Palacký University Olomouc

University of Clermont Auvergne

University of Pavia

MASTER THESIS

Luisa Schillinger

Supervisor: Zdeněk Opršal

Department of Development & Environmental Studies

Erasmus Mundus Master
in Global Development Policy
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Palacký University Olomouc

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The Transition of Costa Rica to a Blue Economy: Linkages between Natural Resource Management & Eco-Innovation

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Declaration

I hereby declare that this thesis entitled "The Transition of Costa Rica to a Blue Economy: Linkages between Natural Resource Management and Eco-Innovation", is my own original work except where citations indicate otherwise. This thesis was written by my own effort for the Erasmus Mundus Joint Master Degree in Global Development Policy - GLODEP. The sources of information used are adequately acknowledged and referenced.

Luisa Schillinger

Luisa Schillinger

21st of May 2023

Thesis assignment

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Zásady pro vypracování

My thesis will explore how Gunter Pauli's concept of a Blue Economy could be beneficial for a country such as Costa Rica, explaining also the background of Costa Rica as a pioneer regarding natural resource management and innovation. For this purpose, I will conduct around 20-30 semi-structured qualitative interviews with environmental NGOs, innovation centers, policy-makers, donor institutions as well as actors from the private sector to better understand: 1) how well the Blue Economy concept is known in Costa Rica, 2) if the approach is desirable, 3) relevant and 4) feasible in its national context and also globally, and finally ask 5) what steps would have to be taken to undergo a transition towards a Blue Economy in Costa Rica.

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With handing in this master thesis, an important chapter of my life closes and I am more than proud to begin a new one as a full-time employee of Ovation.

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Abstract

In past decades, Costa Rica achieved impressive developments in terms of conserving its environment and integrating into global markets, which both spurred economic growth. However, in view of stagnating poverty and increasing inequality, the country's current sustainability strategy seriously neglects the social dimension. This prosperity paradox could be solved through embracing the Blue Economy concept that provides a new business model which incorporates all three dimensions of sustainability. The research explores the potential of this approach in the context of Costa Rica through reflecting the opinions of key experts on its relevance and feasibility. Implementing the Blue Economy as a piece of the national sustainability puzzle, by complementing movements in place, is the main recommendation drawn from the research. In this sense, the concept serves as a paradigm shift. Instead of contradicting socio-economic development with conservation efforts, it rather counts on the symbiosis of humans with nature through innovation. The work thus provides clues on how to seize "blue innovation" in Costa Rica and further gives specific recommendations for the environmental NGO *Fundecor*. Based on its previous endeavors, *Fundecor* represents an important changemaker that could continue its creative path through harnessing the blue essence as facilitator, catalyst, agenda-setter and synthesizer.

Keywords: Blue Economy, innovation, sustainability, entrepreneurship, natural resource management, poverty reduction

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List of Abbreviations & Acronyms

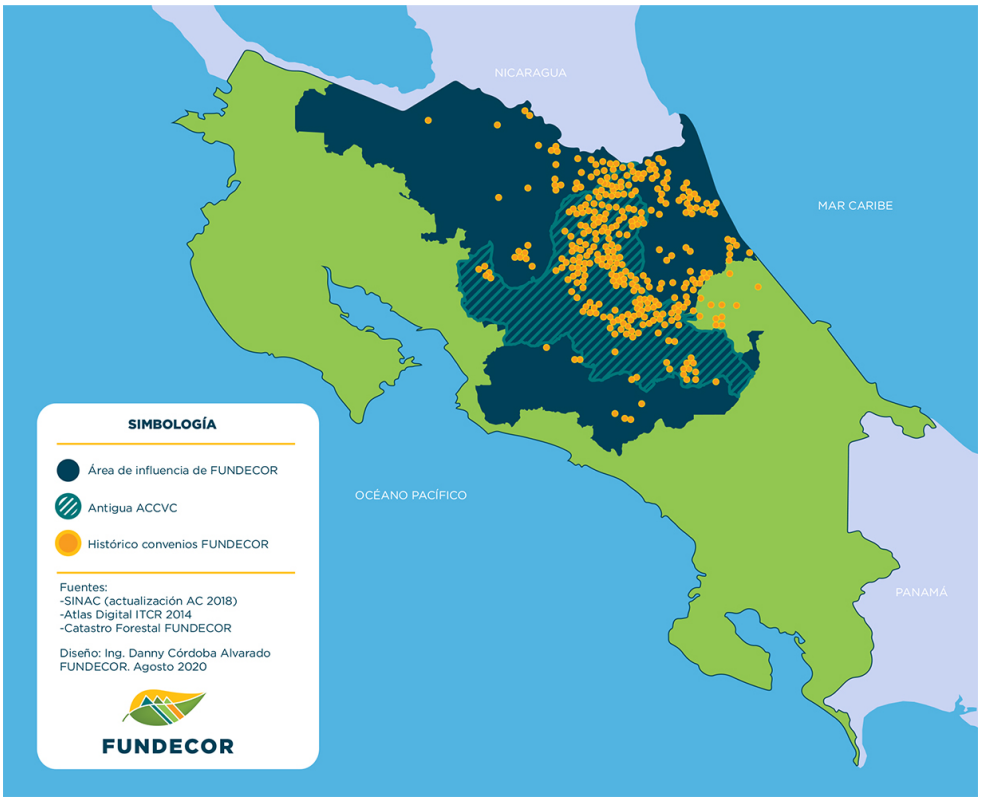
ACICAFOC	Indigenous and Peasant Coordinating Association of Community Agroforestry of Central America - *Asociación Coordinadora Indígena y Campesina de Agroforestería Comunitaria de Centroamérica*
CATIE	Tropical Agricultural Research and Higher Education Center - *Centro Agronómico Tropical de Investigación y Enseñanza*
CCT	Tropical Science Center - *Centro Científico Tropical*
CEDARENA	Center for Environmental Law and Natural Resources - *Centro de Derecho Ambiental y de los Recursos Naturales*
COOPEPIÑA	Trade and Multiple Services Cooperative of Small Pineapple Producers - *Cooperativa de Comercio y Servicios Múltiples de Pequeños Productores de Piña*
CORFOGA	Livestock Development Corporation - *Corporación de Fomento Ganadero*
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
FONAFIFO	National Forestry Fund - *Fondo Nacional de Financiamiento Forestal*
FSC	Forest Stewardship Council
Fundecor	Foundation for the Development of the Central Volcanic Mountain Range - *Fundación para el Desarrollo de la Cordillera Volcánica Central*
GDP	Gross Domestic Product
GIZ	German Agency for International Cooperation - *Deutsche Gesellschaft für Internationale Zusammenarbeit*
ICT	Costa Rican Tourism Institute - *Instituto Costarricense de Turismo*
IDB	Inter-American Development Bank
ISI	Import Substitution Industrialization
MAG	Ministry of Agriculture and Livestock - *Ministerio de Agricultura y Ganadería*
NGO	Non-Governmental Organization
OECD	Organization for Economic Cooperation and Development
OET	Organization for Tropical Studies - *Organización para Estudios Tropicales*
PES	Payment for Ecosystem Services

SINAC	National System of Conservation Areas - *Sistema Nacional de Áreas de Conservación*
SWOT	Strengths, Weaknesses, Opportunities, Threats
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme

1. The work of *Fundecor* & my contribution: finding creative ways to reconcile forest conservation with inclusive socio-economic development

La *Fundación para el Desarrollo de la Cordillera volcánica central*, or in short *Fundecor* (expert interview, March 16, 2023) designs innovative financial mechanisms that allow private forest landowners to diversify their income sources. The non-profit non-governmental organization (NGO) operates in the rural north-eastern zone of Costa Rica and has a local office in Puerto Viejo de Sarapiquí, where I was based. The zone has mainly two characteristics: a considerable amount of forest covering vast territories and a more vulnerable population compared to other regions. Since its creation in 1991, *Fundecor*'s main objective is the promotion of sustainable natural resource management that enables people to coexist and benefit from their natural environment. As a matter of fact, the development of Payment for Ecosystem Services (PES) originates from an idea of *Fundecor*. The well-known institution follows an integral approach with a variety of ongoing programs, including the establishment of PES contracts and monitoring of the contracted area, the support of landowners in the process of *Forest Stewardship Council (FSC)* certification, the provision of technical assistance to reforest or identify the tree species that can be cut in the given perimeter, the creation and management of the first public-private and civil society water fund in Costa Rica *Agua Tica*, as well as the strengthening of local entrepreneurship through individual advice and access to seed funding. Furthermore, the environmental organization owns two companies that bring more efficiency, transparency and fairness into local wood value chains. The map below shows that *Fundecor*'s area of activity covers around 40% of Costa Rica's territory (see Fig. 1), which gives the institution a major role for forest conservation.

Fig. 1: Fundecor's zone of influence (dark blue area) and agreements (orange dots)



Source: Fundecor (2020)

During my three month internship, I was mainly involved in *Fundecor*'s entrepreneurship project called *Sinergia*. The project's mission is to strengthen the entrepreneurial ecosystem of the region through individual support, technical assistance and allocation of non-reimbursable funds from the *Development Banking System*. My main responsibility was the organization and preparation of the *Sinergia Business Forum 2023,* for which I provided assistance to entrepreneurs by preparing them to pitch in front of an audience of potential investors, partners, customers and the press. Furthermore, I conducted research on topics such as the interest of European markets for certified tropical wood and the potential of digital *Non-Fungible Tokens* for conservation funding. In addition, I had the chance to develop and run an orientational strategy workshop for the *Biological Corridor San Juan La Selva*, for which I mainly used the Objectives and Key Results framework. Throughout the internship, I was given the possibility several times to join the team in order to see their work in the field, which also allowed me to meet local entrepreneurs who already implement Blue Economy initiatives.

2. Introduction: Behind the curtains of a praised green nation

"There is no conservation if there is hunger" - Cristian Zúñiga Chaves, Fundecor
(personal communication, March 2023)

In 2019, the *United Nations Environment Programme* (UNEP, 2019) honored Costa Rica with the title Champion of the Earth, an award given for transformative positive impacts on the environment. The award specifically honors the country's national decarbonization plan with an ambitious aim of accomplishing net zero emissions by mid-century. The small Central American nation's growing recognition as world leader in sustainability began in the 1990s when Costa Rica decided to implement a sequence of innovative environmental policies that helped reverse deforestation and give financial incentives for conservation. Moreover, the *World Bank* (2023) praises the nation as a development success story for its stable economic growth over past decades, that was only interrupted for the shock caused by the covid pandemic.

Even though the country succeeded in putting environmental concerns at the heart of politics, it is important to keep in mind that there are three dimensions of sustainability: the environment, the economy and the society. Whilst Costa Rica focused on protecting nature and boosting its economy through ecotourism and export of products, more vulnerable groups of its society have been largely left out. Over one million Costa Ricans are below the national poverty line, that is one out of five of the population, according to the *World Bank* (2019). Stagnating poverty and rising inequality indicate the existence of societal challenges that need to be addressed. Especially because underlying factors reinforce severe conditions that keep certain parts of the population trapped in poverty. The *Ministry of Health* (2022, 29 ff.) published a report stating that more than 16% of households struggle with moderate to severe food insecurity. At the same time, roughly a third of the population suffers from obesity with a rising tendency for more people to be overweight, women being particularly affected. This issue is even more disconcerting looking at the high prevalence of over 30% for Costa Rica's youth. The data on current nutritional

deficiencies reflects the socio-economic effect of a lower income for households, which limits their access to better quality food as stated by the Ministry (2022, 44). Furthermore, the youth faces a lack of opportunities which paves the way for them to engage in criminal activities. A recent article (Murillo, 2023) exposed the uncomfortable reality of a surge in violence spurred by the lack of education, partly induced by the covid pandemic, and combined with a very high youth unemployment rate. The exclusion from the official labor market opens the door for poor young adults to take part in Costa Rica's increasing drug trafficking business (Sheridan, 2023). The country's successful environmental friendly development is therefore built on shaky ground.

It is key to consider the needs of local communities, especially of those living in more vulnerable areas, as a major concern of a new economic model to incorporate the social dimension into Costa Rica's current sustainability strategy. To achieve this transition, a new approach is needed. This research explores the potential of the Blue Economy concept in the Costa Rican context. The qualitative research design draws on a desk review of the socio-economic conditions, the conduct of key expert interviews as well as the observation of existing initiatives to provide insights for the potential of transition. According to Gunter Pauli (2017, 84), author of the Blue Economy books, it is particularly important to empower the youth, even more so if they face unemployment and poverty, as their involvement can bring great economic impact. Costa Rica was chosen as a case study for its capacity to continuously experiment and innovate in order to foster new strategies for sustainable development. This research aims to put Pauli's disruptive sustainability approach into perspective, especially in terms of desirability and practicability. Therefore, a set of research questions was included that grasp various thoughts: What do different institutions think about the Blue Economy concept? Is it relevant in the context of Costa Rica? Is it feasible? What is recommended to achieve the economic model laid out by Pauli? What could stand in its way? And finally, is there potential for Costa Rica to transition to a Blue Economy? This research also aims to take a closer look on what role *Fundecor* could play for this transition, as the institution continues to imagine holistic strategies to reconcile forest conservation with socio-economic development.

To respond to the research questions, the author will first of all assess Costa Rica's current approach to sustainable development, exposing major gaps for the social dimension. A short historical background describes how the structural dualism of today emerged, to then examine the reasons for which innovation is needed to meet societal challenges. Notwithstanding, the author displays that the country lags behind in its support for innovation. The conceptual framework therefore explores the key concept of the Blue Economy and its principles for imagining more sustainable business models which put innovative ideas and the needs of local communities at their core. Then, a chapter on methods and data gives insights into the collected qualitative material which was gathered through key expert interviews that were conducted with a variety of different institutions. These insights are analyzed and discussed, bringing answers to the research questions above, with the main suggestion to introduce the Blue Economy concept as a piece of Costa Rica's sustainability puzzle. Finally, the conclusions drawn from the research stress that it is not so much the particular concept, but rather its essence - the constituting ideas that should be part of local sustainability strategies.

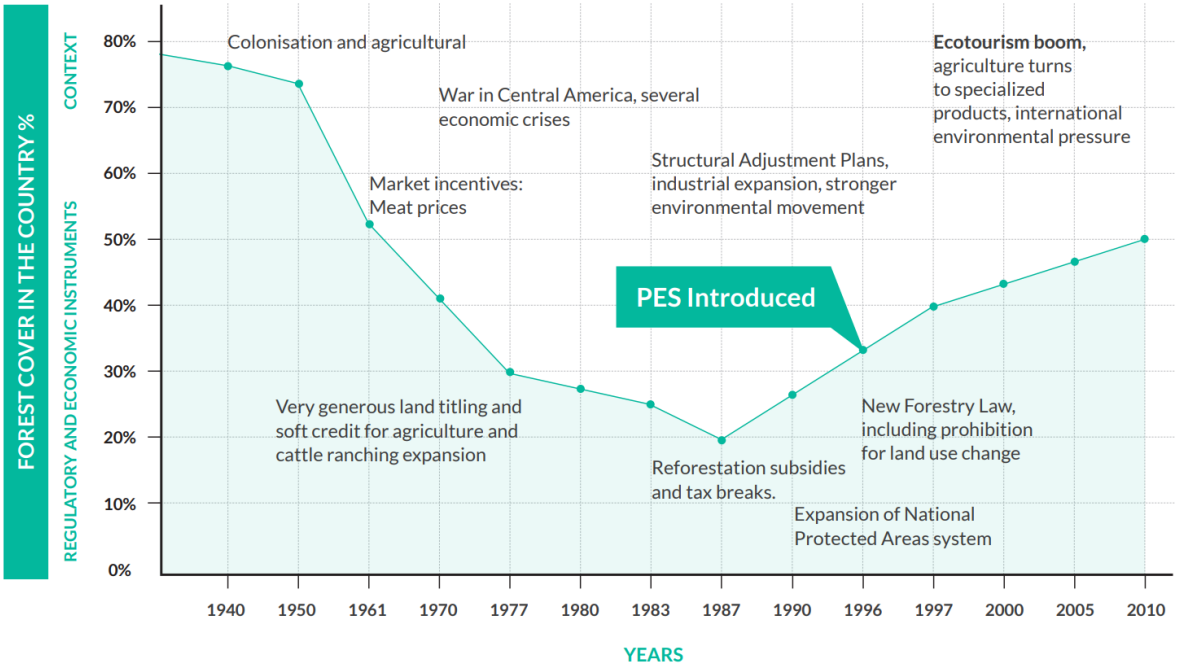
3. Conceptual framework: Costa Rica's sustainability strategy neglects the social dimension for which reason a new holistic approach is needed

3.1 Becoming a pioneer in sustainable natural resource management

Costa Rica is famous today for its internationally recognized conservation efforts, accompanied by the development of ecotourism practices. The country's national parks cover approximately 5% of the world's biodiversity according to the *National System of Conservation Areas* (SINAC, 2014, 10) that is embedded in the *Ministry of Environment and Energy*. The interest in observing this diversity of wildlife brought over 3.3 million international tourists in 2019, before the covid pandemic largely impeded cross-border movement, as reflected in the data of the *Costa Rican Tourism Institute* (ICT, 2022). Growing tourist crowds are thus attracted by the promise of experiencing a vacation in harmony with nature.

A publication of the *International Institute for Environment and Development* shows however that the situation used to be very different a few decades ago, when forest cover declined immensely from 70% in 1950 to only 20% in 1987 (Porras et al., 2013, 8 ff.). This deforestation rate was one of the most rapid witnessed in Latin America. Drastic landscape changes were primarily caused by the conversion of forest into agricultural and cattle ranching areas. This was promoted by the government's underlying strategy of populating new land through the provision of land titling and affordable bank loans. The following timeline illustrates how forest cover and the policy framework evolved over time (see Fig. 2).

Fig. 2: Evolution of forest cover and policy milestones



Source: Global Green Growth Institute (2016, 34)

The trend reversed in the 1980s due to rising regional political and economic instability as well as collapsing global commodity markets, which both caused the abandonment of agricultural land. In addition to these severe events that greatly affected Costa Rica's economy, there was an increasing environmental consciousness which steered the national political course in a different

direction: protecting nature to attract tourists from abroad. The government's first step was the establishment of national parks, forest reserves and wildlife refuges. According to the *International Union for Conservation of Nature* (n.d.), the 165 established protected areas represent today around 28% of the total landmass. Moreover, Costa Rica created complementary policies which target private forest ownership. The Forestry Law of 1996 introduced two instruments: 1) a conversion ban on established forests and 2) PES schemes which emerged as a powerful tool to boost reforestation, forest protection and management. PES, as described by policy analyst Hinojosa (n.d.), financially rewards conservation efforts of private landowners through a public fund which is also supplemented by private and international public donors. The monetary incentive functions through taxing the polluting agents to then channel the collected money as a payment to agents who safeguard the environment. Since its implementation, there are around one million hectares of privately owned forests conserved through the protection, reforestation, sustainable management and regeneration incentives of PES schemes (Porras et al., 2013, 62). Besides, Costa Rica's energy supply derives to almost 100% from renewable energy sources as shown in the energy matrix publication of the national *Institute of Electricity* (Durán et al., 2020, 11).

A shift in political priorities therefore led to a creative adaptation of the legal framework. This transformation not only derived from the threat of destroying the nation's most valuable natural resources (the biodiversity concentrated in its tropical forests), but also the perception of new opportunities (tourism-oriented growth). It is precisely this innovative thinking and challenging of the status quo that made Costa Rica a pioneer for sustainable natural resource management.

3.2 Stuck in a prosperity paradox

Despite Costa Rica's efforts to boost economic development through a relatively new niche, the one of ecotourism, some challenges persist and even intensified over time.

Firstly, steady economic growth is not to the benefit of all. Tourism is one of the main pillars of the national economy (ICT, n.d.). It directly and indirectly accounts for 8.2% of its Gross Domestic Product (GDP). Past President Alvarado (2018-22) himself stressed the fact that for thousands of families, tourism activities represent the main source of income. One needs to look nonetheless at the other side of the coin. The *Organization for Economic Cooperation and Development*'s (OECD, 2023) Economic Survey of Costa Rica shows that the purchasing power of the growing number of international tourists fuels local prices, which further causes high inflation. Hidalgo (2014), a Costa Rican policy analyst, illustrates the consequences of inflation for the poor in his article on "*Growth without Poverty Reduction: The Case of Costa Rica*":

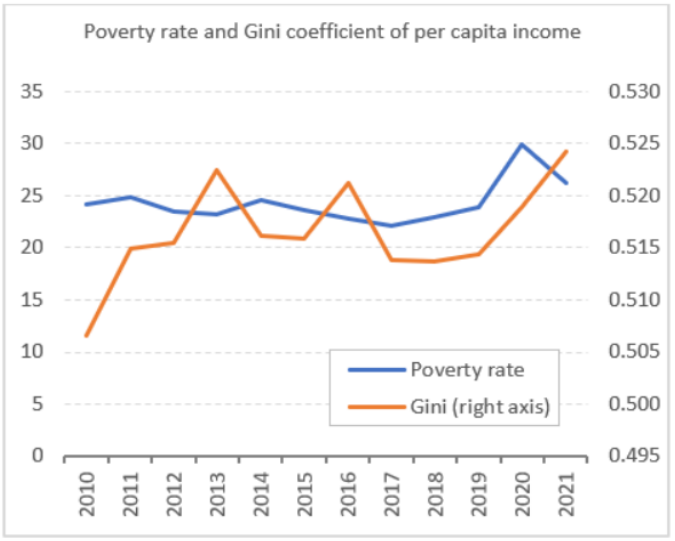
> "Inflation is the most regressive tax since it punishes the poor the most. Unlike the upper and middle classes who can protect themselves more effectively from inflation by owning assets or switching their savings to foreign currencies, the poor tend not to own assets or have significant savings. Thus, they cannot shield their colón-dominated incomes (salaries, pensions, or other) from inflation. Costa Rica's monetary policy in the last 30 years has subsidized the well-off sectors of the economy at the cost of higher inflation."

In addition, soaring tariff costs are imposed on basic food items such as chicken, milk, potatoes, rice, pork, beans, and onions. Agricultural protectionism, that is mainly to the advantage of large

producers, thus significantly impacts the livelihood of poor households as food expenditures take up a large share of their income (ibid.).

Secondly, an unfavorable business environment hinders local entrepreneurship and hence, the creation of new jobs. Although Costa Rica's government attracts multinational firms with tax and regulatory incentives, its treatment of domestic businesses is rather severe. Local entrepreneurs struggle with inefficient bureaucracy, difficult access to finance, heavy tax and labor regulations. Hidalgo (2014) states for example that the government's large fiscal deficits caused a crowding out effect on the private sector regarding access to credit, since the increasing public sector's debt raised interest rates. All these factors push many Costa Ricans into pursuing informal activities. The *OECD* (2023) estimates that informality and unemployment affect almost half of the national labor force with high rates of respectively 45% and 12%.

Fig. 3: Costa Rica's poverty rate (based on national definition) and Gini coefficient of per capita income



Source: De Hoop & Arakaki (2022)

Thirdly, poverty has stagnated for years at a rate of around 23% based on Costa Rica's national poverty definition (see Fig. 3). Nicaraguan migrants, Afro-descendants, indigenous people and single mothers are particularly exposed to structural poverty. De Hoop and Arakaki (2022), two economists in the *World Bank's Global Poverty and Equity Practice*, examine the reasons why poverty and inequality are not declining in Costa Rica. The authors point out three main factors:

- People with lower educational levels face a lack of job opportunities.
- The increasingly older population, who is leaving the workforce, causes a demographic shift which affects households' dependency ratio.
- Female labor force participation remains continuously low compared to other countries of the region - mostly due to family care responsibilities (OECD, 2023).

For poor households, these circumstances induced a decline in the contribution of labor to household income whereas workers with a higher level of education experienced improvement in the same time period. Based on Hidalgo (2014), one explanation could be the relative increase in demand for skilled labor compared to the one of less skilled workers, which is particularly true for the economy's most dynamic parts. With the majority of new jobs being created in sectors

that need skilled workers, the existing income gap will continue to widen. As a matter of fact, only half of Costa Rica's citizens aged 25-34 completed upper secondary education, based on the *OECD*'s Economic Survey (2023). A condition exacerbated by lengthy school closures during the peak of the covid pandemic. The above mentioned constraints for entrepreneurship further inhibit the country's prospects for poverty reduction. Inequality is consequently on the rise as demonstrated by the country's Gini coefficient (see Fig. 3).

Lastly, the improvement of livelihoods through conservation policies is limited (Arriagada et al., 2015, 11 ff.; Porras et al., 2013, 38 ff.; Robalino et al. 2014, 9 ff.). In their essence, ecosystem services represent the benefits that society can receive from nature. This is especially true for poorer people who are dependent on natural resources with few other options on the table. Cash transfers from PES schemes are embraced as valuable compensation. Having said that, there is no specific targeting for poorer communities in place. On the contrary, the requirements for participation are quite strict: an absence of a legal property title, missing tax and social contributions or a mortgage on the property inhibit access to any payment. It is thus no surprise that landowners with better education, relatively more land and income receive disproportionally more money. But compared to poor households, their income often comes from various sources, which makes them independent from farming activities. As a reaction to these distributional asymmetries, the *National Forestry Fund* (*FONAFIFO*) introduced agroforestry contracts, together with soft loans and technical assistance, as a means to increase the participation of small-scale landowners (Porras et al., 2013, 49). Forest economist Navarro (2014, 23 ff.) argues nonetheless that sustainable forest management cannot be solely financed by PES schemes. The latter need to be embedded in broader business models which include other income generating activities as well. The environmental service providers could thus use payments as a sort of bridge financing for these new activities.

3.3 Exclusive economic growth is rooted in Costa Rica's history

It is important to understand the economic history of Costa Rica, based here on a publication of the German *Friedrich-Ebert-Stiftung* (2019), in order to see where new opportunities can be found. The country's remarkable development started with the growing coffee production in the 1840s which fostered first links with the global economy. However, it also led to the monopolization of political power through the few privileged coffee producers that followed the interest of multinational capital. This caused rising social discontent, which questioned the monopolized power structure, and eventually resulted in the Revolution of 1948. From this historic moment onward, new groups accessed power and a new economic model arose. It was based on the *Import Substitution Industrialization (ISI)* strategy deployed in many Latin American countries at that time[1]. The policy of replacing foreign imports with domestic production helped Costa Rica to lift its people out of poverty through economic growth and modernization that provided job

[1] According to Martínez Franzoni & Sánchez-Ancochea (2017, 132), Costa Rica had more success with the *ISI* strategy than the rest of Latin America, because it helped create the conditions for significantly improving social services from the government. This happened mainly for two reasons: 1) Higher labor costs as a consequence of gradually expanding social policy did not cause any harm, since the country was not competing internationally, therefore the *ISI* policy facilitated taxes and public spending; 2) *ISI* policies were not only to the benefit of large firms, but also small and medium-sized companies.

opportunities for all parts of society. Increasing income levels and public investments into social services induced a decline of the poverty rate from 50% in 1961 to 22% at the end of the 1970s. Yet, the political course changed radically when Costa Rica faced a severe economic crisis in the 1980s that led to reforms and a shift of strategy. The country managed to create a new wave of growth through promoting export activities of domestic agricultural products and attracting Foreign Direct Investments (FDI) towards tourism and high-technology sectors, as pointed out by Costa Rican economist Monge-González (2016, 6). This radical shift happened nonetheless at the expense of sectors dependent on the internal market. For this reason, a structural dualism is visible in Costa Rica today, whereby highly dynamic productive activities integrated into international markets coexist with low value-adding and unproductive activities. Economic growth is also mainly concentrated within the central valley around the capital city of San José. Territorial asymmetries are increasing, even though the promotion of ecotourism brought employment opportunities (as hotel staff, nature guides, service providers for adventurous activities, etc.) to the coasts. To conclude, it was mainly the accumulation of factors of production, such as labor and capital, that spurred economic growth over the past five decades (ibd., 11). Notwithstanding, poverty persists in Costa Rica. This tendency is consolidated through the current economic model, especially its outward-orientation, as pointed out in the previous chapter.

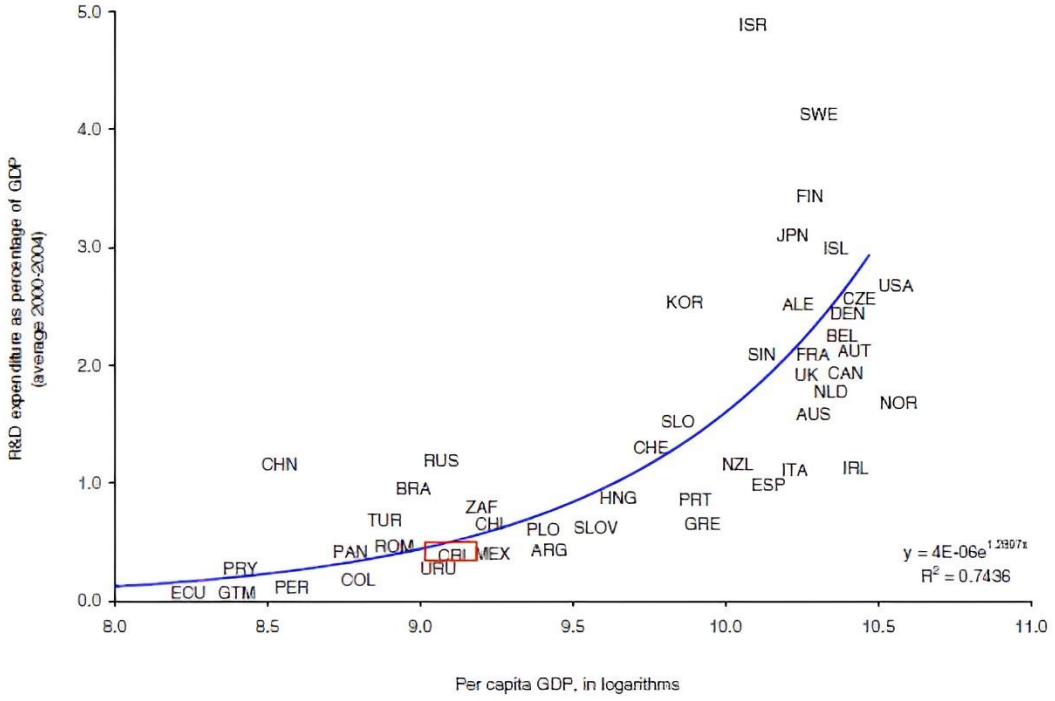
3.4 The need for innovation to face societal challenges

To respond to the challenges faced by society, innovation is key. An article published on the *Inter-American Development Bank (IDB)*'s blog states that more innovation is needed across Latin America to reconcile economic growth with social inclusion and sustainability (Rivas, 2020). Social inclusion implies access to education, work, health services, dwelling, security and more, especially for the most vulnerable parts of society. According to innovation management expert Rivas, it is not enough to introduce new inclusive policies to alleviate fragile conditions, as this also brings up the cost for social spending. He insists that there has to be an increase in productivity that helps generate more and better employment in order to reduce inequality. This also brings in the money necessary for sustaining a higher level of social spending. Innovation is thus key for boosting the country's productive capacity, which furthermore allows more efficient, inclusive and sustainable growth through the use of less and more appropriate resources.

The *IDB* further published a technical note on challenges and opportunities for innovation, productivity and growth in Costa Rica (Monge-González, 2016, 11 f.), whereby innovation is defined as a process of continuously incorporating technology and knowledge into production systems. This does not happen automatically since the process feeds on capacity-building and know-how. However, the following figure exposes the low level of innovation efforts in Costa Rica compared to other countries (see Fig. 4 where Costa Rica = CRI is marked in a red box). Considering its GDP per capita, the current level of investment in research and development is estimated to be five times below the optimal one, an estimated 2.5% of GDP. Even though the presented figure draws on a dataset from 2008, a recently published article of Monge-González (2023) states that the situation is aggravating, given Costa Rica's declining position for global indexes on innovation, innovative products, researchers per habitant, a coefficient for invention and attraction of FDI.

Besides the level of innovation efforts, other factors such as human resources, infrastructure and the business environment represent important enabling conditions for innovation. The previous chapter showed nonetheless that high levels of poverty and inequality combined with low levels of education, skills and female labor force participation as well as unfavorable conditions for entrepreneurship are the reality for Costa Rica. The lion's share of domestic firms are small businesses that manifest a very low level of productivity. All these factors contribute to undermining the overall productivity of the economy, as stated by Monge-González (2016, 28).

Fig 4: Innovation efforts and per capita income for selected countries



Source: United Nations Economic Commission for Latin America and the Caribbean (2008)

The promotion of innovation is likely a question of what evolved first: the chicken or the egg? Do we first require the implementation of favorable policies that ease starting and doing business or is the dynamic taking off with creative entrepreneurs whose activities bring up the necessity to implement such policies? In their book *The Prosperity Paradox*, Christensen et al. (2019, 10 ff.) argue that first comes the innovation thanks to entrepreneurs. As their companies grow, they also establish the necessary infrastructure to run their business including education, transportation, communications, and institutions such as government policies and regulations favorable to entrepreneurship. For the authors, innovation equates to process transformation through which an entrepreneur deploys labor, capital, materials and information to create new products and services which generate more value. However, there is no such thing as uniform change. In fact, Christensen et al. (2019, 22 ff.) point out three distinctive types of innovation:

1) *Sustaining innovations* improve existing solutions on the market providing new flavors, colors or other features for better performance from the point of view of customers.
2) *Efficiency innovations* improve business processes, allowing companies to use less resources but achieve more in terms of cost-effectiveness, performance, profits.

3) *Market-creating innovations*, as the name suggests, create new markets which target large parts of the local population for whom there has not been a solution or the existing one was out of reach for different reasons.

It is specifically the last type of innovation that represents a game-changer for many societies, as this innovation has the potential to function as a growth engine. Market-creating innovations therefore encourage the above mentioned thorough transformation that lays the foundation for building the economy (ibid., 2019, 10 ff.):

> "Market-creating innovations transform complex and expensive products and services into simple and more affordable products, making them accessible to a whole new segment of people in a society whom we call 'nonconsumers'. Nonconsumers are people who are struggling to make progress in some way, but have been unable to do so because historically a good solution has been beyond reach. This does not mean there isn't a solution on the market, but often nonconsumers are unable to afford existing solutions or lack the time or expertise required to successfully use the product. [...] The bigger the nonconsumption, the bigger the potential market [... and thus] the bigger the impact."

The emergence of market-creating innovations has three major benefits (ibid. 2019, 10). First, domestic profits are generated that can be reinvested locally which boosts the local economy. Second, jobs are created for the local community. As new consumers are found, more people need to be hired in order to harvest, produce, process, store, package, market, distribute, sell and service the product. Third, creating new markets enables cultural change. As new impactful solutions emerge locally, people begin to understand that their problems can be solved in a productive manner and it is in their own hands to act for change. At best, this type of innovation has the potential to create a virtuous cycle whereby people get inspired to act upon their means and create their own solutions.

However, identifying a new market is not easy (ibid. 2019, 29 ff.). In fact, it requires a profound analysis of the problems that people face in their local environment. It is a question of understanding the "job that people want to get done", but it has to be a real struggle so that if there is a solution, it will improve the beneficiaries' life in a substantial way. Most importantly, it is not only about the product or service itself. The business model is a crucial consideration to render the entrepreneurs' product available, affordable and accessible. The introduction of the Blue Economy approach could deliver new business models that are sustainable in economic, environmental and social terms.

3.5 The Blue Economy as paradigm shift

Once a critical number of individuals seizes the opportunity to identify local resources and understand their use, society as a whole can progress. This has been introduced previously as cultural change, one of the benefits of market-creating innovations. But what is needed to bring about such a paradigm shift? The relatively new and disruptive Blue Economy approach could be the answer. This holistic concept has been developed by Gunter Pauli - economist, entrepreneur and founder of the *Zero Emissions Research Initiative*. Pauli (2017, 29) highlights that it is through the belief that change can be achieved that a community builds self-confidence and advances substantially.

Pauli's intention with his book on the Blue Economy is to go beyond an academic reflection on what actions could possibly be undertaken to achieve a sustainable economy that generates more value for all parts of society, where humans are part of the natural ecosystems. For this purpose, he provides a blueprint based on the learnings from initiatives around the world that already work in practice, in order to inspire new implementers. There are four closely interconnected guiding principles (ibid., 1 ff.) that apply to all blue initiatives:

1st Principle: Learn continuously from nature

According to Pauli, ecosystems can be understood as delicate networks that operate within clear boundaries given by their carrying capacity. Individual parts come together to a complex web of life with plenty of interdependencies. There is no waste in natural systems, every output can be a valuable input for another part which creates continuous flows. Nature constantly evolves, reinvents itself and adapts to new realities ensuring the supply of all needed parts through multiple sources. Diversification of local flows of resources is therefore key to foster resilience. The more diverse the life in an ecosystem, the more resilient it is. At the same time, this means that today's rapid loss of biodiversity threatens this delicate balance as fewer species exist and the loss of yet another species affects the whole community more and more intensely. In brief, nature is seen as an inspiration in organizational terms for optimizing the entire ecosystem, which increases the benefits for all parts within.

Beyond this inclusive optimization model, nature teaches us an important lesson about the use of laws of physics strictly applied within all natural systems. For example, the interplay of black and white zebra stripes, that helps the animal maintain a cooler body temperature (up to 10°C less) whilst keeping away insects, could inspire energy-efficient housing. Black color absorbs sunlight, white color reflects it. This creates a temperature differential whereby the hot air above the black stripes rises, leading to differences in pressure which make the cooler air above the white stripes flow to the black ones and vice versa. This process thus generates cooling micro air currents right above the zebra's skin. It also makes it harder for insects to land on zebras.

2nd Principle: Transform the rules of the game

The prevailing business model aims for profit maximization through cost-cutting which relies on outsourcing, economies of scale and standardization, whereby global markets compete on a limited set of products and services. Competition is performed in terms of price and quality, with tightly knit supply chains operating in a globalized manner, concentrating production in a few hands and places.

In contrast, the Blue Economy encourages an integrated portfolio-based approach. Multiple interlinked revenue streams are established through a portfolio of different products and services. This takes the level of competition from individual parts to the entire system. To achieve this approach, Pauli argues in line with Christensen et al. (2019, 47) that the first step of change is perceiving problems as opportunities. Otherwise, unnoticed issues can turn into unintended consequences that are not being addressed and henceforth accumulate, intensify or aggravate. He also claims that current production and consumption patterns need to be replaced by thoroughly sustainable practices. It is a transition from mitigating negative impacts to creating

multiple positive outcomes. This requires a shift of priorities. A portfolio of opportunities ensures that basic needs are met with locally made products and services at affordable prices. Basic needs include water, food, shelter, employment and health care. The Blue Economy's strength lies in its system design that helps respond simultaneously to several needs of the community. If business models were to be designed in a way that everything and everyone is considered to have value within the system, more value could be generated with a new modus operandi. It is nonetheless crucial to understand that value is not necessarily financial. Value can also be non-monetary: diversified nutrition, food security, healthy ecosystems, abundant supply of natural resources, social cohesion, zero pollution and so on.

3rd Principle: Generate more value through local economic development

Current development strategies rely on aid and imports, such as external solutions, to respond to the needs of communities. However, this fosters a mindset that is blind to the existing local wealth. People should not have to pay for items to be brought into their community if they can create these themselves. The Blue Economy thus aims at linking the local supply chain from raw material to finalized products in order to ensure that value is added locally as far as practicable. To achieve this, the approach focuses on recognizing the dynamic interrelations that exist locally, discovering all flows of matter, nutrients and energy. The sustainable deployment of these flows brings multiple benefits in financial and non-financial terms. Every blue initiative aims to establish multiple cash flows which diminishes risks and redirects money back into local communities. The economy consequently becomes more dynamic as money circulates locally and cooperation along the value chains reinforces social cohesion. All these developments occur whilst respecting the environment thus not causing any unsustainable harm to it.

The goal is neither to create economically self-sufficient communities nor to develop local economies that only serve international markets, it is rather to consider all options available in order to find an intermediary point between both sides. Ethics are kept at the core since all blue business models are designed to cover the local community's basic needs, pursuing answers for today's most urgent social and environmental issues. Integrating the social dimension is also what distinguishes the Blue Economy from the green and circular economy approach.

4th Principle: Embrace continual change

Needless to say that learnings will evolve and so will the principles of the Blue Economy, according to Pauli. Sometimes this might require society to unlearn commonly accepted things. For example, the universal use of fishing nets could be replaced with a hunting process inspired by dolphins. The intelligent animal uses air bubbles to lift up small light fish only, whereas fishing nets also catch other inedible forms of sea life as well as pregnant fish. Designing new fishing boats that substitute fishing nets with air bubbles could thus solve the issue of overfishing as female fish carrying babies are not being touched because of their heavier weight, which would replenish fish stocks in a sustainable manner.

In contrast to the current economic model, the Blue Economy focuses on optimizing the entire system by means of an inclusive portfolio-based approach rather than just maximizing a few selected components of it. Just like in nature, Pauli (2017, 6 ff.) claims that our economy needs clear boundaries in order to stay within the carrying capacity of the local resources deployed. He uses the example of a tree to illustrate his point: if a tree would maximize its chlorophyll production, it would suffer from overheating as a consequence of neglecting transpiration. This would be detrimental for its own health. Applying this principle to the world's current growth strategy for production and consumption, it becomes clear that it does not comply with sustainability as future generations are deprived of what they will need for their livelihoods. Instead of basing competition on the quality/price of a product, the Blue Economy promotes the value-creation within the carrying capacity of the local economy. If we were to harness the power of physics (gravity, pressure, temperature) for our economic systems, we could benefit from risk reduction and thus ensure predictable results while limiting unintended consequences.

An actual example (ibid., 10) helps to better grasp what a portfolio business approach looks like. One Blue Economy initiative is based on the symbiosis of waste from coffee production with mushrooms. Coffee residue provides nutritional ground for mushrooms to grow. Once they are harvested, the substrate that is left can be used as organic animal feed such as for chickens, that then lay eggs. The community can drink or export the coffee, eat the mushrooms or give it to their animals, eat or process the eggs. This creates a cascading effect: from one waste stream four additional direct cash flows are created. Furthermore, this generates much more value for the local community in terms of purchasing power through diversified income sources, locally circulating money, avoidance of methane pollution caused by coffee decomposition, additional affordable food options, and less reliance on imported goods.

However, big corporations struggle to see the advantages of such a blue business model. When Pauli (2017, 49) presented this symbiosis between coffee and mushrooms to the multinational food and beverage company *Nestlé*, they refused the idea of integrating other income sources into their business model and rather focused solely on their core business, which is coffee production. Even though their current treatment of waste, using spent coffee grounds as biomass to generate energy, is a celebrated example of the green economy[2], perhaps some major opportunities have been missed in not adopting the Blue Economy approach. The latter might have put the coffee residue at better use from a system point of view, covering first the basic needs of thousands of people through mushroom farming. This example shows that the promotion of circularity alone may not always be the most suitable solution since the basic needs of all are not being considered.

It is precisely for this reason that Pauli (2017, 84 ff.) highlights the important role of entrepreneurs to steer innovation towards his approach of sustainability as they are willing to take more risks. Seeing waste as a sign of inefficient material use, not as an unavoidable consequence of the chosen process, inspires innovation. A paradigm shift from reaching the unreached and inspiring the uninspired, which gives a chance to those who are usually out of sight, is needed to seize the potential of the Blue Economy. Entrepreneurs can bridge the gap, acting as change agents who bring innovative ideas from contemplation to realization.

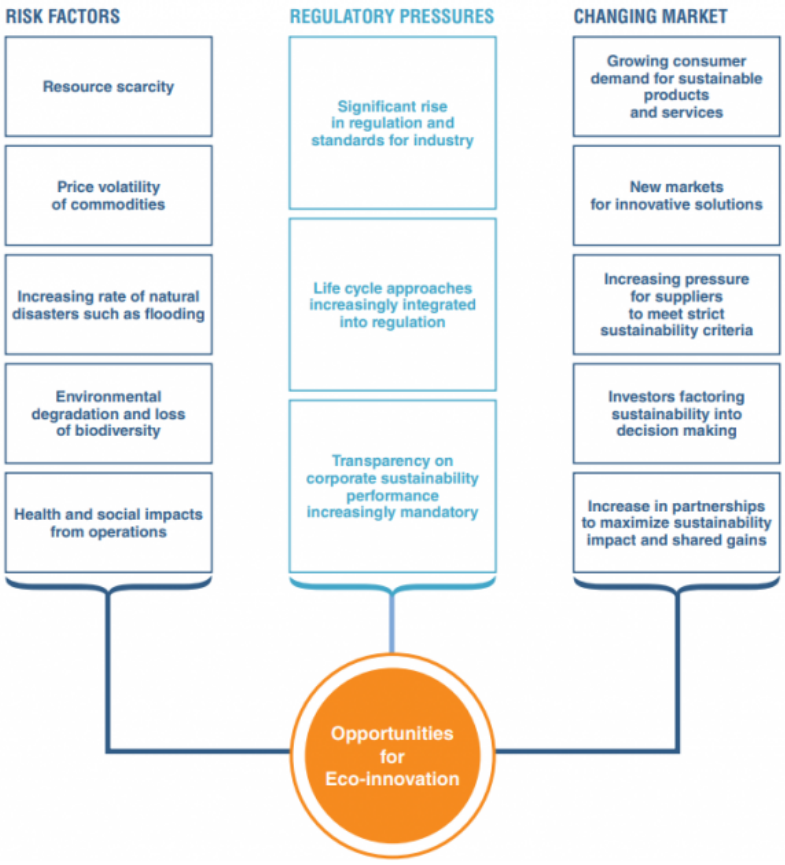
[2] See article published in *The Guardian* (2013).

3.6 Enhancing Costa Rica's sustainability strategy through the Blue Economy

There is little science and media coverage of the Blue Economy as a holistic approach to render current production and consumption patterns sustainable, although Pauli's concept has first been published more than ten years ago. This might partly be due to the existence of a terminological confusion with the blue economy that refers to marine ecosystems. For these reasons, the spread of the concept is rather limited. Although the concept might not be very well known in Costa Rica, its international recognition as an innovative pioneer for nature conservation, that contrasts with its negligence of social matters, raises the question whether there is an interest to go beyond current efforts for sustainability through transitioning to a Blue Economy.

It is sufficient to go back to national history in order to understand the importance of the Blue Economy approach for Costa Rica. For instance, the coffee industry historically played a vital role for its economy up until today. Yet, this industry was mainly focused on exporting high quality coffee beans to more developed countries, whilst the local population was left with lower quality rests. This not only drained money outside of the local economy, it also diverted the value added out of the country. Moreover, coffee residues were thrown into rivers which caused a process of fermentation and oxidation, ultimately leading to the extinction of many fish (Navarro, expert interview, March 23, 2023). Similar developments are happening in Costa Rica with other major agricultural commodities produced mainly for export: pineapples and bananas. The livelihoods of Costa Ricans therefore depend on international commodity markets. At the same time this means that once there is a drop in prices, incomes decrease accordingly.

Fig. 5: Pressures of different nature that are favorable to eco-innovation



Source: UNEP (n.d.)

Increasing pressures on companies, as illustrated here above (Fig. 5), create favorable conditions to innovate in Costa Rica. The Blue Economy is particularly fond of eco-innovation, that are innovative solutions for goods and services, processes, market approach and/or organizational structure that enhance sustainable production as described by *UNEP* (n.d.). Eco-innovation allows companies to be more flexible, creating more value for the business, the environment and society. The real challenge for Costa Rica is therefore to spur innovation in order to promote inclusive, sustainable economic growth. Entrepreneurial ideas have to be imagined that do not diminish the already limited pool of natural resources, but rather find ways to stay within the carrying capacity of the Earth. The country proved at multiple occasions its capacity to innovate, reversing deforestation by means of regulation and incentives. Notwithstanding, Wallbott et al. (2019, 2) underline that current efforts such as the PES program are not enough to deal with ecological, social and economic pressures on nature. The authors are in favor of transforming the country by taking advantage of new knowledge, technology and sustainable business models.

4. Methods & Data

Qualitative research design

The research focuses on understanding how relevant and feasible a transition to the Blue Economy is for Costa Rica, from the perspectives of different (inter-)national experts of various backgrounds, policymaking power and interests. The key experts are either part of a relevant institution or have pertinent experience in natural resource management and/or innovation. Represented organizations include environmental NGOs, policymakers, financial institutions, private sector actors, international donors, research and innovation centers. The research aims to identify similarities and differences in opinions, attitudes and perceptions between/within these different groups. A qualitative research design was hence chosen that first analyzes Costa Rica as a case study considering its current socio-economic situation through a desk review. As a second step, the conduct of key expert interviews allowed to center the conversation around the exploration of the relatively disruptive approach of the Blue Economy. More general questions on institutional responsibilities and the view on Costa Rica's current model for natural resource management / sustainability complemented the open exploration part. Data was collected partly in-person and partly online during February-May 2023, through the use of semi-structured interviews that exposed different types of stakeholders with the Blue Economy concept in order to gather their reactions and explore the potential for transition[3]. A typical interview lasted around 1 to 1,5 hours and the majority was conducted in Spanish. To analyze the data, a color code was applied to every transcript. For each of the nine following key terms that came across the reflections of the interviewees, a distinctive color was used: 1) role of participant(s) and responsibilities of institution, 2) opinion on sustainability model, 3) relevance and 4) feasibility of the Blue Economy approach, 5) implementation recommendations, 6) obstacles/challenges for implementation, 7) criticism, 8) examples for blue initiatives and 9) "food for thought". Then, the relevant information was filtered and synthesized corresponding to frequency that gives an

[3] The collected data is available at request in the form of audio recordings and transcripts by the author.

idea of its importance as well as the originality of the expressed ideas. Thirdly, observational research was included in the form of visits to Blue Economy initiatives in the region of Sarapiquí that exemplify the practicability on the ground. The following table briefly presents the interviewed institutions and individuals, a more detailed description of each one can be found in Appendix 3. With a total of 21 interviews, data saturation was reached within the given time constraint, as various aspects started to repeat and at a later stage of data collection, interview partners pointed out fewer elements that were completely new to the research.

Table 1: Key institutions and individual experts interviewed with their corresponding category

Categorization	**Name of the institution / individual**
Environmental NGO	Fundecor, Asociación Coordinadora Indígena y Campesina de Agroforestería Comunitaria de Centroamérica (ACICAFOC), Centro de Derecho Ambiental y de los Recursos Naturales (CEDARENA)
State institution / policymaker	Fondo Nacional de Financiamiento Forestal (FONAFIFO), Sistema Nacional de Áreas de Conservación (SINAC), Ministerio de Agricultura y Ganadería (MAG)
Financial institution	FONAFIFO, Costa Rica Por Siempre
Private sector	Corporación de Fomento Ganadero (CORFOGA), Cooperativa de Comercio y Servicios Múltiples de Pequeños Productores de Piña (COOPEPIÑA)
Innovation / research center	Organización para Estudios Tropicales (OET), Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), Centro Científico Tropical (CCT), Ovation
International donor	German Agency for International Cooperation (GIZ), Food and Agriculture Organization (FAO), United Nations Development Programme (UNDP)
Independent experts	Guillermo Navarro (forest economist), Katie Tavenner (rural sociologist), Pavel Rivera (agricultural economist), Karine Steinvorth (circular economy specialist), Marielos Alfaro (forest engineer & public policymaker)

Source: Author's own work (2023)

Limitations

The method used was non-probability sampling with interview partners being selected based on two characteristics: 1) the relevance of their institution's work and/or experience to the research; and 2) the accessibility as contact people in *Fundecor*'s network. This nevertheless introduced some research bias. In particular, the research faces a male gender bias provoked by the underrepresentation of women compared to men as interview participants. The given disbalance poses some ethical constraints such as the incomplete identification of existing socio-cultural norms which represent a burden to non-male individuals and unequal power relationships, that both affect the practicability of the approach for marginalized groups. Moreover, the risk of a confirmation bias is present, whereby participants prefer information that support their preexisting beliefs, eventually ignoring contradictions. For example, a key expert active in innovation ecosystems seemed to have a broader view on the application of the concept than an agricultural expert who focused on its viability for his specific sector. The mitigation of this bias is difficult however, as all interview partners expressed their opinion through their own particular

lens of educational training, personal beliefs, exposure to specific problems and challenges in their given work environment, etc. Another bias is the framing effect which refers to the way information is presented that determines how appealing it is to someone. The risk of this effect was limited through an academic presentation of the Blue Economy concept during the interviews, explaining its four principles, its main differences to the current economic model and other alternatives as well as some of the challenges for its implementation. Please find the presentation in Appendix 7. The appendices furthermore include the informed consent form signed by every interview partner for ethical approval to recording and use of material.

Author's position

As an European student who had the chance to dive into the Costa Rican reality for 4 months and learn from the experience of a well established institution there, I believe in the power of innovation and entrepreneurship to bring a profound sustainable transformation to the way the economy provides for society, using natural resources in a more responsible manner. This belief has been fostered in the past two years as I worked for a resource center for entrepreneurs, business incubators and changemakers in various innovation ecosystems. Having the chance to interview a variety of stakeholders from Costa Rica and abroad as an outsider of the local context provided this research with a lot of valuable insights. However, I might not be aware of the complete picture which may cause the ignorance of some essential initiatives and tendencies that are currently shaping the country's future and sustainability strategy.

5. Analysis & Discussion: The Blue Economy approach as piece of the national sustainability puzzle[4]

5.1 A critical reflection on the Blue Economy concept and its relevance for Costa Rica

Before one can dive into the practicability of the Blue Economy approach for the Costa Rican context, some conceptual issues mentioned by the interviewees have to be pointed out. The first consideration concerns definitions for key concepts used by Pauli. What is considered as waste? Valentiny from *Ovation* argues that waste can be a question of time, because even nuclear waste is decomposed at some point, but the way how waste is commonly understood is often anything that lasts longer than two human generations. Moreover, it can be hard to define the boundaries of what is considered to be local and thus the perimeter for local sourcing as well as the carrying capacity of the local ecosystem might not be clearly delimited.

A major issue of the Blue Economy approach is the idealization of how the world operates. For rural sociologist Tavenner, the concept lacks human differentiation. The ignorance of existing

[4] All the following material derives from the key expert interviews that were conducted between February-May 2023 and represent the ideas, reflections and suggestions made by the interviewees. Sometimes these were supplemented by the author's own considerations.

disparities in the world might further deepen unequal power structures if marginalized groups and their particular multidimensional challenges are not examined or taken into account. Women's suffering from social inequality, for instance, is aggravated by gender discrimination, sexism and patriarchal culture (*Instituto Nacional de las Mujeres*, 2016). For this reason, empowering entrepreneurship does not equate to empowering male and non-male individuals to the same extent. Moreover, Tavenner found the absence of acknowledgement for the efforts and cultural practices of indigenous communities, who have proclaimed the importance of natural ecosystems for years, deeply disconcerting. Even more so because indigenous communities have crucial knowledge on how to live in balance with the surrounding nature, which has been continuously underlined by various authors (Sobrevila, 2008; Morales & Leiva, 2013; Havemann, 2018; Nitah, 2021).

Despite this criticism, the majority of interview partners evaluated the presented ideas of Pauli's Blue Economy as relevant for Costa Rica, mainly because the deficiencies of the current model make it unsustainable in the long-run. As previously explained, it seriously neglects the social dimension of sustainability, considering that most institutions and policies are solely focused on the environment. And even amongst these institutions, the main focus is on forests for which reason other important natural resources, such as marine ecosystems, do not receive enough attention. Cruz from *SINAC* stated that there are a lot of social and economic pressures on nature these days. One example is the illegal extraction of wood due to a very strict conservation legislation. Notwithstanding, Porras from *FONAFIFO* pointed out that people often do not have bad intentions by doing such activities, they simply do not have any other choice in order to survive. Interestingly, the poorest people live where Costa Rica's biodiversity is particularly rich, as claimed by *CEDARENA*[5]. This causes many to think that it is a question of conserving nature vs. executing human activities, which leaves them dissatisfied and keeps a considerable amount of socio-economic conflicts unresolved. The government's strategy of expanding protected areas is obsolete according to Rivera, given the small size of the country. The needs of today are different than 50 years ago which brings the necessity to reevaluate the public policies in place. For the economist, it is important to understand how to use the rich natural resources from a value-adding point of view, formulating a new scope of innovation processes and sustainable business models that respond to the social dimension.

An important element of the Blue Economy is to consider humans as a part of the natural ecosystem they live in. Instead of opposing human activities to nature, the suggested approach thinks of it as symbiosis rather than coexistence. Efficient and inclusive natural resource management could generate more value for everyone, helping to cover basic needs of local communities while still serving global markets. The approach thus adds to the idea of circularity by introducing the aspect of putting resources at their best utilization from a system point of view. This helps avoid greenwashing whereby a celebrated green product in one part of the world destroys nature in another. For instance, Pauli (2017, 14) himself marketed biodegradable organic soap in Europe until he understood that the main ingredient, namely palm oil, caused large deforestation in Indonesia. The importance of understanding global problems and identifying the various complex interdependencies that exist between different processes to optimize the overall system was therefore a key takeaway for many interviewees.

[5] For further evidence, see Costa Rican *Institute of Research in Economic Science* (2023).

Another point for which respondents judged the Blue Economy as relevant is the need to identify new income sources that allow Costa Ricans generate the necessary resources to support their livelihoods. This is especially key for local communities and their youth in rural areas, because many times they face a lack of education and opportunities, with the few existing ones often being saturated. Also, the majority works in the same activity as little diversification exists. Or people simply move away to the central valley, which provokes a rural exodus. These areas are more vulnerable to issues of food insecurity (that mostly shows in the form of obesity), poverty and narcotraffic. Interestingly, Cole from *UNDP* and Alfaro mentioned that these conditions persist for coastal communities despite the attractiveness, wealth and economic potential at the coast.

Notwithstanding, some experts considered the concept, but not necessarily its constituting ideas, irrelevant either for 1) the choice of the approach's name "Blue Economy" as many people do relate it to marine ecosystems for the growing number of initiatives in that area; 2) the confusion and significant overlap with existing concepts, such as the bioeconomy, regenerative economy, circular economy, traditional indigenous ecological knowledge etc.; and/or 3) the given political conjuncture in the sense that such a new concept would not be of real value, since it is hardly practicable in view of what is going on in the country right now. A concept can sound brilliant in theory but be hardly operational at the same time. For this reason, interviewees were asked to evaluate the Blue Economy's feasibility in the context of Costa Rica.

5.2 Demonstration of the approach's feasibility through a SWOT analysis

To evaluate the feasibility of the Blue Economy approach in Costa Rica, a SWOT analysis was chosen as a tool for identifying the country's strategic position in terms of internal (strengths and weaknesses) and external factors (opportunities and threats). Whilst strengths and opportunities represent advantages, weaknesses and threats could take a toll on the country's sustainable development. Furthermore, some ambiguous elements are exposed that could become either a positive or negative influence or both at the same time. The table below summarizes the most important points, a more in-depth analysis can be found in Appendix 1.

Overall, the majority of interview partners judged the Blue Economy approach as feasible in the given Costa Rican context. For this reason, it can be presumed that the presented strengths and opportunities have a stronger weight than the weaknesses and threats, which shows to be true when Costa Rica's past handling of problematic situations is considered (see chapter 3.1). In line with its current reputation, the country has the potential to become an international role model for sustainability matters in all three dimensions. The feasibility depends to a great extent on the economic system in place. Based on Navarro's reflections, good governance, high level of education, clear rules, local power and autonomy in decision-making connected to a strong identity on local/regional/national level are favorable characteristics. He mentioned that Costa Ricans have a great deal of freedom but this sometimes comes at the cost of compromises. The Blue Economy's feasibility could therefore alter depending on agents' attitude, the geographical area and sector they are operating in.

Table 2: SWOT analysis to examine the feasibility of the Blue Economy in Costa Rica

Strengths	***Weaknesses***
• rich debate around sustainability • involution, more organic agriculture • legal instruments, such as PES schemes, that provide legal security for natural resource management • willingness of private sector for transition to more sustainable practices • agile entrepreneurial culture • conservation as basis for tourism, one of the economy's main pillars • high mobilization for sustainability matters • convenient moment for new approaches, as government loosens strict laws for nature protection to allow more use of resources • high environmental consciousness and openness to enhance current strategy with new approaches • environmental certifications (*FSC*, *Tourism Sustainability*) and *Nationally Appropriate Mitigation Action*	• inherent contractions of current sustainability strategy: 1) absolute nature protection vs. harnessing 2) conservation vs. high use of agrochemicals 3) reputation vs. reality of livelihoods • illicit businesses of struggling people that live in conservation areas • PES is not enough economic relief • few policies for poverty reduction • disconnection of urban State officials with rural zones • lack of political willingness, fragile policies as demonstrated by indigenous rights • State is in comfortable position owning a large share of GDP • private sector monopolies • inefficient wealth redistribution • logic of continuous growth through consumption • time limited politic mandates and projects in international cooperation inhibit long-term implementation of holistic model • fiscal crisis (enhanced by covid pandemic) • humans' reluctance to change
Opportunities	***Threats***
• foreign markets demand more sustainability, traceability and transparency of products • incorporation of external technologies and innovative solutions (but State prefers to keep monopoly in certain areas)	• international donors are mostly focused on biodiversity action, and slowly retreat due to middle-income status of Costa Rica • dilution of project money • productive processes of big industry players are not being tackled • residential tourism leads to gentrification, huge land-sell-dynamics and inflation
Ambiguous factors	
• ambitions of Costa Rica's youth: open-mindedness vs. opportunities • global collaborative efforts for more sustainability in value chains • personal motivation of (powerful) stakeholders to act for change	

Source: Author's own work (2023)

5.3 Recommendations for implementing the Blue Economy approach as part of a new sustainability strategy

When the interviewees were asked how the Blue Economy could become a reality, a variety of different aspects were mentioned that can be structured into eight distinctive yet connected recommendations:

1- Recommendation: Provide a solid philosophical anchoring with respect to what exists.

Most of the interviewees that had a positive perception of the Blue Economy concept stressed that the approach builds on what exists conceptually and does not substitute. The following elements represent the key value-added of Pauli's approach, as mentioned by the respondents:

- Adopting a system level view on interconnected problems to avoid pollution globally through more intelligent decisions on how to produce and consume.
- Incorporating the social, environmental and economic dimensions of sustainability into one holistic economic model by pointing out explicitly the social benefits that are often neglected.
- Framing economic activities in relation to overall human-nature symbiosis, giving a major role to entrepreneurs for value generation.
- Starting from the local level, which brings more value to local communities and the actual implementers of the approach.
- Using natural resources in more efficient innovative ways inspired by nature which saves water, energy and materials plus boosts productivity.
- Understanding businesses not only as economic agents that bring more money into the economy, but also as value providers that strengthen society's health and resilience.

These aspects differentiate the Blue Economy from other concepts, and are not yet perceived to be communicated in a very clear way. In fact, many interviewees recommended presenting Pauli's approach as a patch to the current economic system rather than a fundamental change in order to facilitate its implementation. For this purpose, Navarro advised changing the concept's name to something that stresses compatibility and does not give the feeling to replace what exists. Instead of incorporating multiple income flows into one single business model, the forest economist encouraged keeping the capitalist principle of specialization by involving more people along value chains with dedicated businesses. Based on *CATIE*'s interview, the Blue Economy lays out processes on how to perform more sustainable production patterns, however, it is crucial to formulate as well the results that shall be achieved. Otherwise, it will be difficult to determine positive impacts. To remain a holistic approach, all economic sectors and all natural resources have to be considered. Tavenner further stressed the importance of applying a gender perspective to the concept to include human differentiation embedded in present socio-cultural norms that exist within economic, political, and natural resource management systems. Communicating the Blue Economy approach as a vehicle for job creation and a strategy for poverty reduction could help sell it to public policymakers conforming to Cole, partly because more jobs go along with less people asking for money from the social security system.

2- Recommendation: Inform, sensitize, capacitate and organize efforts for sustainability.

It is first recommended to clearly expose the above presented value-added of the Blue Economy ideas, so that different types of actors are willing to enrich their respective sustainability strategy. This should happen through an open discussion with various organizations to better understand their challenges and point of views. According to Ureña, the approach should also demonstrate its cost structure and profitability in numbers, not only in financial terms but also in regards to time and effort, thinking beyond the typical project duration. For this purpose, a pilot project could be run that shows how to adopt the Blue Economy principles and their potential for scale-up. The crucial role of spreading knowledge has been stressed by all interviewees without any exception. Even if environmental education is a crucial part in schools and universities, it does not cover all relevant elements such as water/electricity savings, recycling and waste management in general. The government could hereby take responsibility through information campaigns that help beneficiaries understand benefits or through incentives such as tax exemptions for sustainable products or social responsibility initiatives of the private sector. The spread of technology represents another opportunity. Besides, it popped up a few times that the financial skills of individuals and organizations are insufficient and often prevent them from making financially smart decisions. It is thus important to boost financial education and technical know-how on how to effectively distribute funds.

Sensitization is ultimately aiming at changing the mindset on what is sustainable, as stressed by many interviewees. For *Ovation* it starts with recognizing the real problem at the base to have a better problem formulation. Valentiny mentioned the example of an ecological furnace that was created in the Democratic Republic of Congo and used three times less wood than traditional ones. Yet, this does not solve the issue of deforestation. In a Blue Economy approach, the priority would therefore be to find a new source of heat in order to prevent destructive forest use in the first place. Soil regeneration practices as opposed to the use of improved chemical fertilizers was another example mentioned by the *MAG*. It is thus a process moving from reacting to preventing problems, according to Navarro. In line with this prevention approach, it is advised to involve all concerned stakeholders in the innovation, decision-making and implementation processes in order to lower resistance to adoption from the start. Stakeholders should include first and foremost beneficiaries, enabling organizations such as NGOs and international donors, research centers, policymakers, financial institutions, more powerful actors from the private sector and so on. It is particularly important to include diverse voices (women, indigenous groups, poorer marginalized communities, etc.) and their specific goals, priorities and aspirations to bring more equity to the Blue Economy model. More equity could further be achieved by setting the goal of improving the situation for the whole community through the creation of alliances. For example, bigger companies could encourage and support smaller ones to get involved in their local value chain through a reflection of what kind of services or products could complement their own business. The majority of interviewees underlined that it is a matter of combining individual efforts and harmonizing the approach with the reality on the ground. In this sense, Costa Rica's government launched a national decarbonization plan (2019) and a national strategy for bioeconomy (2020). These efforts resonate with the work done by research centers, for instance, *CATIE* published a step-by-step guide to facilitate the transition to a circular economy for local governments (Mercado & Rivera, 2021). Sensitization and

capacitation have to be understood as long-term games that have to target both producers and consumers to inform them about the consequences of their behavior. Without the willingness of consumers to purchase local products over imported ones, it will be very hard to convince producers to change their practices. This involves not only considering the price, but also origin, conditions of production and the local economic contribution as stated by Navarro.

3- Recommendation: Use a bottom-up approach to bring up the necessity for favorable policies.

There are quite a few ways how policies could shape consumer behavior and steer the private sector in a more sustainable direction. Ideally, the government combines a mix of incentives and obligations such as tax breaks, payments and conditions to do so. It would be particularly important to strengthen small producers through favorable policies, for example, initiatives of market exploration and access for certified tropical wood could be helpful, as mentioned by *Fundecor*. That being said, modifying or introducing new laws that oblige companies to apply the Blue Economy principles would be a radical move that could easily be perceived as undesirable, even if legitimate. The risk is to turn impactful laws into dead words, just as it happened with the Indigenous Law of 1977 (see appendices). For this reason, interviewees suggested giving the government a support role that facilitates communities' learning on how to reduce their impact through a bottom-up approach. Another way for the State to support local businesses would be to arrange field visits whereby representatives go to citizens and explain to them the benefits of starting and formalizing their business. For Rivera, the needs of entrepreneurs and small producers have to be identified first, to give a justification based on which organizations and politicians can act upon. The needs should thus derive from the beneficiaries' side or else there is a risk that policies are disconnected from the local reality. It is crucial to figure out strategies for the local level that can demonstrate the effectiveness of a Blue Economy approach to then scale-up. From this point of view, decentralizing power to grant more decision-making rights to municipalities would be desirable, so that small local initiatives can be set up. Once the movement is started from the bottom together with local governments, a coordination towards top deciders can take place, facilitated through the connections between representatives. This process could be supported by the work of international donors providing capacity-building to people in charge of replicating local models in other zones. For instance, *FAO* currently works on the capacitation of local governments to include the topic of food insecurity.

4- Recommendation: Give the responsibility for change to NGOs while promoting joint efforts.

The role of NGOs is particularly crucial in order to transition to more sustainability, because they have more autonomy and a broader scope of actions than public institutions, since the latter have to follow laws blindly as pointed out by *FONAFIFO*. Another advantage represents their continuity of efforts to follow the same direction/vision, that is not determined by policy terms. Artavia for instance stated that it is thanks to NGOs (and natural scientists) that conservation efforts work so well in Costa Rica, not the government. It is further recommended that the team within NGOs is multidisciplinary to facilitate the establishment of an integrative approach. Potential profiles include biologists, forest engineers, economists, educators, sociologists, social workers, fundraisers, environmental historics, etc. Private-public partnerships could be a useful

means to have various actors participating. NGOs often act as intermediaries between producers along value chains, private and public sector actors. International markets could thus be accessed through the involvement of the numerous transnational companies present in Costa Rica. An alliance of beneficiaries with NGOs represents an impactful vehicle to raise awareness and incite the interest of public institutions. To work together efficiently, very good coordination is needed. As stated before, the State is quite comfortable because it owns a large part of GDP for which reason Navarro argued that the government lacks the incentive to innovate. Therefore, it is more realistic that the first impulses are realized by private sector actors, but they likely need to be encouraged. NGOs could act as umbrella structures that distribute funds to economic stakeholders, with the support of local municipalities. Some interviewees suggested sharing risk through sharing responsibility for success between the government, NGOs and the private sector, intending to apply more holistic approaches whenever possible. For example, Steinvorth said that a course on empowerment for female entrepreneurs should also include the advantages of circularity for their business. NGOs could help spread information and exchange best practices from the initiatives in their zone of influence to enhance the development of other regions. The altruistic visions and often present non-profit nature of NGOs limit their competition with each other and favor an environment of mutual trust.

5- Recommendation: Accompany entrepreneurs through smart, directed innovation support.

Entrepreneurs play a major role for the implementation of the Blue Economy approach. Padrón therefore suggested conducting a diagnostic to better understand the Costa Rican innovation ecosystem, its strengths and deficits. A better stimulation of entrepreneurship should become the government's priority, mainly for the burden of regulation (see chapter 3.2) that inhibits the potential of innovation to bring more value to local communities and tackle issues of poverty (see chapter 3.4 & 3.5). Local entrepreneurs have to understand that "working hard enough" is not sufficient to run a successful company, more skills are required. There are already several support structures operating in the country, but most programs provide individual support. It would thus be interesting to bring together entrepreneurs in a collective program framework to promote a complete value chain design, viewing startups as interdependent parts of the same ecosystem. This could be encouraged through several initiatives as proposed by *Ovation*:

- A "blue business model" hackathon[6] could be run that brings together multidisciplinary teams. This type of initiative is more likely to be sponsored due to its short duration, solution-oriented nature and potential to solve specific value chain issues of bigger companies or needs of society targeted by public institutions with financial means.

[6] "Hackathons have emerged as a format to gather participants and jointly work on issues of common interest or to propose the design of new services. [...] They usually have a predefined duration (e.g. one or two days) and they start with the presentation of several challenges that are typically related to a common theme. Participants - usually working in groups - collaboratively work through phases such as ideation, prototyping and, possibly, preliminary testing, following in a very condensed way design processes [...]. At the end of the hackathon, the different groups present their solution and, in some cases, one of the groups gets an award for the promising work done. The hackathon is staged so that several actors interact with each other and with the participants: usually, there is a presenter that keeps the timing of the event, announcing the different phases/tasks of the day and entertaining the participants, several facilitators that support the work of the different groups, making sure that they have what they need in order to progress in their design process and some crucial stakeholders that provide knowledge or resources of different nature that can help the participants to articulate their solution" (De Götzen et. al 2020, 1 ff.).

- Establishment of a Blue Economy or nature-based innovation startup studio, whereby ideas are created based on the locally available resources and needs of the local community. First come the ideas, then the entrepreneurs who are most suited to work on them are identified (today, the typical innovation program requires the entrepreneurs to apply with their own ideas). This shifts the trigger of innovation from the market side (potential customers) to the input side (resources, waste streams) as stated by Valentiny.
- Once the idea is imagined, a collective entrepreneurial program could follow that provides capacity-building, hard and soft skills in terms of organization, finances, communication, networking, marketing, planning, critical, strategic and creative thinking etc. that allow the entrepreneurs to build a business plan for their value proposition.
- Creative input-output matching, also considering waste as potential resource.
- Publication of an inspirational book/manual on existing blue initiatives in Costa Rica, including a short description of their business, the tackled problem, the value provided for the community, their learnings and contact details.
- Promotion of creative innovation workshops within existing companies that help them diversify their revenue sources through so-called intrapreneurship. This initiative could also target their production processes to make them more sustainable.
- Collaboration with foreign service providers that support local incubators or innovation centers through their international expertise, assist in networking and attract funding from abroad.

All blue initiatives should respond to one or several needs of the local community. This could potentially create new markets in regions where people are poor and do not yet consume the imagined solution in any alternative form. It is thus important to consider the locally available markets and design solutions adapted to customers even if their purchasing power is limited. This is the first step for local economic development.

6- Recommendation: Start with what exists - blue initiatives in rural agricultural areas.

Most of the blue initiatives in Costa Rica (even though they are not labeled as such), are found in rural areas where the deterioration of socio-economic development required local stakeholders to be creative. The tropics in particular show potential for the establishment of Blue Economy business models, because of the variety of agricultural products that grow there. Just to mention three initiatives in Sarapiquí: 1) *Nicoverde* is a pineapple marketer, working together with local small producers, which exports organic fruits and uses their crowns to grow mushrooms and extract fiber for textile production (Morera Ruiz, 2022); 2) Pedro García's *Finca Integral El Jícaro* (personal communication, April 2023) applies ecosystem design to cultivate plants for cacao, peppers, spices, and more to inform interested tourists and students on their organic cultivation and uses, to then sell the derived products to them and surrounding hotels; 3) the potential exploitation of almond trees to provide wood, seeds, flour, milk, beer and the natural habitat of the green macaw who only nests in almond trees - besides, both the tree and bird face extinction (Ulises Alemán, personal communication, March 2023). In this sense, it is recommended that Blue Economy implementers encourage small producers to explore all their available resources and get inspired by role models, such as the "integral farm", to transfer and apply this knowledge

to their own farms. Ureña stressed the importance of starting with initiatives that exist, because projects made from scratch have a higher risk of failure.

Small producers in Sarapiquí face a big challenge to improve the quality of soils as pointed out by Barrantes, but the increasing understanding of producers that soil represents their productive basis makes them willing to adapt their production processes. Barrantes, as environmental manager of *COOPEPIÑA*, supports producers whose main commercial client is *Nicoverde*, and he stated that certifications such as *Fairtrade* provide their members with an important financial incentive to implement more sustainable practices. Sarapiquí is a region with a lot of ecological production and environmental consciousness according to *CEDARENA*. Thanks to the variety of projects, products and support structures that already exist in the area, it makes sense to start implementing blue initiatives there, also because the region has a more vulnerable population and thus a greater need to innovate and create new job opportunities. Moreover, Barrantes warned that the figure of the small producer is crucial to the region's identity and if it disappears, the social dimension would suffer immensely.

7- Recommendation: Improve existing legal instruments such as PES schemes.

To maintain forest cover in the future, agroforestry is increasingly important as a source of socio-economic development for private forest owners. However, as explained before, there are contradicting views on the compatibility of human intervention with nature protection in Costa Rica (see chapter 5.2) and forest production alone cannot provide sufficient jobs in areas of major need for income-generating activities, according to *FONAFIFO*. The biggest financial incentive for private owners to take care of their forests are PES schemes that have no specific targeting for poor people in place (see chapter 3.2), and distribute benefits unequally. Besides, Navarro pointed out that there is a need to reach out to landowners whose forests present a higher risk for deforestation. Giving more incentives that decrease their reliance on extracting wood to provide for their livelihoods or support them in creating their own sustainable business could alleviate the situation. Since not all forests are equal, the usage rights should be adapted accordingly, protecting in particular forests of high biodiversity within biological corridors.

PES recipients are allowed to spend the payment they receive in the way they wish. Until today, there are no formal ways to control where this money is reinvested. For this reason, a more holistic approach that encourages a Blue Economy could be applied. The formal criteria for receiving the PES could require forest owners to indicate a blue initiative in which they wish to invest, it could be their own or shares of another existing one. Or their participation in the PES scheme could be bound to mandatory participation in one of the above explained innovation initiatives which foster blue businesses. Another way to channel the money from PES schemes more efficiently could be the obligation to convert all waste outputs of the landowner's farm into raw material for other businesses in the area. Based on the interview with *FONAFIFO*, the implementation of these criteria is possible through a new directive given by the decision-makers, which are basically the members of the Board of Directors, or a decree of the executive power.

8- Recommendation: Continue to innovate and evolve Costa Rica's sustainability strategy.

Apart from NGOs, universities could act as crucial enablers for the implementation of the Blue Economy principles. González from *GIZ* stressed the potential of directing research efforts towards real issues faced in the private sector in order to render their processes more sustainable and/or enrich local value chains. But many academic papers do not find a practical application once they are published and companies are often unable to acquire university patents. A new understanding of the role of universities and their potential to assist the private sector's transition towards more sustainability is essential. Research projects could include:

- Analysis of all sustainable-related concepts to identify shortcomings, overlaps, compatible and contradictory elements to combine them into a new sustainability strategy.
- Studies that compare, for example, the pollution effect of burning coffee residues vs. producing organic matter from a system level point of view, to provide sound scientific evidence for the advantages of a Blue Economy, as suggested by Vargas from the *OET*. This could also provide a basis for cost calculation and profitability. Similar feasibility studies that demonstrate the impact, benefits and effectiveness of the approach could inform policies and strategies to boost its implementation. Negative effects for the incorporation of the Blue Economy principles should also be pointed out.
- A better understanding of all resources within a given local ecosystem, their complex interconnections and potential uses. For instance, the *CCT* published a study on the ecological viability of the commercial use of the almond nut (Araya et al., 2022).
- Benchmark of best practices from other countries. For example, understanding poverty alleviation through forest conservation in Ecuador (De Koning et al., 2011) could inspire decision-makers on how to improve PES schemes in Costa Rica.
- Historical outline on how legislators in the 1980s achieved to implement two of the most innovative and radical conservation instruments: the ban on land use change and PES.
- Studies on transferability of learnings to different geographical contexts. Murillo stressed that the approach has to be adaptable to specific natural ecosystems. Within Costa Rica, there are various microclimates and each of them requires other types of solutions. A local community living in a dry tropical area that struggles with droughts probably has other needs than one living in a humid zone that suffers frequent inundations. Same is true for rural vs. urban characteristics.
- Moreover, the system level view requires to grasp all interconnections present within and between different natural ecosystems because, for example, rivers in a mountainous area eventually flow into the sea. If rivers are contaminated, it will have consequences sooner or later for the marine ecosystem.

5.4 Challenges and obstacles for implementation

One cannot deny that it is a complex process to make various actors understand and interiorize integral multidimensional approaches to sustainability. In this context, the interviewees had the following concerns when asked about challenges and obstacles for implementation:

Conceptual overlap

The majority of interviewees said that the growing amount of different concepts and definitions is confusing. In the end, all of them have similar goals. People feel lost because of the vast variety of concepts and potential solutions, it is hard to know where to go first and what to implement. Having so many similar concepts around and new ones added every year could thus have the counterproductive effect that people lose interest or in the worst case, are reluctant to adopt more sustainable principles. As said before, there is also confusion because the exact same name exists for a concept focused on marine ecosystems and Rivera further stated that there are blue regions like the Nicoya Peninsula, where people with high life expectancy live.

Financial issues

Many interviewees expressed that there is a lack of financial resources available. The main issue with this is that NGOs might struggle to take responsibility for a movement to more sustainability, as they have no financial resources to implement such programs, according to *Fundecor*. The *MAG* added that neither do small producers have the resources necessary to transform their practices since certification, for instance, is expensive and the Ministry cannot help in this sense either. Additionally, there is little access to credits. Various interviewees pointed out harsh requirements to be fulfilled, which makes it even harder for small producers as they often have no collateral security to give to banks. However, financing to bridge the gap during transition is crucial, for which reason more investment is necessary. Small producers, rural landowners, entrepreneurs and poorer people furthermore lack financial understanding to make smart choices, which also impacts their capacity to design a business or investment plan. Many businesses remain consequently in the informal sphere, also because of the high obstacles for legalization. This process is tedious due to the amount of institutions and steps one has to go through, which causes a lot of costs and stress. González mentioned that one can add to the cost of registering a business, the cost of running one with a tax burden of over 35% taking a toll on the establishment of a small company. For this reason, many entrepreneurs work outside the law and are thus not part of the social security system. In a similar way, the formalization of NGOs or associations equates to a bureaucratic burden that takes years to overcome.

The lack of financial resources also concerns research and the implementation of projects. Costa Rica depends considerably on external financing sources. Yet, as said before (see chapter 5.2), foreign donors are slowly retreating from the country and often limit their scope of work to biodiversity action. Moreover, few private financial institutions want to promote sustainability as they are stuck in the vicious logic that capital has to grow, based on *CEDARENA*. Same is true for current public policies. In the list of priorities for public investment, nature is rather on the lower end. It is therefore crucial to understand how financial resources could be mobilized for poverty reduction, stressing the need for action in this sustainability dimension. A first hint could be existing funds such as the ones from *Costa Rica Por Siempre* and the *Development Banking System*, or the forest company credit of *FONAFIFO* that could be used to finance blue initiatives. Ureña warned nonetheless that based on past experience, payments should be given in smaller amounts to limit the temptation of poorer people, who probably never handled a big amount of money, spending it on consumption rather than investment in productive activities.

Political disbalances

One of the biggest limitations of public institutions is that they blindly follow the law. This has caused increasing conflicts between conservation efforts and livelihoods of people living in protected areas over past years. Some interviewees mentioned the contradictory nature of Costa Rican laws that are sometimes incompatible with its endeavor to sustainability. The laws on usage of natural resources are very strict which limits especially the profitability of forest landowners as pointed out by *Fundecor*. Navarro added that overregulation increases the transaction cost which makes resource use less profitable and limits agroforestry. Another issue is the lack of financial and human resources of public institutions to adequately take care of the implementation of laws. Barrantes mentioned for example, that the law of keeping 15 meters distance to water bodies is disrespected in many places, but *SINAC* does not have the means to work against this, let alone promote the restoration of such areas.

If there is no obligation by law, public institutions are not incentivized to do more than they are legally required. The same is true for voluntary certification and recommended good practices. However, Araya from the extension office of the *MAG* in Sarapiquí mentioned that even though the Ministry is alright with the use of agrochemicals, the local office goes a step further by supporting producers in taking informed sustainable decisions. This is thus rather a personal / local choice. There is no general vision of the State regarding these topics, at least not at big scale. On the contrary, the current government seems to ignore what has been done before and takes a completely different direction with new priorities (see Appendix 1). Some interviewees mentioned that political dynamics are increasingly shaped by the power of monopolies and small groups that lead politics, lobbying, greenwashing and corruption which indicates a deficiency of political willingness for sustainability. The State could also do more to stimulate entrepreneurship in Costa Rica since it is not enough to inject financial resources - support structures providing access to information and markets are needed.

Lack of willingness

Based on Alfaro, Costa Rica is technically and ideologically equipped to implement sustainability. The principles of the Blue Economy have already been known for over 50 years, but people struggle to understand their own role for transition. The irresponsibility goes as far as humans willingly polluting their most precious resource: the air we breathe. This causes immense costs for the health system. Political willingness is hence crucial, because there is no way to capacitate and sensitize political leaders if they are not interested in addressing larger issues, according to Hernández from *FAO*. At the same time, Ballestero from *UNDP* mentioned that it is impossible to achieve change through public policies because the opposition would be too fierce. A lot of efforts to convince the latter are therefore needed.

One of Costa Rica's presented strengths is the consciousness and appreciation for natural ecosystems, however, this does not necessarily reflect the willingness of different actors to get engaged. Or as Gaspard from *Ovation* said: everyone wants their piece of the economic cake. The responsibility for change cannot solely be put on the shoulders of producers, it depends also on the final consumers and their eagerness to pay a higher price for more sustainable practices. The

price of products is still a main concern for households, especially in a country where inflation is constantly on the rise. Steinvorth pointed out that those people with the privilege to choose what they consume represent a small percentage. The environment might thus not be the priority in many developing contexts as people can barely feed their families and life in general is rather a struggle, so one has to see how to subsist. In a similar way, traditional businesses are focused on profits, returns and utility at any cost due to the high competition pressure. Purchasing power is not located in Central America, it is the Global North who has more economic development and can thus afford differentiated products. This is why part of the responsibility for change in Costa Rica depends on the acceptance of markets in the United States and Europe to pay higher prices for tropical products. However, *Fundecor* said that from their experience, more sustainable products such as *FSC* certified wood are not necessarily more valued by foreign markets. In this sense, some people do not care at all about their impact and continue to pollute, trapped in a logic of consumerism.

From Pauli's (2017, 20) point of view, the Blue Economy does not come at a higher cost, in fact, strategic products and services responding to basic needs could be provided at much lower cost. This key message has to be included in a convincing way in any type of project that works with the principles of the Blue Economy. However, the perception that sustainable production is more expensive, difficult and less profitable persists and is a major challenge to overcome.

Adverse characteristics of big industry players, small producers and the economy in general

The biggest opposition to the Blue Economy could derive from fossil fuel dependent industries. Some interviewees mentioned Costa Rica's dependency on hydrocarbons, especially in the transport sector. Many international tourists who come to the country rent a car to get around, which in itself might represent a contradiction to the proclaimed ecotourism vacation. For a lot of people, it is difficult to imagine a replacement for individual transportation that does neither require the use of fossil fuel nor batteries. People struggle to embrace uncertainty which makes it hard to change systems. *Ovation* brought up the example of *Danone*'s CEO Emmanuel Faber who got fired, because his sustainability agenda was too ambitious[7]. A major limitation of the linear mindset is its short-sightedness; consequences of climate change are not necessarily taken into account even if they affect long-term rentability. In addition, Alfaro explained that diversification is difficult. Due to the rough international competition, rules of efficiency and profitability persist. To diversify, businesses require various market segments, communication and marketing teams to position the different products and define a clear strategy for each market segment. Even if big industry players have more means to introduce a sustainable transformation, small producers feel more pressure to diversify risks and pursue various income generating activities. Notwithstanding, changes within production systems of big industry players bring greater impact, reduce the cost of technology and render many processes possible. Especially because they have the means to go beyond the minimum required by law, not only compensating their carbon footprint for example, but also creating more value through regeneration. The funding for small initiatives could thus be provided by big producers. This requires nonetheless a certain

[7] This was a very publicized case covered by various major international media, for instance the *Time Magazine* (Walt, 2021), *Forbes* (Van Gansbeke, 2021), the German *Zeit* (Blume, 2021) and the Spanish *El País* (Bassets, 2021).

consciousness and willingness of decision-makers. Big corporations often do not want to give up their profits and their need to diversify is much lower because they operate on a bigger scale. The current economic model of Costa Rica is made to serve immense export markets. If large export companies would suddenly disappear, small farms could not substitute, based on Steinvorth. In addition, the Blue Economy design requires that value chains are connected from start to finish, without any interruption. For Cruz, this translates into a lot of work, time, knowledge, money to be put in place and is certainly not achievable from one day to another.

Turning to agricultural small producers as recommended, entails some considerable difficulties. A change in production process affects their productivity substantially in the first few years, as they have to decrease their production whilst augmenting costs. It is very difficult to do such a transition without any kind of economic loss for them. At the same time, the quality of their product remains similar, what changes is the fact that the practices used for cultivation are more sustainable. Sometimes farmers are therefore impatient with seeing results, as they know that a certain chemical process has always worked short-term. This also requires producers to unlearn what they may have done in the past 30-40 years, but the older population[8] may be particularly resistant to such change, because things have worked a certain way throughout their lives. Most importantly, there are more incentives given to big than to small producers, even though they are more likely to dispose of the necessary resources for transition. Having said that, larger farms may have the economic resources for transition, but the vast majority of farms in Costa Rica are small. Yet, the State provides hardly any subsidies for the private sector, meaning that there is no external impulse for producers to transform their practices. The harder it is for small producers to run their farms, the more attractive it becomes to sell to bigger farms. Commercial, productive and economic limitations turn farmers from being their own boss to becoming employees of a transnational company, which often is less preoccupied with Costa Rica's nature as the decision-makers do likely not live in the country.

Social conditions leading to paradoxical situations

Poor people do not always want to be helped. Sometimes they are comfortable with their current situation even if their livelihoods are precarious, for instance, through the engagement in narcotraffic. Tavenner also pointed out that we are not aware of all the effects that the Blue Economy could bring, if its implementation would alleviate poverty or further marginalize certain groups. It is hard to imagine that everyone is going to benefit equally. According to Pauli, everyone and everything has value within a Blue Economy, so it would be interesting to understand how this accounts for domestic work done by women mostly. To put it in Tavenner's words, less gender discrimination is still discrimination. Even if diverse voices are included in the decision-making, their physical presence is not enough - the process is only equitable if a space is created where everyone can actively participate. Achieving conciliation and cooperation of all involved parties is hard, at the beginning most people are interested until the discussion revolves around money. The cleft between theoretical approval and practical application is considerable. In this sense, Ballestero wondered how far away regions such as the Osa Peninsula or indigenous communities could be reached, which could indicate the limitations of the Blue Economy.

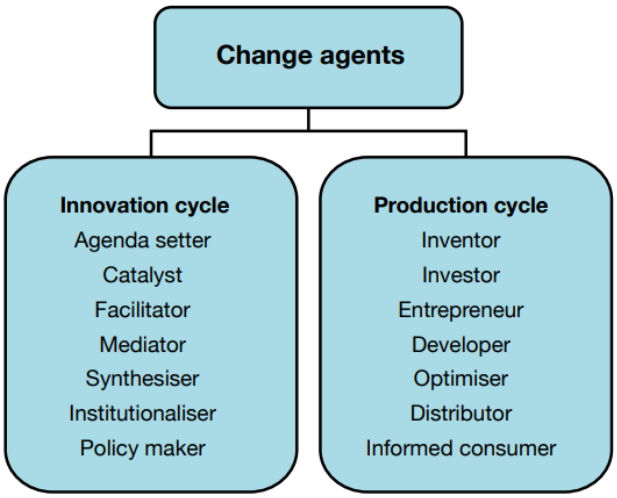
[8] Barrantes from *COOPEPIÑA* stated that the median age of farmers in Costa Rica is around 60 years.

Moreover, a distinction between what is desirable on societal level vs. individual level has to be examined. Tavenner said that many young people have other aspirations than farming and thus not everyone wants to be an agripreneur despite favorable conditions in the area they live. Another aspiration is culturally influenced, many Costa Ricans want to live a western lifestyle inspired by what they see from the United States, which might not be the most sustainable one. This means that once citizens improve their purchasing power, they gain access to products they could not afford before and for a matter of status and privilege, the essence of what it means to be a good consumer (in terms of sustainability considerations) could be lost.

5.5 *Fundecor*'s role as Costa Rican changemaker[9]

The following consideration should be taken to heart: "When everything is a priority, nothing is." Tavenner's observation brings up the final thought that, first and foremost, implementers of the Blue Economy approach have to decide on what recommendations they want to focus on. Once this is clear, it makes sense to lay out the various stakeholders of the Costa Rican innovation ecosystem to advance with a sustainability strategy that is holistic and includes all relevant changemakers (see Fig. 6).

Fig. 6: Roles of various change agents within innovation ecosystems



Source: German Advisory Council on Global Change (2011, 244)

In *Fundecor*'s case, there are several change agents' positions that could be taken on:

Facilitator: The current innovation support of *Fundecor* is on an individual-basis. It is therefore recommended to seize collective power by bringing together groups of entrepreneurs who are more or less at the same stage of advancement. This could induce potential benefits through peer-to-peer learning, networking to solve issues and seize new business opportunities, linking of business models through a value-chain system approach, etc. The *Sinergia Business Forum 2023* can therefore be understood as an event that goes in that direction, giving entrepreneurs the chance to meet each other as well as potential investors, partners, clients and the press.

[9] Please find in Appendix 5 *Fundecor*'s comments on the research results.

Catalyst: It will take time until *FONAFIFO* considers including new criteria for the PES scheme. It is hence recommended that *Fundecor* encourages private forest owners to invest the money from PES into blue innovation. For instance, there are several recipients who reforest almond trees and thus contribute to the conservation of the green macaw. The first step has already been done: connecting one of the owners with a knowledgeable bird specialist to explain to him not only the importance of the almond tree as such, but also the benefits of harvesting the almonds for several products (see chapter 5.3). As a second step, it could be interesting to bring together almond-tree owners to discuss how they could work together in order to set-up a production line in Sarapiquí, which could provide a variety of jobs for harvesting, processing and marketing the almond-derived products. This process has thus the potential of becoming a market-creating innovation - a game-changer for the local rural area. Moreover, the institution could more systematically inspire students, entrepreneurs and other workers of public institutions or NGOs by inviting them to visit local initiatives with whom they collaborate, such as the Finca Integral *El Jícaro*. This process is already done sporadically with one university.

Agenda-setter: Once real progress is achieved and a business set-up, such as the almond one for example, through accompanying the forest owners in the *Sinergia* entrepreneurial program, a meeting with *FONAFIFO* can be arranged. The objective would be to advocate blue innovation's potential to combine conservation with socio-economic development, an issue that *FONAFIFO* sooner or later has to face if the institution wants to persist over time. Similarly, a conversation with *SINAC* could take place to argue in favor of the following.

Synthesizer: During the interview with Barrantes from *COOPEPIÑA*, it became clear that small producers in Sarapiquí are willing to get engaged in sustainable initiatives. However, he pointed out that it is contradictory that they are the ones who start the conversation with institutions such as *SINAC*, when it is their role to promote the conservation of nature. For this reason, it is suggested that *Fundecor* works as a synthesizer in the sense of talking simultaneously with both, in order to identify synergies and facilitate connections. For instance, small producers (who may not be part of PES schemes because they have few or no trees) could replace some pineapple plants, or any other small part of their productive area, with native trees. These trees could allow more connectivity by enlarging biological corridors[10]. This recommendation makes particularly sense, because one of *Fundecor*'s experts for environmental services currently represents the institution as President of the local *Corredor Biológico San Juan La Selva*. It is thus a matter of converging existing efforts and not letting them stand as isolated parallel movements.

Fundecor, with its long history as an innovative living laboratory, provides the favorable conditions needed to incorporate these recommendations. Despite scarce human and financial resources, the NGO has the ability to harness the blue essence as Costa Rican changemaker.

> *"Identifiable actor constellations with sufficient power, resources and creativity, prepared to welcome innovations and reforms in order to overcome the established obstructive powers, emerge as the drivers of change."*
> (German Advisory Council on Global Change, 2011, 242)

[10] Biological corridors are "delimited continental or marine-coastal territories whose primary purpose is to provide connectivity between protected wild areas, as well as between natural or modified landscapes, ecosystems and habitats, whether rural or urban, to ensure the maintenance of biodiversity, ecological and evolutionary processes" translated from SINAC (n.d.). Please find a map of all biological corridors in Costa Rica in Appendix 2.

6. Conclusion: Harnessing the blue essence for poverty reduction

This research has shown that the implementation of the Blue Economy principles is relevant and feasible in the context of Costa Rica, especially as a vehicle for poverty reduction. Promoting nature-based innovation that first tackles the needs of local communities through the creation of new markets and thus the creation of jobs, whilst encouraging a more responsible use of natural resources, represents the "blue essence". The country urgently needs to address the mentioned societal issues as the presented tendencies worsen and particularly affect the youth. It is thus not enough to rest on the country's laurels given by the international community, even if past conservation efforts have been impressive. The clue could lie in changing the mindset from protecting nature to understanding ourselves as a part of it, interacting with and harnessing our natural environment in a way that benefits everyone's development. Despite some important challenges, Costa Rica has potential to transition to a Blue Economy mainly if implementers follow the recommendations that aim at complementing its current sustainability strategy.

Professionally speaking, I would like to stress that the internship with *Fundecor* was very enriching thanks to the countless insights into challenges and opportunities for sustainable natural resource management. Planning and organizing a Demoday from scratch was a unique way to discover the inspirational local entrepreneurs and see a vulnerable rural area with new eyes. I also learnt that NGOs are much more than gap-fillers for responsibilities that are not taken on by the government. They can be change agents sending important impulses for the three dimensional development of a country.

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Appendices

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1- Extensive SWOT analysis to examine the feasibility of the Blue Economy in Costa Rica

Strengths: Costa Rica is a country keen on incorporating sustainability into its economic growth model, a strategy which further constantly evolved through the rich national debate around different existing concepts, including regenerative economy, bioeconomy, green and circular economy, etc. Araya from the *MAG* further brought in the idea of involution, meaning that small agricultural producers get back to what has been done before, replacing agrochemicals with natural processes of organic agriculture. According to *FONAFIFO*, many legal instruments are in place for nature protection. PES schemes are one of them, providing legal security for natural resource management which supports producers in their transition to more sustainable practices. Barrantes from *COOPEPIÑA* and Murillo from *CORFOGA* underlined that small producers already follow various strategies for production that cause less pollution, which means that the private sector is willing to adopt new ways of producing that help limit their impact. There is therefore a tendency of producers to apply new sustainability approaches proposed by the government, including the recent national decarbonization plan. This favorable environment is complemented by an agile entrepreneurial culture in Costa Rica, as pointed out by innovation and entrepreneurship expert Padrón from *CATIE*. The conservation of natural ecosystems further represents the foundation for one of the national economic pillars: tourism, because people pay for the entrances to national parks in order to see wildlife in their undisturbed habitats. Public policy therefore has an interest in continuing to invest in nature protection and maintain Costa Rica as an exclusive non-massified tourism destination.

In this perspective, many interviewees underlined the variety of institutions, initiatives and policies that work with the concept of sustainability, which demonstrates a high mobilization around this topic completed through the implementation of concrete actions on the ground. As Artavia from *Costa Rica Por Siempre* put it: sustainability, peace and democracy are in the DNA of Costa Ricans. These elements are seen as part of their culture. Moreover, institutional awareness for the incompatibility of the current conservation model with the socio-economic development

of Costa Ricans is on the rise. Cruz said that the government slowly loosens the law to guarantee more access to their natural resources. An example is the allowance of collecting and exploiting naturally fallen wood. For this reason, Ureña from *ACICAFOC* stated that it is a convenient moment to get engaged in Costa Rica with new approaches to sustainability as its citizens realize that they cannot continue with the status quo due to climate change and are thus willing to change their modus operandi. It is precisely for this existing environmental consciousness and conservation efforts that most interviewees judged the Blue Economy principles to be more feasible in Costa Rica than elsewhere. Alfaro further stressed that Costa Ricans are very receptive as society for new knowledge and elements that enhance their sustainability strategy.

Weaknesses: Even though sustainability is widely accepted as a beneficial development strategy for Costa Rica, there are some inherent contradictions to its current application. First of all, two opposite views towards nature conservation coexist: absolute protection with zero human intervention vs. management through harnessing of natural resources in a sustainable manner. Secondly, current agricultural practices such as the high use of agrochemicals contradict conservation efforts. This affects further the social dimension. The *Pan American Health Organization* and the *UNDP* (2022a; 2022b, 159) for instance warn about the impact of pesticides on health, stating that between 2010 and 2020 over 50 deaths were provoked by intoxication in the country. However, pesticides continue to be largely used in the cultivation of bananas, coffee and pineapples which represent some of Costa Rica's main export products. Thirdly, the country is internationally marketed as a leader in sustainability. However, the current sustainability strategy is mainly focused on the environmental component, as seen previously. Cascante from *CEDARENA* described this double discourse as hypocrisy: on the outside, Costa Rica presents itself as a green nation that conserves nature, but most efforts are concentrated in forest and biodiversity protection. People who live in conservation areas struggle a lot for their livelihoods which causes problems of illicit business such as illegal hunting or logging, drug trafficking and unregulated construction work. Moreover, she specified that PES schemes are not enough to give economic relief to forest owners, especially because a high number of people do not even benefit from them. According to Cole from *UNDP*, there are few policies in place that actively reduce poverty in Costa Rica and the covid pandemic exacerbated the already alarming poverty rate of 23% (see chapter 3.2). The reality might not be seen by decision-makers since many NGO and State offices are located in San José, which provokes sort of a disconnection from their operational activities in rural areas. For example, *FONAFIFO* plans to implement a broader range of PES schemes that also include other types of natural ecosystems, but this would be financed through an increasing tax burden for everyone on Costa Rica's territory. This could disproportionately affect the poor and reinforce the growing reluctance to conservation initiatives. According to various interviewees, the current model has reached its peak because of the mentioned gaps, which become more and more visible.

Moreover, there is a lack of political willingness and the policies in place are fragile, as they can be manipulated or ignored. The issue of indigenous rights is a baffling example. Based on a recent report of the *International Work Group for Indigenous Affairs* (Durocher & Camacho Nassar 2023, 344 ff.), indigenous people in Costa Rica see their territorial rights repeatedly violated despite the Indigenous Law of 1977 that established their legal status and the mechanisms to

prevent land appropriation. The government further continues to deny the right to autonomous development and self-determination of indigenous communities. Simply because of its sheer size, the State is in a comfortable situation concentrating power and financial resources, which also explains the multitude of public institutions and ministerial extension offices in Costa Rica. The same is true for the private sector as there are a lot of monopolies in the country which dictate national prices. The most prominent one is the cooperative of milk producers *Dos Pinos*. Morales from *CEDARENA* further described the State as inefficient in the redistribution of wealth. The adopted consumption-capitalism model disincentivizes the public and private sectors to adopt a more sustainable holistic approach. For example, Navarro stated that it is not clear who has to take care of the waste produced, if it is the consumers or the producers who should take on this responsibility. For most economic actors who strive for continuous growth, waste represents a negative externality that is an implicit part of any economic production. Besides, the limited duration of international cooperation projects and political mandates play against the long-term implementation of a holistic approach. In view of the fiscal crisis[11] and the major economic shock caused by the covid pandemic, the current government prioritizes reactivating Costa Rica's economy without necessarily turning it into a recovery of green growth.

The most important inherent weakness is that humans tend to be reluctant to change. This could be in part due to the fact that the concept of change is abused these days, because in the context of climate change it is often presented as an irreversible process, as mentioned by Navarro. Taking further into account the rigidity of politics, it is not surprising that after a tedious process of policy formulation, the implementation of what has been agreed on is even more complex. *CEDARENA* and others therefore judged a radical shift to the Blue Economy utopic.

Opportunities: Concerning the private sector, the demand for more sustainability, traceability and transparency from markets in Europe and the United States is increasing, which obliges Costa Rican economic agents to adapt their production processes accordingly. For instance, the *European Union* agreed on a new regulation for deforestation-free supply chains (European Commission, 2022). As a major consumer of timber and agricultural imports that cause emissions and biodiversity loss, the *European Union* sees its initiative backed up by the support of European citizens (ibid., 2021). Some interviewees mentioned that Costa Rica already reacts to these market requirements through the establishment of certifications such as the one of *FSC* for sustainably harvested wood or the one for *Tourism Sustainability*. The *Nationally Appropriate Mitigation Action* are additional strategies that indicate greenhouse gas reduction efforts in the form of policies directed to businesses or actions across economic sectors (*Instituto del Café de Costa Rica*, n.d.). Artavia warned nonetheless, that certification systems are a little complicated, because they can become accomplices of certain practices, which could result in greenwashing.

Another potential opportunity are existing technologies. Thanks to Costa Rica's openness and connectedness with international markets, it could be easy to access and incorporate innovative solutions, which is also pointed out in *IDB*'s technical note on innovation (Monge-González,

[11] Arley Solís (2021) points out that the crisis has not been caused by the covid pandemic, but the latter reinforced the country's fiscal fragility rooted in the growing indebtedness, fiscal deficit and tax evasion over past decades. According to Umaña Venegas (2017), it is a structural problem of the Costa Rican State, which not only affects the government, its budget and capacity to invest in social programs and infrastructure, but also the lives of all citizens.

2016, 12). Steinvorth mentioned however that the State prefers at times to limit such spread. According to her, the State's intention could be to discourage new entrepreneurship to maintain its monopoly in certain areas such as waste management. Technology from abroad is also often expensive and thus not easily accessible.

Threats: International donors such as *GIZ*, the *United Nations* and other activist organizations are focused on maintaining and increasing the national biodiversity. Notwithstanding, ever since Costa Rica has the status of a middle-income country, these development organizations retreat slowly and projects become more limited to the environmental sphere. In addition, project money gets often diluted and it is hard to guarantee that the benefits reach the intended beneficiaries. Even though international cooperations focus on the improvement of livelihoods for vulnerable groups, *CEDARENA* indicated that it also makes sense to simultaneously invest in big industry players to change their productive processes if a thorough sustainable transformation is to be seen. An open honest political dialogue is needed that takes into account existing development gaps to understand how international donors can contribute in bridging these gaps, aligning their priorities with the ones of the country.

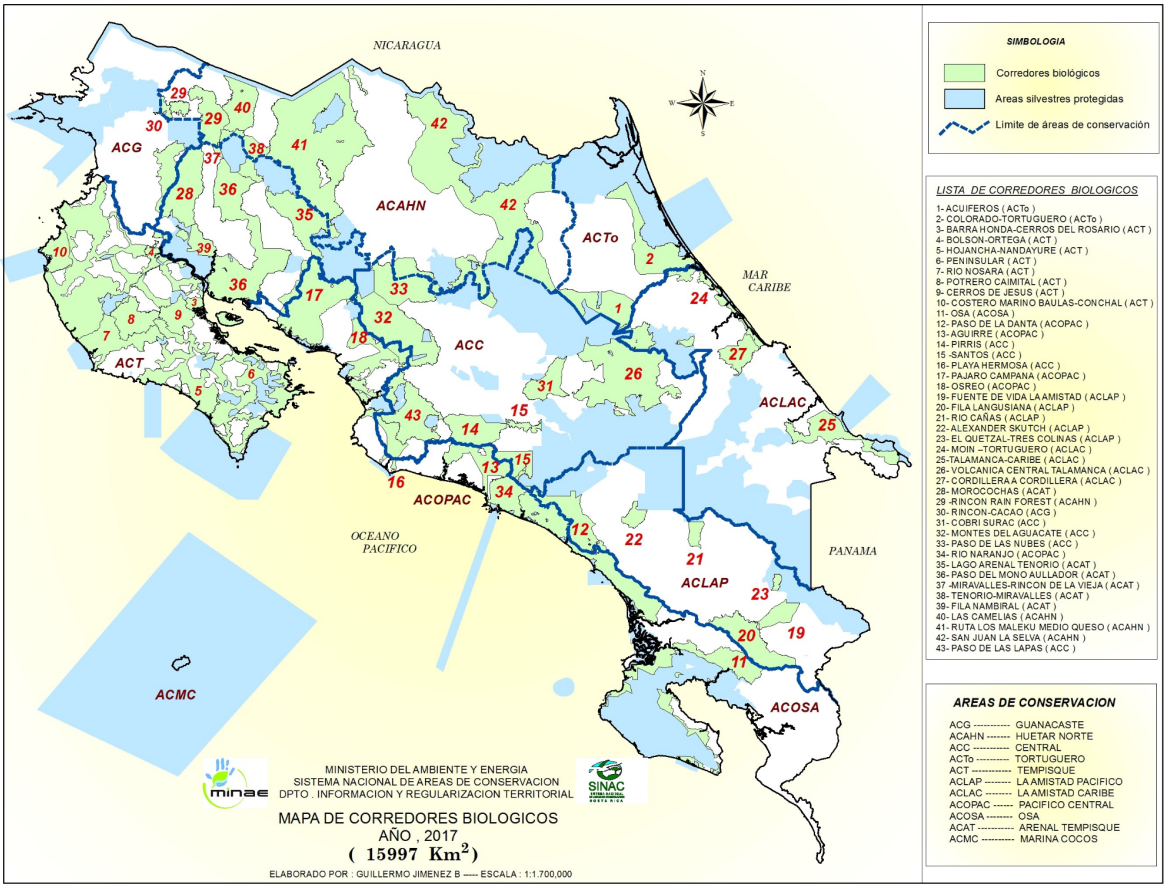
A growing tendency of recent years is the sale of land in Costa Rica. More and more foreigners are interested to live in the country for its tropical weather, beaches and calm lifestyle, but their higher purchasing power fuels local prices. However, Costa Ricans often do not invest the money obtained from the land sale into their livelihoods. Steinvorth stated that it is mostly for buying expensive items like cars or going on vacation, but many sellers end up at the same property that they sold, to work for the foreigner who bought it from them in the first place. According to Steinvorth, many of these foreigners are not interested in engaging with the local communities where they live, because they often use their Costa Rican houses as a vacation home. For this reason, the equity of this residential tourism tendency is questionable, because the presence of foreigners does not necessarily create a more dynamic and collective local economy. The increase in demand for land raises property prices, which not only makes it attractive for an increasing number of nationals to sell their land as well, but also makes it harder for them to buy houses especially in the coastal zones. This process of gentrification could be further tentatively classified as a new form of land grabbing due to increasingly difficult land access for Costa Ricans (Van Noorloos, 2014, 14 ff.). Steinvorth added that these land-selling-dynamics even disincentivize eligible forest owners to compromise themselves by participating in a PES contract of 10 years, as they are rather waiting for a foreigner to buy their land, which presumably brings them a higher amount of money in a shorter time period. These unsustainable dynamics thus inhibit socio-economic development and nature conservation to a significant extent, representing to some areas a poverty trap that could affect several generations.

Ambiguous Factors: Costa Rica's youth has potential for their open-mindness to adopt more sustainable practices, but quite a few interviewees pointed out that they often are not interested in staying in rural areas and prefer pursuing job opportunities in the central valley. This might be an additional reason for which poverty is concentrated in rural areas and increases its population's vulnerability over time.

The system design of the Blue Economy approach makes its feasibility dependent on global collaborative efforts, because neither Costa Rica nor any other country alone can bring about a complete sustainable development for its nation due to the complex existing interconnections.

This further depends on the personal motivation and priorities that different stakeholders have to act for change. Based on a recent speech[12], it seems that Costa Rica's current President sets an agenda that rather addresses issues of insecurity, unemployment, the educational system and infrastructure leaving out environmental concerns, as stated by Alfaro. The President does thus not include any environmental strategy, which is unusual since past presidents saw it as a crucial part of public policy. To Alfaro, the government's biggest challenge is to continue with strong public policies for the environment, which is what gives Costa Rica credibility as reference for sustainability on the international scene, whilst promoting other pressing serious issues of national importance. Many things would have to happen simultaneously in order to move towards sustainable development and there is probably no step-by-step process that one can follow.

2- Map of Costa Rica's biological corridors covering around 33% of its continental territory



Source: SINAC (2017)

[12] See press release of Costa Rica's presidency from May 2, 2023: https://www.presidencia.go.cr/comunicados/2023/05/presidente-chaves-robles-presenta-informe-de-labores-del-primer-ano-de-su-mandato/.

3-Table with details on key expert interview participants and their respective institutions

Key expert interview participants and their respective institutions	
Name of organization & interview partner(s)	**Short description**
Environmental NGOs	
Fundecor - Cristian Zúñiga Chavez (business development & fundraising)	*Fundecor* is an environmental non-profit organization that promotes sustainable resource management through PES schemes, FSC certification and entrepreneurship. *Fundecor* bases all its activities on the synergies between conservation and development, creating resources that allow people to coexist with nature conservation.
ACICAFOC - Arturo Ureña (project coordinator)	*ACICAFOC* facilitates processes that allow access, use and responsible management of natural resources and thus contributes to the socio-productive development of indigenous peoples, peasants, Afro-descendents and local communities across Latin America, but also Africa and Asia. Their priority is to adapt to and mitigate climate change.
CEDARENA - Jean Pierre Morales (executive director) & Sara Cascante (project coordinator)	*CEDARENA* addresses gaps in the national legal framework to what regards environmental issues and natural resource management. The team also supports conservation areas of *SINAC*, working a lot with local communities to help them adopt best practices for their agricultural systems to adapt to climate change.
State Institutions / Policymakers	
FONAFIFO - Michael Antonio Porras (forest engineer, regional office representative)	*FONAFIFO* is part of the *Ministry for Environment and Energy*. Its main responsibility is to manage funds and contracts for the PES schemes that exist all across Costa Rica. Besides the administration, *FONAFIFO* also takes care of monitoring and inspection in the field. For the most part, the budget derives from the tax on fossil fuels.
MAG - Jairo Araya Vega (head of the extension agency in Sarapiquí)	The Ministry provides technical assistance, support and advice to small and large producers, mainly for agricultural extension. At least in this agency (1 out of 95 local extension agencies in Costa Rica), there is a moral commitment to sustainable practices not only to maintain but also improve ecosystems without using agrochemicals. Soil conservation and regeneration is one of the promoted priorities.
SINAC - Moisés Cruz (forest engineer)	*SINAC* is integrated into the *Ministry for Environment and Energy* and has an integral model for the management of conservation of wildlife, forest resources, protected areas, watersheds and water systems.
Financial Institutions	
Costa Rica Por Siempre - Adolfo Artavia (program officer)	*Costa Rica Por Siempre* looks for other financial resources from governments, international NGOs, foundations outside of the country. The private non-profit NGO administers and distributes, for example, funds from the first debt-for-nature swap between the United States and Costa Rica to other non-profit organizations that execute projects. The organization also supervises, supports and revises technical / financial information on indicators for the successful implementation of projects.

	Most projects concern conservation areas out of protected territory that are in private hands in order to facilitate conservation, protection, restoration and sustainable use of forests and often capacitate local communities and organizations to better manage their territory or productive activities. The goal is also to help them improve their lives through local development and consolidation of entrepreneurship.
Private Sector	
CORFOGA - Leonardo Murillo Torres (head of research)	The corporation is a public institution whose objective is to foster livestock farming in terms of environmental viability, genetics, production, nourishment, animal welfare and national infrastructure. The institution integrates and represents its members that consist mostly of ranchers. *CORFOGA*'s purpose is helping the private sector through the guidance of its members. Moreover, economic, market and quantitative studies are conducted.
COOPEPIÑA - César Barrantes (environmental manager)	The cooperative of small pineapple producers is working towards improving the quality of life for their associates, families and the community through the generation of decent work and income. *COOPEPIÑA* sells fresh fruit with the *Fairtrade* certification having the ambition to harmonize production with the environment. Some of their projects include reforestation, restoration of fragile ecosystems within productive units, soil regeneration supporting producers towards their transition to organic agriculture. Their primary commercial client is *Nicoverde* (an initiative with a Blue Economy business model).
Research & Innovation Centers	
OET - Orlando Vargas (scientist)	The *OET* is a consortium of 50 Costa Rican, US, South African and Australian universities with 3 main purposes: conservation, education and research for a rational intelligent use of natural resources. In Costa Rica, there are 3 biological stations among which *La Selva* in Sarapiquí, where data on biodiversity is collected to inform public policy decisions.
CATIE - Ricardo Padrón (innovation & entrepreneurship expert)	The regional and international research center has existed for 50 years and has over 10 members from Latin America. Its three pillars are education, teaching master and doctor degrees, research units as well as extension which refers to the implementation of the gathered knowledge to bring impact in environmental and social terms to the partner countries and communities, grounded in scientific findings. Moreover, *CATIE* has its own active incubation center for rural entrepreneurs.
CCT - Alexander Gonzalez Vega (project coordinator for biological corridors)	The non-profit NGO is dedicated to acquire and apply knowledge that concerns the human relationship with natural resources of the tropics. Their work englobes project planification and implementation, direct communal work, management of their own protected areas, education, consultation, administrative support and spread of information. Studies have been conducted across three different continents: Latin America, Africa, Asia.
Ovation - David Valentiny (CEO) & Francois Gaspard (bioengineer)	*Ovation* is a resource center for changemakers, business incubators and entrepreneurs that harnesses effective methods for creativity and innovation in order to boost private sector development in nascent /emerging contexts.

International Donors	
GIZ - Daniel González Coto (technical advisor)	The German development agency *GIZ* has a variety of activities in Costa Rica. One portfolio concerns the biodiversity within businesses and has 5 components: 1) Program *Campo Al Plato* to integrate biodiversity in agricultural value chains; 2) innovative idea contests; 3) proposals for new financing models e.g. for biological corridors; 4) knowledge management through various tools; 5) value chain integration of so-called "auto mercados" that are responsible corporate companies which positively impact the quality of life of Costa Ricans, while addressing issues of national importance.
FAO - Raquel Hernández (nutrition consultant)	*FAO* supports governments and partners to design the right policies and programs to end hunger, promote food security and sustainable agriculture for millions of people around the world. The main goal is that people have regular access to enough high-quality food and nutrition to lead active, healthy lives. The focus in Costa Rica is to bring the topic of food insecurity on the agenda of local governments as the covid pandemic brought the need to rethink dependency on foreign markets for basic food items and agricultural inputs.
UNDP - Maureen Ballestero (project coordinator) & Jorge Cole (project coordinator)	*UNDP*'s mission in Costa Rica and worldwide is to eradicate poverty and protect the planet. The institution supports countries in developing strong policies, skills, partnerships and institutions so that they can sustain their progress. Starting 15 years ago, *UNDP* has worked on strategies for *Reducing Emissions from Deforestation and forest Degradation* (REDD). This encourages Costa Rica to protect, better manage and utilize their forest sources to fight climate change. Another project concerns climate finance from the *Green Climate Fund* that acknowledges Costa Rica's REDD efforts and fire management. This project involves a lot of participation of indigenous territories.
Independent Experts	
Guillermo **Navarro**	Independent consultant specialized in forest economics and policy, but generally working in the field of natural resource management and agriculture. He has work experience in the *FAO*, *CATIE*, two Costa Rican universities as an expert, researcher, dean and professor. Part of his research focuses on transforming cultivation and productive systems to be more sustainable through economic analysis.
Katie **Tavenner**	Independent consultant for gender, climate change and agricultural research for development. With a background and PhD in rural sociology and women's studies, Tavenner is now working on gender-related issues in areas such as biodiversity conservation, food security, livestock systems and natural resource management. Having been based in Costa Rica for several years, she also undertook a short-term consultancy for *CATIE* at the nexus of gender, climate security and migration patterns.
Pavel **Rivera Vargas**	Agricultural economist who is specialized in development and adaptation to climate change, working on climate risk analyses and green businesses. His experience englobes research at *CATIE*, university teaching, project coordination at *Fundecor* and he is currently engaged as an expert in the *International Union for Conservation of Nature*.

Karine **Steinvorth**	Circular economy expert and agronomist who specialized in practices of sustainable development and conservation that are more equitable and inclusive. She worked a lot in knowledge generation that allows projects and products to bring in the social component. Steinvorth also works as a consultant for *CATIE* and the private sector. 2,5 years ago she established her own business for the management and sustainable transformation of waste based on the principles of the circular economy.
Marielos **Alfaro**	Alfaro has more than 40 years of professional experience as a forest engineer specialized in economics, business and international trade. She worked in the academic sphere as a researcher, university professor and director of the *School of Environmental Science*, both at the *Universidad Nacional de Costa Rica*. During 2010-2014, she was a deputy of the legislative assembly, designing public policies for the environment, education and health. Moreover, Alfaro has been a member of trade organizations, the Board of Directors of the *Costa Rican Union of Chambers*, the Board of Directors of the *Costa Rican Social Security Fund* and she was the president of the *Forestry Business Chamber*. Besides, together with other partners she set up a company dedicated to giving advice on forestry and environmental matters.

Source: Author's own work (2023)

4- Semi-structured interviews - guiding questions

Questions for general understanding before Blue Economy presentation:

- What is your role and/or experience?
- What are the most important responsibilities of your institution?
- What is your opinion on Costa Rica's current model for natural resource management / sustainability? (This question was adapted at a later stage)

Questions to gather reactions after the Blue Economy presentation:

- What do you think about this concept?
- Do you think it is relevant in the context of Costa Rica?
- If yes, do you think it is feasible in the country?
- What should be done to implement and move towards the vision of a Blue Economy?
- From where should the impulse for change come first?
- What obstacles or challenges could hinder its implementation?
- Do you know any initiative that applies the four principles of the Blue Economy?

5- Fundecor's comments on the research results

To give more credibility to the research, results were presented to Carla Solís, project coordinator of *Fundecor*'s entrepreneurial program *Sinergia*, during an informal meeting on May 11, 2023. The following represents her opinions and suggestions when exposed to the contents of this thesis.

First of all, Solís explained that there is a dilemma between the work done by institutions and the money needed, which often has to come from external sources. For this reason, organizations many times face an issue of where to get the funds necessary for their projects. The role of the government should be supportive in the sense of providing a budget for the organization's work. But since the State itself has so many different institutions, it cannot do much and it has little budget even for its own capacitation. Same is true at the institutional level, the budget for employees to receive capacitation is very limited and thus the demand has to come from the employee's side and requires approval. Solís agreed that the government cannot take on the responsibility for change, because as its weight grows for taking on more matters, its costs go up at the expense of efficiency due to its bureaucratic structures. It is precisely for this reason that Solís recommended that the State entrusts part of its duties to other organizations. However, there is a lack of vertical and horizontal communication, which causes the isolation of efforts. Even within public institutions, such as the *MAG*, there are missing links between the different local extension agencies as well as between them and the central office in San José. This explains why certain projects take place in one area but might not spillover to the adjacent zone of influence of the same institution, because there are two separate local offices that do not coordinate or replicate their activities. The reason for which organizations in rural zones are better connected than in the central valley is the necessity to work together, not necessarily because the various actors are explicitly looking for these connections. Their collaboration is henceforth rather to be classified as coincidence than desideratum.

Concerning the proposed recommendations, Solís judged the facilitator and synthesizer roles much more practicable for *Fundecor* than the catalyst and agenda-setter ones. In fact, she strongly agreed that the proposed facilitation is in accordance with *Fundecor*'s general line of work. It is crucial to provide entrepreneurs with networking opportunities so that they connect with their local ecosystem, opening new doors. It is precisely for this reason that the idea of the *Sinergia Business Forum* was born, not so much for the external audience, but rather for the entrepreneurs themselves since their businesses also face issues of isolation. It is thus very helpful to offer them moments of collective interaction and exchanges to favor linkages and value chaining. Besides, it is important to mention that the *Sinergia* project has only existed for roughly two years, the project first had to grow its number of beneficiaries to now be able to connect them. In this sense, *Fundecor*'s team also plans to display all local entrepreneurs who participate in *Sinergia* on a dedicated website, to give them a platform that facilitates contact-making. Solís nonetheless appreciated recommendation n°5 in line with the facilitator role and stressed that it is rather a matter of finding appropriate funds than willingness to implement these types of initiatives from *Fundecor*'s side. Today, the project relies on funds from the *Development Banking System*, however, it would be interesting to explore and diversify financial sources. The funds of the latter, provided by the Costa Rican State, give *Fundecor* the credibility needed to seek for alternative resources. By being bound to the State's funds, the NGO and other participating organizations are also bound

to their rules, which limits space for creativity. The team is consequently open to new alliances in order to have a more flexible framework for their entrepreneurial programs.

Solís estimated the catalyst role to be quite difficult. Implementing "blue innovation" as criteria in *FONAFIFO*'s PES schemes is no easy task, mainly because many forest owners see PES as their right since they consider that their forests provide low value to them. Again, this is due to the ban on land-use change which takes decision-making freedom from forest owners for what to do with their lands. In *Fundecor*'s zone of influence, there are mainly two profiles of PES recipients: 1) cattle farms of around 20 hectares or more that do not depend on PES and use it solely as additional income source; 2) farms whose productive area is only 2-5 hectares with few animals, but who have a significant portion of forest, as for example, around 40 hectares. The latter need the PES to finance and maintain their productive activities. Still, Solís sees potential for the catalyst role but it requires a lot of effort in terms of increasing landowners' consciousness. Also, because farmers see these productive activities as their main business, it might be hard to motivate these PES recipients to take the risk of starting a new business. The profile that is more interested in seizing innovation are people without permanent jobs.

Regarding the agenda-setting role, Solís said it is not easy to influence public institutions. There is no existing dialog, even though *Fundecor* as inventor of the PES mechanism played a crucial part for *FONAFIFO*'s existence, as it provided the foundation for its creation. As a NGO, *Fundecor* basically could not distribute large amounts of public funds for which reason the State created a new institution. This is nonetheless what gave *Fundecor* credibility as a major actor of Costa Rica's strategy for sustainability. However, there are no direct communication links established and as said before, collaboration between institutions is more out of necessity than inclination. In the same sense, it is rather difficult to work with *SINAC*, but not impossible. Solís mentioned that *Fundecor* differentiates itself from other institutions by having a dedicated position for a manager of ecological and human resilience that further takes care of coordinating strategic prospective planning. Basically the person in charge is constantly looking for the creation of new alliances to enlarge *Fundecor*'s impact whilst keeping its values at the core. In Solís words, the NGO aims to be transcendent through seizing its learnings and experience from the past to incorporate new projects that respond to recent tendencies. Hence, *Fundecor* aims to maintain its relevance. This way of operating goes very well with the identity of a changemaker.

Finally, Solís considered the first steps to be a synthesizer rather straightforward as real initiatives such as the one of *COOPEPIÑA* already exist. The project coordinator explained that based on the first reforestation work done by small producers, it will be easier to convince larger ones to participate in a similar initiative. This would be of real interest, since it could lift conservation efforts to a larger scale. Such an initiative might further be financed by *Costa Rica Por Siempre*.

All in all, Solís considered the recommendations relevant, she only warned that everything that targets the involvement of public institutions is more difficult to tackle and that NGOs often face the limitation of resources as explained before. *Fundecor* definitely has adopted the role as changemaker throughout its history, with innovative projects and financial mechanisms for forest landowners to value their forests. They are thus open for new clues to pursue their vocation.

Consent Form

I, _____, agree to participate in the research project titled *the transition of Costa Rica to a Blue Economy - linkages between natural resource management and eco-innovation*, conducted by Luisa Schillinger who has discussed the research project with me.

I had the opportunity to ask questions about this research and I have received satisfactory answers. I understand the general purposes, risks and methods of this research.

I consent to participate in the research project and the following has been explained to me:

- the research may not be of direct benefit to me
- my participation is completely voluntary
- my right to withdraw from the study at any time without any implications to me
- the risks including any possible inconvenience, discomfort or harm as a consequence of my participation in the research project
- the steps that have been taken to minimize any possible risks
- what I am expected and required to do
- whom I should contact for any complaints with the research or the conduct of the research
- I am able to request a copy of the research findings and reports

In addition I consent to:

- audio recording of my interview
- being quoted myself or as representant of my institution
- publication of results from this study

Name:

Place, Date:

Signature:

Formulario de consentimiento

Yo, _____, acepto participar en el proyecto de investigación titulado *La transición de Costa Rica a una Economía Azul: vínculos entre la gestión de recursos naturales y la ecoinnovación*, realizado por Luisa Schillinger, quien ha discutido el proyecto de investigación conmigo.

Tuve la oportunidad de hacer preguntas sobre esta investigación y he recibido respuestas satisfactorias. Entiendo los propósitos generales, los riesgos y los métodos de esta investigación.

Doy mi consentimiento para participar en el proyecto de investigación y se me ha explicado lo siguiente:

- la investigación no es de beneficio directo para mí
- mi participación es completamente voluntaria
- mi derecho a retirarme del estudio en cualquier momento sin ninguna implicación para mí
- los riesgos incluyendo cualquier posible inconveniente, incomodidad o daño como consecuencia de mi participación en el proyecto de investigación
- las medidas que se han tomado para minimizar los posibles riesgos
- lo que se espera y requiere que haga
- a quién debo contactar para cualquier queja con la investigación o la realización de la investigación
- Puedo solicitar una copia de los resultados de la investigación

Además doy mi consentimiento para:

- grabación de audio de mi entrevista
- ser citado yo mismo o como representante de mi institución
- publicación de los resultados de este estudio

Nombre y apellido:

Lugar y fecha:

Firma:

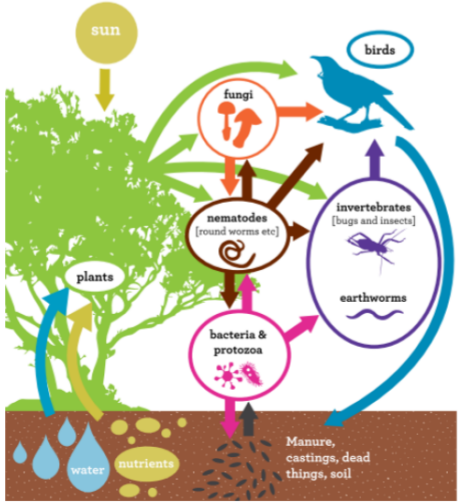
7- English version of the author's Blue Economy presentation that was used in the interviews

The Blue economy

iStock

Luisa Schillinger
Global Development Policy

March-May 2023



Guiding principles - 1

Be Continually Inspired by Nature

- consider "web of life", all interconnections in a system
- improve quality of the Commons, for everyone
- local diversification as basis
- use laws of physics

Department of Conservation, New Zealand Government

Familie

Redshift Autodesk

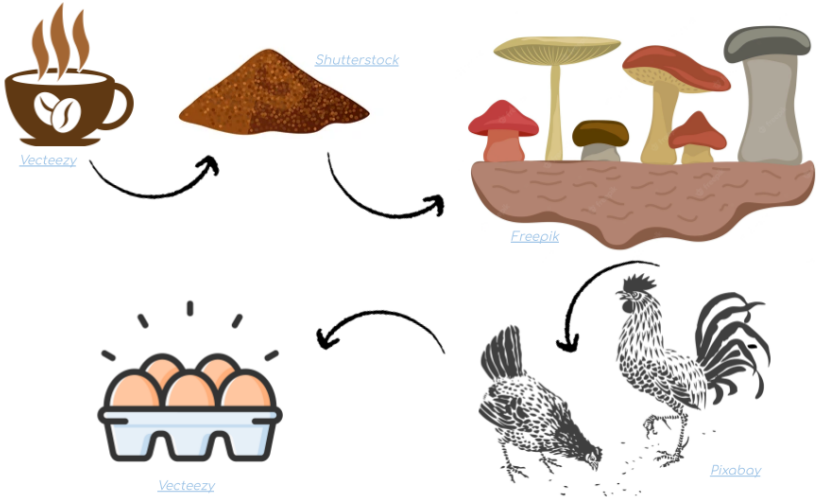
Guiding Principles - 2

Change the Rules of the Game

- design for continuous change
- multiple revenue streams
- respond to basic needs of generations today & tomorrow
- value everything & everyone

Flaticon

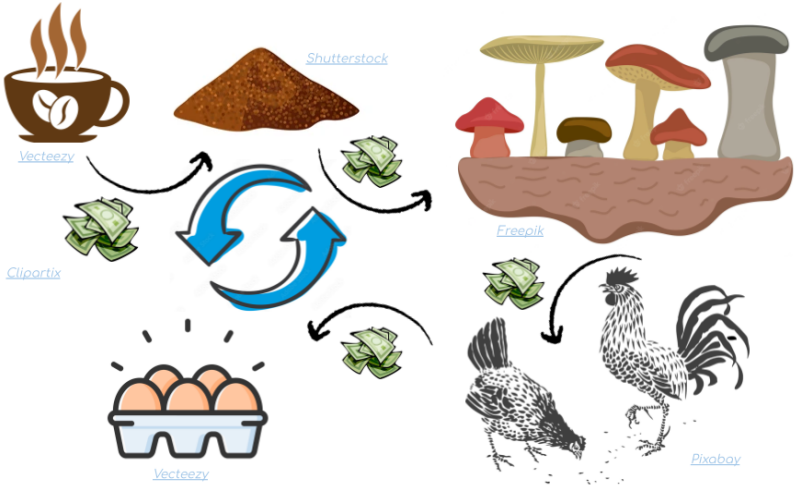
"Polluting less is still polluting"



Guiding principles - 3

Focus on What is Locally Available

- redirect money into local communities
- portfolio of local initiatives
- increase resilience
- ethics at the core



Guiding principle - 4

See Change as the Only Constant

"We have to be prepared to unlearn what we have learned"

THE BLUE ECONOMY - IN SHORT

How can we create a Blue Economy?

"By being inspired by Nature,
by changing the rules of the game,
first growing the local economy, in order to better respond to
people's needs through a much greater focus
on the use of what is locally available"

Gunter Pauli

CHALLENGES FOR THE BLUE ECONOMY

- ★ job loss in traditional industries
  => but creation of new ones
- ★ fundamental shift of business models that follow mainly a cost-cutting logic would be needed => portfolio approach
- ★ large corporations struggle to embrace multiple revenue model (e.g. Nestlé) => entrepreneurs

MAIN DIFFERENCES TO CURRENT ECONOMY

- ★ optimize the whole system, rather than just selected parts
- ★ not only eliminate negative impacts but create compounding positive outcomes
- ★ focus on consumption-driven growth vs. satisfaction of basic needs first and creation of local purchasing power
- ★ Blue Economy is a holistic approach that does not only focus on the economy and business models, but interplay of society and nature through efficient resource management

REACTIONS