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Hidden socio-environmental costs of free trade: The case of shrimp pre-processing industry in Kerala, India

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Signature……

„The love of knowledge is a kind of madness. “

C.S. Lewis, Out of the silent planet.

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ABSTRACT

This paper examines the relation between free trade and socio-environmental costs, which are due to their less visible character and difficulty to be captured excluded from accounting. On the background of emerging trade liberalization, this paper reviews how the concept of costs that are related to damages to the environment and decreased human well-being evolved during the last century, and how different frameworks made attempt to capture them. Kapp's framework that strictly distinguishes between social and environmental costs is applied to the case study of shrimp pre-processing industry in Ambalappuzha, small fishery village in Kerala. Using both qualitative methods of interviews and field observations, and quantitative methods for collecting data by questionnaires, the research uncovers the main socio-environmental costs that are born mainly by poor women from low social strata with limited access to information. These women lack power to avoid health problems and damages of air and water pollution caused by the industry. The direction of the shifted costs point at developed countries that have been taking advantage on the less developed ones by systematically incorporating these failures in their economies. The economic system itself is being suspected for its rigidity, the market failure may not necessary be accidental, but intentional as the entire economic system relies on them.

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LIST OF ABBREVIATIONS

ATREE	Ashoka Trust for Research in Ecology and Environment
CEFTA	Central European Free Trade Agreement
CISFTA	Commonwealth of Independent States Free Trade Area
COMESA	Common Market for Eastern and Southern Africa
EC	Environmental costs
EEC	European Economic Community (the Common Market)
EFTA	European Free Trade Association
EKC	Environmental Kuznets Curve
FAO	Food and Agriculture Organization
FTA	free trade agreement
GAFTA	Grain and Feed Trade Association
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
GNP	gross national product
INR	Indian rupee
MERCOSUR	Mercado Común del Sur (Southern Common Market)
MTA	multilateral trade agreement
NAFTA	North American Free Trade Agreement
NOK	Norwegian krone
OECD	Organisation for Economic Co-operation and Development
OLS	ordinary least square
SAFTA	South Asian Free Trade Area
SC	Social costs
TEEB	Economics of Ecosystems and Biodiversity

TPP	Trans-Pacific Partnership
TTIP	Transatlantic Trade and Investment Partnership
UN	United Nations
UNCED	United Nations Conference on Environment and Development (The Earth Summit)
US	United States
USD	US Dollar
WTO	World Trade Organization

1 INTRODUCTION

Despite decades of international environmental policy, ecological life support systems are declining worldwide (MA, 2005), biodiversity loss remains unabated (Butchart et al., 2010), and climate change keeps accelerating (IPCC, 2013). Earth system scientists suggest that human scale is overshooting planetary boundaries (Rockström et al., 2009) and Ehrlich et al. (2012) note that humanity has never been moving faster nor further from sustainability than now. While the roots of current environmental problems are often traced back to the times of the industrial revolution, there is growing consensus that a more direct origin lies in the so called *great acceleration* following World Word II, after which global economic growth and related environmental pressure increased exponentially (Steffen et al., 2015a).

The great acceleration takes place in the time the Bretton Woods treaties created the foundations of an international architecture to promote free trade across the world through the creation of the General Agreement of Trade and Tariffs (GATT), the precursor of today's World Trade Organization (Stiglitz, 2002). Free trade describes an open-market system free of discrimination, that means free of quotas, tariffs, or any protectionist rules (OECD, 2004) and it is widely recognized to be a key driver of economic growth (UNCED, 1992, UN, 2002, UN, 2012). The case for free trade is rooted in the theory of comparative advantages – stating that trade improves welfare of all who participate in the transaction (Ricardo, 1817). However, the promises and perils of free trade have been a matter of political economic debate for at least two centuries (Ricardo, 1817, Polanyi and MacIver, 1944) and since 1990s whether free trade is good or bad for environment has been widely discussed (e.g. Copeland and Taylor, 1994, Frankel and Rose, 2005, Copeland and Taylor, 2004, Morin et al., 2018).

Scholars have studied the relation between trade and sustainable development focusing on aspects of scale, technology, and industrial structure (Cole et al., 1998, Copeland and Taylor, 1994). Some scholars have emphasized the importance of a scale effect, theorizing that increased liberalization of markets and trade results in an increase in the size of production, which consequently involves higher use of environmental resources (Cole, 2006) and higher level of waste and emissions (Wheeler, 2000). In 1990s, however, Grossman and Krueger (1991) theorized a model known as the Environmental Kuznets Curve (EKC), according to which growth and free trade should be seen to have a long term beneficial effect on the quality of the environment. Scholars studying the relation between trade and environment used this model as a theoretical foundation for an synergy of trade on environment - as trade increases the real incomes the theory goes, industries can afford to invest in greener and more efficient

production methods (Antweiler et al., 2001, Reppelin-Hill, 1999, Li et al., 2016, Bustos, 2011, Wheeler, 2000). Others, however, have argued that the for most pollutants the predictions of the EKC have proven wrong, growing in parallel with economic growth, as in the case of CO2 emissions (Peters et al., 2011) and total material consumption (Wiedmann et al., 2015). Even more important importantly for the sake of this thesis, scholars in the traditions of ecological economics and the sustainability sciences have repeatedly emphasized that mainstream economic theory fails to account and recognize pervasive external social and environmental costs of economic growth and free trade, including pollution, resource depletion, biodiversity loss, and undermining of labour rights (Mishan and Mishan, 1967, Kapp, 1953, Daly, 1992, Daly, 2010).

Despite decades of debates and the large body of literature on the topic, scholars have not met in a unified agreement whether trade affects environmental and social sustainability in a positive or negative way (Cherniwchan et al., 2017, Wheeler, 2000). This thesis revisits the debate on growth, free trade, and sustainable development through the lens of unaccounted socioenvironmental costs in economic activity.

The objective aim of this research is **to inform the debate on free trade and sustainable development by advancing scientific understanding on the definition, identification, and measurement of social and environmental costs that escape conventional economic accounting and policy design.** Specifically, we focus on social and environmental costs resulting from growth in food exports in the context of international trade liberalization, using as a case study the shrimp pre-processing industry in Ambalappuzha, region of Kerala, India.

The specific objectives of this thesis are the following:

1. Review theories and frameworks for assessing external socio-environmental costs.
2. Identify and give visibility to the communities and social groups upon which unaccounted socio-environmental costs from free trade are being shifted.
3. Analyse the nature, importance and scale of these social and environmental costs.
4. Assess perceived capacity of local communities to cope with external costs.

To address these objectives, the following research questions will be addressed:

1. What are the key available concepts, frameworks and approaches to assess external socio-environmental costs? How do they differ from each other?

2. Who are the local actors carrying these costs and what is their demographic and socioeconomic profile?
3. What are the main unaccounted social and environmental costs of trade-driven industries as perceived by affected local communities?
4. What is the perceived capacity of the local communities to prevent, mitigated and cope with these costs?

First, in the chapter 2, I provide background information on the utilitarian roots of free trade concept, its later evolution into international trading organizations and free trade zones, and contemporary stagnation of the trading agreements. Then, in the chapter 3 I synthetize knowledge, concepts and frameworks how socioenvironmental costs have been defined and integrated in accounting systems and well-being indicators. In the chapter 4, I introduce the case study of Indian shrimp pre-processing industry in Ambalappuzha in Kerala, followed by methods in chapter 5 that were used to collect the data and analyse the key environmental and social costs resulting from trade-driven market expansion. In the chapter 6 and 7, I present and discuss the results of the research answering what are socio-economic characteristics of main actors carrying socio-environmental costs, what are the main socio-environmental costs, and how vulnerable these actors are according to their capacity to cope with these costs. I conclude in chapter 8 that the problem of growing inequalities through trade needs to become more openly articulated showing the pervasiveness of these costs.

2 BACKGROUND

2.1 The origins and development of free trade idea

The theoretical foundations of limited government in trade can be found in the work of some of the founding fathers of economics, such as Adam Smith or David Ricardo (Ricardo, 1817, Smith, 1776). Before that, trade with a few exceptions has been mostly restraint - feudalists protected trade in their medieval towns, mercantilists supported domestic production, and frequent wars dissipated attempts to liberalize trade (King Jr, 2008). Exceptional cases, however, can also be found across the whole Europe, for instance Northern Italian city-states in the twelfth and thirteenth century, Hanseatic League in Northern Germany in the thirteenth century, or commercial trading centres in Bruges, Antwerp and Amsterdam. King (2008) regards these cases as germs for free trade idea.

During the late 18th and 19th century trade liberalization and minimal governance started to be enhanced through the doctrine of laissez-faire that dominated over policy emphasizing governmental interventions (The Editors of Encyclopaedia Britannica, 2018). Smith (1776, IV.2.9) in his book The Wealth of Nations, illustrated how a market without barriers where people selfishly follow their own interests can successfully increase one's wealth and correlated these self-intervening powers to a metaphor of "invisible hand. Later, Ricardo (1816) elaborated Smith's thoughts further and analysed partners involved in a transaction; he supported the freedom for trade with the theory of comparative advantages stating that all involved partners benefit if they specialize in a production of goods with the lowest production costs.

According to Irwin (1998), most classical economists proposed free trade as the best way how to increase national income pointing that the goal of production is to deliver greater utility, prosperity, and social well-being. Such approach, however, has not found a general agreement. Already contemporary economists dared to question the validity of main-streamed theories, for instance Malthus (1809) questioned the verity of unlimited growth and prosperity within Earth limits, or List and Colwell (1856) suspected vaunted benefits of trade without no barriers claiming that infant industry needs certain level of domestic protection to be able to compete in an open marketing system. Chang (2003) refers to Friedrich List theory of protected infant industry and by historical analysis documents that also industry in developed countries have been evolving under relatively strict greenhouse market conditions. Brown (2010) points out that Smith did not fully explain all channels of the market mechanism and hindered the role of slavery. According to him, a market without barriers enabled European nations to get access to

"free" labour that was during that time traded over Atlantic Ocean from Africa to American plantains, and European colonies (Brown, 2010). Semmel (2004) looks at the origin of free trade from an ideological view, and concludes that imperialism and colonial expansion increased the lust for open markets to decrease trading difficulties between colonies and colonizing countries.

2.2 Golden age of trade liberalization: The promise of prosperity

The idea of free trade expanded dramatically during the late 19th and early 20th century regarded as an easy available solution how to increase the national income interchanged to increased prosperity and welfare (Polanyi and MacIver, 1944). Although protectionist rules were put in place during the First and Second World War to protect own domestic production (Krasner, 1976); since 1948, the world entered the Golden age of globalization (Rodrik, 2016) referred by others to the time of the Great Accelaration (Steffen et al., 2015b). A process of global trade liberalization has been restored and international trade has experienced a rapid growth (WTO, 2018c). This time, the economic growth was given concrete numbers. Initiated in the late 1930s, Simon Kuznets laid down the foundation for GDP indicator, which has during the Bretton Woods conference in 1944 become a standardized tool for measuring the performance of economies (Dickinson, 2011). Data provided by Ortiz-Ospina and Roser (2017) indicate that while the portion of total trade on the global GDP rose only from 2% to 10% in the range between the beginning of 16th century and the beginning of the 19th century, since the end of the Second World War the share increased from 20% to 60% with about a 10% decrease during the financial crisis in 2009 (Federico and Tena-Junguito, 2017). In monetary terms, the volume of all merchendized goods, measured as a sum of imports and exports, has risen from 0.12 trillions US dollars in 1948 to 38.09 trillions US dollars in 2014 (WTO, 2018b).

The peak of the golden age was reached at the end of the 20th century. Since 1990s, the adopted political decisions were determined by sustaining the economic growth that has become one of the main macroeconomic goals (Samuelson and Nordhaus, 2009, Mankiw, 2012). And since the concept of sustainable development was launched in 1987 by the Brundtland Commission (Brundtland, 1987), and after the theory of the EKC came to prominence, all major policy documents guiding global environmental governance have endorsed the thesis that growth and free trade are good for the environment (Gómez-Baggethun and Naredo, 2015).. This thesis is reflected, among other places, in the Earth Summit Declaration of Rio 1992 (UNCED, 1992), the Johannesburg Declaration on Sustainable Development in 2002 (UN, 2002), and the Stockholm declaration in 2012 (UN, 2012). Governments in the occasions of

United Nations´ conferences and United Nations Framework Convention on Climate Change expressed their further support of the theory that trade enhances both sustainable production and sustainable consumption (UN, 2012, par. 224-226, UNCTAD, 2015). The political focus on economic growth was also expressed in Goal 8 and Goal 12 of the United Nation's 2030 Agenda for Sustainable Development (UN, 2015).

The key institutional document for development of the liberalized international trade was the signature of the General Agreement on Tariffs and Trade (GATT) in 1948 (WTO, 2018c).The aim of this agreement was to establish an international trade organization (ITO) that would set up harmonized rules and quotas on a global scale and reduce thus trade barriers for goods. The multilateral international trading system was further liberalized throughout the Dillon, Kennedy, and Tokyo GATT negotiation rounds that took place during the 1960s and 1970s (WTO, 2018c). The most recent stage in the expansion of global trade has taken off with neoliberal deregulation policies implemented since the 1980s. Negotiation rounds held in Uruguay (1986-1994) gave an emergence to the World Trade Organization (WTO) that in 1995 replaced the GATT. It has not been now only a concern about traded goods, but the scope expanded over traded services and intellectual property rights (WTO, 2018c).

In 2001, a new negotiation round started in Doha that has been focusing on new emerging problems related to growth in less developed countries lasting up to day. The negotiations have not reached an agreement due to reluctance from the very developing countries. According to Flentø and Ponte (2017) these agreements represent a benefit only to developed countries and the new proposed agreement does not attempt to change the contemporary trading paradigm. They state that the agreement aims only to remove "soft" administrative barriers, such as quotas and bans, but does not try to decrease the "hard" obstacles, which would provide for developing countries the same opportunities, for instance to build the same physical infrastructure as developed countries operate with.

In 1990s it has become more obvious that establishment of a global trading organization with unified rules will be challenging (Krugman, 1991, Bhagwati, 2008). The establishment of GATT was followed by emergence of free trade regions. Some agreements were signed earlier, for instance European Economic Community (EEC) in 1957, the European Free Trade Association (EFTA) established by four Nordic European countries in 1960s, the Grain and Feed Trade Association (GAFTA) established in 1971s with a goal to promote trade of agricultural products among its members in more than 90 countries. But most free trade

agreements (FTAs) appeared in the early 1990s, such as the Central European Free Trade Agreement (CEFTA) in 1992 among Southeastern European countries, the Commonwealth of Independent States Free Trade Area (CISFTA) in 1991 among eight post-soviet countries, the Common Market for Eastern and Southern Africa (COMESA) in 1993 signed by 19 Southeastern African countries; the North American Free Trade Agreement (NAFTA) established in 1994 between the US, Mexico and Canada; MERCOSUR (Mercado Común del Sur or the Southern Common Market) in 1991 established as regional free trade zones in the North America, or for instance the South Asian Free Trade Area (SAFTA) in 2006 reducing custom duties between India and other South Asian counties. In June 2013 a mandate was established to negotiate a new agreement between the EU and the US called the Transatlantic Trade and Investment Partnership (TTIP) (European Commission, 2017), and in 2015 a new partnership was drafted called the Trans-Pacific Partnership (TPP) which aim was to facilitate trade between twelve Pacific-rim counties, including the US and Mexico (MFAT, 2015).

The increasing regionalism can be explained from different viewpoints. Krugman (1991) and Bhagwati (2008) state that these agreements serve as an alternative to the unsuccessful establishment of the global trading organization or a multilateral trade agreement (MTA). They argue that the reason of establishing FTAs was to gain at least a partial benefit from trade liberalization as the countries have become sceptical towards the results of negotiations that has been proceeding too slowly. Others provide different explanations. Evans et al. (2009) correlate the emergence of FTAs with changes in global politics, uch as the collapse of the Soviet Union in 1991; Ravenhill (2010) point out at the financial and political crisis in the East Asia, or for instance Martin et al. (2012) relate the phenomenon to the increased need to bring political stability after war. While Krugman (1991) concludes that FTAs can make nations worse off than MTAs due to protectionism of own domestic or regional market, Frankel et al. (1995) show that FTAs bring less welfare than MTA because of increasing transaction costs, in particular the costs of transportation.

2.2.1 Free trade vs. environment debate

The argument over benefits of regional agreement has not been the only one around the idea of free trade. The trade liberalization was observed on the background of increasing visibility of environmental and social inequalities, and thus stimulated the research on its effects (Duro et al., 2018, Daly, 1993, Daly, 2010). In 1970s, scholars started to discuss whether free trade is good for the environment (Muradian and Martinez-Alier, 2001), and since 1990s the trade vs.

environment has become a hot issue in international policy debates (e.g. Copeland and Taylor, 1994, Frankel and Rose, 2005, Copeland and Taylor, 2004, Morin et al., 2018).

Scholars have studied the relation focusing on the aspect of scale, technology, and industrial structure (Cole et al., 1998, Copeland and Taylor, 1994). Some emphasized the importance of a scale effect theorizing that increased liberalization of markets results in an increase in the size of production which consequently requires more resources (Cole, 2006) while the emissions concentrates in certain areas (Wheeler, 2000). In 1990s Grossman and Krueger (1991) reproduced a model of Environmental Kuznets Curve which advocated that economic growth at higher levels of income improves the quality of the environment. Scholars studying the relation between trade and environment used this model as a theoretical foundation for explaining the positive technological effect of trade on environment - as trade increases the real incomes, industries can afford to invest in greener and more efficient production methods (Antweiler et al., 2001, Reppelin-Hill, 1999, Li et al., 2016, Bustos, 2011, Wheeler, 2000). The effect of trade liberalization on the environment can be determined also by structure of the industry in a certain country or region (Cole, 2006) or for instance by the type of polluting matter (Managi et al., 2009).

Since the late 1990s, evidence started to grow indicating that the effect of trade depends on country's level of development, emphasizing that the quality of environment in non-OECD countries worsens with the increased degree of market openness (Rock, 1996, Copeland and Taylor, 2004, Ang, 2009, Jalil and Feridun, 2011, Nasir and Rehman, 2011, Al-Mulali and Ozturk, 2015, Managi et al., 2009). And thus, these countries became "pollution havens" where more developed countries outsource their "dirty" industries (Mani and Wheeler, 1998, Xiao et al., 2018). Dasgupta (2012) claimed that the concept of trade serves as a theoretical underpinning to get an access to cheap resources. And According to Mani and Wheeler (1998) and Muradian and Martinez-Alier (2001), this is not a coincidence, there is a relation between the adverse effects on the third world and the structure of the WTO whose goal is to support trade without barriers to deliver equal opportunities for everyone (WTO, 2018c). Despite that aim, Subramanian and Wei (2007) find its results unequal. Comparing the structure of the global trading system and the contemporary politico-economic situation in 1966 and 2016, Wilkinson (2017) illustrated the backwardness of international trade institutions, and assumed further distortions of markets in developing countries in the future.

Nevertheless, the WTO claims that free trade has a positive effect on the environment, and that through trade openness, the organization "contributes to protection and preservation of the environment" (WTO, 2018b). With the increasing environmental concerns, the WTO established a Committee on Trade and Environment in 1995. WTO members can report to this Committee all environment-related issues suspected a correlation with trade (WTO, 2018a). The following table demonstrates the increasing amount of reported notifications coming from 25 different areas related to environment, for instance afforestation, air pollution, biodiversity and ecosystems, environmental friendly consumption, plant protection, sustainable fisheries management, waste management and conservation (WTO, 2018b).

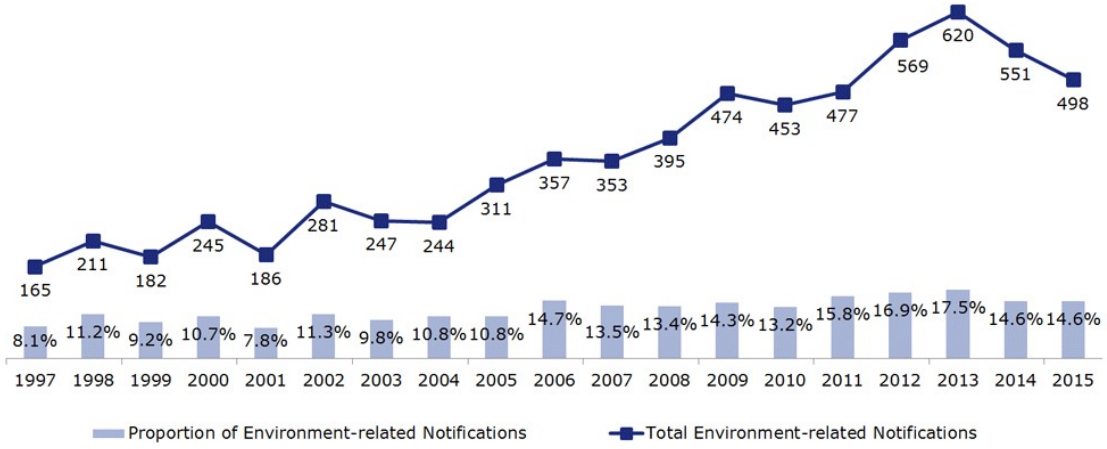


Figure 2.1. *Environmental-related notifications submitted by WTO members (2001-2015)*

Source: (WTO, 2018b)

Despite the established institution for reporting, the WTO accounts are based on merchandized values of goods and services. Costs that are related to damage of environment or decreased human welfare are not included in such system.

2.3 A downfall of the free trade idealization

In 2015 the volume of all merchendized goods, measured as a sum of imports and exports, has decreased to 33.22 trillions in 2015 and 32.21 trillions US dollars in 2016 (WTO, 2018b), out of which the exported amount increased from nearly 3.5 trillion US dollars to more than 19 trillion US dollars in 2014, but since 2015 the trade started to stagnate and receded over the following three years (Statista, 2018).

Villareal and Fergusson (2017) associate these changes to the global expectation for political turnarounds of one of the most powerfull player in the global trade - the United States

(US). Under the promise of „America first“policy, the newly elected president Donal Trump articulated his disappointment with results of free trade agreements, with NAFTA in particular. He stated his intention to withdraw the US from NAFTA and TTP, impose additional taxes on goods and services from Mexico (Villareal and Fergusson, 2017), and stop the negotiations on TTIP and TPP with a vision to increase employment, incomes, and reach the old American dream (Rettmann, 2017). He justified his return for tariffs and quotas for Mexico, with a promise of increase in job opportunities and higher revenues. This policy found criticism already during his first year of presidency due to a lack of theoretical economical foundations, radical nationalism and protectionism which could increase global risk and uncertainty (Vujačić and Milošević). During March and April 2018, president Trump stated he is willing to renegotiate signature of TTIP, but not TPP (Bravo & Chatterly, March 2018). His political decision enhance discussion among scholars about the direction of free trade policy observing trade partners stagnating in uncertainty as the risks related to investments increased (Vujačić and Milošević).

3 THEORY

3.1 The concept of well-being

The expansion of trade in terms of quantity, frequency, and travelling distance, gave a birth to many negative consequences that are not captured by the current trading system or current national accounts, such as Gross Domestic Product (GDP) or Gross National Product (GNP) (Daly 1993). These negative consequences of food trade (and not limited to food) can be found in literature under different concepts, mainly referred to as externalities, external costs, or more recently to as environmental and social costs. In this chapter, we review these concepts, their definition in relation to trade, their measurement and how these costs have or have not been included in national accounts and alternative measurement accounts. The concepts itself aim to pinpoint on the reduction in well-being and in satisfaction with quality of human life.

The discussion on the concept of well-being and its different dimensions has a long history within different areas of social sciences (Easterlin, 1974, Diener, 1984, Dodge et al., 2012). With the growing frequency and occurrence of various environmental and social issues, also the interest to measure and capture human well-being has increased. However, reviewed literature shows that the concepts of well-being, quality of life and progress lack a unified definition.

Dodge et al. (2012) distinguish between two main bases when defining the concept of well-being: the hedonic and eudaimonic tradition. While the first emphasises the role of happy life, low negative disturbances, and general life satisfaction, the later highlights human development. Many scientists, however, also combine both approaches (Waterman, 1993, Ryan and Deci, 2001, Keyes et al., 2002). Consequently, the concept of well-being gains different definitions. On one hand, hedonic tradition defines well-being as pleasure attainment and pain avoidance or as a way how individuals experience their daily lives, the eudaimonic approach, on the other hand, states that well-being concerns life meaning and self-realization, that means how people perceive life as a whole (Ryan and Deci, 2001). Dodge et al. (2012) reviewed and summarized definitions from the time of Aristoteles until the early 21st century. Based on this summary, they define well-being as a fluctuating point between available psychological, social, and physical resources and psychological, social, and physical challenges. When these resources and challenges become balanced, one can achieve the state of well-being.

The concept of the quality of life encounters also several challenges, especially when being used interchangeably for the concept of well-being (Graham et al., 2017). According to Schalock et al. (2017), this multidimensional concept is composed of three main domains: independence (such as personal development and self-determination), social participation (such as relationships, social inclusion, and rights), and well-being (emotional, physical, and material well-being). As one can notice, well-being becomes an inseparable part of the concept itself (Schalock et al., 2017).

While some scholars show that well-being is predominantly determined by economic growth (Stevenson and Wolfers, 2008, Veenhoven and Vergunst, 2014), a more than three decade long denial debate still continue. It has been Easterlin (1974) that reported that increasing income does not have any significant influence on person's well-being. Proto and Rustichini (2013) revisited this issue and found that the level of satisfaction and well-being increases but only in countries with lower GDP, they identified the level on per capita GDP below 15,000 USD. The higher level of GDP a country has, the more flatter the curve of satisfaction becomes (Proto and Rustichini, 2013).

The concept of progress may be defined both as a mean or realization, but also not as an end itself. It can be understood also as a technological development or as social development, including for instance the larger variety of products and services, technological changes, market expansions, or intellectual and spiritual development. As mentioned in the debate above, economic growth, measured most commonly with the GDP indicator, is sometimes incorrectly mistaken as an equal term of a progress and development (Stevenson and Wolfers, 2008, Veenhoven and Vergunst, 2014). From the view of both hedonic and eudemonic conception of well-being, the indicator itself does not include lost or gained benefits from for instance environmental degradation, loss of biodiversity, increased health issues and diseases, security, or education opportunities (Boyd, 2007).

3.2 Measuring well-being and quality of life

3.2.1 Misunderstanding the GDP indicator

The idea that there is a direct relation between GDP growth and human well-being via wealth creation is central to contemporary economic policy. The GDP indicator was developed during the 1930s and 1940s in the US and the UK, by Simon Kuznets as a measure of economic performance, to bring stabilization of prices, and exchange rates after the Great economic depression and First World War (Raworth, 2017). This indicator, called Gross Domestic

Product (GDP), is an estimation of annual flow of goods and services based on census data and annual economic surveys (Costanza et al., 2009). It has helped economists to measure the ratio of the increase in production due to inflation or for instance the proportion of consumption in opposition to investments and savings. Unfortunately, despite the early and persistent warning from Kuznets himself that the indicator is a very specialized tool measuring only the economic activity, it has been soon misused as a measure of economic development, where growth and well-being are assumed to go hand in hand (Costanza et al., 2009, Raworth, 2017, Cobb and Daly, 1989).

The GDP indicator measures the amount of produced goods, traded services, and investments in new buildings, imported and exported products. However, it does not include such products and services that do not enter the market, such as volunteer work, help within family and friends, barter trading, and social costs such as costs of crime, costs of imprisoning, meeting human basic needs, or costs of pollution or ecosystem depletion (Costanza et al., 2009). In fact, for instance building a factory in a third world that causes a destruction of an ecosystem and where basic human needs are not met, can be read in the GDP accounting only as an increase in value as it calculates only the costs of building and labour wages. A French Economist Frederic Bastiat illustrated already in the 19th century in his "broken window" parable that destruction does not bring better well-being (Bastiat, 2010). We can see investments and economic activity after a window is broken or when a country reconstructs after a war, but what we cannot see is where could these investments go and where could other activity flourish if such activity did not happen. He highlights, that it is necessary to be aware of both what is seen and what is not seen.

Nevertheless, despite the common knowledge that GDP is only a measure of economic performance, economic growth together with price stability and low unemployment, has become the main macroeconomic goal (Samuelson and Nordhaus, 2009, Mankiw, 2012). Throughout the last decades, however, efforts have been made to correct the GDP measure, to find an alternative measures to the indicator, or to combine GDP with other indicators (Costanza et al., 2009). Identification of costs that are not captured by the accounts and by which the GDP indicator needs to be corrected, had to precede (Jackson, 2009). In the reviewed literature, such costs are found under concepts of externalities (Pigou, 1932, Foster, 1980), external social costs (Coase, 1960) or for instance environmental and social costs (Kapp, 1953).

3.2.2 Alternative measures of human well-being

As discussed earlier, the GDP measure has not been designed to measure human well-being. There has been, however, a great amount of effort to design and implement different measures that would capture the quality rather than the quantity of human well-being correcting for external costs. Costanza et al. (2009) divide these measures in four various categories: measures that correct the existing GDP accounts, measures that address well-being directly, combination of both existing GDP measures and direct well-being measures, and indicator suites. In Table 1, we give an overview of these categories with examples of measures, and if this measure includes social and/or environmental costs.

Table 3.1. *Overview on the main alternative measures to GDP account and their inclusion of social and environmental costs*

Measure category	Example of measures	How does the measure work?	Are social costs (SC) and environmental costs (EC) included?	Example of use and application
Measures that correct the existing GDP accounts	Index of Sustainable Economic Welfare/ The Genuine Progress Indicator	Corrects GDP account on costs that reduce natural and social capital (e.g. income inequality, crime, loss of leisure) and benefits that improve the welfare (e.g. voluntary work)	SC, EC	(Cobb and Daly, 1989)
	Green GDP	GDP is reduced by estimated environmental degradation and pollution	EC	(Kunanuntakij et al., 2017, Li and Lang, 2010, Boyd, 2007)
	Genuine Savings	GDP account is corrected by subtracting environmental degradation and resource depletion costs and adding for human capital development (e.g. skills, know-how, trust, cooperation, efficient judicial system and government)	EC, measures social benefits not costs	(Pearce and Atkinson, 1993, Hamilton and Clemens, 1999, Pezzey et al., 2006) (Pezzey and Burke, 2014, Greasley et al., 2014, Lindmark and Acar, 2013, Mota et al., 2010)
Measures that address well-being directly	Ecological Footprint	Calculates how much land is needed to produce resources consumed by a certain region on a year basis, includes used land (fields, pastures), forests used for wood, and area that would be necessary to absorb carbon released by burning fossil fuels.	EC	(Wackernagel and Rees, 1998, Van den Bergh and Verbruggen, 1999, Lenzen and Murray, 2001, Haberl et al., 2001, Van Vuuren and Smeets, 2000, Zhao et al., 2005)
	Subjective Well-Being measure	Individuals or group assessment of own well-being, life satisfaction and perceived life quality subjectively.	EC, SC	(Diener, 1984, Diener et al., 1999, Goodman et al., 2017, von Möllendorff and Welsch, 2017, Apergis, 2018, Tomaney, 2017)

	Gross National Happiness index	It measures cultural and spiritual values using a form of survey collecting data from 9 areas: psychological wellbeing, health, time use, education, good governance, community vitality, cultural diversity, ecological diversity, and living standard.	EC, SC	(Ura et al., 2012, Kelly, 2012, Brooks, 2013, Mitchell et al., 2013)
Combination of both existing GDP measures and direct well-being measures	Human Development Index	Developed by the UN Development Programme in 1990s as a composite index of three sub-indices: health (life expectancy at birth), education (mean years of schooling) and economy (real GNI per capita).	SC	(Alkire and Foster, 2010, Chowdhury and Squire, 2006, Cooke et al., 2004, Crafts, 1997, Barrera-Roldán and Saldıvar-Valdés, 2002, Noorbakhsh, 1998)
	Living Planet Index	It measures environmental pressure by assessing two components: the state of global ecosystems, and burdens on environment caused by human activity. The main measured values are world's forests, freshwater and marine ecosystems, and biodiversity loss.	EC	(Loh et al., 2005, Böhringer and Jochem, 2007, Collen et al., 2009, Wackernagel et al., 2000)
	Happy Planet Index	The index measures country's ecological efficiency for human well-being. It is composed of life expectancy at birth, life satisfaction, and ecological footprint.	SC, EC	(Abdallah et al., 2009)
Indicator Suites	National Income Satellite Accounts	Does not use estimation of economic values of nature and ecosystem services, but creates a "satellite" accounts that reports them in physical units.	SC, EC	(Repetto et al., 1989, Reyes et al., 2017, Graham et al., 2007)
	Calvert-Henderson Quality of Life Indicators	The indicator does not work as a unified tool, but leaves up to its user its interpretation, the indicator collects data from following areas: education, economy, energy, environment, health, human rights, income, infrastructure, national security, public safety, recreation, and shelter.	SC, EC	(Henderson et al., 2000)

	Millennium Development Goals (MDG) and Indicators	UN DESA identified 48 indicators to measure how MDG are met, covering areas from extreme poverty, education, to women' empowerment, child mortality, or environmental sustainability.	EC, SC	(Easterly, 2009, Attaran, 2005)

Source: Own elaboration based on literature review.

3.3 Socio-environmental costs

The concept for external detrimental effects causing damage to environment and/or to society and which I call in this paper socio-environmental costs, has not gained an unanimous definition in economic literature. Pigou (1932) and Coase (1960) defined these external effects – *negative externalities* or *social costs* respectively – as a difference between individual and social costs that are not involved in the production or consumption function and affect a third site that is not involved in the transaction. While Pigou views the negative externalities as market failures that may be fixed by public policy interventions (e.g. taxing), Coase rather inclines to support market-based solutions. Mundt (1993) continues in a similar spirit as Pigou and Coase and defines externalities as uncalculated outcomes of an exchange. Foster (1980), however, derives and defines the concept of externalities as action choices of third parties that negatively affect the utility function of individuals without the ability to control them. Such, often unintended, side effects occur both within processes in production and consumption because the current economic mechanism is not capable to register them. Related to the divergence among the definitions, issue of negative external costs has become not only a practical problem, but also a theoretical one, concerning the definition of the concept itself.

Kapp, who is also regarded as a founder of Ecological Economics, came with a framework of implementing social and environmental costs. In other words, he suggested a non-utilitarian view as an alternative approach to Pigou (1932) or Coase (1960). Berger (2008) regards this framework as one of the most comprehensive. Kapp (1953) considers basic human needs as priority and according to him they should determine political decisions.

From early development in the 20th century, these environmental and social costs started to be taken slowly into consideration within economic models. Despite the common knowledge among economists, that transformation of production factors (land, labour and capital) includes more than manufacturing and transportation, information on the "hidden" environmental and social costs have been for a long time excluded from an economic analysis. During the early

development of economic thinking on the externalized costs, economists tent to regard occurrence of these costs as exceptional cases (Ayres and Kneese, 1969). For instance Walras in his model, developed at the end of the 19th century, considered the possibility of other than accounted costs, but he eventually equalled all to zero explaining that the state always inclines to general equilibrium due to market clearing prices (Walras and Jaffé, 1954). Knight (1921) on the other hand considered the effect of these costs significant when analysing firm decision, but his work has been criticised for not distinguishing between risk and uncertainty which is crucial when dealing with environmental degradation (Barzel and Kochin, 1992). In following decades an issue of imperfect information aroused. Von Hayek (1937) emphasized the importance of information when making an allocation decision and suggested a mechanism where individuals would be awarded for contributing to a full information overview. Simon (1955) elaborated the issue of information further when analysing how costly the process of gathering the information is and thus the maximization of utility sporadically happens under conditions of perfect information. Such conditions consequently create some costs that might be not internalized. Stigler (1961) also addressed the problem of information. In his model he "simply" turned unconventional commodity – the information – into conventional commodity to be able to process it within an economic analysis. During 1950s the concept developed also within the study of property rights and monopolist structures. For instance Alchian (1959) and Hardin (1968) argued that common property leads to resource misallocation as such institutions fail to recognize all costs. Consequently, the issue of privatization and resource allocation has become a mainstreaming issue, despite having encountered wide criticism (Ostrom, 2015). During the 1950s, Director and Levi (1956) addressed also the height of the costs related to the power of monopoly.

The turnaround occurred when Coase's work "The Problem of Social Costs" was published in 1960 (Barzel and Kochin, 1992). Coase changed the view on un-internalized costs deviating from the view that externalities occur only occasionally, he explicitly distinguished between a perfect world without transaction costs and a world where the transaction costs are higher than zero. Despite being well-known for his famous Coase theorem, his contribution to knowledge on externalized costs became more important in terms of shifting the economic thinking to unification of ideas about costs and externalities. He criticised Pigou for making policy recommendation to internalize the "externalities" through taxing mechanism under conditions of zero transaction costs (Coase, 1960). Other economists continued in developing the knowledge on these costs and challenges for policy makers (Davis and Whinston, 1962,

Turvey, 1963, Buchanan and Stubblebine, 1962, Mishan, 1965). Demsetz (1969) identified for instance fallacies around government's interventions in the market. He highlighted that neither markets nor interventions are perfect and that nothing is for free. When it comes to governmental intervention, careful analysis of costs and benefits is crucial before head, because not every decision means an efficient improvement.

With increasing visibility of environmental problems in 1970s, the issue of environmental and social costs became even more urgent. Recognizing the lost utility of ecosystem functions, monetary valuation of ecosystem services through market-based instruments became an increasingly used approach since the 1990 s (Gómez-Baggethun et al., 2010). Recognition of social costs was the pivot issue of Kapp's work from 1950s. He suggested that policy makers should implement more "humanized" approach in evaluating costs, taking a precautionary principle. He also suggested that costs assessment should not be strictly limited only to an activity, but the scope of investigation should be broadened and taken into account also related activities stating that basic human rights need to be included in this accounting (Kapp, 1953).

The Economics of Ecosystems and Biodiversity (TEEB) shares a similar approach. As a global initiative founded in 2007 it aims to make visible natural values in order to be recognized by decision makers and captured by the economic systems. Ring et al. (2010) discuss the strength of economic instruments when discussing biodiversity conservation and challenges of integrating natural values.

4 CASE STUDY

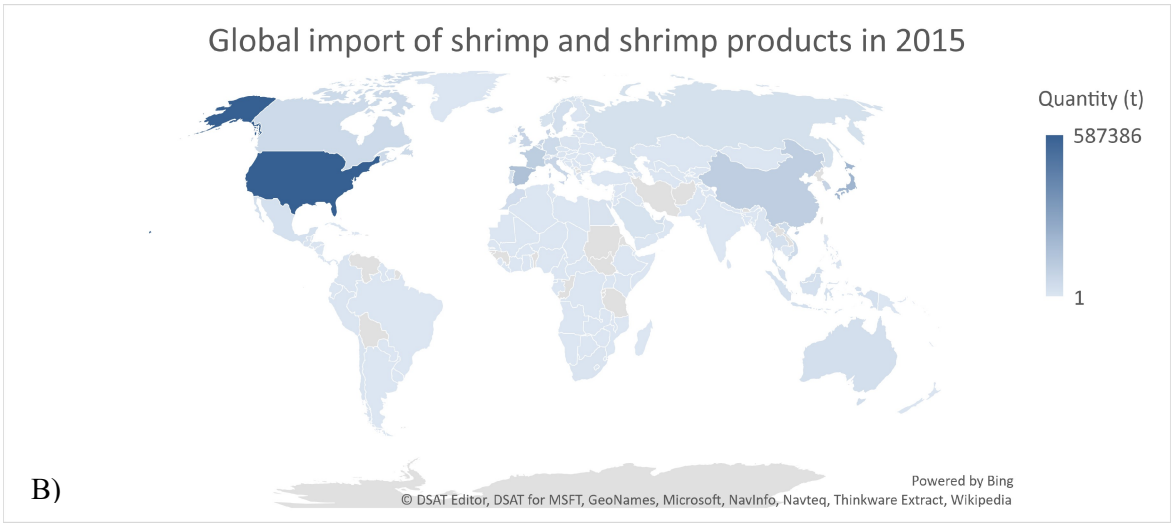
4.1 The shrimp farming industry

Shrimp products belong to fishery commodities traded with the highest value, followed by salmon and tuna - in 2015 they have been traded for USD 24.8 billion, 19.1 billion, and 11.9 billion respectively (FAO, 2017).

Since 1976 the traded amount of shrimp and shrimp products has increased more than six times, while the value has increased more than fourteen times (FAO, 2017). Figure 4.1 demonstrates the steadily increasing trend in quantities and values of these products between the years 1976 and 2015.

Figure 4.1. *Global trade with shrimp and shrimp products (1976-2015)*
Source: own elaboration of data from FAO (2017)

Since 1985 the value of shrimp products has started sharply increasing corresponding the increased demand in three markets: the US, Japan, and Europe (FAO, 2017). India has positioned itself on the top of the leader for exporting partners in the world (FAO, 2017). In Figure 4.2, the quantities of exported and imported shrimp products of world partners are visually demonstrated.



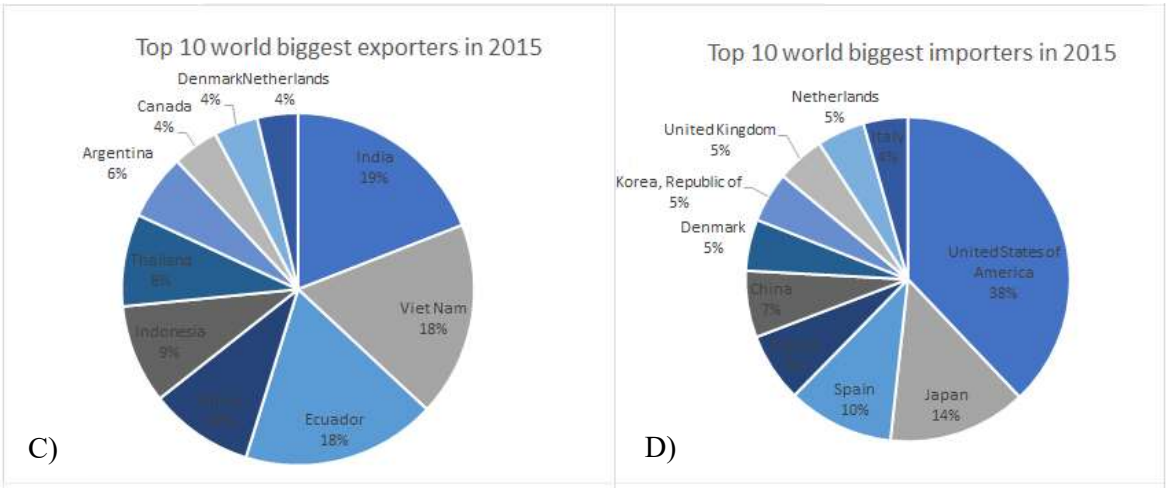


Figure 4.2. *Figures on global trade with shrimp and shrimp products in 2015*

Note: *A) Graphical chart demonstration of countries exporting shrimp and shrimp products B) Graphical chart demonstration of countries importing shrimp and shrimp products C) Pie diagram of*

top ten world biggest exporters of shrimp and shrimp products D) Pie diagram of top ten world biggest importers of shrimp and shrimp products
Source: own elaboration of data from FAO (2017)

As visualized above, India has positioned itself as the top largest exporter of shrimp and shrimp products with a share of 19% on the global trade in 2015, followed by Vietnam and Ecuador (see Figure 4.2). Measured in monetary values, the amount of exported shrimp goods has significantly increased since late 2000s – this increase is presented in Figure 4.3.

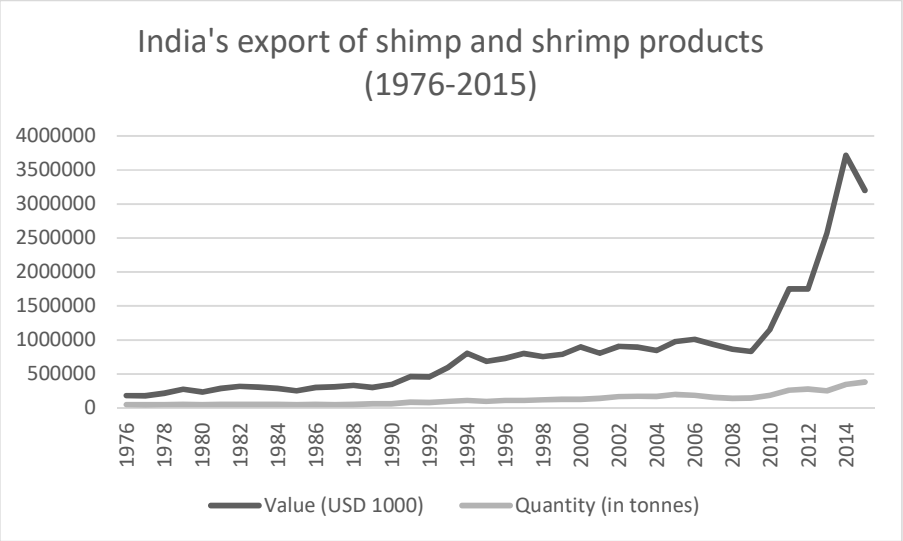


Figure 4.3. *India's export of shrimp and shrimp products between 1976 and 2015*
Source: own elaboration of data from FAO (2017)

The increase may have been caused by several factors and events. In 2009, a FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing has been implemented to minimize illegal catches (FAO, 2014) and more importantly, industrial shrimp farming which products were primarily export-oriented started to be promoted by financial institutions and development organizations as a solution to promote development, decrease poverty, and facilitate economic growth (Rivera-Ferre, 2009). According to FAO (2016), about 31.4% of fish stock was overfished in 2013. Increased scarcity has led to some major changes both in the way of fish production and in its origin. Shrimp aquaculture has been introduced to developing counties and since 1990s aquaculture started to compensate the economic losses caused by the depleted marine stocks (Steffen et al., 2015a), and the share of developing countries in global trade measured by volume has increased from 37% in 1976 to 60% in 2014 (FAO, 2016). While in 1990s only about 13,4% of fish stock was farmed, in 2009 more than 42% has been produced in farms (FAO, 2014)

Although growing seafood production has increased the amount of available food for global population, effects of production methods question if it has brought more benefits than harm. As showed in the following chapter, the increase in shrimp production has left a significant social and environmental consequences.

4.2 Environmental and social costs of shrimp industry

With the increasing produced and traded amounts of shrimp and shrimp products, social and environmental effects started to become more visible. Both methods of shrimp production – wild capture and aquaculture farming – have left not negligible social and environmental consequences for ecosystems and marginalized communities (Sathirathai and Barbier, 2001).

Wild shrimps meant for trading are usually captured by trawlers. By trawling, however, the sea bottoms are being disturbed and consequently also the habitat for marine animals (Simpson and Watling, 2006). The biodiversity suffers also by the trawling itself, together with shrimps, other organisms are being caught. According to Fulanda (2003) shrimp trawling has one of the highest share of by-catch, approximately around 72%. Andrew and Pepperell (1992) state that most of the shrimp by-catch is not being utilized. Shrimp trawlers specialized on crustaceans processing and by-catch is being discarded in sea (Andrew and Pepperell, 1992). Because, the by-catch often contains also endangered species, such as sea-turtles, Kumar and Deepthi (2006) recommend implementing a precautionary principle when allowing shrimp trawling. Discarding of by-catch creates environmental externalities by changing the biodiversity not only of the marine ecosystem, but also for the birds living off the fish catch (Martinet and Blanchard, 2009).

Although shrimp farming or aquaculture does not disturb the bottom sediments, this method can affect ecosystems and human health. The main concern of shrimp aquaculture is destruction of mangroves, a tropic biotope growing only in brackish waters and salt marshes, due to favourable conditions for pond constructions (Páez-Osuna, 2001, Sathirathai and Barbier, 2001). The ponds in developing countries, for instance in Bangladesh or Thailand, have limited waste water treatment facilities and release waste pollutes in water streams. Such release can not only pollute the water streams, but also cause an outbreak of disease, invasion of insects, or affect ecosystems and biodiversity (Islam and Yasmin, 2017). The shrimp farming practices rely heavily on antibiotics, antifungals, and agrochemical substances which also lead to increased levels of antibiotic residues, antibiotic-resistant bacteria, persistent organic pollutants, metals, parasites, and viruses in farmed shrimps. Such practices affect thus humans

indirectly through damaged ecosystems and loss of biodiversity, but also directly when consuming the produced meat (Sapkota et al., 2008).

Shrimp production can, however, have consequences also on various stages of production than during the stage of fishing. The accelerated demand from the international market has increased the pressure on the marine ecosystem resilience (Folke et al., 2004, Woodward et al., 2012), as low levels of biological diversity have made ecosystems vulnerable to disturbances but it has also created other costs that have being shifted within the global society (Kapp, 1953, Martinez-Alier, 2004). Increased availability of the international products caused drops in prices and increased the demand for foreign products. The prices, however, reflect only private costs of businesses. Costs that are shifted to the society, for instance through exploitation, and to the environment – for instance through resource depletion - are majorly excluded (Mishan and Mishan, 1967, Alier and Schlüpmann, 1987). Sathirathai and Barbier (2001) in their study addressed the problem of externalities, calculating that the lost benefits of ecosystem services that mangrove forests bring overweight the revenues from shrimp aquaculture. Such costs-shifting has become recently visible also within the shrimp pre-processing industry (Sathyan et al., 2013, Rekha and Devi, 2016) which has become the central topic of this thesis.

4.3 Shrimp farming in Kerala

Shrimp pre-processing industry in India has been predominantly located on the Kerala coastline in the part between Cochin and Malabar Coast which is often being described as the richest prawn fishing grounds in the world (Ammini et al., 2010). Although some scholars describe shrimp pre-processing industry as a seasonal activity that fades during the monsoon seasons, as we observed some areas stay active even during these months. Our data were collected during a monsoon month, September, in Ambalappuzha, and most of the workers in the industry did not feel a significant difference between the seasons. In 2010, there were about 120 thousand fisherman families located in 222 fishery villages around Cochin and Malabar (Ammini et al., 2010).

Ambalappuzha block is composed of several small fishing villages, which are located about 14 kilometres south from Alappuzha, a town well-known for its backwaters boat cruises (see Figure 4.4. *Location of a village Ambalappuzha in Alappuzha district, Kerala, India*

Source: own elaboration Figure 4.4). We have chosen a coastal area that lies in two panchayat areas: Ambalappuzha North Gram Panchayat and Ambalappuzha South Gram Panchayat. This location has been chosen as a representative place for this study as the pre-

processing industry produces an output planned mainly for exportation purposes and this industry is predominantly located in the southern part of this coast. This location has been chosen by a cooperation with researchers from the Ashoka Trust for Research in Ecology and Environment (ATREE) institute who assisted in contacting fishery offices alongside the coast and provided this research with translators into English.

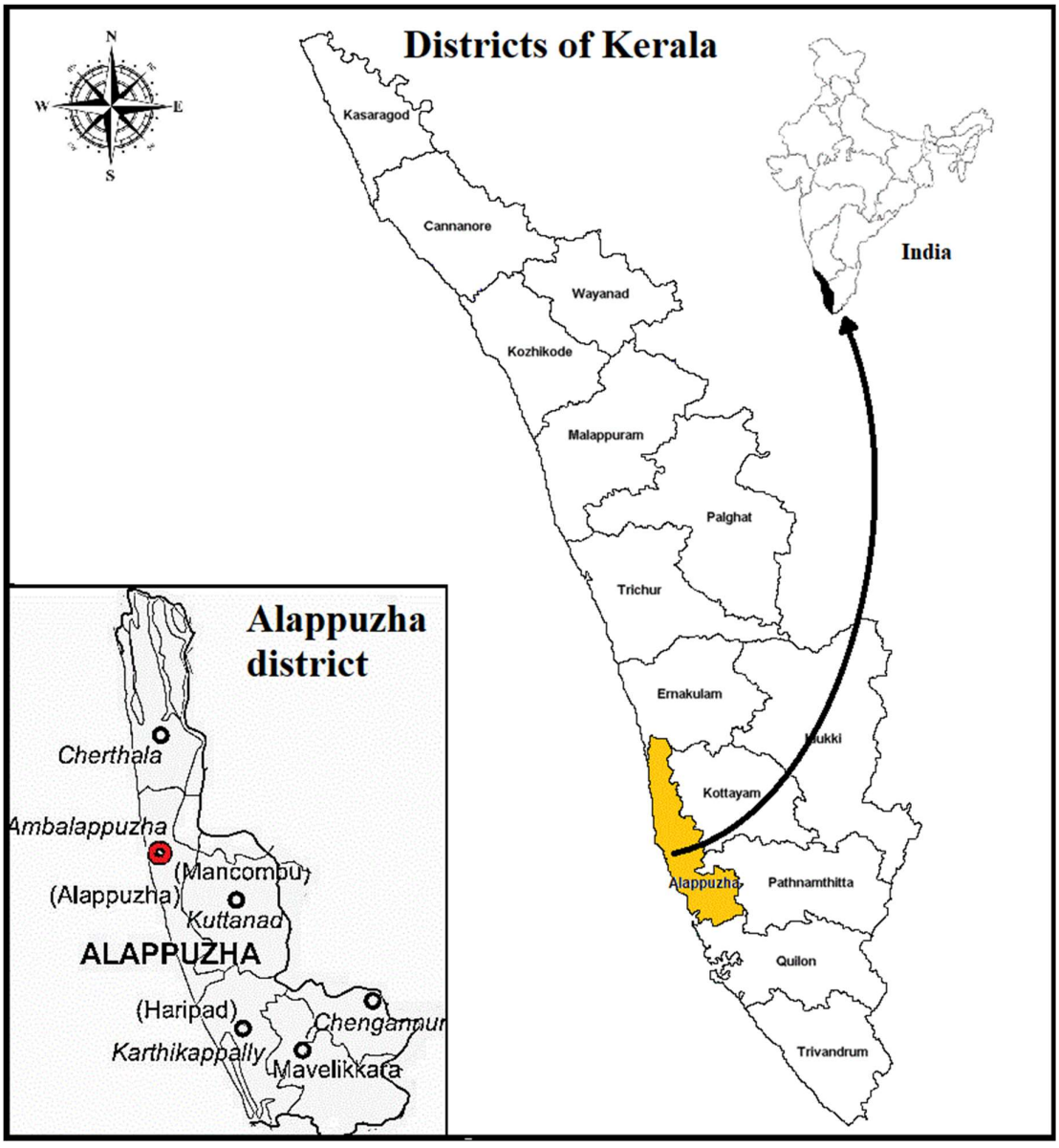


Figure 4.4. *Location of a village Ambalappuzha in Alappuzha district, Kerala, India*
Source: own elaboration of blank maps of India

Kerala has become a dominating partner for shrimp production in the global market, trading about USD 5 billion in 2016 as demonstrated in figure 3. It has, however, not always been the front trader. The seafood export has experienced a rocket-sky growth only during the

last few decades. In fact, before 1952 not a single shrimp has been exported from the state (Larssen, 1966); Sathyan et al. (2013) correlate this trend with the development of the fish processing sector. This sector was heavily intervened in the 1950s and 1960s, when Norway under the patronage of the United Nations participated in a technical assistance programme with an advocacy to develop and encourage the enormous potential Kerala fishery sector was supposed to have. In 1952, India signed an agreement for Indo-Norwegian Project, where modernization and mechanization should have helped Kerala to meet up its production potential (Larssen, 1966). The project started in Quilon and three years later the realizations were expanded along the fertile Cochin coasts. Throughout the project, Norway contributed to the creation of new harbours, mechanization of off-shore fishing, and provision of trawlers to reach the deep-sea catches in the Bay of Bengal, the Arabian Sea and the Indian Ocean. Norway also supported Kerala with a technical and administrative assistance and helped in developing an adequate oceanographic research (Larssen, 1966).

Advocacy for development support may be one reason for this help. Nevertheless, according to Larssen (1966), Norwegian seafood company Frionor hoped to cooperate on exporting and marketing shrimp in the United States. The shrimp industry in Ambalappuzha has been initiated in 1957 with the emergence of the Indo-Norwegian project. According to the information from Fishery Department officer for Ambalappuzha region, there are about 125 pre-processing facilities (or peeling sheds as commonly known) out of which only 10 are officially registered. The coastal Ambalappuzha fisheries village has a total of 1115 houses and 1152 households living in them (KSCADC, 2018). There are, however, no official data available for the number of households on the coast of the North and South Gram Panchayat. While the northern part of Ambalappuzha beach serves us as a reference location, at the southern part most of the households live in a close surrounding of shrimp pre-processing facilities.

Introducing Kerala shrimps to the global market has brought some benefits in terms of higher incomes and increased GDP to the country. In the fiscal year 2001-2002, fish and fishery product export accounted for 20% of the total food export in Kerala state, with a 65-70% contribution from export of frozen shrimps (Henson et al., 2005). However, expanding the market has also brought many changes and difficulties, and shifted costs of production to people and the environment: for instance, the traditional fishing communities are being marginalized (Bindu and Rajasenan, 2011), international pressure for investments in high quality management systems forces the industry to meet new food safety restrictions (Unnevehr, 2000,

Henson et al., 2005), or among others create poor working conditions for those working in the pre-processing sector (Sathyan et al., 2013). In terms of environmental costs, chemical compounds are released to nature and biological cycles in the nature are disturbed (Rekha and Devi, 2016). Within this case study, to scope the size of this issue, we will focus solely the shrimp pre-processing sector.

While the number of exported shrimps and shrimp products has been increasing as illustrated in Figure 4.3, high income countries that imported these products slowly started requiring stricter rules and standards on the conditions where the products were made. In 1997, the EU even banned for several months import of shrimps from India and Bangladesh, because they did not comply with the quality standards (Henson and Jaffee, 2008). While some shrimp processors responded in implementing these requirements, some turned their interest to other countries, mainly to China and other Southeast Asian countries (Henson et al., 2005). Some have, however, diversified their industry and divided processes under different facilities (Henson and Jaffee, 2008). It has been common for Kerala, that cleaning and deshelling (or peeling) of shrimps is separated from other processes. Separating the operations like sorting, cooking, packing, and freezing from the commodity chain production reduces the operating costs of the industry (Henson et al., 2005).

Kerala's shrimp pre-processing sector, both formal and informal, is mainly run by women from the lowest economic strata (Rekha and Devi, 2016, Pushpangadan and Murugan, 2000). Many basic social conditions and human rights are being ignored in facilities that are often referred to as peeling sheds; women work for long hours in unhygienic conditions being exposed to health and safety risks (Rekha & Devi, 2016). Their work demands standing or squatting for more than 10 hours a day in a wet environment with air saturated with chemicals and with no access to rest rooms and toilets (Rekha and Devi, 2016). According to Sathiadhas et al (2003), women labour in the fishery sector is disregarded and their contribution has not been showed enough appreciation in the society (Sathiadhas et al., 2003). Sathiadhas et al. (2003) state that the reason why this situation continues to these days is that these women have not enough access to information about their basic rights and possibilities about credit support, and thus their lack of awareness places them in such situation. In average, a woman working in a peeling sector earns about INR 50-60 (that is about NOK 6-8) a day during a peak season (Sathiadhas, 2003) which is less than half below the poverty line set at 1.90 USD a day by the (World Bank, 2015). Their income depends on the quantity of shrimps they peel. The raw shrimps are either being provided by the agent who run the peeling shed, or women must bring

their own from local fish market. The later demands borrowing about INR 500-2000 in advance before going to the market (Sathiadhas et al., 2003).

So far, scholars dealt with topics of legal rights and social justice (Sathyan et al., 2013, Dhanya, 2013, Panini, 1999), gender relations (Pushpangadan and Murugan, 2000), health issues and occupation risks (Rekha and Devi, 2016), or for instance environmental consequences (Kaladharan et al., 2014, Ammini et al., 2010). No attention has, however, been put on studying the relation between the emerged issues and the environmental and social costs that are not captured by the accounting system and are shifted in the society by encouraging the free trade policy.

This issue pinpoints on the unintended consequences of globalizing markets. Throughout this case study, we examine the social and environmental costs that are not captured by current accounting system that operates only with monetary values based on utilitarian approach, when trading shrimps and shrimp products in the global market.

5 METHODOLOGY

This research is based on a mixed method approach combining both qualitative and quantitative methodological tools. The qualitative research approach covers research parts, such as observation of the landsite and working conditions, semi-structured interviews with different entities: public authorities, local fishermen, and trading agents; and semi-structured group interviews with workers in the shrimp pre-processing facilities. Quantitative research approach covers a collection of primary data using a form of survey among workers in the pre-processing facilities and among local households. All data were collected with an informed consent of the research participants.

5.1 Data sampling

The purpose of the field research in Ambalappuzha village was to collect data on the effects and impacts of the shrimp peeling industry both on the social and environmental area, the magnitude of the problem, and get an overview about actions locals take to protect themselves. To meet these goals, first we conducted several interviews with key stakeholders, that is with a public authority from the Indian Fishery Department Office, two local fishermen, one trading agent; and one semi-structured group interviews with four workers in the shrimp pre-processing facilities. From the collected information, I could make a general overview about the industry in this area, and also using a framework designed by Kapp (1953), separate such costs that appeared to be the most relevant for this industry, that became the air and water pollution, and health and access to clean water and sanitation. Based on this knowledge, we have designed two different surveys, one for the people working in the peeling sheds and one for the nearby households.

From the Fishery Department Office of India, where we surveyed one person with a public authority, we received an allowance to survey workers only from the officially registered peeling sheds and on our first visit out of five during September within a period of two weeks. In total, 50% of these ten official peeling sheds were randomly sampled. As no list of employees was available for this research, we randomly selected 50% of the currently available workers at the peeling sheds. In total, we collected 71 responses.

Given the lack of street names and number of households in Northern and Southern Panchayat, we were walking randomly from one household to another (Wang and Landau, 2001). The Fishery department office in the Southern Gram Panchayat and Pallikavu Bhagavathy Temple in the Northern Gram Panchayat was selected a centre of the researched

area. By spinning a pen, a direction of the walk was chosen, by flipping a coin the side of the road was chosen, and by drawing a random number a house for surveying was selected. The total sample of surveyed households was set on 100 samples in both Northern and Southern parts of the coast approximately representing about 17% of the coastal fishery households in all Ambalappuzha villages.

The survey for people working in the peeling consisted of three main parts. In the first part general socioeconomic information about the worker were collected, including gender, age, marital status, or number of children. The second part of the survey was designed to collect the information on social costs by assessing the quality of working environment. Data on length of the working day were selected, the second-best job opportunity, job opportunities in low season, working injuries, and health issues. The third part of the survey focused on the environmental costs, following the typology of social costs by Kapp's (1953) Social Costs of Private Enterprise as presented in figure 5. We designed the survey only for those categories that were applicable for this study based on the conducted in-depth interviews. Thus, we focused in our study on air pollution by smoke and smell, and by water pollution of inland water sources: groundwater, rivers and streams, and on sea pollution. Other costs were mentioned as unimportant. The survey contained both closed and open questions. Closed question provided the space to compare the responses among each other, such as the perceived intensity of pollution, and open-answer questions gave the opportunity to assess the perceived damage and indirectly assess the environmental costs. In the survey, we collected information for those cases who feel a damage on them or their possessions, what actions do they undertake to avoid these damages.

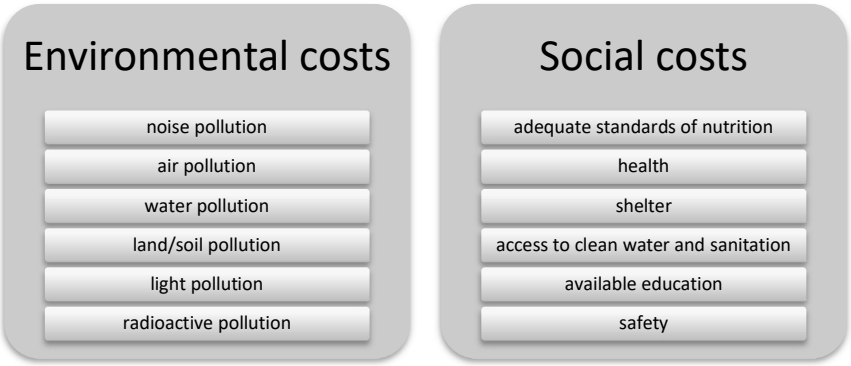


Figure 5.1. *Framework for environmental and social costs*
Source of data: Kapp (1953)

The survey for the households is composed only from two parts. In the first part we collected the general data on number of household members (adults and children), length of

settlement in the village, size of the household, ownership and size of a garden, ownership of vehicles, and type of access to drinking water. In the second part, we collected the data on environmental costs caused to a whole household. We avoided collecting data on social costs from two reasons, first many of the workers live in nearby households and we could have collected the same data twice, and second, social costs may be regarded as individually perceived damages and may be confusing or nearly impossible to sum those costs of all members together.

5.2 Data analysis

There were several stages of the data analysis. Essentially, the first data analysis started when interviewing the people and making small notes meanwhile the whole interview was recorded, except one interview that was not allowed to be recorded, but notes were allowed to be used (Bryman, 2015). The second data analysis started when transcribing the texts, such analysis has several weaknesses as it deals with transcription only of the English translated text, native language of the interviewees were not transcribed and consequently we have not been able to take a record of intonation and word emphasis (Bryman, 2015). In a few cases, we were not able to identify what had been said, not because of the quality of the record, but because more people spoke at once, we have marked these places using the convention of ???. In the third part of the data analysis, to keep the interviewees in anonymity, we erased names and attributed numbers to each sample/interviewee, noting only an occupation of the person (e.g. fishermen, public authority, shrimp peelers). This part of analysis already included application of the coding method, when the most important statements and phrases were highlighted with different colours depending which research question it may help answering. Four different codes were used: socio-demographic characteristics, social costs, environmental costs, and prevention capacities. Using grounded theory, as a basic analytical strategy, a new space was open to think of new theories and with every new finding further literature has been reviewed (Bryman, 2015). After another literature review, following codes were sorted out under socio-demographic characteristics: role of gender, employment opportunities, under the code of social and environmental costs: role of women, access to drinking water and sanitation, excessive working hours, health problems and injuries, water pollution of sea, groundwater pollution, pollution of streams and rivers, water pollution of, air pollution by smell, air pollution by smoke, traffic activity, waste management; and under the code of prevention capacities: vulnerability, family help, low social strata, small helpless actions.

Based on this coding approach, a survey was designed. This survey reflected the findings from the qualitative analysis; such approach helped to sort out the most critical issues and focus on them within the surveys, especially in terms of social and environmental costs of this industry.

Collection of the data via surveys was also followed, by several-stage analysis. First a coding book was prepared, answer for closed questions were ascribed different numbers, answers for open questions were ascribe several categories depending on the content of the answer. Questions that were missing answer were ascribed a number 999. Such data coding was required in order to be able to analyse the data in a software „R“, where the basic descriptive informative data were collected (min, median, mean, max). The software R was further used for a regression analysis based on ordinary least square (OLS) models in order to determine relevant correlation between set variables and how a change in one variable can affect the dependent variables (Field et al., 2012). For this case study we used one linear regression model and two multiple regression models' bases on finding a linear relationship between explanatory variable x and the dependent variable y.

6 RESULTS

6.1 Demographic and socioeconomic profile of cost payers

The data show that women from lower socio-economic strata carry the bulk of socio-environmental costs of the shrimp pre-processing industry at the study area in Ambalappuzha village. This shift in cost holders happened when the products started to be merchandized and sold in the international market. The sample of 71 workers from peeling sheds located in Ambalappuzha village reveal only a female composition between the age of 23-78. When the reason being that these women do not have any other employment opportunities and their husbands are mostly employed already in the industry, mainly as fishermen.

Figure 6.1. *Field research in one of the peeling sheds in Ambalappuzha*
Source: own caption

The average age of women is 45 years old. Most of these women are married (99%) with an average of two children. While some of these women has started to work in the shrimp pre-processing industry recently, there are some women who have worked in the shed up to 40 years. Average time working in the industry, is between 11-15 years with a median 15.2 years. A summary of collected data on the socio-demographic profile of the respondents is presented in Table 6.1.

Table 6.1. *Sociodemographic data of workers in shrimp pre-processing industry in Ambalappuzha village*

Characteristics		Frequency (n = 71)	Percent (%)
Sex	Male	0	0
	Female	71	100
Age group	20-29	7	9.9
	30-39	17	23.9
	40-49	23	32.4
	50 +	24	33.8
Marital status	Married	70	99
	Single	1	1
Number of children	0	2	2.8
	1 - 2	49	69.1
	3 - 4	18	25.3
	5 +	2	2.8
Years of employment	1 - 5	11	15.5
	6 - 10	14	19.7
	11 - 15	24	33.8
	16 - 20	5	7.0
	21 +	17	23.9

Note: NA=Not available data, NA=0
Source: own elaboration of data

The households received a survey, which differed in some parts from the one the workers in the pre-processing industry received. As we surveyed two diverse groups of households in the northern part of the village (further in the text called only Northern households) and in the southern part of the village (further only as Southern households) where majority of the peeling sheds is located. Although both areas belong to the same village, they are being managed by different Panchayats. In comparison to each other, the Northern and Southern households have approximately the same number of members with a median 5 and 4 respectively, and about the same number of children, with a median 2 and 3 respectively. Household members responded they had been living in this Northern and Southern area for 32,6 and 32,2 years respectively in average. While the most common vehicle in the Northern part of the village is a motorcycle, in the households have also a similar access to clean drinking water. In the Northern and Southern households 59.6% and 47% of surveyed members respectively responded they have some sort of water filters installed in the building, mainly mentioning a pipeline operated by the Panchayat, and 40.4% and 53% of surveyed Northern and Southern households stated they use a well.

Table 6.2. *Household characteristics in the Northern and Southern parts of Ambalappuzha village*

Household characteristics	**Northern**	**Southern**
Number of adults	**Frequency (n1=100)**	**Frequency (n2=100)**
1-2	12	22
3-4	32	31
5+	55	47
Number of children		
1-2	53	47
3-4	25	34
5+	10	19
Length of settlement (in years)		
1-10	4	0
11-20	28	18
21-30	16	37
31-40	19	41
41+	32	24
Type of water access		
Installed water filters in building	59	47
Well	40	53

Note: NA = Not available, NA1 =1, NA2 =0
Source: own elaboration of data

The data received from a question on how large household in square meters they manage the members responses differed significantly. The minimum size of a household state was 80 square meters in the Northern part and 200 square meters in the Southern part. The maximum size had been stated as 1200 square meters and 600 square meters in Northern and Southern part respectively. Considering a personal field visit in this area where all houses had approximately the same size, this data will not be considered as measuring in square meters might have been confusing in a country where this measurement is not used.

All houses were surrounded by a piece of land, but only 57% and 48% in the Northern and Southern part respectively use this land for gardening purposes. The household members stated the average size of their garden is 71.74 and 83.96 square meters respectively in the Northern and Southern part. These data, however, might be biased in the same way as the size of the households.

6.2 Socio-environmental costs of the shrimp pre-processing industry

6.2.1 Social costs

Our data reveal long working hours, risk of injuries, and health problems to be important social costs of the shrimp pre-processing industry (see Table 6.3). Collected data indicate that women in this pre-processing industry are exploited as they work in average 56 hours a week during the high season and 37 hours a week during the low season. Although some women denied answering (NA=8), most surveyed workers in the sample (49.3 %) informed us they have been injured at least once at their working place listing mainly broken or injured hands (58%), injured fingered due to lack of protective gloves (19%), and broken legs (13%).

The women also reveal some long-term health issues, mainly bone or structural/postural related problems (67%), skin issues (27%), high or low blood pressure (24%), problems related to the sight (21%), and breathing issues (15%). While some diseases and problems shows to be quite recent, for instance the women suffering by diabetes admitted a length in average of 4.75 years, by psychological issues about 5 years in average, or for instance problems related to blood pressure for 5.8 years. Specific health problems reportedly have accepted the worker for prolonged periods of time, including genitourinary problems (17 years in average), problems related to bones and posture (15.79 years in average), eye problems (13 years in average), neurological problems (12.78 years), gastrointestinal problems (12.25 years), and skin problems (11.6 years). Minimum, maximum, mean and average values of length of health problem are attached in Table 6.3. Regression analysis, which results are attached in appendix 3, revealed correlation between the five most commonly appearing health issues in the shrimp pre-processing industry in Ambalappuzha and three other variables: age, number of children, and years working in the industry. The multiple regression shows that postural and bone diseases and blood pressure diseases have very strong correlation with the working years, eye issues have strong correlation, and skin issues had some certain correlation. The analysis shows that there are other factors affecting these diseases, such as age or number of children that can determine the state, an example is high and low blood pressure. Breathing issues as the only one, does not indicate any correlation towards age, working years, or number of children.

According to the data, 96% of respondents reported there is no security net or contribution for health and care benefits. The women, however, did not complain they would have to take their children to work, as most of them (67%) go to school or are old enough to take care of themselves.

Table 6.3. *Social costs of shrimp pre-processing industry in Ambalappuzha village*

Working hours per week	**High season**	**Low season**	
Min	20	14	
Median	56	35	
Mean	56.34	37.66	
Max	84	84	
Frequency of being injured			
Never	28	39.4 %	
Rarely	29	40.8 %	
Several times	2	2.8 %	
Very often	4	5.6 %	
N/A	8	11.3 %	
Type of injury			
Has fallen down	4	13%	
Broken leg(s)	1	3%	
Broken hand(s)	1	3%	
Concussion	1	3%	
Hand injury	18	58%	
Injured fingers	6	19%	
Health issues	**Frequency**	**Percentage (%)**	**Length of health problems in years (mean)**
Bone issues (n=71)	47	67.14	15.79
Skin issues (n=71)	19	26.76	11.6
Blood pressure (n=71)	17	23.94	5.8
Eye issues (n=71)	15	21.13	13
Breathing issues (n=71)	11	15.49	9.6
Neurological issues (n=71)	9	12.68	12.78
Diabetes (n=71)	8	11.27	4.8
Other (n=71)	7	9.86	-
Gastrointestinal issues (n=71)	4	5.63	17
Arthritis (n=71)	4	5.63	6.5
Psychological issues (n=71)	1	1.41	5
Social security			
No security	67	95.71%	
Partial contribution of the employer	3	4.29%	
Children care			
No children	2	2.86%	
Partner or family care	20	28.57%	
Taking children to work	1	1.43%	
Other (school, adulthood)	47	67.14%	

Note: N=71, NA=Not available, NA=1
Source: own elaboration of data

6.2.2 Environmental costs

Concerning data on environmental problems related to the activity in the peeling sheds, the sampled workers responded that they are mostly concerned about air pollution by smell (100%), ethical issues (58%), sea pollution (55%), pollution of rivers and streams (53%), and traffic around the shed (52%). This study focuses only on air pollution and water pollution costs.

All informants (100%) stated that they or their family or household feel affected by the operation of the peeling sheds in terms of air pollution (either smoke or smell), and about 40% of the respondent showed they feel affected due to polluted water resources (rivers, streams, or sea).

The women were further surveyed how intensively they feel affected by certain types of pollution. On a scale from 1 to 10 where 1 marks no concerns and 10 very intensive pollution concerns, the respondents showed concerns mainly about sea pollution (median 7), by smell (median 7), and some also about pollution of rivers and streams (median 3).

Although many respondents reported to be affected by the air pollution, by smell, only about half of the sampled informants (49%) observe damage on them or their possessions. However, most respondents (64%) reported damages caused by sea pollution.

Table 6.4. *Environmental costs of shrimp pre-processing industry perceived by shrimp pre-processing workers*

Environmental cost	**Subcategory of the cost**	**Perceived effect of the issue on workers' lives**		**Perceived intensity on a scale from 1-10 (mean)**	**Perceived damage of EC by peelers**	
		Frequency	**Percentage (%)**		**Frequency of perceived damage**	**Percentage of those who perceive damage (%)**
Air pollution	By smoke	71	100	6.8	35	49.3
	By smell			1	0	0
Water Pollution	Of rivers and streams	19	40.43	4.1	1	46.2
	Of sea			6.2	42	63.6
	Of groundwater	-	-	2.9	12	25

Note: NA=Not available
Source: own elaboration of data

The damage caused by smell has been manifested specifically by making the area unattractive both for destination visit and business, by odorous clothes, odorous households,

lost business, and a loss of dignity and humiliation. The damage caused by groundwater resources pollution manifested by polluted drinking water. The damage caused by rivers and stream pollution manifested by increase occurrence of mosquitos and insects transmitting diseases, and useless water resources. The damage caused by sea pollution has manifested as lost business and jobs, lost income due to lack of fish resources, lost recreation purposes, and harm to aquatic ecosystem. All this damage is presented in Table 6.5.

Table 6.5. *Specific damages perceived by shrimp pre-processing workers*

EC	Subcategory of the cost	Concerned perception of workers		Specific damage	Frequency	Percentage (%)
		Frequency	Percentage (%)			
Air pollution	By smoke	0	0	N/A	N/A	N/A
	By smell	71	100	Unattractive destination/place	7	21.88
				Odorous clothes	11	34.38
				Odorous household	6	18.75
				Lost business	5	15.62
				Humiliation and lost dignity	3	9.38
Water Pollution	Of rivers and streams	38	53,52	Mosquitos and insect diseases	26	86.67
				Useless water resources	4	13.33
	Of sea	39	54,93	Lost business	10	23.81
				Lost income	18	42.86
				Lost recreation purposes	1	2.38
				Harm to aquatic ecosystem	13	30.95
	Of groundwater	N/A	N/A	Polluted drinking water	12	100

Note: N/A=Not available
Source: own elaboration of data

The households were then surveyed on the same questions as the workers in the pre-processing industry on the effects of the peeling sheds on their homes in terms of environmental damage. The households showed similar concerns, both in the Northern and Southern village on air pollution by smell (both 100%), on pollution of rivers and streams (53% and 47% respectively), on pollution of the sea (49% and 51% respectively), on poor waste management

(57% and 48% respectively), on traffic and activity around the shed (49% and 59%), and on ethical issues (52% and 45%).

All households in both parts of the village feel affected by the air pollution. Despite the predominant location of the peeling sheds in the Southern part, larger portion of households in the Northern part (53.62%) than in the Southern part (40%) stated they feel affected by the water pollution caused by the activities from the peeling shed.

Households were further surveyed how intensively they feel affected by certain types of pollution. On a scale from 1 to 10 where 1 marks no concerns and 10 very intensive pollution concerns, the respondents in both parts showed the most concerns about sea pollution (median 7). The Southern households, however, showed some further concerns also about pollution in the nearby rivers and streams, the median of the intensity is 6 in the South and 3 in the North. Otherwise the parts show similar concern about pollution of groundwaters with a median 4.

There is also a higher portion of respondents in the Southern part of the village who stated that they feel affected by the pollution, both in terms of air pollution by smell and groundwater resources. There is, however, a significant difference between the responses on damage from river and stream pollution. The Southern households feel significantly more damage (73%) than the Northern households (9%). Both areas have the most damage coming from sea pollution with 93% and 92% in the Northern and Southern part respectively.

Table 6.6. *Environmental costs of shrimp pre-processing industry perceived by Northern and Southern households*

Environmental cost	**Subcategory of the cost**	**Perceived effect of EC**				**Perceived intensity on a scale from 1-10 (mean)**		**Perceived damage**			
		Counts		**Percentage**				**Counts of those who perceive damage**		**Percentage of those who perceive damage**	
		North	South	North	South	North	South	North	South	North	South
Air pollution	By smoke	100	100	100	100	1	1	0	0	0	0
	By smell					3.95	6	39	39	43	43
Water Pollution	Of rivers and streams	37	40	53.62	40	3.55	5.61	9	9	73	73
	Of sea					7.27	7.23	93	93	92	92
	Of groundwater	N/A	N/A	N/A	N/A	4.2	3.96	50	50	55	55

Note: N/A=Not available
Source: own elaboration of data

The ones who feel certain damage by smell pollution stated similar reasons as workers in the peeling sheds, mostly complaining about odorous households (10%) in the Northern part and about unattractive place to be visited in the Southern part (12%). A similar percent of household members stated damage in a form of polluted drinking water, around 50-55%. As showed earlier, the Southern region showed they feel significantly more damage by river and stream pollution, they stated it is specifically because of the frequent occurrence of mosquitos and insect in these streams. The households were stating similar specific damages caused by pollution of sea, in form of lost business, lost income, lost recreation purposes, and harm to aquatic ecosystem. All counts and percentages are demonstrated in the following Table 6.7.

Table 6.7. *Specific damages perceived by close households of Northern and Southern part of Ambalappuzha beach*

EC	**Subcategory of the cost**	**Perception of households**				**Specific damage**	**Frequency**		**Percentage (%)**	
		Frequency of concerned households		**Percentage of concerned households (%)**						
		North	South	North	South		North	South	North	South
Air pollution	By smell	100	100	100	100	Unattractive destination/place	8	12	8	12
						Odorous clothes	7	9	7	9
						Odorous household	10	6	10	6
						Lost business	7	9	7	9
						Humiliation and lost dignity	8	7	8	7
Water Pollution	Of rivers and streams	53	47	53	47	Mosquitos and insect diseases	6	55	6	55
						Useless water resources	3	18	3	18
	Of sea	49	51	49	51	Lost business	26	22	26	22
						Lost income	22	22	22	22
						Lost recreation purposes	20	26	20	26
						Harm to aquatic ecosystem	25	22	25	22
	Of groundwater	N/A	N/A	N/A	N/A	Polluted drinking water	50	55	50	50

Note: N/A=Not available
Source: own elaboration of data

6.3 Perceived capacity to prevent or mitigate costs

According to the collected data, respondent seems in most cases powerless to avoid the damages. While 32 women listed they feel a certain damage, only 20 women commit an action to avoid it, for instance purchasing and using perfumes, incense sticks, or even by moving away in a different household. All 12 women who listed they feel affected by polluted groundwater resources showed that they filter water, buy bottled water, or harvest water from rain, in order to avoid the damage. Out of 30, however, only 5 women said they avoid the damage caused by rivers and stream pollution by using a different source of water for irrigation and by using water filters. Out of 42 respondents who feel a damage caused by sea pollution, only 28 undertake an action to avoid it. These 28 respondents listed they must go fishing further from the village or further in the sea, or they voluntarily clean the polluted beaches. The complete statistics are listed in the Table 6.8.

Table 6.8. *Perceived capacity of workers to mitigate or reduce environmental costs*

EC	Subcategory of the cost	Perception of peelers (workers) to have power to avoid damage		Specific actions taken to avoid damage	Frequency	Percentage (%)
		Frequency	Percentage (%)			
Air pollution	By smoke	N/A	N/A	N/A	N/A	N/A
	By smell	20	29.41	Perfumes	9	50
				Incense sticks	6	33.33
				Moved away	3	16.67
Water Pollution	Of rivers and streams	5	7.69	use of other water resources for irrigation	2	66.67
				water filtration	1	33.33
	Of sea	28	42.42	fishing further from the polluted coast	26	92.86
				cleaning the beaches	2	7.14
	Of groundwater	12	25	Water filters	4	33.33
				Bottled water	2	16.67
				Rainwater harvesting	6	50

Note: N/A=Not available
Source: own elaboration of data

Concerning nearby living families, out of the 39 and 43 households that stated they feel a certain damage caused by the air pollution, 30 and 43 households in the Northern and Southern part respectively act to avoid the damage, mostly by using perfumes in the Northern part (12%) and by moving away in the Southern part (20%). In both areas residents try to avoid the damaged caused by polluted groundwater resources by using water filters, 28% and 38% in the

Northern and Southern part respectively. The ones who feel a damage caused by the polluted water streams use filtered water to avoid it and those who feel a damage caused by the polluted sea stated they had to go fishing further away from the village. See the

Table 6.9 where the counts and percentages are demonstrated. The counts do not include those responses that do not feel any damage and thus do not take any actions.

Table 6.9. *Perceived capacity of households to mitigate or reduce environmental costs*

EC	**Subcategory of the cost**	**Perception of peelers (workers) to have power to avoid damage**				**Specific actions taken to avoid damage**	**Frequency**		**Percentage (%)**	
		Frequency		**Percentage (%)**						
		North	**South**	**North**	**South**		**North**	**South**	**North**	**South**
Air pollution	By smoke	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	By smell	30	43	30	43	Perfumes	12	10	12	10
						Incense sticks	10	13	10	13
						Moved away	8	20	8	20
Water Pollution	Of rivers and streams	9	73	9	73	Water filtration	9	73	9	73
	Of sea	89	92	89	92	Fishing further from the polluted coast	89	92	89	92
	Of groundwater	50	55	50	55	Water filters	28	38	28	38
						Bottled water	0	0	0	0
						Rainwater harvesting	22	17	22	17

Note: N/A=Not available
Source: own elaboration of data

7 DISCUSSION

7.1 The need for a unified framework to capture socio-environmental costs

The results and literature review show increasing scholarly concern to capture the hidden socio-environmental costs. On the background of accelerated loss of biodiversity, growing acidification of the oceans, and increasing nutrient pollution by nitrogen and phosphorus (Steffen et al., 2015b), large scale and variety of concepts, frameworks, and methodologies, has arisen over the last hundred years that have aimed to capture the hidden costs negatively affecting the society and its environment and to define the concept of well-being and progress. The large variety of methodological tools increases the difficulty to implement frameworks that would capture them and despite the growing fragility of ecosystems, governmental bodies show continuous reluctance towards the implementation that would support the visibility and accountability of these costs.

The concept for costs that negatively affects the society and the environment differs among the scholars. While some refer to these costs as to externalities (Pigou, 1932, Foster, 1980), other use concepts of external social costs (Coase, 1960) or for instance environmental and social costs (Kapp, 1953). Almost a hundred years of discussion over the concepts gave rise to large spectrum of methodologies. However, despite the methodological opulence, scarce examples of its application can be found. The governmental bodies pervasively remain in the mental matrix that economic growth supports the ecosystem in a long run justifying that increased economic wealth will enhance and support recognition of other than basic human needs, such as by the need for belongingness and protection of one's environment (Grossman and Krueger, 1991). One of the rare examples is Bhutan where in 1972 the king exchanged GDP account for Gross National Happiness Index because of his concerns that the GDP measure cannot take the holistic approach to measure also non-economic activities that contribute to human well-being. Aside of applying the methodology to case studies, no other country has attempted to change the remaining paradigm. There might be several reasons why the implementation of framework has not gained a wider acceptance, I identify three of them: inability to capture the hidden costs; paralysis by choice, and systematic incorporation of market failures.

One of the reasons used for remaining in the GDP paradigm supporting economic growth as one of the main macroeconomic pillar (Mankiw, 2012) is that socio-environmental

costs are not openly visible, but their hidden character creates space both for underestimating and overexaggerating of the severity. The utilitarian character of the current monetary systems makes it more difficult to accept an alternative approach based on unaccountability, comparativeness, and precautionary principles. The lack of market prices for these costs hence made it easy for industries to justify their position for remaining firmly grounded on economic prices. This, however arise a question, if such reasoning does not serve only as a justification of profit-based industries to increase their economic power and influence. The governments are directly dependent on the decisions of industries and voters and that creates a problem of rational choice. Further on, the information overload creates further problems: non-unified concepts, frameworks, and methodologies can paralyze the decision makers from taking any action. To decide would require many resources to distinguish and identify the alternative methods appropriate for a given country and then changing the system that is all dependent on a market economy. This system dependent on trading and exchanging monetary values itself can be suspected the be the source of the rigidity behind economic progress. As the system itself is dependent on increasing economic wealth defined sometimes as progress, the market failures – meaning of externalizing or shifting costs among the entities – can be non-accidental, but intentional fitting to the most powerful stakeholders who speak with the loudest voice.

7.2 Searching for the hidden

The identified socio-environmental costs bring up benefits and difficulties connected to the selected methodological and conceptual framework used for its identification. Kapp's framework provided the research a stable foundation for identifying the major variables, i.e. air and water pollution, health risks and injuries, and access to clean water and sanitation. Both sampling and data collection, however, also reveal several challenges. As mentioned before, during our research, only official pre-processing facilities were visited as allowed by the public fishery authorities. Consequently, this circumstance may have biased the research on peeling sheds as the situation may be very different in the unregistered sheds. However, the results of this research may provide us a conclusion what are the lowest costs appearing in this industry.

The Kapp's framework from 1950s implemented in the study of shrimp pre-processing industry in Ambalappuzha, used to investigate to hidden socio-environmental costs, confirms the difficulty governance face when dealing with changing the economic progress paradigm. Kapp's framework for social and environmental costs with its simplicity and flexibility opens a large space for fitting into different fields and study areas. Although the survey was specifically designed and asked for such costs that are connected to the activity from the shrimp

pre-processing industry, not even the respondents – that is the workers and the close households – may not have been able to distinguish among impacts that come from the industry or have a different source. Qualitative study did not fully uncover all environmental and social costs. When surveying costs in general, other than air pollution and water pollution were recognized: traffic and activity around the industry, ethical issues, and poor waste management. Further, the categories create an issue of costs double accounting because they may overlap each other. The framework has a great ability to capture large variety of social and environmental costs that are not included in the GDP measure. Some of the social costs, however, can become a result of environmental costs. This multiplication affect increases the reluctance of governances to use such framework. Despite its simplicity, the categories may be misleading and create also misunderstanding. Consequently, the interviewed stakeholders who are suspected and inspected for bearing some of these costs, may unintentionally omit defining some of them. Using a regression analysis, the results have uncovered some social costs that have been previously related to the shrimp pre-processing industry (Rekha and Devi, 2016). However, the analysis shows that may of the health issues can be majorly caused by aging, such as blood pressure problems, skin issue and bone issue. The framework has a potential to be implemented as a precautionary indicator, but lacks the stability and uniformity that could make studies investigated under such framework ready for comparison between each other.

7.3 Vulnerable groups bear large shares of hidden trade costs

The findings indicate that with the emerged free trade policy, socio-environmental costs are being shifted profoundly among members in the society. In the studied case of shrimp pre-processing industry in Kerala several characteristics of those who shift and to whom the costs are shifted can be identified. Comparing results of the research with previous knowledge and findings, it is notable that female groups from lower social strata with limited access to information belong to the most vulnerable groups.

According to the mainstream environmental-economic theories – Environmental Kuznets Curve and comparative advantages theory – the entire society should benefit from established trade links and increase one's welfare. The collected data, however, reveal that the reality is more complex. Despite the direct involvement of shrimp pre-processing workers, the narratives of elder fishermen tell a story of a decreasing profit from fishing over the time since fishery products change their distribution channels from domestic to international market. The situation becomes even less black and white with the realization that the workers do not have any other job opportunities where to earn money. The finding of "being trapped" in this life situation is

consistent with previous research in this industry (Rekha and Devi, 2016, Sathiadhas, 2003). This may be one of the most key factor and reason, why the local fisherman families persevere in the inherited industry. These economic strata that deals with pre-processing industry shares some general specifics. In comparison to previous research, some specific characteristics can be tracked. The findings of Sathiadhas et al. (2003), Sathyan et al. (2013) and Rekha and Devi (2016) corresponds with findings of this study, the costs are born mostly by poor middle aged women from families with low social status who have limited access to information or have low education background. Successively, as they are not aware of their basic human rights confirming the research of Dhanya (2013), they are exploited as human resource working for many hours every day (Rekha and Devi, 2016, Panini, 1999). According to the findings, these women are exploited over the period of the entire year which does not match the findings of research of Sathiadhas et al. (2003) and Sathyan et al. (2013) who found that this industry is only seasonal and does not work during the monsoon period. Although the previous research (Sathyan et al., 2013, Sathiadhas, 2003, Dhanya, 2013) found that the women earn less than what the World Bank calls "living under the poverty line" stated as 1.90 USD per day (World Bank, 2015), the finding from this study show that women earn more than that, approximately 6 USD dollar a day (400 INR). Despite working in poor conditions with no access to sanitary facilities and fresh drinking water, based on the results of interviews, women did not complain about their life situation but confirmed what Sathiadhas et al (2003) or Dhanya (2013) research found, that they are satisfied with what they get.

The research support the idea that the direction of the costs can be tracked from the developed towards the developing countries (Copeland and Taylor, 2004, Ang, 2009, Jalil and Feridun, 2011, Nasir and Rehman, 2011, Al-Mulali and Ozturk, 2015) - while most of the costs are held by the poor groups in Kerala, developed parts of the worlds, such as the U.S. and Europe, gain the benefits. However, although the research indicates a correlation between the emergence of free trade and growing abuse of vulnerable women from low social strata, our study has been limited to base the comparison of collected data for the present situation and collected narratives for the situation before the industry changed its focus on the international market. Relying on the narratives would mean ignoring possibility of respondent bias because the interviewed fishermen and workers could not answer honestly manipulating the data results or simply could have not remembered correctly the situation before the industry arrived in that area. Thus, although the local fishermen stated that the current export-oriented industry has reduced their incomes compared to the time before, this study lack a more objectively

comparable baseline when the shrimp industry produced only products for locals or domestic market. Thus, it must be carefully assessed whether the changed situation, and all stated environmental and social costs are a result of the free trade policies, or also other factors. Despite that disadvantage, the research shed new light on unequal distribution of social and environmental costs within the shrimp pre-processing industry.

7.4 The capacity to cope with the costs

Marginalized communities prone to be more vulnerable than communities in urbanized areas. Their separation and more primitive ways of living makes them more vulnerable to external shocks. The findings of our research on limited capacities of small local communities to avoid social and environmental costs, confirm, that the WTO systematically relies on the uneven distribution of powers. The WTO system requires growth and therefore is correctly likened to a bicycle ride (Hoekman, 2011); without growth measured as an increased production of goods and provision of services, the system comes to recession and can lead to economic and financial crisis involving increased unemployment, crash of stock markets, and inflation (Van den Bergh, 2011).

Although there has been already calls among the scientific society to reform the WTO system, no political efforts have been showed (Wilkinson, 2017). The WTO representatives attempt to push the trade liberalization even further. However, as visible from the unsuccess of Doha round negotiation, there is no unified agreement on this topic among WTO members, especially between developed and developing countries (Flentø and Ponte, 2017). Developing countries did not agree on further liberalization of trade as many scientists from these countries report no benefit from it and that such policies serve only as a tool for current growth-based system to get access to cheap resources. As Flentø and Ponte emphasize (2017), in order to take trade liberalization further, developing countries need to be provided the same growth opportunities in terms of hard infrastructure, that means provision of such equipment and building that available the producers not only to export raw unprocessed products, but also to enable them to sell own goods with increased added value. Hoekman (2011) argues that the current WTO system is too medieval and democratic at the same time, through the increased trade openness it allows the biggest industries to impose their power over smaller ones.

The calls for a complete reformation of the trading systems is desirable. However, since the system relies on the opportunities to shift costs that affect both the society and environment and it is a key pillar on which the industry rests, more than a reformation of the very trading system

is necessary. To bring a more social equity between nations, increase environmental justice within and across generation, our ecological footprint should decrease by localizing, minimizing and simplifying our consumption (Jia et al., 2017, Jackson and Senker, 2011). Unless this change in the society happens supported by the governments, reformation of the growth-based WTO will remain a utopian vision.

7.5 Free trade agreements in crisis?

Although free trade remains to be the celebrated way to address large scale of environmental issues (UNCED, 1992, UN, 2002, UN, 2012), recent changes in the political governance of two powerful economic players can imply consequences for the trade organization. As the two important global trade partners - the US and the UK - have recently showed discontentment with free trade policy, their reasoning that free trade is bad for their employment and incomes rather seems to camouflage their real concerns with increasing number of immigrants. This can be substantiated by the fact that despite the American president refuses to sign the new free trade agreement TTIP with Mexico, he remains positive about entering a new free trade zone with the EU. The same behaviour can be observed in case of the UK, despite leaving the EU, the politicians and industries have not showed any concerns about staying in the European Community. The free trade idea has not been exposed to a sufficient degree of critical assessment by representatives of international organization and individual governments. The history shows, however, that the golden age of free trade is over and that the governments select rather an option of regional trade agreements.

8 CONCLUSION

The main findings suggest that there is a negative relation between market openness and a tendency to shift socio-environmental costs. Under the circumstances of missing a unified conceptual framework, the scattered knowledge increases the difficulty to internalize these hidden costs. The historical evolution of free trade policy suggests that more developed countries have been taking advantage on the less developed ones by systematically incorporating these failures in their economies. Although the accelerated production made the failures more visible over the span of last seven decades, free trade policy justifying growth and economic prosperity has been put forth as a solution rather than suspected to be the driving source of the problem.

Trade liberalization keeps being accepted by the international environmental politicians as a future remedy for environmental degradation (UNCED, 1992; UN, 2002; UN, 2012). However, as visible in case of the shrimp industry, deregulation of trade policies has promoted exports and pushed upwards production together with associated social and environmental costs. Following the track of economic prosperity, further destruction of ecosystem and growing social inequalities is expected. Although the topic of shifted socio-environmental costs has been on the research table for more than a hundred of years and scholars suggested different ways how to operationalize these costs, limited number of actions has been taken. Kapp's framework advances socio-environmental costs with wide and open framework, which however lacks crucial tools that would identify all relevant costs within each category and separate their possible multiplication effect.

Despite the weaknesses the selected conceptual framework detected large socio-environmental costs in the pre-processing part of shrimp industry in Kerala, India. Products from this industry are being shipped for large international markets mainly in the United States. Despite shrimp and shrimp products are being sold for high value, actors responsible for environmental damage and social marginalization, do not compensate these socio-environmental costs. We conclude that the current trading system does not avoid these costs accidentally, but the costs are pervasive and key pillar upon which the industry rests. Conditionally, although the shifted costs have been detected decades ago, due to this incorporated "failures" in economic systems, the industry is meant to cause further harm. The historical evidence showed that liberalization of markets produces not only winners, but also losers. Although political representatives of powerful economies, such as of the US and the UK, have undertaken steps backwards from their free trade agreement, such as TRIPS and the EU

respectively, the real intention do not necessarily have to correlate with environmental sustainability, but rather their immigration policy.

Thus, it is not only important to make these costs visible as a precondition to policy action, but also to take a step further and re-establish a new global trading system that would be based on respecting human rights and precautionary principle towards ecological changes. If such change is not implemented, further socio-environmental issues will flow on the surface and bring the society closed to planetary boundaries that represent a real threat to the entire civilization.

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APPENDICES

Appendix 1: Questionnaire for workers in the pre-processing industry

General questions:

1. What is your gender?
   - □ Female
   - □ Male
2. How old are you? Answer: ____ years
3. Are you married?
   - □ Yes
   - □ No
4. How many children do you have? Answer : _____(number)
5. For how long have you been working in a peeling shed? Answer: ____ years
6. How many hours a week do you work in high season?
   Answer: ____ hours
7. How many hours a week do you work in low season?
   Answer: ____ hours

Quality of the working environment

8. Has there been a second job opportunity you would take if you did not work at this peeling shed?
   Name position and type of industry:

9. Where do you work during the low shrimp season?
   Name position and type of industry:

10. Have you ever been injured during your working hours at the peeling shed?
    - □ No, I have never been injured.
    - □ Yes, but it happens rarely.
    - □ Yes, I have been injured several times.
    - □ Yes, I get injured very often.
11. If you answered previous question (n. 10) positively, what sort of injury?
12. Fill in following table by crossing if you ever experienced any of the following health issues and if yes, for how long? If you have suffered by different illnesses than stated in the table, please, fill in the blank cells.

	NO	**YES**	**For how long? (in years)**
Skin problems (dermatitis, allergies, eczemas, …)			
Problems with breathing			
Bone and joint diseases			
Neurological diseases			
Genitourinary problems			
Psychological problems (anxiety, stress, depression, addictions …)			

Diabetes			
Eye problems			
Gastrointestinal problems			
High or low blood pressure			
Arthritis			

13. Does your employer guarantee social and health care benefits?

□ No, my employer does not contribute anything.
□ Yes, my employer covers part of my costs.
□ Yes, my employer covers most of my costs.
□ Yes, my employer covers all my health and social costs.

14. How do you take care of your children when you are working in the peeling shed?
    - □ I do not have any children.
    - □ My partner or family member takes care of them.
    - □ I have hired a nanny to take care of them.
    - □ I take them to work with me.
    - □ Other (name briefly):

Quality of the environment

15. Please look at the following list of environmental issues, and **cross** those issues that **concern** you the most and that are related to activities at the nearby peeling shed:

□ Air pollution by smoke
□ Air pollution by smell
□ Pollution of rivers and streams
□ Pollution of sea
□ Poor waste management
□ Traffic and activity around the shed
□ Ethical issues concerning the shrimp processing
□ Other: (please specify)

Air pollution related to activities at the nearby shrimp peeling shed

16. In your view has air pollution coming from the nearby shrimp peeling shed, for instance smoke or intensive smell, ever affected you, your family or your household?
    - □ Yes (go to question 2)
    - □ No (go to question 8)
    - □ I don't know (go to question 8)

On following scale **mark the intensity** of listed types of **air pollution**: (1 – no pollution, 10 – very intensive pollution)

Smell pollution

17. Intensity of smell:

1	2	3	4	5	6	7	8	9	10

18. Have you experienced any form of damage caused by smell pollution (including your home, garden, or vehicle)?

- □ Yes
- □ No

Specify, if yes:

19. Do you take any actions to avoid the smell?
    - □ Yes
    - □ No

    Specify, if you do:

    Smoke pollution

20. Intensity of smoke:

1	2	3	4	5	6	7	8	9	10

21. Have you experienced any form of harm caused by smoke pollution coming from the peeling shed (including your home, garden, or vehicle)?
    - □ Yes
    - □ No

    Specify, if yes:

22. Do you take any actions to avoid the smoke?
    - □ Yes
    - □ No

    Specify if you do:

Water pollution related to activities from shrimp peeling industry?

23. In your view has water pollution related to activities at the nearby shrimp peeling shed, for instance pollution of the ground waters, rivers and streams and sea pollution, ever affected you, your family or your household?
    - □ Yes (go to question 9)
    - □ No (go to question 18)
    - □ I don't know (go to question 18)

    On following scale **mark the intensity** of listed **water pollution**: (1-no pollution, 10-very intensive pollution)

    Groundwater pollution

24. **Intensity of the groundwater pollution**

1	2	3	4	5	6	7	8	9	10

25. Have you experienced any form of harm caused by pollution of ground waters sources coming from the peeling shed (including you, your household, garden, and vehicles)?
    - □ Yes
    - □ No

    Please specify, if yes:

26. Have you taken any actions to avoid the groundwater pollution?
    - □ Yes
    - □ No

Please specify, if yes:

River and stream pollution

27. Intensity of the pollution:

1	2	3	4	5	6	7	8	9	10

28. Have you experienced any form of harm caused by pollution of water streams and rivers that is related to activities at the nearby peeling shed (including you, your home, garden, or vehicle)?
    - □ Yes
    - □ No

    Please specify, if yes:

29. Have you taken any actions to avoid the stream water pollution?
    - □ Yes
    - □ No

    Please specify, if yes:

Sea water pollution

30. Intensity of the pollution:

1	2	3	4	5	6	7	8	9	10

31. Have you experienced any form of harm caused by sea pollution that is related to activities at the nearby peeling shed (including you, your home, garden, or vehicle)?
    - □ Yes
    - □ No

    Please specify, if yes:

32. Have you taken any actions to avoid the sea water pollution?
    - □ Yes
    - □ No

    Please specify, if yes:

Additional remarks

33. Would you be willing to take part in a brief interview (either in person or over the phone) to discuss these issues further? **As with this questionnaire, interviews will be strictly confidential.**
    - □ **Yes**
    - □ **No**

    If yes, please could you write your full telephone number here: _____

34. Would you like to receive results of the research?

    If yes, please write your email address: _____

Appendix 2: Questionnaire for households

General questions:

1. How many members does your household have?
   - Number of adults: _____
   - Number of children (less than 18 years old): ____
2. For how many years have you been living in this household? Answer:____ years
3. What is the floor size of your dwelling in square meters? Answer: _____ m^2
4. Is there a garden which belongs to your household? YES/NO
5. If there is a garden, how large it is in square meters? Answer: ____m^2
6. Fill in (in numbers) how many vehicles are owned or available for use by members of this household:

   ___ van(s)

   ___ car(s)

   ___ motorcycle(s)

   ___ bicycle(s)

   ___Other (please, specify):

7. How does your household get access to drinking water?
   - □ Drinking non-filtered tapped water
   - □ Buying bottled water
   - □ Using simple water filter
   - □ Using water filter installed in the building
   - □ Other (please specify):

Quality of the environment

Please look at the following list of environmental issues, and **cross** those issues that **concern** you the most and that are related to activities at the nearby peeling shed:

- □ Air pollution by smoke
- □ Air pollution by smell
- □ Pollution of rivers and streams
- □ Pollution of sea
- □ Poor waste management
- □ Traffic and activity around the shed
- □ Ethical issues concerning the shrimp processing
- □ Other: (please specify)

Air pollution related to activities at the nearby shrimp peeling shed

8. In your view has air pollution coming from the nearby shrimp peeling shed, for instance smoke or intensive smell, ever affected you, your family or your household?
   - □ Yes (go to question 2)

□ No (go to question 8)
□ I don't know (go to question 8)

On following scale **mark the intensity** of listed types of **air pollution**: (1 – no pollution, 10 – very intensive pollution)

Smell pollution

9. Intensity of smell:

1	2	3	4	5	6	7	8	9	10

10. Have you experienced any form of damage caused by smell pollution (including your home, garden, or vehicle)?
    □ Yes
    □ No

    Specify, if yes:

11. Do you take any actions to avoid the smoke?
    □ Yes
    □ No

    Specify, if you do:

Smoke pollution

12. Intensity of smoke:

1	2	3	4	5	6	7	8	9	10

13. Have you experienced any form of harm caused by smoke pollution coming from the peeling shed (including your home, garden, or vehicle)?
    □ Yes
    □ No

    Specify, if yes:

14. Do you take any actions to avoid the smoke?
    □ Yes
    □ No

    Specify if you do:

Water pollution related to activities from shrimp peeling industry?

15. In your view has water pollution related to activities at the nearby shrimp peeling shed, for instance pollution of the ground waters, rivers and streams and sea pollution, ever affected you, your family or your household?
    □ Yes (go to question 9)

□ No (go to question 18)
□ I don't know (go to question 18)

On following scale **mark the intensity** of listed **water pollution**: (1-no pollution, 10-very intensive pollution)

Groundwater pollution

16. Intensity of the groundwater pollution

1	2	3	4	5	6	7	8	9	10

17. Have you experienced any form of harm caused by pollution of ground waters sources coming from the peeling shed (including you, your household, garden, and vehicles)?
□ Yes
□ No

Please specify, if yes:

18. Have you taken any actions to avoid the groundwater pollution?
□ Yes
□ No

Please specify, if yes:

River and stream pollution

19. Intensity of the pollution:

1	2	3	4	5	6	7	8	9	10

20. Have you experienced any form of harm caused by pollution of water streams and rivers that is related to activities at the nearby peeling shed (including you, your home, garden, or vehicle)?
□ Yes
□ No

Please specify, if yes:

21. Have you taken any actions to avoid the stream water pollution?
□ Yes
□ No

Please specify, if yes:

Sea water pollution

22. Intensity of the pollution:

1	2	3	4	5	6	7	8	9	10

23. Have you experienced any form of harm caused by sea pollution that is related to activities at the nearby peeling shed (including you, your home, garden, or vehicle)?
    - □ Yes
    - □ No

    Please specify, if yes:

24. Have you taken any actions to avoid the sea water pollution?
    - □ Yes
    - □ No

    Please specify, if yes:

Additional remarks

25. Would you be willing to take part in a brief interview (either in person or over the phone) to discuss these issues further? **As with this questionnaire, interviews will be strictly confidential.**
    - □ **Yes**
    - □ **No**

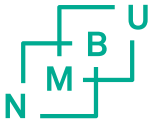
    If yes, please could you write your full telephone number here: _____

26. If you want to research results of the research, please, fill in your email address: _____

Appendix 3: Multiple regression analysis

Dependent variable: Health issue:	**Blood pressure**		**Eye issues**		**Bone issues**		**Breathing problems**		**Skin issues**	
	Coef (Std. Error)	**Coef (Std. Error)**	**Coef (Std. Error)**	**Coef (Std. Error)**	**Coef (Std. Error)**	**Coef (Std. Error)**	**Coef (Std. Error)**	**Coef (Std. Error)**	**Coef (Std. Error)**	**Coef (Std. Error)**
Independent variables:	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Age	0.138*** (0.029)	0.156*** (0.037)	0.232*** (0.065)	0.146. (0.078)	0.380*** (0.099)	0.212* (0.956)	0.044 (0.039)	-0.576 (1.847)	-0.111 (0.068)	-0.245** (0.082)
Children		0.003 (0.377)		-0.022 (0.798)		-2.200* (0.974)		-0.075 (0.049)		1.378 (0.834)
Working years		-0.047 (0.040)		0.225** (0.085)		0.662*** (0.103)		-0.048 (0.053)		0.202* (0.088)
Intercept	-4.826*** (1.370)	-4.929 (1.390)	-7.654* (3.021)	-7.152* (2.946)	-6.396 (4.581)	-3.894 (3.594)	-0.619 (1.817)	-0.565 (1.847)	8.271* (3.171)	8.052* (3.079)
Number of observations (n)	71	71	71	71	71	71	71	71	71	71
R-squared - multiple	0.241	0.256	0.155	0.235	0.176	0.518	0.0179	0.034	0.037	0.136
R-squared - adjusted	0.23	0.222	0.142	0.201	0.165	0.496	0.004	-0.009	0.023	0.097
P-value	0.000014	2.00E-04	0.0007	4.00E-04	0.0002	1.19E-10	0.267	0.501	0.108	0.019
Residual standard error	2.836	2.849	6.255	6.037	9.485	7.366	3.762	3.785	6.565	6.310

Note: Significance level coding: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1



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