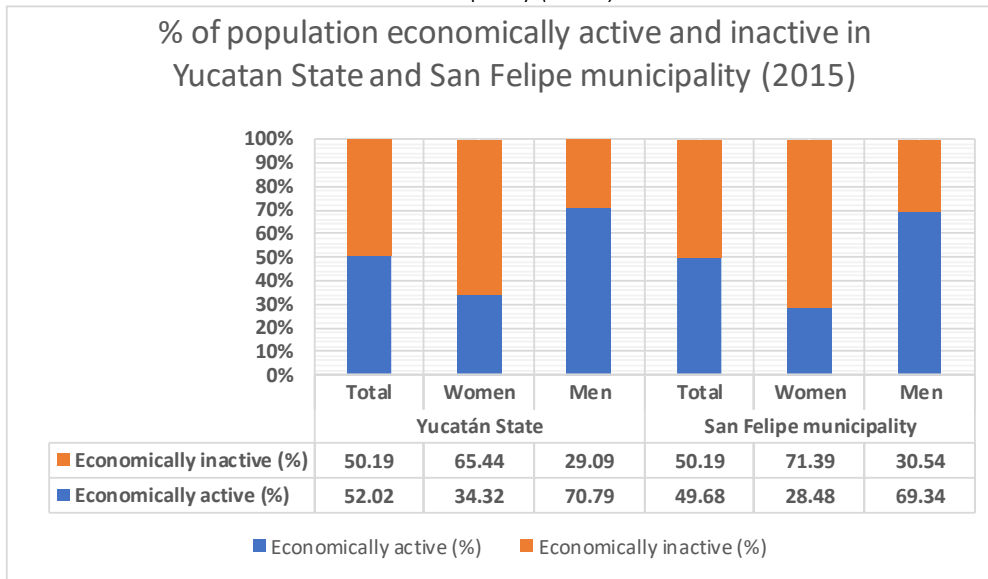
5.3.7. Economic Activities

According to census data, in 2015, 50% of the total population in San Felipe was economically active. From the total of female population aged 12 or above, 71% was economically inactive, which is a higher proportion than the figure for Yucatan State (65%). In comparison, 69% of the male population aged 12 or above was economically active (Figure 5-19).

The main economic activity in San Felipe is fishing. Tourism is commonly carried out by fishers as a secondary economic activity. As shown in Figure 5-19, 64% of male population is engaged in the primary sector, mainly fisheries, while 54% of the female population which is economically active (28% of the total female population) is dedicated to services (which include transport, government and other services).

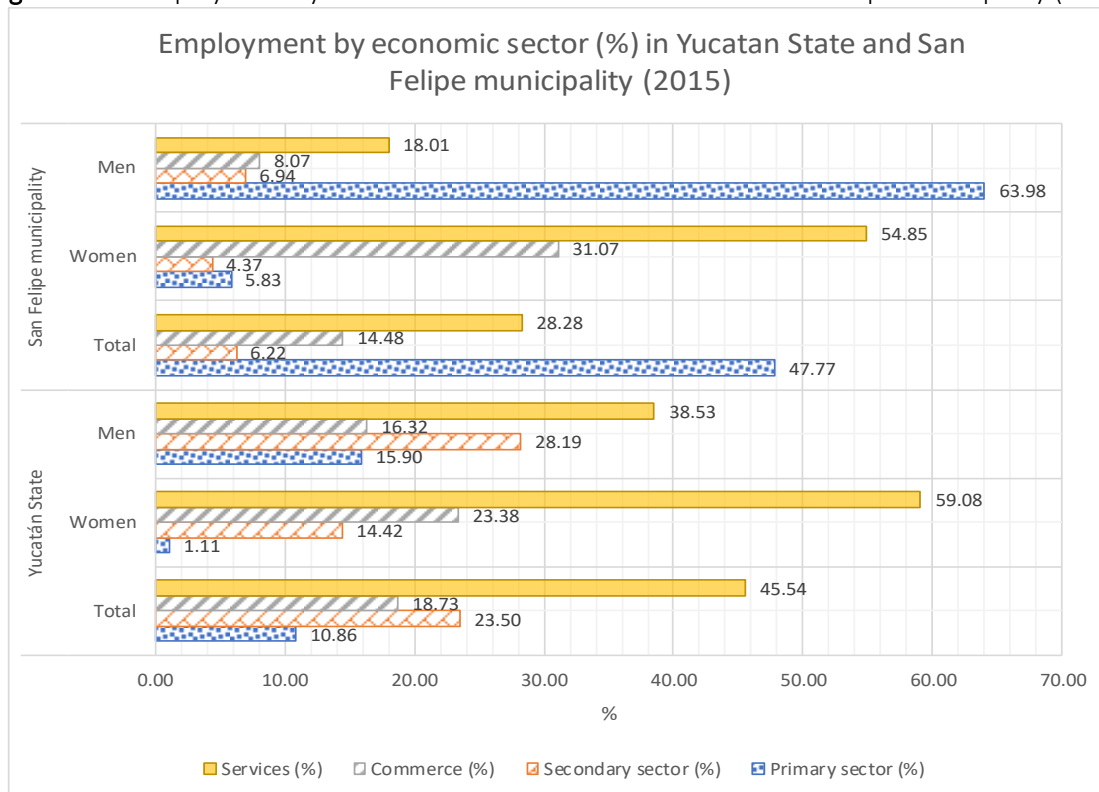
³⁶ The minimum monthly wage in 2016 was MX\$2,103

Figure 5-19. Percentage of population economically active in Yucatan State and San Felipe municipality (2015)



Data retrieved from INEGI Databases (INEGI, 2015)

Figure 5-20. Employment by economic sector in Yucatan State and San Felipe municipality (2015)



Data retrieved from INEGI Databases (INEGI, 2015)

In 2001, the cooperative of 14 fisherwomen was created: *Mujeres Trabajadoras del Mar* (Working women of the Sea). Their main fishery is the octopus' bait, two species of crabs, including the "maxquil" crab (*Libinia dubia*) and in some occasions they -illegally- catch horseshow crab, (*Limulus polyphemus*) (pers. communication), an endangered and protected species found in limited distribution in Mexican beaches.

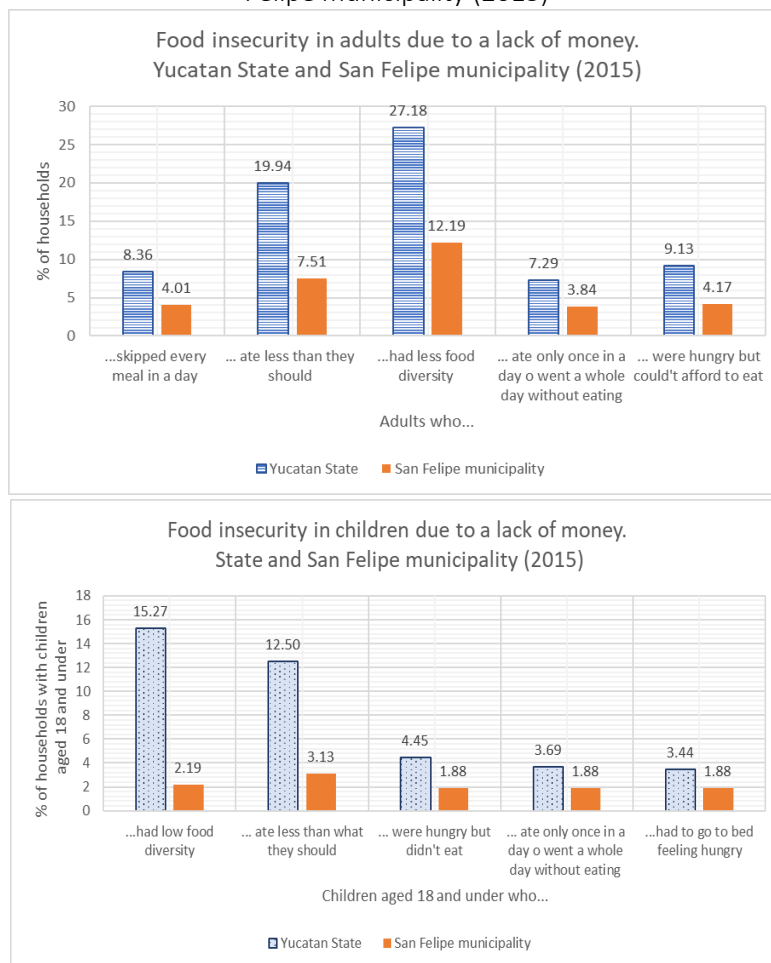
As in the case of the men's cooperative, the women's cooperative split up in two small groups which, unlike the men's case, seem to be still disorganized. Some of the respondents who self-identified as members of the women's cooperative reported that they didn't know the new cooperative. Women's cooperatives in San Felipe seems to work in an opportunistic way, based on available government funding for specific projects. Even without the basic structure of a cooperative, groups of women fish at night the species that are used as bait for the octopus' fishery. The profit is lower than for the main fisheries, however the fishing activity in San Felipe is male dominated, with only one woman in the main two fishing cooperatives.

5.3.8. Food insecurity due to a lack of money

Official data about food insecurity was collected for the first time in 2015, as part of the intercensal survey questionnaire (INEGI, 2015). Figure 5-21 shows that, in comparison with Yucatán State-level figures, San Felipe municipality has significantly lower proportion of adults and children with food insecurity, which is consistent with the shared perception that in San Felipe "no one goes hungry".

When asked about the reasons of this affirmation, respondents asserted that in case of food insecurity, people go to the beach, where local fishermen share some of their catch, usually the one that does not comply with minimum size or other requirements and is hand-picked for self-consumption. In this way, the geographical context, combined with the solidarity networks of the community, serve as a coping strategy to alleviate food insecurity. This coping mechanism seems to be not exclusive to members of the community, as some respondents pointed out. In some occasions, people from inland towns, such as Panabá, come to San Felipe to overcome food insecurity.

Figure 5-21. Food insecurity in adults and children due to a lack of money. Yucatán State and San Felipe municipality (2015)



Data retrieved from INEGI Databases (INEGI, 2015)

5.4. Closing remarks

This Chapter presents the analysis of the *Situation/Context* domain depicted in the Conceptual Framework. It focuses on the description the dynamics that are shaping the enabling and disabling conditions in the research site, the fishing community of San Felipe, Mexico. This Chapter has described the specific context in which the actors are situated and that shape the way in which their ideas of a flourishing life, poverty and justice emerge.

A peculiarity of the research site is that it is surrounded by three different types of protected areas: A National-managed Biosphere Reserve (the Ria Lagartos); a State-managed Protected Area with marine and terrestrial zones (Dzilam de Bravo); and the Actam Chuleb Marine Reserve, a community-designed fish refuge. The Actam Chuleb Marine Reserve provides a good case study of how common-pool resources (CPR) institutions can turn unsuccessful by altering some of the seven mechanisms identified by Elinor Ostrom in enduring, self-governing CPR. This aim was beyond the scope of this research.

Chapter 6. Normative approaches, national metrics and local perceptions of poverty

“In an increasingly performance-oriented society, metrics matter. What we measure affects what we do. If we have the wrong metrics, we will strive for the wrong things... Too often, we confuse ends with means”
(Stiglitz et al., 2009)

6. 1. Introduction

This Chapter includes two sections. The first section focuses on Mexico’s societal aims and its related metrics. It aims to understand what is normatively pursued at the national level and how it is measured. Within this section, the three spaces of the Mexican multidimensional poverty measure are described: the economic well-being space, the social rights space and the social cohesion space. The second section presents the results of the qualitative analysis of local meanings and reasons of poverty and wealth. The results were disaggregated by gender to examine differences in both the meanings and the reasons associated to poverty and wealth from a gender perspective.

6. 2. Mexico’s normative approaches and metrics of social development

6.2.1. Global scale: Mexico and the Sustainable Development Goals (SDGs)

At a global scale, Mexico is a signatory of multiple multilateral normative treaties, protocols and voluntary agreements, including relevant normative approaches (Human Rights, Elimination of Discrimination against Women, Rights of Migrant workers, Rights of the Child, among others) and the Sustainable Development Goals (SDGs) (SCJ, 2012). The latter is analysed in this section given that, at a national level, since 2015, it has prompted the voluntary development of a set of metrics to report upon the progress towards the SDGs.

The 2030 Agenda for Sustainable Development was adopted in 2015 at the Sustainable Development Summit, by more than 149 member-States, including Mexico. The Agenda includes 17 goals (Table 6-1), 169 targets and 230 indicators. The definition of the indicators finalized in March 2016.

Table 6-1. Sustainable Development Goals

1. No poverty	2. Zero Hunger	3. Good Health and Well-being	4. Quality education	5. Gender equality	6. Clean water and sanitation
7. Affordable and clean energy	8. Decent work and economic growth	9. Industry, innovation and infrastructure	10. Reduced inequalities	11. Sustainable cities and communities	12. Responsible consumption and production
13. Climate action	14. Life below water	15. Life on land	16. Peace and Justice. Strong institutions	17. Partnerships for the goals	

At the end of 2015, México created the Specialized Technical Committee of the Sustainable Development Goals (CTEODS for its acronym in Spanish) to develop a work program focused on the monitoring and reporting of the 2030 Agenda. As a result, an online SDG's National Platform was developed in partnership with the National Digital Strategy Office and INEGI, to serve as an open source tool where data is available to enable collaborative mechanisms of progress monitoring (Gobierno de la República, 2016).

Poverty definition in the SDG's: Mexico's poverty figures

Table 6-2 details the five targets and the indicators used to measure progress towards the first SDG goal. The SDG's National Platform compiles open data according to all the SDGs. The SDGs define poverty using six analytical spaces: 1) A monetary-based international poverty line, which adopts an absolute approach to the definition of poverty (Target 1.1.); 2) a relative-approach which adopts national definitions of multidimensional poverty (Target 1.2.); 3) a space that includes social protection systems (Target 1.3); 4) equal rights to economic resources, basic services, ownership and control over land, natural resources, new technology and financial services (Target 1.4), and 5) Resilience to economic, social and environmental shocks and disasters (Target 1.5).

Target 1.5 focuses on building resilience of the poor and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters. Two of the agreed indicators to measure progress towards this target are focused on end-of-pipeline metrics. Indicator 1.5.1 measures the number of deaths, missing persons already affected by disasters, and indicator 1.5.2. measures disaster-related economic loss in relation to GDP. None the indicators are focused on identifying vulnerability or resilience to economic, social and environmental shocks. The definition of social vulnerability and resilience, its identification and measurement can be a more opportune and useful indicator to inform intervention mechanisms than the current end-of-pipeline indicators.

Table 6-2. The measures of poverty in the Sustainable Development Goals (SDGs) (UN, 2018)

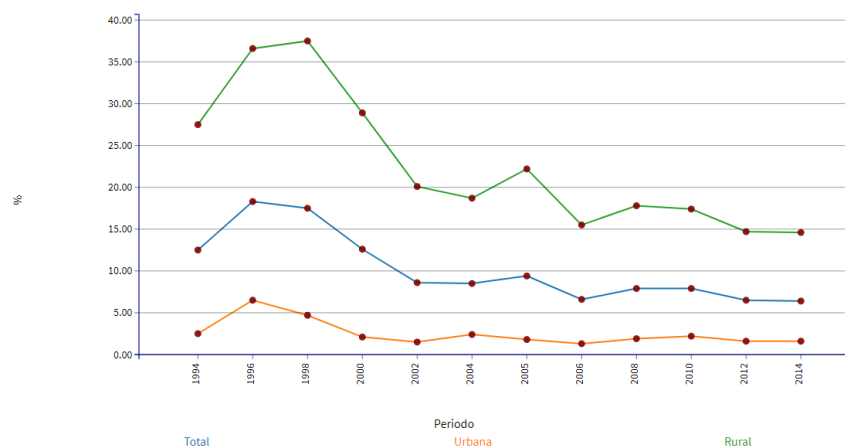
Space	Monetary-based. International poverty line	Multidimensional approach according to National definitions	Social protection systems
Target	1.1. By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 per day.	1.2. By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions	1.3. Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable.
Indicators	1.1.1. Proportion of population below the international poverty line, by gender, age, employment status and geographical location (urban/rural)	1.2.1. Proportion of population living below the national poverty line, by gender and age 1.2.2. Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions.	1.3.1. Proportion of population covered by social protection systems ¹ , by gender, distinguishing children, unemployed persons, older persons, persons with disabilities, pregnant women, new-borns, work-injury victims and the poor and the vulnerable.
Space	Equal rights to economic resources, basic services, ownership and control over land, inheritance, natural resources, new technology and financial services	Resilience to economic, social and environmental shocks and disasters ²	
Target	1.4. By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance	1.5. By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.	
Indicators	1.4.1. Proportion of population living in households with access to basic services 1.4.2. Proportion of total adult population with secure tenure rights to land, with legally recognized documentation and who perceive their rights to land as secure, by gender, and by type of tenure.	1.5.1. Number of deaths, missing persons and persons affected by disaster per 100,000 people 1.5.2. Direct disaster economic loss in relation to GDP 1.5.3. Number of countries with national and local disaster risk reduction strategies.	

¹ Social protection programmes including social assistance such as cash transfers, school feeding and targeted food assistance; social insurance and labour market programmes, including old-age pensions, disability pensions, unemployment insurance, skills training and wage subsidies.

² Disaster risk reduction mechanisms to increase resilience and reduce exposure and vulnerability to climate-related extreme events and other shocks and disasters.

México has partially reported its progress towards some of the poverty-related SDG's targets. The latest report in 2018, include data only for Targets 1.1, 1.2, 1.5 and 1.A³⁷. Information about Target 1.3³⁸ (Social protection systems), and 1.4³⁹ (equal rights to economic resources, basic services, natural resources) is absent. Regarding Target 1.1, the monetary-based international poverty line, the main deficiency is the lack of disaggregated data by gender, age, and employment status. The reported data only cover disaggregation based on geographical location (urban/rural), as shown in Figure 6-1.

Figure 6-1. Proportion of the population who live below the international poverty line in Mexico, as reported towards SDG Target 1.1. (Source: ODS, 2018)



Graph developed by CONEVAL with data from INEGI, as reported in the online SDG national platform

Target 1.2. is reported through elements of the Mexican multidimensional poverty metric. Indicator 1.2.1 is reported through the national monetary poverty line composed by the value of two baskets, one for food and the other for other goods or services usually consumed by the Mexican families (economic wellbeing); Indicator 1.2.2. is reported by the Mexican multidimensional poverty metric, which combines economic wellbeing and social rights to estimate the proportion of the population who lacks of at least one social right (education, access to health services, access to social security, quality and spaces of the dwelling, basic services in the dwelling and access to food), and whose income is insufficient to obtain the goods and services required to satisfy food and non-food needs.

³⁷ This target aims to ensure mobilization of resources to provide means to implement programmes to end poverty.

³⁸ Target 1.3. measures the existence of social protection programmes such as cash transfers, school feeding and targeted food assistance; social insurance and labour market programmes, including old-age pensions, disability pensions, unemployment insurance, skills training and wage subsidies

³⁹ Target 1.4. refers to equal rights to economic resources, basic services, ownership and control over land, inheritance, natural resources, new technology and financial services

6.2.2. National scale: Mexican social rights and multidimensional poverty measures

At the national level, Mexico is normatively guided by a set of social rights granted by the Constitution, specifically, by the Law of Social Development. As a result, the poverty and social development metrics created by the CONEVAL (National Commission of Evaluation) seek to be aligned with the Social Development Law and policy responses for poverty alleviation and social development are informed by these metrics.

Before 2004, México didn't have a methodology to measure poverty. Different government and academic institutions had developed their own poverty metrics but even at the state level, there were disparities among the figures obtained through different methodologies. Poverty conceptualization and measurement was usually unidimensional, relying on income figures as a proxy for economic wellbeing.

In 2004, the General Law of Social Development (LGDS) was unanimously approved and enacted. The main goal of the law is "to guarantee the full exercise of the social rights set forth in the Political Constitution of Mexico, ensuring access to social development to the population as a whole" (DOF, 2004b). The enactment of the LGDS was a pivotal moment for the definition and measurement of social development and poverty in Mexico. From the normative side, the LGDS defined the set of social rights that are necessary for social development (Article 6) and the guiding principles of Social Development policies (Article 3). On the other side, it stipulated the creation of the National Council for the Evaluation of Social Development Policy (CONEVAL) (Chapter II), which, besides the goal of coordinating the evaluation of the social development policies and programs designed by public entities, it established the guidelines and criteria for the definition, identification and measurement of poverty (Chapter VI) (DOF, 2010).

Article 3 defines the principles that guide Social Development policies (DOF, 2018), namely:

- I. *Freedom*: The capacity of people to choose the means to their own personal development.
- II. *Distributive Justice*: Equitable distribution of benefits according to their merits, needs and possibilities.
- III. *Solidarity*: Collaboration among people, social groups and government levels.
- IV. *Integration*: Articulation and complementarity of programs and actions in the framework of the Social Development National Policy.
- V. *Social Participation*: The right of people and organizations to participate, individually and collectively, in the design, implementation and evaluation of social development policies, programs and actions.

- VI. *Sustainability*: Conservation of the ecological balance, environmental protection and the sustainable use of natural resources to improve the quality of life and productivity of people without compromising the satisfaction of needs of future generations.
- VII. *Respect to diversity*: Recognition of diversity in terms of ethnic origin, gender, age, disability, social condition, health condition, religion, opinions, preferences, marital status or other, to overcome any discriminatory condition.
- VIII. *Free determination and autonomy of indigenous groups*: Recognition of internal ways of organization, election of authorities and representatives, means to preserve and enrich their language and culture, means to conserve and improve their habitat, preferential access to their natural resources.
- IX. *Transparency*: The information related to social development is public.
- X. *Gender perspective*: Proposes to eliminate the causes of gender oppression, such as inequality, injustice and the hierarchization of people based on gender.

Article 6 of the LGDS grants a set of eight social rights. It defines that

“the rights to social development –or social rights- are education, health, food, housing, the enjoyment of a healthy natural environment, employment, social security, and those related to non-discrimination” (DOF, 2004a).

Article 6 has been reformed two times to add qualitative attributes to the social rights. In 2016, Article 6 defined that food must be nutritious and of good-quality (DOF, 2016). In 2018 it defined that housing must be decent and dignified (DOF, 2018). Associated with these rights is the national definition of poverty, which for the first time was conceptualized in multidimensional terms. Consistently, Article 14, described a multidimensional strategy for social development and poverty alleviation focused on (i) securing education, health, nutritious food, employment and income generation, self-employment and training; (ii) social security and support programs; (iii) regional development; (iv) basic social infrastructure and (v) the promotion of the social sector of economy.

The multidimensional definition and measurement of poverty in México

Under the argument that measuring poverty through income was important but not enough, and recognising that poverty has many dimensions, the Council for the Evaluation of Social Policy (CONEVAL) designed its multidimensional poverty Index and was adopted officially by the Mexican government in 2010. At the High-level panel of the 69th UN General Assembly, the then-Secretary of Foreign Affairs, J.A. Meade mentioned that during a very long-time poverty was defined as a lack of income and there was a line above you were not poor. By adopting the multidimensional poverty, it was intended to make visible what was needed to combat poverty and what situations citizens have to face in order to escape poverty: Income, education, access to health services, access to formal social

security (package that include pensionary services, cultural goods), good quality of housing, access to food and level of social cohesion. He justified the adoption of a multidimensional approach by saying: “We will not be able to truly defeat poverty unless we first measure it correctly and measure it in all of its dimensions, address it correctly from a public policy perspective. Once you realise that poverty is not just income, then you tend to move away from conditional cash transfers to enrich the conditions under which you will provide support and we will be able to mount a public policy effort at a global level to advance the post-15 agenda” (OPHI, 2014)

Mexico was the first country in the world to have an official multidimensional poverty measurement (CONEVAL, 2009; OPHI, 2018). Since its creation, the CONEVAL adopted a multidimensional approach which conceives poverty in terms of three analytical spaces: “social rights, economic wellbeing and the territorial context where the population interacts” (CONEVAL, 2010b, p.3). Anybody that does not exercise at least one of her social rights is considered socially deprived. The contextual factors are taken into consideration by incorporating social cohesion, a relational indicator measured at a territorial scale. According to the CONEVAL (CONEVAL, 2010b, p.5)

“A person is considered to be multidimensional poor when the exercise of at least one of her social rights is not guaranteed and if she also has an income that is insufficient to buy the goods and services required to fully satisfy her needs”

A person is considered to live in extreme poverty when she lacks three or more social rights (out of the six measured indicators) and her income is below the minimum economic wellbeing line. The bi-dimensional nature of the Mexican poverty definition was proposed by David Gordon, who adopted Townsend’s concept of poverty (1970), and which measures poverty in terms of both income (*economic wellbeing*) and living standards (measured through the material and social conditions that each person has, as well as the participation on social, cultural and political activities of the society where she lives). For Townsend, poverty was a relational experience, so, the space of measurement in the Mexican metric tried to reflect this aspect by adding a relational concept, *degree of social cohesion*, in which the analysis unit is not the individual, but communities or social groups. (CONEVAL, 2010c).

According to CONEVAL poverty is conceived in terms of three analytical spaces: Social rights, economic wellbeing and the territorial context where the population interacts (CONEVAL, 2010d). The third analytical space tries to incorporate a relational notion of poverty, in which contextual factors influence the factual experience of poverty. Following this, social cohesion is assessed as an extrinsic aspect which influences the way in which poverty is experienced, but not evaluated as an intrinsic dimension of poverty at the individual or household level (CONEVAL, 2010d, p.4).

In order to identify the population in poverty, CONEVAL developed a three-step methodology. Firstly, in the social rights space, it identifies if a person is socially deprived by using six indicators which are paired to some of the social rights granted by the LGDS: educational gap, access to health services, access to social security, quality and spaces of the dwelling, access to basic services in the dwelling and access to food. Secondly, in the economic wellbeing space, it identifies whether the person's income is enough to satisfy her needs. Thirdly, it classifies a person as multidimensionally poor if she is socially deprived and has insufficient income (CONEVAL, 2010b, p.5)

The economic wellbeing space is measured by the indicator of current per capita income, which is compared with two poverty lines that defines a minimum amount of monetary resources required to satisfy people's needs (CONEVAL, 2010b). *Poverty* is defined by a *wellbeing threshold* which identifies the population that does not have enough resources to acquire the necessary goods and services to satisfy their needs (food and non-food). *Extreme poverty* is defined by a *Minimum Wellbeing threshold* which identifies the population that, even when using all their income to purchase food, cannot acquire enough to ensure adequate nutrition.

The social rights space use dichotomic indicators which take the value one when a person shows a specific deprivation and zero otherwise. The poverty thresholds of these type of indicators were defined in the following sequential way: 1) to apply existent laws and regulations; 2) In its absence, to use knowledge and experience of experts from public institutions specialized in the topics related to the social right; 3) In case the former steps were inconclusive, to apply statistical methods to define the thresholds; and 5) the threshold is defined by the CONAVAL with informed arguments (CONEVAL, 2010c).

CONEVAL's argument to justify the adoption of a multidimensional approach to poverty is that "what can be measured can be improved" (CONEVAL, 2009, p.1). The indicators selected for poverty measurement were anchored in the regulations of the Ley General de Desarrollo Social (LGDS) (General Law of Social Development) regarding poverty measurement (CONEVAL, 2010d) and correspond to social rights granted by the Constitution and specified in Article 6 of the LGDS, except of social cohesion. The social rights include: Food, health, education, social security, housing, employment, non-discrimination and the right to a healthy environment. All of them except the right to a healthy environment and non-discrimination are measured through the six indicators of deprivation. The economic wellbeing space is measured by the traditional per capita income sufficient to satisfy people's basic needs.

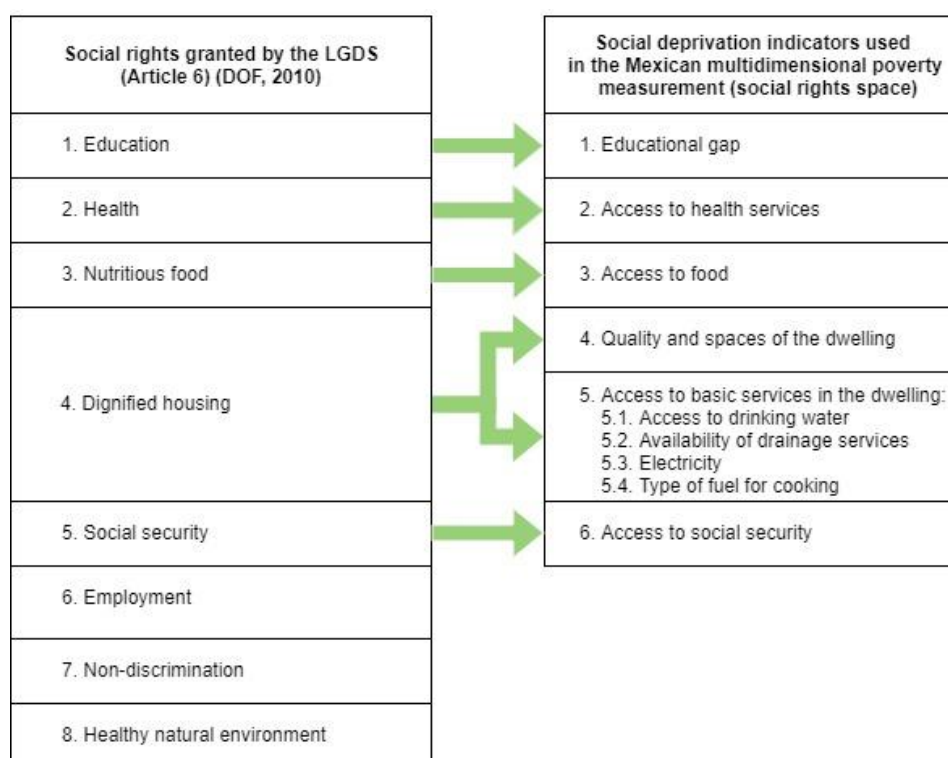
Table 6-3. The dimensions of poverty in the multidimensional poverty measurement in Mexico (CONEVAL, 2010)

SPACE	ECONOMIC WELLBEING	SOCIAL RIGHTS	SOCIAL COHESION
DESCRIPTION	Standard monetary poverty method which compares per capita income with the monetary value of two baskets, one for food and the other for other goods or services usually consumed by the Mexican families.	Binary variables. The indicators take the value one when an individual is deprived and zero otherwise.	Relational concept associated with the territorial context. Indicators 1 -4 are measured at the municipal and state levels, while indicator 5 is only measured at the state level.
INDICATORS	1. Current per capita income in the household	1. Average education gap in the household 2. Access to health services 3. Access to social security 4. Quality and spaces of the dwelling 5. Access to basic services in the dwelling 6. Access to food	1. Gini Index (Economic inequality) 2. Degree of social polarization 3. Proportion of income of the population living in extreme multidimensional poverty relative to the income of the population that is not living in multidimensional poverty and that is not vulnerable. 4. Social networks perception index ¹
DEPRIVATION CRITERIA	Poverty, defined by a <i>Wellbeing threshold</i> : Population that does not have sufficient resources to acquire the necessary goods and services to satisfy their needs (food and non-food) Extreme poverty, defined by a <i>Minimum Wellbeing threshold</i> : Population that, even when using all their income to purchase food, cannot acquire enough of it to ensure adequate nutrition.	Population deprived in at least one of the six social indicators. The Social Deprivation Index is calculated by adding up the number of deprivations.	

¹ Indicator estimated only at the state level.

As shown in Figure 6-2, the social deprivation indicators used in the Mexican multidimensional poverty measurement are only paired to education, health, nutritious food, dignified housing (which has two indicators and 4 sets of sub-domains) and social security. The right to employment could be observable within the economic wellbeing space, with the indicator of current per capita income. However, indicators about the right to non-discrimination and the enjoyment of a healthy environment are entirely absent.

Figure 6-2. Social rights and social deprivation indicators



The LGDS establishes that the goal of the National Policy for Social Development is the promotion of the conditions that allow enjoyment of social rights -both individual and collective. The enjoyment of a healthy environment and non-discrimination are important social rights that are currently absent in the Mexican poverty measurement. There are no measurement spaces nor indicators that can give an idea of the presence or absence of these rights, and, using CONEVAL's argument, if they are not measured, they cannot be improved. More importantly, their effect on poverty and social exclusion remains hidden by their absence.

To calculate the level of deprivation in the space of social rights, the first step is to identify the type of social deprivation a person has using binary variables (one when an individual is deprived and zero otherwise). Afterwards, the social deprivation index is calculated by adding up the binary variables

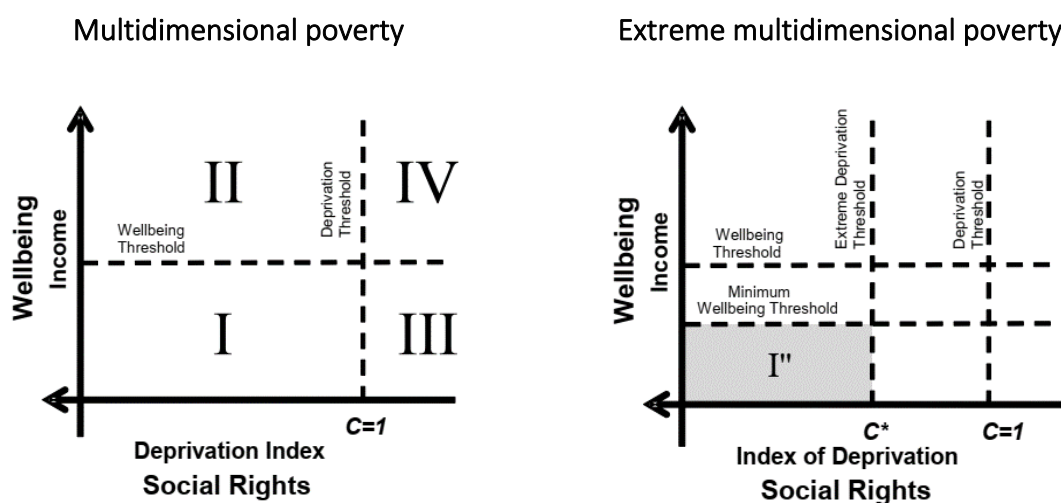
generated (CONEVAL, 2010a). This assumes that each social right has the same relative importance. CONEVAL justifies this decision by the “principles of indivisibility and interdependence of human rights, which recognize that the non-fulfilment of any of the human rights infringes upon the fulfilment of the others, and that there is no human right that can be considered more important than any other” (CONEVAL, 2010, p. 30).

CONEVAL adopted the principles of universality, inalienability and indivisibility of the United Nations regarding all rights -political, civil, social, cultural and economic- and applies them in a narrow way, including only some of the social rights granted by the LGDS and excluding the right to non-discrimination and to a healthy environment. Using the same argument of indivisibility and interdependence of rights, indicators about discrimination and a low-quality environment should be included as part of the deprivation indicators, so that the single non-fulfilment of these, could be recognized as a social deprivation.

Social deprivation is defined as the condition in which people has at least one social right deprivation ($C=1$) (out of the -measured- six indicators) (*deprivation threshold*). *Extreme poverty* is defined as the population who lacks more than three of the six measured social rights (extreme deprivation threshold). The number of social deprivations of a person is called the social deprivation index.

The combination of the economic wellbeing space and the social rights space gives the definition of multidimensional poverty. Unlike other multidimensional poverty metrics which exclude income-based metrics, the Mexican measurement combines the threshold of income poverty with the social rights threshold. Figure 6-3 shows the combination of both spaces.

Figure 6-3. Conceptualization of multidimensional poverty and extreme multidimensional poverty in Mexico: the combination of the wellbeing space and the social rights space.



Source: (CONEVAL, 2010, p. 31 and 32)

According to CONEVAL (2010, p. 32), any person may be classified in one, and only one, of the following groups:

- I. *Multidimensional poor*: People with an income below the wellbeing threshold and with one or more social deprivations
- II. *Vulnerable due to social deprivation*: Socially deprived people with an income higher than the wellbeing threshold.
- III. *Vulnerable due to income*: Population with no social deprivation and with an income below the wellbeing threshold.
- IV. *Not multidimensional poor and not vulnerable*: Population with an income higher than the wellbeing threshold and with no social deprivations.

Among the multidimensional poor, it is possible to identify the population in extreme multidimensional poverty. Extreme multidimensional poverty is defined as the experience of having an income that is so low that even if spent entirely on food, it wouldn't be possible to buy the necessary nutrients for a health life and in addition, experiencing at least three of the six -measured- social deprivations. The population in multidimensional poverty that is not included in extreme multidimensional poverty is defined as living in moderate multidimensional poverty (CONEVAL, 2010, p. 33).

Despite being recognised as a social right, the right to a healthy environment is not currently measured as part of the Mexican multidimensional poverty metric. It is not included as an intrinsic factor affecting the individual and household experience of poverty nor as an extrinsic factor affecting the conditions that can aggravate or mitigate the experience of poverty. Access to water in the dwelling is included as part of the indicator measuring access to basic services and could be considered as one environmental indicator, however the way in which is being measured, based only on quantity and not quality of the water, is a poor reflection of the health risks and economic impact in the household that bad quality water in good quantity brings. The fact that poor quality water disproportionately affects already vulnerable groups and individuals who cannot afford good quality water keeps invisible with the current multidimensional poverty metric. What differentiates a poor and a non-poor person according to the official multidimensional metric can be explored by the poverty thresholds shown in Table 6-4.

Table 6-4. Economic and social deprivation thresholds in the Mexican Multidimensional poverty measurement. Source: (CONEVAL, 2010)

Space	Indicator	Deprivation threshold	Link with Mexican Legal Framework
Economic wellbeing	Income	<ul style="list-style-type: none"> Wellbeing line Minimum wellbeing line 	
Social rights	1.Educational gap	<ul style="list-style-type: none"> For people aged 3 to 15 years: When they lack mandatory basic education and are not attending a formal education center. For people born before 1982: If they do not meet the minimum mandatory basic education level that prevailed at the time when they should have attended elementary school. For people born from 1982 onwards: If they have not completed the minimum current mandatory basic education requirement (secondary school). 	<p>Article 3 of the Political Constitution of Mexico</p> <p>Articles 2, 3 and 4 of the General Education Law (LGE)</p> <p>Article 31 of the Constitution and Article 4 of the LGE</p>
	2.Access to health services	<ul style="list-style-type: none"> People not enrolled in or entitled to receive medical services from any health institution, including the Popular Health System, the social security public institutions (IMSS, federal or state ISSSTE¹, Pemex², Army or Navy) or private medical services. 	<p>Article 4 of the Constitution</p> <p>Article 77 of the General Health Law (LGS)</p>
	3.Access to social security	<ul style="list-style-type: none"> For those economically active: When, through their job, they don't enjoy the benefits established in the law. For non-paid workers and independent workers, when they don't receive medical services as a job benefit or when they are not voluntarily enrolled and when, in addition, they don't have a retirement plan. For the general population, when they don't benefit from a retirement program or pension or none of their relatives has access to social security. 	<p>Article 123 of the Constitution (labour rights)</p>

¹ ISSSTE is the national health system for Mexico's governmental workers.

² PEMEX is the Mexican oil industry

Space	Indicator	Deprivation threshold	Link with Mexican Legal Framework
Social rights	4. Quality and spaces of the dwelling	<p>At least one of the following:</p> <ul style="list-style-type: none"> • If the dwelling has dirt floor • If the roof of the dwelling is made of cardboard sheets or waste. • If the walls of the dwelling are made of mud or daub and wattle; reed, bamboo or palm tree; cardboard, metal or asbestos sheets; or waste. • The ratio of the number of members of the household per room is greater than 2.5 (overcrowding) 	Article 4 of the Constitution
	5. Access to basic services in the dwelling	<p>Four sub-dimensions:</p> <ul style="list-style-type: none"> • <u>Access to drinking water</u>: Water is obtained from a well, river, lake, stream, or truck; or when piped water is carried from another dwelling or gotten at a public faucet or hydrant. • <u>Availability of drainage services</u>: There is no drainage service, or when the drainage is connected to pipes leading to a river, lake, sea, ravine or crack. • <u>Electricity</u>: The dwelling has no electricity. • <u>Fuel for cooking</u>: Wood or coal with no chimney are used for cooking or heating food inside the dwelling. 	
	6. Access to food	<p>CONEVAL uses a scale of food security based on four possible levels of food insecurity: Severe food insecurity, Moderate food insecurity, Mild food insecurity and Food security.</p> <ul style="list-style-type: none"> • A household is deprived in access to food if they present moderate or severe food insecurity. 	<p>The Mexican Constitution incorporates the right to food only for girls and boys, but not for the rest of the population. However, the right to food is incorporated in the LGDS.</p> <p>In addition, Mexico has signed and ratified International Pacts, including the ICESCR (1996), which establishes the right of everyone to an adequate standard of living, including food. Additionally, the 1996 Rome Declaration on World Food Security reaffirms the right to have access to safe and nutritious food.</p>

6. 3. Local perceptions of the meanings and reasons of poverty

6.3.1. Local perceptions of the meanings of poverty

As detailed in Chapter 4, the results presented in this section draw on data collected in San Felipe during the Summer of 2016 through 80 semi-structured qualitative interviews. The breadth of definitions used by respondents is shown in Figure 6-4. The analysis of the semi-structured interviews shows that poverty was mainly defined as a condition of not having material aspects, the two most important are shortages of food (55% defined poverty as a lack of food) and income (53% defined poverty as lack of income); followed by the lack of dignified housing (18%) and the lack of dignified clothing and shoes (18%) . Apart from the definitions of poverty describing the experience of lacking material aspects, poverty was defined by using a diverse array of elements that can be grouped as:

- 1) The *lack of non-material aspects* such as life opportunities; a religious life, love and knowledge, culture and personal history;
- 2) The *lack of institutional-mediated aspects*, such as access to academic education, employment opportunities and health services
- 3) *Beings and doings*, such as the experience of facing multiple shortcomings simultaneously; to be unseen, to be unnoticed by others; to be humble; to treat people well.
- 4) *Lack of capabilities*, understood as reduced freedoms to have, be and do valuable functionings. Some examples include the definitions of poverty as *not being able* to enjoy childhood (e.g. the need to work from early age to contribute to family's expenses); *not being able* to cope with unexpected circumstances (vulnerability) and *not being able* to freely pursue and achieve valuable life functionings (e.g. keep studying, avoid young marriage, find alternative livelihood).
- 5) *Feelings*. To a much less extent, poverty was defined as having increased levels of anxiety; for example, "*to be poor is to be full of worries all the time*"; or to be poor is "*to feel death alive, without any illusion or motivation*".

Previous studies (Narayan, Schafft, et al., 2000; Green, 2012) also find the role of anxiety in the experience of poverty, highlighting that anxiety emerges as a defining characteristic of insecurity and is based not on one but many risks and fears: "anxiety about jobs, not getting paid, needing to migrate, lack of protection and safety, floods and drought, shelter, falling ill, about the future of children, and settling them well in marriage" (Green, 2012, p.166).

The gendered analysis of poverty definitions (Figure 6-5) show that women and men share the perception of poverty defined as a shortage of food, income and clothing. However, they differ on the definition of poverty as a lack for academic education. None of the interviewed men defined poverty as a lack of academic education, whilst for interviewed women this definition was the fourth most-used descriptor, just after the lack of clothing and shoes. This might be linked to the centrality of employment in the idea of a flourishing, worth-lived life (discussed in the previous Chapter) and the gendered differences in access to employment. In San Felipe, the most profitable and valued livelihood is fisheries, to which men have an asymmetrical access. Whereas men have access to the most commercially valuable fisheries (e.g. lobster, sea cucumber, octopus); women's access to fishery is for octopus' bait, which is a fishery not guaranteed by an exclusive permit and less commercially-valuable; In addition, the women's fishing activity is performed at night, after all the household chores -socially attributed to women- are finished. In this context, women value academic education as a possibility to expand employment alternatives, not only for themselves but for their children.

The results show that while poverty is described as a multidimensional experience, the central descriptors are focused on the lack of food, income, housing and clothing. These results reflect those of Narayan et al. (2000, p.26), who found that poverty is routinely defined as "the lack of what is necessary for material well-being – especially food but also housing, land, and other assets". In addition, the findings are also consistent with that of Narayan et al. (2000) who report that definitions of poverty reveal psychological aspects of poverty and that poverty never results from the lack of one thing but from many interlocking factors that cluster in people's experiences. The findings show that poverty was also defined by the experience of multiple shortcomings simultaneously and by psychological aspects, such as the experience to be "unseen, unnoticed by others" and to live full of worries.

In contrast to Narayan et al. (2000, p. 26), however, the findings of this study show that poverty focus more on income rather than assets. This could be explained by the fact that, as presented in the network analysis, income is highly valued as a means to access good quality health services and medicines, that would not be accessible otherwise.

One unexpected finding was the extent to which a proportion of women (8%) assigned positive qualities to the meaning of poverty, defining it as a circumstance in which people treat others well, and act with humbleness and kindness toward others. As will be presented further in the Chapter, the opposite attribute is assigned to people living in wealth. One of the definitions of wealth was linked to behaving with arrogance, which was considered as a negative attribute and an undesirable condition.

Figure 6-4. Local definitions of Poverty (% of population sample who defined poverty)

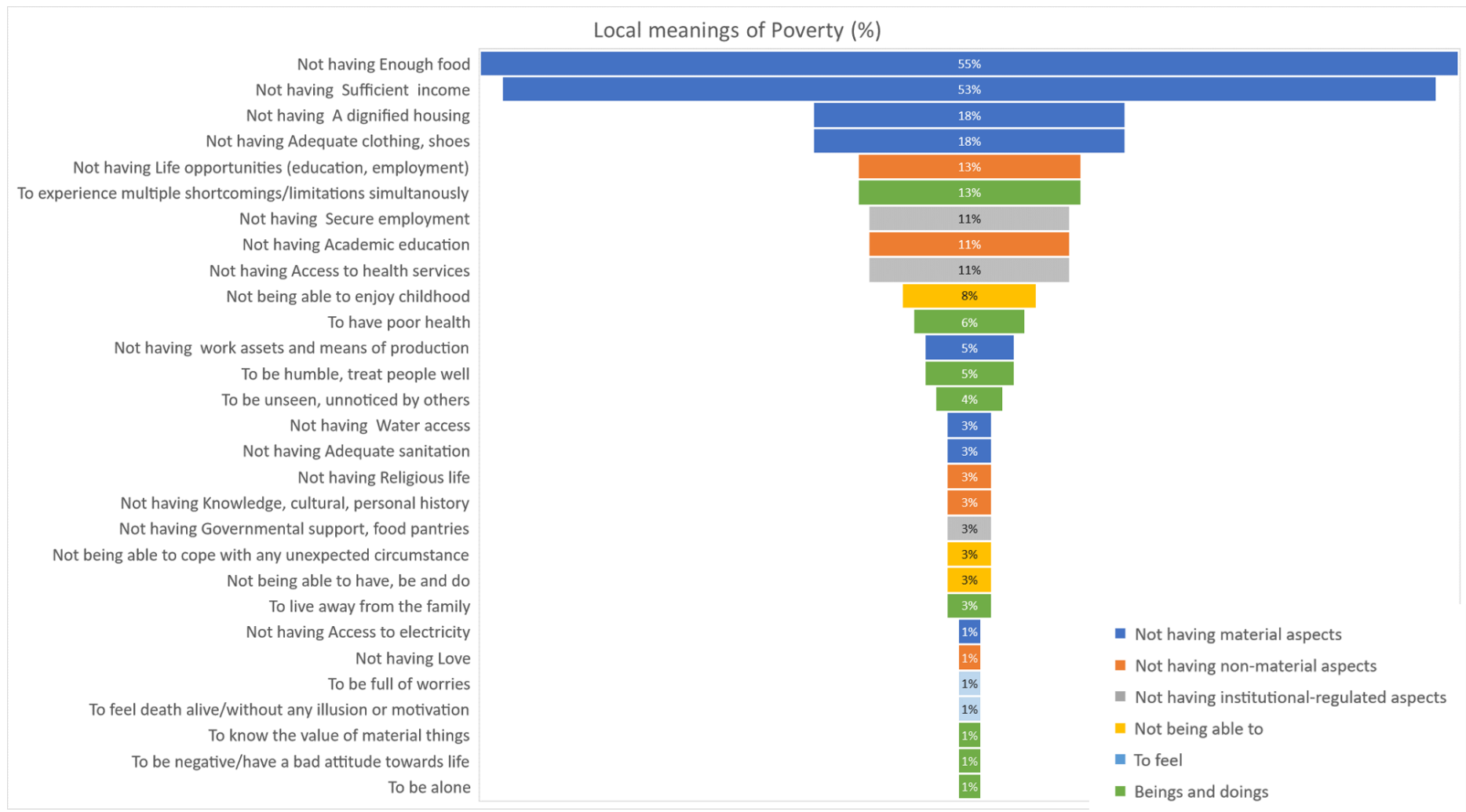
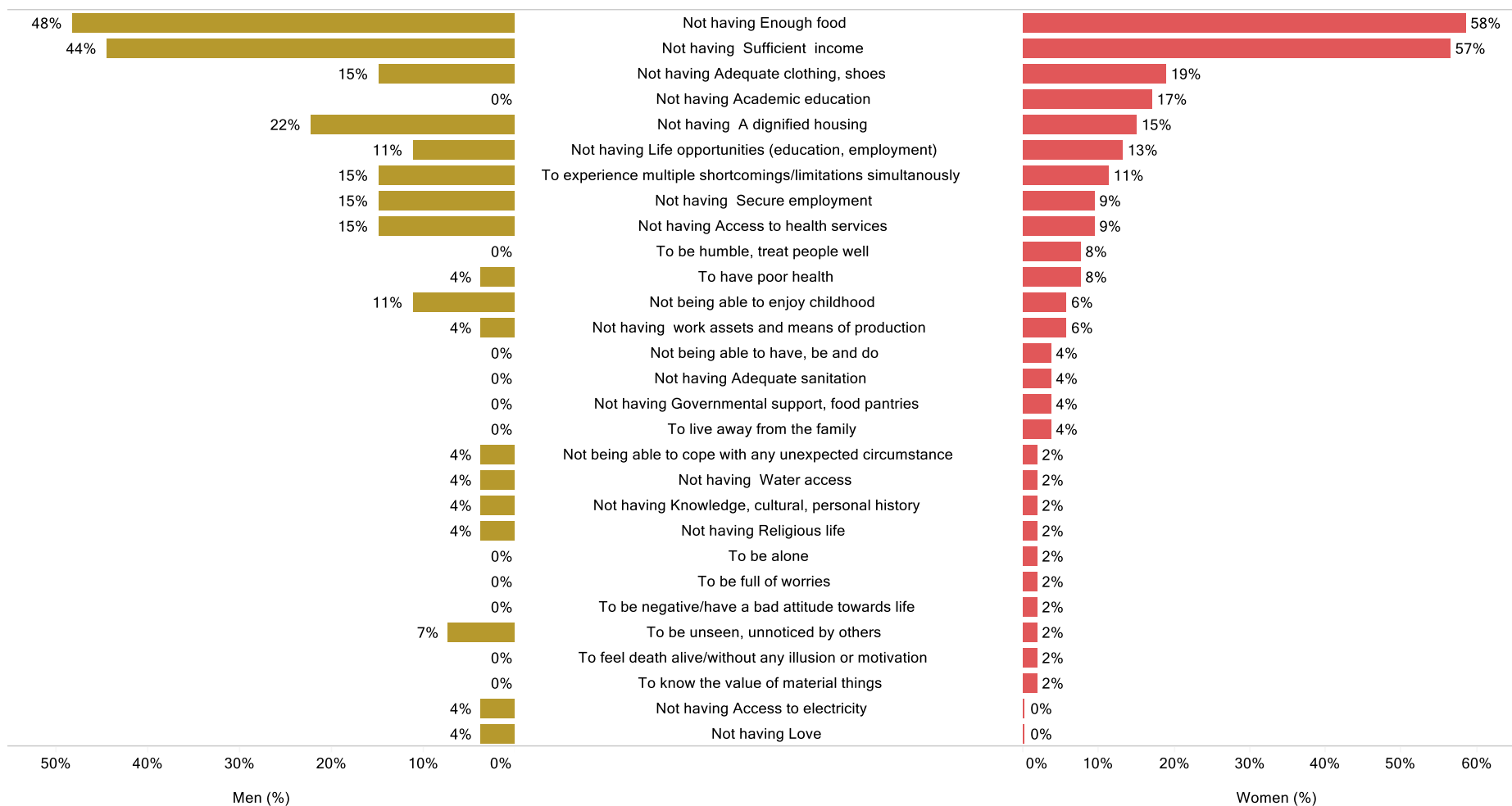


Figure 6-5. Definitions of poverty by Gender (%)



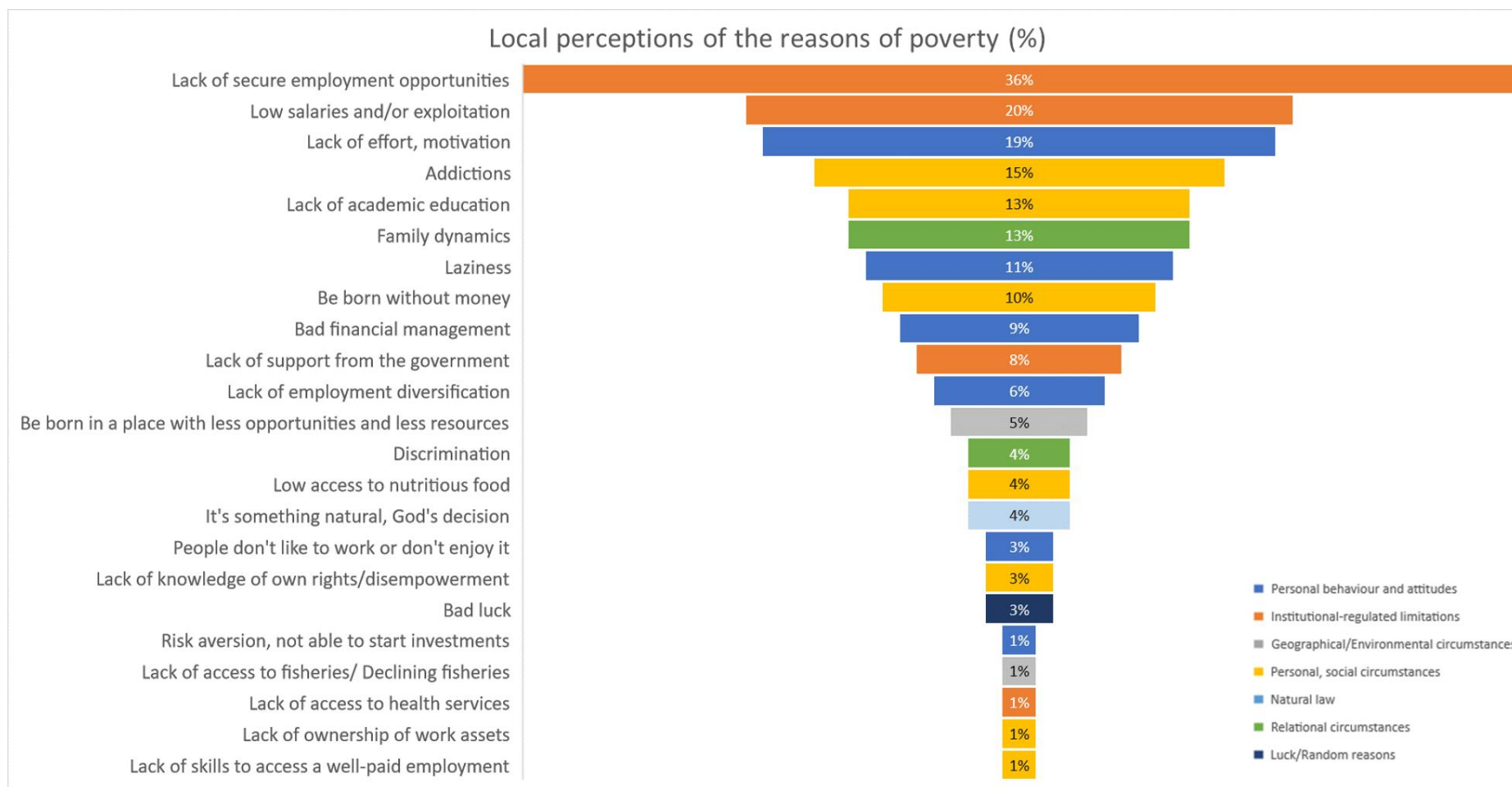
6.3.2. The reasons of poverty as perceived locally

Nancy Fraser insists that we must look at the why of poverty in order to both understand it and remedy it. Figure 6-6 shows the range of reasons of poverty that were mentioned by respondents. Consistent with the findings of Narayan et al. (2000, p.27), poverty is perceived as the outcome resulting from many interlocking factors that cluster in the tangible experience of poverty. The findings show that poverty is locally understood as being the result of factors that interact with each other to worsen the experience of poverty. These factors can be grouped in 7 types: 1) Institutional-mediated limitations; 2) Personal behaviour and attitudes; 3) Geographical or environmental circumstances; 4) Personal circumstances; 5) Relational circumstances; 6) Natural laws and 7) Luck/Random reasons.

The two most-mentioned reasons for poverty were related to institutional-mediated limitations, specifically, the lack of secure employment opportunities (38% of the participants) and the low salaries and/or exploitation (20%). In a context where fisheries are the main source of employment, the seasonality associated to this livelihood and the lack of alternative livelihoods are considered a source of vulnerability. The tangible livelihood alternatives to fisheries are tourism and farming/ranching. In both cases, the limited alternatives interact with the lack of ownership of the means of production, from land rights, livestock or work assets.

During the interviews, when asked about the reasons why people were poor the most frequent answer was the lack of secure and constant employment opportunities, specifically, the lack of access to fisheries and the lack of alternatives to fisheries. A common response was that people were poor because they couldn't perform the fishing activity (as in the case of disabled people or for other reasons) and must work as farmers in nearby municipalities with salaries that can be as low as one tenth of what can be earned in fisheries. The seasonality of the fishing activity is a source of vulnerability, which has been aggravated by changes in the institutions that regulate fisheries, including the rise in the number of newly-formed fishing permit holders, changes in the fishing cooperatives, changes in the market prices of commercially valuable species (e.g. sea cucumber), changes in the number and type of buyers and sellers of fishing products, and changes in the governmental authorities that provide surveillance and regulate the fishing activity.

Figure 6-6. Local perceptions of the reasons of poverty (% of respondents who identified the indicated reason of poverty)



Apart from the reasons of poverty linked to secure jobs and low wages, respondents identified reasons of poverty related to personal behaviour and attitudes, for example, the lack of effort and motivation (19%), laziness (11%), bad financial management (9%), the lack of employment diversification (6%), the lack of enjoyment of work (3%) and a risk avert behaviour to start new ventures (1%). The seasonality of fishing activity leads to a situation in which during fishing season, people can earn large amounts of money that need to be well-administered to keep the same quality of life during fishing bans. For this reason, in this context, poor financial management is considered a reason of poverty.

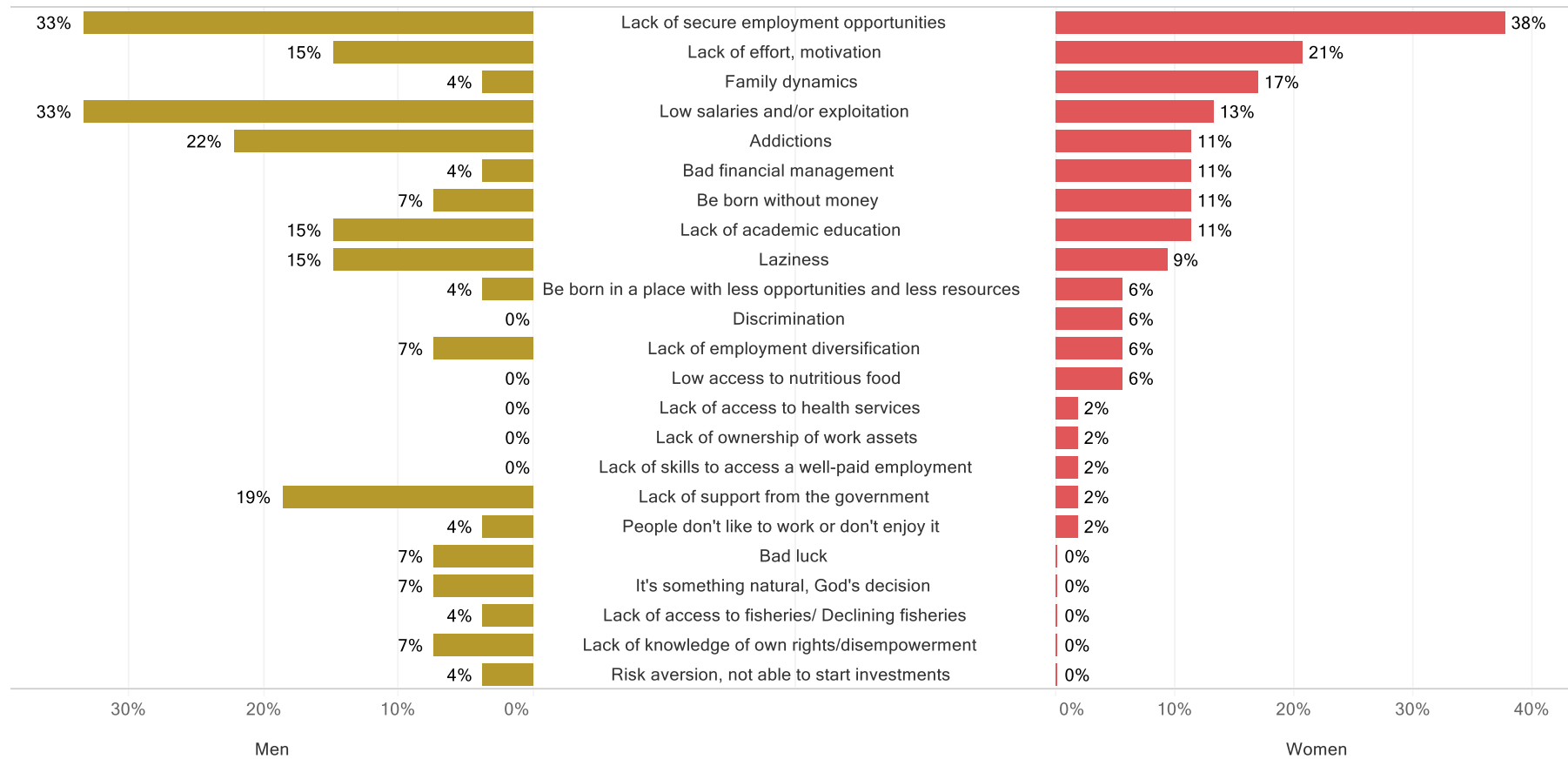
Personal-related circumstances are also considered reasons for poverty, such as addictions (15%), the lack of academic education (13%), to be born without money (10%), the low access to nutritious food (4%), the lack of knowledge of own rights (3%) and the lack of ownership of work assets and the lack of skills to access a well-paid employment (1%).

Relational circumstances including family dynamics (13%) and discrimination (4%) were also mentioned as reasons for poverty. Family dynamics include the condition of being born or have a numerous family already poor, family abandonment and single parental families. Notably, the identification of family dynamics and discrimination as reasons of poverty were much higher in women's perceptions. Only 4% of male respondents mentioned family dynamics as a reason for poverty compared to 17% of female respondents; and 6% of female respondents identified discrimination as a cause of poverty, in comparison to 0% of male respondents.

Geographical and environmental circumstances were identified as a reason for poverty, specifically the random fact of being born in a place with less employment opportunities and less resources. In general, respondents consistently mentioned that people in San Felipe were not poor because they lived in a place rich of natural resources, where they could easily overcome food insecurity, access nutritious food (seafood) and find well-paid (but seasonal) employment despite not having access to high-academic education. They frequently compared their privileged situation to the situation lived in other nearby ranches and municipalities, where, in their view, poverty could be truly be found.

With much less frequency, respondents identified natural law and luck/random reasons as the causes of poverty. Four percent of the respondents mentioned that poverty was something natural or God's decision and three percent of the respondents mentioned that poverty was caused by bad luck.

Figure 6-7. Reasons of poverty as perceived by Women and Men



The gendered analysis (Figure 6-7) shows a shared view of the lack of secure employment opportunities as a reason of poverty. The main differences, as noted earlier, are family dynamics and discrimination, which were reasons identified mostly by women but not by men. Another discrepancy is the consideration of bad financial management as a cause of poverty, which was mentioned by 11% of women whilst by only 4% of men. The lack of support from the government in the form of fishing and other types of incentives was identified by 19% of men and by only 2% of the women and low salaries and/or exploitation was identified by 33% of men and by only 13% of women. This might respond to the fact that the expected incentives are related to jobs, specifically, to the access to fisheries, activity which is asymmetrically accessed by men.

6.4. The local meanings of wealth and the nexus to the natural environment

6.4.1. Local meanings of wealth

The range of definitions used by respondents to describe wealth is shown in Figure 6-8. Wealth was defined in terms of:

- 1) *Material aspects*: Having income (49%); work assets (13%); land ownership and rights (8%); livestock (4%)
- 2) *Beings and doings*: To be healthy (16%); To have/perform a secure livelihood/employment (11%); to be humble, kind, spiritual/religious (5%); to be arrogant (3%).
- 3) *Natural/Environmental*: To live in a healthy environment that allows fisheries (11%)
- 4) *Freedom of choice and action*: To be able to have, be and do (8%) (some valuable functionings mentioned were the freedom to keep studying to complete high education, the freedom to travel and have fun); and the ability to cope with individual and collective shocks (resilience) (4%).
- 5) *Relational aspects*: To have friends and good relations with the community (3%)
- 6) *Feelings*: To be free of anxiety and worries.

Wealth is mainly defined in terms of income (49%), followed by health (16%), ownership of work assets (13%), jobs (11%) and a healthy environment that allows diverse livelihoods such as fisheries and tourism (11%). The gendered analysis of wealth definitions (Figure 6-9) shows similar perspectives with slight disparities. For example, four percent of the women defined wealth as arrogance compared to 0% of the men. Wealth was defined as the ability to be free of anxiety by 4% of the men, but none of the women.

The definition of wealth based on environmental integrity that allows different livelihoods was slightly more used by men than by women (15% of the men/ 9% of the women). Again, this might respond to the differing life functionings that fisheries enable for both men and women.

Figure 6-8. Local definitions of wealth (% of respondents who defined wealth as the indicated definition)

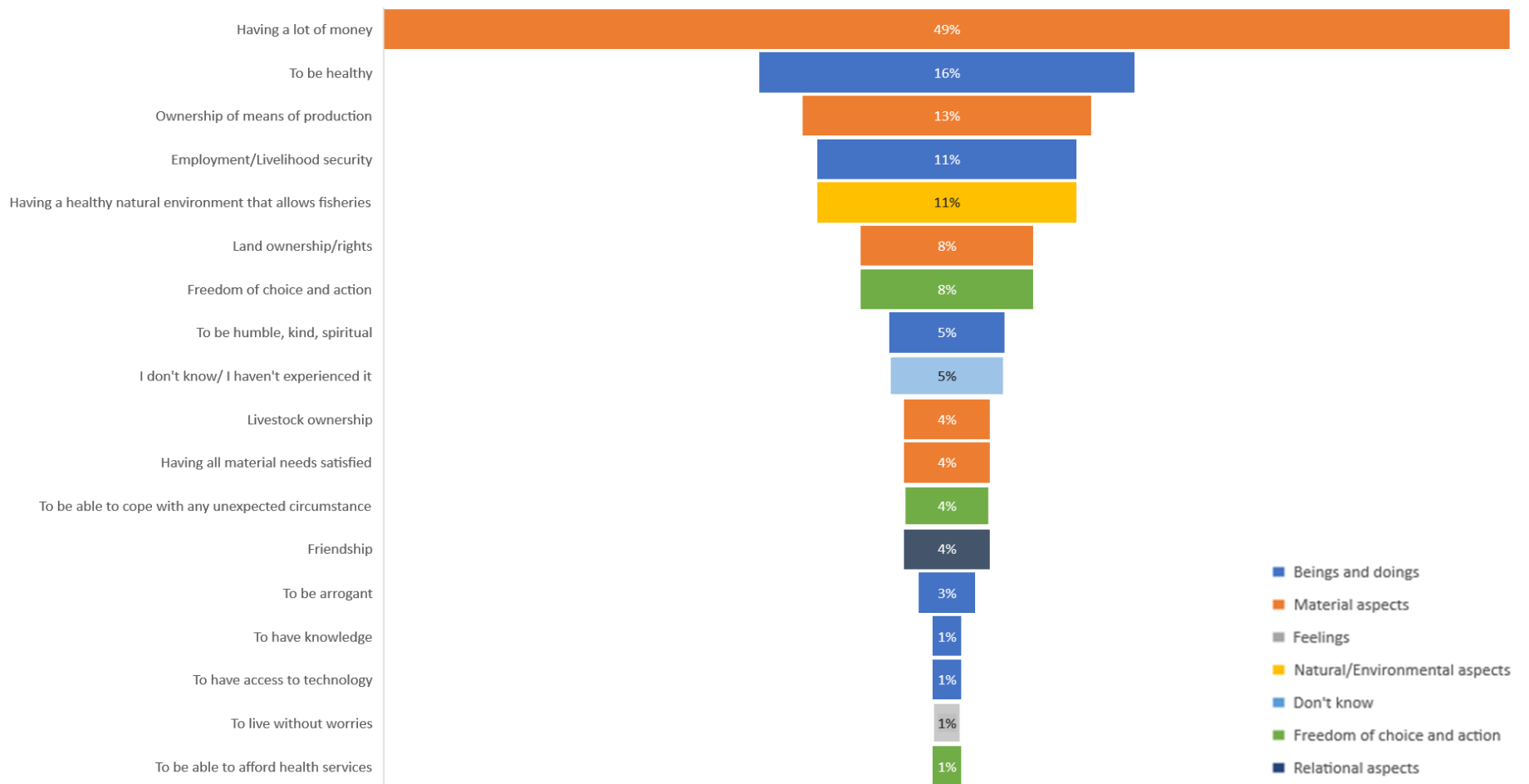
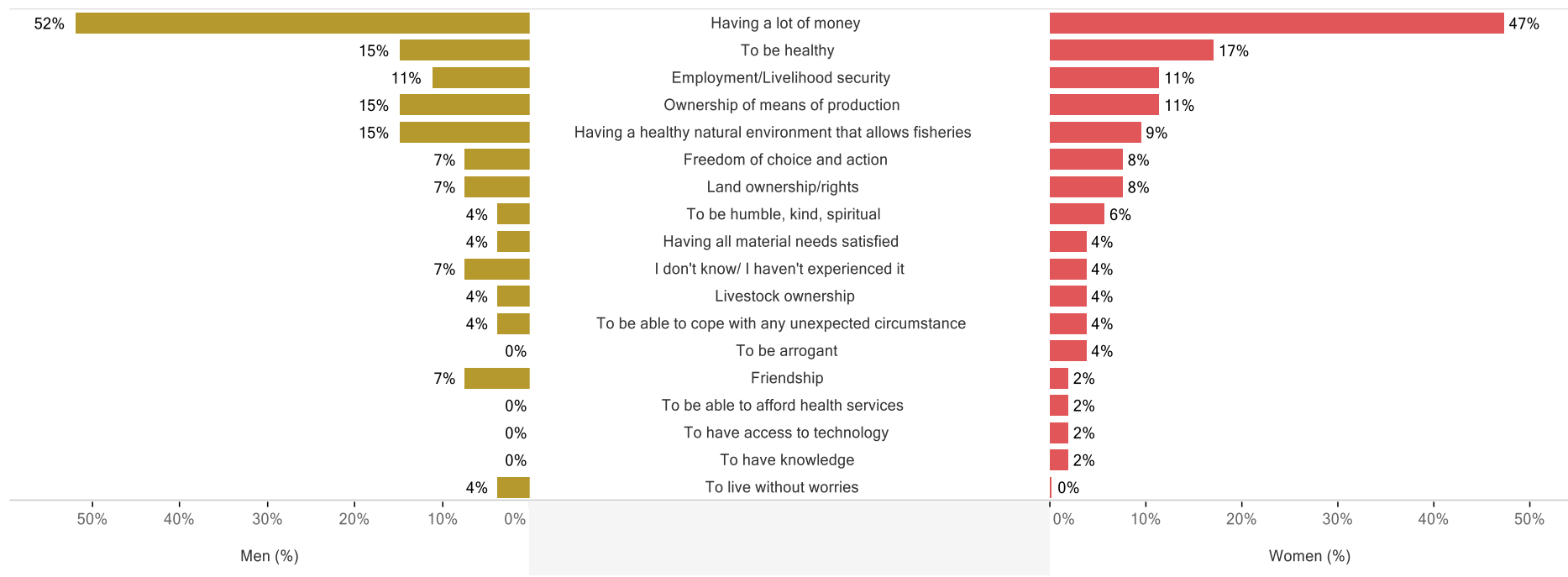


Figure 6-9. Definitions of wealth as perceived by Women and Men



6.4.2. Local perceptions of the reasons of wealth

To the question, *'why are people wealthy?'* respondents gave a range of answers that were classified using the same typology as in the case of poverty (Figure 6-10). In contrast with the reasons that explained poverty, which were mainly associated to institutional-mediated limitations, such as the lack of employment opportunities (36%) and low wages (20%), the main reason of wealth was identified as the starting-point personal circumstance of being born in a wealthy family or having inherited family's wealth (36%). The second most-frequent reason was the access to well-paid jobs (25%); followed by the ownership of work assets and means of production (14%), such as fishing boats or fish-processing plants.

In a similar way as in the case of poverty, wealth is understood as the result of many interlocking factors that cluster together to allow feedback loops, either of poverty or wealth. For example, being born in a wealthy family interlocks with owning fishing boats/land rights/livestock which interlocks with a higher ability to find a well-paid job.

Personal behaviour and attitudes are also considered reasons of wealth, but to a less extent than family's wealth, access to well-paid jobs and ownership of work assets. Among the personal behaviours and attitudes that were identified as reasons of wealth are good financial management (14%), hard work and personal effort (11%), engagement in illegal activities (10%), abuse and exploitation of others (6%), making good decisions in life (6%), have a good attitude towards life (4%), greed (3%) and to be creative/innovative (3%).

In comparison with poverty, luck and random reasons were locally perceived as contributing more to wealth (6%) than to poverty (3%). Environmental factors, specifically the access to a healthy natural environment was considered as a reason for wealth according to 6% of the respondents; while relational factors (good relations with the family and the community) were identified by 4% of respondents.

The gendered analysis (Figure 6-11) shows that women and men differ in the contributions of some reasons for wealth. For example, while 28% of women considered having a well-paid job a reason for wealth, only 19% of men shared this view. In relation to personal effort, 15% of the women considered this as a reason for wealth, whilst only 4% of the men shared this view. Having healthy fisheries was considered as a reason for wealth by 11% of men whilst only 2% of the women. These results, which show similarities with the poverty definition analysis, highlight the central role of fisheries in enabling life functionings of men; while at the same time highlighting women's perceptions, focused on highlighting the central role of accessing alternative well-paid jobs.

Figure 6-10. Local perceptions of the reasons of wealth (%)

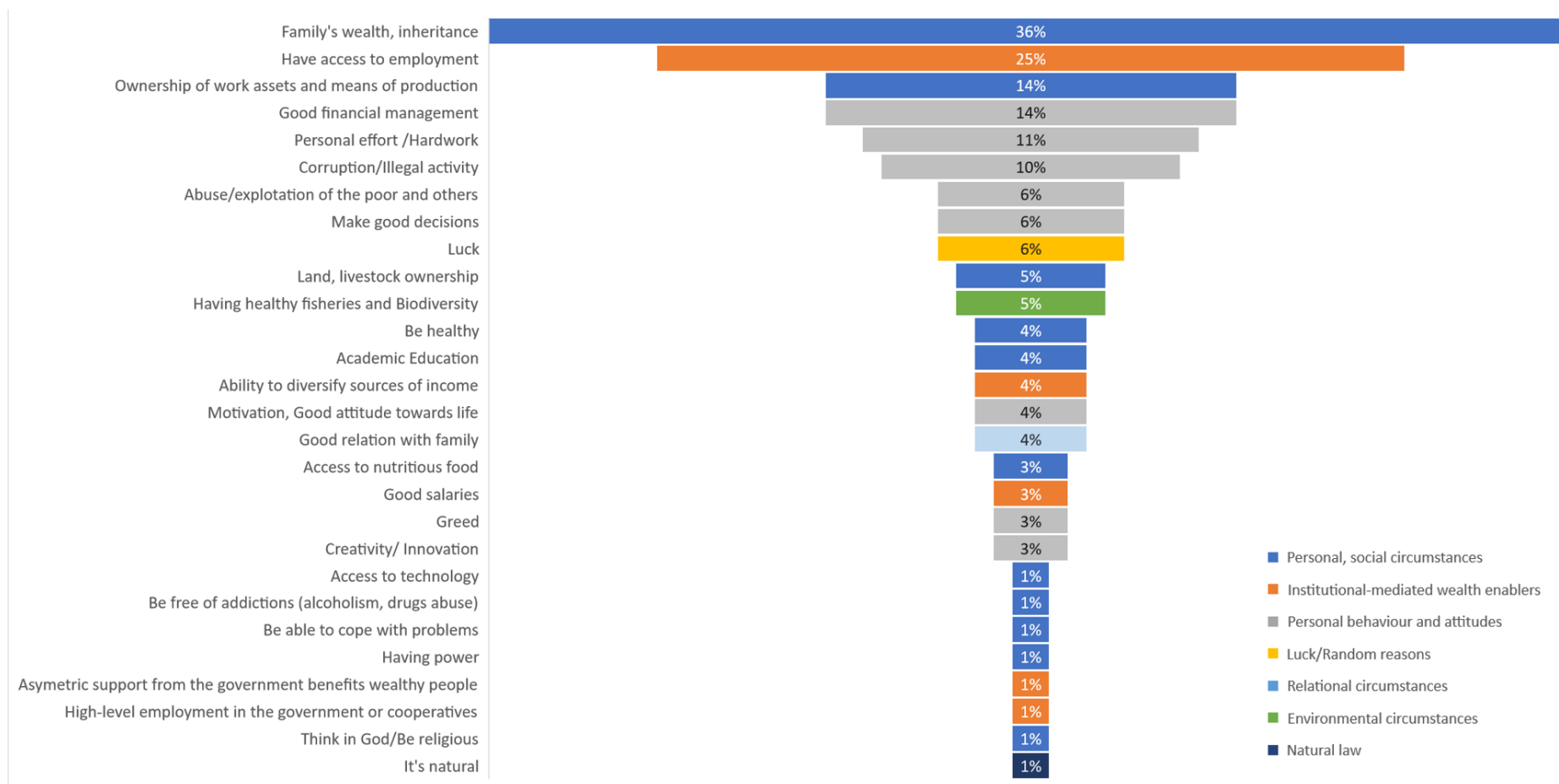
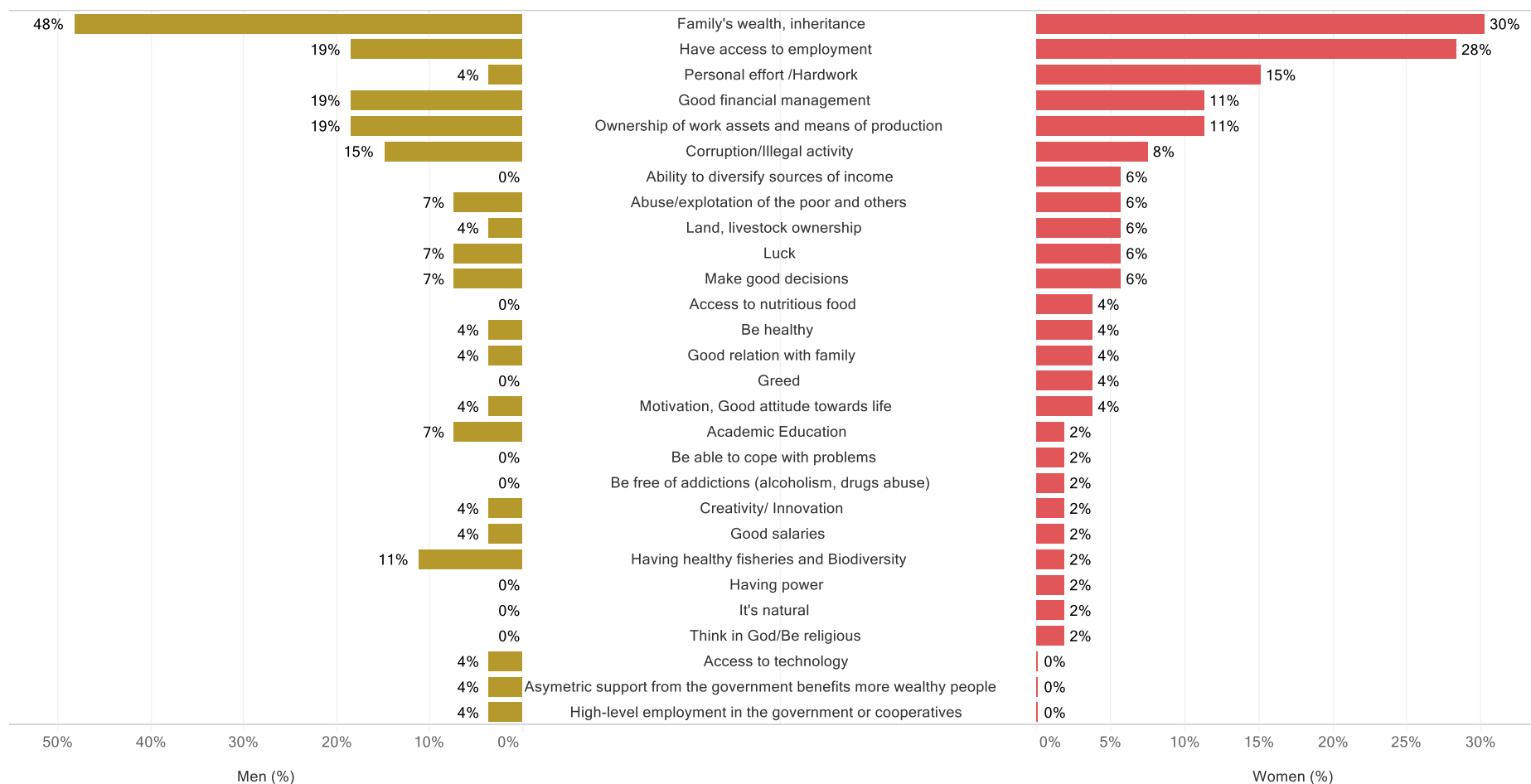


Figure 6-11. Reasons of wealth as perceived by women and men (%)



6.5. Concluding remarks

At the national level, the CONEVAL is normatively grounding the concept of social development in the securement of human and social rights, as legally guaranteed by the Mexican Constitution and the General Law of Social Development (LGDS). Under the argument of indivisibility and interdependence of rights, which is the argument used by CONEVAL, the eight social rights granted by the LGDS should be included in the Mexican multidimensional poverty measure. However, only six of the eight social rights are currently included in the Mexican multidimensional poverty measurement (education, health, access to nutritious food, dignified housing, social security and employment) excluding the right to a healthy environment and the right to no-discrimination.

At the national level, the only environmental-related indicator included in the multidimensional metric is the access to piped water, which is included -and weighted- as one of four sub-dimensions of the Access to basic services indicator. The low weighting assigned by the designers of the multidimensional poverty measure (1/4) to water access doesn't accurately represent the essential role of water for health and basic survival. In addition, the indicator only measures the whether a household has access or not to piped water, whilst completely ignoring the quality of such water. This is highly relevant and worrying because, as presented in Chapter 5, all the respondents affirmed that they did not drink tap water, and for drinking purposes they only consumed bottled water. The empirical research found that an average household (composed by 4 family members) earning a minimum wage⁴⁰, would have to dedicate 16% of its income to purchase bottled water for drinking and other vital purposes.

The results of the local meanings and reasons of poverty and wealth can be summarized in four points. First, the findings indicate that both poverty and wealth are locally defined not by one thing but by intertwined factors that bundle to create fertile advantages or corrosive disadvantages with self-reinforcing effects. In other words, both wealth and poverty, even when mainly defined in terms of having/not having material and non-material aspects, are described by a range of descriptors, such as the lack of freedoms to be and do valuable life functionings, to experience anxiety (feelings) and the effects of institutional factors. These descriptors are not used in isolation but combined with other elements. For example, the experience of anxiety that comes from the simultaneous deprivation of food, income, housing, etc. This finding reinforces what multiple studies have reported: that the experience of poverty is multidimensional (Narayan, Chambers, et al., 2000; Green, 2012; Alkire and Foster, 2011).

⁴⁰ The minimum monthly wage in 2016 was MX\$2,103

The challenge is to understand what dimensions and fertile advantage interlocking conditions (wealth perpetuators) and corrosive disadvantage interlocking conditions (poverty traps) are running in this specific location and making it difficult for people to move out from poverty.

Second, the local definitions of poverty highlight the lack of responses related to environmental conditions. The meaning of poverty is mostly defined in terms of the minimum needed to survive, thus triggering answers that relate to basic survival, such as having enough food, income, a dignified housing and adequate clothing. Enabling conditions catalysed by the natural environment, including the access to nutritious food or the access to employment (and income), seem to be overlooked when respondents are asked about poverty. This is not the case when respondents are asked about a flourishing life, and its constituents and determinants. These results are presented and contrasted in Chapter 7.

Third, the results suggest that poverty interlocking conditions and wealth interlocking conditions include different elements for women and men. The instrumental value of the fisheries is more present in men's perceptions of both poverty and wealth reasons (the lack of or the access to, respectively); whilst the access to academic education to find well-paid jobs alternative to fisheries is more present in women's perceptions. This finding highlights the asymmetrical access to well-paid jobs for women and men, and the centrality of employment as a fertile enabler that can expand freedoms.

Fourth, the findings highlight the role of institutional-mediated circumstances as perpetuating poverty interlocking conditions, specifically, the role of the institutions (local, governmental, markets) in creating job opportunities, regulating fair wages and labour conditions. At a local level, the latter has to do with the relations between fishing permit holders and seasonal fishers or fishers who don't own fishing equipment and are not covered by social protection schemes that cooperatives give.

Chapter 7. Local notions of a flourishing, worth-lived life and the natural environment

And it is rather peculiar to think of the happy person as a solitary person: for the human being is a social creature and naturally disposed to live with others.

Aristotle, Nicomachean Ethics IX.9

7. 1. Introduction

This Chapter presents the results of the qualitative and network analysis of the local meanings of a flourishing life disaggregated by gender and age. The first section of the Chapter presents the wide array of meanings of a flourishing life, organised according to the Conceptual Framework elements of *Resources* (Enabling conditions), *Capabilities*, *Functionings*, *Subjective measures* and *Selfless aspirations*. The second section presents the results of the network analysis. The results identify the core elements of a flourishing life and the interlinkages among identified constitutive and determinant elements. The third section presents the results of the landscape-based analysis. It focuses on examining how the San Felipe landscape contributes to or restricts the achievement of a flourishing life as defined by respondents.

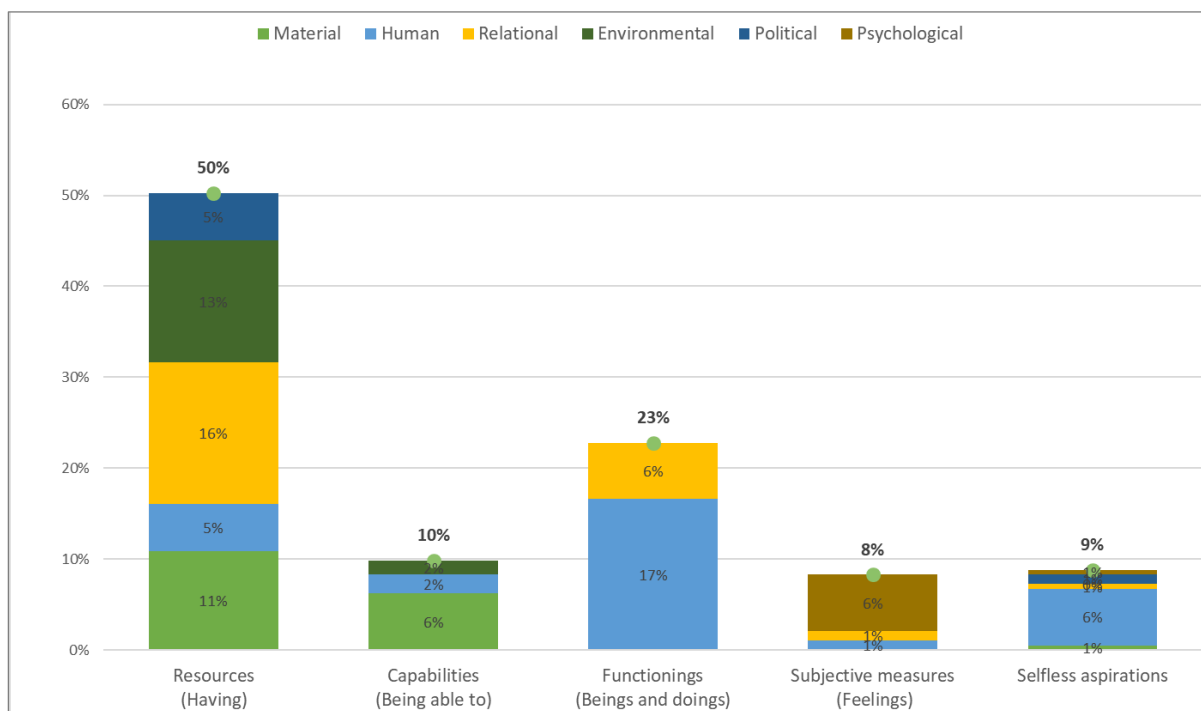
7. 2. Local notions of a flourishing, worthwhile life and the natural environment

Unsurprisingly, the definitions obtained from the qualitative data analysis of the ideal notion of a flourishing life include a wide array of resources, capabilities, beings, doings and feelings. As described in Chapter 4, the examination of the ideal conceptualization of a flourishing life followed three sequential questions. The first was used to capture the widest possible meaning and all the elements that constitute a flourishing life; the second was used to prompt the respondent to extend the timeframe and to think about lifelong aims and motivations; the third was used to capture those elements without which life would be meaningless.

The full detail of responses for each of the three questions is shown in Appendix E

For the first question, ninety respondents provided 198 definitions of a flourishing life. These definitions were analysed and categorized according to the typology⁴¹ presented in Chapter 4. The results of the first question, as shown in Figure 7-1, show that half of the descriptions of a flourishing life were expressed in terms of *Having* a variety of resources that would enable a flourishing life. From the *Resources* group, most responses correspond to relational aspects (15%) (such as *Having a Family* and *having the support of the family and the community*); followed by *Environmental resources* (13%) and *Material resources* (11%). The pre-eminence of *Relational* and *Environmental* resources over *Material* resources in definitions of a flourishing life is a surprising result, as it differs from the conceptualisation of poverty and wealth (Chapter 6) in which material resources such as food, income, housing and dignified housing and clothing have a predominant role.

Figure 7-1. Local definitions of a flourishing life



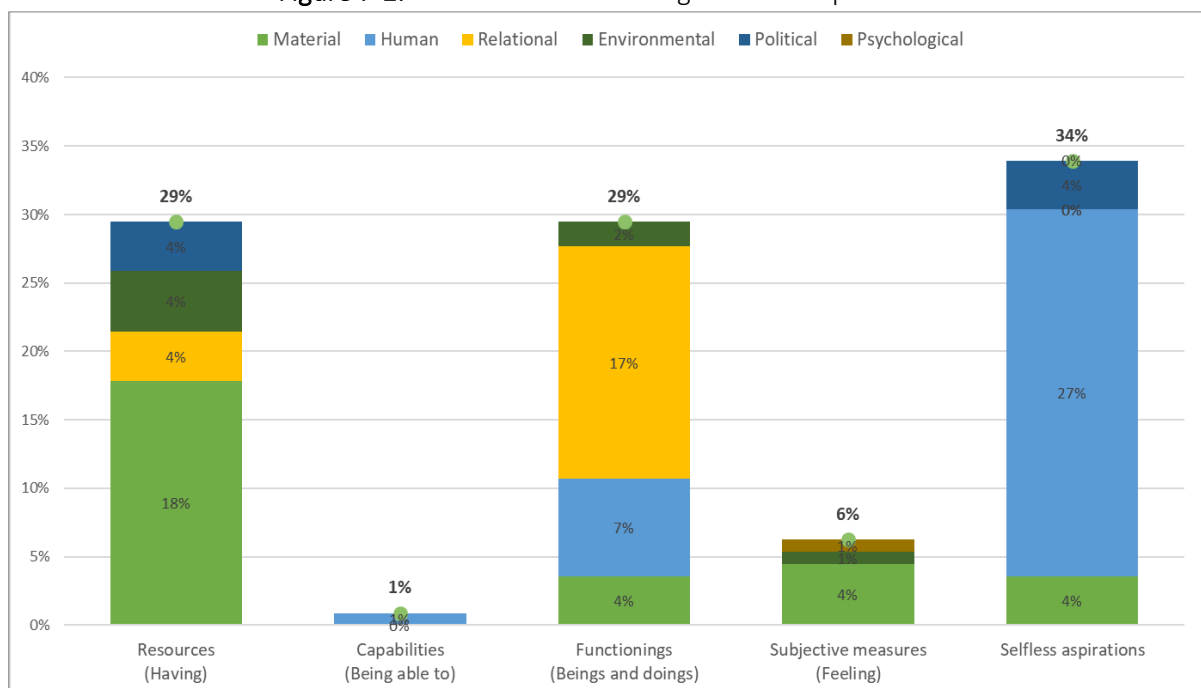
It can be seen from the data in Figure 7-1 that a flourishing life was also defined by 'beings' and 'doings' (functionings). The main valuable human functionings are *Being Healthy* (14%) and *Being with/Look after my family* (6%). Other valuable human functionings with lower consensus include: To have fun, to travel, to progress in life, to be honest, to be humble, to be educated, to be a good citizen, to be hardworking and to love (3%).

⁴¹ The matrix-based typology includes the following categories: *Resources* (Enabling/Disabling conditions), *Capabilities*, *Functionings*, *Subjective Measures* and *Selfless aspirations* as columns and *Material*, *Human*, *Relational*, *Environmental*, *Socio-political* and *Psychological* as rows.

A flourishing life was also expressed in terms of having life options (Capabilities) or being able to do things that are considered valuable (10%). These responses were grouped under the category *Capabilities* to highlight that the respondent's answers posed value not only in the fact of achieving certain functionings in a specific moment in time, but in the possibility/ability of having life choices and being able to maintain the achievement of life functionings over time. For example, a respondent mentioned that a flourishing life is *Being able to keep studying*. She then described the moment when she couldn't continue her education due to family restrictions and financial constraints. In this case, the element of a flourishing life refers to the *option* not the *functioning*, as element of a flourishing life. Examples of material-related capabilities (corresponding to 6% in the Capabilities group) include *Being able to pay my debts* and *being able to be adequately nourished*.

Figure 7-2 shows the results obtained from the analysis of the second question. Ninety respondents provided 117 answers. Asking respondents about the dream of their lives had the purpose of encouraging thinking about the long-term rather than in the immediacy of satisfying short term needs. Interestingly, answers to this question shifted from having resources (of any kind) to defining life-long motivations in terms of non-self-centred future aspirations (34%).

Figure 7-2. Local definitions of long-term life aspirations



As detailed in Chapter 4, the element *Selfless aspirations* was added during data analysis to group definitions of a flourishing life that are expressed in terms of others' future's functionings. The criterion to code definitions under this category was that the answer was expressed using third person rather than first-person as the subject of the action. Some examples of definitions that were grouped under

this category include: 'The dream of my life (my lifelong aspiration) is that my children are able to complete higher education' (15%), or 'My lifelong aspiration is that my family are able to have all their needs satisfied' (8%).

A noteworthy result is the idea of Education as an element of a flourishing life. As inspected in the definitions of a flourishing life, *being educated* or *having access to education* had a low consideration (only 2%). However, when inspected through the long-term lens, most respondents (15%) defined the idea of their children to have higher education as the dream of their lives. This is consistent with a recurrent worry expressed in relation to how changing conditions of fisheries is making the life of fishermen harder (declining fish stocks, increased competition, the dangers associated to illegal fishing) and the wish that their children would find alternative employment to fishing, to which education is considered a requirement.

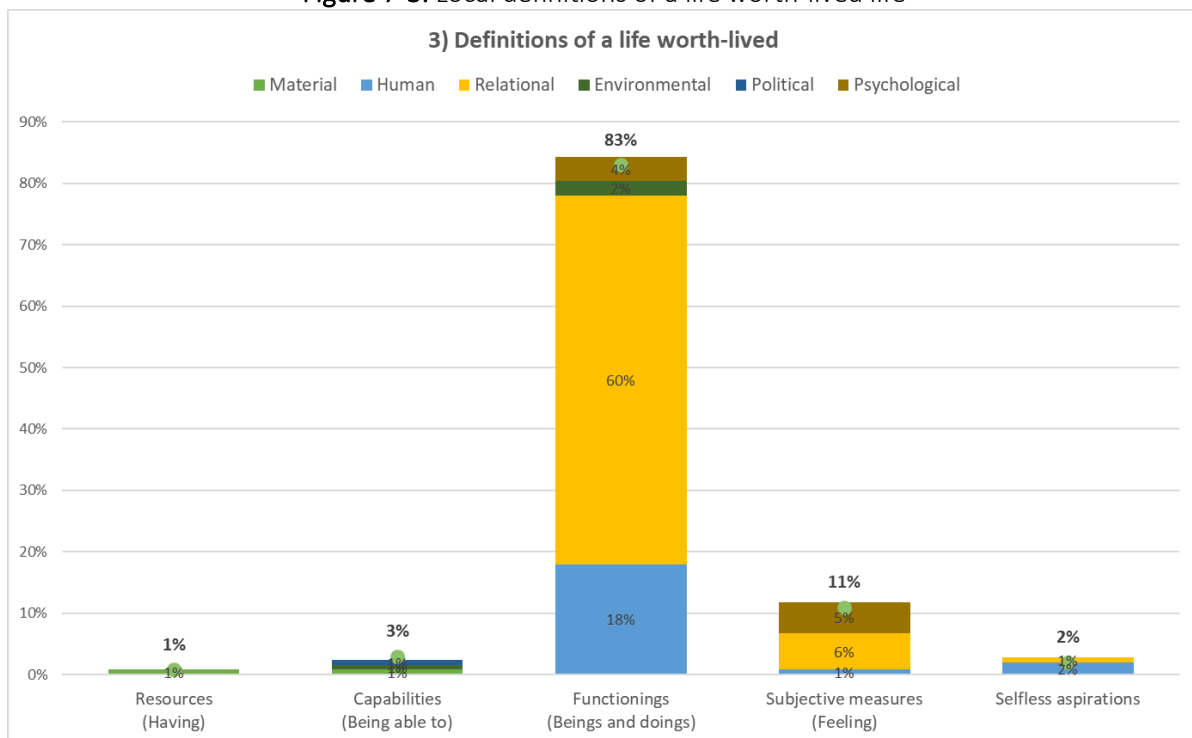
Another distinctive feature is the definition of long-term aspiration in terms of *Functionings* (Beings and Doings) (29%), particularly in terms of relational functionings, that is, *Being in relation to others*. A recurrent answer of valuable functionings of this kind was *to be with my family* (15%); *to see my children grow* (5%); *to look after my family* (3%).

Comparing data from Figure 7-2 with the data in Figure 7-1, a noteworthy element is the increased relevance of having material resources as a long-life aspiration (from 11% to 17%) and the reduction of the relevance of having environmental resources (from 13% to 4%). Considering that *having nutritious food* was coded as a resource within the environmental dimension, these results can be explained by the fact that most of the respondents answered the life-long aspiration question in terms beyond minimum thresholds of material needs satisfaction, under which having access to food is included.

Figure 7-3 presents the results obtained from the third question, in which definitions of a life worth-lived were examined through the question: What is that without which your life would be meaningless? To this question, ninety respondents provided 173 answers. Interestingly, differently from the two previous questions, the answers were not scattered along Resources, Capabilities, Subjective Measures or Selfless/Extended-self aspirations, but mainly located in the group of *Beings and Doings* (Functionings) (83%). Within this group, most definitions described relational aspects (60%). Some examples include: *to be with/ look after my family* (11%), *to see my kids grow* (10%), *to do the right things for oneself and others* (7%), *to leave something good to others* (2%), *to spend time with friends* (1%).

Eighteen percent of the responses corresponds to life functionings describing a set of valuable *doings*, such as: *to experience life as it is* (9%), *to achieve personal goals* (3%), *to have fun* (1%), *to travel* (1%). Interestingly, the group of statements that were grouped under the category of “*experiencing life as it is*” (9%) define a worth-lived life in a non-hedonistic way. In other words, respondents assigned value to be able to live life even with its natural complications and challenges, which they considered important elements in life. This result contrasts with the low value assigned to Psychological Subjective measures (5%) of *Happiness* (4%) and *Peace of mind* (1%) as elements of a worth-lived life.

Figure 7-3. Local definitions of a life worth-lived life



In summary, these results show that the idea of a flourishing, worth-lived life in San Felipe, Yucatán, involves having a bundle of resources, mainly *relational* (such as having a family, good relations with the community, friendship and social support networks); *environmental* (such as healthy fisheries and clean air); and *material* (mainly good housing that can cope with natural disasters).

These resources allow a diverse array of beings and doings that are considered valuable for a worth-while life. The most valued life functionings are *relational* and *human-related*. This means that the most valued activities are those which involve interaction with others. Examples of these statements include *to live with one's family; to look after the family, to see my children grow*. Examples of human-related functionings include *to be healthy, to be educated*.

The data show the definition of life-long aspirations in non-self-centred terms. This means that, in the research site, life purposes and motivations, are mainly defined by family members to be able to achieve valuable life functionings. Among these valuable life functionings is to have higher education, and to possess a variety of human virtues, such as to be hardworking, be honest and behave with civility.

7.2.1. The idea of flourishing life and its nexus to the natural environment

The results obtained from the qualitative data analysis of the first question (perceptions of a flourishing life) highlight the role of the natural environment as a provider of environmental resources such as clean and safe water, nutritious food, livestock, land and healthy fisheries. Healthy fisheries are considered the most important enabler of different valuable functionings of a flourishing life. The following quote reflects this idea:

“The meaning of a good life? “I summarize it in one: Fisheries. If people in San Felipe have healthy fisheries, we have everything. It is the strength to give everything”. Interview 16. Man, 34 years old. Fishing business.

When reflecting about long-term aspirations, the role of the natural environment went beyond provisioner of natural resources to be valued as an enabler of life functionings and subjective measures. For example, some respondents answered that the dream of their lives was to live in proximity with nature and to be able to farm; while others reflected that one of their long-term aspirations was to feel relaxed by the sight of the landscape and its elements.

“The dream of my life is that my kids can complete their career and then, I would like to go to live in my ranch. I love it there... the animals, the plants. It helps me to feel relaxed”. Interview 61. Man, 42 years old. Restaurant owner

Analysing definitions of a life worth-lived in relation to the natural environment triggered most proactive answers of duties to the environment, such as looking after the landscape. In this sense, this type of definition recalls Nussbaum’s argument of the centrality of human agency in conceptualizations of a life worth-lived in comparison with conceptualization of human well-being.

“What makes life worth-living? To leave something useful to the planet and future generations. To leave good memories in the community and the family” Interview 65. Man, 44 years old. Restaurant owner.

“To see that the community is fine in everything. To look after this place, this community”. Interview 77. Woman, 39 years old. Unpaid household chores.

7.3. Interlinkages among Constituents and Determinants of a flourishing Life. Social Network Analysis (SNA) Results.

As argued in Chapter 4, Network Analysis allows the examination of interlinkages using networks and graph theory. Thus, it is well suited to inspect networked structures in terms of the *nodes* (elements within the network) and the *edges or links* (interactions) that connect them. The results presented in this section correspond to the analysis of the Constituents and Determinants of a flourishing life. These data were collected using sequential questions that have directionality. In other words, *determinants* are elements that are instrumental to achieve *constituents*, thus there's a directed interaction (edge) from determinants to constituents.

The results from the analysis present the elements identified by respondents (90) during the semi-qualitative interviews. Constituents and Determinants are represented as *nodes* and the number of interlinkages identified as *edges* (lines connecting nodes). The width of the edges represents the number of mentions that the interaction received. The arrow of the edges shows the directionality of the association. For example, if *Health* is identified as a constituent of a flourishing life and *Food* is identified as a means to achieve health, then the network graph shows both *Health* and *Food* as nodes connected by an arrow coming from *Food* to *Health*.

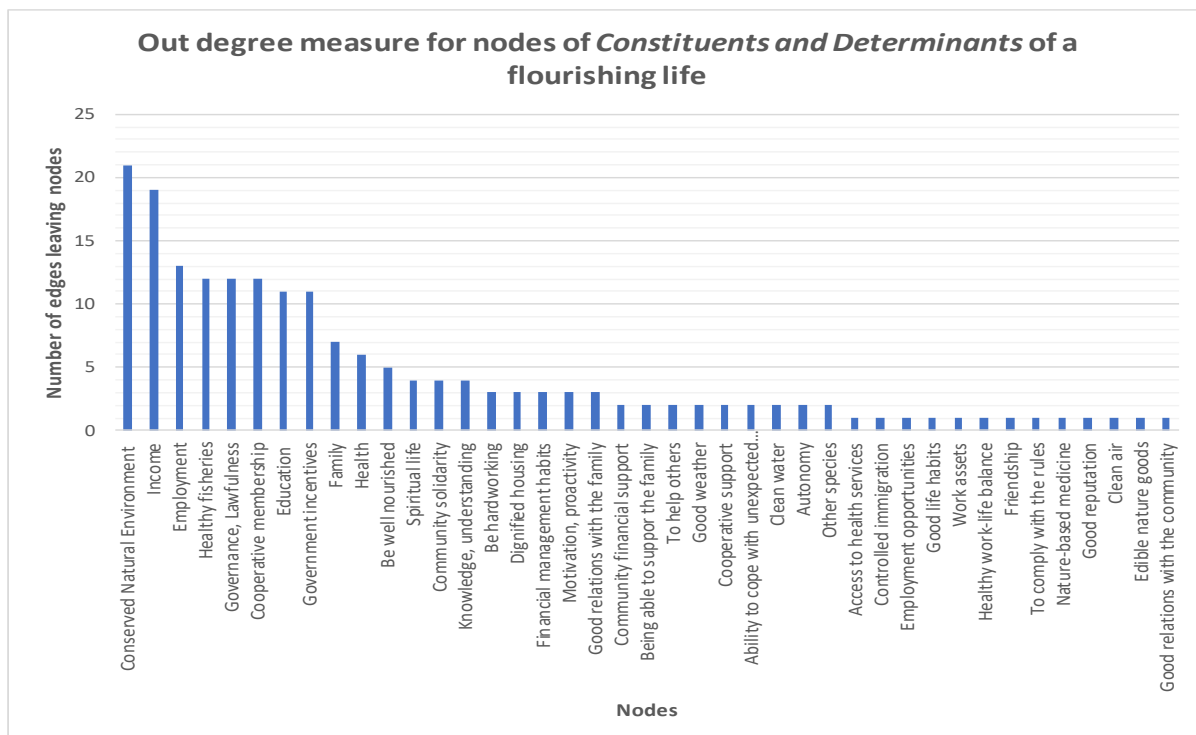
Figure 7-4 presents the network of Constituents and Determinants of a flourishing life according to the eigenvector centrality of each of the nodes. Eigenvector centrality assigns relative scores to all nodes in the network based on their connection to other nodes. Employment (Eigenvector = 1), Income (Eigenvector = 0.9179), Healthy fisheries (Eigenvector = 0.6900), Be well nourished (Eigenvector = 0.6536) and Health (Eigenvector = 0.6302) are the nodes with the highest eigenvector scores.

The network is composed by 61 nodes (vertices) which correspond to the number of resources, beings, doings and psychological states that were identified as valuable in the meaning of a flourishing, worth-lived life. The network has 187 edges, connecting all the nodes. The width of the edges represents the number of mentions that the connection was identified by respondents. The widest edge corresponds to the relationship between Employment and Income. In fact, the graph shows the centrality of the node *Employment* as a determinant of highly valuable elements such as Income and Health. At the same time, it highlights the bidirectionality of the relationship *Health* and *Employment*.

7.3.1. Fertile capabilities: Identification of catalysers of a flourishing life through the out-degree measure

Of the 61 nodes of the network, 42 nodes have edges leaving out from them. This means that these nodes enable other valuable capabilities and functionings. The out-degrees measures for each of the nodes are shown in Figure 7-5. The two nodes with the largest number of edges leaving their vertices are Conserved Natural Environment (Out-degree=21) and Income (Out-degree = 19). These two elements act as fertile advantages, enabling the largest number of valued beings and doings in comparison with other nodes.

Figure 7-5. Out-degree measures for nodes of Constituents and Determinants of a flourishing life



The ego-network of the *Conserved Natural Environment* (Figure 7-6) shows the range of elements that are perceived to flow from the Natural Environment. The width of the edges shows the weight of the relationship, which represents the number of times that the link was identified by the interviewees. For example, if three interviewees mentioned that healthy fisheries were a key ingredient in their own idea of a flourishing life and that in order to have healthy fisheries a well-conserved natural environment was needed, then the weight of the relationship was recorded as 3 and the network graphical representation shows an arrow from the node *Conserved Natural Environment* to the node *Healthy fisheries* with an edge with a width proportional to the weight of the relationship.

Figure 7-6. Conserved Natural Environment Ego-Network showing out-degree links only

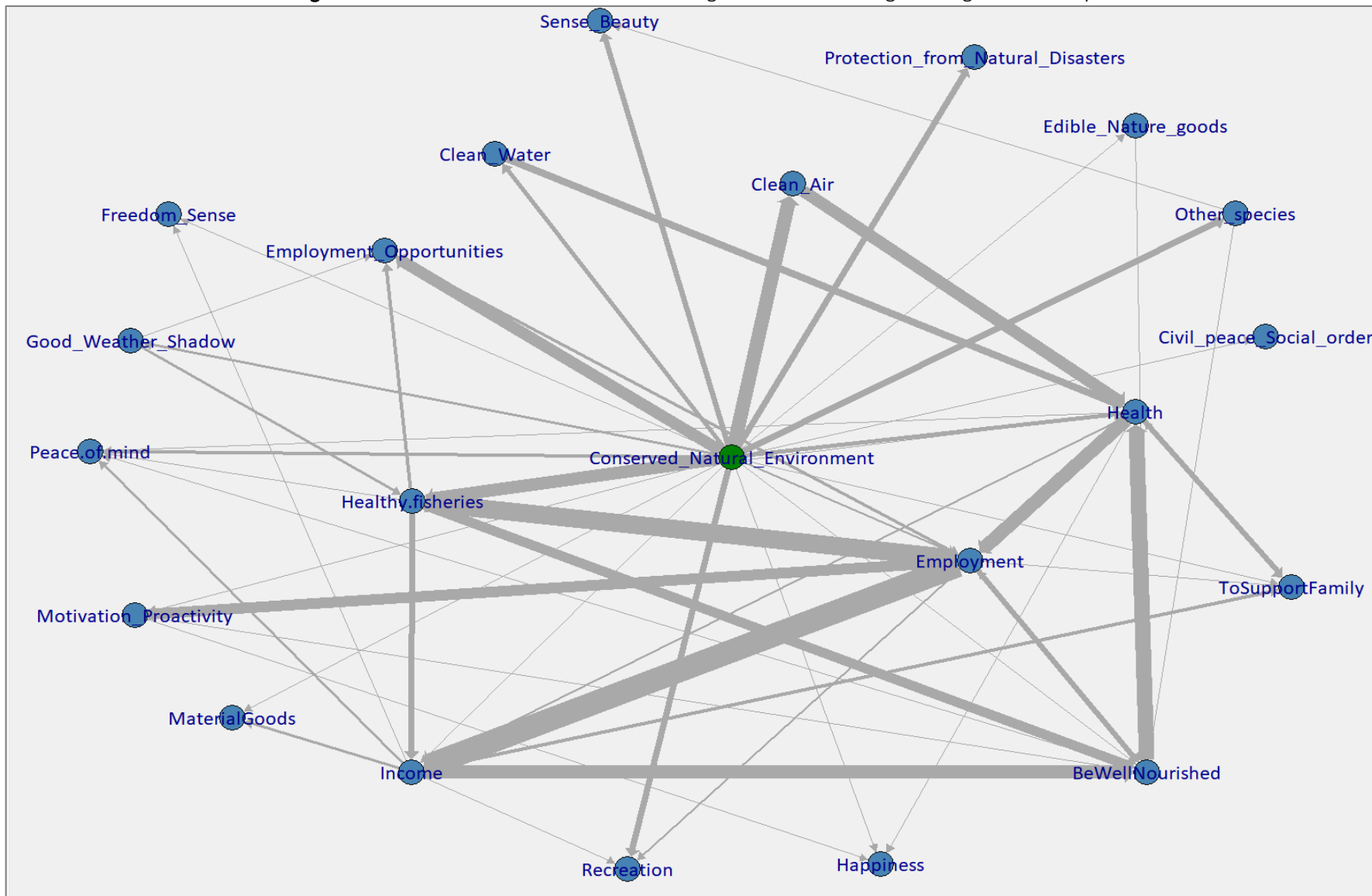


Figure 7-6 presents the ways in which a Conserved Natural Environment enables different elements of a good life, from the highly valued *Healthy fisheries*, which in turn catalyses *Employment and Income*; to other more intrinsically valued elements, such as the sense of Freedom. The three most valued elements flowing from the Natural Environment are *Healthy Fisheries*, *Employment Opportunities* and *Clean Air*. In turn these elements were linked to a series of valuable functionings, such as *Income* and *Health*. Health was strongly linked to the pristine environment of San Felipe, and when asked about determinants of Health, many people attributed it to the *Clean air* and to a lower extent to be well nourished with nutritious food (fresh seafood) and to the proactive action of adopting a healthy life style. In turn *Health* was linked to the possibility of having *Employment*.

The in-degree ego-network of the factor Conserved Natural Environment shows a single edge coming from Governance and Lawfulness. This result captures the perception of respondents that in order to have a functional natural environment, better governance, and lawfulness were needed. As will be detailed in Chapter 9, the perception of illegality, the discretionary application of the management rules of the Biosphere Reserve and the asymmetrical allocation of fish permits spread the acceptance of illegal behaviour as a fair behaviour.

Figure 7-7 shows the ego-network of the resource *Income*. The network suggests that *Income* is valued as a means to facilitate a wide range of other resources and functionings, mainly *access to health services*, *to be well-nourished* and the *expansion of life options*. This reflect a common answer I found when I asked interviewees about the role of income in their lives. People reflected that even when they have access to the Popular Health Service, they refer to the low quality of the service, the lack of medical equipment and the scarcity of medicines. To counterbalance this challenge, having income was the solution to have access to medicines and to be able to travel to Tizimin or Merida to access specialized private health services. In addition, the most common health problem in San Felipe is kidney-related diseases. Under these circumstances people try to get the most locally-expensive bottled water available, Bonafont, which is considered as having the best quality. The expansion of life options refers to the sense of freedom of choice and action that allows people to autonomously choose the path of their lives. Some respondents refer that the lack of income led them to quit studying, mainly because in order to continue mid- and higher education they must travel to nearby towns, and this imply additional costs that not everyone is able to cover. In turn, education is considered to expand life options because it is locally perceived as a way to find alternative employment opportunities other than fisheries.

Figure 7-7. Income ego-network showing out-degree links only

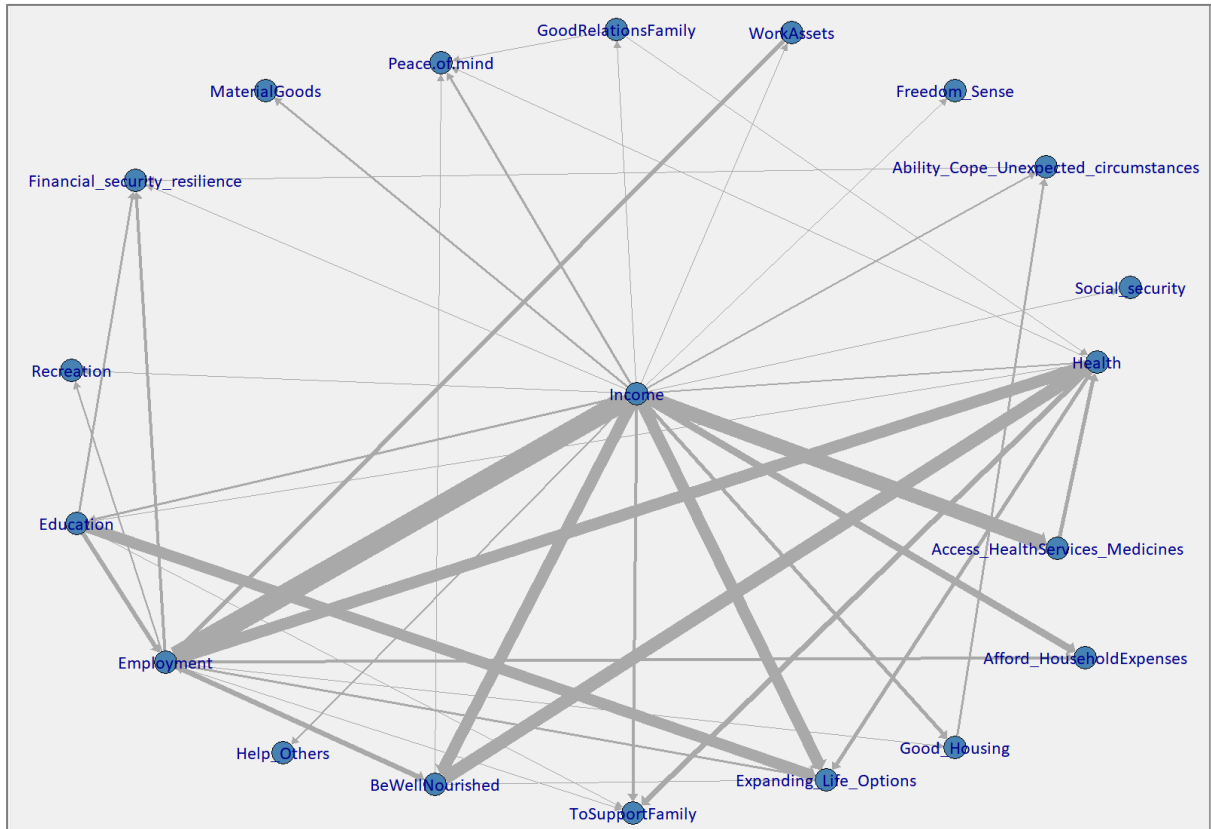
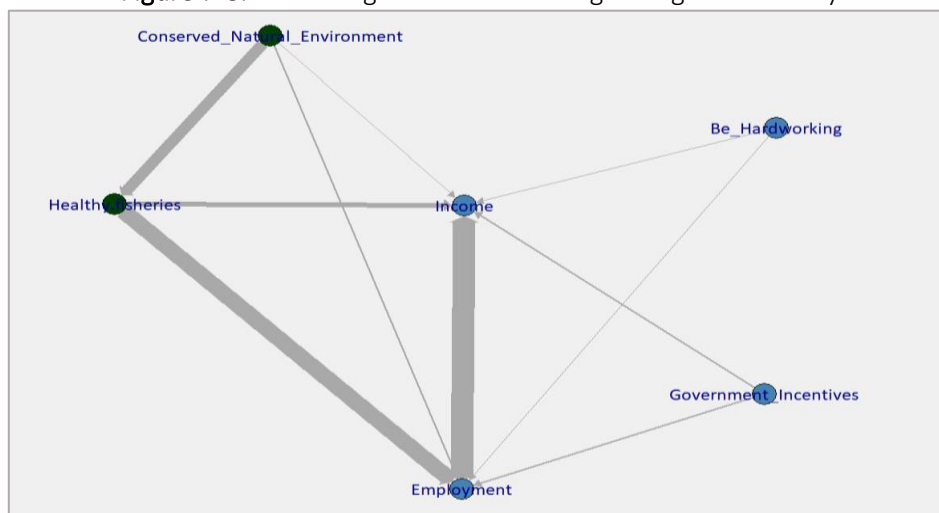


Figure 7-8 shows the ego-network highlighting in-degree links of the component *Income*. According to the respondents' perceptions, the flow of income directly depends mainly on having *employment*, and to a less extent on having *healthy fisheries*, *governmental incentives*, and personal effort (*being hardworking*). However, as the network shows, there is a strong link between conserved natural environment-healthy fisheries-employment. This is noteworthy because, as presented in the previous section, even when *Conserved natural environment* is the most fertile advantage, even beyond income, the direct contributions of the natural environment to a flourishing life are not as visible.

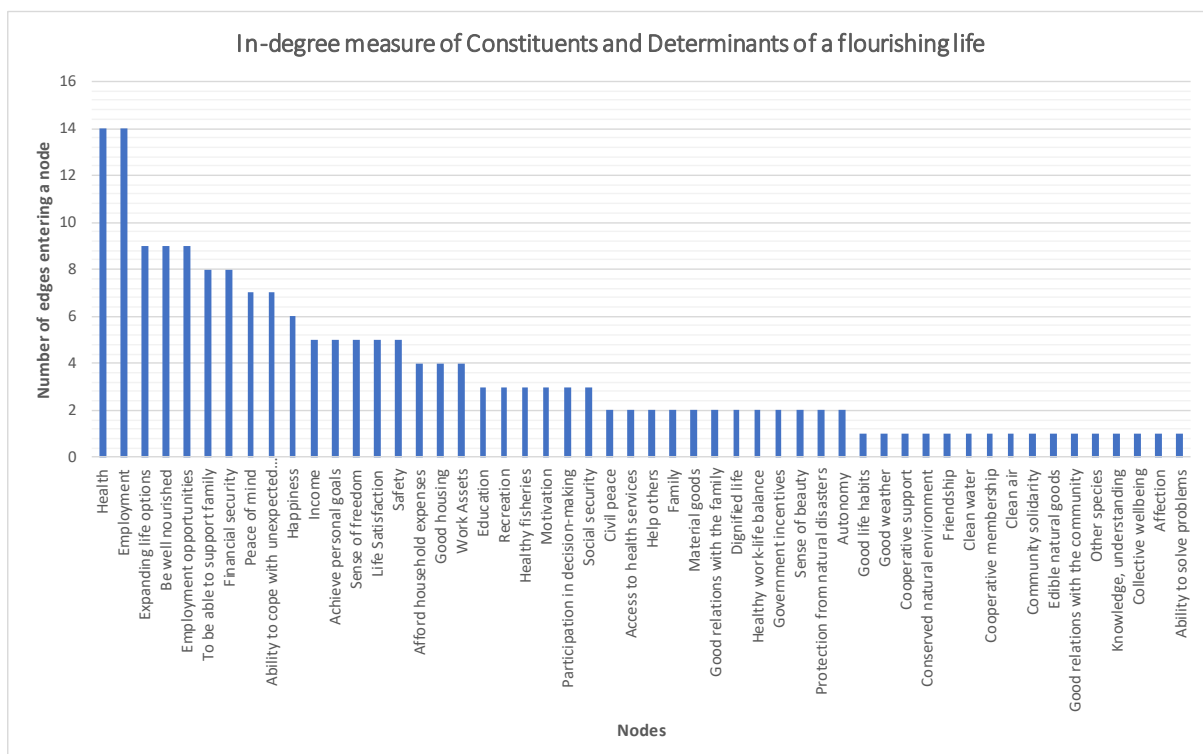
Figure 7-8. Income ego-network showing in-degree links only



7.3.2. Intrinsically-valuable features: The identification of Constituents of a flourishing life through the in-degree measure

The in-degree measure is the number of edges entering a vertex. This measure is useful to identify those elements which are catalysed by other factors and, thus, are highly-valued as end in themselves rather than as means to other things. Figure 7-9 displays the in-degree measure of the network nodes. The two most-valuable elements towards which many other factors are directed are *Health* and *Employment*.

Figure 7-9. In-degree measure of Constituents and Determinants of a flourishing life



Health includes physical and mental health. The contributors of *Health* are multiple, as shown in Figure 7-10. Most respondents directly associate having *Clean air*, having *safe water*, *being well nourished* and *having good life habits* to *Health*; whilst some strong indirect links are shown between *Employment* and *Being well nourished*. This link is explained by understanding that the fishing activity is not only considered as a provider of income but a provider of nutritious food. As a matter of fact, one of the most mentioned enabling conditions of the landscape, as will be presented further in this Chapter, is the access to fresh seafood. The *Natural Environment* contributes to a great extent to the valuable capability *Health* through the provision of *clean air* and *healthy fisheries*. *Income*, on the other side contributes through facilitating *access to health services*.

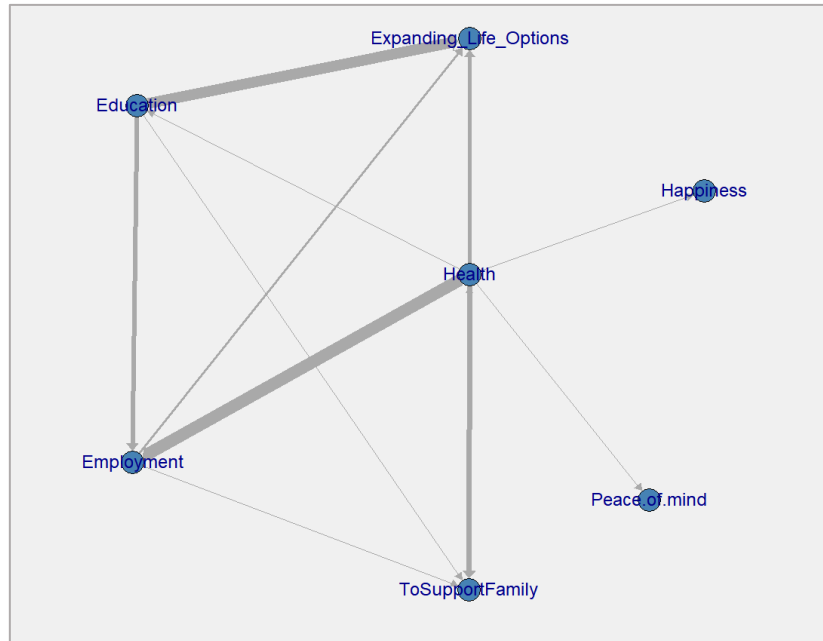
Figure 7-10. Ego-network of Health showing out-degree measures

Figure 7-10 shows that *Health* is mainly valued as an enabler of employment; to be able to support and look after the family and to expand life options and to a lower extent to get education, peace of mind and happiness. The most important contributors to employment are *healthy fisheries* and *health*.

7.3.3. Examining the bundle of central elements of a flourishing life through Cohesive blocks

Figure 7-13 shows the results obtained from the analysis of cohesive blocks. The network of Constituents and Determinants of a flourishing life can be grouped in 5 clusters with different clustering coefficients. The most cohesive block ($c=5$) is composed by the following 13 nodes: 1) Health: 2) Expanding life options, 3) Ability to support family, 4) To be well nourished, 5) Employment, 6) Employment opportunities, 7) Education, 8) Healthy fisheries, 9) Income, 10) Governance – Lawfulness, 11) Peace of mind, 12) Conserved natural environment and 13) Government incentives.

This means that these elements are central to the idea of a flourishing life and function as a bundle that groups the most tightly intertwined block. In network theory, the clustering coefficient ‘ c ’ represent the number of nodes that would disconnect the group if removed. In this case, the 13 nodes are cohesively intertwined and would require the removal of 5 blocks to disconnect the other nodes. Thus, each of these elements allow the connection with the full range of identified components of a flourishing life.

Figure 7-11. Ego-network of Health showing in-degree measures

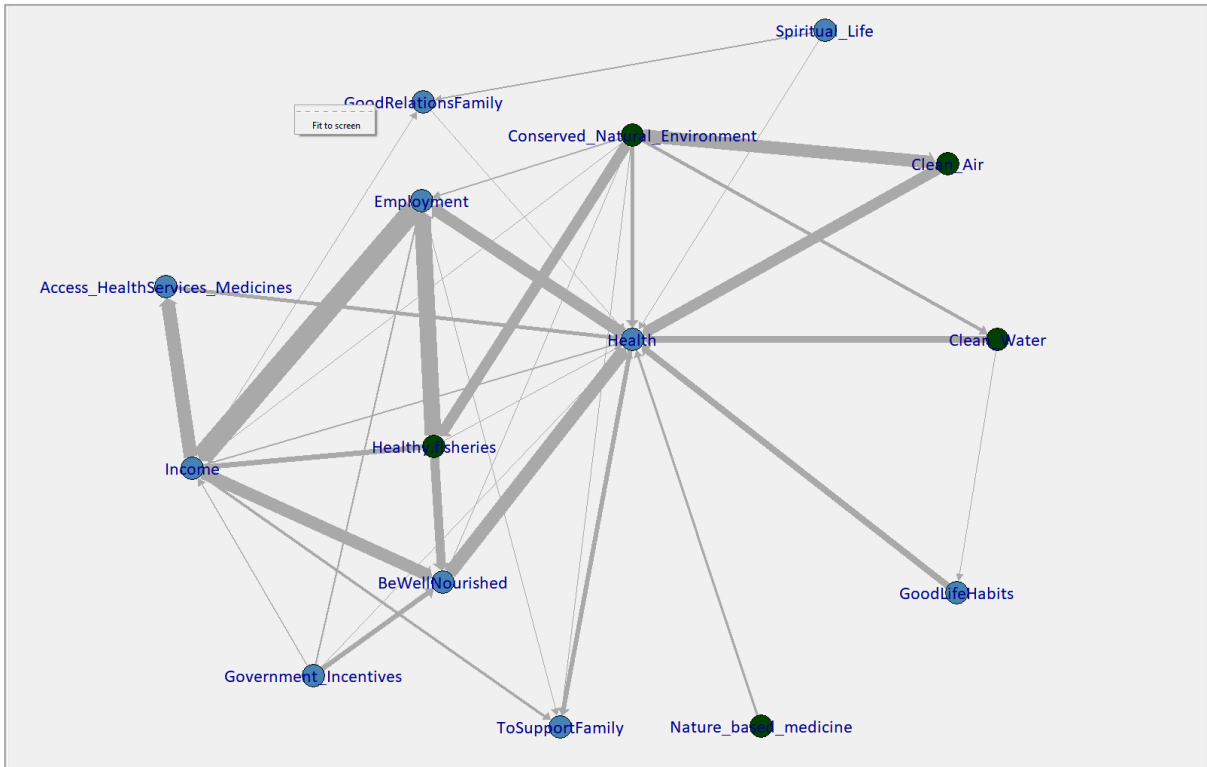


Figure 7-12. Ego-network of Employment showing in-degree measures

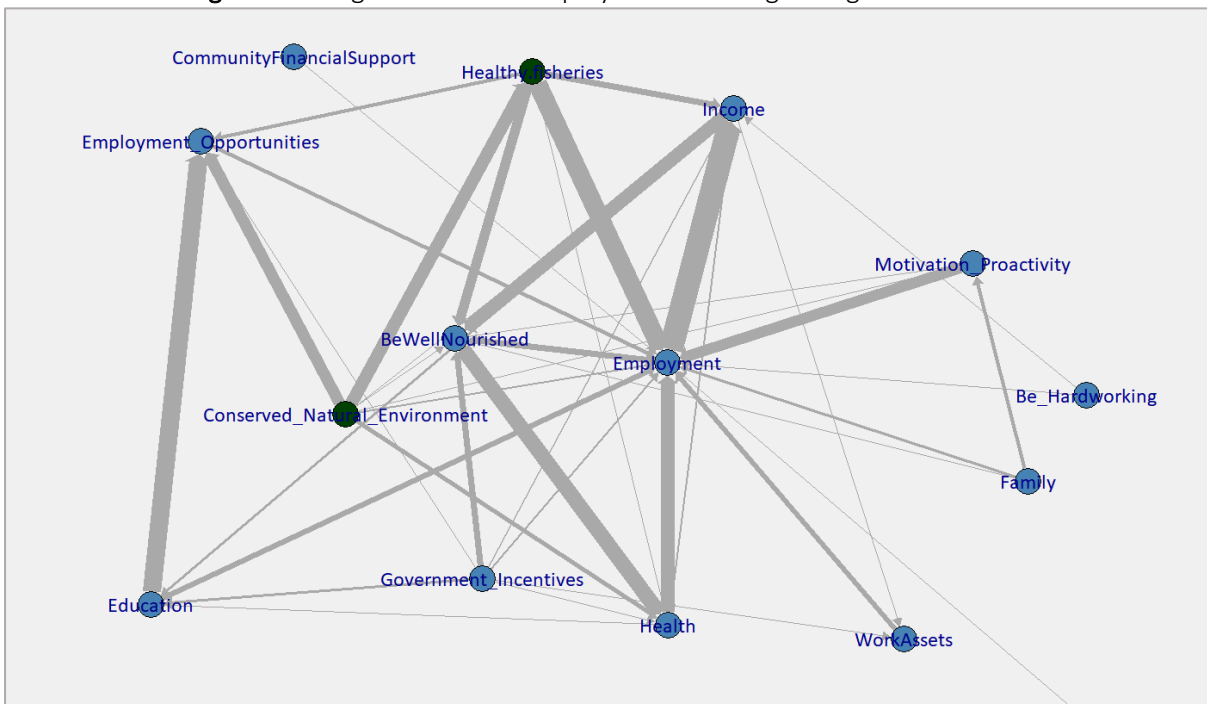
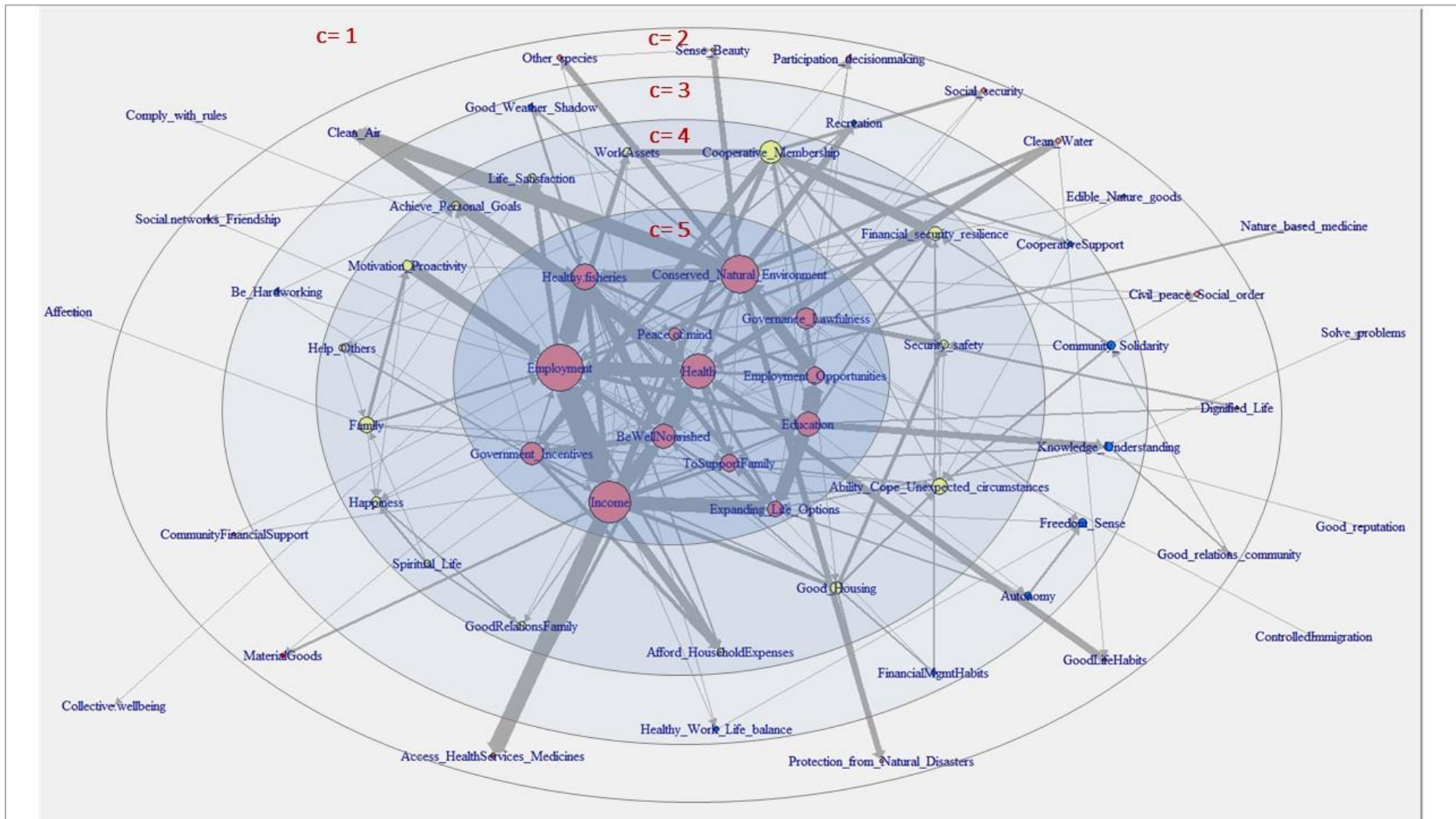


Figure 7-13. Cohesive blocks of Constituents and Determinants of a flourishing life



7.4. Landscape-based Enabling Conditions for a flourishing, worth-lived life

This and the following section focus on the real lived experiences of the interaction with the place in enabling or disabling the achievement of the ideas of a good life. This examination focus on 'actual realisations' (Sen, 2010) rather than on ideal conceptualisations. I used the word 'landscape' (*'paisaje'* in Spanish) to recall a broad meaning of place in which the natural environment and its varied valued elements can be included, while at the same time, examine what other elements specifically attached to the landscape are working as enablers or disablers of a flourishing life. Network Analysis was used to examine both aspects, enablers and disablers through a social difference lens based on gender and age.

In the case of San Felipe, the main source of employment is the fishing activity. This is not only the most widespread activity but also the most lucrative. During low fishing seasons, people find in tourism a good additional economic activity. Commerce and the provision of services (government-related, restaurant, hairdressing, among others) are also sources of employment in the community. Thus, people systematically unable to participate in any of these activities are excluded from employment and the benefits that derive from it.

During my fieldwork I noted that some members of the community expressed their struggles to find a well-paid employment. Some women complained that apart from fisheries, there were very few well-paid employment opportunities for women. The most prevalent option for them was to work as shop attendants, but employment conditions are below the national minimum wage without any kind of social security provisions. Some women didn't notice any difficulty in terms of employment, referring to the *Women fishing cooperatives* as sources of access to the fishing activity.

However, it is important to note that women perform the fishing activity at night and is mainly focused on two species of crabs which serve as baits for the octopus' fishery, and which are less well-paid than the main fisheries of lobster, octopus and sea cucumber, whose access seems to be reserved for men during the day.

One member of the Women's Fishing Cooperative described her employment situation as follows:

Original Spanish direct quote:

“Somos madres de familia y amas de casa. Antes de salir a laborar en las noches tenemos que limpiar la casa, dar de comer a nuestros maridos e hijos, verificar que los niños hagan sus tareas escolares y, al retorno, ya amaneciendo, hay que preparar el desayuno y la comida del mediodía. Está muy cabrona nuestra chamba, pero el dinero es necesario”

English translation:

“We are housewives and we run our household. Before going fishing at night, we have to clean our houses, feed our husbands and children and check that they have finished their homework. When we come back early in the morning, we must make breakfast and prepare the midday meal. Our work is very hard, but we need the money”.

Elder people also detailed the difficulties of finding employment even when they felt fit to work. As with the gender analysis, the case of the elderly is not homogeneous. Some elders refer that they receive a retirement pension and support from their family; while those who don't have a pension nor family support are heavily dependent on the governmental social protection schemes, such the program '60 and more', which is a bi-monthly cash transfer of MX\$1,160⁴² (~46 GBP) that is designed to cover basic expenses. According to official data, at a national level only 23% of elder women and 40% of elder men have access to a retirement pension; while 26% of elder people don't have pension nor any kind of social support (SEDESOL, 2015).

Regarding to dignity and non-discrimination, with one of the survey questions, I recorded the number of times people have felt discriminated or not treated with dignity. I recorded that most people in the community feel respected and have had few events of discrimination within the community, with some episodes of mis-treatment in governmental offices such as health clinics in Tizimín or Mérida or when carrying out bureaucratic procedures in governmental offices. The few records of discrimination within the community were referred from subjects without heteronormative identities.

To closely inspect the lived experience from the lens of social difference, I ran the analysis of enabling and disabling conditions based on disaggregated data based on gender (male, female) and age (people aged <60 years and people aged \geq 60 years). The type of network analysis ran in this section differs from the one ran for the Constituents/Determinants network analysis.

⁴² Figures of 2015

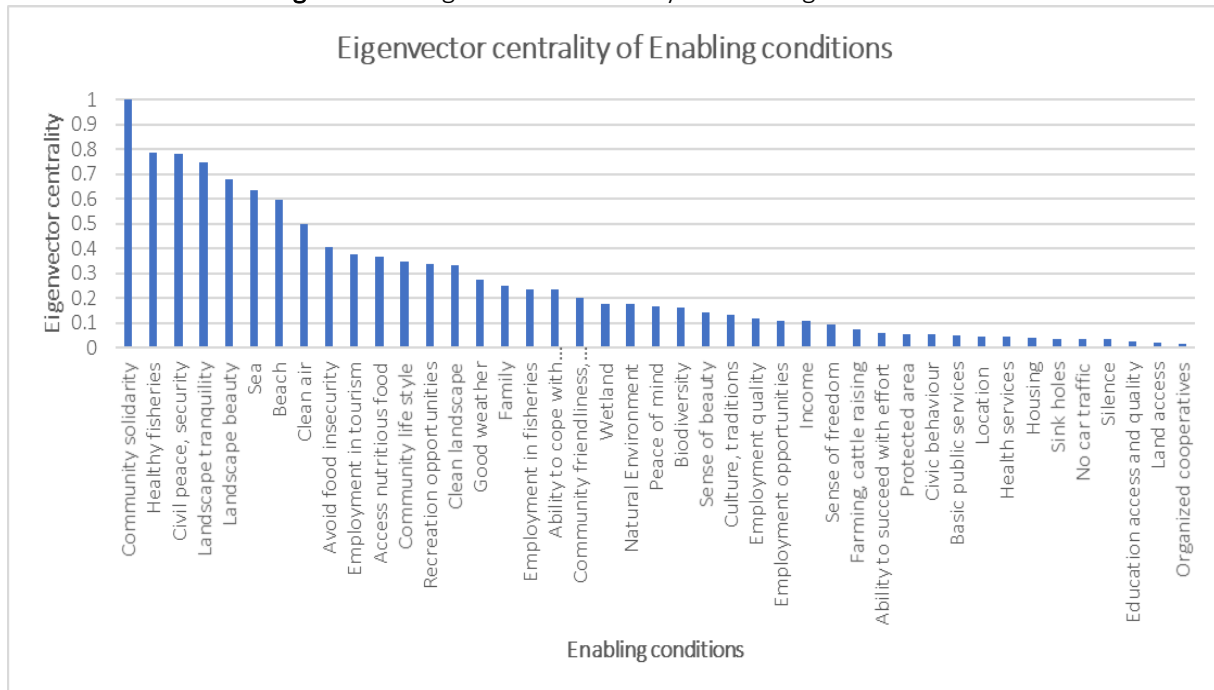
In this section, the matrix used for the analysis is not an adjacency matrix, but an incidence matrix which links individuals with variables, as exemplified in Figure 7-14. Consequently, the network obtained allows the examination of the relationship between individuals and variables. This type of network is denoted 'bipartite network' because is composed by two differentiated entities which can also be analysed separately. This type of analysis allows the examination of disaggregated data and the construction of networks based on gender and age groups. The bipartite network (Figure 7-15) includes both individuals and enabling conditions as differentiated nodes. The network is composed by 136 nodes in total, 43 of which are identified enabling conditions and 93 are individuals; and 365 connections among nodes (edges).

Figure 7-14. Example of incidence matrix constructed for the network analysis of Enabling and Disabling conditions

	Enabler 1	Enabler 2	Enabler 3	Enabler y
Individual 1	1			1
Individual 2		1		
Individual 3			1	
Individual i		1		

Figure 7-16 shows the degree and eigenvector centrality measure for each of the enabling conditions identified during the interviews. As shown in the figure, the most-valued landscape-based enabling condition is the community solidarity, followed by four environmental-related enabling conditions: landscape beauty, healthy fisheries, the sea, and landscape tranquillity.

Figure 7-16. Eigenvector centrality of Enabling conditions

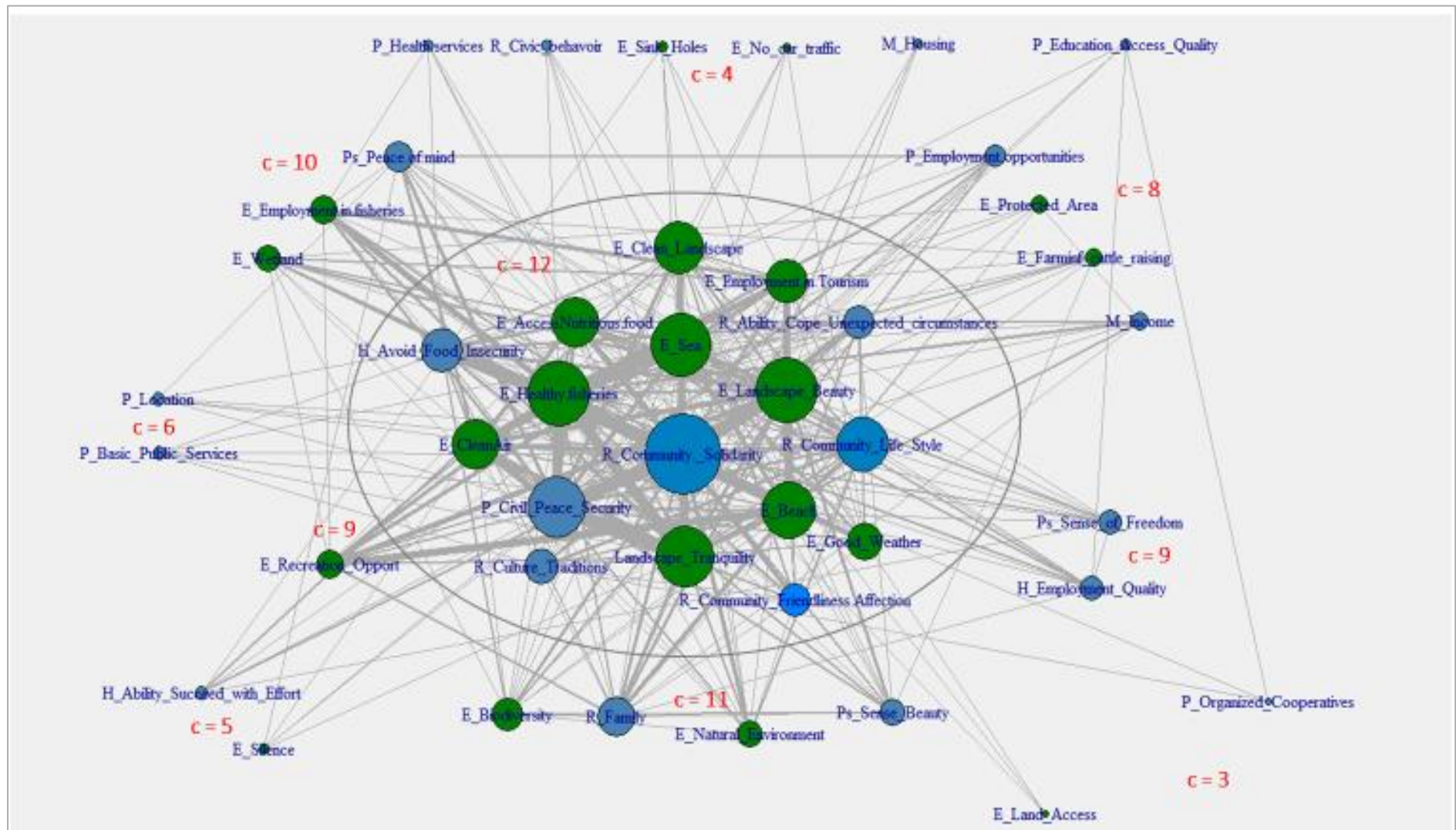


7.4.1. Landscape-based bundles of enablers of a flourishing life: Cohesive blocks

Figure 7-17 shows the ten blocks identified in the Enabling conditions network. The cohesive block structure for the network is composed by 10 blocks with different cohesion coefficients. Block 10 shows the largest cohesion coefficient ($c=12$) and is constituted by 17 elements ($n=17$).

The most cohesive block is Block 10, which is located at the core of the network. It is composed by seventeen elements that work as a tightly knit cluster and include 17 elements: 1) Community solidarity; 2) Landscape beauty; 3) Healthy fisheries; 4) Sea; 5) Landscape tranquillity; 6) Civil peace, security; 7) Beach; 8) Community life style; 9) Clean landscape; 10) Clean air; 11) Access to nutritious food; 12) Ability to avoid food insecurity; 13) Employment in tourism; 14) Good weather; 15) Culture, traditions; 16) Community friendliness, affection and 17) Ability to cope with unexpected circumstances.

Figure 7-17. Cohesive blocks of Landscape-based enabling conditions



Looking at Figure 7-17, community solidarity clearly appears as a key fertile enabler of a flourishing life. During the interviews, community solidarity was described as a source of resilience to overcome a variety of unexpected and challenging circumstances. For example, people constantly described that in case of illness, the community provided an essential supportive role, raising funds to aid the person in need; when facing economic challenges, they describe the common situation of being able to avoid food insecurity by just walking to the seashore, wait for the return of fishermen and asking for help. The community also provides financial support in the form of loans called ‘Mutualistas’, in which a group of people give small payments every month and each of them take turns to receive the large sum collected every month in a cyclical way. Community solidarity appears as a building block of coping capacity, influencing the ability of people who are considered members of the community to cope with challenging circumstances. In addition, community solidarity, linked to community life style, culture and traditions also plays a role in subjective measures of well-being. An example of this link is described in this extract from an interview with an 83-year-old man (Interview #36):

Original Spanish quote:

“Aquí hay amistad, la gente me habla y me visita. Cuando me voy a Mérida me enfermo porque nadie me saluda. Aquí me siento afuera de mi puerta y todo el mundo me saluda. Se alegra uno”.

English translation:

“There’s friendship here. People talk to me and visit me. When I travel to Mérida, I fall ill because no one greets me. Here, I sit outside my door and everyone greets me. It cheers me up”

Notably, 10 out of the 17 enabling conditions at the core cohesive block are elements related to the natural environment. Apart from community attributes, the cluster of landscape elements that serve as enablers of a flourishing life are mostly related to the natural environment. The enabling conditions trigger a varied set of valued elements from instrumental resources such as having healthy fisheries to access nutritious food, employment and income; or the landscape beauty as a source of employment opportunities in tourism; to more relational values catalysing subjective well-being, such as the joy of listening the sound of the flamencos when they flight in flock. This is exemplified by this extract of the interview with a 70-year-old lady (Interview #70):

Original Spanish quote:

“La gente de acá. Hay mucha gente que se ayuda. En tiempo de veda los pescadores te regalan 2-3 pescados y ya tienes para comer. Nos ayudamos mucho. Si me enfermo me traen comida las vecinas. Hacen pan y me traen. Hay un festejo y traen platillo.

....

En el día me gusta ver los flamencos cuando pasan por aquí. De noche se oye cuando pasan y me gusta escucharlos”

English translation:

“People from here. There are many people who help each other. During the fishing ban season the fishermen give you 2 -3 fishes and then you have something to eat. We support each other very much. If I got ill, my neighbours bring me food. If they bake bread, they bring me some. If there’s a celebration, they bring me a dish”.

...

During the day I like to watch the flamencos when they fly in flocks. At night I can hear when they fly, and I like to hear them”.

7.4.2. Gendered perceptions of landscape-based enabling conditions: Network Analysis Results

This section presents the network analysis results based on gender differences. The women's network is composed by 99 nodes in total, 45 of which are identified enabling conditions and 56 individuals; the men's network is composed by 76 nodes in total, 33 of which correspond to individuals. The two groups share the perception of *Community solidarity* as one of the most important landscape-based enabling conditions. The two most important landscape-based enabling conditions for women are *Community solidarity* (Eigen-centrality =1) and *landscape beauty* (Eigen-centrality =0.87). For men, *civil peace and security* (Eigen-centrality =1) and *Community solidarity* (Eigen-centrality =1).

Figure 7-18. Eigenvector centrality of Enabling conditions: Women's perceptions

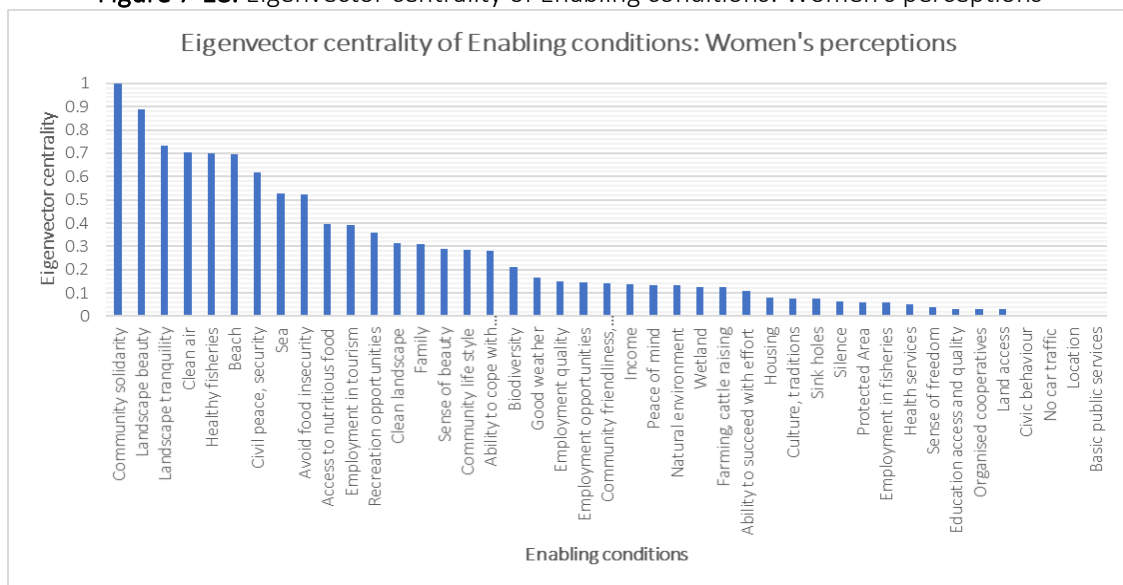
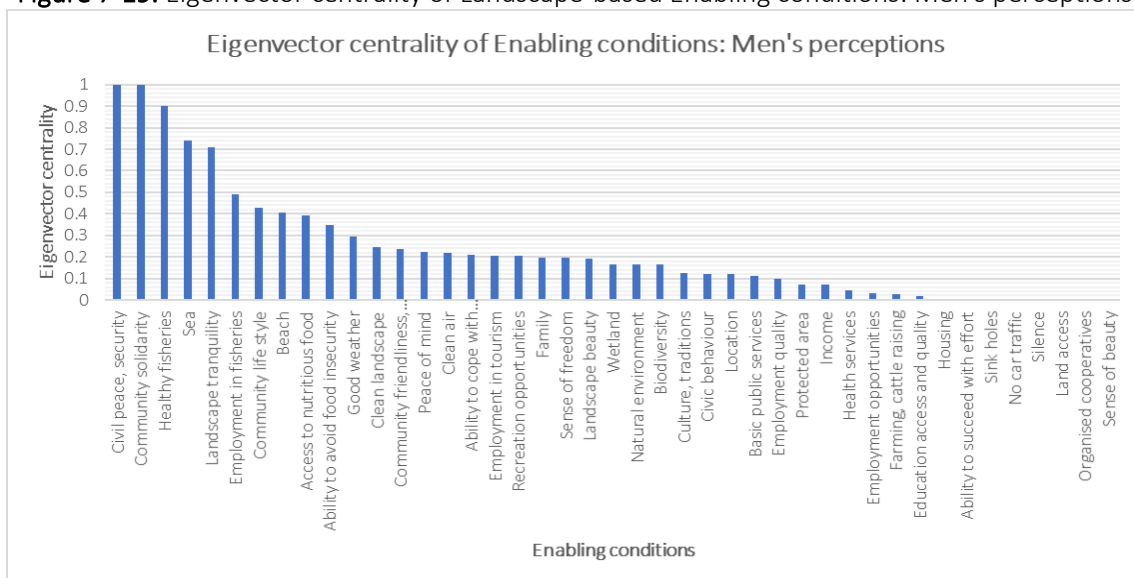


Figure 7-19. Eigenvector centrality of Landscape-based Enabling conditions: Men's perceptions



As Figures 7-18 and 7-19 show, there are notable differences in women's and men's perceptions: *Civil peace/security* and *Healthy fisheries*, whilst important for both groups, are considered as enabling conditions in a higher degree by men (*Civil peace* has an eigen-centrality = 1 for men vs 0.61 for women; *healthy fisheries* has a eigen-centrality = 0.9 for men v 0.7 for women). On the contrary, *Clean air* and *landscape beauty* were highly considered enabling conditions by women. *Clean air* (Eigen-centrality = 0.7 for women vs 0.21 for men) and *Landscape beauty* (Eigen-centrality = 0.89 for women vs 0.19 for men). The network analysis showed the nexus of landscape beauty with relaxing opportunities and with increased employment opportunities in tourism. The results show that, compared to men, women value landscape beauty more; however, the results provide limited information regarding whether landscape beauty is valued as an end in itself or as a means to an end (i.e. tourism income).

7.4.3. Age and perceptions of landscape-based enabling conditions: Network Analysis Results

This section presents the analysis based on two groups according to age difference. Perceptions of people younger and older than 60 years old were grouped and analysed separately in order to identify landscape-based enablers that are impacting in a differentiated way vulnerable groups, such as the elderly. Figures 7-20 and 7-21 show the results for each of these groups.

For both age groups, *community solidarity* appears as the most important landscape-based enabling condition. The three most important landscape-based enabling conditions for younger people are *Community solidarity* (Eigen-centrality=1); *Healthy fisheries* (Eigen-centrality=0.91) and *Landscape beauty* (Eigen-centrality=0.87). The last two elements are associated with employment opportunities. This result suggests that the valuable capabilities and functionings resulting from these enabling conditions are the increased access to employment opportunities and the resilience mechanisms that community solidarity provides, from the ability to overcome food insecurity to other forms of social protection provided by the community.

The three most important landscape-based enabling conditions for people aged ≥ 60 years are *Community solidarity* (eigen-centrality = 1), *Clean air* (eigen-centrality = 0.85), *Landscape tranquillity* (eigen-centrality = 0.72) and, *Civil peace and security* (eigen-centrality = 0.72). *Clean air* was consistently mentioned as a key contribute to *Health* and many respondents attributed the longevity of some community members to the clean air of San Felipe.

Figure 7-20. Enabling conditions as stated by people aged <60 years. Network Analysis Results.

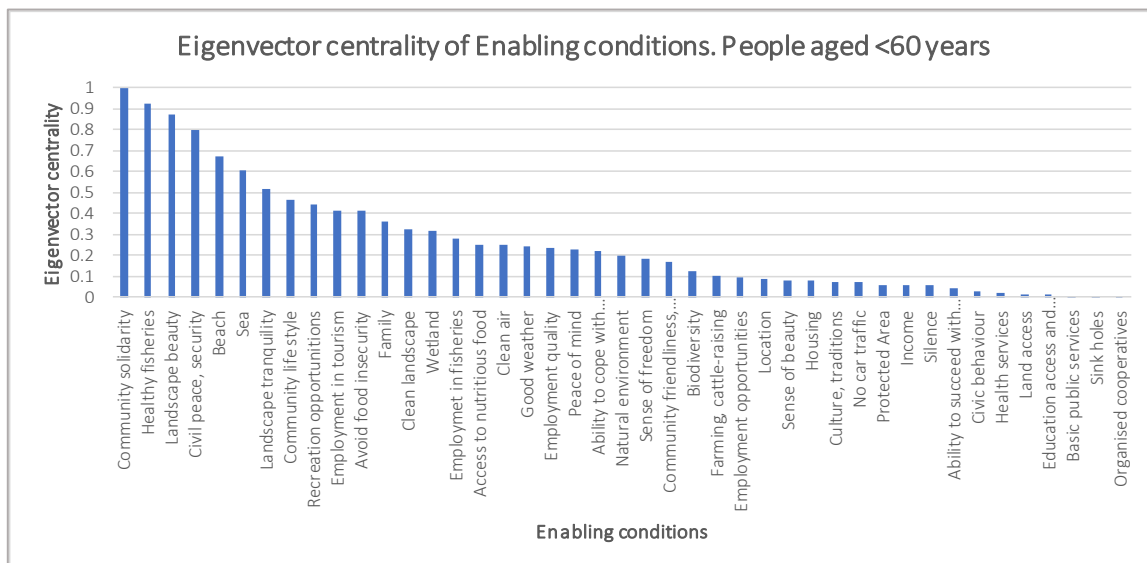
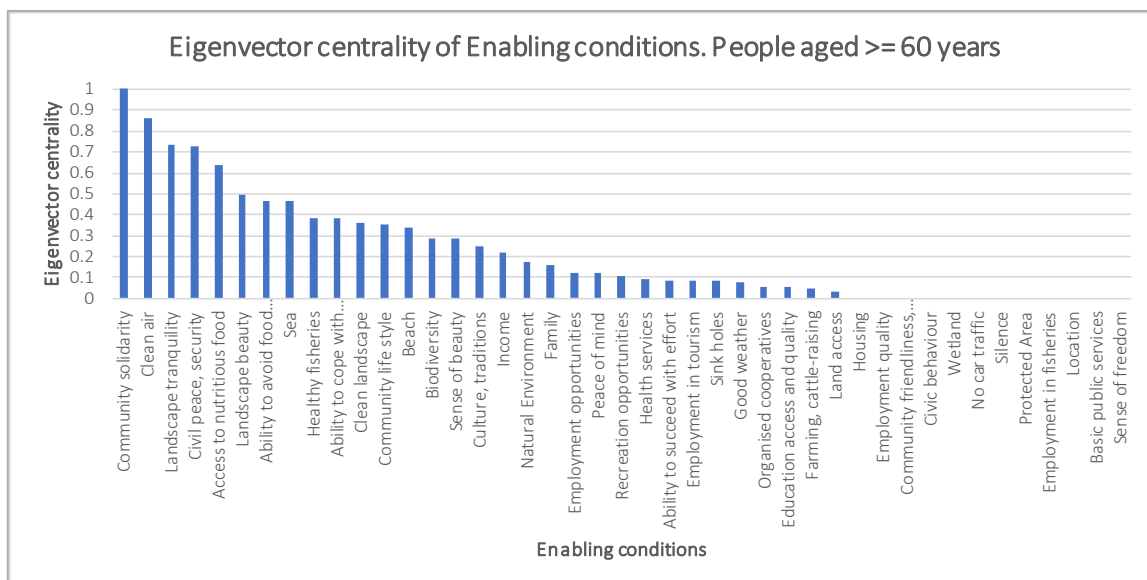


Figure 7-21. Enabling conditions as stated by people aged >=60 years. Network Analysis Results.

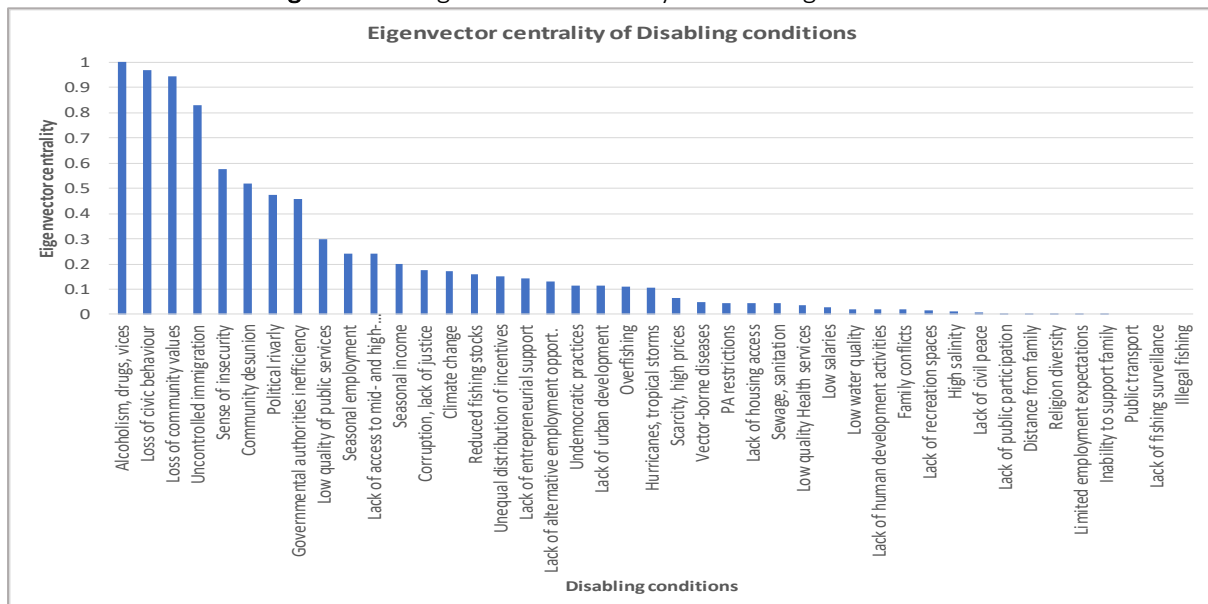


Among the two groups, the main difference is the consideration of *Clean air* as a landscape-based enabling condition. Whilst it has an eigen-centrality of 0.8 for older people, it has only an eigen-centrality of 0.23 for younger people. This might respond to a higher importance assigned to *Health* as a valuable life function by the older group compared to the functioning of *Being Employed* of the younger group.

7.5. Landscape-based Disabling Conditions for a flourishing, worth-lived life

Figure 7-22 and 7-23 show the network results of those elements that were identified as landscape-based disabling conditions for a flourishing life. In comparison to the enabling conditions' network, which has 365 edges, this network (Figure 7-23) is less dense, which means that less disabling conditions linked to the landscape were identified in comparison to enabling conditions. In other words, respondents consider San Felipe as having more elements that help them to achieve their own ideas of a good life than elements that restrict them. Figure 7-22 shows the eigenvector centrality measure for each disabling condition. The four most influential disabling conditions are the presence of *addictions* (alcoholism, drugs abuse), *the loss of civic behaviour*, *the loss of community values* and *uncontrolled immigration*.

Figure 7-22. Eigenvector centrality of Disabling conditions



The cohesive block structure for the network is composed of 10 blocks. The core block has a cohesion of 7, which is lower than for the enabling conditions' network ($c=12$ in its core block). This means that the disabling conditions in this block are less connected to each other than the elements in the enabling conditions network's core block. The most cohesive block is composed by the following 17 elements: 1) *Addictions* (alcoholism, drug abuse); 2) *Loss of civic behaviour*; 3) *Loss of community values*; 4) *Uncontrolled immigration*; 5) *Sense of insecurity*; 6) *Community disunion*; 7) *Political rivalry*; 8) *Governmental authorities' inefficiency*; 9) *Low-quality public services*; 10) *Seasonal employment*; 11) *Lack of access to mid- and high-education*; 12) *Seasonal income*; 13) *Lack of alternative employment opportunities*; 14) *Lack of entrepreneurial support*; 15) *Climate change*; 16) *Hurricanes, tropical storms* and, 17) *Unequal distribution of incentives*.

Figure 7-23. Bipartite network. Landscape-based Disabling conditions

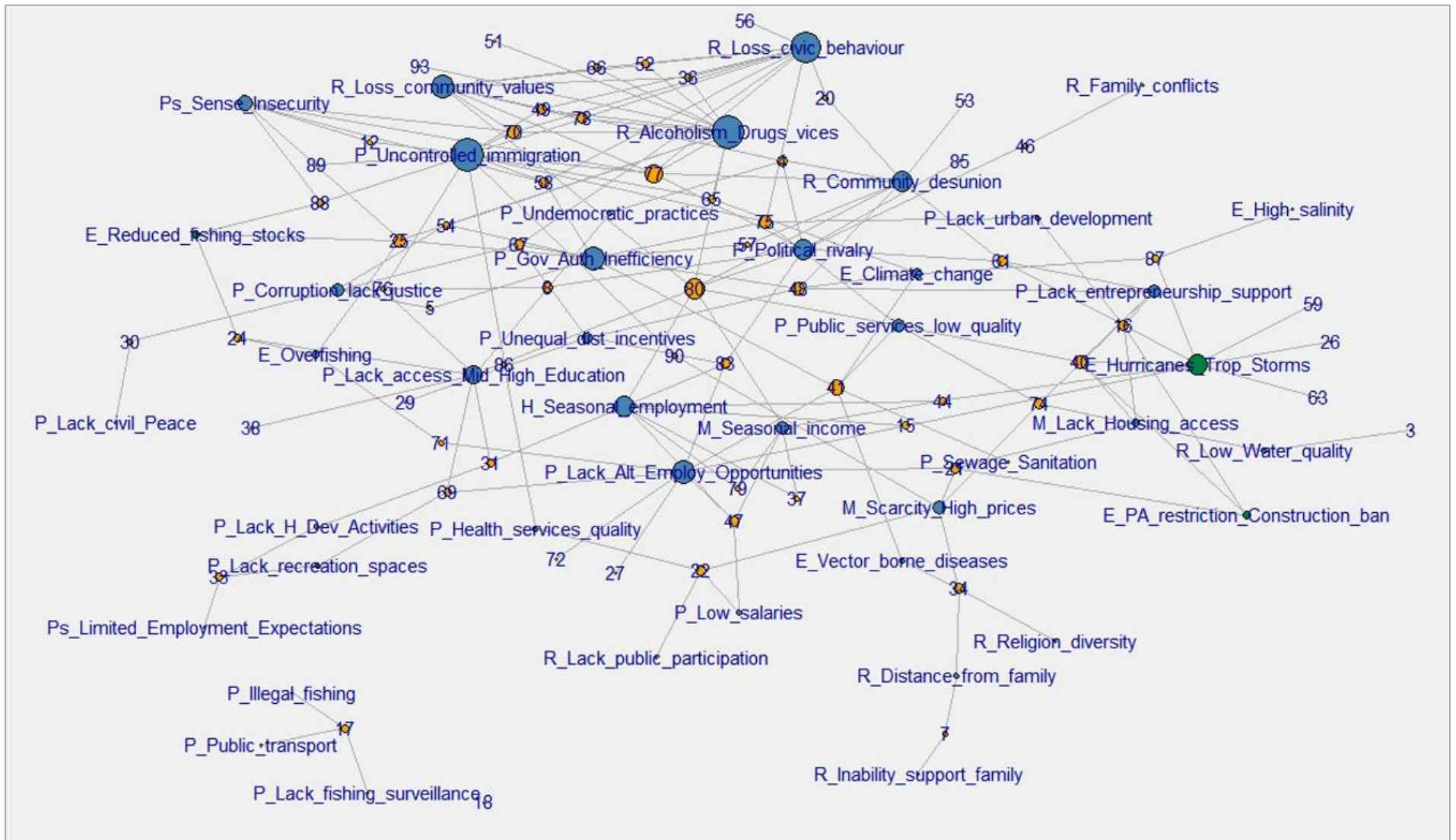
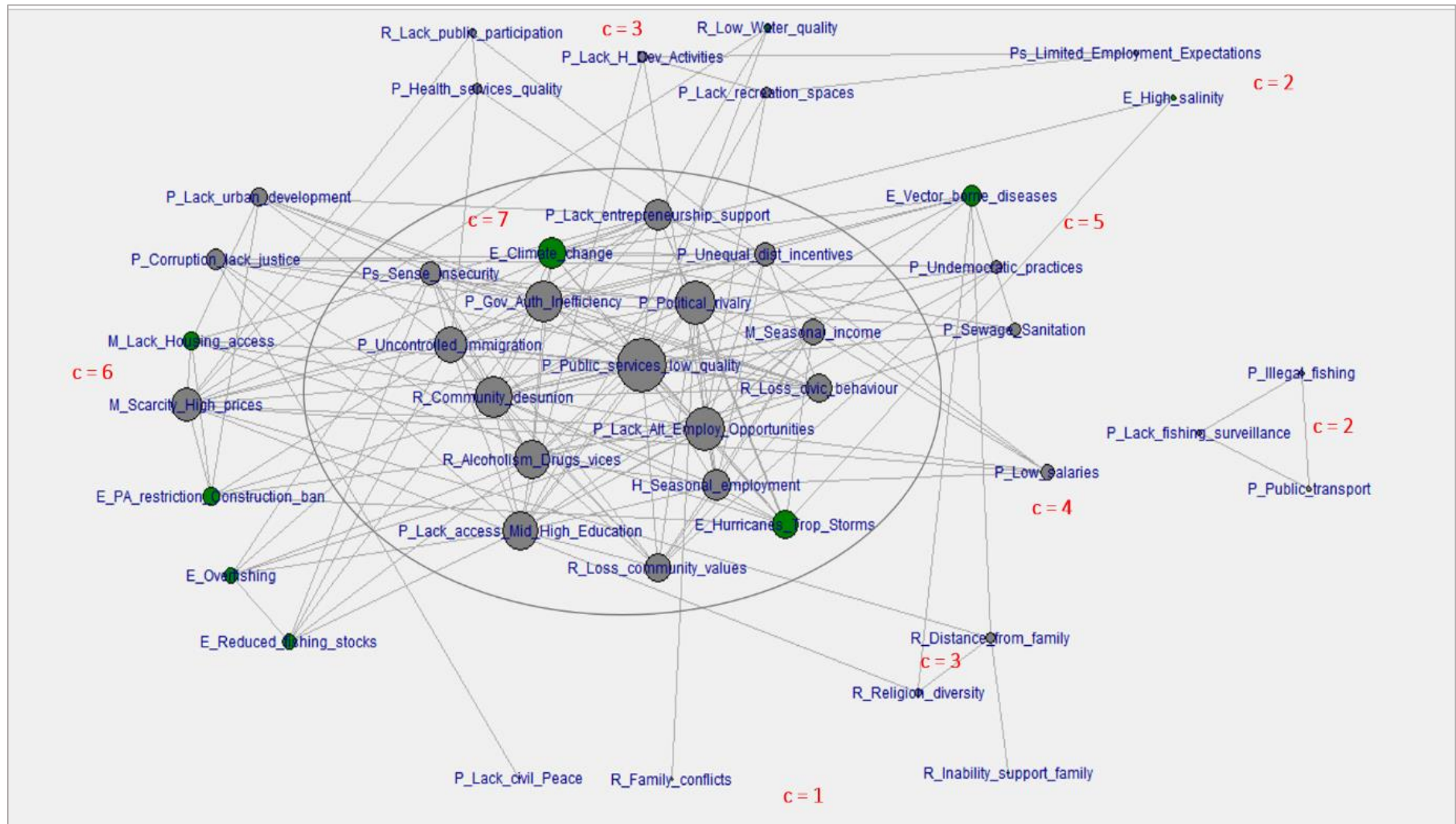


Figure 7-24. Cohesive blocks of disabling conditions



The disabling conditions network shows that most of the disabling conditions identified are *Socio-political* elements, such as the increased presence of additions such as alcoholism and drugs abuse; uncontrolled immigration, the loss of community values, the loss of civic behaviour, community disunion and political rivalry. The two environmental-related identified disabling conditions are *climate change* and the risk of *hurricanes and tropical storms*.

7.5.1. Gendered perceptions of landscape-based disabling conditions: Network Analysis Results

Figures 7-25 and 7-26 show the perceptions of landscape-based disabling conditions for women and men. For women, the five most important landscape-related disabling conditions are the *loss of civic behaviour* (eigen-centrality=1); *uncontrolled immigration* (eigen-centrality= 0.9); *alcoholism, and drugs abuse* (eigen-centrality = 0.9); *loss of community values* (eigen-centrality = 0.85), and *sense of insecurity* (eigen-centrality = 0.62). During the interviews, these elements were commonly associated by respondents with the arrival of newcomers, mainly fishers from other regions who have been attracted by the lucrative sea cucumber fishery. The generalized perception is that this uncontrolled immigration, which has been catalysed by the emergence of new fishing permit holders, has increased the incidence of addictions (including alcoholism and drug abuse) and in turn this is causing an increasing loss of community values, such as solidarity, which, as presented in the previous section, is the core of the enabling conditions for a flourishing life in this community.

For men, the five most important landscape-related disabling conditions are the increasing prevalence of addictions (eigen-centrality = 1), the loss of community values (eigen-centrality =1); community disunion (eigen-centrality = 0.78), political rivalry (eigen-centrality = 0.76) and the loss of civic behaviour (eigen-centrality = 0.65).

A notable difference is that for men, the lack of mid- and high-education opportunities is considered a significant disabling condition (eigen centrality= 0.58) while for women is not (eigen centrality= 0.066). This result suggests that dominant gendered social norms might still playing an effect in the perceptions of men and women in considering education and employment as an activity more valuable for men.

Figure 7-25. Women. Disabling conditions. Network Analysis Results

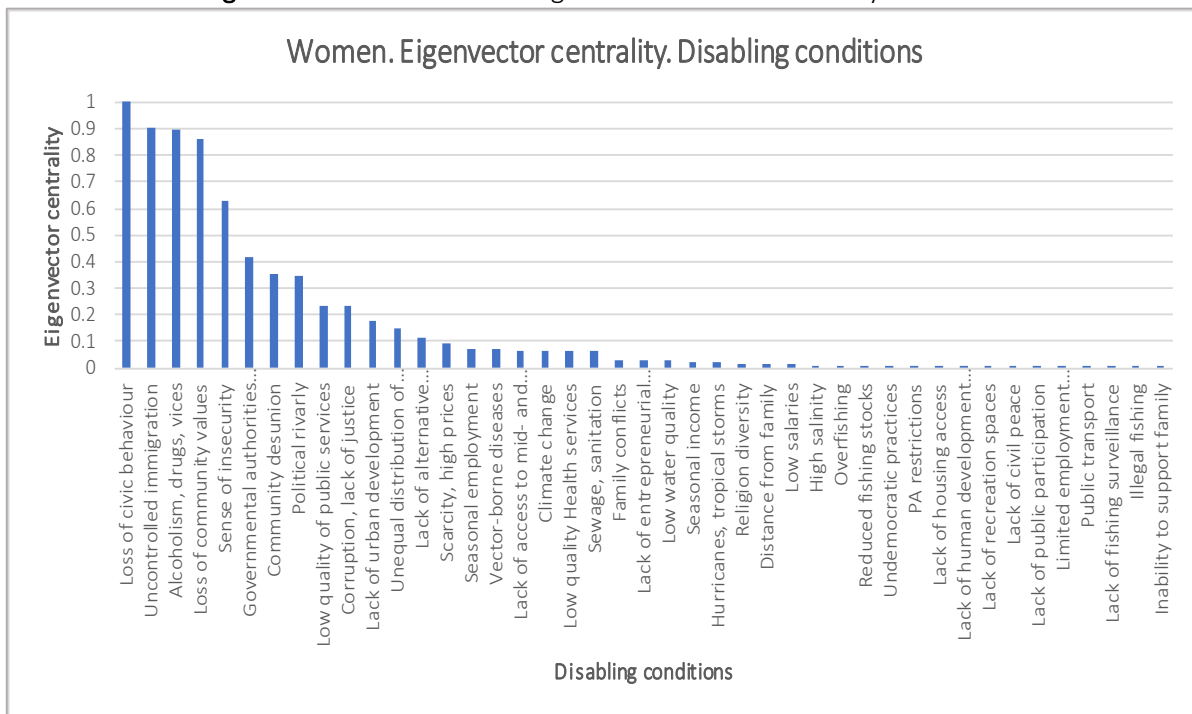
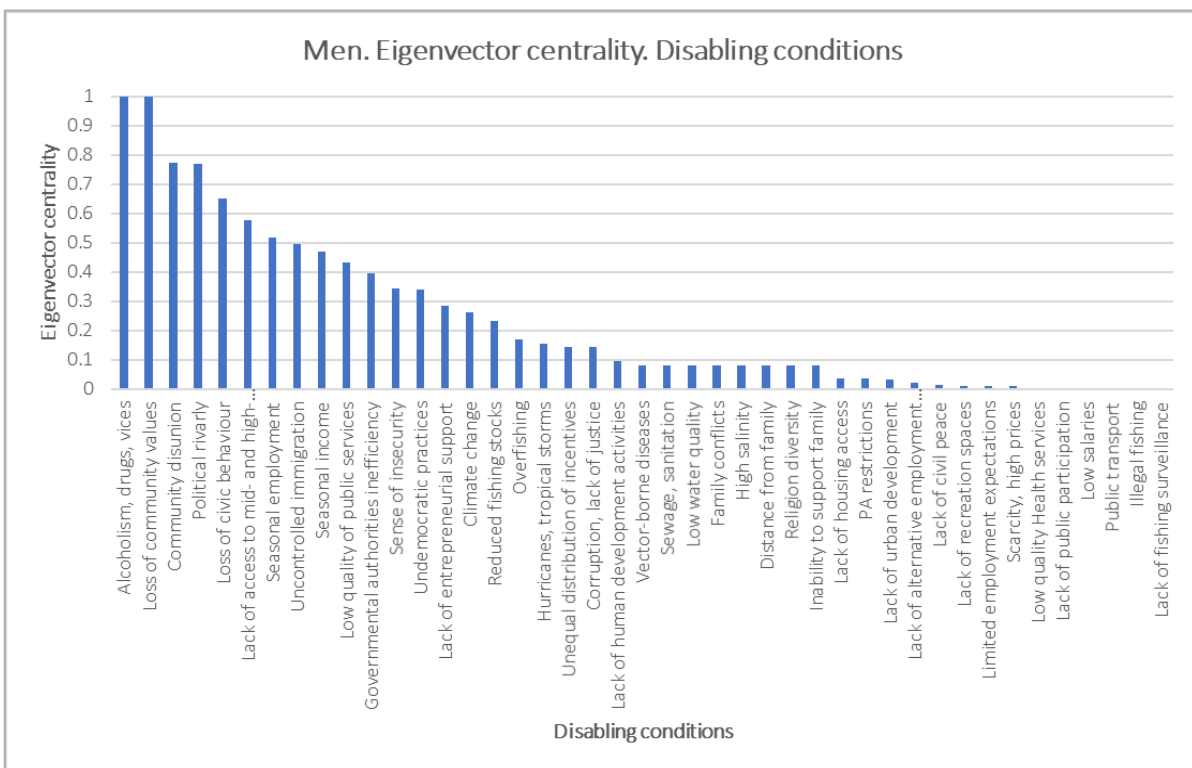


Figure 7-26. Men. Disabling Conditions. Network Analysis Results



7.5.2. Age and perceptions of landscape-based disabling conditions: Network Analysis Results

Figures 7-27 and 7-28 show the eigen-vector centrality of the landscape-based disabling conditions identified by respondents belonging to two age groups. The five most important landscape-based disabling conditions for the younger group are the *governmental authority's inefficiency* (eigen-centrality =1); the *lack of entrepreneurial support* (eigen-centrality= 0.72), the *community disunion* (eigen-centrality = 0.7), *climate change* (eigen-centrality = 0.63), and the *lack of employment opportunities* (eigen-centrality = 0.57).

For the older group, the five most important disabling conditions are the *loss of civic behaviour* (eigen-centrality =1), *uncontrolled immigration* (eigen-centrality =0.9), *addictions* (eigen-centrality = 0.8), the *loss of community values* (eigen-centrality =0.8) and the *sense of insecurity* (eigen-centrality (0.7).

The most noticeable difference among both groups is the strikingly fewer landscape-based disabling conditions identified by the older group. Only 6 disabling conditions were identified by the older group compared to 43 landscape-based disabling conditions identified by the younger group. For people aged 60 or more years-old the most serious disabling conditions are the inter-dependent elements of *loss of civic behaviour; uncontrolled immigration; the prevalence and increased risk of addictions; the loss of community values*, and the *increasing sense of insecurity*.

A similarity is the identification of governmental authorities' inefficiency as a disabling condition by both groups. During the interviews, the examples of the consequences of the lack of governance and institutional inefficiency were broad and included the discretionary application of the law and regulations, the unlawful granting of fishing permits, the lack of fishing surveillance, and, in general, the inability to fairly regulate the access to fisheries and to create alternative employment opportunities, such as tourism or small-entrepreneurial projects.

Figure 7-27. Disabling conditions for people aged <60 years old. Network Analysis

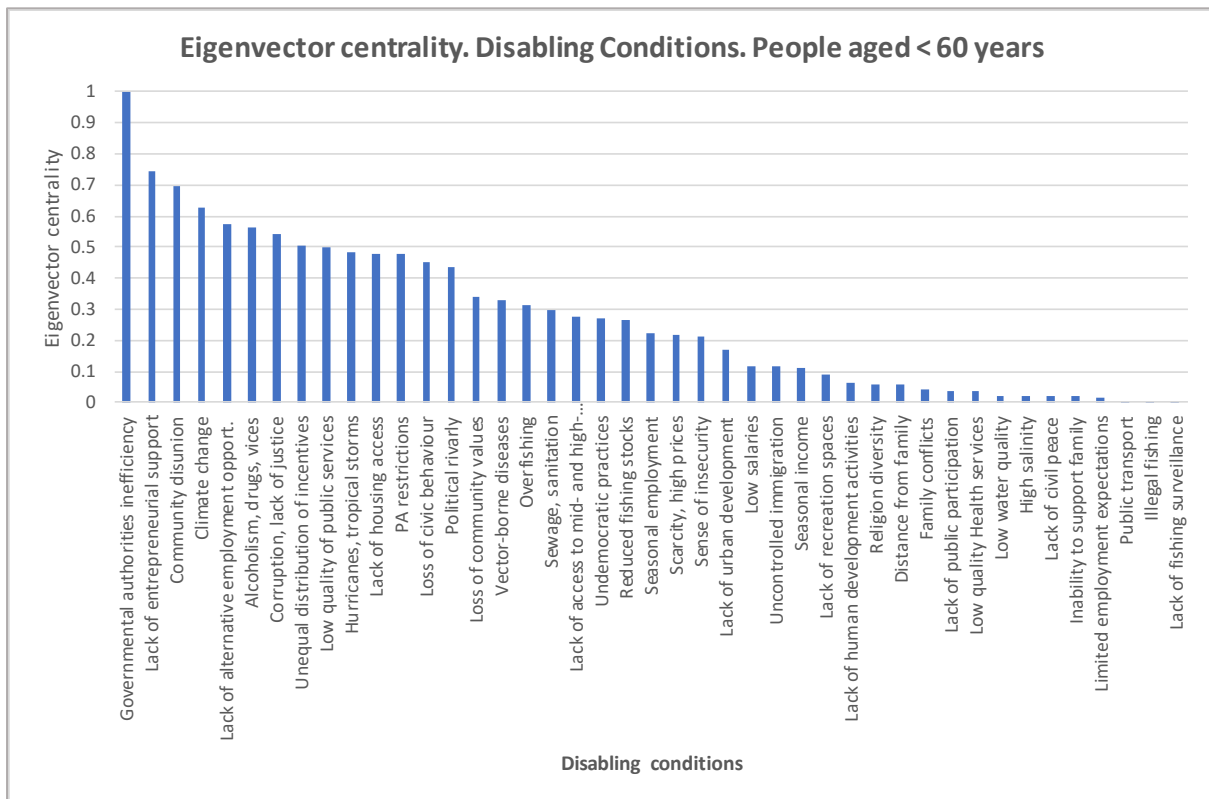
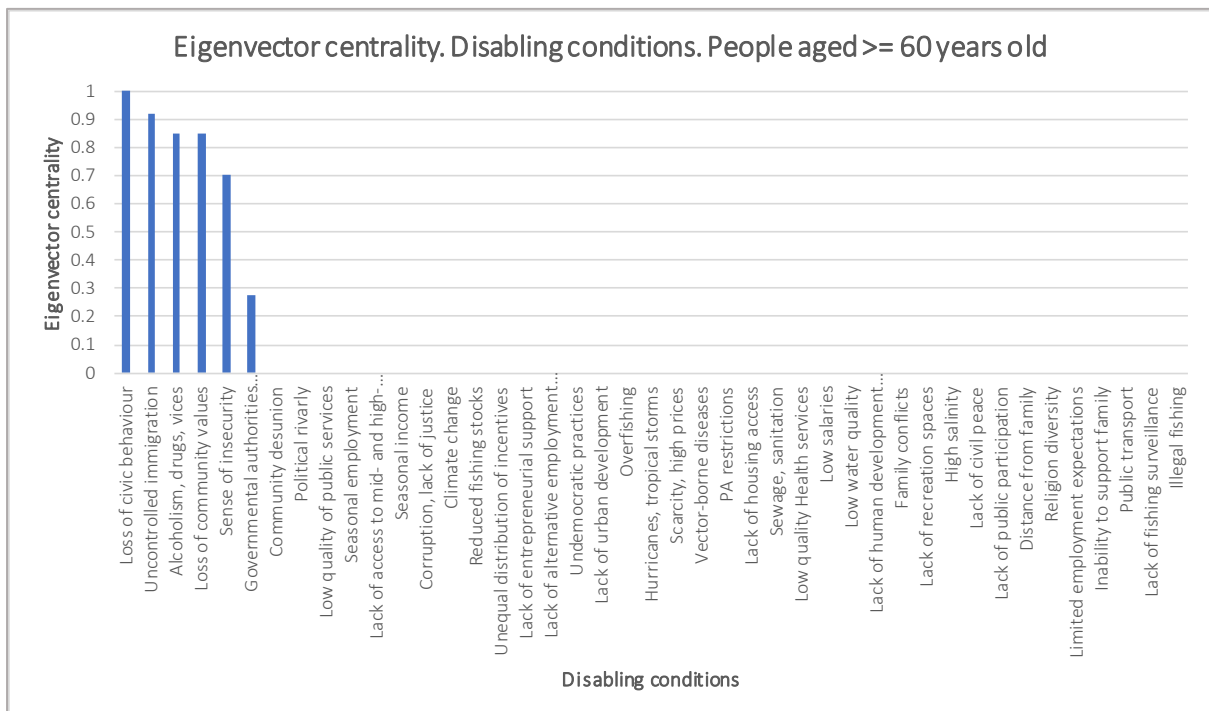


Figure 7-28. Disabling conditions for people aged >=60 years old. Network Analysis



7.6. Closing remarks

This Chapter has presented the results of the data analysis of the local notions of a flourishing, worth-lived life and the nexus to the natural environment. It presents the results of the qualitative data analysis of the idea of a flourishing, worth-lived life; the results of the network analysis of the Constituents and Determinants of a flourishing life and the network analysis results of landscape-based enabling and disabling conditions disaggregated by gender and age.

The chapter began by describing the different definitions of a flourishing life that were uncovered by the different type of questions used to examine it. Asking openly about a flourishing life brought answers located in a short time-frame and focused on *having resources*. Asking about lifelong aspirations brought future aspirations expressed in third person. The uncovering of this, not self-centred definition of a flourishing, worth-lived life, was the most surprising aspect of the data. Asking about what makes a life worth-lived brought answers describing relational activities.

The network analysis highlighted the role of a *Conserved Natural Environment* (Out-degree =21) as the greatest enabler of the widest array of valuable life functionings, even above of *Income* (Out-degree = 19). These two elements act as fertile advantages, enabling the largest number of valued beings and doings in comparison with other nodes. The two most-valuable elements towards which many other factors are directed and thus, can be considered as intrinsically-valued, are *Health* and *Employment*.

The analysis of landscape-based enabling conditions highlights the central role of Community solidarity, followed by four environmental-related enabling conditions: landscape beauty, healthy fisheries, the sea, and landscape tranquillity. Community solidarity clearly appears as a key fertile enabler of a flourishing life which acts as a source of resilience to overcome a variety of unexpected and challenging circumstances. The gendered analysis shows that *civil peace/security* and *Healthy fisheries*, whilst important for both groups, are considered as enabling conditions in a higher degree by men than by women; whilst *Clean air* and *landscape beauty* were highly considered enabling conditions by women but very low by men. *Clean air* was also identified as an important enabling condition by the age group of ≥ 60 years old.

The network analysis of landscape-based disabling conditions identified mainly *Socio-political* elements, such as the increased presence of additions such as alcoholism and drugs abuse; uncontrolled immigration, the loss of community values, the loss of civic behaviour, community disunion and political rivalry. The two environmental-related identified disabling conditions are *climate change* and the risk of *hurricanes and tropical storms*, mainly identified by the younger age group (< 60 years old).

Chapter 8. Local perceptions of Justice and the Natural Environment

“That we often derive sorrow from the sorrow of others, is a matter of fact too obvious to require any instances to prove it; for this sentiment, like all the other original passions of human nature, is by no means confined to the virtuous and humane, though they perhaps may feel it with the most exquisite sensibility. The greatest ruffian, the most hardened violator of the laws of society, is not altogether without it”.

Adam Smith (The Theory of Moral Sentiments, I.i.i.i. in the 1976 ed., pp.9)

This chapter presents the results of the qualitative and Q analysis of the local perceptions about Justice in relation to Natural Resources. The results are based on the analysis of the data collected through semi-structured interviews and Q methodology, in which 20 respondents sorted 40 statements defining just and unjust situations with nexus to the natural environment. Based on the perspectives around justice, this chapter contributes to the discussion about the meaning of justice and its dimensions in relation to the natural environment. This Chapter is organised in two sections. Section 8.1 presents the results of the analysis of the semi-structured interviews following the two lines of reasoning about justice: the ‘social contract’ tradition, and the social choice tradition. In this respect, the first line of reasoning focusses on identifying the types of social arrangements that would be considered just. In particular, the section aims to identify *Environmental primary goods*⁴³ that would be accepted as elements of justice. *Clean air* and *safe, drinkable water* are proposed as EPGs. The second line of reasoning follows the ‘social choice’ tradition, in which justice is advanced by identifying manifest injustice. Thus, the results present an array of identified perceived injustices in relation to the natural environment. The perceptions flowing from both lines of reasoning were used as the main inputs for the construction of 40 statements describing justice. In turn, these statements were the inputs for the Q analysis. Section 8.2. presents the results of the Q analysis, providing an interpretation of the shared viewpoints around justice revealed by Q methodology. Section 8.3 provides final remarks about the importance of understanding the variety of perspectives of justice and of exploring the notion of Environmental Justice from an empirical approach.

⁴³ In Rawlsian terms, primary goods are defined as collective goods that everyone would like to have no matter their own conception of the good, their social position or their value-judgements and are the common base for the unanimous selection of justice principles.

8. 1. Local perceptions of justice and injustice linked to the natural environment

8.1.1. Ideal conceptualisations of justice and the natural environment and Environmental Primary Goods (EPGs)

The qualitative analysis of the meanings of poverty, and a flourishing-worth-lived life, identified two elements that were recurrently identified as vital environmental elements that everyone would need without regarding their own perceptions of a good life. These two elements are: *Clean, safe Air* and *Safe, drinkable water*. These two elements were recognised as essential for physical subsistence. *Clean air* was recognised as a landscape-based fertile advantage that can unfold multiple valuable functioning through its contribution to Health. On the other hand, the *lack of clean, safe water* was considered a corrosive disadvantage that have self-multiplying detrimental effects in health and income. Drawing on the Rawlsian concept of social primary goods, these elements can also be considered *Environmental primary goods* because are elements that everyone will need no matter their own conception of a good life and can be the common base of a selection of environmental justice principles.

Clean air, as presented in the previous Chapter, was highly valued by elderly people as a key contributor to health and closely linked to longevity. For other age groups is also valued as a source of Subjective well-being. On the other hand, the *lack of clean, safe water* is perceived as a corrosive disadvantage. This perception was triangulated with other observations. During the second stage of fieldwork, I collected information- through the 90 semi-structured interviews- of the number and brand of the bottled water consumed in the households per week. The results show that in average, households spend MX\$21.5 per week per person in bottled water (MX\$86 monthly/person). Compared to the monthly minimum wage for 2016⁴⁴ (MX\$2,103, when fieldwork was conducted), bottled-water expenses correspond to 16% of a 4-person household⁴⁵ (the average household size for 2016).

8.1.2. Perceived manifest injustices in relation to the natural environment

This section presents the results of the qualitative data analysis focused on identifying manifest injustices in relation to the natural environment. From one side, there's a general perception of injustice in relation to the restrictions imposed by the Management Plan of the Ria Lagartos Biosphere Reserve. Other perceptions of injustice are related to the way in which the wetland and fisheries are managed.

⁴⁴ The minimum monthly wage in 2016 was MX\$2,103

⁴⁵ Assuming a household with one source of income and minimum wage.

The restrictions imposed by the Ria Lagartos Biosphere Reserve

The most recurrent account of injustice in relation to the natural environment comes from the restrictions imposed by Management Plan of the Ria Lagartos Biosphere Reserve, specifically the construction ban that forbids the construction of new houses and imposes large fines to those who don't comply. In general, people expressed their support and understanding of the rationale behind the restrictions imposed by the Protected Area. They expressed awareness of the biological importance of the area and of the protection given by the wetland in case of tropical storms and hurricanes. This restriction was not, by itself, considered unjust. The experienced injustice originates from the combination of the Protected Area's restrictions with the discretionary way in which the restrictions are enforced. A widespread perception is that only people without power and 'connections' are the ones who are forced to comply with the law; whereas wealthy and powerful individuals are not. The partial way in which the authorities have enforced the construction ban is a source of perceived injustice in relation to the Protected Area. During fieldwork, the social outrage was fuelled when the first property of a local young family was cordoned off with the subsequent imposition of high fines by the Federal Attorney for Environmental Protection (PROFEPA, in Spanish)⁴⁶. At the same time, respondents described that wealthy individuals were constructing additional properties in the wetland without any restriction. To the follow-up question of what would be required to eradicate this manifest injustice, some respondents reflected that, in this context, the motivations of companies (i.e. profit) and individuals (i.e. building a house to live) that led to land conversion are not the same and that these motivations should be considered by the governmental authorities for the imposition of fair fines.

The distribution of Temporary Job Opportunities allocated by CONANP

Respondents described the way in which the few temporary job opportunities were allocated by the municipal authority and the National Commission of Protected Areas (CONANP), which were, reportedly, mainly offered to those who participate more in activities organised by the authorities. While this distributive principle based in participation was considered just for some, arguing that *'those who show more effort should benefit more'*, it was considered unjust for others, who claim that the fact that people don't participate in voluntary activities does not mean they show less effort. In some occasions, the reason they don't participate is that they work in other activities.

⁴⁶ Procuraduría Federal de Protección al Ambiente (PROFEPA) is a Mexican administrative body which is a division of the Ministry of Environment and Natural Resources (SEMARNAT) with technical and operational autonomy. PROFEPA is responsible for supervising the compliance of the juridical normative to protect the environment, monitoring the implementation of laws. It is also responsible for safeguarding the interests of the people in environmental matters, ensuring compliance of environmental legislation as well as sanctioning those who violate these legal precepts.

Fisheries Management

Some of the fishermen expressed that the lack of effective surveillance from the governmental authorities, in this case from the Naval Secretariat (SEMAR), have led the local fishermen to take over the surveillance role of illegal fishing. In this sense, the authorities' non-compliance with its duties is perceived as a source of injustice. In some participant's opinion, cooperatives are ineffective mechanisms because they are easily corrupted by the personal interests of the managers in turn, whereas, according to some participants, private companies have more efficient decision-making processes (faster) and the possibility of employing more people.

During the interviews, participants expressed their concern about the distribution of fishing incentives from the government. A shared opinion was that the current allocation of incentives, rather than enabling people in need to improve their labor conditions, was intensifying unequal access to fisheries, perpetuating dynamics of social exclusion. This was exemplified by a fisherman who described the way in which fishing incentives were allocated to fishing cooperatives and how he, without owning a fishing boat, has been systematically excluded from the fishing incentives. The reason of exclusion is that one of the requirements to receive a new engine is to already have a fishing boat, and one of the requirements to receive a half-priced fishing boat is to pay 50% upfront. In both cases, people who can, in practice, benefit from the incentives are the ones who already have fishing boats or who can afford half-the price of a new fishing boat. In this way, people without these resources, are systematically excluded from the incentives designed to allow access to fisheries to those worse-off.

8.1.3. The construction of a Q-set: Combining ideal and manifest perceptions of justice and injustice and their nexus to the natural environment

Using the inputs from the semi-structured interviews, a list of statements defining Justice were defined. The complete list of statements included in the Q-set is presented in Table 8-1. The statements were organized according to the three dimensions of Environmental Justice (Distribution, Recognition and Procedural) to give consistency to the analysis.

In terms of *Recognition* (Table 8-2), local perceptions expressed differing viewpoints regarding whether people from outside the community were worthy of equal consideration and entitled to the same resource's rights as the members of the community. Perspectives that adopted a point of view that recognised ecosystems, non-human animals and immediate and remote generations as being worthy of equal consideration and entitled to equal consideration were also grouped under *Recognition*.

Table 8-1. List of Q Statements

ID	Read order	Statement in English
1	27	The most just thing would be that everyone (governmental authorities, touristic services providers and local community) is equally responsible of protecting the wetland
2	37	The most just thing would be that the governmental authorities are the main responsible of surveillance of fishing rules.
3	16	The most just thing is that fishing permits are given mainly to fishing cooperatives.
4	17	The most just thing is that the fishing permits are given to any person who complies with fishing rules.
5	38	The most just thing would be that everyone (governmental authorities, local community, fishermen) is equally responsible of the surveillance of fishing rules.
6	20	It is just that people who participate more in community activities have more support from the government.
7	29	The most just thing would be that the local community is the main responsible of protecting the wetland.
8	30	The distribution of benefits in the fishing cooperatives is more just than in the private fishing business.
9	24	The most just thing is that everyone without exception comply with fishing regulations (fishing bans, minimum sizes' specifications and maximum number of fishing boats)
10	9	People who comply with fishing regulations (bans, sizes) should have more fishing rights than people who don't.
11	28	The most just thing would be that touristic providers are the main responsible of protecting the wetland.
12	2	The animals that live in the sea and in the wetland have the same right to live well as people.
13	8	The more just thing would be that members of the community have more fishing rights than those who are not.
14	22	The most just thing is that the governmental support for fishing favours those worse off who don't own fishing equipment.
15	15	It is more just to fine large companies that destroy the wetland than to fine people who destroy the wetland to build their houses.
16	21	The most just thing is that the governmental support is given to those who more request for support.
17	4	The most just thing is that the private fishing companies have more legal benefits.
18	26	The most just thing would be that the governmental authority is the main responsible of protecting the wetland.
19	3	The existence of fishing cooperatives is more just than the existence of private fishing business.
20	10	In order to conserve the wetland, it is just that the government bans the construction of more houses to everyone.

ID	Read order	Statement in English
21	7	The most just thing is that everyone equally has the same right to profitable fishing in San Felipe.
22	12	The most just thing is that the communities, whose members are committed with the conservation of wetlands, can decide who, among the community members, have a priority on building a house in the wetland.
23	31	The most just thing is that the governmental authorities give fishing permits through transparent processes without distinction nor preference.
24	34	The most just thing is that the governmental authorities promote that those who can fish give fish to those worse off who can't fish.
25	33	The most just thing is that the governmental authority's sanction those who do not comply with the rules without distinction nor preference.
26	36	The most just thing is to comply with the rules even when not complying them brings more personal benefits.
27	35	The most just thing is to comply with the fishing rules even when others benefit more by not complying with the fishing rules.
28	23	The most just thing would be that fishing companies that earn more from the fishing business suffer more the consequences of the fisheries decrease.
29	25	The most just thing is that the <i>cenotes</i> (sink holes) have a private owner in order to be better conserved.
30	5	The most just thing is that fishing regulations are established through agreements among fishing cooperatives.
31	13	In order to conserve the wetland, it is just that the government bans the construction of more houses to those who already have one but allows the construction of houses to those who don't.
32	6	The most just thing is that the fishing regulations are established through agreements among communities.
33	11	The most just thing is that the governmental authorities and the local community can reach agreements about how to conserve the wetland.
34	19	We have the responsibility to leave the sea, the wetland and the landscape in good condition for 10 generations after our children (generations that we will not know).
35	32	The most just thing is that the governmental authorities promote that the fishing companies have surveillance duties of the sea condition.
36	1	The marine and wetland ecosystems have the same right to exist than humans.
37	18	We have the responsibility to leave the sea, the wetland and the landscape in good condition for the generation of our children
38	14	The most just thing is that the governmental authorities teach by example the best way to effectively manage the natural resources.
39	40	The most just thing would be that the local community is the main responsible of the surveillance of fishing rules.
40	39	The most just thing would be that fishermen are the main responsible of the surveillance of fishing rules.

Viewpoints that describe processes associated with defining who can participate in decision-making and the way in which decisions are made were grouped as *Procedural* (Table 8-2). Depending on the type of decision making process that were referred to, the statements were grouped using Elinor Ostrom's and Chris Armstrong's typology of Resource Rights (Ostrom, 1990; Armstrong, 2017) in the following way: a) *Exclusion*, if the decision involved determining who can access and withdraw a resource; b) *Management*, if the decision involved the way in which resources can be accessed and whether and how resources ought to be protected; c) *Regulate alienation*, if the decision involved setting rules about how rights over resources can be sold or transferred and d) *Regulate income*, if the decision involved defining who can derive income from resources they have rights over. Mainly, these decisions involve institutional processes.

Besides those perspectives that fit well into the three dimensions of Environmental Justice, there were other viewpoints that were recurrently used to describe injustice, even beyond the scope of natural resources. These perspectives describe the significance of institutional and individual compliance with duties and obligations. Participants identified a feedback loop between institutional and individual compliance with duties and obligations. There was a shared perspective that one source of injustice in relationship with fisheries was the lack of compliance with fishing rules and regulations from both individuals and institutions. From a normative perspective of justice, there were contrasting views. From one side, there were people who justified the lack of individual compliance based on the lack of institutional compliance. From the other side, alternative viewpoints argued that rules and regulations must be followed individually independently of others' behaviour. Perspectives describing Duties, Obligations and Compliance were grouped under *Procedural* Justice given that they describe how the rules resulting from institutional decision-making processes are expected to be enforced and complied by all the members of society, including institutions.

In terms of *Distribution* (Table 8-3), participants had competing viewpoints of justice in relation to: a) the distribution of rights (mainly fishing permits) and income; b) the distribution of the burdens associated with the decline of fisheries, and c) the distribution of duties and obligations related to the management of natural resources, surveillance and enforcement. This group of statements fit neatly under the notion of Justice as Distribution and were thus classified as *Distributional Justice* with three sub-categories, namely *Rights/Benefits*, *Costs/Burdens* and *Duties*. These statements have in common that they describe different types of distribution (of benefits, burdens and duties) that are considered just. They mainly express who should enjoy the benefits, who should bear the costs and who should have duties associated with fisheries and the wetland's management.

Table 8-2. Q methodology statements related to Recognition and Procedural Justice

A. RECOGNITION	
	12. <i>The animals that live in the sea and in the wetland, have the same right to live well as people.</i>
	36. <i>The marine and wetland ecosystems have the same right to exist than humans.</i>
	13. <i>It is just that members of the community have more fishing rights than those who are not.</i>
B. PROCEDURAL	
	26. <i>It is just to comply with the rules even when not complying them bring more personal benefits.</i>
	27. <i>It is just to comply with the fishing rules even when others benefit more by not complying with the fishing rules.</i>
B. Second Order Rights	
B1. Exclusion	14. <i>It is just that governmental fishing incentives favour those worse off who don't own fishing equipment.</i> 16. <i>It is just that the governmental fishing incentives are given to those who more request for support.</i> 6. <i>It is just that the governmental authorities give more opportunities of the Protected Area's Temporary Employment Program to those who most participate in community activities.</i>
B2. Management	29. <i>It is just that the cenotes (sink holes) have a private owner in order to be better conserved.</i> 22. <i>It is just that the communities can decide by themselves the way to protect the wetland</i> 33. <i>It is just that the governmental authorities and the local community can reach agreements about how to conserve the wetland.</i> 38. <i>It is just that the governmental authorities teach by example the best way to effectively manage the natural resources.</i> 25. <i>It is just that the governmental authorities sanction those who do not comply with the rules without distinction nor preference.</i>
B3. Regulate alienation	30. <i>It is just that fishing regulations are established through agreements among fishing cooperatives.</i> 24. <i>It is just that the governmental authorities promote that those who can fish give fish to those worse off who can't fish.</i> 32. <i>It is just that the fishing regulations are established through agreements among communities.</i> 23. <i>It is just that the governmental authorities give fishing permits through transparent processes without distinction nor preference.</i>
B4. Regulate income	8. <i>Cooperatives have more just rules to distribute economic benefits than private fishing business.</i>

Table 8-3. Q methodology statements related to Distributional Justice

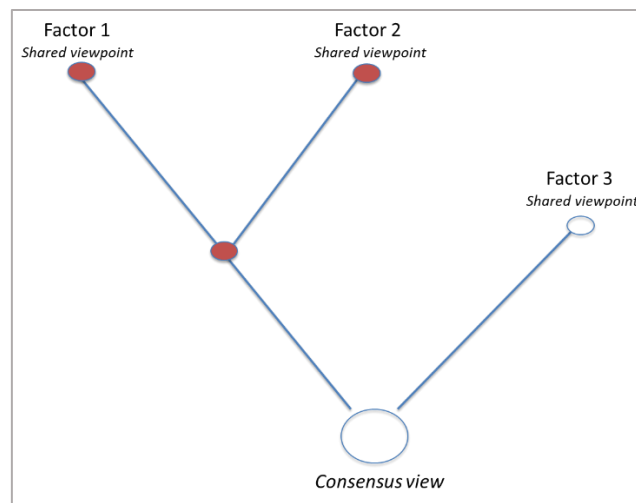
C. DISTRIBUTION	
C1. Resource Rights / Benefits (Entitlements or Justice Claims)	
C1.2. Withdrawal	13. <i>It is just that members of the community have more fishing rights than those who are not.</i> 10. <i>People who comply with fishing regulations (bans, sizes) should have more fishing rights than people who don't.</i> 21. <i>The most just thing would be that everyone equally has the same right to profitable fishing in San Felipe.</i> 17. <i>It is just that the private fishing companies in San Felipe have more freedom of hiring people from outside the community</i>
C1.3. Transfer ownership /Alienation	3. <i>It is just that fishing permits are mainly given to fishing cooperatives.</i> 4. <i>It is just that the fishing permits are given to any person who comply with the fishing rules.</i>
C1.4. Derive income	19. <i>Income distribution in cooperatives is more just than in private fishing business.</i>
C2. Burdens	
C2.1.Costs	28. <i>It is just that fishing companies that profit more from the fishing business suffer more the consequences of the fisheries decrease.</i> 15. <i>It is more just to fine large companies that destroy the wetland than to fine people who destroy the wetland to build their houses.</i> 20. <i>To conserve the wetland, it is just that the government authorities ban the construction of more houses to everyone.</i> 31. <i>To conserve the wetland, it is just that the government bans the construction of more houses to those who already have one, but allows the construction of houses to those who don't.</i>
C3. Duties of Justice	
C3.1 Duties	35. <i>It is just that those who profit more from fishing have more responsibilities to protect the fisheries.</i> 39. <i>It is just that the local community is the main responsible of the surveillance of fishing rules.</i> 40. <i>It is just that fishermen are the main responsible of the surveillance of fishing rules.</i> 9. <i>It is just that everyone without exception comply with fishing regulations (fishing bans, minimum sizes' specifications and maximum number of fishing vessels)</i> 1. <i>It is just that everyone (governmental authorities, touristic services providers and local community) is equally responsible of protecting the wetland</i> 7. <i>It is just that the local community is the main responsible of protecting the wetland.</i> 11. <i>The most just thing would be that touristic providers are the main responsible of protecting the wetland.</i> 18. <i>It is just that the governmental authority is the main responsible of protecting the wetland.</i> 2. <i>It is just that the governmental authorities are the main responsible of surveillance of fishing rules.</i> 5. <i>It is just that everyone (governmental authorities, local community, fishermen) is equally responsible of the surveillance of fishing rules.</i>
C3.2. Positive Duties	34. <i>We have the responsibility to leave the sea, the wetland and the landscape in good condition for 10 generations after our children (generations that we will not know).</i>
C3.3. Negative Duties	37. <i>We have the responsibility to leave the sea, the wetland and the landscape in good condition for the generation of our children</i>

8. 2. Uncovering shared viewpoints around justice and the natural environment through Q methodology

As explained in Chapter 4, the Q-sorts were analysed using the software PQMethod (Schmolck, 2017) and the software 'R' with the package 'qmethod' (Zabala, 2017, 2014). The selection of the number of factors to extract was informed by a combination of statistical criteria⁴⁷ and a sensitivity analysis focusing on the variance explained by each of the five factor-solutions using the Normalised Factor Index (NFI) (Zabala, 2015, p. 207). The 4- and 5-factors solutions included factors composed by only one defining Q-sort with very low stability index, so were rejected. I used my own interpretation of the meaningfulness of the factors in the 2- and 3-factor solution using qualitative data, specifically, the characteristics of participants. For example, the flagged Q-sorts for Factor 1 correspond to respondents whose main source of income is not fishing, while for Factor 2, nine out of the ten defining Q-sorts correspond to respondents whose main source of income is or was fishing, and Factor 3, corresponds to respondents whose main income source is the commercialisation of fisheries and tourism. Choosing the 2-factor solution would have blended the perspectives from those who work in the commercialisation of fisheries and tourism. As a result of the analysis, three factors were extracted representing three distinctive viewpoints of justice and a set of consensus statements where no significant difference was found across the three factors. Appendix D shows the full bootstrapped Q results.

The 3 viewpoints (factors) can be visually represented as a figure (Figure 8-1) where, at the root, there is a shared view of justice defined -mainly- by injustice (consensual statements); and two very distinctive groups of factors (Factor 1 and 2 distinctively different from Factor 3). Factor 1 and Factor 2 have key things in common that clearly differentiate them from Factor 3 but depart from each other in few aspects.

⁴⁷ a) the Kaiser-Guttman criterion, b) the Cattell Scree test plot, c) the Significant loading test using factor loadings calculated using the equation suggested in Brown (1980, pp. 222-223) and the Humphrey's rule; d) Horn's Parallel analysis, and e) Variance explained criteria.

Figure 8-1. Visual representation of shared viewpoints of Justice and the natural environment.

The three-factor solution consists of a highly stable first factor (NFS = 0.0068) which is defined by six Q-sorts that explain 24% of the study variance. The second factor explains the same percentage of study variance as the first factor (24%) and while having the largest number of defining Q-sorts (10), is the least stable (NFS = 0.0117). This suggests that the responses in this factor are less consistent, which is understandable, given the number of defining Q-sorts. The third factor is the most stable (NFS=0.0042). It is defined by two Q-sorts explaining 10% of the study variance. The high stability of this factor is understandable given the fewer defining Q-sorts. This suggests that the views of the defining Q-sorts of factor 3 are more consistent than those of factor 2.

It is noticeable that the consensus viewpoints around justice are mostly defined by the shared experience of injustice. In this case, as will be detailed in the next section, the construction ban imposed by the regulations of the Protected Area *in combination* with the discretionary way in which this restriction is enforced, was homogeneously considered as unjust. During the interviews this was highlighted as well; the imposed restrictions always in combination with the discretionary way in which sanctions are enforced. The source of manifest injustice is the perception, fuelled by lived examples, that poor, vulnerable or even people without the 'right connections' are the only ones who are forced to comply with the law; whereas wealthy and powerful individuals and institutions are not. The partial way in which the authorities have enforced the construction ban is one of the main sources of perceived injustice in relation to the Protected Area management.

Factor 1 and Factor 2 have in common the view that private fishing companies are unjust mechanisms for the distribution of fishing-derived income and the view that privatisation is an unjust mechanism

for the conservation of cenotes ('sink-holes'). In both viewpoints, cooperatives are regarded as institutions where the distribution of fishing income and fishing benefits is more just.

8.2.1. Shared viewpoints of Justice and Natural Resources: Consensus statements

Table 8-4 presents the list of consensus statements from the Q analysis. As shown in the Table, regarding definitions of justice (identified by positive Z-scores), the three factors share a perspective that the *asymmetrical application of restrictions and fines* for those who carry out activities that led to wetland loss, is just. In other words, the three factors agree that companies and individuals that make profit through activities resulting in wetland loss should pay more and should be subject to more restrictions than people living in the wetland (Statement 15). Another shared definition of justice is stated in terms of effective environmental governance, specifically referring to the role of governmental authorities of *complying with its duties in a non-discretionary way* (Statement 25). These duties include enforcing the 'rule of law', sanctioning those who don't comply with the rules and allocating fishing permits in a non-discretionary way.

Regarding definitions of injustice (identified by negative Z-scores), the *construction ban imposed by the environmental authorities* (Statement 20) is the main source of shared perceived injustice, especially in light that the construction ban is enforced in a discretionary way. This shared viewpoint echoes the recurrent account of injustice in which young families have been fined by the authorities for the construction of their home; while at the same time have exempted companies and wealthy individuals of the same fines.

With respect to the *distribution of duties*, there's consensus that it's unjust to leave to the community the surveillance responsibility of fishing activities and to let the community to decide only by itself the ways to protect the wetland (Statement 39). Regarding principles of distribution, there's consensus that a *principle of distribution of employment opportunities based on participation is unjust* (Statement 6). The example is the allocation of job opportunities of the Temporary Employment Program⁴⁸ (PET) based on a principle of participation in activities organized by the municipal authority. While the distributive principle based in participation was considered just for some, who argued that '*those who show more effort should benefit more*', it was considered unjust for others, who claim that the fact that people don't participate in voluntary activities does not mean they show less effort. In some occasions, the reason they don't participate is that they work in other activities or have mobility disabilities.

⁴⁸ PET is managed by both the municipal authority and the Natural Protected Areas Commission

It is noticeable that the consensus viewpoints around justice are mostly defined by the shared experience of injustice. In other words, the shared viewpoints are composed mainly by what is considered unjust. In this case, the construction ban imposed by the regulations of the Protected Area in combination with the discretionary way in which this restriction is enforced was homogenously considered as unjust.

Table 8-4. List of Consensus statements with Z-scores

Id	Consensus statements	Z-score Factor 1	Z-score Factor 2	Z-score Factor 3
6	It is just that people who participate more in community activities have more support from the government.	-1.50	-1.67	-1.42
15	It is more just to fine large companies that destroy the wetland than to fine people who destroy the wetland to build their houses.	1.61	1.48	1.16
20	In order to conserve the wetland, it is just that the government bans the construction of more houses to everyone.	-1.25	-0.88	-1.32
22	The most just thing is that the communities, whose members are committed with the conservation of wetlands, can decide who, among the community members, have a priority on building a house in the wetland.	-0.15	-0.09	-0.60
25	The most just thing is that the governmental authorities apply sanctions those who do not comply with the rules without distinction nor preference.	0.90	1.08	1.32
39	The most just thing would be that the local community is the main responsible of the surveillance of fishing rules.	-1.11	-0.81	-1.37

In summary, the consensus statements highlight a shared experience of injustice resulting from the interaction of two elements. From one side, the discretionary way in which sanctions are enforced by municipal and environmental authorities; and from the other side, the construction ban imposed by the Ria Lagartos Biosphere Reserve Management Plan.

Transforming the statements from injustice to justice definitions, the consensus statements suggest that there is a shared viewpoint across the three factors that define justice as *impartiality* and *duty compliance of governmental authorities*, who are expected to apply sanctions in a non-discretionary way and follow the rule of law.

8.2.2. Viewpoint 1. Justice as a Cooperative model of recognition and collective responsibility.

In a nutshell, this viewpoint defines justice in terms of recognition of remote future generations (10 generations) as rightful holders of environmental rights. It also represents a conception of justice defined in terms of the recognition of ecosystems (marine and wetland) to have equal existence rights as humans. It conceives justice in terms of a collective duty-bearing where everyone, including governmental authorities, are expected to comply with the rules and obligations. It also holds a view

that a just process would be one in which fishing regulations are established through agreements among communities and cooperatives and that measures to conserve the wetland should be the result of agreements between governmental authorities and local communities, which resembles a vision of a very empowered society. A distinctive element of this viewpoint is that rules must be complied by everyone even when not complying the rules *could bring more personal benefits or even when others don't comply with the rules*. In this sense, holders of this view seem to envision a just system as one in which people behave in alignment with an internal moral compass that don't depend on others' behaviour.

Viewpoint 1 adheres a duty-based view of justice that encompasses the non-discretionary compliance with rules and regulations from the authority and includes the recognition of duties to remote future (10 generations). Remote future generations are considered as rightful members of the community of justice. It is noticeable that a similar statement that focused on immediate generations (St. 37) ("our children's generation") had a scoring of -1, denoting a slight disagreement with it. This highlights the long-term view held by Viewpoint 1. Viewpoint 1 also represents a conception of justice defined in terms of the recognition of ecosystems (marine and wetland) to have equal existence rights as humans (+2). Viewpoint 1 conceives justice in terms of a collective duty-bearing. For example, statements 9 (+4) and 1 (+2), which state that the responsibility of complying with fishing regulations and with protecting the wetland must be held by everyone equally. Consequently, the process of establishing, (St. 32, +1), implementing (St 23, +2) and enforcing (St.25, +2) rules and regulations are also defining elements of justice. In terms of the process of establishment of fishing rules and regulations, Viewpoint 1 holds a view that a just process would be one in which fishing regulations are established through agreements among communities and cooperatives (St 32, St. 30) and that measures to conserve the wetland should be the result of agreements between governmental authorities and local communities. The definition of justice in terms of compliance with duties (rules and regulations) is restated by the view expressed by St. 25, St. 38 (compliance with rules by authorities) and 10 ('People who comply with fishing regulations should have more fishing rights').

Despite of adhering an egalitarian view regarding the distribution of duties, in Viewpoint 1, a just distribution of 'burdens' is not egalitarian. This is exemplified by the most stable statement of Factor 1, which describes justice as an asymmetrical distribution of 'costs' in this case, exemplified by Statement 15, which considers that companies that destroy the wetland for profit should be mainly the ones that pay fines, instead of the people that destroy it to build houses. Another characteristic element of Factor 1 is the viewpoint that rules must be individually-complied even when not complying them could bring

more personal benefits and the perspective that cooperatives can distribute income and benefits in a more just way.

The actors of a 'Just system' according to Justice as a cooperative model of recognition and collective responsibility

Table 8-5 presents in descending order of importance, the main social actors and its roles, as described by Viewpoint 1.

Table 8-5. Social actors of a 'Just system' according to Viewpoint 1

<i>Social actor</i>	<i>Role</i>
<i>Society</i>	Defined in the statements as 'people' and 'everyone': governmental authorities, communities, cooperatives'. For Viewpoint 1, society is empowered, and everyone is equally and strongly expected to comply with rules and obligations in a deontological way, ascribing positive duties for future generations and individual compliance with duties (rules and regulations) even when non-compliance could bring more personal benefits. Relies on civic behaviour.
<i>Governmental Authorities</i>	Expected to comply with its obligations in a non-discretionary way. For example, the application of sanctions without distinction and preference (St. 25, +3), or the allocation of fishing permits through transparent processes (St. 23, +2); and to work with local communities and cooperatives (society) to reach agreements for the establishment of fishing regulations (St. 32, +1; St. 30, +1, respectively) and for the definition of the wetland conservation strategies (St. 33, +2)
<i>Future generations</i>	Recognition of remote generations (St. 34, +3) and immediate (St 37, +1) generation) as members of the community of justice to which society have positive duties of maintaining ecosystems in good function and integrity.
<i>Landscape, marine and wetland ecosystems and animals:</i>	Recognised as members of the community of justice and with a right to exist (St 36, +4; St. 12, +2).
<i>Cooperatives</i>	Considered as just mechanisms for distributing fishing-related income distribution and benefits than private fishing companies.
<i>Private companies</i>	Should not have more legal benefits or more fishing rights than cooperatives. Privatisation is not seen in this viewpoint as a just mechanism for conserving cenotes ('sink-holes').

8.2.3. Viewpoint 2. Justice as a Cooperative model of distribution

In a nutshell, viewpoint 2 defines justice in terms of distribution rather than by specifying who are entitled to equal consideration or rights. It defines justice in terms of increased considerations of the community as having more rights than others to access fisheries. A key discrepancy with Viewpoint 1 is the increased expectations from the government rather than the equal collective responsibility endorsed by Viewpoint 1. This viewpoint recognises immediate future generations rather than remote generations as members of the community of justice to whom our generation has responsibilities. Distinctly from viewpoint 1, viewpoint 2 considers that when authorities don't comply with the rules it is fair not to comply with the rules. In this sense the 'moral compass' is socially-constructed and depend on other's behaviour.

Viewpoint 2, like Viewpoint 1 holds a view where justice is also defined as compliance of the governmental authorities with its duties and obligations (St. 38, +2). For example, the granting of fishing permits through transparent processes (St 23, +4); the non-discretionary application of sanctions (St 25, +2); or the consideration that the governmental authorities has the main responsibility for the surveillance of fishing rules (St. 2, +4) and of protecting the wetland (St. 18, +1). However, a key discrepancy with Viewpoint 1 is the increased expectations from the government of Factor 2 rather than the equal collective responsibility endorsed by Viewpoint 1. For Viewpoint 2 view-holders, the governmental authorities are the main responsible of protecting the wetland (St 18, +0), rather than the equal responsibility expressed by Viewpoint 1.

Viewpoint 2 defines justice in terms of Distributive aspects. For example, it considers that a distributive principle based on favouring those worse-off would be a just one for the distribution of fishing incentives from the government (St. 14, +2). Viewpoint 2 defines justice in terms of increased fishing rights for members of the community (St. 13, +2) and highly disagrees with a view that gives everyone equal fishing rights (St 21, -3).

Similar to Viewpoint 1, Viewpoint 2 considers private fishing companies as unjust mechanisms for the distribution of fishing-derived income and privatisation as unjust mechanisms for the conservation of cenotes ('sink-holes'). Consistently, cooperatives are regarded as institutions where the distribution of fishing income and fishing benefits are more just. A distinctive element of Viewpoint 2 in comparison with Viewpoint 1 is the recognition of immediate future generations (St. 2, +2) rather than remote generations (St 34., +1) as members of the community of justice to whom our generation has responsibilities.

Distinctly from Viewpoint 1, Viewpoint 2 does not consider just the compliance with personal duties (compliance of fishing rules) when not complying them bring more personal benefits (St. 26, 0), or when others benefit more by not complying them (St. 27, -3), denoting a less strict moral compass in comparison with Viewpoint 1. Viewpoint 2 holds a view that considers just a distributive principle based on membership to the community. Compared with three different distribution principles, namely, i) egalitarian (St 21); ii) being part of a cooperative and iii) complying with fishing rules and regulations, Factor 2 characterises for considering just favouring those who are members of the community (St. 13).

The actors of a 'Just system' according to Justice as a cooperative model of distribution

Table 8-6 presents in descending order of importance, the main social actors and its roles, as described by Viewpoint 2.

Table 8-6. Social actors of a 'Just system' according to Viewpoint 2

<i>Social actor</i>	<i>Role</i>
<i>Governmental Authorities</i>	Expected to 'teach by example' the best way to effectively manage the natural resources (St. 38,+2), grant fishing permits through transparent processes (St. 23, +4), enforce fishing rules (St. 2, +3), distribute governmental fishing incentives favouring those worse-off (St. 14, +2), enforcing fishing rules (St. 2, +1), sanction non-compliance of fishing regulations in non-discretionary way (St. 25, +2), being the main responsible for protecting the wetland (St. 18, +0);
<i>Local Community</i>	Factor 2 considers that local community have more fishing rights than those who are not. Expected to reach agreements with the governmental authorities about strategies for the wetland conservation and for the establishment of fishing regulations.
<i>Cooperatives</i>	Considered more just mechanisms for distributing fishing-related income distribution and benefits than private fishing companies.
<i>Future Generations</i>	Immediate generations as members of the community of justice to which society have positive and negative duties.
<i>Society</i>	Defined in the statements as 'people' and 'everyone': governmental authorities, communities, cooperatives'. The holistic interpretation of Factor 2 suggests that if the governmental authorities fail in complying with its obligations, it would be fair for the society to not comply with the rules and regulations. In Factor 2, society ascribes a pragmatical view, not the ethics-based/deontological one represented by Factor 1.
<i>Landscape, marine and wetland ecosystems</i>	Slightly recognised as having the same right to exist than humans.
<i>Private fishing companies</i>	Should not have more legal benefits or more fishing rights than cooperatives.
<i>Non-human animals</i>	Not recognised as entitled to rights to live well as people.

8.2.4. Viewpoint 3. Justice as a model of Utility and Efficiency.

Opposite to viewpoints 1 and 2, viewpoint 3 embraces a vision of justice paired to a rationale of efficiency. In this view, cooperatives are considered unjust mechanisms for the distribution of benefits because, in the holders' view, they are not as efficient as private institutions. Cooperatives are considered less efficient institutions than private companies and therefore, the results are considered less just. For example, the consideration that is more just that cenotes (sink-holds) are privately conserved lies on the perception that private conservation has higher potential to effectively achieve conservation outcomes. This is consistent with the view that private fishing companies should more fishing rights. In terms of Recognition, Viewpoint 3 holds a recognition for marine and wetland ecosystems as holders of existence rights and a recognition of positive duties for immediate future generations.

Viewpoint 3 shares the consensus view of justice linked with the roles of the governmental authorities in complying with rules and regulations (St. 38, +2), granting fishing permits through transparent processes (St. 23, +4), the non-discretionary sanctioning processes (St. 25, +3), being the main responsible for the enforcement of fishing regulations. Viewpoint 3 definition of justice in terms of distributive elements, such as the principles of distribution-based prioritising those worse-off. A key difference between Viewpoint 2 and 3 is Viewpoint 3 disregard of cooperatives. Opposite to Viewpoint 1 and 2, Viewpoint 3 embraces a vision of cooperatives as unjust mechanisms for the distribution of fishing income-benefits (St. 19, -2; St. 3, -4), and the consideration of processes of reaching agreements among cooperatives for establishing fishing rules as unjust.

Another distinctive characteristic of Viewpoint 3 is the perception that it is just that private fishing companies have more fishing rights and that cenotes (sink-holes) could be better conserved if privately owned. In terms of Recognition, Viewpoint 3 holds a recognition for marine and wetland ecosystems as holders of existence rights (St. 36, +2) and a recognition of positive duties for immediate future generations (St. 37, +1).

The actors of a 'Just system' according to Justice as a model of Utility and Efficiency

Table 8-7 presents in descending order of importance, the main social actors and its roles, as described by Viewpoint 3 and Table 8-8 presents a summary of the roles of different social actors according to the three viewpoints.

Table 8-7. Social actors of a 'Just system' according to Viewpoint 3

<i>Social actor</i>	<i>Role</i>
Governmental Authorities	Similar to Factor 2) Expected to 'teach by example' the best way to effectively manage the natural resources (St. 38,+2), grant fishing permits through transparent processes (St. 23, +4), enforce fishing rules (St. 2, +3), distribute governmental fishing incentives favouring those worse-off (St. 14, +2) and sanction non-compliance of fishing regulations in non-discretionary way (St. 25, +2).
Private fishing companies	Should have more legal benefits or more fishing rights than cooperatives are they are better positioned to deliver efficient outcomes.
Landscape, marine and wetland ecosystems and plants and animals	Slightly recognised as members of the community of justice and to have a right to exist (St 36, +2; St. 12, +1)
Future generations (both immediate and remote generations):	Recognition of immediate and remote future generation (St 37, +1; St 34, +1) as members of the community of justice to which society have positive duties of maintaining ecosystems in good function and integrity.
Local Community	Less power in fishing-related decision-making. Expected to reach agreements with the governmental authorities about strategies for the wetland conservation.
Society	If it brings more personal benefits or others don't comply with the fishing rules, it would be fair not to comply with the fishing rules.
Cooperatives:	Not considered just mechanisms for distributing fishing-related income distribution and benefit as they are not considered as efficient as private fishing companies.

8.2.5. Viewpoints and respondent's characteristics

As described in Chapter 4, one of the characteristics of Q methodology is that inferences can't be drawn to the larger population. However, Q allows to explore potential relations. A key observation during the analysis was that viewpoint 1 was held mainly by people whose main household income is not directly related to fisheries, for example, housewives, people who work in tourism, restaurant owners and teachers. Holders of viewpoint 1, seem to adhere to a non-consequentialist approach to decision-making in which what guides personal decision is an internally-constructed moral compass that works independently from others' behaviour and even separately of calculations of personal benefit. It resembles the Kantian duty-based approach in which the acts of individuals meet certain standards of behaviour (Kant's categorical imperative) (Dworkin, 1977). The recognition given to remote generations (10 generations or more) as rightfully entitle to live well and to whom our generation has environmental responsibilities suggest the perception of justice as a matter of long-term concern.

Table 8-8. Roles of social actors in the 'Just systems' described by each viewpoint

ROLES OF STAKEHOLDERS IN THE 'JUST SYSTEMS' DESCRIBED BY EACH VIEWPOINT								
	Society	Local community	Governmental Authorities (Three levels)	Future generations	Marine and wetland ecosystems. Landscape	Non-human animals	Cooperatives	Private companies
Viewpoint 1. Justice as Recognition, collective responsibility and an internally- constructed moral compass	Defined in the statements as 'people' and 'everyone': governmental authorities, local communities, cooperatives'. society is empowered, and everyone is equally and strongly expected to comply with rules and obligations in a deontological way, ascribing positive duties for future generations and individual compliance with duties (rules and regulations) even when non-compliance could bring more personal benefits. Civic behaviour.		Expected to comply with its obligations in a non-discretionary way. For example, the application of sanctions without distinction and preference, the allocation of fishing permits through transparent processes. Expected to work with local communities and cooperatives (society) to reach agreements for the establishment of fishing regulations and for the definition of the wetland conservation strategies	Recognition of both remote and immediate generations as members of the community of justice to which society have positive duties of maintaining ecosystems in good function and integrity	Recognised as members of the community of justice and to have a right to exist	Recognised as members of the community of justice and to have a right to exist	Considered as just mechanisms for distributing fishing-related income distribution and benefits than private fishing companies.	Should not have more legal benefits or more fishing rights than cooperatives. Privatisation is not seen in this viewpoint as a just mechanism for conserving cenotes ('sink-holes').
Viewpoint 2. Justice as a Cooperative- model of Distribution	If the governmental authorities fail in complying with its obligations, if would be fair for the society to not comply with the rules and regulations	Members of the local community have more fishing rights than those who are not. Expected to reach agreements with the governmental authorities about strategies for the conservation of the wetland and for the establishment of fishing regulations.	Main responsible of protecting the wetland and expected to 'teach by example' the best way to effectively manage natural resources, allocate fishing permits through transparent processes, enforce fishing rules, distribute governmental fishing incentives favouring those worse-off, surveilling fishing rules, sanction non-compliance of fishing regulations in a non-discretionary way.	Recognition of Immediate generations as members of the community of justice to which society have positive and negative duties.	Slightly recognised as having the same right to exist than humans.	Not recognised as entitled to rights to live well as people.	Cooperatives considered more just mechanisms for distributing fishing-related income distribution and benefits than private fishing companies.	Should not have more legal benefits or more fishing rights than cooperatives.
Viewpoint 3. Justice as Utility and Efficiency. Consequentialist pragmatism.	If it brings more personal benefits or others don't comply with the fishing rules, it would be fair not to comply with the fishing rules.	Less power in fishing-related decision-making. Expected to reach agreements with the governmental authorities about strategies for the wetland conservation.	Expected to 'teach by example' the best way to effectively manage natural resources, allocate fishing permits through transparent processes, enforce fishing rules, distribute governmental fishing incentives favouring those worse-off, surveilling fishing rules, sanction non-compliance of fishing regulations in a non-discretionary way.	Recognition of both immediate and remote future generation as members of the community of justice to which society have positive duties of maintaining ecosystems in good function and integrity.	Slightly recognised as members of the community of justice and to have a right to exist	Slightly recognised as members of the community of justice and to have a right to exist	Not considered just mechanisms for distributing fishing-related income distribution and benefits than private fishing companies.	Should have more legal benefits or more fishing rights than cooperatives.

Viewpoint 2 was composed mainly by people whose main household income come directly from fisheries. In this case, the view regarding complying personal duties (fishing regulations) is such that if the institutions fail to comply with the duties, it is fair not to comply with personal obligations. In this case, the moral compass that guides individual behavior seems to be socially-constructed, and it can be adapted to the circumstances. However, for holders of this viewpoint it is just to comply with the rules even when not complying them would bring more personal benefits. This suggests that the moral compass doesn't change with utilitarian calculations of personal benefits, but only with cases of institutional failure. In contrast with viewpoint 1, holders of viewpoint 2 seem to define justice as concerning a short-term vision, prioritizing duties to immediate future generations rather than remote ones.

Viewpoint 3 is mainly composed by people whose main household income come from the commercialization of fishing products. Holders of this view adhere to a consequentialist-utilitarian rationale, in which the rightness or wrongness of a decision depends on its consequences. This is evidenced by the explanations rooted on improved efficiency of decision-making processes relating to fisheries and wetland conservation made by private companies and private conservation mechanisms in comparison with cooperatives and governmental authorities. In this case, justice is a matter concerning both remote and immediate generations, aspect which I have interpreted as mid-term vision given that these statements were ranked lower than viewpoint 1 but higher than viewpoint 2.

Figure 8-2 and Table 8-9 show a summary of the distinguishing characteristics of the three viewpoints described in this section.

Figure 8-2. Summary of key features of each viewpoint

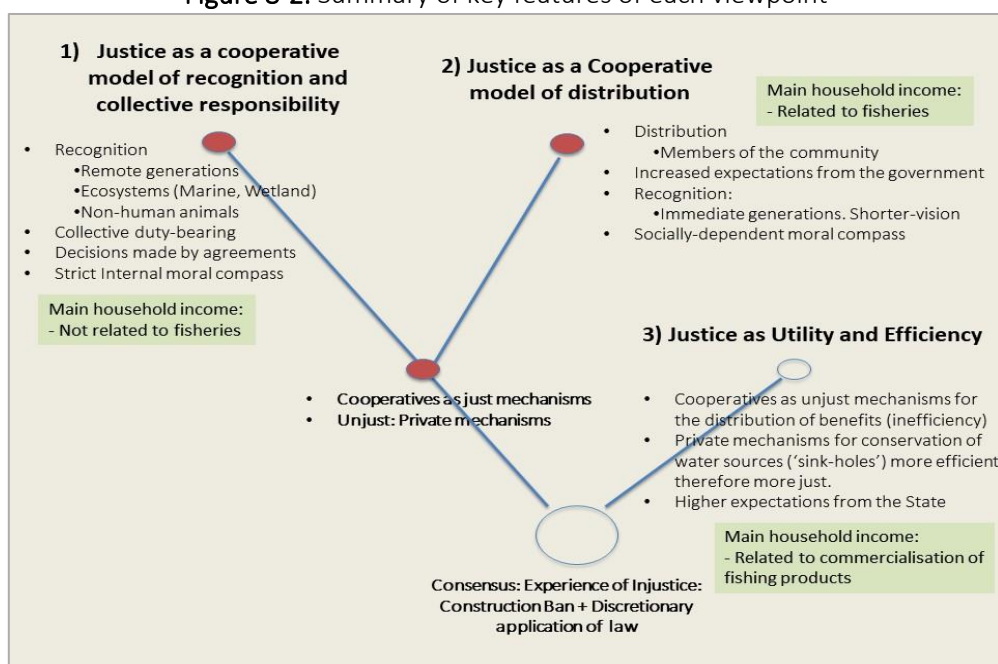


Table 8-9. Shared views and distinguishing characteristics of the three local viewpoints of justice and natural resources

	SHARED VIEWS	VIEWS ON DUTIES	MORAL COMPASS		RELATIONSHIP WITH TIME	OBSERVED CORRELATION WITH RESPONDENT'S
Viewpoint 1. Justice as Recognition, collective responsibility and an internally- constructed moral compass	The construction ban imposed by the Protected Area managers in combination with the discretionary way in which governmental authorities enforce the law is a source of injustice. The lack of governmental authorities' compliance with its duties and obligations is a source of injustice.	Collective compliance of duties. Empowered society. "Rules must be complied by everyone equally even when not complying could bring more personal benefits or even when others don't comply with the rules".	Non-consequentialist	Internally-constructed	Long-term vision	Main household income do not come directly from fisheries
Viewpoint 2. Justice as a Cooperative- model of Distribution	Roles of the governmental authorities in complying with rules and regulations , granting fishing permits through transparent processes, the non-discretionary sanctioning processes , being the main responsible for the	If the governmental authorities don't comply with the rules, it is fair not to comply with the rules and obligations.	Semi-consequentialist	Socially-constructed	Short-term vision	Main household income comes directly from fisheries
Viewpoint 3.. Justice as Utility and Efficiency. Consequentialist pragmatism.			Consequentialist: Utilitarian		Mid-term vision	Main household income comes from commercialisation of fisheries

8.3. Closing remarks

This Chapter has presented the results of the qualitative data analysis of perceptions of justice following two different lines of reasoning about justice: the ‘social contract’ tradition and the ‘social choice’ tradition. The results were then used as inputs for the analysis of Q methodology. The Q analysis has uncovered three distinctive viewpoints of justice which were called: *Justice as a cooperative model of recognition and collective responsibility*; *justice as a cooperative model of distribution*; and *justice as a model of utility and efficiency*. Each viewpoint has distinctive features with implications that are discussed in the next chapter.

This Chapter is the last of Part II, which has presented the empirical analysis results. The following two chapters discuss the results by finding coincidences and disparities among the local perceptions and normative frameworks and national metrics (Chapter 9) and by discussing the pertinence and possible ways to incorporate environmental considerations into national social development metrics.

Chapter 9. Coincidences and disparities among local perceptions, frameworks and national metrics

This and the following chapter aim to bring together the many layers of results presented in the previous chapters. The first section of this Chapter focuses on the coincidences and disparities among the revealed local perspectives of justice with normative approaches and with the three Environmental Justice dimensions and identifies potential sources of injustice along the well-being pipeline. The second section focuses on the discussion of the coincidences and disparities among local perceptions and metrics of poverty and its nexus to the natural environment. It highlights the implications of not including environmental elements into metrics of social progress. Specifically, this discussion pays attention to what kind of reality derives from current metrics and in the identification of who is left behind, who is ignored and what kind of dynamics of social exclusions are in motion and untouched by current policies and its metrics.

9.1. Coincidences and disparities among local perceptions of justice and the theoretical conceptualizations of Environmental justice

9.1.1. Coincidences: Defining justice by voicing injustice

Historically, the environmental justice movement has adopted the realist, social-choice approach used by Amartya Sen. For example, the Environmental Justice Atlas (Temper et al., 2015), recovers stories of environmental injustices all over the world. The assumption is that the ideal state would be the removal of these expressed injustices. This is aligned with Amartya Sen's assertion that human beings are as concerned with eliminating remediable injustice as they are with pursuing their own self-interest. Consistently, the three dimensions of Environmental Justice, namely, Distribution, Recognition and Procedure, were proposed by Schlosberg (2007) after the inspection of how the term *Environmental Justice* was being used by self-described environmental justice movements in the world with factual claims of injustice that needed to be acknowledged and fixed.

From both the interviews and the Q analysis, it is noticeable that those statements that defined issues considered unjust were more homogeneously ranked in the Q grid (as unjust). In other words, to the question 'how a just society is', respondents agreed more easily on what is to be avoided rather than what is to be pursued. Consequently, justice was defined in clearer and more consensual terms by defining what is not just. Definitions of what is just were less homogeneous than the definitions of injustice and were related to the respondent's characteristics. The results suggest that the shared experience of injustice smooths differences in viewpoints and allows the creation of a tangible discourse of injustice that aligns perspectives.

9.1.2. The role of Recognition in the lived experience of environmental justice

During the interviews in San Felipe, recognitional aspects were clearly accentuating the exclusion of certain groups. In particular, the group of seasonal fishers who are not considered part of the community, are recurrently excluded of all the forms of social protection that the government and the community provide. In addition, their access to fisheries is mediated by fishing permit holders and owners of private fishing companies. Interestingly, the basis of exclusion was not rooted on differences in ethnicity, but the perception of 'not belonging' to the community. This description resembles the anti-migrant narratives that are increasingly prevalent all over the world.

In terms of gender, the evident unequal access to fisheries associated to gender remained unperceived as an issue framed as injustice. The asymmetrical access to equal employment opportunities of men and women, the unequal access to fisheries and the huge disparity in income resulting of men- and women- fishing activities were, in the eyes of the local population, not framed as a matter of justice, but as a normal situation congruent with gendered social norms in which it is acceptable that women devote themselves to household activities and raising children rather than look for equally-paid employment opportunities. This social arrangement was explained as rooted in tradition and in some cases explained using a religious rationale.

9.1.3. Disparities: The role of duties in the definition of Justice

One interesting finding was the extent to which the viewpoints exposed the role of the fisheries' and the Protected Areas' governance systems and individual behavior as central in the perceptions of just arrangements or as catalyzers of unjust circumstances. These results echo Rawls' key features of *Justice as fairness* (Rawls, 1971, 2001). The results of the empirical analysis of justice and the natural environment highlight two circumstances that are clearly shaping the current notion of justice/injustice in relation to the natural environment, namely, the current environmental governance embodied by

the Protected Area management processes, and the governmental authorities' lack of compliance with specific duties, inefficiency, discretionary enforcement of the law and corruption. For holders of viewpoints 2 and 3, inefficiencies and lack of compliance with duties from the governmental authorities result in self-replicating processes of corruption and non-compliance with the law.

In Rawls' Theory of Justice, justice is considered a matter of institutions, and justice is defined by the way in which social institutions assign rights and duties to social cooperation and not directly concerned with the realization of human well-being under any description (Rawls, 1971). Opposed to this view, in 2010, in his book 'The idea of Justice', Amartya Sen asserts that human beings are as concerned with eliminating remediable injustice as they are with pursuing their own self-interest, breaking in this argument with the traditional notion of *homo economicus*, or 'rational economic man', as motivated mainly by self-interest⁴⁹. From the local perspective, however, the role of institutions as a source of injustice seem evident.

One of the shared definitions of injustice refers to the lack of duty compliance of the governmental authorities and the discretionary way in which sanctions were enforced and permits and fishing rights were allocated. The observed emphasis on institutions and behavior resonates with Rawls's argument of a well-ordered society based on a 'just, basic structure of major social institutions', in which both the presence of 'just institutions' and of members of society observing the rules of such institutions are *sine qua non* conditions of a 'just society'.

It might be argued that the Procedural dimension does in fact relates to decision making processes which are carried out by authorities; however, the way in which Procedural justice is conceptualized, that is, how decisions are made and by whom, leaves the issue of lack of duty compliance (i.e. lack of observance to laws and regulations) as a tangential aspect of justice, highlighted only insofar as they are related to decision-making processes and ignoring the way in which the lack of adherence to duties (laws and regulations, due diligence) directly influences the access (or lack of-) to natural resources or rights, even in the absence of any tangible decision making process.

Thus, the results of this research support the idea of incorporating the dimensions of Rights and Duties as elements of Environmental Justice. This idea is not new and has been advocated by Bulkeley et al. (2014), who have visually depicted a pyramid-shaped *Climate Justice framework* including the three

⁴⁹ Amartya Sen recovers Adam Smith's notion of "enlightened self-interest" (the idea that the practice of enlightened self-interest was natural for the majority of people and that the pursuit of personal profit is "not only economically desirable, but also morally acceptable") (Williams and Arrigo, 2004, p.54). Smith argued that the term should not be confused with unenlightened self-interest or greed, in which people act according to their own "myopic selfishness"

dimensions of Environmental Justice plus *Rights* and *Duties*. This framework is shown in Chapter 2. What is new in the current proposition is the focus on both individual and authorities' duties. By including these elements, an empirical study of environmental justice would pay attention to the role of individual behavior (social feedbacks) and authorities' behavior in shaping perceptions of injustice/justice.

9.2. Integrating justice dimensions in the 'Well-being pipeline' Conceptual model

This section aims to harmonize the results empirically obtained to refine the Conceptual framework proposed in Chapter 3. The results of the Q analysis presented in Chapter 8 uncovered three viewpoints of justice. In each of the viewpoints, coincidences with the three dimensions of Environmental Justice framework are found. Table 9-1 summarizes the relationship of each of the viewpoints with the three dimensions of the Environmental Justice Framework.

The empirical research uncovered the different ways in which environmental injustice is experienced and perceived, highlighting the way in which decisions are made are affecting the ecological and social dynamics. This is an example of *Procedural Justice* linked to the *Situation/Context* element in the conceptual framework. Injustice was also described as an experience originating from types of *distributions* of benefits/rights and costs/burdens derived from the natural environment. In this case, distribution affect the type of *disabling and enabling conditions* available to people. *Recognitional* aspects play a role in the *conversion rates* from resources to and also through the way in which social diversity affects the participation in decision-making processes.

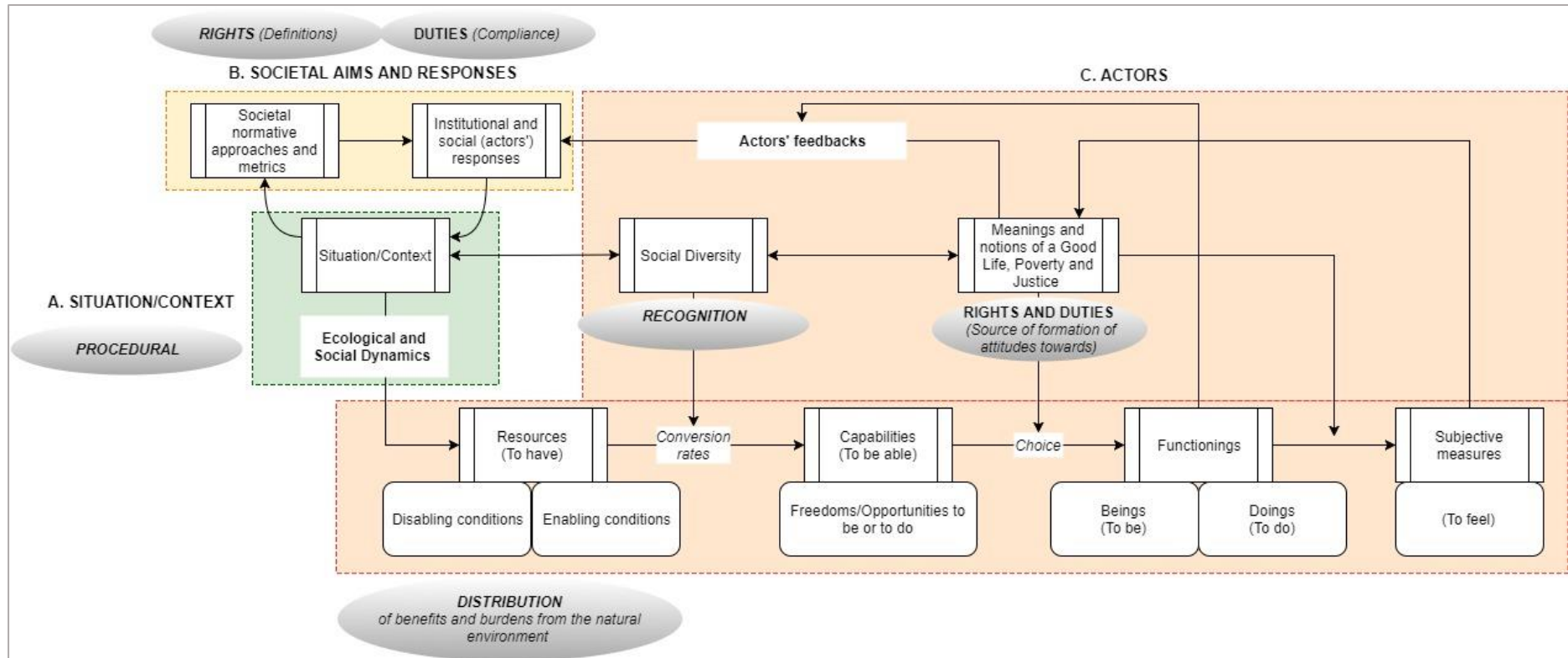
The results of the empirical study offer additional insights to the framework by identifying the relevance of rights and duties. From one side, certain environmental elements (Clean air and safe water) were identified as plausible 'environmental primary goods. On the other side, the key role of duties was evidenced. From the institutional side, the lack of duty compliance from the government (exemplified in many ways) was identified as the single most important source of perceived injustice. From a personal side, the lack of duty compliance from individuals was considered to have a corrosive effect. The Q results offer additional insights into the effect of the individual's lack of duty compliance in modifying the 'internal moral compass' of people who adhere to shared viewpoint 2. Figure 9-1 illustrates the way in which the dimensions of justice were integrated in the Conceptual Framework.

Table 9-1. Local viewpoints of justice and natural resources and the Environmental Justice dimensions

ENVIRONMENTAL JUSTICE FRAMEWORK					
	DISTRIBUTION			PROCEDURE	RECOGNITION
	Benefits /Rights	Costs/Burdens	Duties		
<p>Viewpoint 1. Justice as Collective responsibility/duty compliance and an internally-constructed moral compass</p>	Consistently, in this view, duty compliance is emphasized. For this perspective people who comply with fishing rules should have more fishing rights.		Egalitarian distribution of duties and responsibilities of fisheries' and wetland conservation and management. Recognises environmental duties to remote generations	Decision-making processes related to establishing fishing regulations and conserving the wetland guided by reaching agreements between governmental authorities, local communities and cooperatives.	The definition of Justice in this viewpoint relies more on defining who are members of the community of justice , entitled to equal rights and consideration. For holders of this view, remote future generations (10 generations or more), ecosystems (marine and wetland) and non-human animals have equal existence rights as human animals.
	<p>People who are members of the community should have more fishing rights.</p> <p>Cooperatives are more just mechanisms for the distribution of fishing-related benefits.</p> <p>People who comply with fishing regulations should have more fishing rights.</p> <p>Fishing incentives should be primarily allocated to those worse-off without fishing equipment</p>	<p>Shared viewpoint of distributing environmental costs/burdens based on differentiated responsibility</p>	<p>The definition of Justice in this viewpoint relies on emphasizing the equal distribution of duty compliance with fishing regulations.</p> <p>Governmental authorities are expected to be the first to comply with the rules and to teach by example. the main responsible of protecting the wetland.</p>	Slightly agree with the idea that decision-making processes related to wetland conservation guided by agreements between the governmental authorities and the local community.	<p>Members of the community are recognised as more entitled to fishing rights.</p> <p>Immediate generations also recognised as members of the community of justice to whom our generation has responsibilities.</p>
	<p>Private fishing companies should have more fishing rights (permits, legal benefits).</p> <p>Fishing incentives should be primarily allocated to those worse-off without fishing equipment</p>		<p>The definition of Justice in this viewpoint mainly relies on assigning duties to the governmental authorities, who are considered to be the major responsible of enforcing fishing regulations</p>	Decision-making processes related to the establishment of fishing regulations based on agreements among communities rather than cooperatives.	<p>This viewpoint is skeptical of decision-making processes made only by the local community or through agreements among cooperatives or communities that don't include governmental authorities.</p>
<p>Viewpoint 3. Justice as Just institutions, Utility and Efficiency. Consequentialist pragmatism.</p>					

(Bordered squares indicate accentuated dimensions in the Q Analysis through the high z-scores of related statements)

Figure 9-1. Integrated pipeline framework of capabilities and justice dimensions incorporating *Rights* and *Duties*



9.3. Coincidences and disparities among local notions of poverty and a flourishing life and national metrics of social development

As detailed in Chapter 6, in the case of Mexico, the normative position is clearly defined by Constitutional rights, specifically by the bundle of eight social rights⁵⁰ granted by the Social Development Law. Poverty measurement in Mexico has progressively evolved in the direction of making these rights visible by adopting a multidimensional approach and, correspondingly, by modifying the design of household surveys to include aspects that were not assessed in previous ones. An example is the inclusion of questions related to food insecurity in the latest INEGI Household survey.

The multidimensional aspect measures poverty in the spaces of *economic well-being* (income), *social rights* and *social cohesion*. The latter is inspired by Townsend's concept of relational poverty (1970) and is reflected in the metric by the relational indicator of degree of social cohesion, in which the analysis unit is not the individual, but communities or social groups (CONEVAL, 2010a).

By adopting the multidimensional poverty, it was intended to make visible what was needed to combat poverty and what situations citizens have to face in order to escape poverty: Income, education, access to health services, access to formal social security (package that include pensionary services, cultural goods), good quality of housing, access to food and level of social cohesion. Despite these advances, two social rights remain hidden in the current poverty measures: the right to a healthy environment and the right of non-discrimination.

In summary, the dimensions of poverty in the multidimensional poverty measurement in Mexico are illustrated in Table 9-2.

Table 9-2. Dimensions of poverty in the Mexican multidimensional poverty measure

<i>Space</i>	<i>Economic wellbeing</i>	<i>Social rights</i>	<i>Social Cohesion</i>
<i>Dimensions</i>	<ul style="list-style-type: none"> • Income (per capita) in the household 	<ol style="list-style-type: none"> 1. Education 2. Health 3. Social security 4. Dignified housing 5. Access to food 	<ul style="list-style-type: none"> • Social cohesion

⁵⁰ The eight social rights are: 1) Access to food; 2) Health; 3) Education; 4) Social security; 5) Housing; 6) Employment; 7) Non-discrimination and 8) the right to a healthy environment

The empirical analysis carried out in San Felipe was designed to understand the local perceptions around the meaning of poverty, but not limited to it, instead moving along a continuum until extracting the meaning not only of poverty but also of what constitutes a flourishing, worth-lived, meaningful life. The goal of this endeavour is to understand how well calibrated current metrics of poverty with local perceptions of poverty and human development are. This intends to close the gap between meanings and metrics to find common understandings of what truly enables a good life. In practical terms, closing this gap will increase the legitimacy and credibility of policy and decision makers when they claim that poverty has been reduced poverty by X%, or that effective poverty reduction/alleviation interventions are being designed.

Without any surprise, the empirical study shows, as presented in Chapters 7 and 8, that the meanings of a flourishing life and poverty and the nexus between a flourishing life – natural environment are highly diverse; and in some occasions contrasting. For example, there are people who consider the proximity to the wetland as contributor to their wellbeing grounded on the instrumental value posed on the use of biodiversity to heal themselves (directly, by the use of nature-based medicines and remedies or indirectly, by the use of nature as a mean to alleviate mental afflictions) and people who feel insecure and highly vulnerable to live in the proximity of the protected wetland and afraid of the same species that provide healing services to others in the same community.

Table 9-3 shows a summary of the variety of dimensions of what constitutes a flourishing, worth-lived life that were mentioned during the empirical analysis. The resources, capabilities, functionings and subjective measures mentioned were grouped in dimensions. Dimensions are defined as “conceptual categories into which indicators may be arranged (and possibly weighted) for intuition and ease of communication” (Alkire et al., 2015, p.197). The table highlights (bold font) the coincidences from the Mexican social rights, some of which are included in the multidimensional poverty measure, whilst the disparities are those elements that are not bolded. As noted in the table, the eight social rights granted by the law (1. Access to food; 2. Health; 3. Education; 4. Social security; 5. Housing; 6. Employment; 7. Non-discrimination and 8. the right to a healthy environment), are included in the local notion of a flourishing life.

Regarding access to food, the local perceptions add a quality aspect, considering that San Felipe’s geographical location adds an advantage because they can access nutritious food (mainly fresh seafood) and also, they are able to avoid food insecurity through the solidarity of the community members, which acts as a very important coping mechanism to overcome food insecurity in case of need.

The right to health is considered locally to have not only a bodily dimension, but also a mental dimension and is a result of multiple factors. The most evident is to be well-nourished, but, surprisingly, the interviews show that health is locally considered to be highly influenced by the access to clean air, which many inhabitants refer as the source of the longevity and good health of people in San Felipe. Health was also considered to be the result of adopting healthy life habits, such as having healthy food habits, to be free of vices (alcoholism and drugs abuse) and even to have good financial habits. Access to health services was also regarded as important but mentioned as a disabling condition. People referred to the lack of equipment of the health services at the local level, the scarcity of medicines and how expensive it is to travel to other cities where health services with better quality and equipment can be found. For simple illnesses, people rely on traditional medicine, using tree barks, leaves and other elements found in the wetland to treat and heal themselves. During my fieldwork, I collected a wide array of traditional medicine remedies to heal from simple colds and snake bites, to kidney stones. Here the link between a healthy environment and bodily health is quite visible. In this sense a healthy environment acts as an enabler of health that might or might not be required in case of need.

Mental health was also regarded as important, mainly expressed as the motivation to work. Motivation to work was linked to employment and livelihoods. Some respondents considered the proximity to the natural environment (mainly the beach and the protected wetland) as a source of recreation, activity that was experienced in different ways. Some of them, mentioned that walking in the beach helped them to reduce their stress levels. An elder woman commented that going to the wetland with her grandson helped her to feel happy, by thinking that she will leave good memories in her grandson. A woman who had just divorced said that instead of going to a therapist she went to walk in the pathway in the protected wetland every afternoon until she felt better. Many people answered that they valued spending time with family in the beach and have fun.

The Mexican social right to *Non-discrimination*, whose indicators are missing from the multidimensional poverty measure, is included within the dimension of *Respect* as a valued element of a flourishing life, highlighting the importance of this element. The local definition of a flourishing life contains many elements that point to the agency of individuals in achieving a flourishing life with attitudes and decisions made in life influencing the achievement of a good life. An example of this is the high value associated with elements related to virtuous behaviour as enablers or constituents of a good life. For instance, to be honest, to be a good citizen, to be hard-working, to have good life habits (including healthy food habits and financial management) were regarded as both enablers and constituents of a good life.

Table 9-3. Dimensions of the local definition of a flourishing, worth-lived life in San Felipe, Yucatán
(*bold font show coincidences with the Mexican social rights*)

<i>Space</i>	<i>Material</i>	<i>Human</i>	<i>Relational</i>	<i>Environmental</i>	<i>Institutional/Political</i>	<i>Psychological</i>
<i>Dimensions</i>	<ol style="list-style-type: none"> 1. Income 2. Healthy finances 3. Work assets 4. Dignified housing 5. Material goods (clothing, car) 	<ol style="list-style-type: none"> 1. Health (Bodily and Mental) 2. Employment 3. Education 4. Freedom of vices (alcoholism, drugs abuse) 5. Virtue (e.g. be honest, humble, hardworking, good citizen, have good life habits) 6. Recreation 7. Respect 8. Spiritual/religious life 9. Rest 	<ul style="list-style-type: none"> • Family • Community solidarity/support • Friendship 	<ul style="list-style-type: none"> • Nutritious food • Clean air • Clean and safe water • Healthy fisheries • Healthy natural environment (wetland) • Beach • Sink-holes (cenotes) • Biodiversity • Good weather/normal rain patterns • Clean streets • Land tenure • The silence/ Freedom of noise and car traffic 	<ul style="list-style-type: none"> • Civil Peace and secure environment (social tranquillity, safety, order) • Cooperatives • Access to health services • Employment/Livelihood opportunities and good salaries • Access to education services • Social security • Governance • Lawfulness and access to justice (rule of law) • Sufficient and equitable distribution of incentives • Be able to participate in decision-making processes • Controlled immigration • Public urban services (energy, sanitation, street lightning) • Access to recreational, sports and cultural centres • Road connectedness 	<ul style="list-style-type: none"> • Peace of mind • Satisfaction • Motivation and self-confidence • Happiness

This perception also arose when people were asked to share their perception of the causes of poverty. Many people adhere to the commonly-held perception that poverty was a result of financial mismanagement or the lack of healthy habits, including being free of vices such as alcoholism and drugs abuse.

The great majority of respondents self-rated as *Very happy* and *very satisfied* with their lives. However, pairing the ranking data of the Satisfaction/Happiness survey to the qualitative data suggests that some confounding factors might be at play. Even when the questions regarding happiness and satisfaction were temporarily bounded to two weeks, people seem to understand the question in different ways. One respondent answered she/he was very happy, and then referred to the new antidepressant pills that were working well. Another one answered that happiness is not the end-goal of life and in some cases the lack of suffering allowed people to be in numbness, as if people were “vaccinated” from a truly grateful and meaningful life. He then described that he started to be truly happy and enjoy life when his wife got ill because it was the moment when he started to understand which the most worthwhile moments in life are and prioritize his time to engage in meaningful activities with his wife. Some other respondents seemed reluctant to mention that they were struggling in life, posing high value to be grateful for the opportunity to be alive and considered that to complain about life or self-described as unsatisfied would be an insult to God.

These two elements (to define a good life in term of virtuous behaviour and to self-define as happy-satisfied) suggest that people in San Felipe consider themselves highly responsible for their own poverty/flourishing in life. This perception reduces the chances to make visible any injustice experienced originated as a result of an external threat, such as the lack of governance, lawfulness or unequal opportunities. Communities with high coping capacities to external shocks are less prone to be affected and react against manifest environmental injustice such as the lack of participation in decision-making, the lack of recognition or the lack of symmetric distribution of benefits and burdens. Even when the majority of the community seem unaware of some manifest environmental injustices they confront, such as the low quality of water access and the associated health risks; the discretionary use of the law in granting access to high-value natural resources (high-value fisheries); the discretionary application of the law to fine those who destroy the protected wetland, the environmental injustice is there, even when it's not locally conceived as such. This finding opens the question of the roles of institutions to identify and redress manifest injustice even when local communities seem and report being unaffected.

The right to a healthy environment is an ambiguous term to be measured and enforced. Locally, a healthy environment enables a wide array of beings and doings, expanding the freedoms of people in differently-valued ways. Some of the goods and services flowing from the natural environment enable immediate/short-term needs, such as the fulfilment of subsistence needs; having income, providing livelihoods and some other offer protection against risks (Vira and Kontoleon, 2013). Local perceptions identify interlinkages, for instance, a healthy environment allows healthy fisheries, which are considered a key element to access nutritious food (subsistence); while at the same time, enabling employment opportunities in both fisheries and tourism (livelihoods). The protected wetland is seen as a protection against tropical storms and hurricanes (insurance); Biodiversity is considered as a coping mechanism for illness and a source of joy (mental health).

Table 9-4 highlights the enabling/disabling conditions, capabilities, functionings and subjective measures that were linked to elements of the natural environment. It is important to note that one of the main findings regarding the meaning of a flourishing life was the definition of a meaningful/worth-lived life in second-person terms, which moves away from self-centred conceptualizations of a good life. In other words, people tended to define a worth-lived life in relational terms and using a structure in which the subject of the action was other different than the self. For example, statements such as: “a worth-lived live is such in which *others* (my family, my kids, my friends, nature) have/can have/live, etc”.

Despite the diversity of valuable links to the natural environment, there were common aspects that were mentioned consistently as enabling or disabling conditions for a flourishing life and which were highlighted by the network analysis, as they have the capacity to act as flourishing advantages to unfold a variety of arrays of other life functionings. These elements are Clean air, Healthy fisheries, Clean water, Other species (biodiversity), Protection from natural disasters, Good weather and Recreation

Table 9-4. Natural Environment - Flourishing life nexus identified in San Felipe

	Resources (To have) (Enabling /Disabling Conditions)	Capabilities (To be able)	Functionings Beings (To be) and Doings (To do)	Subjective measures
3. Environmental	<p>Enabling conditions</p> <ul style="list-style-type: none"> • Clean and safe water in the dwelling • Enough food • Scenic quality: A beautiful (functional and integral) landscape • Sink holes (cenotes) • The wetland • Biodiversity • Livestock • The ocean • Healthy fisheries • The beach • Good weather/Normal rain patterns • Clean air, free of toxic chemicals • Clean streets • Land tenure • The silence: Landscape free of noise and car traffic <p>Disabling Conditions</p> <ul style="list-style-type: none"> • Hurricanes and tropical storms • Low quality of water • The restrictions of the Protected Area 	<p>Capabilities</p> <ul style="list-style-type: none"> • To be able to work in fisheries • To be able to work in tourism opportunities related to the landscape/nature (sink-holes, wetland, beach) • To be able to heal when sick using remedies from nature • To be able to farm land • To be able to be nurtured/avoid food insecurity 	<p>Beings</p> <ul style="list-style-type: none"> • To be in nature • To be protected against the effect of tropical storms and hurricanes <p>Doings</p> <ul style="list-style-type: none"> • To heal (physically and mentally) using elements from the landscape • To have leisure, fun in nature (sink-holes, wetland, the ocean, the beach) • To interact with nature/biodiversity (e.g. to watch birds, raise/see animals, grow plants) • To care for the landscape and planet • To have a sense of place/identity ("to live in this place") • To live in close proximity with nature 	<p>Feelings</p> <ul style="list-style-type: none"> • To feel relaxed/healed by the sight/presence of the landscape • The sense of beauty ("from the smell of the sea) • To feel protected against the effects of tropical storms and hurricanes

9.4. Implications of the social reality as portrayed by the Mexican multidimensional poverty measure

The purpose of integrating environmental aspects into the multidimensional poverty measures is to improve policy responses, refining the information that is used to inform social reality. As argued in this thesis, the natural environment in San Felipe is enabling a wide array of valuable capabilities as well as advancing social rights granted by law such as *Health* (bodily and mental), *Access to Food*, *Employment* and *Income*; while at the same time being a social right in itself. However, the centrality of its role, is neglected by the current poverty measure.

In this community, the dependence on the natural environment is so high, that it becomes highly vulnerable to any shock that alters the flow of valuable goods and services from the natural environment. An indicator of poverty and vulnerability that doesn't make visible how the natural environment shapes coping and adaptive mechanisms is failing to capture this influence and has the risk to be blind to policies aiming to maintain the dynamics that increase social resilience and that unnoticeably contribute to alleviate and reduce poverty. This is the case of the Mexican multidimensional poverty measure. By ignoring aspects from the natural environment that are indispensable to overcome poverty or to reduce risks, is not only not complying with enforcing the lawful right to a healthy environment, but risks designing inefficient poverty reduction interventions.

For instance, the current poverty measure only includes one environmental-related indicator: the access to water in the dwelling. This indicator is part of the Dignified housing dimension, and only measures whether a dwelling has or not access to water, completely ignoring the quality of such water. As argued earlier, the economic impact of lacking drinkable safe water is very high at the household level and has asymmetrical consequences for those who cannot afford bottled purified water of good quality. The type of information derived from the current poverty measure portrays the municipality of San Felipe as a non-poor, non-marginalised community, which coincides with the perspectives uncovered by this empirical study. The aspect that remains hidden is the acute dependence on the natural environment (healthy fisheries, healthy wetland) and the high vulnerability of the entire population to environmental changes.

Currently, fisheries stocks are being affected by external market shocks linked to the Asian-market increased demand for sea cucumber. This demand is increasing the pressure and incentives for fishing effort and illegal activity. Illegal activity is being widespread and can take different forms, from the emission of fishing permits, to the use of many more fishing boats than allowed per fishing permits and

other practices). In addition, the arrival of seasonal fishers with short-term aims of maximising their fishing benefits is altering the social dynamics of the community, affecting one of the most important coping mechanisms locally available: community solidarity.

An adequate poverty/vulnerability measure should make visible those elements that either increase the risks or that act as a counter-acting force against the effects of multidimensional poverty. By having this information, policy making processes could design interventions that allow those elements that act as enablers of a flourishing life to be maintained over time; while at the same designing interventions to reduce those elements that act as corrosive disadvantages (Wolff and De-Shalit, 2007).

9.4.1. Health and Education indicators

Among those corrosive disadvantages that remain hidden by the current multidimensional poverty measure are the asymmetrical access to the highly valuable functionings of *Health* and *Education*. The way in which they are measured doesn't provide information about the kind of limitations that people - in San Felipe municipality - experience in effective access to health and education. Access to health service is measured by a binary indicator identifying the number of people not entitled to receive medical services. Education is measured in the *functionings* space, identifying the number of people who have completed mandatory education.

Apart from the information about the quality of such services, which is already recognised by CONEVAL (2010c) as one of the elements that are needed to improve the metric, there are some limiting factors in the access to *Health* and *Education* that are not captured. In terms of access to *Health*, the empirical analysis in San Felipe shows that key limiting factors are (1) the economic resources needed to access high-quality health services; the scarcity of medicines (with the associated high cost of access), and (2) the distance/time-to-arrive to high quality health services, which is nested to the access to efficient public transport (sometimes it takes an entire day for a family to travel from San Felipe to Tizimín and more days to access the more specialised hospitals in Mérida).

In terms of access to *Education*, the empirical analysis in San Felipe shows that the lack of mid- and high- education facilities and the distance and associated cost to get to educational facilities plays an important disabling condition that reduces the access to education for people in San Felipe. This disabling condition impacts on their overall sense of well-being because, worried by declining fisheries and the increased safety risks in the fishing activity, people in San Felipe consider that a valuable alternative livelihood option is education and the employment opportunities derived from it. However, it is a high-cost to pay (to continue to mid-education) because San Felipe has only basic and secondary schools. In this sense, geographical location translates into an asymmetrical access to education, a

starting-point disabling condition which only people with enough economic resources can overcome easily. So, what information is needed for policy makers to highlight efficient ways to balance this starting-point disabling condition? Apart from quality indicators of education (e.g. schools with prepared teachers covering all mandatory subjects, access to electricity, adapted infrastructure for students with disabilities, sanitation facilities, etc), key factors in the asymmetrical access to education identified by the community are: (1) the cost of education, including the transportation cost and time invested to get to mid-education facilities located in nearby and, for higher-education, the cost of accommodation.

Table 9-5 shows the proposed indicators to make visible the elements that are having a disabling effect in the access to *Education* and *Health* in the research site. As presented in Chapter 6, Mexico has endorsed the Sustainable Development goals, and has a commitment to report against their targets and indicators. Thus, the proposed indicators aim to harmonise, to the extent of possible, to the SDGs indicators. Table 9-5. highlights when there are relevant coincidences between specific SDG indicators and the proposed indicators based on the empirical results.

To propose indicators that can be adopted at a national level is beyond the scope for this research, and to answer this question a different research design would have been needed. However, the local voices and their lived experience provide valuable inputs to make visible those gaps between national metrics and the local reality. The proposed indicators are based on these inputs and may serve as an iteration to further examine their applicability to national level.

Deprivation thresholds are not suggested, as this point lies beyond the scope of this thesis. In relation to mobility, Pérez-Cirera et al. (2017) suggest a deprivation threshold for commute time from the household to the workplace or to school based on the time spent by any member to get to work or school. They propose a binary indicator in which a household would be deprived in terms of mobility if any member of the household spends more than 2 hours in an individual trip. I think that this indicator could better reflect social reality when combined with an indicator of the access to efficient public transport.

Table 9-5. Proposed indicators of Health and Education (Enabling conditions)

Indicator	Multidimensional poverty measure. Deprivation threshold (CONEVAL, 2017) <i>(Functionings space)</i>	Proposed indicators <i>(Enabling conditions space)</i>	Coherence with <i>Sustainable Development Goals (SDGs)</i> reporting needs
Access to health services <i>(Linked the Social right to Education)</i>	People not enrolled in or entitled to receive medical services from any health institution, including the Popular Health System, the social security public institutions (IMSS, federal or state ISSSTE ⁵¹ , Pemex ⁵² , Army or Navy) or private medical services.	<ul style="list-style-type: none"> Household expenditures on health as a share of total household expenditure or income (including transportation costs) 	SDG 3. Ensure healthy lives and promote well-being for all at all ages Target 3.8. Indicator 3.8.2.
		<ul style="list-style-type: none"> Distance (km) from household to specialised health institution. 	
Education gap	<ul style="list-style-type: none"> For people aged 3 to 15 years: When they lack mandatory basic education and are not attending a formal education center. For people born before 1982: If they do not meet the minimum mandatory basic education level that prevailed at the time when they should have attended elementary school. For people born form 1982 onwards: If they have not completed the minimum current mandatory basic education requirement (secondary school). 	Access to education <ul style="list-style-type: none"> Household expenditures on education as a share of total household expenditure or income (including transportation and accommodation costs) Transport time to get to school 	
		Quality of education <i>(already recognised by CONEVAL as an information need)</i>	SDG 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all Target 4.A Indicator 5. A.1.
Access to efficient public transport <i>(Not linked to social rights, but important to highlight enabling/disabling conditions at the start point)</i>		<ul style="list-style-type: none"> Quality of public transport based on safety, affordability and sustainability Quality of roads (safety and connectivity) Accessibility of transport systems to attend the needs of vulnerable population, such as children, people with disabilities and older persons 	SDG Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable. Target 11.2 Indicator 11.2.1

⁵¹ ISSSTE is the national health system for Mexico's governmental workers.

⁵² PEMEX is the Mexican oil industry

9.5. Closing remarks

This Chapter presents the coincidences and disparities between the local perspectives of poverty, a flourishing life and justice and normative frameworks, theoretical conceptualisations and national metrics of poverty. In relation to the justice analysis, concluding remarks include that an empirical analysis of environmental justice allows the observation of the dynamics of the narratives around injustice and justice in a particular society. Injustices that are voiced as such have the potential to move towards its eradication, whereas viewpoints that disagree on whether a situation is just or unjust might lack the social legitimacy and support to be fought upon. One unexpected finding during the empirical analysis of environmental justice was the extent to which the viewpoints exposed the role of institutions and individual behavior as central to just arrangements or as catalyzers of unjust circumstances. Thus, the evidence supports the idea of incorporating the dimensions of Rights and Duties as elements of Environmental Justice. This idea is not new and has been advocated by Bulkeley et al. (2014). What's new in the proposition is the focus on both individual and institutional duties.

The results presented reiterate that justice definitions and their relation to natural resources are not static, but space- and time- dependent. The results highlight the way in which perceptions of what is just and unjust are highly influenced by circumstances shaped by dynamic processes, such as the environmental governance arrangements, the influence of markets and the shifting adherence to cultural norms. The shared perceptions of injustice seem to be space and time specific, responding to the circumstances that the community is facing. This observation resonates with Harvey's emphasis on relations and connectedness and with his claim for viewing things as "moments" within processes, in contrast to the permanently existing monadic thinking (Harvey, 1996).

The second section of the Chapter has highlighted the coincidences and disparities among local perceptions and metrics of poverty and its nexus to the natural environment. Key findings include evidence that the current poverty measure is not making visible the extent to which the natural environment shapes coping and adapting mechanisms to overcome poverty and achieve own ideas of a flourishing life. By ignoring aspects from the natural environment that are indispensable to overcome poverty or to reduce risks, the current poverty measure is not only not complying with enforcing the lawful right to a healthy environment but increasing the risk to design inefficient poverty reduction interventions. The chapter also suggests some possible ways in which the current poverty measure could be adapted, in light of empirical findings. Further alternatives to calibrate the current poverty measure with social reality in this specific context are discussed in the next Chapter.

Chapter 10. Incorporating environmental considerations into poverty and social development metrics



The practical goal of this research is to provide insights about how reality looks in this fishing community and how measures of social development could better capture the social reality and everyday struggles, aiming to maintain those enabling conditions that expand capabilities and increase social resilience, and reduce the disabling conditions that increase vulnerability and prevent individuals and groups from achieving their own ideas of a flourishing, worth-lived life. As will be detailed in this chapter, enabling conditions are strongly related to mechanisms of environmental governance and environmental justice dimensions, making the case for just environmental governance systems as enablers of a flourishing, worth-lived life.

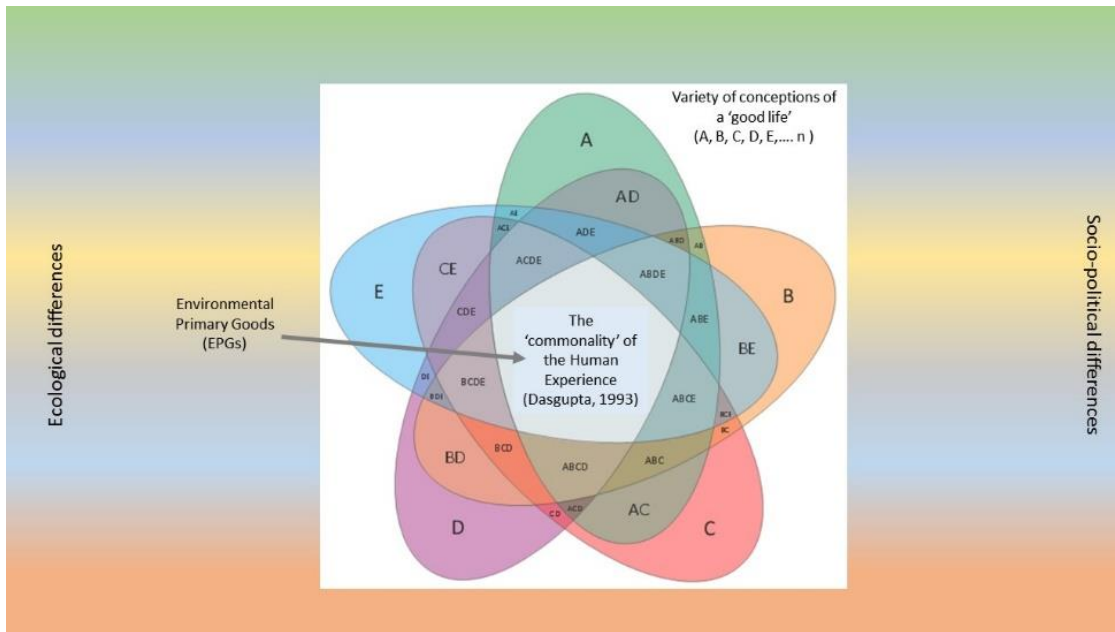
10.1. Incorporating the natural environment into poverty, well-being and justice metrics

In his 1979 Tanner lecture entitled “Equality of What?” Amartya Sen (Sen, 1980) presented the capability metric as an alternative for, and improvement on the social primary goods metric. Sen argued that “the primary goods approach seems to take little note of the diversity of human beings... If people were basically very similar, then an index of primary goods might be quite a good way of judging advantage. But, in fact, people seem to have very different needs, varying with health, longevity, location, work conditions, etc” (Brighouse and Robeyns, 2010, p.3). According to Rawls, defining ‘primary goods’ consists **precisely** on identifying *those goods that anyone would want regardless of whatever else they wanted* (Rawls, 1971). In this sense, primary goods, if well identified, are exactly things that people very similarly would wish to have or would very similarly need. Following this idea, would Sen agree that an index of ‘environmental primary goods’ might be a good way of judging advantage?

In his book, *An Inquiry into Well-being and Destitution*, Partha Dasgupta (Dasgupta, 1993) argues that there is a level under which people’s needs (destitution) are, in fact, very similar. He calls it the “commonality of the human experience”. This idea is illustrated in Figure 10-1, where among all the diversity of human preferences and needs, there are some commonalities in the human experience of life. These commonalities derive from a survival point of view. The “commonality of human experience”, so conceived, finds common ground on those things or circumstances that human beings need to physically survive (food, care, shelter, protection from risk).

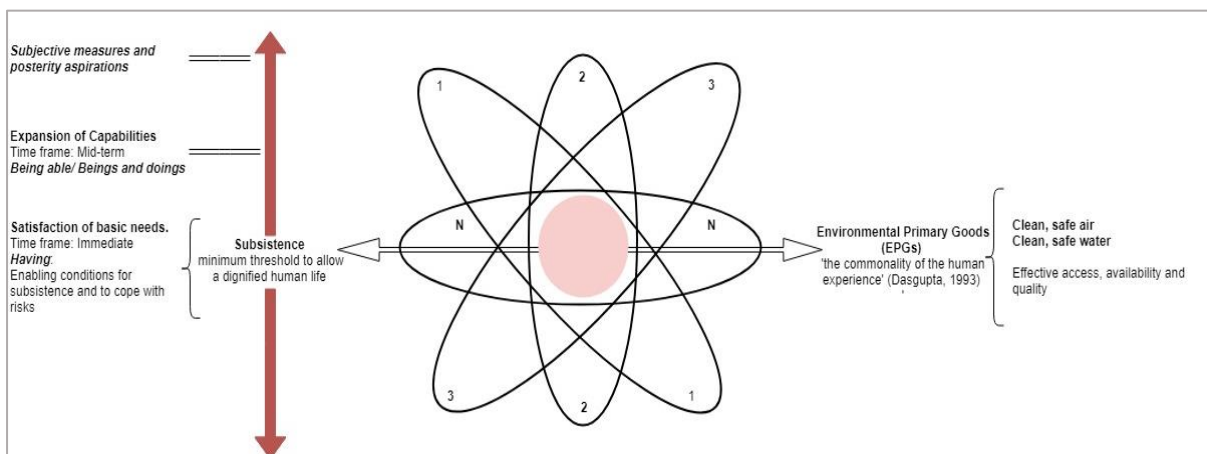
Dasgupta notes that “states of mind are notoriously difficult to monitor”, and “since norms are often internalized by people, it is dangerous to regard differences in cultural practices as reflecting differences in primary ethical values”. “There is less danger of an eventual error in ethical reasoning where we start from the commonality of the human experience and to then show how and why people and societies differ, than to start from an assumption of complete differences and to then narrow them down by admitting commonalities” (Dasgupta, 1993)

Figure 10-1. Visual representation of the "commonality of the human experience", inspired by (Dasgupta, 1993)



Drawing on Dasgupta’s concept of the ‘commonality of the human experience’ and Rawls’ concept of primary goods a continuum from the satisfaction of basic subsistence needs to a flourishing, worth-lived live (Figure 10-2) can be conceptualised. For illustrative purposes, imagine that the meaning of poverty and a good flourishing life of a person A in a defined time and context could be represented by an ellipse. This conceptualisation meets other people’s meanings (from Individual 1 to N) in the same time and context. According to Dasgupta (1973), within the diversity of meanings of a human well-being, there must be some commonalities in the human experience, which are visually represented by a red circle in the intersection of all the different meanings.

Figure 10-2. Continuum from the satisfaction of basic subsistence needs to a flourishing, worth-lived life



In a similar way but from a different entry point, Rawls (1971, 2001) defines *social primary goods* within his theory of justice as fairness. Justice as fairness derives from the conception of the citizens as free and equal, reasonable and rational and requires an account of citizen's fundamental interests. In the diversity of interests of citizens, *social primary goods* are supposed to be desirable for every human being no matter their own conception of a good life (Rawls, 1971) and are those that the citizens need as free and equal members of the society (Rawls, 2001). Thus, these goods are the common base for the unanimous selection of the justice principles in the original position.

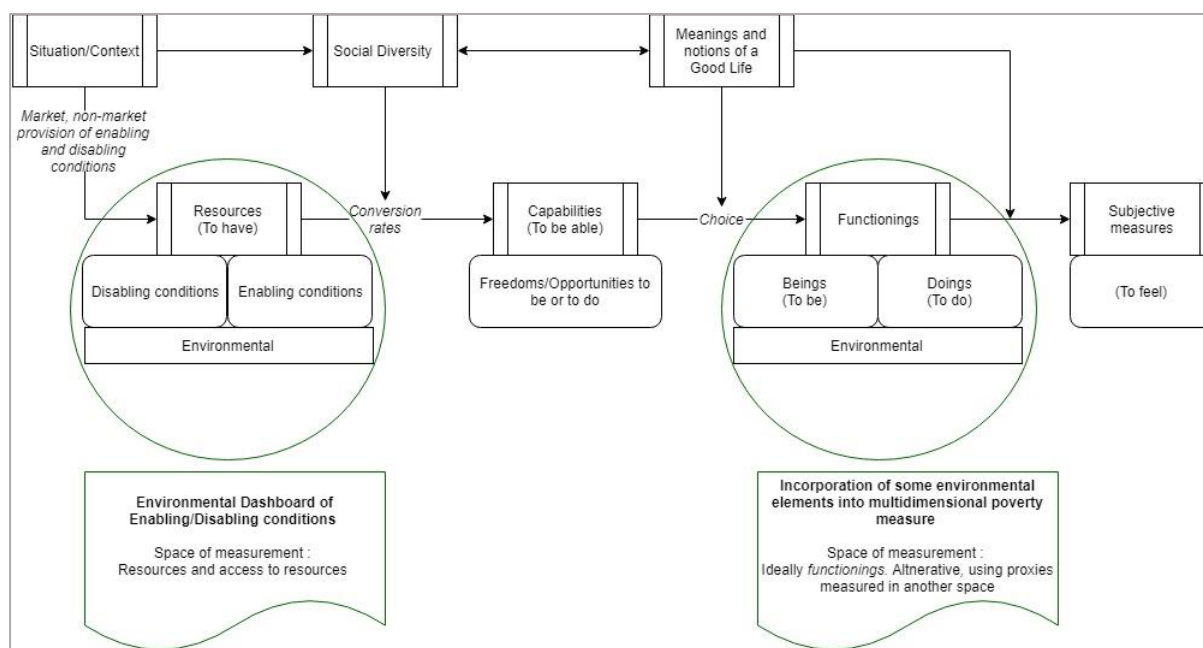
The empirical analysis carried out in San Felipe collected the meanings of poverty, and a flourishing-worth-lived life, identifying two distinctive environmental elements that lie at the intersection of the 'commonality of the human experience': Clean, safe Air and Water. These two elements are not only essential for physical subsistence but can unfold capabilities and a variety of valuable functionings (beings and doings). Drawing on the Rawlsian concept of social primary goods, these elements can also be considered *Environmental primary goods* because these are elements that everyone will need no matter their own conception of a good life and can be the common base of a selection of environmental justice principles. These two elements were considered as enabling conditions directly linked to the landscape. Clean air, in the view of people of San Felipe, is closely linked to their health and longevity and is also a source of Subjective well-being.

Drawing on the options identified by Thiry et al. (2018) and the recommendations of the Stiglitz, Sen, Fitoussi Commission (Stiglitz et al., 2009), I argue for the incorporation of the natural environment in the poverty and social progress measures by using a combined approach that encompass the *addition* of some environmental indicators into the current multidimensional poverty measure **and** a *separate* environmental enabling conditions dashboard alongside the measure.

Alkire et al. (2015) argue that to design a multidimensional measure, the *space* of the measure should be defined. The space of the measure determines whether poverty is measured in the space of resources, inputs and access to services, outputs, or functionings and capabilities. The proposed combined approach uses two different spaces. From one side, it includes measures in the space of *functionings*. In this space, some environmental indicators are already incorporated within the current multidimensional poverty metric and measured at the individual level through household surveys. On the other side, it includes measures in the space of *inputs* (environmental enabling conditions). These environmental conditions are suggested to be measured from sources other than household surveys.

The Conceptual Framework that has guided this research consists on a pipeline process of 'well-being production' (Figure 10-3). The multidimensional poverty measure is designed to report the end-of-pipe result of well-being in the defined point of time when the household surveys or the source of data come from. This information is important to identify those groups and places where the poorest and/or vulnerable population is located, and the intensity and incidence of the deprivations experienced. Additionally, the end-of-pipe information, focused on the space of *functionings* take into account the conversion factors associated with social difference. The Report by the Commission on the Measurement of Economic Performance and Social Progress (Stiglitz et al., 2009) argue in favour to move from the space of *resources* to the space of *functionings*, following Sen's capability approach (Sen, 1995).

Figure 10-3. Combined approach to incorporating environmental considerations into the Mexican multidimensional poverty measure



However, Sen's argument is that human development should *not only* be measured in the space of resources (Sen, 1995; Robeyns, 2017), but must *also* take into consideration the various ways in which social diversity interacts with the same resources. This is important because it clarifies that the selection of one measurement space doesn't exclude the possibility of using another. Drawing upon this clarification, the measurement space recommended for the separate environmental condition's dashboard is *resources*, specifically, enabling and disabling environmental conditions. Using again the mental image of a well-being pipeline process, the separate environmental dashboard aims to collect information from the starting point of the well-being pipeline, to make visible which enabling/disabling

conditions from the environment are in place. For policy purposes, this dashboard would have very practical implications, as it will highlight urgent environmental risk factors to be addressed. The combined approach is schematically represented in Figure 10-3.

A recent proposition for incorporating the environmental dimension into the Mexican multidimensional poverty measurement (Pérez-Cirera et al., 2017) conceptually roots the poverty-environment nexus in three contributions of a healthy natural environment: a) as provider of key goods and services for human *survival* such as food, water and fibres; b) as a catalyser of *agricultural productivity* resulting from higher outputs per unit of effort derived from healthy soils; and c) as an enabler of better human capacities due to good *health* derived from an adequate air or water quality (MA, 2005a).

To incorporate the environmental dimension, Pérez-Cirera et al. (2017) propose two sub-dimensions: *Ecosystem Health*, understood as the quantity, quality and resilience of ecosystems and their critical goods and services for welfare); and *Environmental Health*, defined as the impacts on human health from the interactions with their proximate environment. From these sub-dimensions, two groups of indicators are proposed: 1) *Indicator of Wellbeing deficiency from Environmental Poverty*, which, in turn unfolds in two groups Ecosystem Poverty (variables include: water, energy and biodiversity) and Poverty in Environmental Health (variables include: respiratory health, spatial health and sanitation health); and 2) *Indicator of Poverty Vulnerability due to Climate Change*, which identifies those households most likely to become poor, due to their exposure and vulnerability to climate change.

Thiry et al (2018) inspect the options for the incorporation of environmental and natural resources within analyses of multidimensional poverty and discuss the implications of designing a general ENR-enhanced MPI. They draw on the conceptualisation of the natural environment as a determinant (instrumental) or as a constituent of wellbeing and poverty (Schleicher et al., 2018) to explore the options for combining the natural environment and multidimensional poverty analysis. They argue that environmental-related determinants of poverty should most appropriately be analysed alongside a multidimensional measure, whilst environmental-related constituents of poverty should be captured within the multidimensional measure. Consistently, two options exist to either integrate environmental considerations within the poverty metric or analyse alongside it. The first option they advance is to incorporate environmental and natural resources (ENR) data collected from household surveys into the multidimensional poverty measure. The second option is to use ENR data from sources other than household surveys. This second option is consistent with one of the recommendations of the Stiglitz, Sen, Fitoussi Commission (Stiglitz et al., 2009), which states that “environmental aspects of sustainability deserve a separate follow-up based on a well-chosen set of physical indicators. In

particular there is a need for a clear indicator of our proximity to dangerous levels of environmental damage (such as associated with climate change or the depletion of fishing stocks” (Recommendation 12) (Stiglitz et al., 2009, p.17). For the first option (the integration of ENR *within* the multidimensional poverty index (MPI), Thiry et al. (2018) argue that ENR could either be included as a separate dimension, or as indicators within existing dimensions, or a mix of both options. The three main poverty-environment nexus that are proposed by Thiry et al. (2018, p. 22) are livelihoods, environmental health, and vulnerability to environmental hazards, as detailed in Table 10.1

Table 10-1. Dimensions of ENR that might be integrated into an MPI. Source: (Thiry et al., 2018, p.22)

Components	Subcomponents	Brief outline
Livelihood	This component mostly refers to the means of subsistence provided by ENR to people.	
	Material aspects	Refers to the qualitative and quantitative aspects of direct subsistence provided by nature (such as crop food, for instance) and indirect subsistence (such as incomes coming from the sale of ENR on a market)
	Institutional	Relates to the ways access to the means of subsistence provided by nature are institutionally organized (collective local management system or land rights, land tenure, for instance)
	Skills	Relates to the cognitive and practical knowledge people have to sustainably manage and benefit from ENR.
Environmental health	This component addresses the factors in the environment that can adversely affect human health.	
	Household (Indoor)	How the members of the household are affected by the ENR-related health problems.
	Workplace	Issues related to ambient factors affecting the worker within the working environment.
	Ambient (Outdoor)	Close environment of the household's habitation.
Vulnerability to environmental hazards	This component addresses the extent to which the unit of identification is exposed, sensitive and adaptive to a hazardous event.	
	Exposure	Likelihood of a system (e.g. a community) experiencing particular conditions (Smit and Wandel, 2006).
	Coping Capacity	Extent to which a human or natural system can absorb impacts without suffering long-term harm or some significant state change. (Adger et Winkels, 2014)
	Adaptive Capacity	Ability of a system to evolve in order to accommodate environmental hazards or policy change and to expand the range of variability with which it can cope. (<i>ibid.</i>)

Vira and Kontoleon (2013), based on a systematic review of literature on the ways in which poor people depend on biodiversity identify two types of links between poverty and biodiversity: (i) as a direct contribution to their subsistence, income and other livelihood needs, providing inputs into poor people's livelihoods, and (ii) as a source of risk coping and insurance, providing a buffer against risks and shocks. report some patterns in the biodiversity-poverty nexus.

They find that agro-biodiversity provides the poor with a form of cost-effective insurance against the risk of food insecurity. They argue that a higher degree of resilience (used to denote an ecosystem's ability to maintain its basic functions and controls under disturbances) is found in ecosystems that exhibit higher degrees of biodiversity. The relevance of ecosystem resilience is linked to human welfare: “as a system flip may entail huge welfare losses since the continued provision of several key ecosystem

services would be at risk of total collapse” (Vira and Kontoleon, 2012, p.70). In relation to the poor, the value of resilience is linked to its role as an insurance against irreversible damage. They find evidence supporting the hypothesis that the poor make extensive use of their natural resources, as long as these remain relatively low-value and subsistence-oriented, but the same groups either lose access to, or are actively excluded from more highly-valued resource uses. This last aspect of the dependence of the wealthy on the natural environment and its effect on poverty dynamics is largely ignored by focusing on poverty measures.

The Report by the Commission on the Measurement of Economic Performance and Social Progress (Stiglitz et al., 2009) argues that the complexity of sustainability assessment strongly advocates in favour of treating it separately from monetary or non-monetary dimensions of *current* well-being. To stress the importance of this recommendation, they use the following analogy: “when driving a car, a meter that weighed up in one single value the current speed of the vehicle and the remaining level of gasoline would not be of any help to the driver. Both pieces of information are critical and need to be displayed in distinct, clearly visible areas of the dashboard” (Stiglitz et al., 2009, p.265).

Alkire et al. (2015, p. 2018) highlight that “the aim remains to reduce poverty, not to measure it”, and therefore “improved channels of complementarity are required between censuses, administrative records, household surveys, and other information”. If the purpose of a poverty measure is to improve policy responses to alleviate it or reduce it, then the matter becomes how to improve the information emanating from the metrics to improve such responses. I argue that, as illustrated in the analogy used by Stiglitz et al., two simultaneous pieces of information are needed: poverty and enabling/disabling environmental conditions. This envisions a complementary measurement approach using (i) a separate measure of environmental enabling/disabling conditions that runs alongside the poverty multidimensional poverty and (ii) some key environmental indicators integrated within the poverty measurement. These complementary approaches can provide meaningful information to shape policy responses for poverty prevention, alleviation and reduction.

10.1.1. The poverty-natural environment- flourishing life nexus

As presented in Chapter 7, in the local definition of a flourishing, worth-lived life there are elements that are not considered rights which are required to be enforced and agreed upon. For example, a definition of a good life may be one in which there are constant opportunities to find beauty, but this doesn't imply that there's an obligation of others to secure our interest of finding beauty. In contrast, there are elements that are constituents of a good life which are considered human and social rights and it is expected for nation states to secure them. The identification of these elements are essential

to this analysis because they are the bridges in the discussion about well-being and justice as they are the bricks to the answer of how to live together in a shared, finite planet and how to allow others (including future generations and other species) to have the same opportunities to live a flourishing, worth-lived life.

Network analysis highlighted the centrality of the natural environment in catalysing a diversity of locally valuable resources and functionings. Among these are social rights granted by the law, such as access to food; health and employment. Healthy fisheries, directly linked to a conserved natural environment, provides direct access to nutritious food enabling the capability to be well nourished. In addition, it enables employment, which in turn enable income. Interestingly, income was highly valued in an instrumental way, mainly to improve access to high-quality health services and medicines. The conserved natural environment then enables the functioning Being Healthy (both physically and mentally), which is the centrepiece of the definition of a flourishing life, by providing the highly valued resource of *Clean air* and other elements that were considered contributors to a healthy life, such as safe water, access to medicines from nature, peace of mind and recreation.

The central role of the natural environment, which was uncovered by the answers about constituents and determinants of a flourishing life and enabling /disabling conditions attached to the landscape, was, to a great extent, absent in the open-ended answers related to definitions of a flourishing, worth-lived life. This might correspond to the common attitude of taking for granted aspects in which people rely on a constant basis without noticing the influence and centrality they have. For instance, people mentioned *Being healthy* as an essential constituent of a flourishing life; and the access to nutritious food and clean air as essential determinants of health; and they linked the access to nutritious food to healthy fisheries, which, along with clean air, was linked to a conserved natural environment. Despite its underlying role in enabling all the processes that are valued as enabling conditions for a flourishing life, the element *conserved natural environment* was rarely mentioned as an ingredient of a flourishing life in a direct way. The natural environment was not only valued in instrumental terms, but also in relational terms, referring to the sense of beauty, the capacity to be healed by being in contact with nature through birdwatching or a walk in the beach.

The central role of the natural environment, specifically, fisheries (as a source of employment/income/nutritious food) and the landscape integrity and function (expanding alternative employment opportunities such as tourism, protecting against the effects of natural hazards, enabling physical and mental health) makes the community of San Felipe highly vulnerable to environmental degradation and inefficiencies in environmental governance. Social difference plays a role in how

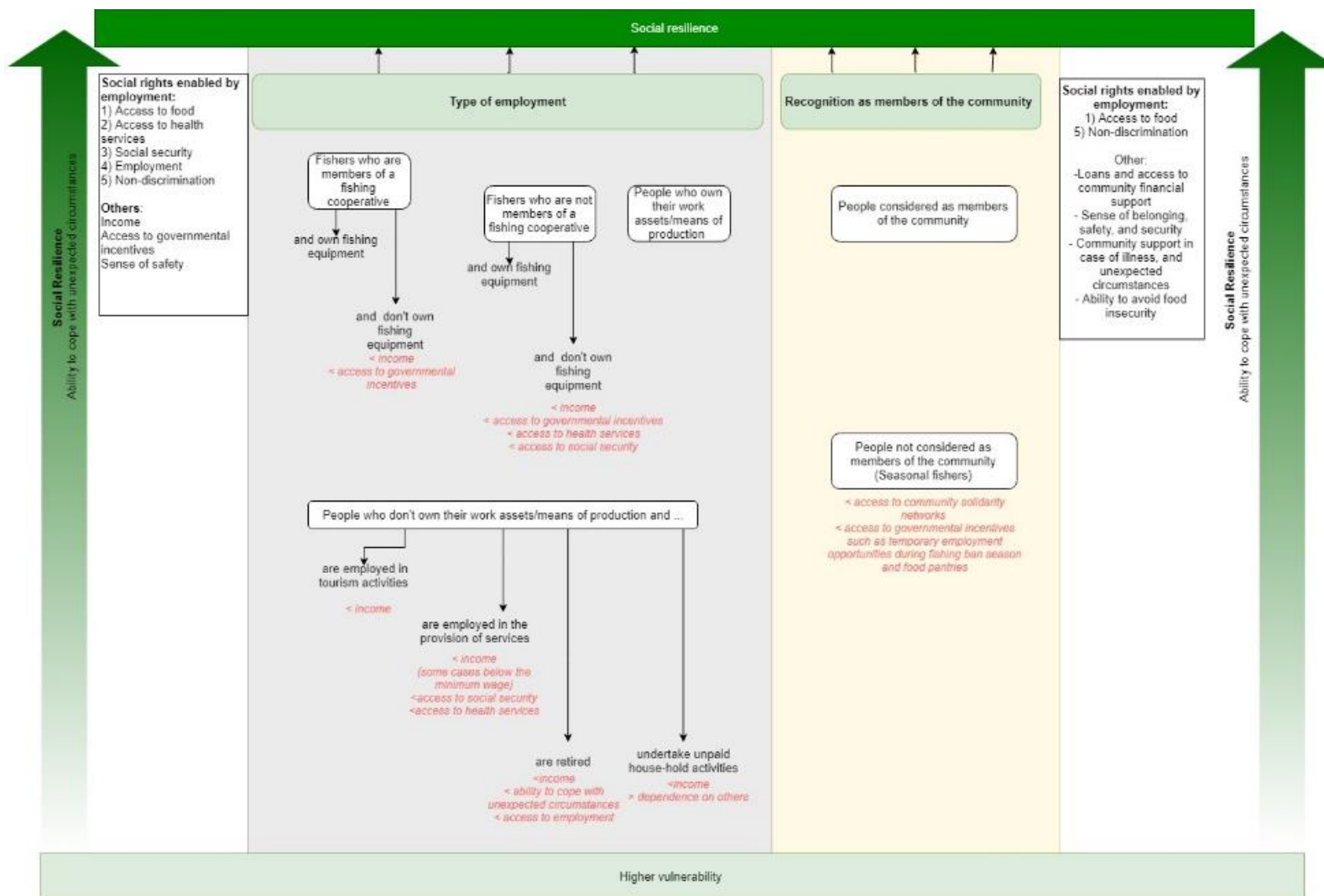
vulnerability is experienced, and social resilience is formed. San Felipe is a relatively homogenous community in terms of religion, ethnicity and socioeconomic status (in function of income and education).

However, as presented in Figure 10-4, dynamics of exclusion are shaped mainly in two ways: firstly, by the type of employment that is accessible and secondly, by the recognition as members of the community. These two elements shape the level of vulnerability and social resilience as they define the way in which people can cope with unexpected circumstances, from illness and food insecurity to environmental degradation and changes (including those related to climate change) and governmental institutional inefficiencies.

Different studies associate vulnerability to environmental change to a household's socioeconomic status (Adger, 2006; Brouwer et al., 2007) and to differentiated exposure, coping capacity and adaptive capacity (Gallopín, 2006; Akter and Mallick, 2013). Thiry et al. (2018, p.29) define *exposure* as the "probability of occurrence of a hazardous event (storm, earthquake, flood... "; *coping capacity* as "the extent to which a human or natural system can cope, in the short run, with impacts without suffering long-term harm or some significant change" (Thiry et al., 2018, p.30); and *adaptive capacity* as the "long term ability of a system to evolve in order to accommodate environmental hazards or policy change and to expand the range of variability with which it can cope" (Adger and Winkels, 2014, p. 207, as cited by Thiry et al. 2018).

Employment in fisheries provides the most fertile capability as it unfolds a varied array of possibilities to respond to immediate unexpected circumstances such as illness, emergencies, food insecurity or environmental hazards. It represents the best-paid employment, which, despite being seasonal, is the most profitable economic activity. People in the community have adapted to the seasonality of income, and assign high value in adopting healthy financial habits, like saving 'for bad times'. This is reflected in the commonly-held opinion that there is no poverty in San Felipe, only bad-administered people. In addition, governmental authorities have designed social protection mechanisms for target groups such as old-age pension (program 60 and more) and focusing on conditions of vulnerability such as employment guarantees (like the temporary employment program during fishing ban season) and cash transfers. These mechanisms help people cope with food insecurity and unemployment due to seasonality by implementing temporary employment programmes and the distribution of food pantries.

Figure 10-4. Socially-differentiated Coping capacity



Within the fisheries sector, there is a difference in the levels of coping capacity. Those who are most able to cope with immediate unexpected conditions are those who belong to a fishing cooperative. Membership of a cooperative unfolds multiple coping mechanisms, such as access to social security; access to health services; access to subsidies to obtain valuable work assets, such as fishing boats and engines, which in turn improve access to employment opportunities. In addition, belonging to a cooperative increases the feeling of safety and security, as cooperative members are sure that they will have the collective support from the cooperative in case of need. Such need may come in many forms, from an unexpected challenging situation, such as the illness of a family member; financial need for a family celebration (wedding, funeral); or dangerous situations like being lost at sea or experiencing a fishing-related emergency, such as decompression.

From the group of those who have access to employment in fisheries, those most unable to cope with unexpected circumstances are those outside the solidarity networks that either the cooperative or the community provides and those who don't own fishing equipment. Those who don't belong to a fishing cooperative and don't own fishing equipment are in an exclusion loop as they are unable to access fishing subsidies and incentives provided by the government. For example, the government provides support to renew the motor engine for fishing boats. To access these incentives, it is required to own a fishing boat and/or to pay upfront a lump sum. These requirements have an asymmetrical effect as they favour the allocation of incentives to fishers who already have work assets and/or the possibility to pay lump sums up front.

Those outside the community solidarity networks, such as seasonal fishers, have also higher social vulnerability, as they are excluded from the diverse benefits that the community support can offer to cope with unexpected circumstances, from food insecurity to access to financial support. Still, seasonal fishers have the benefit of the high profits of the fishing activity, especially when seasonal fishers arrive to San Felipe to work the sea-cucumber and octopus' fishery. This is not the case for other community groups, such as those who don't have employment in the fishing activity. Among them, women who undertake unpaid household activities experience high vulnerability, which is only evident when the challenging circumstances they must cope with are different from the main provider of income in their household. For example, when they face the detrimental effects of domestic violence usually linked to alcohol and drugs abuse, which is one of the main landscape-attached disabling conditions identified by the community.

10.1.2. Integrating key environmental indicators within the Mexican poverty measurement.

Alkire et al. (2015, p. 197) describe eight design elements of a poverty measure. The first five serve to structure a poverty measure and the last three to calibrate key parameters. These design choices are intended to be made in an iterative fashion in combination with consultations and empirical work. In line with this, the empirical work in San Felipe allows to propose a first iteration of the first six design elements that can serve for further iterations. For illustrative purposes the current elements of the Mexican multidimensional poverty are shown in Table 10-2.

The current multidimensional poverty measure already includes indicators about water access and type of fuel for cooking, which relates to respiratory health, in turn linked with air quality. So, what is the novelty of including Environmental rights as a separate dimension? The answer to this question draws on the recommendation of the Stiglitz, Sen, Fitoussi Commission (Stiglitz et al., 2009). They recommend having a separate environmental dashboard that can display critical and distinct pieces of environmental information.

Currently, water access and type of fuel for cooking is one of the 4 sub-dimensions within the 6 indicators of the social rights space. Considering that each of the sub-dimensions is weighted equally, the relative weight assigned to both water and air quality don't reflect their centrality to bodily health. They're not even associated to health. They're included as part the right to a dignified housing. The location of these two essential environmental rights and their relative weightings not only distort their importance but prevent the identification of sources of risk derived from environmental degradation. In addition, the indicator of access to drinking water doesn't include information about the quality of such water; and, as argued in Chapter 8, the low quality of available water has a high health and economic impact, disproportionately affecting those already marginalised and vulnerable. A key difference from the current and the proposed indicators is the inclusion of indicators about water quality and not only the access to water in the dwelling. The relevance of this point was discussed in Chapter 8.

Table 10-2. Design elements of the Mexican poverty measure and the proposed incorporation of environmental elements

Design element	Mexican multidimensional poverty measure (current)	Proposed
Purpose of the measure	<ul style="list-style-type: none"> • Policy applications to help design and target poverty prevention and reduction social programs at a national, State and municipal level. • Monitor performance over time, accountability and reporting towards international commitments, such as the SDGs. 	
Choice of space	<ul style="list-style-type: none"> • Economic wellbeing space: Resources • Social rights space: Access to services (inputs), Functionings 	
Unit of identification and analysis	The unit of <i>analysis</i> is the person (the results are reported and analysed individually) while the unit of identification is the <i>household</i> (data is collected through household surveys).	
Dimensions	<ol style="list-style-type: none"> 1. Economic wellbeing 2. Social rights 3. Social cohesion 	<ol style="list-style-type: none"> 4. Environmental rights
Indicators	<ol style="list-style-type: none"> 1. Economic wellbeing <ol style="list-style-type: none"> 1.1. Current per capita income in the household 2. Social rights: <ol style="list-style-type: none"> 2.1. Average education gap in the household 2.2. Access to health services 2.3. Access to social security 2.4. Quality and spaces of the dwelling 2.5. Access to basic services in the dwelling <ol style="list-style-type: none"> 2.5.1. Access to drinking water 2.5.2. Availability of draining services 2.5.3. Electricity 2.5.4. Type of fuel for cooking 2.6. Access to food 3. Social cohesion <ol style="list-style-type: none"> 3.1. Gini index 3.2. Degree of social polarization 3.3. Proportion of income of the population living in extreme multidimensional poverty relative to the income of those not living in multidimensional poverty 3.4. Social networks perception index. 	<ol style="list-style-type: none"> 4. Environmental rights <ol style="list-style-type: none"> 4.1. Access to safe drinking/domestic water <ol style="list-style-type: none"> 4.1.1. Availability 4.1.2. Quality 4.1.3. Effective access 4.2. Air quality (not from household data but from municipal data) (Pérez-Cirera et al., 2017) <ol style="list-style-type: none"> 4.2.1. Air quality in outdoor spaces 4.2.2. Air quality in indoor spaces

This new proposal is intended to improve policy decision-making by minimizing the number of changes needed to the current measure to ease implementation and to allow comparability over time. In concrete, the proposal to integrate environmental considerations within the current Mexican poverty measure consists on adding a separate *Environmental rights* dimension which includes two indicators related to safe drinking water and air quality.

The indicators of water and air quality draw on the proposal of Pérez-Cirera et al. (2017) to use the criteria of *availability*, *quality* and *effective access*. They suggest a water indicator composed of the three sub-indicators shown in Table 10-3 and an air-quality indicator composed of the two sub-indicators shown in Table 10-4.

Table 10-3. Indicators of access to safe drinking/domestic water (Pérez-Cirera et al., 2017)

Indicator: Access to Safe drinking/domestic water

<i>Sub-indicator</i>	Description	Cut-off point
<i>Water availability</i>	Measured as the minimal quantity required for the members of a household to meet their basic needs. Critical value of 2lt/day per household member (Pérez-Cirera et al., 2017, p.13)	1 – If household has access to 2l of water-day per member 0 – Otherwise
<i>Effective access</i>	Measure of water accessibility in relation to available infrastructure, costs relative to the household income or social conflict that prevent access to water.	1 – If household invest more than 10% of family income or if there is an intermittence in supply 50% or more of the time. 0 - otherwise
<i>Water quality</i>	The Mexican norm NOM-127-SSA1-1994 includes threshold values for 4 types of water pollutants: 1) Biological Oxygen Demand (BOD); 2) Chemical Oxygen Demand (COD); 3) Total suspended solids and 4) Concentration of faecal coliforms (Pérez-Cirera et al., 2017)	1 – if the household is in a municipality where any of the NOM-127-SSA1-1994 threshold values are violated or any household member has reported periodic diarrheic health events (Pérez-Cirera et al., 2017) 0 - otherwise

Table 10-4. Indicators of air quality (Pérez-Cirera et al., 2017)*Indicator: Air quality*

<i>Sub-indicator</i>	Description	Cut-off point
<i>Air quality in outdoor spaces</i>	Measures air quality in outdoor spaces based on welfare threshold as defined by the Mexican air quality standards for main air pollutants (SO ₂ , NO ₂ , PM ₁₀ , , PM ₂₅ , CO, O ₃ , and Pb) (Pérez-Cirera et al., 2017, p.20)	1 – If municipal air quality exceeds the average maximum within 24 hours, as nationally normed, once a year, for all pollutants and <ul style="list-style-type: none"> the household head belongs to any of the health vulnerability groups (adults older than 60 years old, people with disabilities, single mothers, people with HIV) (Pérez-Cirera, et al., 2017,p.21) or any of the household members are younger than 5 years old. 0 – Otherwise
<i>Air quality in indoor spaces</i>	Measure of the exposure to air pollutants produced in the household.	1 – If the household uses firewood or other source of biomass, as the main source of heat or cooking, and <ul style="list-style-type: none"> it does not have a separate room for cooking, and if children younger than 15 years old live in the household 0 – Otherwise (Pérez-Cirera, et al., 2017, p.22)

10.2. Designing an environmental enabling/disabling conditions dashboard

The network results presented in Chapter 7 show that a healthy natural environment can unfold a wide array of valuable life functionings, and that -in this context- catalyse an even larger amount of valuable functionings than income. Income is one of the constituent dimensions of the Mexican poverty measure because of its centrality in expanding life options, and for this centrality, it is measured in a separate dimension than social rights.

Poverty metrics give information centred in the person or household and their lived circumstances, and thus, they rely on census data from household surveys. The rationale of this is that multidimensional poverty metrics allow poverty identification and an assessment of the depth and incidence of poverty. In the Mexican case, the poverty metric informs policy decisions for poverty alleviation/reduction strategies and public programmes.

It's important to recall that at the end, the aim of poverty metrics is poverty reduction, not perfecting the metrics. As argued in this thesis, the absence of environmental indicators in poverty measurement is giving an incomplete picture of social reality. But, what kind of information is missing? From the

poverty perspective, it's missing the effect of the lack of safe drinking and domestic water, as currently, the only information in the poverty metric measures whether a household has or not water disregarding whether the water is safe, and drinkable. In addition, it's missing the centrality of an environment with safe, clean air. Without these two vital elements, a person's health and basic survival is challenged and that's why they're included within the poverty metrics centred in the individuals and households.

However, as shown in the network analysis presented in Chapter 7, a healthy natural environment is not only important for survival purposes. It acts as a precursor of multiple life options that are considered valuable to achieve a meaningful, worth-lived life. It opens life possibilities. A more complete picture of social reality would require making visible those elements able to catalyse or limit life chances in order to ensure that those conditions can be maintained over time. These elements are presented in Table 10-5 with a list of examples of indicators that could be used to assess their condition and potential to secure and maintain the provision of environmental enabling conditions over time. A key difference with the inclusion of environmental indicators within the poverty metric is that the source of data is the individual/household level, whilst in the case of the environmental dashboard, the source of data is at municipal level, where the unit of analysis depends on the type of indicator.

The environmental enabling conditions dashboard aims to make visible the range of environmental enabling/disabling conditions before entering the "wellbeing pipeline" in which these already-unequal conditions will encounter the different conversion rates associated to social difference. The proposed environmental enabling conditions dashboard includes 5 dimensions: 1) Freshwater resources; 2) Ecosystem health; 3) Air; 4) Recreation opportunities and 5) Climate risk.

10.2.1 Freshwater

Chapter 8 has emphasized the unperceived effect of the low water quality in the life of community members in San Felipe. The community is so used to the low water quality that it seems normal to be able only to drink bottled water. Chapter 6 highlighted the health risks evidence by late studies documenting water pollution with organochlorine pesticides (Polanco-Rodríguez et al., 2015; Polanco et al., 2011) and also the higher vulnerability derived from a combination of exposure with low risk-perception, asymmetrically affecting low-income population (Polanco-Rodríguez et al., 2015). The proposed environmental dashboard includes a dimension of freshwater resources that has four sub-dimensions: (i) quality of freshwater sources; (ii) level of water stress; (iii) water management and sanitation; and (iv) protection and restoration of water-related ecosystems. Table 10-13 details examples of proposed indicators and highlights the coherence with SDGs targets and indicators.

10.2.2. Ecosystem health

The proposed sub-dimensions to make visible those elements from the *Ecosystem health* dimension that were relevant from a local perspective are (i) Environmental governance/justice; (ii) Life below water; and (iii) Life on land. The sub-dimensions draw on Sustainable Development Goals 14, 15 and 16.

10.2.3. Environmental governance/justice

Chapter 9 identified common-held definitions of justice in relation to the natural environment. One of the identified viewpoints of justice highlights the role of the institutions in shaping individual behaviour. The results suggest that for holders of this view, if the institutions don't comply with their expected duties, it is just for citizens not to comply with their obligations. In this sense, for individuals that hold this viewpoint, duty compliance is contingent to institutional behaviour. This result suggests that, in addition to the direct damaging effects of the lack of governmental authorities' compliance with the rules, it has a corrosive effect that has the potential to multiply those damaging effects. Drawn on this result, one indicator included to make visible potential threats to ecosystem health due to lack of observance of rules, is the legitimacy and credibility of environmental governance, measured as a function of levels of illegal activity, corruption, reported cases of environmental injustice and perceptions of population about the credibility of governmental authorities.

The empirical analysis has highlighted the lack of communication among the Protected area staff of the Ria Lagartos Biosphere Reserve and the community. Even when there are some people informed about the Protected Area (PA), this is not the case for most of the population, whose main reference to the PA was that it was the cause of the construction ban and other resources' use restrictions. At the time of this research, environmental management decisions were made without the knowledge and participation of the whole community. Considering the value of participation in decision making as an element of environmental justice, a sub-dimension of Information and participation in environmental decision-making processes was included.

10.2.4. Life below water

The dimension *Life below water* is intended to be aligned to the homonymous SDG 14 to advance already-committed country reporting needs. It includes 4 sub-dimensions and.: (i) marine pollution; (ii) ocean acidification level; (iii) fisheries; and (iv) external pressures to fisheries. The last item aims to make visible market pressures of high-commercial-value species, which are central to understand the type and source of perverse incentives for overfishing or illegal activity that might act as corrosive threats to maintain fishing stocks over time.

10.2.5. Life on land

The dimension *Life on land* includes three sub-dimensions: (i) biodiversity; (ii) market pressures and (iii) conservation, restoration and sustainable use of terrestrial ecosystems. These dimensions aim to make visible the proportion of important sites for terrestrial and freshwater biodiversity and its pressures. As highlighted by the network analysis a conserved natural environment underpins multiple life functionings. An identified threat or a change in the condition of terrestrial ecosystems would imply a change in the provision of environmental enabling conditions.

10.2.6. Air

Air quality was included within the poverty measure in combination. In that individual/household-centred metric, a threshold was proposed using air quality interacting with a member of the household belonging to any vulnerable groups (elderly, children, people with disabilities). In the case of the dashboard, the type of indicator proposed is the municipal level highlighting historical records that can help to identify trends and patterns that might pose a health risk.

10.2.7. Recreation

In the empirical analysis, life functionings such as having fun, exploring and enjoying life, were highly valued and recognised as having fertile advantages for mental health (reduction of stress, relaxation, self-healing); relational functionings such as spending time with family (which was locally regarded as constituent element of a worth-lived life) and subjective feelings such as beauty and awe; motivation, happiness and even. For the centrality of this element and its close relation to the natural environment, it was included as a dimension within the environmental enabling conditions dashboard with a sub-dimension of access to the natural environment or green public spaces.

10.2.8. Climate and environmental emergencies risk

The inclusion of a dimension of Climate risk draws on Wolff and De-Shalit (2007, p.9), who argue that “exceptional risk and vulnerability is itself a disadvantage, whether or not the feared event ever actually happens”. The vulnerability to risk is considered to be a function of “exposure, coping capacity and adaptive capacity”, drawing on the description provided by Thiry et al. (2018, p.29). *Exposure* includes magnitude, frequency, duration and areal extent of the hazard. “*Coping capacity* is the extent to which a human or natural system can cope, in the short run, with impacts without suffering long-term harm or some significant state change “ (Thiry et al., 2018, p.30). *Adapting capacity* differs from coping capacity in that it refers to “adjustments in the long term that can modify the sensitivity and exposure of a system to a disturbance”(Thiry et al., 2018, p.30), rather than the short-term ability to survive to a shock.

To define the indicators related to climate and environmental emergencies risk, environmental emergencies are defined as a “sudden-onset disaster or accident resulting from natural, technological or human-induced factors, or a combination of these, that causes or threatens to cause server environmental damage as well as loss of human lives and property” (UNEP, 2002, p.1). The reason to include the term *environmental emergencies* and not only *climate risks* is that a few people in the community referred to the latent risk of marine pollution due to oil spills. The term *Environmental emergencies* is an overarching term that can highlight the need for community preparedness and for the integration of disaster preparedness and reduction strategies into national, municipal and local policies.

Drawing on Thiry et al. (2018) the dimension of *Climate and environmental emergencies risk* aim to highlight two sub-dimensions: (i) Exposure at a municipal level to climate risks; and (ii) Coping and adaptive capacity at a municipal and local level.

Table 10-5. Proposed indicators for an *Environmental enabling conditions* dashboard (the right to a ‘healthy environment’) – Municipal level data

Dimension	Sub-dimension		Proposed indicator (<i>Enabling conditions space</i>)	Coherence with <i>Sustainable Development Goals (SDGs)</i> reporting needs
Freshwater	Quality of freshwater sources		<ul style="list-style-type: none"> Water quality measured according to the standards established by the Mexican norm NOM-127-SSA1-1994 which defines thresholds for (i) Biological Oxygen Demand (BOD); (ii) Chemical Oxygen Demand (COD); (iii) total suspended solids and (iv) concentration of faecal coliform. 	
	Level of water stress		<ul style="list-style-type: none"> Freshwater withdrawal as a proportion of available freshwater resources 	SDG 6. Ensure availability and sustainable management of water and sanitation for all Target 6.4. Indicator 6.4.2.
	Water management and sanitation		<ul style="list-style-type: none"> Efficiency level/rate of water harvesting, desalination, purification, recycling and reuse technologies 	Target 6.A. Indicator 6.A.1.
	Protection and restoration of water-related ecosystems		<ul style="list-style-type: none"> Condition and change in the extent of water-related ecosystems 	Target 6.6 Indicator 6.6.1.
Ecosystem health (function and integrity)	Environmental governance/justice	<ul style="list-style-type: none"> Legitimacy and credibility of environmental governance 	<ul style="list-style-type: none"> Proportion of persons who had at least one contact with a public official and who paid a bribe to a public official or were asked for a bribe by those public officials, during the previous 12 months. Proportion of businesses that had at least one contact with a public official and who paid a bribe to a public official or were asked for a bribe by those 	SDG 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels. Target 16.5. Indicator 16.5.1 Indicator 16.5.2. Indicator 16.6.2.

Dimension	Sub-dimension		Proposed indicator (<i>Enabling conditions space</i>)	Coherence with <i>Sustainable Development Goals (SDGs)</i> reporting needs
			<p>public officials, during the previous 12 months.</p> <ul style="list-style-type: none"> Perception of population of governmental authorities' compliance and enforcement of the law and regulations related to the natural environment. Number and type of environmental injustices and its sources reported by society 	
		<ul style="list-style-type: none"> Information and participation of citizens in environmental decision-making processes 	<ul style="list-style-type: none"> Proportion of population who believe environmental decision-making is inclusive and responsive, by sex, age, disability and population group. Proportion of population who feel informed of environmental decisions that might affect them. 	<p>Target 16.7 Indicator 16.7.2.</p>
	Life below water (Healthy fisheries)	<ul style="list-style-type: none"> Marine pollution (marine debris and nutrient pollution) Ocean acidification level Fisheries 	<ul style="list-style-type: none"> Index of coastal eutrophication and floating plastic debris density Average marine acidity (pH) measured at agreed suit of representative sampling stations Proportion of fish stocks within biologically sustainable levels 	<p>SDG 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</p> <p>Target 14.1. Indicator 14.1.1.</p> <p>Target 14.3. Indicator 14.3.1.</p> <p>Target 14.4. Indicator 14.4.1.</p>

Dimension	Sub-dimension		Proposed indicator (<i>Enabling conditions space</i>)	Coherence with <i>Sustainable Development Goals (SDGs)</i> reporting needs
		<ul style="list-style-type: none"> External pressures to fisheries 	<ul style="list-style-type: none"> Number of illegal fishing reported incidents (formally and informally) Changes in market value of high-value fishing species or Subsidies that could act as perverse incentives for overfishing 	
	Life on land	<ul style="list-style-type: none"> Biodiversity External pressures to species Conservation, restoration and sustainable use of terrestrial ecosystems 	<ul style="list-style-type: none"> Red List Index Changes in market value of high market-valued species or subsidies that could act as perverse incentives for overfishing Forest, wetland, dryland area as a proportion of total land area. Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type 	<p>SDG 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.</p> <p>Target 15.5. Indicator 15.5.1</p> <p>Target 15.1. Indicator 15.1.1. Indicator 15.1.2.</p>
Clean Air	Air quality		<ul style="list-style-type: none"> Average maximum within 24 hours of air pollutants (CO₂, NO_x, SO₂, PM₁₀, PM₂₅ and CO) as defined by Mexican norm 	

Dimension	Sub-dimension		Proposed indicator (<i>Enabling conditions space</i>)	Coherence with <i>Sustainable Development Goals (SDGs)</i> reporting needs
Recreation opportunities	Recreation opportunities	<ul style="list-style-type: none"> • Access to the natural environment or/green and public spaces 	<ul style="list-style-type: none"> • Proportion of green natural spaces/urban area 	
Climate and environmental emergencies risk	Exposure	<ul style="list-style-type: none"> • Level of exposure of the municipality to climate risks 	<ul style="list-style-type: none"> • Level of exposure to drought, flood, hurricanes, tropical storms or heat waves according to the standards established by the National Institute of Climate Change (INECCC) 	SDG 13. Take urgent action to combat climate change and its impacts
	Coping and adaptive capacity	<ul style="list-style-type: none"> • Municipal and local disaster and climate risk reduction, preparedness and response strategies • Community awareness and preparedness to environmental emergencies 	<ul style="list-style-type: none"> • Level of integration of municipal and local disaster preparedness and reduction strategies into municipal and local policies. • Level of integration of climate change measures into national, municipal and local policies, strategies and planning • Level of community awareness to environmental emergencies • Level of municipal and community preparedness and coordination to environmental emergencies. 	Target 13.1. Indicator 13.1.3. Indicator 13.1.2. Indicator 13.2.1.

10. 3. Closing remarks

Metrics are designed to provide information about an element of interest. For example, poverty metrics are designed to provide information about the experience of everyday-struggles and can take many forms; from monetary-poverty metrics of income to subjective measures of utility, or multidimensional approaches. Poverty measurement frequently takes a political stance in two senses. Firstly, the definition of poverty involves a series of normative positions of what means to be poor and non-poor, thus, defining social aspirations and goals. Secondly, a slight change in the definition and measurement of poverty could back the claim that poverty has been reduced, hampering social credibility. The challenge of integrating indicators of a healthy environment in poverty metrics is at least three-fold. Firstly, there's a lack of consensus about the poverty-natural environment nexus. This lack of consensus is also fuelled by the variety of possible definitions of poverty. Secondly, once a poverty-natural environment nexus is identified, the challenge is to define the threshold of what means to be poor/non-poor in relation to the right to healthy environment. Thirdly, there's the limitation of data availability, or, as Amartya Sen defines it, "information precarity", meaning, the lack of household data integrating environmental considerations. There are also limitations associated to the integration of environmental considerations into poverty metrics. Poverty, as argued in this thesis, is in great part a social construct (Fischer, 2018) that tends to focus the attention to the minimum needed for a human being to survive (absolute poverty) or to live a sufficiently dignified life in a community (relative poverty).

Poverty measurement relies on setting thresholds for identification purposes. It is assumed that by identifying those groups experiencing poverty or vulnerable to poverty, appropriate interventions for poverty reduction, poverty alleviation or strategies for preventing poverty by addressing vulnerability could be designed (Roe et al., 2013). However, poverty measurement does not give any indication of the underlying causes of poverty dynamics. Without information about how poverty is created and sustained in a specific place, how can poverty reduction/alleviation interventions be efficiently designed? If the information guiding poverty responses is only giving indication of the risk, incidence and intensity of poverty and not the causes, the responses that are designed to tackle it will remain insufficient. This is one of the main limitations of poverty measurement. To overcome this limitation, an environmental enabling conditions dashboard is proposed, including elements that were highlighted by the empirical research as essential enabling conditions for a flourishing, worth-lived life. When possible, these elements were grouped in harmony with the Sustainable Development Goals to follow the good research practice of avoid introducing new terms when the terms needed are already available. The proposed environmental enabling conditions dashboard includes five dimensions: Freshwater, Ecosystem health, Clean Air, Recreation and Climate and environmental emergencies risk.

Chapter 11. Conclusions

*While they waited, the six blind men talked about the elephant.
 "An elephant is like a wall," said the first blind man. "Surely we can finally agree on that."
 "A wall? An elephant is a giant snake!" answered the second blind man.
 "It's a spear, I tell you," insisted the third blind man.
 "I'm certain it's a giant cow," said the fourth blind man.
 "Magic carpet. There's no doubt," said the fifth blind man.
 "Don't you see?" pleaded the sixth blind man. "Someone used a rope to trick us."
 Their argument continued and their shouts grew louder and louder.
 "Wall!" "Snake!" "Spear!" "Cow!" "Carpet!" "Rope!"*

*"How can each of you be so certain you are right?" asked the ruler.
 The six blind men considered the question. And then, knowing the Rajah to be a very wise man, they
 decided to say nothing at all.
 "The elephant is a very large animal," said the Rajah kindly. "Each man touched only one part. Perhaps
 if you put the parts together, you will see the truth."*

*The six men rested quietly in the shade,
 "He is right," said the first blind man. "To learn the truth, we must put all the parts together. Let's
 discuss this on the journey home."*

The Blind men and the Elephant, Indian folk tale

11.1. Putting all the parts together: Key findings of the thesis

The Indian tale, *The Blind Men and the Elephant*, tells the story of six blind travellers who come across different parts of an elephant and try to describe it by touching it. Each blind man feels different parts of the elephant, creating different versions of reality.

In a way, this research resembles the fable because one part of it has been focused on understanding local individual meanings of poverty, a flourishing life and justice. As in the fable, the array of meanings is vast and correspond to personal circumstances and beliefs. The other part of the research has focused on understanding normative approaches and measures of social development in Mexico. This again, resembles a key question portrayed in the fable: In light of the vastness of local meanings of poverty, a flourishing life and justice, how do we accurately 'put the parts together' and measure what matters?

This thesis has two main arguments that run in parallel but have implications at different scales. In one respect, this thesis argues that poverty and social exclusion dynamics are better understood by adopting an integrated approach in which the processes involved in shaping life outcomes and justice dimensions are incorporated. On the other hand, it argues that the absence of national indicators to measure progress towards the social right to a healthy environment hides the detrimental and corrosive effects of an unhealthy environment. To support this argument, the research uses a case study to uncover the nexus of the natural environment and ideas of poverty, a flourishing life and justice in a Mexican fishing community and provides evidence of the centrality of the natural environment as an enabler of a wide array of valuable life functionings. Based on the evidence, this thesis proposes a hybrid approach that encompasses the incorporation of a set of *Environmental Primary Goods* (EPGs) within the current multidimensional poverty measure and the creation of an *environmental enabling conditions dashboard* focused on making visible key environmental enabling conditions.

The research aimed to answer three specific questions: 1) How is the natural environment represented in normative approaches and **metrics** that shape institutional responses of poverty reduction/alleviation? 2) How does the natural environment interact with local **perceptions** of poverty, a flourishing life and justice in San Felipe, a Mexican fishing community? And 3) How to **calibrate** national metrics of poverty with local perceptions to better reflect social reality?

To answer these questions, a conceptual framework (described in Chapter 3 and illustrated in Figure 3-32) has been developed to represent a dynamic well-being pipeline that flows from a specific situation in which a geographical area (A. Situation/Context) produces a series of enabling or disabling conditions. *Social diversity* interacts with the enabling/disabling conditions with different conversion rates, which helps to understand why the same resources are converted into capabilities and functionings in dissimilar ways depending on social differences. Then, the opportunities open to people interact with personal choices, which in turn are influenced by personal meanings of desirable life paths (ideas of a flourishing life), and meanings of justice. Life choices define life functionings (array of beings and doings), and feelings (subjective measures). Personal actions (beings and doings) close the cycle by affecting the situation/context from where the well-being pipeline starts.

Based upon this framework, Chapter 4 described the research methods used in this dissertation. The line of inquiry focused on examining normative approaches and national measures has followed a top-down approach and relied on secondary data collection and analysis. The bottom-up approach has followed a mixed methods approach, including qualitative data analysis, network analysis of semi-structured interviews and Q methodology to examine definitions of justice. Chapter 5 describes the *Situation/Context* of the empirical research site, San Felipe, Yucatán, a Mexican fishing community.

Chapter 6 describes the normative approaches and measures of social progress adopted by the Mexican government and presents the results of local perceptions of the ideas of poverty and wealth, highlighting perceptions' differences according to gender. Chapter 7 and 8 describe the local perceptions of a flourishing life and justice respectively. Chapters 9 discuss the coincidences and disparities among local perceptions and frameworks, normative approaches and national metrics. Based on the evidence collected in previous chapters (6, 7 and 8), Chapter 10 proposes a way to incorporate environmental considerations into Mexican social development measures.

11.1.1. Key findings related to the Situation/Context (Chapter 5)

A relevant contextual finding from the examination of the social and natural environment dynamics in the research area is the pervasive social effect of increased market pressures of fisheries with high-commercial value, mainly sea cucumber. These pressures have set in motion a series of social changes, such as the increased number of private fishing enterprises and the increased seasonal fishing migration. These dynamics are an important finding because they explain much of the perceptions around immigration and justice in relation to fisheries management.

Another key contextual finding is the heavy dependence of people on bottled water for drinking purposes. Despite observing that all households have access to piped water, none of the respondents use tap water for drinking purposes. The empirical research found that an average household (composed of 4 family members) with a minimum wage income⁵³ would have to dedicate 16% of its income to purchase bottled water for drinking and other vital purposes.

11.1.2. Key findings related to local poverty definitions (Chapter 6)

A methodological observation in relation to conducting poverty research in San Felipe is that people felt intimidated or shy when asked about the meaning of poverty, as if I was telling them that they were poor. To ease the reception of the question, I included a previous question about the meaning of 'wealth'. This dual focus was received with more neutrality and added value to the analysis.

Key findings from the analysis of local definitions of poverty are aligned with those of Narayan et al (2000). Poverty and wealth are locally defined not by one thing but by intertwined factors that bundle to create fertile advantages or corrosive disadvantages with self-reinforcing effects. Descriptors are not used in isolation but combined with other elements. For example, the experience of anxiety that comes from the simultaneous deprivation of food, income, housing, etc.

⁵³ The minimum monthly wage in 2016 was MX\$2,103

The findings suggest that poverty clusters and wealth clusters include different elements for women and men. The instrumental value of the fisheries is more present in men's perceptions of both poverty and wealth reasons; whilst the access to academic education to find well-paid jobs as alternatives to fisheries is more present in women's perceptions. The findings highlight the role of institutionally-mediated circumstances as perpetuating poverty clusters, specifically, the role of the institutions (local, governmental, markets) in creating job opportunities, regulating fair wages and labour conditions. At a local level, the latter has to do with the relations between fishing permit holders and seasonal fishers or fishers who do not own fishing equipment and are not covered by social protection schemes that are provided by cooperatives.

11.1.3. Key findings related to meanings of a flourishing, worth-lived life (Chapter 7)

As mentioned in the literature review (Chapter 2), the types of questions used to examine the meaning of a flourishing life have defined the "parts of the elephant" that are highlighted in the ideas of a flourishing life. Asking questions about basic needs and values uncover very different answers than asking about transcendental motivations. To prompt a comprehensive definition, the research used a combination of questions to examine the meanings of a flourishing life. In addition to asking the open-ended question of "what's the meaning of a good, flourishing, worth-lived life to you?", I draw on additional questions. One added a temporality aspect, prompting the respondent to expand the temporal scale of the response to a lifetime (*Lifelong motivation*); another question was inspired by the question reportedly used by Aristotle in his *Eudaimian Ethics*⁵⁴ to inquire what is a good life and how is it to be acquired (*What makes life worth living?*). Finally, the last three questions draw on the concept of constituents and determinants of well-being (Dasgupta, 1993, 2001; Schleicher et al., 2018) to identify interactions and pathways of poverty/well-being and the specific contributions of the landscape to achieve personal ideas of a flourishing life.

A noteworthy aspect of the definitions of a flourishing life was the uncovering of lifelong motivations expressed in third-person aspirations. In other words, asking about *What is the dream of your life?* brought answers defined in terms of others, such as "*That my children have higher education*". This dimension of a flourishing life was called *Selfless aspirations*.

Another relevant finding that contributes with evidence to the increasing relevance of relational values (Chan et al., 2016; Klain et al., 2017) is that asking about what makes a life worth-lived brought answers mainly grouped in relational life-functionings (83%).

⁵⁴ For Aristotle, "if life is to be worth living, it must surely be for something that is an end in itself"

The network analysis highlighted the role of a *Conserved Natural Environment* (Out-degree =21) as the greatest enabler of the widest array of valuable life functionings, even above *Income* (Out-degree = 19). These two elements act as fertile advantages, enabling the largest number of valued beings and doings in comparison with other nodes. The two most-valuable elements towards which many other factors are directed and thus, can be considered as intrinsically-valued, are *Health* and *Employment*.

Community solidarity clearly appears as a key fertile enabler of a flourishing life, which acts as a source of resilience to overcome a variety of unexpected and challenging circumstances. The gendered analysis shows that *civil peace/security* and *Healthy fisheries*, whilst important for both groups, are considered as enabling conditions in a higher degree by men than by women; whilst *Clean air* and *landscape beauty* were highly considered enabling conditions by women but very low by men. Clean air was also identified as an important enabling condition by the age group of ≥ 60 years old.

The network analysis of landscape-based disabling conditions identified mainly *Socio-political elements*, such as the increased presence of additions such as alcoholism and drugs abuse, uncontrolled immigration, the loss of community values, the loss of civic behaviour, community disunion and political rivalry. The two environmental-related identified disabling conditions are climate change and the risk of hurricanes and tropical storms, mainly identified by the younger age group (< 60 years old).

11.1.4. Key findings related to meanings of justice and its nexus to the natural environment (Chapter 8)

The focus on justice in this research followed an empirical approach (Martin, 2017) and is grounded in the analysis of semi-structured interviews and bootstrapped Q analysis. As detailed in Chapter 8, the research was inspired by two notions of justice: the ‘social contract’ tradition and the ‘social choice’ tradition. Thus, following the ‘social contract’ tradition (Rawls, 2001), the collection of data was designed to identify: i) the types of social arrangements that would be considered just and ii) Environmental Primary Goods (EPGs). Following the ‘social choice’ tradition (Sen, 2010), in which justice is advanced by identifying manifest injustice, the collection of data was designed to identify perceived injustices in relation to the natural environment.

The findings reiterate that justice definitions and their relation to the natural environment are not static, but space- and time- dependent. The results highlight the way in which perceptions of what is just and unjust are highly influenced by circumstances shaped by dynamic processes, such as the environmental governance arrangements, the influence of markets and the shifting adherence to social norms. These findings resonate with Harvey’s emphasis on relations and connectedness and with his

claim for viewing things as “moments” within processes, in contrast to the permanently existing monadic thinking (Harvey, 1996).

One of the most relevant findings was the nexus between environment injustice and environmental governance, embodied by the Protected Area management processes, and the governmental authorities’ lack of compliance with specific duties and the discretionary enforcement of the law. The Q analysis (Chapter 9) uncovered the following three distinct viewpoints about justice and the natural environment, a) *Justice as a cooperative model of recognition and collective responsibility (viewpoint 1)*; b) *justice as a cooperative model of distribution (viewpoint 2* ; and c) *justice as a model of utility and efficiency (viewpoint 3)*

Key findings suggest that perceptions of poor environmental governance, not only have an effect on those affected, but act in a corrosive way, by affecting the social responses (societal feedback) from those who “calibrate” their behaviour according to external circumstances (holders of viewpoint 2). The corrosive effect of social feedbacks based on perceptions of injustice is locally exemplified by the wreckage of the fish refuge (Actam Chuleb Marine Reserve) established in 1995 as a result of an agreement between communities (Chapter 5). The successful establishment of a fish refuge as an “area for the bad times” by voluntary organisations intuitively followed the seven mechanisms that were identified by Elinor Ostrom in enduring, self-governing common-pool resources (CPR) institutions⁵⁵. The environmental governance at the municipal level started to change in 2000 as a result of multiple factors described in Chapter 5. This circumstance shattered the mechanisms of successful common-pool resources management. During my fieldwork, the main reason for the abandonment of the fish refuge was the perception that others were not complying with the rules jointly defined, and it seemed fair to stop complying with the rules and take advantage of the increased fisheries population in the refuge. In other words, perceptions of injustice seem to have activated Hardin’s archetype of the tragedy of the commons. This finding coincides with what Pascual et al. (2014) and Dawson et al. (2017) report about the way in which social feedbacks influence ecological outcomes and can serve either to positively reinforce ecosystem governance or negatively compromise it. In this case, potential negative social feedbacks come from the portion of society with viewpoints guiding behaviour that are adjusted according to external circumstances (e.g. poor environmental governance).

⁵⁵ For example, (i) *clearly defined boundaries* (the fish refuge was clearly delimited); (ii) *congruence between appropriation and local conditions* (the refuge restricted fishing access to allow fish spawning and there was a provision rule that allowed extraction during “bad times”); (iii) *collective-choice arrangements* (which is closely related to procedural justice in that it establish that most individuals affected by the operational rules can participate in modifying them); (iv) *Monitoring* (the communities had reached monitoring agreements); (v) *Graduated sanctions* (established by the community council), (vi) *Conflict-resolution mechanisms* (through the community council) and (vii), *Minimal recognition of rights to organize* (the rights of the appropriators to devise their own fish refuge was not challenged by external governmental authorities).

11.1.5. Key findings related to the integration of environmental considerations into national social development metrics

The part of the research focused on inspecting the normative approaches and metrics used to measure poverty and social development in Mexico was about understanding poverty and well-being (a flourishing life) from a normative perspective. One of the main arguments is that the absence of indicators to measure progress towards the social right to a healthy environment hides the detrimental and corrosive effect of an unhealthy environment (polluted, toxic, degraded, fragmented). This argument highlighted the need to dissect what a “healthy environment” means in practical terms and to identify those elements from a healthy environment that need to be measured and tracked as environmental rights.

The analysis of empirical data designed to understand the nexus between the natural environment and local perceptions of poverty (Chapter 8), a flourishing life (Chapter 7) and justice (Chapter 9) were used to answer this question. The analysis of the nexus between poverty and a flourishing life and the natural environment provided a wide array of identified ways in which the natural environment influences the lived experience of poverty and a worth-lived, flourishing life. The analysis of justice helped to refine this long list by asking which of these elements are sources of experienced injustice and which elements can be considered environmental rights to be enforced. For the latter, I draw on the Rawlsian concept of primary goods to define Environmental Primary Goods (EPGs) as those environmental elements that are a matter of justice and which are needed by citizens no matter what idea of a good life they hold.

The local notions were compared to the national measures of poverty to identify conceptual gaps that could distort the reality portrayed by the national indicators. Using a ‘well-being pipeline’ framework that draws on Amartya Sen’s capabilities approach, I argue that the current poverty measurement exclusively focusses on functionings and does not give any indication of the underlying causes of social dynamics that sustain poverty. The current poverty measure allows the identification of poor households but provides limited information about the initial enabling or disabling conditions that people face.

Making visible the bundle of starting-point disabling conditions that might have corrosive effects or enabling conditions that act as fertile advantages, have the potential to improve the design of interventions to tackle underlying causes of poverty (interventions at the start of the ‘well-being pipeline’) and not only the treatment of the experience of poverty (interventions at the end of the ‘well-being pipeline’). The research question of *How to improve poverty metrics to track the progress of the ‘social right to a healthy environment’ in the Mexican context* was answered by proposing an hybrid approach that encompasses the incorporation of a set of *Environmental Primary Goods* (EPGs) (i.e.

indicators of clean safe air and safe water) within the current multidimensional poverty measure (end-of-pipeline measurement focused on households); and *in addition*, the creation of an *environmental enabling conditions dashboard*, focused on making visible environmental enabling conditions (start-of-pipeline measured focused on environmental area-based data). The proposed environmental enabling conditions dashboard includes five dimensions: *Freshwater, Ecosystem health, Clean Air, Recreation and Climate and environmental emergencies risk*.

11.2. Research contributions of the thesis

Overall, this thesis has three types of original contributions to knowledge: conceptual, methodological and policy-oriented.

11.2.1. Conceptual contributions

Integrated 'Justice and Well-being pipeline' Conceptual Framework

The Integrated 'Justice and well-being pipeline' conceptual framework (integrated version illustrated in Figure 9-1) that guided the research has provided a novel way to examine in a holistic way the processes contributing to shape the dynamics of social exclusion. Inspired by the capabilities approach (Sen, 1995; Robeyns, 2017), the integration of environmental justice dimensions provides an additional analytical layer that highlight key moments when dimensions of environmental justice have an evident role or when sources of environmental injustice may arise.

Novel use of concept: Environmental Primary Goods as elements of environmental justice

For Rawls (1971, 2001), social primary goods are things which it is rational to want whatever else you want because they are required for any conception of a good life. A core idea of Rawls is that justice is a fair distribution of social primary goods. I extended this Rawlsian concept to the environmental dimension to identify those elements from the natural environment that could be defined as *Environmental Primary Goods (EPGs)*. Thus, *EPGs* are defined as the minimum set of rights and resources from the natural environment that individuals need to be able to participate as equals in the society of which they are part. For the empirical research, a question⁵⁶ was designed to uncover definitions of *EPGs* and the concept was proved relevant in the construction of a hybrid-approach for the inclusion of environmental considerations into social development measures in Mexico.

⁵⁶ The question was: *What aspect from the natural environment you think everyone would need no matter their own definition of what a good life is?*

Introduction of the term: ‘Selfless aspirations’, as a descriptor of flourishing life expressed in third-person

Dimensions of well-being, happiness, human development are vast; however, they are similar in the way that they are framed by adopting a first-person point of view and present tense. My empirical analysis (Chapter 7) uncovers definitions of a flourishing, worth-lived life that are expressed as wishful thinking for others’ well-being. These definitions were called ‘*Selfless aspirations.*’

11.2.2. Methodological contributions***The use of network analysis to inspect relational data.***

Network analysis has traditionally been used to analyse interpersonal relations. In this research network, analysis was used to examine interlinkages among concepts, allowing the analysis of the causal relationships among elements that were identified as constituents or determinants of a flourishing life. Network analysis highlighted the extent to which identified valuable life functionings such as *Health, Employment*, and others, are closely linked to the natural environment. The way in which network analysis was applied in this research, proves the possibility and utility of the method in the analysis of relational data. In the context of the emerging interest in relational values (Chan et al., 2016; Klain et al., 2017; Arias-Arévalo et al., 2017), network analysis provides an alternative to examine complex relationships.

Empirical research of justice using a hybrid approach following the ‘social contract’ (Rawls, 2001) and the ‘social choice’ (Sen, 2010) traditions

To my knowledge, this is the first time that an empirical study of environmental justice reconciles two - usually opposing- lines of reasoning about justice: the ‘social contract’ tradition, embodied by the pivotal work of John Rawls (Rawls, 1971, 2001); and the ‘social choice’ tradition, embodied by the work of Amartya Sen (Sen, 1980, 1995; Robeyns, 2017). The first line of reasoning, the ideal theory, has aimed to provide insights to the normative approaches, focusing attention to the identification of ideal social arrangements of a ‘just society’. The second line of reasoning, the realist theory, has aimed to identify manifest environmental injustices. Both insights were examined through qualitative data analysis and Q methodology.

The use of bootstrapping method and the Factor stability index to increase the reliability and comparability of Q analysis results (Zabala, 2014)

The package developed by Zabala (Zabala, 2017) was used to bootstrap Q methodology results to increase the reliability of Q analysis results. As proposed by Zabala, a factor stability index was

calculated for each of the factors extracted in Q analysis. According to Zabala (2015, pp.205–206), this factor “allows the comparison between factors within the same study and also enables the comparison between studies as long as they have the same distribution and the same number of statements”. Therefore, any future Q study with a bell-shaped grid from -4 to +4 and 40 statements will be comparable.

11.2.3. Practical/Policy-oriented contributions

Integrated hybrid-model for measuring the right to a healthy environment

The detail of the contribution to the policy debate is in Chapter 10, where a hybrid measurement approach is proposed. The hybrid approach is composed of two types of measures: one at the start-of-the-well-being-pipe (resources level) and one at the end (capabilities/functionings level). The start-of-pipe measure is an *environmental enabling conditions dashboard*, focusing on making visible key environmental enabling conditions such as *Freshwater, Ecosystem health, Clean Air, Recreation and Climate and environmental emergencies risk*. The end-of-pipe measure is an addition to the current Poverty multidimensional measure that encompasses the incorporation of indicators to measure a set of *Environmental Primary Goods* (EPGs) (i.e. Indicators of clean safe air and safe water). This approach crystallizes one of the key recommendations made by the Stiglitz, Sen, Fitoussi Commission to enhance environmental metrics (Stiglitz et al., 2009).

11.3. Limitations, recommendations and future research

Along the research a series of areas that were beyond the realistic feasibility or scope of the study were identified. I classified them in two groups: those specific to the evidence of the study and those related to future research. Within the first group, the first recommendation is linked to what the original research plan envisioned. Originally, the research design included a comparative analysis among different research sites in order to identify how geographical differences influence the way in which the three concepts (poverty, flourishing life and justice) and the nexus to the natural environment are shaped and perceived. In the case of the Yucatan, the original design included a community with forest-based livelihoods in the south of Yucatan. This plan was not feasible due to time and language limitations. The current study offers an in-depth inspection of the research questions in the specific research site, however, the evidence it provides to inform the relevance and feasibility of incorporating environmental considerations into national poverty metrics is limited and represents only a first iteration and a small window that needs to be opened in other Mexican municipalities.

The second recommendation in this group (the evidence) is related to the analysis of dynamics of social exclusion. For the collection of primary data, I used probability systematic sampling to guarantee an

equal opportunity to every household to be selected. However, as I noticed during data analysis, different groups have distinct challenges: women facing an asymmetrical access to high-value commercial fishing species and limited access to well-paid jobs; elderly and ill-people groups, facing an asymmetrical burden of the low quality of water; people following non-traditional gender norms, facing an asymmetrical exclusion from housing opportunities and reduced coping mechanisms to the Protected Area restrictions; foreign/seasonal fishers, facing the exclusion from the social protection given by the community in the form of community solidarity and facing being unnoticed from the sight of the government, who do not register them in poverty statistics as they live in San Felipe only during the fishing season periods. This situation leads to this group being excluded from any form of governmental incentives, food pantries or other in-kind support. One recommendation to improve the evidence base would be to use stratified sampling instead of probability systematic sampling to highlight the views from at least these groups.

Recommendations related to future research include what Vira and Kontoleon observed in 2013 and which was observed in the primary research, namely, the appropriation by richer groups of high-value natural resources, pushing poorer households into 'poverty traps' (Vira and Kontoleon, 2013). In the research site, this was exemplified in the case of the high-value sea cucumber fishery, which has attracted not only richer groups from the community, but from other economic elites from Mexico, increasing market pressures and changes in social cohesion structures that provide safety and social protection nets. The nexus between Poverty-Environment has been increasingly widely examined; however the nexus between Wealth-Environment has been largely ignored despite the scattered evidence reporting that the way in which richer groups interact with the natural environment influence poverty-dynamics (Vira and Kontoleon, 2013). Potential research questions aligned with this would be, What are the relations between Wealth, inequality and the natural environment? What's the role of the natural environment in wealth-creation dynamics? What's the effect of wealth creation in relation to the natural environment in poverty dynamics and inequality?

From a moral-philosophy or ethical theory perspective, the research of the Wealth-Environment nexus could be aligned with current research conducted by political philosopher Ingrid Robeyns, who argues that it is morally objectionable to be rich and examines whether the moral argument or political doctrine of *limitarianism* could be convincingly defended (Robeyns, 2016). Potential research questions would include: is it morally permissible to limit ecological resources that each person can appropriate? In addition, mirroring the rationale of having poverty metrics, it would be interesting to explore wealth metrics focused on the natural environment. How would an *Environmental Wealth line* look like? This

information could help not only for identification purposes (those who are living much beyond fair shares), but also for policy design and interventions.

From the practical side of the incorporation of environmental considerations into poverty metrics, further research needs to involve the analysis of appropriate environmental indicators. This research provided geographically-located evidence of those elements that would “calibrate” national poverty metrics with the local experience and perceptions of poverty, and a bundle of indicators were suggested (environmental enabling conditions dashboard). However, the technicalities, data sources and discussion of poverty thresholds were beyond the scope of this study.

A final recommendation of future research would be to increase the longitudinal time-frame to inspect how perceptions of poverty, a flourishing life and justice change over time as the context change. This would add evidence of those elements that remain constant over time and that could be considered constituents of a good life. In addition, it would contribute to stimulate the good practice of listening to local narratives to inform policy- and decision- making processes and for those responding, to stimulate the practice of self-inspection and the confidence of using the power and beauty of their own voice.

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Appendices

Appendix A. Semi-structured interview Protocol A. for First Research Stage (In Spanish)

A. FORMATO DE ENTREVISTA SEMI-ESTRUCUTRADA

0. LOCALIZACIÓN Y CÓDIGO

1. Nombre de casa y código	
2. Punto de referencia en GPS del domicilio (UTM o WGS84)	
3. Distancia del domicilio al centro de la comunidad (en km)	

A. DATOS DE IDENTIFICACIÓN

Pregunta	Códigos para N-Vivo
A1. ¿Cuál es su nombre?	Name
A2. Género	Gender
A3. ¿Cuál es su edad?	Age
A4. ¿Me podría decir en qué trabaja?	Employment Location
A5. ¿Me podría decir cuál es su idioma materno?	First_language Ethnicity
A6. ¿Me podría decir hasta qué grado fue a la escuela?	Education Literacy
A7. ¿Es usted casado (a)?	Marital status
A8. ¿Tiene alguna religion?	Religion

B. IDENTIFICACIÓN DE MIEMBROS DEL HOGAR

Pregunta	Códigos N-Vivo
B1. ¿En total, incluyéndole a usted y a todos los niños del hogar, ¿cuántas personas viven en su hogar?	Number_ Household_Members Relationship_Household_Members

RESUMEN B: Detalles de los miembros del hogar (A ser completada después de la entrevista)

No.	Name	M/F	Age	Education and Literacy	Occupation	Place of occupation	Language	Self-described ethnicity

C. POSICIÓN SOCIAL RELATIVA DEL HOGAR

Pregunta	Código N-Vivo
C1. ¿Usted considera que pertenece a alguna clase social particular?	Individual Self-defined social class 1 Household self-defined social class 1.
C2. Comparado con otras personas y hogares, ¿se considera usted en una mejor o peor posición social?	Relative social standing
C3. ¿Qué tan buena es su posición social comparada con su situación hace 5 años?	Trend social standing

1. Percepciones de pobreza, riqueza y los vínculos con el medio ambiente

Pregunta	N-Vivo Code
1.1. En su opinión, ¿qué significa la riqueza?, ¿Cómo es ser rico?	Wealth
1.2. Usando su propia definición de riqueza, ¿cuáles son las razones por las cuales hay personas ricas?	Causes wealth
1.3. Y ahora, ¿Qué significa para usted la pobreza?	Poverty
1.4. Usando su propia definición de pobreza, ¿cuáles son las razones por las cuales hay personas ricas?	Causes poverty
1.5. ¿Existe algo en San Felipe que contribuya a que una persona sea pobre o rica o que contribuya a cambiar su situación económica?	Landscape contributions
1.6. ¿Considera usted que aquí en San Felipe los hombres y las mujeres tienen las mismas oportunidades de alcanzar su propia idea de vida buena?	Gender
1.7. ¿Qué cosas deberían pasar, cambiar o mantenerse para asegurar que todos en San Felipe puedan tener las mismas oportunidades de alcanzar una vida buena?	Justice perceptions

Appendix B. Semi-structured interview Protocol B. for Second Research Stage (In Spanish)

Same sections 0, A, B and C, as in Interview Protocol A.

1. Percepciones acerca de lo que es una vida buena, digna de ser vivida

Por favor tome un momento para pensar en lo que hace que su vida sea importante para usted. Por favor recuerde que estas son preguntas subjetivas y no hay respuestas correctas o incorrectas.

Pregunta	N-Vivo Codes
1.1 ¿Podría platicarme cómo describiría usted una vida buena, segura, completa, feliz, digna de ser vivida?	Meaning of a flourishing life
1.2. Ahora por favor tome un momento para pensar cuál es su motivación de vida más grande, ¿cuál es el sueño de su vida?	Life-long aspiration
1.3. Y ahora por favor piense en aquello que le da sentido a su vida. Piense por favor en aquello sin lo cual su vida parecería que no tiene sentido. Para usted, ¿por qué vale la pena estar vivo?	Transcendental driver
1.4. Ahora considerando las tres respuestas anteriores por favor tome un momento para pensar ¿Cuáles serían los tres elementos más importantes de una vida buena, segura, completa, feliz, digna de ser vivida?	Constituents
1.5. ¿Qué aspectos necesita o le ayudan a conseguir esos tres elementos que mencionó?	Determinants
1.6. ¿Existe algo en el paisaje de aquí de San Felipe que le ayude a alcanzar su idea de vida buena?	Landscape-based Enabling conditions
1.7. ¿Existe algo en el paisaje de aquí de San Felipe que le impida a alcanzar su idea de vida buena?	Landscape-based Disabling conditions

2. Felicidad y satisfacción

Pregunta	N-Vivo Codes
2.1. En una escala de 1 a 5, ¿Qué tan satisfecho está con su vida en las últimas dos semanas?	Satisfaction
2.2. En una escala de 1 a 5, ¿Qué tan feliz se siente con su vida en las últimas dos semanas?	Happiness

3. Bienes ambientales primarios (EPGs)

Pregunta	N-Vivo Codes
3.1. ¿Existe algo en el medio ambiente que usted o su comunidad necesite, valore o en el que tenga algún interés que puede hacer que su vida sea buena o mejor?, en otras palabras, ¿el medio ambiente le ayuda a usted de alguna forma para alcanzar la idea de vida buena que describió al principio?	Local Environmental Needs,
3.2. ¿Qué recursos, bienes o servicios del medio ambiente usted considera que todos los seres humanos desearían, sin importar el plan de vida que tengan?	EPGs

4. Percepciones de justiciar e injusticia y medio ambiente

Ahora haré algunas preguntas para conocer su percepción acerca de lo considera que es equitativo o justo

Pregunta	Code
4.1. ¿De qué manera a usted le ha afectado o beneficiado vivir en un lugar rodeado de áreas protegidas?	PA impact
4.2. ¿Considera que los beneficios del Área protegida han sido distribuidos de manera justa?	Distribution of benefits
4.2. ¿Considera usted que es adecuada la forma en la que se toman las decisiones con relación al manejo del área protegida y a la pesca?	Procedural
4.3. ¿Con el establecimiento del área protegida, ¿las personas y grupos locales retuvieron sus derechos reglamentarios y tradicionales?	Recognition
4.4. Para usted, ¿qué quiere decir la justicia? ¿Cómo sería una sociedad justa?	Justice definitions

Appendix C. Detailed description of the decisions made to select the number of factors to extract

Selection of number of factors to extract

The selection of the number of factors to extract was informed by a combination of statistical criteria and my own interpretation of the meaningfulness of the factors extracted. The process followed two stages. The first stage included using standard criteria for selecting the number of factors to extract including the following: a) *Kaiser-Guttman criterion*: to retain factors with eigenvalues higher than 1.0. Eigenvalues (EV) are indicative of a factor's statistical strength and explanatory power, as, for a given factor, EV measure the amount of variation in the total sample accounted for by each factor. If a factor has a low eigenvalue, then it is contributing little to the explanation of variances in the variables; b) *The Cattell Scree test plot*, which plots the components as the X axis and the corresponding eigenvalues as the Y-axis. When the curve makes an elbow toward a less steep decline, Cattell's scree test recommends dropping all further components; c) *Significant loading test*, which accept those factors that have two or more significant factors loadings following extraction. The significance of a factor loading can be calculated by two methods. One of this methods is using the equation suggested in Brown (1980, pp.222–223). The second method is following the Humphrey's rule. With the first method, a significant factor loading at the 0.01 level can be calculated using the following equation: Significant factor loading for study = $2.58 \times (1 \div \sqrt{\text{no. of items in the Q sets}})$. Humphrey's rule "states that a factor is significant if the cross-product of its two highest loadings exceeds twice the standard error" (Fruchter, 1954, as cited in Brown, 1980, pp. 223); d) Horn's *Parallel analysis*, which is based on random data generation, which is parallel to the actual data set, to determine the number of factors and the comparison of eigenvalues of those two data sets. To decide how many factors to extract, "the observed EV for each successive factor in the data set must be compared with the 95th percentile EV derived from the 1000 random data sets. If the observed EV exceeds the 95th percentile EV, there is a less than 5% chance that this observed value could have occurred where there are, in reality, no factors in the actual data set" (Watts and Stenner, 2012, p.109) and e) *Variance explained criteria*, which suggest keeping factors that account for an acceptable amount of the variability.

The number of factors to extract was decided by pondering the statistical criteria in sequential phases. First, four of the statistical criteria described earlier were applied to the data. This phase suggested the selection of a factor range from one to five factors. Subsequently, a sensitivity analysis was conducted focusing on the variance explained by each of the five factor-solutions and on the Normalised Factor Index (NFI).

Statistical Criteria for factor selection	
Statistical Criterion	Number of factors to retain
a) <i>Kaiser-Guttman</i> Retain factors with EV higher than 1.0.	5 factors
b) <i>Cattell Scree test plot</i> Drop components after a steep decline in the Scree test plot	1 factor
c) <i>Significant loading test</i> : Accept factors that have two or more significant factor loadings following extraction <ul style="list-style-type: none"> • <i>Significance at 0.01 level (Brown, 1980)</i>⁵⁷ • <i>Significance calculated through Humphrey's rule</i>⁵⁸ 	5 factors 2- 4 factors
d) <i>Horn's Parallel analysis</i> : Based on random data generation	1 factor

The normalised factor stability index aggregates the estimates of bias of statement scores after running a bootstrap. The index summarises the information from the bootstrap and provides an estimate of the stability of a factor. For symmetric distributions, the range of the normalised index goes from 0, which represents highest factor stability to 1, which represents the maximum difference between the bootstrapped factor and the standard factor. In this sense, the lower the normalised factor index is, the more stable the factor is. One of the advantages of the normalised factor stability index is that it allows comparisons across studies (Zabala, 2015, p.207).

This sensitivity analysis led to the selection of the three-factor solution, which represents the option that maximises the number of stable factors according to the inspection of the normalised stability index, and at the same time has at least two flagged Q-sorts for each of the factors. The three-factor solution, in total, explains 58% of the study variance after performing a varimax rotation. This percentage of variability is similar to other Q studies (Zabala, 2015; Davies and Hodge, 2012). In the same line, Kline (1994) noted that, for factor analysis, solutions explaining 35-40% of the study variance are considered to be sound (as noted in Armatas et al., 2014).

The three-factor solution consists of a highly stable first factor (NFS = 0.0068) which is defined by six Q-sorts that explain 24% of the study variance. The second factor explains the same percentage of study variance as the first factor (24%) and while having the largest number of defining Q-sorts (10), is the least stable (NFS = 0.0117). This suggests that the responses in this factor are less consistent, which is understandable, given the number of defining Q-sorts. The third factor is the most stable (NFS=0.0042). It is defined by two Q-sorts explaining 10% of the study variance. The high stability of this factor is understandable given the fewer defining Q-sorts. This suggests that the views of the defining Q-sorts of factor 3 are more consistent than those of factor 2.

⁵⁷ For this study (N=40), using the equation in Brown (1980, pp.222, 223), a significant factor loading is 0.4079.

⁵⁸ The four factor solution results from a less stringent use of Humphrey's rule that uses 1(SEr) instead of 2(SEr).

Sensitivity Analysis for selecting the number of factors			
Factor solution	Study Variance Explained	Normalised Stability Index (NFS)	Number of defining Q-sorts
1 factor	43%	NFS 1 = 0.00038	F1: 20
2 factors	52%		
	F1=26%	NFS 1 = 0.0053	F1: 11
	F2 =26%	NFS 2 = 0.0117	F2: 9
3 factors	58%		
	F1 = 24%	NFS 1 = 0.0068	F1: 6
	F2 = 24%	NFS 2 = 0.0117	F2: 10
	F3 = 10%	NFS 3 = 0.0042	F3: 2
4 factors	65.3%		
	F1 =23.9	NFS 1 = 0.0061	F1: 8
	F2 =20.4 %	NFS 2 = 0.0121	F2: 5
	F3 =11.4 %	NFS 3 = 0.0036	F3: 2
	F4 = 9.6%	NFS 4 = 0.0117	F4: 1
5 factors	70.7%		
	F1 = 21.6%	NFS 1 = 0.0057	F1: 8
	F2 = 15.4%	NFS 2 = 0.0133	F2: 2
	F3 = 15.1%	NFS 3 = 0.0114	F3: 2
	F4 = 10.5%	NFS 4 = 0.0036	F4: 2
	F5 = 8.1%	NFS 5 = 0.0114	F5: 1

After the sensitivity analysis, I used my own interpretation of the meaningfulness of the factors in the 2- and 3-factor solution using qualitative data, specifically, the characteristics of participants. For example, the flagged Q-sorts for Factor 1 correspond to respondents whose main source of income is not fishing, while for Factor 2, nine out of the ten defining Q-sorts correspond to respondents whose main source of income is or was fishing, and Factor 3, corresponds to respondents whose main income source is the commercialisation of fisheries and tourism. Choosing the 2-factor solution would have blended the perspectives from those who work in the commercialisation of fisheries and tourism, therefore, the 3-factor solution was selected.

Appendix D. Standard and Bootstrapped results of Q Analysis

Comparison of standard and bootstrapped results for Q-sort factor loading

Q-sorts	Standard factor loading ^c			Bootstrapped factor loadings (&SE) ^d						Flagging frequency ^e		
	F1	F2	F3	F1		F2		F3		F1	F2	F3
1	-0.15	0.78	0.2	0.5	(0.07)	0.12	(0.48)	0.1	(0.34)	0.29	0.35	0.1
2	0.25	0.68	0.22	0.69	(0.06)	0.03	(0.27)	0.03	(0.28)	0.99	0	0.01
3	0.5	0.55	0.16	0.75	(0.04)	0	(0.17)	-0.01	(0.19)	1	0	0
4	0.21	0.69	0.01	0.62	(0.06)	0.01	(0.33)	0.05	(0.33)	0.85	0.02	0.04
5	0.37	0.49	0.3	0.67	(0.05)	0.03	(0.22)	-0.01	(0.25)	0.99	0	0
6	0.43	0.63	-0.2	0.66	(0.06)	-0.09	(0.27)	-0.06	(0.29)	0.97	0	0
7	0.47	0.38	0.37	0.69	(0.05)	0.07	(0.2)	0.06	(0.25)	1	0	0
8	0.71	0.35	0.13	0.75	(0.05)	-0.06	(0.24)	-0.07	(0.21)	1	0	0
9	0.66	0.32	0.22	0.72	(0.05)	-0.02	(0.23)	-0.02	(0.21)	1	0	0
10	0.27	-0.05	0.79	0.4	(0.06)	0.31	(0.36)	0.24	(0.32)	0.23	0.3	0.25
11	0.27	0.6	0.36	0.69	(0.05)	0.08	(0.24)	0.05	(0.26)	0.99	0	0
12	0.36	0.63	-0.09	0.64	(0.06)	-0.05	(0.28)	-0.01	(0.29)	0.95	0	0.01
13	0.34	0.66	0.24	0.74	(0.04)	0.04	(0.2)	0.01	(0.2)	1	0	0
14	0.76	0.23	0.25	0.74	(0.05)	-0.02	(0.28)	-0.01	(0.24)	1	0	0
15	0.73	-0.04	0.22	0.55	(0.07)	0.04	(0.45)	0.1	(0.33)	0.46	0.24	0.07
16	0.45	0.35	0.28	0.63	(0.05)	0.05	(0.24)	0.06	(0.3)	0.92	0	0.02
17	0.74	0.28	-0.06	0.67	(0.06)	-0.08	(0.3)	-0.02	(0.28)	0.98	0	0
18	0.71	0.2	0	0.62	(0.06)	-0.09	(0.35)	-0.09	(0.32)	0.82	0.04	0.02
19	0.51	0.62	0.22	0.81	(0.04)	0.01	(0.14)	-0.01	(0.15)	1	0	0
20	0.01	0.35	0.76	0.48	(0.07)	0.29	(0.32)	0.24	(0.3)	0.38	0.2	0.17

Note: F, factors. In Bold:

^c flagged Q-sorts

^d SE > 0.2

^e frequency of flagging in the bootstrap > 0.8

Full Q methodology bootstrap results for statements

Statements	Standard z-scores			Bootstrap z-scores (SD)						Standard factor scores			Bootstrap factor scores		
	F1	F2	F3	F1		F2		F3		F1	F2	F3	F1	F2	F3
sta_36	1.7343	0.2982	0.3017	1.0283	0.36	0.2357	0.42	0.3288	0.40	4	1	1	2	1	2
sta_15	1.6076	1.4824	1.1602	1.5589	0.26	0.7842	0.80	0.9623	0.77	4	3	2	4	4	4
sta_1	1.5004	-0.1812	1.2068	0.7582	0.34	0.3384	1.34	0.7173	1.16	3	-1	3	2	1	2
sta_34	1.467	0.4411	0.2551	1.1573	0.33	0.0554	0.49	0.1165	0.50	3	1	1	3	0	0
sta_10	1.2704	1.1041	0	1.1114	0.34	0.3602	0.64	0.2889	0.64	3	3	0	2	1	1
sta_9	1.2372	2.2044	0.0466	1.7309	0.29	0.5316	0.96	0.3869	0.85	2	4	0	4	2	2
sta_32	1.1103	0.3032	-0.0466	0.5473	0.26	-0.0011	0.69	0.0129	0.67	2	1	0	1	0	0
sta_12	1.0882	-0.4378	0.3017	0.3233	0.40	0.1788	0.30	0.2732	0.36	2	-1	1	0	1	1
sta_23	1.0376	0.9684	2.2271	1.0763	0.31	1.0903	1.09	1.4366	0.93	2	2	4	2	4	4
sta_25	0.9044	1.0791	1.322	1.1954	0.27	0.6239	0.76	0.7929	0.72	2	3	3	3	2	3
sta_38	0.851	1.4855	0.8585	1.3198	0.23	0.5375	0.48	0.6001	0.53	1	4	2	3	2	2
sta_33	0.6545	0.5863	1.4152	0.714	0.24	0.7005	0.60	0.8388	0.62	1	1	3	2	3	3
sta_30	0.5716	0.0381	-0.5568	0.379	0.26	-0.2468	0.49	-0.2619	0.48	1	0	-1	1	-1	-1
sta_28	0.4844	0.1933	-1.1602	0.2054	0.24	-0.2351	0.92	-0.4672	0.92	1	0	-2	0	-1	-2
sta_26	0.4288	0.0879	-1.7169	0.1588	0.22	-0.6764	1.22	-0.7703	1.23	1	0	-4	0	-3	-3
sta_5	0.4112	-0.2669	0.0932	-0.1506	0.35	-0.0438	1.24	0.2026	1.06	1	-1	0	0	0	0
sta_2	0.2395	0.5807	1.6703	0.6007	0.29	0.7307	0.77	0.8874	0.82	0	1	4	1	3	3
sta_27	0.1174	-1.6031	-1.1602	-1.0533	0.48	-0.6211	0.86	-0.6655	0.89	0	-3	-2	-2	-2	-2
sta_19	-0.0834	0.9298	-0.8585	0.6519	0.31	-0.4723	0.60	-0.572	0.63	0	2	-2	1	-2	-2
sta_24	-0.1096	0.1708	1.1135	-0.3155	0.24	0.7183	0.76	0.69	0.66	0	0	2	0	3	2
sta_21	-0.1333	-1.3587	0	-0.9022	0.40	-0.1583	0.43	-0.087	0.44	0	-3	0	-2	-1	0

State- ments	Standard z-scores			Bootstrap z-scores (<i>SD</i>)						Standard factor scores			Bootstrap factor scores		
	F1	F2	F3	F1		F2		F3		F1	F2	F3	F1	F2	F3
	sta_14	-0.138	0.7827	0.7652	0.5795	0.39	0.414	1.49	0.2226	1.24	0	2	2	1	2
sta_22	-0.1517	-0.0917	-0.6034	-0.4592	0.48	-0.1213	0.64	-0.2993	0.65	0	-1	-2	-1	0	-1
sta_8	-0.1599	0.6189	0	0.1703	0.19	0.1266	1.04	-0.082	0.77	0	1	0	0	0	0
sta_37	-0.2008	0.6707	0.5568	0.5394	0.30	0.1682	0.37	0.215	0.42	-1	2	1	1	1	1
sta_40	-0.2512	-0.8341	-1.972	-0.5494	0.34	-1.0607	0.84	-1.2661	0.81	-1	-2	-4	-1	-4	-4
sta_4	-0.4284	0.2777	-0.5568	0.06	0.41	-0.1269	0.55	-0.1987	0.63	-1	0	-1	0	-1	-1
sta_13	-0.4632	1.0595	-0.0932	0.349	0.33	0.0857	1.23	-0.1766	1.06	-1	2	-1	0	0	-1
sta_3	-0.7302	0.1613	-1.6237	-0.3453	0.32	-0.6288	1.26	-0.9945	0.99	-1	0	-3	-1	-2	-4
sta_29	-0.766	-0.4342	0	-0.7325	0.31	-0.1264	0.40	-0.1725	0.44	-1	-1	0	-1	0	0
sta_35	-1.0264	-1.225	-0.2084	-1.205	0.24	-0.2019	0.63	-0.2226	0.66	-2	-2	-1	-3	-1	-1
sta_31	-1.0497	-0.0218	0.5101	-0.8448	0.32	0.3641	0.59	0.2638	0.58	-2	0	1	-1	2	1
sta_39	-1.1114	-0.8132	-1.3686	-1.0486	0.18	-0.7791	0.67	-0.9519	0.64	-2	-1	-3	-2	-3	-3
sta_11	-1.2161	-0.8491	-0.0466	-0.9828	0.28	-0.1462	0.47	-0.1899	0.52	-2	-2	0	-2	-1	-1
sta_16	-1.2437	-2.0893	-0.1618	-1.5934	0.25	-0.4459	1.27	-0.1652	1.17	-2	-4	-1	-4	-2	0
sta_20	-1.2458	-0.8751	-1.322	-0.9247	0.34	-0.7479	0.73	-0.7569	0.75	-3	-2	-2	-2	-3	-2
sta_7	-1.3346	-0.9835	-0.5101	-1.1132	0.26	-0.4392	0.53	-0.3919	0.50	-3	-2	-1	-3	-2	-2
sta_6	-1.5048	-1.6709	-1.4152	-1.5335	0.23	-1.0155	0.93	-0.9836	0.84	-3	-3	-3	-3	-4	-3
sta_18	-1.6763	0.2827	0.4635	-0.5879	0.50	0.2527	0.92	0.178	0.90	-4	0	1	-1	1	0
sta_17	-1.6914	-2.071	1.1135	-1.873	0.29	-0.0023	1.09	0.261	1.09	-4	-4	2	-4	0	1

Factor1- Bootstrapped (NFS = 0.0068)

Disagree most		FACTOR 1 - BOOTSTRAPPED							Agree most
-4	-3	-2	-1	0	1	2	3	4	
16. <i>The most just thing is that the governmental support is given to those who more request for support.</i>	7. The most just thing would be that the local community is the main responsible of protecting the wetland.	21. The most just thing would be that everyone equally has the same right to profitably fishing in San Felipe.	3. <i>The most just thing would be that fishing permits are given mainly to fishing cooperatives.</i>	13. The more just thing would be that members of the community have more fishing rights than those who are not.	19. <i>Income distribution in cooperatives is more just than in private fishing business.</i>	10. People who comply with fishing regulations (bans, sizes) should have more fishing rights than people who don't.	38. The most just thing is that the governmental authorities teach by example the best way to effectively manage the natural resources.	9. <i>The most just thing is that everyone without exception comply with fishing regulations (fishing bans, minimum sizes' specifications and maximum number of fishing boats)</i>	
17. The most just thing is that the private fishing companies have more legal benefits.	35. The most just thing would be that those who profit from fishing have more responsibilities to protect the fisheries.	20. In order to conserve the wetland, it is just that the government bans the construction of more houses to everyone.	22. The most just thing would be that the communities can decide by themselves the way to protect the wetland.	12. <i>The animals that live in the sea and in the wetland have the same right to live well as people.</i>	2. The most just thing would be that the governmental authorities are the main responsible of surveillance of fishing rules.	23. The most just thing would be that the governmental authorities give fishing permits through transparent processes without distinction nor preference.	25. The most just thing is that the governmental authorities sanction those who do not comply with the rules without distinction nor preference.	15. It is just to fine large companies that destroy the wetland than to fine people who destroy the wetland to build their houses.	
	6. It is just that the governmental authorities give more opportunities from the Protected Area's Temporary Employment Program to those who participate more in community activities.	11. The most just thing would be that touristic providers are the main responsible for protecting the wetland.	40. <i>The most just thing would be that fishermen are the main responsible of the surveillance of fishing rules.</i>	28. The most just thing would be that fishing companies that profit more from the fishing business suffer more the consequences of the fisheries decrease.	14. The most just thing is that the governmental support for fishing favours those worse off who don't own fishing equipment.	36. The marine and wetland ecosystems have the same right to exist than humans.	34. We have the responsibility to leave the sea, the wetland and the landscape in good condition for 10 generations after our children (generations that we will not know).		
		39. The most just thing would be that the local community is the main responsible of the surveillance of fishing rules.	18. The most just thing would be that the governmental authority is the main responsible of protecting the wetland.	8. The distribution of benefits in the fishing cooperatives is more just than in the private fishing business.	32. The most just thing is that the fishing regulations are established through agreements among communities.	1. The most just thing would be that everyone (governmental authorities, touristic services providers and local community) is equally responsible of protecting the wetland.			
		27. The most just thing would be to comply with the fishing rules even when others benefit more by not complying with the fishing rules.	29. The most just thing is that the cenotes (sink holes) have a private owner in order to be better conserved.	26. The most just thing would be to comply with the rules even when not complying them bring more personal benefits.	37. We have the responsibility to leave the sea, the wetland and the landscape in good condition for the generation of our children.	33. The most just thing is that the governmental authorities and the local community can reach agreements about how to conserve the wetland.			
			31. In order to conserve the wetland, it is just that the government bans the construction of more houses to those who already have one, but allows the construction of houses to those who don't.		4. The most just thing would be that the fishing permits are given to any person who complies with fishing rules.	30. The most just thing is that fishing regulations are established through agreements among fishing cooperatives.			
				5. Everyone (governmental authorities, local community, fishermen) is equally responsible of the surveillance of fishing rules					
				24. The most just thing is that the governmental authorities promote that those who can fish give fish to those worse off who can't fish.					

Grey-shaded area represents statements that have remained stable after bootstrap. Bold-font denote distinguishing statements for the factor. Italics denote statements that are distinguishing among the three factors. Statements are placed in increasing order according to the Z-scores from bottom to top in each column and from left to right.

Factor 2 – Bootstrapped (NFS = 0.0117)

Disagree most		FACTOR 2 BOOTSTRAPPED							Agree most	
-4	-3	-2	-1	0	1	2	3	4		
6. It is just that the governmental authorities give more opportunities from the Protected Area's Temporary Employment Program to those who participate more in community activities.	26. The most just thing would be to comply with the rules even when not complying them bring more personal benefits.	7. The most just thing would be that the local community is the main responsible of protecting the wetland.	4. The most just thing would be that the fishing permits are given to any person who complies with fishing rules.	8. The distribution of benefits in the fishing cooperatives is more just than in the private fishing business.	10. People who comply with fishing regulations (bans, sizes) should have more fishing rights than people who don't.	25. The most just thing is that the governmental authorities sanction those who do not comply with the rules without distinction nor preference.	2. The most just thing would be that the governmental authorities are the main responsible of surveillance of fishing rules.	23. The most just thing would be that the governmental authorities give fishing permits through transparent processes without distinction nor preference.		
40. <i>The most just thing would be that fishermen are the main responsible of the surveillance of fishing rules.</i>	20. In order to conserve the wetland, it is just that the government bans the construction of more houses to everyone.	16. <i>The most just thing is that the governmental support is given to those who more request for support.</i>	11. The most just thing would be that touristic providers are the main responsible for protecting the wetland.	13. The most just thing would be that members of the community have more fishing rights than those who are not.	1. The most just thing would be that everyone is equally responsible of protecting the wetland.	38. The most just thing is that the governmental authorities teach by example the best way to effectively manage the natural resources.	24. The most just thing is that the governmental authorities promote that those who can fish give fish to those worse off who can't fish.	15. It is just to fine large companies that destroy the wetland than to fine people who destroy the wetland to build their houses.		
	39. The most just thing would be that the local community is the main responsible of the surveillance of fishing rules.	19. <i>Income distribution in cooperatives is more just than in private fishing business.</i>	21. The most just thing would be that everyone equally has the same right to profitably fishing in San Felipe.	34. We have the responsibility to leave the sea, the wetland and the landscape in good condition for 10 generations after our children (generations that we will not know).	18. The most just thing would be that the governmental authority is the main responsible of protecting the wetland.	9. <i>The most just thing is that everyone without exception comply with fishing regulations (fishing bans, minimum sizes' specifications and maximum number of fishing boats)</i>	33. The most just thing is that the governmental authorities and the local community can reach agreements about how to conserve the wetland.			
		27. The most just thing would be to comply with the fishing rules even when others benefit more by not complying with the fishing rules.	35. The most just thing would be that those who profit from fishing have more responsibilities to protect the fisheries.	32. The most just thing is that the fishing regulations are established through agreements among communities.	36. The marine and wetland ecosystems have the same right to exist than humans.	14. The most just thing is that the governmental support for fishing favours those worse off who don't own fishing equipment.				
		3. <i>The most just thing would be giving fishing permits mainly to fishing cooperatives.</i>	28. The most just thing would be that fishing companies that profit more from the fishing business suffer more the consequences of the fisheries decrease.	17. The most just thing is that the private fishing companies have more legal benefits.	12. <i>The animals that live in the sea and in the wetland have the same right to live well as people.</i>	31. In order to conserve the wetland, it is just that the government bans the construction of more houses to those who already have one, but allows the construction of houses to those who don't.				
			30. The most just thing is that fishing regulations are established through agreements among fishing cooperatives.	5. Everyone (governmental authorities, local community, fishermen) is equally responsible of the surveillance of fishing rules	37. We have the responsibility to leave the sea, the wetland and the landscape in good condition for the generation of our children.					
				22. The most just thing would be that the communities can decide by themselves the way to protect the wetland.						
				29. The most just thing is that the cenotes (sink holes) have a private owner in order to be better conserved.						

Grey-shaded area represents statements that have remained stable after bootstrap. Bold-font denote distinguishing statements for the factor. Italics denote statements that are distinguishing among the three factors. Statements are placed in increasing order according to the Z-scores from bottom to top in each column and from left to right.

Factor 3 – Bootstrapped (NFS=0.0042)

Disagree most		FACTOR 3 BOOTSTRAPPED							Agree most	
-4	-3	-2	-1	0	1	2	3	4		
<i>3. The most just thing would be that fishing permits are given mainly to fishing cooperatives.</i>	26. The most just thing would be to comply with the rules even when not complying them bring more personal benefits.	7. The most just thing would be that the local community is the main responsible of protecting the wetland.	13. The more just thing would be that members of the community have more fishing rights than those who are not.	5. Everyone (governmental authorities, local community, fishermen) is equally responsible of the surveillance of fishing rules	10. People who comply with fishing regulations (bans, sizes) should have more fishing rights than people who don't.	1. The most just thing would be that everyone is equally responsible of protecting the wetland.	2. The most just thing would be that the governmental authorities are the main responsible of surveillance of fishing rules.	23. The most just thing would be that the governmental authorities give fishing permits through transparent processes without distinction nor preference.		
<i>40. The most just thing would be that fishermen are the main responsible of the surveillance of fishing rules.</i>	39. The most just thing would be that the local community is the main responsible of the surveillance of fishing rules.	28. The most just thing would be that fishing companies that profit more from the fishing business suffer more the consequences of the fisheries decrease.	11. The most just thing would be that touristic providers are the main responsible for protecting the wetland.	18. The most just thing would be that the governmental authority is the main responsible of protecting the wetland.	<i>12. The animals that live in the sea and in the wetland have the same right to live well as people.</i>	24. The most just thing is that the governmental authorities promote that those who can fish give fish to those worse off who can't fish.	33. The most just thing is that the governmental authorities and the local community can reach agreements about how to conserve the wetland.	15. It is just to fine large companies that destroy the wetland to build their houses.		
	6. It is just that the governmental authorities give more opportunities from the Protected Area's Temporary Employment Program to those who participate more in community activities.	<i>19. Income distribution in cooperatives is more just than in private fishing business.</i>	4. The most just thing would be that the fishing permits are given to any person who complies with fishing rules.	34. We have the responsibility to leave the sea, the wetland and the landscape in good condition for 10 generations after our children (generations that we will not know).	31. In order to conserve the wetland, it is just that the government bans the construction of more houses to those who already have one, but allows the construction of houses to those who don't.	38. The most just thing is that the governmental authorities teach by example the best way to effectively manage the natural resources.	25. The most just thing is that the governmental authorities sanction those who do not comply with the rules without distinction nor preference.			
		27. The most just thing would be to comply with the fishing rules even when others benefit more by not complying with the fishing rules.	35. The most just thing would be that those who profit from fishing have more responsibilities to protect the fisheries.	32. The most just thing is that the fishing regulations are established through agreements among communities.	17. The most just thing is that the private fishing companies have more legal benefits.	<i>9. The most just thing is that everyone without exception comply with fishing regulations (fishing bans, minimum sizes' specifications and maximum number of fishing boats)</i>				
	20. In order to conserve the wetland, it is just that the government bans the construction of more houses to everyone.	30. The most just thing is that fishing regulations are established through agreements among fishing cooperatives.	30. The most just thing is that fishing regulations are established through agreements among fishing cooperatives.	8. The distribution of benefits in the fishing cooperatives is more just than in the private fishing business.	14. The most just thing is that the governmental support for fishing favours those worse off who don't own fishing equipment.	36. The marine and wetland ecosystems have the same right to exist than humans.				
		22. The most just thing would be that the communities can decide by themselves the way to protect the wetland.		21. The most just thing would be that everyone equally has the same right to profitably fishing in San Felipe.	37. We have the responsibility to leave the sea, the wetland and the landscape in good condition for the generation of our children.					
				<i>16. The most just thing is that the governmental support is given to those who more request for support.</i>						
				<i>29. The most just thing is that the cenotes (sink holes) have a private owner in order to be better conserved.</i>						

Grey-shaded area represents statements that have remained stable after bootstrap. Bold-font denote distinguishing statements for the factor. Italics denote statements that are distinguishing among the three factors. Statements are placed in increasing order according to the Z-scores from bottom to top in each column and from left to right.

Consensus Statements

Disagree most		CONSENSUS STATEMENTS					Agree most	
-4	-3	-2	-1	0	1	2	3	4
	6. It is just that the governmental authorities give more opportunities from the Protected Area's Temporary Employment Program to those who participate more in community activities.		22. The most just thing would be that the communities can decide by themselves the way to protect the wetland.			25. The most just thing is that the governmental authorities sanction those who do not comply with the rules without distinction nor preference.	15. It is more just to fine large companies that destroy the wetland than to fine people who destroy the wetland to build their houses.	
		20. In order to conserve the wetland, it is just that the government bans the construction of more houses to everyone.						
		39. The most just thing would be that the local community is the main responsible of the surveillance of fishing rules.						

Appendix E. Results of analysis of components of a flourishing life

List of elements mentioned at least once to describe the meaning of a flourishing life

	Resources (To have) (Enabling /Disabling Conditions)	Capabilities (To be able)	Functionings Beings (To be) and Doings (To do)	Subjective measures
1. Material	Enabling Conditions <ul style="list-style-type: none"> • Income, healthy finances • Tools and assets to work • Material goods (car, clothing) • Good/Dignified housing 			
2. Social	Enabling Conditions <ul style="list-style-type: none"> • To have a family • That my children have good housing • To have the support and/or good relations with the family • To have friends • To have good relations with the community • Community free of vices • Community solidarity and support • Well-established social institutions (e.g.cooperatives) 	Capabilities <ul style="list-style-type: none"> • That my children have good opportunities for a better life • That my children have employment opportunities 	Beings <ul style="list-style-type: none"> • To be educated • That my children are good persons • That my children are educated • That my children/family are healthy • That my children/family are free of vices • To be with my family • To be a good citizen • To be respected • To be loved • To be part of a fishing cooperative • To be part of a community Doings <ul style="list-style-type: none"> • To achieve personal goals • To see my children grow • That my children have family • That my children practice sports • To look after my family • To do the right things to oneself and others, to respect, to help others and the community • To love • To leave something good (or good memories) to others (future generations and planet) 	Feelings <ul style="list-style-type: none"> • That my children are well and happy • That my children have a religious life • To feel part of a community

	Resources (To have) (Enabling /Disabling Conditions)	Capabilities (To be able)	Functionings Beings (To be) and Doings (To do)	Subjective measures
3. Environmental	<p>Enabling conditions</p> <ul style="list-style-type: none"> • Clean and safe water in the dwelling • Enough food • Scenic quality: A beautiful (functional and integral) landscape • Sink holes (cenotes) • The wetland • Biodiversity • Livestock • The ocean • Healthy fisheries • The beach • Good weather/Normal rain patterns • Clean air, free of toxic chemicals • Clean streets • Land tenure • The silence: Landscape free of noise and car traffic <p>Disabling Conditions</p> <ul style="list-style-type: none"> • Hurricanes and tropical storms • Low quality of water • The restrictions of the Protected Area 	<p>Capabilities</p> <ul style="list-style-type: none"> • To be able to work in fisheries • To be able to work in tourism opportunities related to the landscape/nature (sink-holes, wetland, beach) • To be able to heal when sick using remedies from nature • To be able to farm land • To be able to be nurtured/avoid food insecurity 	<p>Beings</p> <ul style="list-style-type: none"> • To be in nature • To be protected against the effect of tropical storms and hurricanes due to the wetland <p>Doings</p> <ul style="list-style-type: none"> • To heal (physically and mentally) using elements from the landscape • To have leisure, fun in nature (sink-holes, wetland, the ocean, the beach) • To interact with nature/biodiversity (e.g. to watch birds, raise/see animals, grow plants) • To care for the landscape and planet • To have a sense of place/identity ("to live in this place") • To live in close proximity with nature 	<p>Feelings</p> <ul style="list-style-type: none"> • To feel relaxed/healed by the sight/presence of the landscape • The sense of beauty ("from the smell of the sea) • To feel protected against the effects of tropical storms and hurricanes
4. Human	<p>Enabling Conditions</p> <ul style="list-style-type: none"> • Basic services in the dwelling • To have good food habits • To have exercise habits • To have good financial management 	<p>Capabilities</p> <ul style="list-style-type: none"> • To be able to work 	<p>Beings</p> <ul style="list-style-type: none"> • To be nourished • To be healthy • To be free of vices • To be honest • To be humble • To be hard-working <p>Doings</p> <ul style="list-style-type: none"> • To rest • To have/perform a dignified employment/livelihood • To travel • To have fun • To look for new opportunities • To know/enjoy what's around • To experience life with its goods and bads 	

	Resources (To have) (Enabling /Disabling Conditions)	Capabilities (To be able)	Functionings Beings (To be) and Doings (To do)	Subjective measures
5. Political	<p>Enabling conditions</p> <ul style="list-style-type: none"> • Health services • Dignified livelihood/Employment opportunities and good salaries • Education services • Governance (Efficient and effective governmental institutions) • Lawfulness and access to justice (rule of law) • Civil peace and secure environment (social tranquillity, safety, order, peace) • Adequate surveillance • Sufficient and equitable distribution of governmental incentives and subsidies • Controlled immigration • Public services (electricity, sanitation, street lightening) • Sports, recreational, cultural centers • Road connectedness <p>Disabling conditions</p> <ul style="list-style-type: none"> • Scarcity of products • Lack of public transportation • Lack of employment opportunities • Low salaries 	<p>Capabilities</p> <ul style="list-style-type: none"> • To be able to participate in decision-making processes 		
6. Psychological			<p>Beings</p> <ul style="list-style-type: none"> • To be motivated <p>Doings</p> <ul style="list-style-type: none"> • To aim to be better • To have goals 	<p>Subjective measures</p> <ul style="list-style-type: none"> • Peace of mind • Satisfaction (To be well with oneself) • To feel self-confident, optimistic • Happiness • Spiritual life and religious observance

Appendix F. Glossary of Rawlsian Terms developed to read Rawls's work

Concept/Notion	Meaning
Background justice	Secured by a just basic structure
Basic structure of society	The main political and social institutions and the way they fit together as one scheme of cooperation. The background social framework within which the activities of associations and individuals take place.
Domestic justice	Principles applying to the basic structure of society
Fair terms of social cooperation	Idea of fair terms of cooperation: terms that each participant may reasonably accept, and sometimes should accept, provided that everyone else likewise accepts them. Specify an idea of reciprocity or mutuality: all who do their part as the recognized rules require are to benefit as specified by a public and agreed-upon standard. Includes the idea of each participant's rational advantage, or good
Global justice	Principles applying to international law
Local justice	Principles applying directly to institutions and associations
Overlapping consensus	Consensus of comprehensive, or partially comprehensive, religious, philosophical, and moral doctrines in order to formulate a more realistic conception of a well-ordered society, given the fact of pluralism of such doctrines in a liberal democracy. Given the fact of reasonable pluralism, "we must keep track of different points of view if justice as fairness (or any political conception) is to have any chance of gaining the support of an overlapping consensus"
Primary goods	Set of social basic goods such as liberties (speech, conscience, etc) and basic prerogatives that regulate the taking decision process for rules or principles of justice.
Public conception of justice	The idea that provides a mutually recognized point of view from which citizens can adjudicate their claims of political right on their political institutions or against one another.
Rational advantage	Specifies what it is that those engaged in cooperation are seeking to advance from the standpoint of their own good.
Reasonable pluralism	The fact that various comprehensive doctrines, religious, philosophical and moral usually have their own ideas of reason and justification.
Society as a fair system of cooperation	"Political society as a fair system of cooperation over time from generation to the next, where those engaged in cooperation are viewed as free and equal citizens and normal cooperating members of society over a complete life. When we try to formulate principles of political justice such that if the basic structure of society satisfies those principles, then we can say without pretence and fakery that citizens are indeed free and equal". (Rawls, 2001, pp. 4).

Concept/Notion	Meaning
The conception of Justice as 'Fairness'	<p>A political conception of justice rather than as part of a comprehensive moral doctrine</p> <p>The most reasonable principles of justice are those that would be the object of mutual agreement by persons under fair conditions.</p> <p>Develops a theory of justice from the idea of a social contract.</p> <p>The principles it articulates affirm a broadly liberal conception of basic rights and liberties, and only permits inequalities in wealth and income that would be to the advantage of the least well off.</p>
Well-ordered society	<p>A society effectively regulated by a public conception of justice.</p> <p>Society as a fair system of cooperation</p> <p>"Given the fact of reasonable pluralism, a well-ordered society in which all its members accept the same comprehensive doctrine is impossible. But democratic citizens holding different comprehensive doctrines may agree on political conceptions of justice" (Rawls, 2001, pp. 9)</p>
Original position	<p>Fair and impartial point of view that is to be adopted in our reasoning about fundamental principles of justice. "In taking up this point of view, we are to imagine ourselves in the position of free and equal persons (through the 'veil of ignorance' who jointly agree upon and commit themselves to principles of social and political justice" (Freeman, 2016)</p>
Veil of ignorance	<p>To insure impartiality of judgment; the parties are deprived of all knowledge of their personal characteristics and social and historical circumstances. They do know of certain fundamental interests they all have, plus general facts about psychology, economics, biology, and other social and natural sciences. The parties in the original position are presented with a list of the main conceptions of justice drawn from the tradition of social and political philosophy, and are assigned the task of choosing from among these alternatives the conception of justice that best advances their interests in establishing conditions that enable them to effectively pursue their final ends and fundamental interests (Freeman, 2016)</p>

Appendix G. Glossary of terms used by Amartya Sen in his capabilities approach and idea of justice (Robeyns, 2016)

Concept/Notion	Meaning
Capabilities	A person's real freedoms or opportunities to achieve functionings. For example, while travelling is a functioning, the real opportunity to travel is the corresponding capability.
Functionings	Those beings and doings that we take to constitute a human life, and which are central in our understandings of ourselves as human beings. 'Beings and doings'. Various states of human beings and activities that a person can undertake. Examples of the 'beings': being well-nourished, being undernourished, being educated, etc. Examples of the 'doings': travelling, caring for a child, taking part in a debate, etc.
Niti	Sanskrit word that refers to organizational propriety and behavioural correctness
Nyaya	Sanskrit word that stands for a comprehensive concept of realized justice which relates to the particular lives that people are actually able to lead
Social Realizations	Actual capabilities and functionings of people living in a society
Comprehensive outcome	Process which includes the processes involved, and which has to be distinguished from only the 'culmination outcome'.
Deliberative democracy	Discursive democracy is a form of democracy in which collective deliberation is central to decision-making