

UNIVERSIDADE CATÓLICA DOM BOSCO**Master's Degree in Sustainable Territorial Development**

Highlighting, through three case studies in the state of Alagoas, positive environmental consequences generated by the support of local actions in Brazil

Mise en évidence, à travers trois études de cas dans l'état d'Alagoas, de conséquences environnementales positives liées à l'accompagnement d'actions locales au Brésil

Destacando, por meio de três estudos de caso no estado de Alagoas, consequências ambientais positivas vinculadas ao apoio de ações locais no Brasil

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PREFACE

This thesis is the result of Joint Master's degree in Sustainable Territorial Development (STEDE). This programme is offered by a consortium made up of the following universities: Università degli Studi di Padova (Italy), Katholieke Universiteit Leuven - KU Leuven (Belgium), Université Paris1: Panthéon-Sorbonne (France), Universidade Católica Dom Bosco (Brazil), the University of Johannesburg (South Africa) and the Joseph Ki Zerbo University of Ouagadougou (Burkina Faso). This program has a duration of 24 months. The course started at the Università degli Studi di Padova in Italy, followed by a semester at KU Leuven in Belgium, another semester at University of Paris 1 Panthéon-Sorbonne in France and a semester at Universidade Católica Dom Bosco in Brazil.

AVANT-PROPOS

Ce mémoire est le résultat du Joint Master Degree in Sustainable Territorial Development (STeDe). Ce programme est offert par un consortium constitué par les universités suivantes : Università degli Studi di Padova (Italy), Katholieke Universiteit Leuven - KU Leuven (Belgique), Université Paris 1: Panthéon-Sorbonne (France), Universidade Católica Dom Bosco (Brésil), University of Johannesburg (South Africa) and Joseph Ki Zerbo University of Ouagadougou (Burkina Faso). Ce programme a une durée de 24 mois. Le parcours a commencé à l'Università degli Studi di Padova en Italie, suivi d'un semestre à KU Leuven en Belgique, l'autre semestre à l'Université Paris1-Panthéon Sorbonne en France et un semestre à l'Universidade Católica Dom Bosco au Brésil.

PREFACIO

Esta dissertação resulta do Joint Master Degree in Sustainable Territorial Development (STeDe). Este programa é oferecido por um consórcio constituído pelas seguintes universidades: Università degli Studi di Padova (Italia), Katholieke Universiteit Leuven - KU Leuven (Bélgica), Université Paris 1: Panthéon-Sorbonne (França), Universidade Católica Dom Bosco (Brasil), University of Johannesburg (África do Sul) e Joseph Ki Zerbo University of Ouagadougou (Burkina Faso). O percurso começou pela l'Università degli Studi di Padova na Itália, seguido de um semestre em KU Leuven na Bélgica, outro semestre na Université

Paris 1- Panthéon-Sorbonne na França e um semestre na Universidade Católica Dom Bosco no Brasil.

Note: This master's thesis came about (in part) during the period in which higher education was subjected to a lockdown and protective measures to prevent the spread of the COVID-19 virus. The process of formatting, data collection, the research method and/or other scientific work the thesis involved could therefore not always be carried out in the usual manner. The reader should bear this context in mind when reading this master's thesis, and also in the event that some conclusions are taken on board.

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I hope this research project will empower local actors in Brazil and all around the world and contribute to give hope to many people.

Thanks to everyone for this extensive and immersive experience!

ABSTRACT

The global trend of accelerating green and sustainable initiatives is trying to influence changes in every country, through global treaties such as the Paris Agreement. Indeed, even if all countries have not had the same footprint on the climate crisis since the beginning of the Industrial Revolution, the system that is in crisis depends as much on each one. Moreover, as the IPCC (2022) continues to inform us, the environmental crisis and its consequences are exponential, however, the often dramatic social or political climate does not allow public authorities to participate in binding agreements and the pollution of plastic bottles comes second in their priorities. Social issues and ecological issues being linked, growing concerns to change the destiny of the planet are growing. The consequences of future social crises, such as climate refugees, are rooted in today's environmental issues. Global cooperation thus appears to be a necessity on the political agenda: planning virtuous ecological and sustainable paths is the only alternative to overcome the socio-economic challenges to come. The adaptive and resilient strategies of territories already suffering the consequences of climate change can serve as an example for both developed and developing countries. Investing now in adaptation strategies and exchanging knowledge and skills is crucial.

The evolution of Brazilian environmental legislation and its impact on the real exploitation of natural resources is necessary as a first step to change mentalities and set limits. However, other tools and means are essential to effectively prevent damage to the environment. Public and private organisations, as well as civil society, must be empowered so that they can implement and develop actions that are relevant and adapted to their context. In a vast and diverse country like Brazil, centralised actions are not effective ways to address challenges, local actions and decentralisation are opportunities to be further explored and encouraged.

A large part of the population living in Alagoas is socio-climatically vulnerable and lives in areas exposed to high risks of climate change. In order to prevent the worst scenarios, mitigation and adaptation operations must be implemented. However, socio-economic issues are at the heart of people's concerns, leaving environmental awareness far behind. Everyone with whom the subject of environmental concern or awareness has been explored has complained about a rather worrying breach in the environmental knowledge of average citizens. This deficiency is perceived as the result of misinformation or an inability to access information, rather than a lack of interest or consideration. The protagonists claimed a lack of education in all its forms, leading to prejudices that most people are uneducated. In addition, public infrastructure has been accused of preventing effective and frequent monitoring from

being carried out, thus undermining law enforcement. The situation aggravates citizens' loss of confidence in public bodies. The role played by external institutions in the implementation of the actions studied is crucial because they act as neutral bodies, not demonised by society. The small scale and the proximity between the actors and the results appeared as necessary conditions for a large commitment on the part of the communities.

The initiatives that have been implemented act either to protect, conserve or preserve the environment and natural resources. The possibility of positive environmental consequences lies in the creation of a situation of codependency, where economic benefits are integrated with the protection or conservation of the environment. Inequalities and local economic development being rooted in the daily life of most citizens within the study area, environmental means cannot be prioritised. However, actions and priorities will have to evolve over time, to follow the trend of improving environmental knowledge.

Despite the particularities of Brazil and Alagoas, the same kind of patterns and prejudices condition the minds of people all over the world; certain characteristics of the projects studied could thus be effectively reinjected into other territories.

Keywords : public policies; local development; positive environmental consequences; SEBRAE; local initiatives; global cooperation; education.

RÉSUMÉ

La tendance mondiale à l'accélération des initiatives vertes et durables tente d'influencer les changements de chaque pays, par le biais de traités mondiaux tels que l'Accord de Paris. En effet, même si tous les pays n'ont pas eu la même empreinte sur la crise climatique depuis le début de la révolution industrielle, le système qui est en crise dépend autant de chacun. De plus, comme le GIEC (2022) ne cesse de nous en informer, la crise environnementale et ses conséquences sont exponentielles, cependant, le climat social ou politique souvent dramatique ne permet pas aux pouvoirs publics de participer à des accords contraignants et la pollution des bouteilles en plastique arrive en deuxième position de leurs priorités. Les enjeux sociaux et les enjeux écologiques étant liés, des préoccupations croissantes pour changer le destin de la planète grandissent. Les conséquences des crises sociales à venir, telles que les réfugiés climatiques, sont ancrées dans les problèmes environnementaux d'aujourd'hui. La coopération mondiale apparaît ainsi comme une nécessité dans l'agenda politique : planifier des voies vertueuses écologiques et durables est la seule alternative pour pallier les enjeux socio-économiques à venir. Les stratégies adaptatives et résilientes des territoires subissant déjà les conséquences du changement climatique peuvent servir d'exemple tant pour les pays développés que pour les pays en développement. Investir maintenant dans des stratégies d'adaptation et échanger des connaissances et des compétences est crucial.

L'évolution de la législation environnementale brésilienne et ses impacts sur l'exploitation réelle des ressources naturelles est nécessaire comme première étape pour changer les mentalités et poser des limites. Cependant, d'autres outils et moyens sont indispensables pour prévenir efficacement les atteintes faites à l'environnement. Les organisations publiques et privées, ainsi que la société civile, doivent être responsabilisées afin qu'elles puissent mettre en œuvre et développer des actions pertinentes et adaptées à leur contexte. Dans un pays vaste et diversifié comme le Brésil, les actions centralisées ne sont pas des moyens efficaces pour relever les défis, les actions locales et la décentralisation sont des opportunités à explorer davantage et à encourager.

Une grande partie de la population vivant à Alagoas est socio-climatiquement vulnérable et vit dans des zones exposées à de hauts risques de changements climatiques. Afin de prévenir les pires scénarios, des opérations d'atténuation et d'adaptation doivent être mises en œuvre. Cependant, les enjeux socio-économiques sont au cœur des préoccupations des

populations, laissant loin derrière la conscience environnementale. Toutes les personnes avec lesquelles le sujet de la préoccupation ou de la conscience environnementale a été exploré, ont déploré une brèche assez préoccupante dans les connaissances environnementales des citoyens moyens. Cette carence est perçue comme le fruit d'une désinformation ou d'une incapacité à accéder à l'information, plutôt que d'un manque d'intérêt ou de considération. Les protagonistes ont revendiqué un manque d'éducation sous toutes ses formes, entraînant des préjugés selon lesquels la plupart des gens ne sont pas éduqués. En outre, les infrastructures publiques ont été accusées d'empêcher l'exécution d'une surveillance efficace et fréquente, sapant ainsi l'application de la loi. La situation aggrave la perte de confiance des citoyens envers les organismes publics. Le rôle que jouent les institutions externes dans la mise en œuvre des actions étudiées est crucial car elles agissent comme des organes neutres, non diabolisés par la société. La petite échelle et la proximité entre les acteurs et les résultats sont apparues comme des conditions nécessaires à un grand engagement de la part des communautés.

Les initiatives qui ont été mises en œuvre agissent soit dans l'optique de protéger, conserver ou préserver l'environnement et les ressources naturelles. La possibilité de conséquences environnementales positives réside dans la création d'une situation de co-dépendance, où les avantages économiques sont intégrés à la protection ou à la conservation de l'environnement. Les inégalités et le développement économique local étant ancrés dans la vie quotidienne de la plupart des citoyens au sein de la zone étudiée, les moyens environnementaux ne peuvent être placés en priorité. Cependant, les actions et les priorités devront évoluer dans le temps, pour suivre la tendance à l'amélioration des connaissances environnementales.

Malgré les particularités du Brésil et de l'Alagoas, le même genre de schémas et de préjugés conditionne l'esprit des gens partout dans le monde; certaines caractéristiques des projets étudiés pourraient ainsi être efficacement réinjectées sur d'autres territoires.

Mots-clés : politiques publiques; développement local; conséquences environnementales positives; SEBRAE; initiatives locales; coopération mondiale; éducation.

RESUMO

A tendência global de acelerar iniciativas verdes e sustentáveis está tentando influenciar mudanças em todos os países, por meio de tratados globais como o Acordo de Paris. De fato, mesmo que todos os países não tenham tido a mesma pegada na crise climática desde o início da revolução industrial, o sistema que está em crise depende tanto de cada um. Além disso, como o IPCC (2022) continua a nos informar, a crise ambiental e suas consequências são exponenciais, no entanto, o clima social ou político muitas vezes dramático não permite que as autoridades públicas participem de acordos vinculativos e a poluição de garrafas plásticas vem em segundo lugar suas prioridades. Questões sociais e questões ecológicas estando ligadas, crescem as preocupações em mudar o destino do planeta. As consequências de futuras crises sociais, como os refugiados climáticos, estão enraizadas nas questões ambientais de hoje. A cooperação global aparece, assim, como uma necessidade na agenda política: planejar caminhos ecológicos virtuosos e sustentáveis é a única alternativa para superar os desafios socioeconômicos que estão por vir. As estratégias adaptativas e resilientes de territórios que já sofrem as consequências das mudanças climáticas podem servir de exemplo tanto para países desenvolvidos quanto para países em desenvolvimento. Investir agora em estratégias de adaptação e trocar conhecimentos e habilidades é crucial.

A evolução da legislação ambiental brasileira e seu impacto na real exploração dos recursos naturais é necessário como primeiro passo para mudar mentalidades e estabelecer limites. No entanto, outras ferramentas e meios são essenciais para prevenir efetivamente os danos ao meio ambiente. As organizações públicas e privadas, bem como a sociedade civil, devem ser empoderadas para que possam implementar e desenvolver ações relevantes e adaptadas ao seu contexto. Em um país vasto e diversificado como o Brasil, as ações centralizadas não são formas eficazes de enfrentar os desafios, as ações locais e a descentralização são oportunidades a serem mais exploradas e incentivadas.

Grande parte da população que vive em Alagoas é sócio climático vulnerável e vive em áreas expostas a altos riscos de mudanças climáticas. Para evitar os piores cenários, devem ser implementadas operações de mitigação e adaptação. No entanto, as questões socioeconômicas estão no centro das preocupações das pessoas, deixando para trás a consciência ambiental. Todos com quem se explorou o tema da preocupação e sensibilização ambiental queixaram-se de uma preocupante violação do conhecimento ambiental dos cidadãos comuns. Essa deficiência é percebida como resultado de desinformação ou incapacidade de acesso à

informação, ao invés de falta de interesse ou consideração. Os protagonistas alegaram a falta de educação em todas as suas formas, levando a preconceitos de que a maioria das pessoas é analfabeta. Além disso, a infraestrutura pública tem sido acusada de impedir a realização de monitoramentos efetivos e frequentes, prejudicando a aplicação da lei. A situação agrava a perda de confiança dos cidadãos nos órgãos públicos. O papel desempenhado por instituições externas na implementação das ações estudadas é fundamental, pois atuam como órgãos neutros, não demonizados pela sociedade. A pequena escala e a proximidade entre os atores e os resultados apareceram como condições necessárias para um grande comprometimento por parte das comunidades.

As iniciativas implementadas atuam na proteção, conservação ou preservação do meio ambiente e dos recursos naturais. A possibilidade de consequências ambientais positivas reside na criação de uma situação de co-dependência, onde os benefícios econômicos são integrados à proteção ou conservação do meio ambiente. Como as desigualdades e o desenvolvimento econômico local estão enraizados no cotidiano da maioria dos cidadãos da área de estudo, os meios ambientais não podem ser priorizados. No entanto, as ações e prioridades terão que evoluir ao longo do tempo, para acompanhar a tendência de melhoria do conhecimento ambiental.

Apesar das particularidades do Brasil e de Alagoas, os mesmos padrões e preconceitos condicionam a mente das pessoas em todo o mundo; certas características dos projetos estudados poderiam, assim, ser efetivamente injetadas em outros territórios.

Palavras-chave: políticas públicas; desenvolvimento local; consequências ambientais positivas; SEBRAE; iniciativas locais; cooperação global; Educação.

LIST OF ABBREVIATIONS

AF Agricultura Familiar

AL Alagoas

APA Área de Proteção Ambiental

CAR Cadastro Ambiental Rural

COOPMAR Cooperativa de Trabalho dos catadores de Marechal Deodoro

COP Conference of the Parties

Embrapa Empresa Brasileira de Pesquisa Agropecuária

FAO Food and Agriculture Organisation

FNDE Fundo Nacional de Desenvolvimento da Educação

GDP Gross Domestic Product

GHG Greenhouse gas emissions

HDI Human Development Index

IABS Instituto Brasileiro de Desenvolvimento e Sustentabilidade

ICMBio Instituto Chico Mendes de Conservação da Biodiversidade

MEI Microempreendedor Individual

MSEs Micro and Small Enterprises

PNAE Programa Nacional de Alimentação Escolar

PNEA Política Nacional de Educação Ambiental

PNMA Política Nacional de Meio Ambiente

PNMC Política sobre Mudança Climática

PNRS Política Nacional Resíduos Sólidos

PT Partido dos Trabalhadores

SDGs Sustainable Development Goals

SEBRAE Serviço Brasileiro de Apoio às micro e pequenas empresas

SEMARH Secretaria do Estado do Meio Ambiente e Recursos Hídricos de Alagoas

SENAC Serviço Nacional de Aprendizagem do Comércio

SENAI Serviço Nacional de Aprendizagem Industrial

SENAR Serviço Nacional de Aprendizagem Rural

SENAT Serviço Nacional de Aprendizagem do Transporte

SESC Serviço Social do Comércio

SESCOOP Serviço Nacional de Aprendizagem do Cooperativismo

SESI Serviço Social da Indústria

SEST Serviço Social de Transporte

SNUC Sistema Nacional de Unidades de Conservação

UFAL Universidade Federal de Alagoas

UN United Nations

UPA Unidade de Pronto Atendimento

WWF World Wildlife Fund for Nature

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INTRODUCTION

The accelerating global trend for green and sustainable initiatives is trying to foster changes from each country, through global treaties such as the Paris Agreement. Indeed, even though all countries haven't had the same footprint on the climate crisis since the beginning of the Industrial Revolution, the system which is in crisis depends on everyone as much. Furthermore, as the IPCC (2022) keeps updating us about, the environmental crisis and its consequences are somehow exponential, rushing us to start (re)building a path which will make a future possible (see Annex 1 for climate projections). However, in these attempts from the “Northern” countries to hold the hand of developing countries in their path towards a transition, the often dramatic social climate doesn't allow public powers to participate into binding agreements. Indeed, in countries without proper sanitation systems and unable to provide enough drinking water to their populations, plastic bottle pollution comes second on the list of priorities.

Nonetheless, with the accumulation of scientific prevision displaying the evidence that social issues and ecological issues are related, growing concerns to change the faith of the planet have arisen. Having in mind that the causes of tomorrow's social crisis, like climate refugees, are rooted in today's environmental problems, global cooperation appears as a necessity in the political agenda. Indeed, planning ecologically virtuous paths, sustainably viable in not harming or degrading the environment, end up being the only alternative to alleviate upcoming socio-economic stakes.

However, while working towards this more sustainable model of society, the current social concerns have to be tackled, as they are present in every single territory. Indeed, even developed and stable economies encounter social crises. In the framework of a global network stratified by socio-economic issues, previous colonial empires need to work hand in hand with their past colonies. As in intergenerational human interactions, the oldest powers have a lot to learn from emerging economies, traditional communities and marginalised populations. Furthermore, with climate changes in each part of the world, some territories already encounter situations in which they need to adapt to their new environment, getting inspired by populations facing those contexts for decades. The adaptive and resilient strategies Bangladesh have been elaborating to face current and future climate change impacts place it as a key example for both developed and developing countries (Thomson, 2019). Coastal countries such

as France or Italy will face similar issues in the upcoming years, thus investing now in adaptation strategies and exchanging knowledge and competences is crucial.

Many studies have been trying to assess and evaluate the evolution of Brazilians environmental legislation and its impacts on the actual exploitation of natural resources (forests, water bodies, fauna, flora). However, even though a legal framework is needed as the first step in the changes of mentality and as potential threat for the bigger polluters, further tools and means are essential to effectively prevent the environment from being harmed. Indeed, political, economic and social constraints, tangible and intangible ones, disable laws to be truly enforced. The prevalence of unlimited-growth lobbies engaged in conflict of interest with every political sphere undermined possible massive sanctions. In the current Brazilians context, imagining creating environmental governance and regulation that disregard economic interest seems unpromising. To sustain changes toward a better use of natural resources, integrating economical benefits derived from those restrictions is imperative, as political, democratic and economic stability display uncertainties. Furthermore, Brazil's size, coupled with the great percentage of land falling under private property make law compliance monitoring incredibly costly, thus unfeasible. Bearing that in mind, environmental preservation and natural resources overconsumption reduction need more than a policy framework to be guaranteed (Cavalcanti, 2007).

RESEARCH QUESTIONS AND OBJECTIVES OF THE STUDY

POTENTIAL TO EXPLORED :

A study from Oliveira (2002) elaborated the need for decentralisation and inter-institutional cooperation to execute and implement concrete environmental actions at the local level. Public and private organisations, with the civil society, have to be empowered in order for them to implement and develop relevant and concrete actions in articulation with local power and actors influencing the decision-making. The S system (*Sistema S*), composed of 9 organisations¹ providing services of public interest, appears to be the adequate bodies to undertake this position, being independent from the governmental sphere. SEBRAE/AL (Brazilian Services Supporting Micro and Small Businesses/Alagoas) playing an extensive and active role, being respected and well-rooted in the state, have been chosen as the central point of actions' monitoring.

RESEARCH QUESTION :

Considering overall state development level and the intrinsic inequalities, how far interventions from external organisations aiming to support socioeconomic development through local actions can foster positive externalities over the environment ?

OBJECTIVES OF THE RESEARCH :

The aim here is to understand how the actual legislation towards small and middle-sized enterprises is practically implemented by local actors and to what extent those applications are impacting natural ecosystems. Furthermore, through the analysis of three case studies, we aim to spot and pull out the prerequisites for those initiatives to create concrete positive externalities on nature. By identifying those features, the replicability of those initiatives in other contexts will be assessed in order to potentially be implemented in different territories.

1. To report the consideration and level of concerns regarding environmental issues from the civil society, the political sphere and within local agendas, the reasons for it and the opportunities for improvement.
2. To characterise the role of organisations from the *Sistema S*, especially SEBRAE, in the state of Alagoas, and the potential other significant players in local action development.

¹ The organisations of the S System include : SENAI, SESI, SENAC, SESC, SEBRAE, SENAR, SEST, SENAT, SESCOOP.

3. To emphasise the genuine obstacles, tangible or intangible, hindering socioeconomic development, alleviation of inequalities and environmental awareness.
4. To measure the potential of local actions, and oppositely the importance of global movement.

LITERATURE REVIEW

BRAZIL : RELEVANCE OF STUDYING BRAZIL

1. UNEQUAL SOCIOECONOMIC FOUNDATIONS AND WORLD PLAYER

Monumental by its size - the fifth most vast land surface in the world -, and its number of inhabitants - more than 211 millions of inhabitants -, social and regional disparities are withering Brazilian endeavours to display fairness features at the height of its natural richnesses (Statista, 2021; Grottera et al., 2014). Among the podium of the tenth most significant global economies, Brazil still is an emergent economy - the second wealthiest after China - dealing with increasing inequalities and socio-democratic instability (Aklin et al., 2013). Trapped in a swinging economy, the nation went out of the Hunger Map (see Annex 2), built by the World Food Programme, in 2015, subsequently moving backwards since the pandemic (Silva et al., 2019; Grisa & Fornazier, 2018). Bearing in mind that one percent of the wealthiest Brazilians own the equivalent resources of the fifty percent of the most in need, expectancies for a more balanced society are swelling (Grottera et al., 2014). Characteristic of developing countries, 33% of Brazilians citizens didn't had proper access to quality water in 2013, revealing how low income classes happened to live in extreme poverty (Centro Sebrae de Sustentabilidade et al., 2014; Grottera et al., 2014).

2. LENGTH IMPASSE

Larger than Europe (see Annex 3), equipped with suboptimal and poorly maintained road and transportation infrastructures, the connectivity between some municipalities happened to be inexistant. The road network, used in 90% of passenger transportation and globally ranked 116th out of 141 for its quality, interconnects all the 5,500 municipalities dividing the federal territory (CNT, 2021; Centro Sebrae de Sustentabilidade et al., 2014). Tragically, intensifying extreme weather events - recent flooding in the state of Pernambuco and Alagoas (see Annex 4) - and economic activities - ore transportation in the Pantanal region-, accentuate its alteration. Further hindering large scale planning, uncertainties and obstacles for collective actions organisation and centralised initiatives are innumerable.

3. NATURAL AND ENVIRONMENTAL RICHNESS

Major economic player in the contemporary world, its world-crucial biodiversity makes Brazil an essential environmental player too, Annex 5 illustrates the phenomenon (Aklin et al., 2013). With the widest-ranging biodiversity of the planet, qualified as a “megadiverse” region, the crisis accumulating in the country doesn’t allow for ecological concerns (Centro Sebrae de Sustentabilidade et al., 2014). In the middle of a political crisis, with human rights and social inequalities anchored, its incapacity to administer an ecological transition makes it a relevant case to analyse. Global warming consequences impacting predominantly developing nations, this study intends to understand how to implant environmental matters together with social and equality urgencies, with the ambition to replicate and divulge the model.

CONTEXT

1. BRISK POLITICAL HISTORY

The Federal Republic of Brazil is composed of 26 autonomous states and a Federal District, presented on Figure 1, together forming the Union, each regulated by its own constitutions complying with the federal constitution. Governors of state as well as mayors (*prefeitos*) play an important role in the legislative process, similar to the president on a smaller scale (ECLAC, n.d.). Brazil is a federal republic whose first Republican constitution was issued in 1891, nearly four centuries after the beginning of the Portuguese colonisation and several decades after its independence in 1822. Two dictatorships and six constitutions later, the current constitution has been enforced since 1988 (BrazilianLegalSystem, 2013). The unearthly capital city, Brasilia, erected in the middle of the *Cerrado*² in 1960, without attention for its physical and biological conditions, by the president of the time, Juscelino Kubitschek, still the only city from the XXth century acknowledged by UNESCO, and is today mainly composed of executive and legislative federal bodies (GEO, 2022).

² Tropical savanna



Figure 1 : Map of Brazilian states (Alice Terpereau, 2022, Arcgis)

Weak from corruption and political scandal in every layer of the government, Brazil has been running backwards on numerous cases since the 2018 election. After some noticeable social improvement thanks to Luiz Inácio Lula da Silva - Lula - mandates and some controversial years governed by Dilma Rousseff's government - PT (Partido dos Trabalhadores) and Lula's favourite-, the principal achievements of the previous government have been left behind. Indeed, between 2001 and 2004 - Lula's times -, an estimated 5 millions people went forth from misery by the means of revenue transfer programs (e.g. Bolsa Familia, pensions benefits ...) (Grottera et al., 2014). Vulnerable to global trends, especially from its partners in trades like China, a political set-up suffices for the impeachment of Dilma Rousseff in 2016. Corruption scandals involving both Lula and Dilma cleaned the path for the rise of nationalist populism, misogynous, pro-religion climatosceptique former military Jair Bolsonaro, ongoing president. Authorising Amazon's exploitation, cutting off social and environmental budgets, Bolsonaro has been swimming in the other direction, letting the majority of the population drown behind. Worshipped by a large segment of the catholics, which account for more than half of the population, Brazil tallying the utmost number of catholic in the world (see Annex

6), his dramatic Covid-19 management made the country second harshly hit, 150,000 deaths were gauged in October 2020 (Statista, 2021; Climate Transparency, 2020). However, the vast majority of present socioeconomic indicators failed to portray the evident situation of Brazilians, omitting the political changes and the pandemic effects. The pandemic stroked the Brazilian economy, agricultural activities being prevalent in its share of exportations and extremely sensitive to global wellbeing (Grottera et al., 2014).

2. INDUSTRIALLY AND POWER-BASED AGRICULTURAL SECTOR

Historically, food production and foreign exportations acted as an open door for Brazil to integrate the global trade market and the global labour market (Grisa & Fornazier, 2018). Today, agribusinesses are the ones dynamising the Brazilian economy, global leader in a wide range of products - from monoculture production - such as sugar cane and palm oil, the sector profit from the most whopping suitable land for cultivation worldwide (CNA, 2018). With 30% of the total national territory dedicated to food production, the whole system displays the same trend as the rest of the economy : unequal distribution over the resources with 75% of cropland and 75% of agro-policies serving roughly 500,000 large-scale plantations, the remains destined to 4 millions of miniscule rural producers (CNA, 2018; CIRAD, 2022). The unrestrained influential power of the agricultural empire, in a hastily industrialising Brazil, engenders conflicts over lands and occupants (e.g. indigenous communities, croft owners, environmental defenders) (Aklin et al., 2013; CNA, 2018).

3. FOOD INSECURITY, DEFENCELESS NATURE AND GOVERNMENTAL ATTEMPTS

The south of Brazil is likewise coated by soya monoculture, characterised by a deficient yield per hectare, requiring interminable cropland expansion and deforestation (CIRAD, 2022). The nation-wide trend for unsustainable pasture and cropland expansion participates further into human and nature vulnerability, wreaking harsher competition over land and water resources (IPCC, 2022). Despite its leader position regarding food production, food insecurity is a major issue all over the country (see Annex 2). This serious matter attempt to be addressed by the government, failed in the treatment chosen : even though productivity is to mend sustainably - yield gaps reduction worldwide could reached up to 75% according to EAT-Lancet Commission (2019) -, food waste and accessibility are root causes for food precariousness (Grisa & Fornazier, 2018). Furthermore, the global food production system,

driven by detrimental diets advertised through food industries campaigns, shove planet boundaries practically all alone (IPCC, 2022; Porpino, 2018).

4. UNBALANCED DIETS

The cultural traits, prejudices and behaviours embedded in food habits amplify the complexity to consciously convert them (Porpino, 2018). Abundance-lovers, inherited from Latin culture, over-buying and over-cooking Brazilian inclinations, magnified during the crisis, turned out to be a horribly unsustainable pattern. The disdain for leftovers, giant consumption of meat (around 100kg/inhabitant/year) and misuse of fruits and vegetables compared to over-processed food, make Brazilian lifestyle unsustainable for health, with an unbalanced provision of nutrients, and for the environment, with 55% of fruits and vegetables wasted in the entire Latin America, between other causes (Embrapa, WWF-Brasil, 2019; Tillous-Borde, 2021; Porpino, 2018). To handle both predicaments, governmental policies and industrial priorities over the agricultural sector should be reoriented from quantity to quality output (EAT-Lancet Commission, 2019).

5. FOOD SYSTEM METAMORPHOSIS

Moreover, high vulnerability resulting from agricultural activities, put the entire country at risk ahead of climate change, urging for risk management policies (Grottera et al., 2014; CNA, 2018). Massive agricultural lobbyists are shooting themselves in the foot, as agriculture accounts, with deforestation and energy sectors, for the top 3 greenhouse gas emitters, source of climate change (Centro Sebrae de Sustentabilidade et al., 2014). Even though environmental preoccupation is far on the list of priorities, sustainable practices to mitigate climate crisis, adapt its economy, provide basic needs to its population and maintain its valuable natural resources, are yet reachable (Puppim de Oliveira, 2002). Cradle of vital ecosystems : the Amazon forest, 3.6 million km² of maritime zone, more than 15% of all swept water in the world (besides glaciers & ice floe), thousands of hectares of forests, swamps, rivers, an immense variety of biomes - 6 in total : Amazon, Cerrado, Caatinga, Atlantic Forest, Pampa and Pantanal - and the joint biodiversity (see Annex 7), Brazil account for a great share of planet's lungs and could become a groundbreaker in the ecological transition (FAO, 2021). Alongside, the national greenhouse gas emissions per capita were slightly lower than the comparable G20 : 6.96 tCO₂ eq./capita versus 7.32 tCO₂ eq./capita

(Climate Transparency, 2020)³. With 463 millions of hectares covered by forest - 54% of the total territory-, 20% of global carbon is stocked in Brazilian trees (Centro Sebrae de Sustentabilidade et al., 2014). Thus, in the hope of reaching climate ambition, the current weakening of the forest governance need to be reversed and coupled with pastureland restoration, enabling a deceleration in the increase of climate change costs, already annually amounted to 1.72 billions dollars just for extreme weather events expenses (Climate Transparency, 2020).

Time and crisis empowered the role of the government and other public bodies in dealing with socio-economic issues (Grisa & Fornazier, 2018). The large and diverse distinctiveness of Brazil compels for decentralisation in the decisional and operational power to local actors. The northern regions, generally populated by African or Indian former slave descendances⁴, happened to be the poorest, the most socially disparate and subject to climate change impacts (Grottera et al., 2014).

³ These numbers are subject to changes regarding the latest changes in political trajectory.

⁴ The abolition of slavery in Brazil is rather recent, dated to 1888.

ALAGOAS

The state of Alagoas, located in the region Nordeste, is hosting the most impoverished populations, despite its resourceful territory. Composed of 102 municipalities, disseminated among two different biomes, the state is unevenly developed and the resources and wealth unevenly shared, each area having its own characteristics and demands (Silva et al., 2019). Each part of the territory is peculiar in terms of climate conditions, and thus in terms of fauna and flora, all in need to be protected and better considered by both the populations and the legislative system. A large part of the territory, bordering on the littoral from north to south, belongs to the Atlantic Forest, from which 93% already disappeared under slash-and-burn practices or urbanisation schemes. Sugar cane accounts for the greatest amount of monocultures in Alagoas, destroying biodiversity, reducing territory resilience to market prices and weather events. As mentioned above, one of the main issues the state is facing in its path to further development is the variety of local context, the lack of public infrastructures and the tremendous distances separating municipalities, farms and inhabitants (see Annex 8 to grasp the distances and the velocity allowed by the roads). The general low income reflects the insufficient education level and knowledge availability (SEBRAE, 2006). Shallowly palliating the reduced purchasing power, a small businesses economy started to build up through local retailers, offering affordable prices (Silva et al., 2019).



Figure 2 : Map of Brazil displaying the region of Alagoas (left) (Alice Terpereau, 2022)

Figure 3 : Map of Alagoas describing the physiographic regions (right) (Lyra et al., 2014)

LEGISLATIVE SYSTEM

SEBRAE, *serviço brasileiro de apoio às micro e pequenas empresas*

Across a top to bottom model, a wide range of laws have been introduced and are still being improved by a broad ecosystem, including institutions like SEBRAE, to address MSEs issues. Created as a governmental institution in 1972, SEBRAE is, nowadays, autonomous. One of their functions is to strengthen and facilitate social and inclusive development (Smits et al., 2018). Indeed, facilitating daily activities of entrepreneurs and family businesses has been a key development factor in Brazil for more than two decades. The legislation implemented at the higher level displays a governmental incapacity to act locally, necessitating local initiatives to grow and effectively make a difference in the average Brazilian's life (Silva et al., 2019). Through the political and legislative structure of the country, federal initiatives have to be adapted by local actors, following global movement while responding to peculiar context. In this legislative warfare, the organisation has been the representative force of unheard bodies, pressuring for more inclusive governmental tenders and public policies, soliciting preferential treatment and access to microcredit, administrative and tax schemes (Smits et al., 2018; Centro Sebrae de Sustentabilidade et al., 2014). Precarious businesses necessitate fiscal help to sustain their activities, however other needs also need to be palliate to ensure a viable company. Different needs coming from small business owners, like skilled employees and management tools, have been identified and are trying to be addressed by institutions like SEBRAE and by municipalities (Smits et al., 2018). Acting as lobbyists of family business interests' and directing the focus over their reality, the government finally started to esteem small-scale businesses for their positive externalities over the society : levers for unemployment and inequalities, rooting local development virtuous cycle (Silva et al., 2019; Centro Sebrae de Sustentabilidade et al., 2014).

LEI COMPLEMENTAR

In the attempt to balance the weight of agro-industries and improve local sustainable economic growth through entrepreneurship, the *Lei complementar n°123* was released in 2006, following years of struggle (Smits et al., 2018). Even though the legal status of small-businesses and their particular treatment dated from 1984 and 1988 respectively, the fundamental principle was to establish a clear definition of each business owner's status in the law, acting as a recognition phase, finally opening their possibilities.

According to the *CC. L. 10.406/2002 art. 966*, “An entrepreneur is considered as someone who professionally carries out an economic activity organised for the production or circulation of goods or services”.

The financial status of micro and small businesses is defined in the *LC. 123/2006* as follow :

- “micro-enterprise earn in each calendar year a gross revenue equal to or less than R\$ 360,000.00” ($\approx 69\,365$ EUR⁵);
- “small enterprise earn in each calendar year a gross revenue greater than R\$ 360,000.00 and equal to or less than R\$ 4,800,000.00” ($\approx 924\,855$ EUR).

Recognition and status can appear as highly important matters. Indeed, the production of manioc flour passing from industrial to rural activity in Alagoas in 2002, brought consequential changes for small regional producers at the time (SEBRAE, 2006). Despite the long list of social and economic advantages for Brazilians, influencing the law makers in the right direction has been a continuous combat, where the control gain over invisible transactions and trade was decisive. Jumping from 5 millions to 14 millions of formally registered businesses falling under the new status, the wish for illegal activities reduction was a central issue to prevent regulatory and institutional uncertainties (Grottera et al., 2014). Since its establishments, amendments and extensions have been applied to further facilitate those businesses’ activities, revisions are effectuated every 2 or 3 years, aiming to directly address their issues, overcoming socio-economic urgent problems. Besides taking up a census of commercial activities among its citizens, the formalisation of small business owners permits those actors to enter the formal market, giving them potential access to more tools, money, knowledge and power, thus equipping them to face broader issues. The state, through the strengthening and the enablement for coalitions, play the main role in protecting those precarious actors by the means of public policy, as they remain the pillar of the Brazilian economy (Silva et al., 2019).

Other legislative status have been created to respond to the peculiar business model present in more remote areas. Businesses falling under the denomination *Agricultura Familiar* gather small scale producers, encountering logistical or distributional difficulties (Instituto Federal de Alagoas, 2022). Besides the recognition of this status and the socio-economical advantages derived from the creation of this special treatment, turning family farms formal

⁵ The conversion rate applied was the one in force the 20th of August, 1EUR = 5,19R\$.

allows them to better deal with conflicts over land and regulate labour, crime and other uncertainties lingering over farmers' daily life (CNA, 2018). *Microempreendedor Individual* (MEI), created later on in 2008, aimed at turning services providers and retailers without employees, formally, acquitting a fixed and unique tax of almost 50 Reals per month while giving access to social security (Smits et al., 2018). This last status elaborated was of great importance, indeed, in the state of Alagoas, 70% of small companies are categorised as MEI. Starting an entrepreneurial activity, besides the hope for financial improvement, opens the way to getting integrated into society and stop being marginalised from the economic system (Silva et al., 2019). In the framework of creating this link between individual entrepreneurs and the society and to facilitate all processes a MEI could be needed to execute, the *Portal do Empreendedor*, an online platform relating all the governmental services (e.g. tenders, tools ...) was developed (Smits et al., 2018).

The federal law classifying all types of businesses and their tax regimes attempt to balance negative externalities (e.g. relative to the environment, health, noise ...) that potential activities could create on a territory and its society. Thereby, activity of low impact (*baixo impacto*) and high impact (*alto impacto*) doesn't benefit from the same rules and opportunities to acquire certain mandatory licences.

TAXES AND INEQUALITIES

The tax system, mainly relying on indirect taxes over consumption of basic products, and with a non-progressive tax over wages, layer the society by preventing any stable economic situation to be reached for average Brazilians. Until the implementation of the law in 2006, complex, time- and money-consuming administrative processes were imposed for small and micro-enterprises development for more than fifty years (Smits et al., 2018). Spreading a no one-fits-all approach, SEBRAE actions (e.g. courses, seminars, events, individual support ...) allowed the overall informal sector to lessen (Silva et al., 2019; Smits et al., 2018; Grottera et al., 2014). The implementation of the SIMPLES/SIMEI Nacional, the online platform decentralising the payment of taxes for small companies, made possible the enforcement and monitoring of those improvements in the entire country. By collecting together the former 8 federal taxes into one and only monthly contribution, the new platform drops the barrier of bureaucracy (Smits et al., 2018). Other gradual improvements allowed for smaller producers to access different markets, a differentiated tax scheme over interstate and intrastate trade (SEBRAE, 2006).

PUBLIC PROCUREMENT

With more than 400 billions of Reals dedicated to public procurement in Brazil for the year 2014 alone, the role public spendings can play in the development of local and precarious companies appear as major (Centro Sebrae de Sustentabilidade et al., 2014). However, embedding local businesses in public procurement needed for legal obligation, as habits always granted public tenders to large companies. Indeed, the delocalisation of multinational corporation production's in the sixties filled the country with powerful commercial actors, benefiting from cheap labour force and incentivising financial measures. Nonetheless, with 99% of Brazilian businesses categorised as small ones, attempting for more equity in the allocation of public procurement is the core objective in every legislative debate and improvements (Smits et al., 2018). All the enhancement states further are imposed to municipalities whose responsibility is to enable the conditions for the new amendments to be respected. Through the attempt to sustainably integrate them into public procurement, these characteristics of the law aim for producers to acquire more economic stability and guarantee over their investment in their own business.

CHALLENGES

Despite the genuine benefit for the society derived from small businesses expansion and development, the constant disregard from the overall population, especially from the one in power, is undermining their capacity to flourish. The global financial crisis, in 2009, highlighted their ability to resilience, in comparison with large businesses, with 450 000 new employment created from small enterprises only (Centro Sebrae de Sustentabilidade et al., 2014). On top of their resilience potential, which is crucial in uncertain times as today, MSEs account for half of the current formal employment of the country, providing jobs to millions of people (Smits et al., 2018). Besides being essential actors for local development, as well as in addressing societal issues, 27% of the national GDP resulted from their activities in 2011 (Silva et al., 2019; Smits et al., 2018).

However, systemic and rooted ills keep slowing down and hamper prosperous advancement of small entrepreneurs. As Silva et al. (2019) identify in their work, the “grip to power and corruption” has been the major threat and obstacle to proper development from a side of the society and to adequate poverty reduction attempts. The burden embodied by

institutions and the elite force, influencing principal decision processes, have been holding back the country's development capacity.

ENVIRONMENTAL CONCERN

The literature detailing the importance of environmental conservation, protection and its importance is extensive in all kinds of sectors, means of conservation and area of the world. The reason for this study grew through different prisms, bearing in mind the importance of a healthy environment, a healthy planet and a sustainable living environment with the aim to maintain and foster an adequate social, economic and healthy environment. Indeed, with environmental warnings rising, all actors at global scale will have to take their responsibilities sooner or later. By assessing today the opportunities for environmental preservation, tools to achieve long-term targets while addressing other issues more locally grounded, are at the core of the objective of this study. As attempting to protect the environment and slow down the climate catastrophes happening implies attempting to protect the most precarious ones and vulnerable to global warming consequences (see Annexes 1 and 9), analysing one of the poorest states of Brazil aims to understand how far the Brazilian economy of today can prevent the Brazilian economy of tomorrow to collapse.

The idea of a sustainable society as a whole is growing on each side of the Atlantic Ocean, with this trend of integrating sustainability, climate change mitigation and adaptation initiatives into each sector of the economy and of our daily life. Even though a strict and well-defined scalable plan will be one of the more favourable methods to achieve broad, unclear and complex objectives, many territories, political schemes and societies are not even close to ready to adopt this systemic approach. However, whatever the path and techniques chosen to achieve at least one of your objective, a proven opportunity for more efficient initiatives is to anchored these changes at local scales, supporting and guiding citizens, providing them with concrete tools, knowledges and goals, putting their future in their hands (Le monde, 2022).

HUMAN RIGHTS

Compiling basic Human Rights and getting closer to some kind of justice is intrinsically embedded with the actual climate crisis. Indeed, the Right to a Healthy Environment is a universal right, meaning that it should be accessible to everyone, and yet is far from being respected. Defending Environmental Human Rights actually consist in protecting the rights of humans to have access to basic and safe environmental conditions, as depicted by Amnesty International. Furthermore, in the framework of climate justice, we can perceive in Brazil, as in all other countries in the world, a systematic exclusion and a power

imbalance when it comes to short term efforts and long term benefits regarding the climate crisis. Governmental decisions tend to focus more on economic incentives than on environmental concerns. Policies fostering national economic prosperity and thus economic development confront the role of the government in protecting the national territory, its environment and its natural resources even though long-term losses in livelihoods due to climate change are to expect, and are already displayed (Puppim de Oliveira, 2002; Bouças da Silva et al., 2022). Furthermore, the current economic growth and emergent characteristics of the country intensify and tend to legitimise the increase in greenhouse gases emissions (Grottera et al., 2014). While, the pressure over the environment increases collaterally with the demand for products and services, the environmental side of economic growth cannot be disregarded anymore (Centro Sebrae de Sustentabilidade et al., 2014)

BIODIVERSITY

Home of the widest biodiversity hotspot, Brazilians natural richness have been subject to the goodwill of political and economic ambitions while being undervalued (Centro Sebrae de Sustentabilidade et al., 2014; FAO, 2021). Amazonia is currently, through legal and illegal means, being over-exploited, lessening its capacity to store the world carbon, which might lead to irreversible damage. Preventing deforestation is the more straightforward action to take, depicted by the forestry sector as the top emitter of greenhouse gases emissions in 2005 (Grottera et al., 2014; Climate Transparency, 2020). However, the Amazon is also the biome most valued by the international community, thus at the centre of multiple protection actions, unlike others. The Atlantic Forest, cradle of numerous and diverse species, has been subject to disruption leading to 91% of its destruction as of today (Centro Sebrae de Sustentabilidade et al., 2014). This national trend of destruction was highlighted in 2008 by the Ministry of the Environment, stating that 70 species of mammals and 100 of birds were at threat of extinction (Centro Sebrae de Sustentabilidade et al., 2014). However, biodiversity doesn't refer only to wild mammals, it refers to the entire natural world and its richness : animals, plants and microorganisms (Centro Sebrae de Sustentabilidade et al., 2014). Those two other parts are of equal importance, and yet they are left behind. Indeed, in order to feed the growing world in upcoming changing conditions, variety in seeds and their characteristics is crucial. However, as the IPCC dramatically highlighted it (2022), endemic species in biodiversity hotspots are at consequential risk of extinction. Brazil, with only 8 plant species integrated in a proper production chain (e.g. peanuts, cocoa, manioc...) isn't preparing itself for adaptation, putting its farmers and the global population at risk of food shortage (see Annex 10) (Embrapa,

WWF-Brasil, 2019). While food preparation has been the source of our civilisations, spread diets of today have nothing to do with our ancestors' nutrition pattern. The vicious cycle of monocultures spreading, diet simplification and biodiversity reduction gradually made their roots in our food habits, seeming impossible to modify today (Embrapa, WWF-Brasil, 2019).

AGRICULTURE

Today's agricultural system is the source of various greenhouse gases emissions, among the worst : methane due to cattle raising and nitrous oxide due to synthetic fertilisers. Those characteristics make agriculture and livestock activities the sector with the greatest carbon intensity, displaying the un-sustainability of predominant food systems (Grottera et al., 2014; FAO, 2021). Furthermore, in a country like Brazil, where the agricultural sector is the pillar of the economy, the climate crisis is increasing the vulnerability of the country's economy and population (Grottera et al., 2014). However, despite this concern raising parameters, the influence of lobbyists and powerful actors undermined any attempt to modify the system in place. The state of Mato Grosso do Sul, frontier with Bolivia, is home of thousands of hectares wide fazendas and agro-industries, making the whole state dictated by the interests of wealthy Brazilian individuals, thriving from environmentally destroying activities, illustrating in Figure 4 (Aklin et al., 2013). Despite the present and future threat to the Brazilian people, political schemes tend to focus more on economic development, disregarding the long-term effect of such a system (Puppim de Oliveira, 2002). In this framework, governmental actions and policies aren't designed towards the needs of small property owners. In an attempt to compensate for the failure of support allocated to them, SEBRAE, with the technical and scientific support of Embrapa and other third sector organisations, is trying to spread knowledge and modernity up to these properties. Largely expecting innovation and technology to help this segment of the society to grow out of misery, support, training and means are made available in a growing surface of rural territories, SEBRAE being one of the main forces.

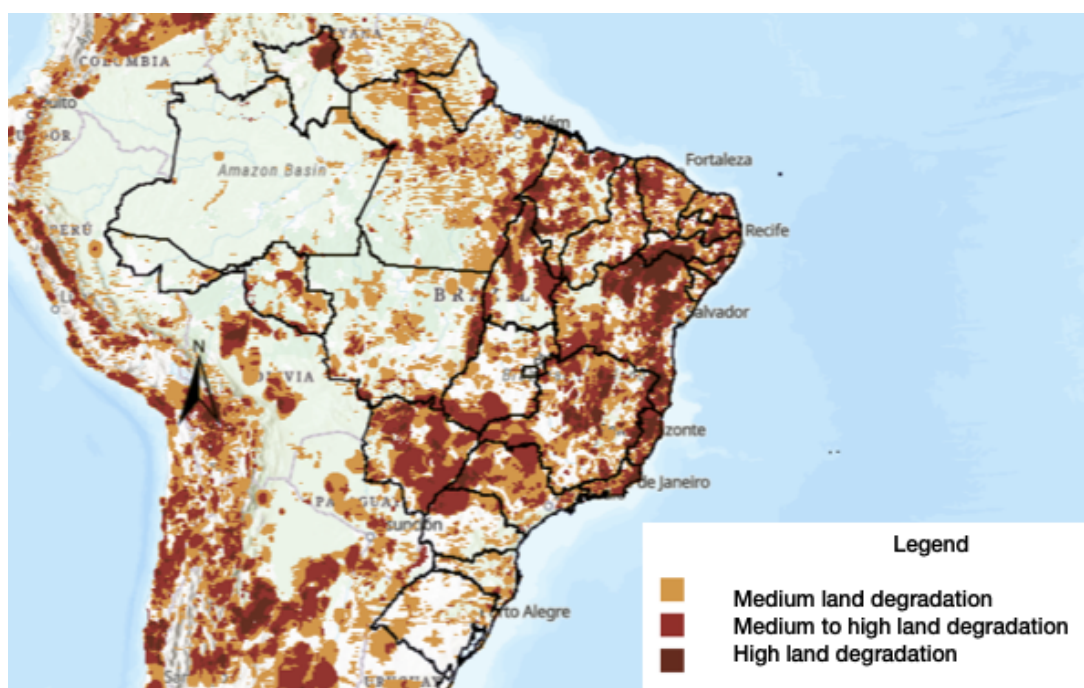


Figure 4 : Land degradation in Brazil (and Latin America) (Source : Map Service)

INNOVATION

Innovation has been driving several sectors in Brazil, notably through the Law of Innovation (*Lei de Inovação*) and the Law of Goods (*Lei do Bem*), providing companies with different incentives to innovate : fiscal incentives, diminishing bureaucracy, promoting international cooperation ... (Smits et al., 2018). Engines for regional development, innovation and entrepreneurship are seen as a means to address issues (Silva et al., 2019; Grisa & Fornazier, 2018). The agricultural sector is particularly in need for innovation and new technologies integration (CNA, 2018). Even though some updates have been incorporated to the law, there is a crucial need for inclusive public policies dealing with innovation. Indeed, if well implemented and properly accompanied, innovation can allow for local development, and even open lucrative activities having positive side effects on the environment and its natural resources (Silva et al., 2019; Centro Sebrae de Sustentabilidade et al., 2014). Technologies can increase possibilities and help organisations or even the government to become more efficient in its actions, serving the common good. The Cadastro Ambiental Rural (CAR) implemented through the *Codigo Florestal* - law relating to forest management and forestry sector- aimed at mapping rural owners, to monitor their impact over nature (Centro Sebrae de Sustentabilidade et al., 2014).

EARTH-WIDE PROTECTION PROJECT

Shift in seasons occurrence, weather events, water cycles are affecting populations all over the world. Brazil, subject to high-rain season due to the presence of the Amazon forest - accumulating large amount of water which liquefy all over the country into tropical rain - is already encountering dramatic drought and rain episodes, putting directly in danger human life, equilibrium of fauna and flora and damaging infrastructures (Le monde, 2022). Worldwide strategies are being elaborated, such as the “Half-Earth” project, aiming at protecting the remaining 50% of intact ecosystems spread all over the world to conserve natural richness. However, those strategies lie on the goodwill of each country to take adequate measures. In Brazil, economically relying on agricultural activities, the greater impact could come from a shift in land management and agricultural techniques (EAT-Lancet Commission, 2019).

HEALTH AND CLIMATE CHANGE

Swinging economies like Brazil can't always rely on basic sanitation, almost taken for granted in tiny European countries. However, extreme droughts which have occurred during the past summer introduced to Europeans issues well-known from a large proportion of the world population. Indeed, access to potable water is, for instance, a growing concern both in developing and developed countries. This pattern displays how codependent our health is with the planet and the natural environment wellbeing (Centro Sebrae de Sustentabilidade et al., 2014).

WASTE

Our food habits, more than diets, are encompassing as well our waste habits. On this matter, every individual is different but trends are displayed differently depending on countries, cultural heritage, weather conditions and plenty of other parameters. Within Brazilian society, social status seeking is the greatest source for food waste, as the larger social class in number of individuals corresponds to a low-middle class, buying in social recognition into an over-consumption pattern (Porpino, 2018). Brazil, as part of Latin America, has food in its veins, and cultivates a culture of “throwing-away” (Centro Sebrae de Sustentabilidade et al., 2014). A recent study from Embrapa (2019) highlighted the terrific number of 128kg of food annually wasted in the average Brazilian family, good students compared to the average inhabitants of Latin America, with 223kg of annual waste. Besides being an environmental

non-sense, the economical cost of these food waste appears as an obstacle. With 37 millions of tons of organic wastes are produced in Brazil each annually, putting it on the top 10 world waster for 2016, only 2% are given a second life, despite the possibilities to turned them into fertilisers or energy (Embrapa, WWF-Brasil, 2019; Grisa & Fornazier, 2018). An estimated 1 trillion dollars, coupled with 700 millions dollars of environmental cost, coming from soil and groundwater contamination due to organic waste dump or toxic gases releasing into the atmosphere, still didn't convince public powers nor the civil society to take the adequate measures.

Waste and food habits are globally negatively impacting public health, the ongoing pandemic opened our eyes about the role humans were playing in their own destruction. Obesity, undernutrition and food waste are caused by humans, whilst being threats to humans. This global non-sense intensifies when we understand that half of the 1.6 billion tons of food wasted, from the end of the production line, could alleviate global hunger if well distributed (Embrapa, WWF-Brasil, 2019). Bearing those characteristics in mind, an urgent need for a shift in consumer behaviours appears as essential (Bouças da Silva et al., 2022). However, as claimed by numerous politicians all over the world, pushing the civil society towards changes isn't that straightforward.

EDUCATION

The behavioural pattern and habits of every individual is defined by multiple parameters. Several studies analysed the essential characteristics for individuals to be, in average, more realistic and concerned regarding the environmental crisis and its consequences. The access to knowledge, the informational effect, proved significant correlation with the level of environmental awareness for Brazilian society, and for emerging countries more broadly. Unlike their expectations, Aklin et al. (2013) found out that the level of wealth didn't appear as the most significant variable, among the Brazilian population. However, Brazilians are at risk of environmental degradation while relying on precarious livelihood, and yet it doesn't seem like their concerns towards environmental protection are rising. Inhabitants of Alagoas are accumulating vulnerability : low-income, subject to extreme weather events, difficulties to adapt, etc; making them tragically exposed to climate crisis effects (Grottera et al., 2014). Those results in mind, giving access to proper information and the tools for citizens to acquire knowledge they need to make conscious choices, is more than necessary. Public policies act as the strongest tool governments can use to establish basic rules and to act indirectly over consumer's behaviours (CIRAD, 2022). The Brazilian Federal Constitution states about the

role of public power within providing environmental education to the people (Peixoto, 2018; Dias de Oliveira & Sander Scarparo, 2018). Some actions already developed by the government, and their outcomes, display the possibility and the role of the government in dealing with these issues, as the variable level of education shows logarithmic behaviour (Dias de Oliveira & Sander Scarparo, 2018; Aklin et al., 2013). The Política Nacional de Educação Ambiental (PNEA), aiming to promote positive side effects between anthropogenic activities and the environment, responded to this urge (Centro Sebrae de Sustentabilidade et al., 2014). Globally, in order to act positively on the climate crisis, by reducing our greenhouse gas emissions for instance, trainings, tools and access to adequate educational materials is needed, and the urge for a shift in our diet has to respect those prerequisites (EAT-Lancet Commission, 2019; Climate Transparency, 2020). Besides education, sharing good practices, solutions and environmental-friendly possibilities will already increase the adoption of more sustainable behaviours (Centro Sebrae de Sustentabilidade et al., 2014). Despite the desperate situation and the ad hoc answers from the government and the civil society, a low level of education is preventing Brazilians from acknowledging their paths forward (Porpino, 2018).

ENVIRONMENTAL LAW

Rich from a variety of natural resources, see Annex 5, to protect and pressured by the civil society as well as the international community, Brazilian politics gradually implemented and expanded a panel of environmental laws and policies.

The public policy *Política Nacional de Resíduos Sólidos* (PNRS), implemented in august 2010, deal with sustainable development and eco-efficiency, facilitating and preventing the generation of waste at every level of the production chain for national level (Dias de Oliveira & Sander Scarparo, 2018; Centro Sebrae de Sustentabilidade et al., 2014). The *Política Nacional do Meio Ambiente* (PNMA) acts as a regulator of socio-economic development, attempting to reach an ecological balance. By claiming for a rational use of natural resources, sharing and educating the public with affordable and harmless behaviour, public and private actions can be subject to penalties if they don't comply with the PNMA (Centro Sebrae de Sustentabilidade et al., 2014). All kinds of companies have to get aligned with those laws and targets, which can appear as counterproductive or literally obstacles from small and precarious enterprises (Centro Sebrae de Sustentabilidade et al., 2014).

Some entrepreneurs and activities don't legally need an environmental licence, thus, the municipality should act at the local level to engage those businesses into following some basic environmental rules (Centro Sebrae de Sustentabilidade et al., 2014)

Long-term national plan was also erected, following international summits and discussions. Indeed, even though Brazil is far behind when it comes to the comparison of its emissions intensity and the bad appraisal of the G20 countries (see Annex 11), proper policies need to be implemented when it comes to improving the industrial sector and its energy efficiency. The 2050 Energy Plan detailed the ambition of Brazil regarding solar and wind power, opening the path for related opportunities to grow off (Climate Transparency, 2020). In 2009, Brazil commit to reduce its GHG up to more than 35% by 2020 during the COP-15, strengthen by the *Política Nacional sobre Mudança Climática* (PNMC), and settle new ambition for 2030 (Grottera et al., 2014; Climate Transparency, 2020). Means and paths of emissions reduction are unique for every country and region, Brazilian most influential changes will be regarding deforestation and recovering of pastures and land (see Figure 4). However, despite the consequential inputs within the environmental law and the derived opportunities, most of them aren't fully exploited due to a lack of knowledge (Centro Sebrae de Sustentabilidade et al., 2014).

OPPORTUNITIES

Brazil, despite multiple challenges, benefits from a profusion of natural resources, spread all-over its territory. This singularity allows for an incredibly varied energy mix, less carbon intensive than the average of G20 countries, with a comparatively high share of renewable energies. Solar, wind, geothermal, biomass and hydropower composed 82% of its energy source, 63% of it being hydropower, highly controversial due to the multiple negative socio-environmental externalities (Climate Transparency, 2020). The *Lei sobre Energia do Fontes Renovais* and other initiatives mentioned above, aim at improving the life quality of the population, as multiple co-benefits derived from the use of renewable energies such as local air pollution reduction and increase in energy security (Centro Sebrae de Sustentabilidade et al., 2014; Grottera et al., 2014). Indeed, looking only at the energy consumption of buildings and private houses, the inequalities over energy use and access, notably regarding the over-use of air-conditioning, are evident (Climate Transparency, 2020).

Besides energy opportunities, other resources stem from biodiversity, new ways of living and of consuming, will become and already are promising possibilities for business

development, innovation and entrepreneurship. Slow or ecological tourism, and in general the economy of services is a segment in need to be exploited, growing in opposition with the economy of good, highly relying on buying-wasting pattern, thus highly unsustainable in terms of resources use (Centro Sebrae de Sustentabilidade et al., 2014). National biodiversity targets display a willingness from a part of the society, to protect this richness that Brazil is holding (FAO, 2021).

THREATS

The threats within the fight to incorporate the entire Brazilian society into the right path for a bright future comes both from the civil society than from the public power. Indeed, despite the development of the country and its inhabitants' life quality, even though income augmentation can be significant in raising the environmental concern of individuals, this effect in Brazil as been proven to be countered by the fact that they are as well increasing their wants for luxury goods and reducing their vulnerability to climate risk (Aklin et al., 2013). Similarly, building and developing their metropolitan area following the American model, the positive impact generally coming with an urbanisation of the population isn't identified. The individual-car model is causing urban expansion and jeopardising the use of public transportation. Besides a few incredibly large cities, like São Paulo, with more than 12 millions of inhabitants, few cities have benefited from a proper urban mobility plan (Climate Transparency, 2020; IBGE, 2021). Broadly, the tool Climate Action Tracker assessed that the overall nationally determined contributions were insufficient regarding the international target, especially due to the current trend of weakening climate policy, notably within the forestry sector, instigated by today's head of state (Climate Transparency, 2020).

Since a few years, easily assimilable with the ascension of Bolsonaro, several backwards actions have been taken by its government and rolled back environmental protection policies. No clear intentions from the presidency regarding environmental ambition for the country have illustrated the path he wanted to take : a tremendous increase in deforestation emissions coupled with cuts in the budget for forest protection, and the willingness to expand fossil fuel energy sources. In 2019, over a third of deforestation will be noticed on public lands, displaying the real threat coming from public power (Climate Transparency, 2020). Following those destruction trends and gradually integrating their upcoming consequences, several non governmental and governmental institutions called for action : zero expansion

policy from natural ecosystems to agricultural land and ambitious land restoration policies (EAT-Lancet Commission, 2019).

GLOBAL PREOCCUPATION

As restrictive climate policies are growing and global binding agreements are trying to be implemented, pressure over economic activities will become normal and will sadly impact the most precarious ones (Le monde, 2022). States' destiny being interrelated due to partnership, trade alliances and other binding compromises, Brazil is already experiencing the changing demands and imperatives of their allies. Regarding agriculture, the country has been trading with strategic world players : China, USA and the all Pacific Alliance⁶, and a massive part of imported soja is sent to European countries (CNA, 2018; Tillous-Borde, 2021). However, new environmental and health norms established by Europe, the changes in demand from consumers, notably their wants for local food products, are an engine of decrease in exportation opportunities for vast exporters such as Brazil (CNA, 2018; FAO, 2021). Besides adapting to those new trends in trade in order to keep their economy afloat and competitive, developing and emerging countries have to juggle poverty and inequality eradication at once (Grottera et al., 2014). All kinds of guidance and support should thus be addressed to the most precarious ones, putting them towards the global trajectory regulations patterns, accompanying them to make the transition and preventing them to face already taken decisions (Le monde, 2022). Furthermore, multiple countries rely essentially on Brazil for basic ailments, notably European countries, and will have to face a food crisis if the Brazilian agricultural system was to collapse suddenly. The war currently happening in Ukraine proved how fragile and co-dependent some countries are to each other, as wheat and gas are lacking. Soya beans, palm oil and maize could soon be subject to the same tension over the market (see Figure 5).

Annex 10 illustrates this phenomenon over the world's most consumed products and their vulnerability to climate change, emphasising the urge for diversification in our diets and the cruel necessity to mitigate and adapt to climate change consequences (see Annexes 1 & 9). Local and global efforts, built on strict environmental governance, are now settled in most national agendas, and are and will be especially needed and effective from emerging powers (Aklin et al., 2013). Developed and developing countries are essential for each other and their destiny are intrinsically related. By helping emergent economies, richer countries are merely trying to secure their future.

⁶ The Pacific Alliance is composed of Chile, Peru, Colombia and Mexico.

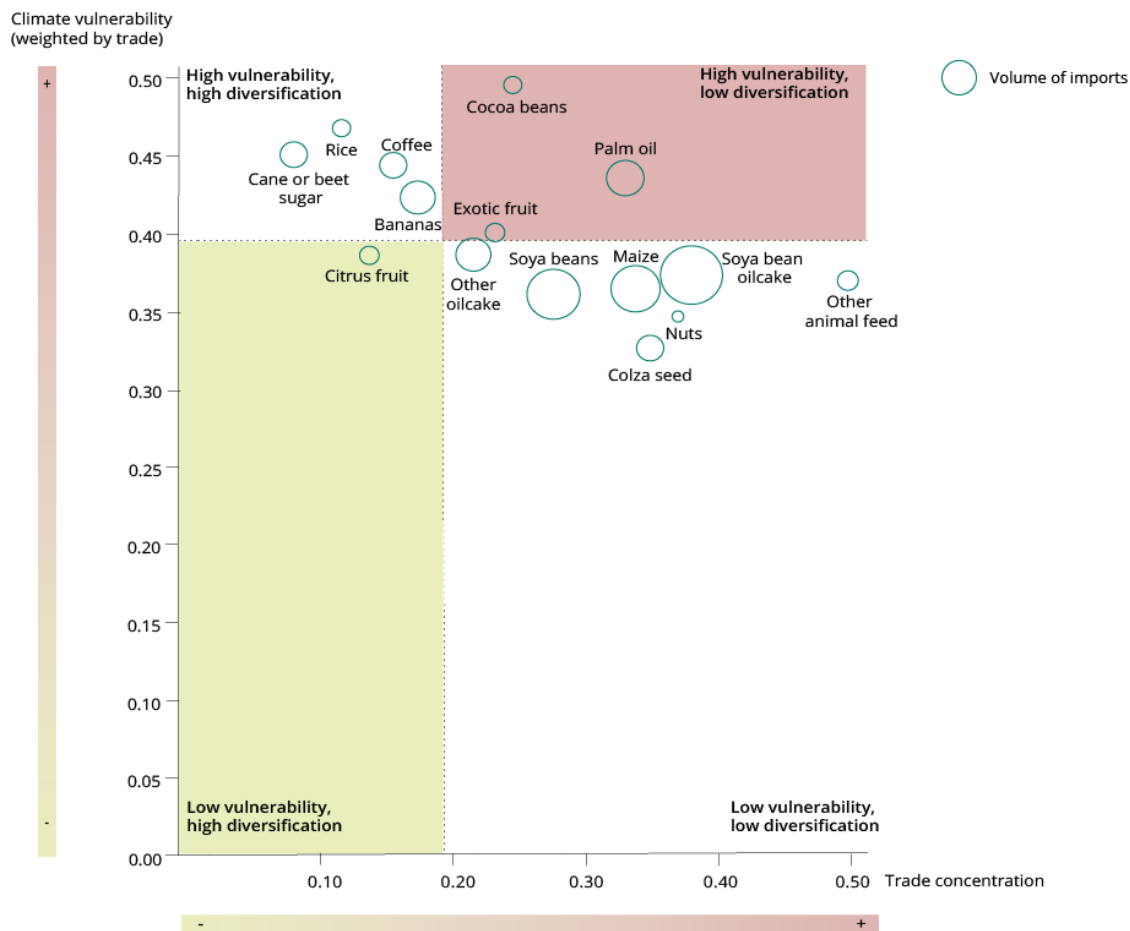


Figure 5 : Vulnerability matrix for the main agricultural commodities imported into Europe (European Environment Agency, 2021)

LOCAL ROOTS

National and local actions are at the root of broader changes. States, municipalities and cities have thus an important role to endure. Their development plans should be adjusted to national and regional objectives while respecting and making use of their own competitive advantages. By creating a prosperous work environment, providing tools and support and fostering small entrepreneurship, institutions like SEBRAE and municipalities are directly and indirectly adding their contributions to the global environmental crisis (Smits et al., 2018).

METHODOLOGY

The three case studies focusing on initiatives supporting small-scale local entrepreneurs and their potential side-effects on the environment were carried out in the state of Alagoas in the North-East region of Brazil (see Figure 2). The results and interpretations are based on a series of 9 semi-directive interviews with a set of different actors from public, private and civil society sectors. The interviews were conducted at the end of the time allocated to the research parts, as a deep understanding of the global and local context, as well as of the dynamics, were essential to perform relevant and useful interviews. The semi-directive interviews were complementary actions to the continuous meetings, events and interventions which brought fundamental materials to the study. The visit made all over the territory of Alagoas made important contributions to understand dynamics and challenges in the rather rural settings of Alagoas. Fieldworks realised throughout the time proved to add an even broader overview of the territory. Lived experiences shared by multiple actors, coming from remote areas and from different generations, opened up the horizon of potential threats and opportunities. The data gathered through the entire time dedicated to the study were interpreted in order to perform a complete exploratory research. Annex 12 summarises briefly how the research was articulated throughout time and gives an overview of the different phases and their composition.

Indeed, with a pre-research phase, since the date 0 of the field research, the experience has been fully immersive, with a succession of desk research and on-the-field actions, empowering each observation, lived experience or interpretation with a complementary theory or conceptual analysis.

THE STUDIED AREA

The research study focused on the state of Alagoas and its main municipalities. Located in the region Nordeste, populated by a large part of inhabitants living in precarious situations, the state shares its frontiers with the state of Pernambuco in the north, Sergipe in the south, and a little border with the massive state of Bahia, on the deeper countryside (see Annex 9). The state is composed of 102 municipalities spread between different climates and natural ecosystems. Numerous municipalities lie on the dry and warm countryside (Caatinga biome) whereas the most famous towns come one after another on the seaboard. The state is unevenly developed and the resources and wealth unevenly shared, each area having its own characteristics and demands (Silva et al., 2019). All biomes are peculiar with fauna and flora

specific to the climate conditions (see Annex 7). The Atlantic Forest boarded by the coastline from north to south, from which 93% already disappeared under slash-and-burn practices or urbanisation schemes. Agricultural practices, urban expansion and thoughtless behaviours participate in destroying the local biodiversity, and intensify the damages caused by extreme weather events (see Annex 4).

RESEARCH DESIGN

FIELDWORK

This report lies behind a continuous and progressive information captation through exchanges with different actors of the local scene. The methodology followed throughout the entire study, and which empowered the investigation, was developed along with participation in multiple formal meetings with local actors directly involved in the decision making. Indeed, the core of the arguments defended here rely on exchanges that have occurred between representatives of key municipalities in the state of Alagoas and the representatives of the organisation SEBRAE. All the sessions occurred in-presence within space chosen by the municipality, receiving the consultation and/or asking for the meeting to occur. The majority of those gatherings took place in municipalities which are part of the programme *Cidade Empreendedora* (CE) and consisted of exchange time between employees of Sebrae and different members of municipalities (see Appendix 1). Different secretaries, including but limited to secretary of public procurement, education, environment and agriculture. Counsellors were also public bodies quite well represented in those meetings with a relatively important presence and interest for the work of SEBRAE. Mayors were present in only a few meetings, with a real struggle from SEBRAE as well as from the other actors of the municipalities to engage the mayor and to require their presence.

During those different events, representations and informal reunions, verbal exchanges were important, but non-verbal communication led to understanding the genuine ties between actors and the actual dynamics within territories. The observations and remarks which emerged from the involvement during each reunion brought significant elements, helping to comprehend the decision-making process within Alagoas and its different parts. In the framework of understanding better those power dynamics, internal conflict and hidden conflict of interest, between municipalities and external organisations, and in Brazil in general, several interviews were conducted. Appendix 1 summarises and describes briefly the chronology of those

meetings and events, displaying the diversity of the actors encountered during the research. Appendix 2, indicating the location of each municipality involved during fieldworks and discussions, confirms the consideration over the entire territory and the specificities from each area of this study (see Annex 8 to comprehend the distances and time travel in Alagoas).

REUNIONS WITH TERRITORIAL AGENTS

Throughout the research period, multiple meetings with territorial agents have occurred. Either for specific matters expressed by the municipalities themselves, or either to deal with issues raised by SEBRAE analysts, those reunions were always oriented towards local development and ways to improve the municipalities economy. Figure 6 and 7, and Annex 13 capture those formal gatherings.



Figure 6 (left) : Reunion with most of the secretaries from Porto Calvo

Figure 7 (right) : Gathering in Pão de Açúcar

EVENTS AND INTERVENTIONS

Besides reunions with municipal agents, diverse events were organised by SEBRAE or resulted from a collaboration of several institutions. Those events were of different nature : award ceremony, training, visit, opening ceremony, etc. It gave the opportunity to meet new actors and to comprehend further the role of actors and institutions by the reactions of invited people or enterprises.

SEMI-DIRECTIVE INTERVIEW

Interviews with SEBRAE employees working in different sectors and with different experiences within the organisation, they are categorised as interviewee B, from the private sector. An interview with employees from the IABS (Instituto Brasileiro de Desenvolvimento e Sustentabilidade) was conducted in order to get a more precise and extensive overview of environmental protection in Brazil, the key actors and the public opinion. The extensive experience of the regional director for the North-East region of the IABS brought a deep analysis of the environmental issues of Brazil and of Alagoas. Those two interviewees are considered as workers from the third sector category C. Three interviews with people from category A, public sector, have been conducted. The workers from Embrapa, one acting in the research sector who provided a theoretical framework, and one from the operational department, who shared her lived experiences and perceptions over her work and the people she meet everyday, perfectly complement each other. The third interviewee was a municipal agent, working at the tourism department, and an actor working for local development. He explained how municipalities try to deal with short and long term challenges. The last and unique interviewees from the academical sector were two last year students in environmental engineering at UFAL. Their contribution was more about their own perceptions, the hopes and beliefs of the young generation, and the state of the art of the actual educational system in Brazil.

Besides several meetings and informal discussions about each case study and the elaboration process behind each initiative, semi-directive interviews allow to collect and congregate interpretation from persons with different experiences and perspectives. Conducting semi-directive interviews was crucial for this research study. Indeed, in a territorial context full of peculiarities, orienting the interviews towards subjects relevant for the study while letting space for their own peregrination permit to capture lived experiences. Appendix 3 summarises the list of interviewees who accepted to participate in semi-directive interviews and share their experiences and thoughts.

LEGISLATIVE DECOMPOSITION

In order to perform a complete research project and apply thoughtful interpretations, an immersive and intensive decomposition and understanding of the legislative system have been

needed. Several colleagues from SEBRAE, coupled with discussion with lawyers or professionals working with law gave extensive tools to conduct this study. Furthermore, the governmental website dedicated to public policies and laws, available to everyone and easily reachable, completed the instrument needed to understand the complex system of Brazilian legislation.

DOCUMENTARY ANALYSIS

Multiple documents have contributed to enrich the study, going further than the material given by interviews and meetings. Numerous studies and papers available online, either in French, English, Spanish or Portuguese brought a theoretical framework to the project. The large library of SEBRAE also allowed to go back in time and find ancient but useful information. The internal communication of SEBRAE also serves as great material for the research.

INTERPRETATION

The interpretation of topics discussed during meetings and events were made gradually, directly after the interventions. The interviews were conducted at the end of the entire fieldwork and documentary analysis, which provided a full understanding and well structured theories and thoughts at the time. The research design allowed for continuous reapproval of ideas emitted by actors throughout the different interventions. The interviewees complement each other's discourse, adding value to the arguments that already emerged. The research schedule allows for direct interpretation, with the possibility to contact and discuss some points with most of the actors interviewed.

LIMITATIONS OF THE RESEARCH

The main limitation encountered during the research project lies in the lack of environmental knowledge and the difficulty to understand the meaning of environmental positive externalities. Socioeconomic being at the core of people's concerns and thinking in a rather short term logic, complex and integrated environmental strategies to overcome upcoming socio economic issues were not always understood by the protagonists. The

interviewees from the academic sector (category D) were the one most inclined to comprehend the broad picture and to imagine the future problems and solutions. These interviewees were also the youngest, being the more concerned by the future issues to address.

The second limitation concerns the panel of interviewees. Indeed, even though experiences and recit from highly different people were collected throughout the research, the sample of interviewees is limited to one segment of Brazilian society, far from encompassing the entire spectrum. The Table 1 displays the similar characteristics that were held by all the interviewees. All the characteristics stated in the table are important factors to consider as depending on your social class, on your close relatives and friends and on your place among the society, you might develop a specific way of thinking, not applicable to the rest of the population.

Interview identification number	Education level	Sex	Race	Work sector
A1	Upper secondary education	Male	White or from a visible minority	Tertiary sector
A2	Upper secondary education	Female	White or from a visible minority	Tertiary sector
A3	Upper secondary education	Male	White or from a visible minority	Tertiary sector
B1	Upper secondary education	Female	White or from a visible minority	Tertiary sector
B2	Upper secondary education	Female	White or from a visible minority	Tertiary sector
B3	Upper secondary education	Female	White or from a visible minority	Tertiary sector
B4	Upper secondary education	Female	White or from a visible minority	Tertiary sector
C1.1	Upper secondary education	Female	White or from a visible minority	Tertiary sector
C1.2	Upper secondary education	Female	White or from a visible minority	Tertiary sector
D1.1	Upper secondary education	Female	White or from a visible minority	NA
D1.2	Upper secondary education	Male	White or from a visible minority	NA

Table 1 : Some characteristics of the interviewees

CONTEXTUALISATION OF RESEARCH CONTENT AND OF CASE STUDIES

The state of Alagoas has been aspiring to develop further since decades now, relying on different actors and means to thrive its population from poverty. Sebrae, as one of the important actors in the region, has been implementing projects and initiatives in different municipalities, aiming to overcome global issues through peculiar actions. Three initiatives carried by, or with the support of the institution have been selected to illustrate and inspire local development initiatives, impacting on ecological necessities. The projects are aiming to display different work and socio-economic environments, composing with specific conditions (biomes, socio-economic features...), treating various problems and bringing several solutions or tools for environmental protection.

CIDADE EMPREENDEDORA

The assorted strategy “*Cidade Empreendedora*” aims to foster an adequate environment for small-size businesses to grow, thus enhancing the overall socio-economic local development and dynamic (Sebrae, 2021). The choice to bottleneck the municipalities and the type of initiative analysed using this component is already implying many characteristics and prerequisites for such projects to work. Indeed, municipalities involved in the programme are run by public bodies who expressed their wish to benefit from the help of the Sebrae, thus implying their wish to involve in local development projects by putting their resources and potential at the service of small business owners to achieve goals targeted together with the institution. Integrating the development scheme is a testimony of their willingness and maturity.

The 21 municipalities chosen to be part of the programme represent, to some extent, quite well the diversity of the state and thus, the diversity of issues encountered on the territory, all facing different climate conditions, threats and strengths (see Appendix 1). Integrated into diverse and complex biomes (see Annex 7), benefiting from uneven involvement from mayor and other public actors, differently empowered by the legislative local team, the municipalities displaying their capacities to cultivate regional development at his best will then be selected

and acknowledged by SEBRAE's programme, after having supported them in diverse phases and obstacles.

SUSTAINABLE TERRITORIAL DEVELOPMENT

In order to get inserted in the project and benefit from the financial and technical support from SEBRAE, all municipalities had to comply with some prerequisites established by the organisation. The *Termo de Cooperação Geral* signed by each municipality and SEBRAE/AL, several clauses described the role and responsibilities of each body involved. One of the main was regarding the update and modernisation, in alignment with the last federal laws, of their *Lei Geral Municipal*, with regard to the *Lei da Liberdade Econômica*, especially regarding public procurement criteria, like the one described in the PNAE. This requirement is basically monitoring the engagement by the law, and its application, of simplified measures for small and local businesses in trading with the public organisation and national companies. Municipalities are expected to provide a complete support to local entrepreneur - e.g. financial, physical, educational, organisational, technical, informational, etc.-, while integrating them into a map of local actors, creating a network, valorising them, strengthening the role of public agents in local development and their duties for the community. From its side, SEBRAE committed to make support available for the population : entrepreneurs, businesses, municipal agents, citizens ...

This national program, aiming at improving the overall environment of local businesses, is emphasising in its general objective the willingness to transform and improve the digital services offered to the citizens, mentioned by the *Lei de Governo Digital (Lei nº14.129/2021)*. In this scope, and as part of a holistic battle from the organisation, simplification (by using for instance a federal and free tool for public tender, ComprasNet) and fluidity of inevitable administrative processes for companies, will become available to a larger audience (e.g. elder, rural inhabitants ...). The relevance of this project lies on the national and state objective of sustainably developing economic dynamics, depending on the viability of proximity businesses. The articulation between actors, activities and processes is also highlighted as a mission affected by SEBRAE : every scale of cooperation and synergies are in need for articulation, from a nation-wide networking to making municipal actions more collaborative and aligned with common objectives.

The following step, after proving their capacity to comply with the preconditions, was for municipalities to participate in a game, enabling the institution to get to know better the strengths and weaknesses within the municipalities. Through a meeting open to all municipal agents, a set of questions regarding the services available and implemented at local scale, reflecting the development level of each territory. This collaborative method to analyse the potentialities and possibilities capacitates the responsible members from Sebrae with a holistic understanding of the dynamics of power and the internal and external hidden interests of everyone. All the statements made during this game are withholding, waiting for proof issued by each concerned secretary. After being certain of the capacities and lacunas, direct solutions to implement are exposed by SEBRAE, offering their help and their resources (e.g. training, consulting ...) for an effective execution.

The genuine goal of SEBRAE, through the conduct of *CE*, is to build strong, independent over long term and prosperous communities, composed of informed citizens, collaborative public bodies and effective public services. Citizens aware of their rights, duties and laws applying to their daily life; a municipality composed of agents with common public interests, recognised by inhabitants : everyone thriving for the same objectives.

NATION-WIDE PERSPECTIVE

Besides the true and genuine objective of sustainably developing territories spread all over the state of Alagoas, the federal government and the institutions taking the bigger picture encompassed other targets within this development strategy. Indeed, the hidden aim of the program “*CE*”, and of the selected initiatives below, is to formalise businesses, to get the remote and forgotten part of the population to be into the system, registered within the national census. With a tremendous part of the society being invisible to the eyes of the government, such changes in the law, coupled with effective and concrete help provided to small business owners, attract rural and marginalised inhabitants and give the government the resources to update national data. Plenty of side reasons are to acknowledge when diving more into the purpose of the government, SEBRAE and all public, private and third sector organisations in supporting the improvement of local development in the whole state.

Rural and not-urbanised areas represent a majority of the Brazilian territory, due to its incredibly large territory of more than 8,500 millions of square kilometres (see Annex 3). The territory of Alagoas is featured with the same characteristics as the country itself, with most of its land covered by crop fields, pastures and few remaining untouched natural areas. However,

the majority of alagoanos live in the capital city Maceio, or nearby, with an increasing rural exodus (Statista, 2021). Nevertheless, Maceio's frontiers are expanding every year more, urban spreading has been continuously occurring in the region without proper urban planning or construction agendas, intensifying the lack of public infrastructures and public services the farthest you arrive from the rich coastal neighbourhood. Public infrastructures being already weak and far from meeting population's expectations and needs, the municipality is already hardly addressing few challenges and demands from upper class neighbourhoods, letting behind basic demands from any other neighbourhood. Having these two phenomena in mind and understanding the complete impossibility for the capital city to meet basic needs of the great majority of citizens, alternatives to provide basic rights to inhabitants of Alagoas have to be explored. In this framework, organisations missioned by the federal government, such as SEBRAE, are funded to guide and accompany actors enabling local development within their territory in order to develop further opportunities and possibilities.

BRAZILIAN ORGANISATIONS

The Sistema S is a network of public mission organisations, however independent from the state, working through local actions to support and help each segment of the population, especially the less privileged one. This system, essential for the majority of the lower social class as it provide every family members with training and opportunities to integrate the economical system, is composed of 9 bodies : SENAI, SESI, SENAC, SESC, SEBRAE, SENAR, SEST, SENAT, SESCOOP.

During this research study, loads of organisations working towards better protection of environmental laws, or more broadly acting in regards to environmental causes and genuinely wishing to make Brazil socially and environmentally concerned, revealed their role and importance for environmental improvements. The Embrapa (*Empresa Brasileira de Pesquisa Agropecuária*) is playing a major role in improving the technical opportunities for farmers, trying to innovate and accompany food system workers in implementing those innovations. The public organisation ICMBio (*Instituto Chico Mendes de Conservação a Biodiversidade*), created by the Ministry of Environment, is acting to preserve and protect the ecological and biological hotspots all over Brazil. The IABS is working with national and international organisations to conduct and implement innovative projects in an attempt to address social issues in an ecologically sustainable manner. Those institutions have been dominant in the

initiatives this work is focusing on, and are working for a brighter Brazil despite obstacles, mostly financial ones.

SCALABLE POWER IN A FEDERAL REPUBLIC

The role and the power of municipalities in the political and legislative system of Brazil is quite important and gives possibilities to local actors to develop their territory in a close-to-the-context approach. The free will acquired by municipalities stem from their possibility to apply the federal laws as to fit with their reality and singularities. In this scope, Sebrae is also acting as a key actor in both notifying municipalities and local legal bodies with the newest laws they need to insert in their system, while accompanying them in the implementation of concrete actions in the execution of these changes. Adoption of new amendments and other legislative matters are treated by elected bodies : the vereadores, legislating and monitoring municipal actions, elected by the population every four years.

Even though there is a transfer of the decisional power into more local public bodies, this shift doesn't imply horizontal and inclusive governance. Indeed, giving control over resources to local bodies can maintain non-participatory governance if the power is not regulated (Puppim de Oliveira, 2002). For small businesses survival, municipalities' choices and priorities are fundamental, thus a no-participatory approach might foster an inadequate environment (CIRAD, 2022).

THREE CASE STUDY

CASE STUDY 1 : CONCURSO DE MERENDEIRAS

The *Concurso de merendeiras* has been chosen as one of the initiatives to be further explored in the scope of this study. The choice towards this initiative has been almost immediate as this initiative proves to have many positive environmental externalities, on top of being socially and economically virtuous. Indeed, the program engaged in responding to actual global adaptation objectives, especially the need for a shift towards more healthy diets (EAT-Lancet Commission, 2019). Promoting balanced diets and food loss and waste reduction act as a path to conserve biodiversity, improve nutrition and thus health, and snowball to plenty of environmental benefits (IPCC, 2022). Appendix 1 shows the map of all the municipalities which participated in the project.

Objective of the initiative

Merendeiras

The primary aim of the contest is to render canteen meal preparers with recognition of their works and their role in participating to shape the country's tomorrow actors. Indeed, besides filling themselves with the acknowledgement of their important role, it also shows children, parents and the society in general their function in the extensive national economy. Merendeiras have a main role in accustoming children to new tastes and new products (Fundo Nacional de Desenvolvimento da Educação, 2009).

Children

Many children rely highly on school meals to get their vital daily food intakes and thus, have enough nutrient and calorie quantities to be able to get their brain to work and handle all day at school. Indeed, with the majority of children coming from low income families, home meals consist of basic, budget and feeble nutritive ingredients such as manioc, rice and beans (SEBRAE, 2006). Food access is a priority in Brazil, as the country is back on the HungerMap (see Annex 2), alleviating malnutrition is a never more up-to-date challenge (CIRAD, 2022; IPCC, 2022). However, despite this urge for complete and rich meal plans in school, today's lunch is mainly relying on the same triptych as at-home meals : manioc, rice and beans (Porpino, 2018). This lack of diversity ends up in anaemia and other health issues in children's

health, taking them away from the main goal of school : studying and learning to have a future with opportunities.

Food habits and consumption culture

On top of a lack of access to more healthy products, there is also a lack of information regarding nutritive and healthy diet. Without a consumer protection union, citizens and parents don't have the tools to elaborate healthful food (CIRAD, 2022). Following their parents' habits, teenagers consume more processed food, ending up being adults suffering with obesity (Porpino, 2018). Awareness campaigns familiarising the population with the problems arising from bad and over consumption of unhealthy diets, and their alternatives, is dramatically needed (Fundo Nacional de Desenvolvimento da Educação, 2009). Engaging the young generation in environmental and health education will participate to implement a new consumption and food culture (Dias de Oliveira & Sander Scarparo, 2018). The present initiative has the ambition to act as such, educating and raising consciousness within children's belief towards the necessity to come back to nature and its products, and showing them the impact of their present consumption over their environment (Fundo Nacional de Desenvolvimento da Educação, 2009).

Variety, adaptation and climate change

The second issue with this non-diverse meal plan elaboration is the non-introduction of local products and diverse food products to children, thus not preparing them to like different tastes. Indeed, with climate changes accelerating and their consequences being stronger all over the world, agricultural practices are subject to change in the short-run. Food production will have to adapt to new conditions, shifting the type of products grown on territories, and the population will have to adapt their diets to the products available (see Annexes 1, 9 and 10).

Farmers

Family farms are part of the lower class of the society, regarding their revenues, hardly covering their production costs, far from making sufficient profit and with no or few help from the government. Without money to invest in their production, they usually produce few quantities, don't have access to modern tools or equipment, using traditional and ancient agricultural techniques and operate under informal businesses (SEBRAE, 2006). Living in remote areas, slowed down by the lack of public infrastructures thus making it impossible to reach new or alternative markets, they survive in trading within their community.

Family farmers and rural family entrepreneurs are defined in the L. 11.326/2006 as “one who practices activities in rural areas, simultaneously meeting the following requirements :

- I. does not hold, in any capacity, an area larger than 4 fiscal modules;
- II. predominantly use the family’s own labour in the economic activities of their establishment or enterprise;
- III. have family a minimum percentage of family income arising from economic activities of their establishment or enterprise, as defined by the Executive Power;
- IV. manage his establishment or enterprise with his family.”

However, there is no lack of demand for food products, as the HungerMap suggests, only an incapacity for supply and demand to meet.

Farmers and Public Food Procurement ⁷

The main issue which is trying to be addressed through this program is to engage local small farmers in public food procurement. Public food procurement represents a huge amount of products and money, as municipalities account for thousands of people to feed. Despite the abundance of food production in Alagoas and the proximity of its producers, no bridges have ever been made between protagonists, ending up in an ineffective cycle, as public money goes out of the municipality pocket into large food industry’s ones, while family farming struggles to survive. The role of public procurement in local investment is crucial as by buying from actors working within the municipalities, public money is reinjected into the creation of public revenue through the tax system. Indeed, by allowing local enterprises, which pay their tax in the municipality, a way to increase their benefits, their local tax over their benefits will naturally increase thus re-injecting this money into the public budget. In the attempt of creating such a virtuous economical circle for the municipality and thus fostering local development, the law dealing with public procurement has been modified at the federal level in order to put incentive on public buyers to buy local. This law, together with the international program PNAE, has been elaborated some years ago but still struggle to be implemented and respected by municipalities all over the country.

The PNAE, the oldest program implemented by the Brazilian government regarding school meals, under the supervision of the Minister of Education, is considered as the most

⁷ Public Food Procurement encompasses institutional food procurement including food for universities, hospitals, prisons ... (FAO, 2021).

complete one. The *Lei 11.947* claimed to municipalities to contract at least 30% of their food procurement from businesses falling under the status *Agricultura familiar*. Even though the prices asked for those products need to be aligned with local market prices, they are no longer the main criteria as the allocated budget is pulled from FNDE's one (Instituto Federal de Alagoas, 2022). This law established in 2009 aim at tremendously facilitating and incentivising public procurement from “*Agricultura familiar, Empreendedor Familiar Rural ou suas organizações*”, by authorising the purchase of food products directly with those actors, without requiring a public call, under certain norms and quality control yet. (Instituto Federal de Alagoas, 2022).

Sharing good practices and behaviours to accompany municipal agents responsible for public procurement, the program relies on a biopsychosocial approach : it takes in consideration social, biological and psychic factors for children development. Managed by the FNDE (Fundo Nacional de Desenvolvimento da Educação), 41 million of children in public primary and secondary schools already experienced positive impacts on their nutrition (Instituto Federal de Alagoas, 2022; FAO, 2021). Their advice ranges from nutritional consequences to environmental impact of diets, insisting on the necessity for municipalities to keep track of local producers, adapting their needs to what they offer (Instituto Federal de Alagoas, 2022). The main reasons advertised by the program are : health security (variety, type of products, type of production), respect of the culture and the tradition, economical support for small businesses and local economy facilitator.

With both the vision of great benefits in terms of local development and local investment, and the urge to make the law apply, school meals have only good reason to be integrated in this circle. Buying from family farmers is a way for the public sector to acknowledge the important role they are playing within the society. Acting as local development actors, feeding the local population with affordable and healthful products, contributing to making their business prosperous is also serving inequalities reduction (Silva et al., 2019). Indeed, while local food products tend to be cheaper than imported food, by taking this step the municipalities are promoting a sustainable food system and decreasing rural poverty (CIRAD, 2022; FAO, 2021).

Besides the PNAE, other programs regarding public purchase have been launched in Brazil, some even prioritising organic or agroecological food products, or putting priority over

indigenous and traditional communities production. Some labels, distinguishing Brazilian fair trade organisations, also erase on the national market (FAO, 2021).

Public and private economy

The improvement of children's health through the reinforcement of their bodies' strengths provided by a good diet is also a path to reduce sickness, which has a heavy cost on public money (through the public health system) and on families expenses. This cost reduction over households budget allows for reallocation of this potential savings in other fundamental areas, in the same manner as for public expenses reallocated into other areas of public budgets.

Training sessions

In order to elaborate the recipe which will enter the competition, the merendeiras, together with the nutritionist(s) from her school, have to comply with rules and prerequisites. Social acceptance, social norms and social status driving many basic decisions of Brazilians as appearances are key to social integration, valorisation was actually the key word of the initiative. Valorising actions, products and services by changing the vision people overlook things is crucial in any society changes. The nutritionist, contracted by Embrapa to train merendeiras and school's nutritionists, was responsible for sharing her knowledge about food production, composition and good practices in nutrition. Figure 8 and 9 and Annex 14 shows some pictures of the trainings performed in the state.



Figure 8 (right) : Food tasting at the end of the training session

Figure 9 (left) : Preparation of a recipe with watermelon and watermelon peel

Socio-economic and health benefits

Transparent over the objective of accompanying rural producers and the opportunity for schools to help and support local producers of their communities, training sessions were putting the highlight on the proximity merendeiras had with farmers : their husband, families or neighbours. Exposing to them all the reasons why they are key actors in the wellbeing of children, in their success at schools and in their thrive for a better future, those sessions were a means to empower women by displaying the importance of local knowledge (Silva et al., 2019). The evolution in mindset and behaviours of each group throughout the time revealed how beneficial and needed those gatherings were. Some basic scientific concepts regarding health, organs and body functions and the roles of several natural chemical substances were as well at the core of the training. Talking about bio-active substances, the needs for fibres of every healthy body and the physical and mental benefits of having a diversified diet was the proficient technique used to involve the women and make them involved and curious to learn more.

The main and last point of those preparatory courses was to explicitly get the women to understand the importance of regional products and the pride they should have in using and valorising those products through delicious recipes. Showing that the financial price of products does not align with health benefits, the nutritive power of forgotten or disregarded aliments such as broto de *palma*, *jaca verde* and *coco de ouricuri* have been clarified (FAO, 2021).

The valorisation of products such as *ovo caipira* was also at the core of the training in some regions of the state. Indeed, behind this name it's only farm eggs, which are known to be better in quality. Through these products, the emphasis around the differences in quality of a product according to the production process have been addressed. Indeed, the same product grown in a wholesome field or in a building without light and a high percentage of chemical intrants, will not have the same taste and not the same nutritive properties and impacts on health. By providing the tools to understand this phenomena to the women participating in the training, they became actors of their health and the health of the ones they are nourishing.

Cultural benefits

Besides their importance in health properties, the cultural character of those products from biodiversity were stressed, highlighting the fact that those products are actually tangible heritage and are part of the regional history and deserve to be considered as such, as much as the traditional processes of cultivation of these biodiversity products. The preservation and handover of traditional communities culinary heritage, such as the *Quilombos*⁸, can be addressed through school meals, by introducing PANC⁹ products - non-conventional food plants-, already valorised in the law of the state of Rio de Janeiro (*Lei n°2275/2016* and by the *Portaria Interministerial MMA e MDS N°284* (Fundo Nacional de Desenvolvimento da Educação, 2009). This handover in cultural heritage is central in an eclectic and culturally-rich country such as Brazil, displaying today its different former influence, from Europe to Asia, encompassing African heritage.

Environmental benefits

School meals have a strategic potential in promoting and introducing concepts related to sustainability and environmental-good practices for the youngest generations, and further to

⁸ The Quilombos are communities created by former afro-descendants slaves in Brazil.

⁹ Hortaliças não convencionais.

their entourage (Fundo Nacional de Desenvolvimento da Educação, 2009). On top of these knowledge sharing, and as part of another national programme developed with Embrapa, the training also includes sensibilisation to food waste. By both explaining the role of each part of products, with some part that will usually go to waste (seeds, vegetables skins ...), the training was showing them how to value it, ending up in financial benefits. Indeed, even though tremendous progress is to be made regarding loss reduction within the production and the supply chain, some improvement can be made directly at the consumption stage, waste habits being socio-cultural patterns (EAT-Lancet Commission, 2019; Porpino, 2018). During the trainings, a “*Manual do Educador #Semdesperdicio*” was distributed to nutritionists and to some of the merendeiras. This guide, elaborated by Embrapa and WWF, and with the support of the European Union, following the Agenda 2030 of SDGs elaborated by the UN, aims to share good practices to involve young generations into changing Brazilian habits regarding food consumption.

The recipes elaborated through the programme, both the ones from the training provided by SENAC and the one created by the merendeiras and the nutritionists, from every year, are a way to share knowledge and techniques either in small groups, who can then spread it around them, and even with large groups through the implementation of an online e-book compiling all those recipes. Those recipes can thus be downloaded by anyone who wishes to, spreading further the possibilities for people to valorise their local biodiversity (Fundo Nacional de Desenvolvimento da Educação, 2009).

CASE STUDY 2 : PREFEITO EMPREENDEDOR

GOVERNANÇA REGIONAL E COOPERAÇÃO INTERMUNICIPAL

Prefeito Empreendedor

The initiative of creating a competition electing best practices done by municipalities was launched by SEBRAE in 2001. This initiative is composed by different categories in which municipalities can submit programmes and projects they implemented in their territory and which were a success, as multiple aims. Happening every 2 years since its implementation, there is firstly a state election which leads the winner to the national election, for each category. In order to participate, the municipalities need to have already acquired a certain degree of planification, organisation and development as their *Lei Geral* - general municipal law- need to be approved prior to the election. The winners and their projects are highlighted and promoted at national scale, acting as examples of good practice to spread in the entire country.

Categoria : Governança Regional e Cooperação Intermunicipal

This year, in 2022, the mayor (prefeito) of Maragogi, a coastal and highly touristic city lying on the Northern part of the littoral alagoanos, won the award in the category “Regional governance and inter-municipal cooperation”. By promoting regional governance and inter-municipal cooperation in adding this category into the competition, SEBRAE is putting a motive on municipalities to invest and develop regional development, highlighting the possibilities such practices can bring to several municipalities at the same time, and thus impacting a greater percentage of the state population. The federal legislative body has also designed new amendments to put incentive on municipalities to develop regional cooperation development law. Maragogi decided to put in practice this law, developing regional governance through the opportunity given by SEBRAE. This initiative appears particularly significant for the study project and the region. Indeed, coastal reefs are some of the most negatively impacted ecosystems, thus they require specific regard in terms of protection (Beck et al., 2022). Furthermore, the territorial development framework, with a collaborative and regional perspective, is at the core of what we expect to be an alternative and effective method for sustainable social and environmental goals to be achieved (Schulz Macedo, 2013).

Área de Proteção Ambiental : Costa dos Corais

The project is covering and managing the Costa dos Corais, an *Área de Proteção Ambiental* (APA) registered as an Unidades de Conservação¹⁰, area of environmental protection designated by the government, aiming to protect biodiversity, aggregate cultural and socioeconomic values for the society (Centro Sebrae de Sustentabilidade et al., 2014; Barboza et al., 2022). The creation of the Sistema Nacional de Unidades de Conservação (SNUC) allowed for empowerment and promotion of a proper regulation on the interaction between the civil society, the state and the environment (Centro Sebrae de Sustentabilidade et al., 2014). Implemented in 1997 by presidential decree in the aim of protecting coral reefs, its ecosystem and the endangered species living in the environment (e.g. peixe-boi marinho). In 1997, the federal decree acted as the registration of the APA Costa dos Corais, larger federal unity of conservation coastal-marine of the country with 400,000 hectares and 120 kilometres of beaches (Barboza et al., 2022; ICMBio, 2021). These terrestrial and marine ecosystems are protected, however anthropogenic activities are still allowed. The APA Costa dos Corais is managed by the ICMBio, as every APA on Brazilian territory, with the role to engage actors in order to pursue objectives and maintain an agenda aiming at protecting the zone (Schulz Macedo, 2013). Figure 10 shows the area covered by a protection status, overlaying on the state of Alagoas and Pernambuco, and the location of the municipality of Maragogi.



Figure 10 : The *Área de Proteção Ambiental Costa dos Corais* (Alice Terpereau, 2022)

¹⁰ The *Unidade de Conservação* aims at enhancing the life quality of the local population : finding a balance between biodiversity protection and subsistence of local communities (Barboza et al., 2022).

Maragogi municipality

Maragogi is the second most touristic pole of Alagoas, the hotspot of the coral region, benefiting from public investments (e.g. airport, sanitation infrastructures ...), it thus appears as the natural leader in the region's development plan. Furthermore, the implementation of the *Lei n°675 (21/05/2019)*, the *Lei Governança*, strengthened its role.

The *Lei Municipal de Governança* has been created in order to allow the implementation of a planned and effective governance in different sectors of the city council, enabling decentralised decision-making, simplifying process and improving efficiency of municipality actions. The council of Maragogi, with the support of the mayor, is looking towards a development at regional scale, dividing the role within environmental protection among several actors (Puppim de Oliveira, 2002).

The need for regional cooperation in the region was crucial as the average Human Development Index (HDI) of the municipalities located in the territory falling under the conservation area was 0,577 in 2010, a lower rate than the HDI of state (0,631), already one of the lowest nationally, far behind the global index of Brazil. This indicator shows the tremendous inequalities characteristic of the region, and particularly of the region relying only on tourism-based activities, an appalling situation illustrated by the GDP per capita of the Costa dos Corais region, higher than the overall GDP of the state.

Governance

Governance is defined by Maragogi public actors as “the capacity to administrate or, more specifically, the capacity that government have to create conditions and response for the demand of the society; it needs a participative administration involving local population in the elaboration, the monitoring and (sometimes) the execution of public policies". Their definitions and expectations regarding appropriate governance has been adapted from the definition inscribe in the federal law *Decreto n°9.203 da Política de Governança (22/11/2017)*, describing public governance like “a set of leadership, strategy and control mechanisms put in place to assess, direct and monitor management, with a view to conducting public policies and providing services of interest to society; (...)”. Going further, Maragogi decided to add the concept of sustainability to their *Política Pública de Governança*, “sustainability : principle intimately related to social responsibility of organisations, whose purpose is to get and maintain good conditions for the society and the planet as a whole by the mean of sustainable development when dealing with social, economic and environmental aspects, in a way as

resources to satisfy the present necessities should not comprise the satisfaction of the necessities of the future generation.”, detailed in the *Lei Municipal N°675*.

Benefiting from an upstream planification and well-structured public governance, the implementation of centralised actions, aiming at developing the area, prevent a fully unequal development. For instance, the creation of an airport, an emergency service (UPA) and a public university together with the development of tourism articulated by the secretary of each municipality was enabled.

Regional actors

The project is gathering together 11 municipalities from Alagoas : Paripueira, Barra de Santo Antonio, Passo de Camaragibe, São Miguel dos Milagres, Porto de Pedras, Porto Calvo, Japaratinga, Maragogi, and from Pernambuco : São José da Coroa Grande, Barreiros, Tamandaré. Considering all the municipalities, the benefit derived from this initiative impacted the 12 153 MSEs located on these extensive territories.

The role of SEBRAE in the implementation and the monitoring of this project have been consultancy work in the creation and elaboration of the development plan and the monitoring possibilities in the northern littoral of Alagoas. The creation of a formal network of decision-takers from the whole region in a sustainable way and with the capacity to structurally plan and coordinate actions, was the final aim in which SEBRAE support was needed. The actions conducted with their support were thought as actions to foster strong and qualitative outcomes, with a genuine integration of the sustainable character and enabling innovative patterns. Mobilising and gathering participants around constructive debates to establish collective visions and directions for the regional touristic development, through territorial analysis, mapping of actors, definition of indicators and goals. Through knowledge sharing, the economic benefits of environmental protection and the integrated elaborated plan ensure the participation of actors from the tourism industry (Puppim de Oliveira, 2002).

Many other actors have been involved within this project due to its nature and its size. The nature of the project relying on exploitation of a natural environment lying on a large territory, as well as the protected area feature of the territory, which in the Brazilian legislative system goes under federal authority, imply a complex network of actors and interests. The organisation ICMBio is the main body involved in the conservation of the area, involved in research, protection, preservation and conservation of biodiversity while playing the role of an environmental police (ICMBio, 2021). With a total cost of more than 3 millions reais, the collaborative scheme shows its effectiveness as the project got the possibility to rely on various

fundings. Indeed, the need for financial and political support from different sides and institutions is fundamental for a project to go through. Each municipality involved, from both the state of Alagoas and Pernambuco, financially added their contribution, but the greater support with 1.650 millions of reals, came from the federal government through the Minister of Tourism, illustrating how important politics influence environmental policies establishment outcomes. Splitting costs, means combining strengths, guaranteeing more possibilities and ending up with shared and complete benefits from every actor (Puppim de Oliveira, 2002).

Diverse participants joined the initiative and a common interest association started, reinforcing the long term viability : technical collaboration from the training centre IFAL and even support from Banco do Nordeste, a major financial actor in the region.

Objectives

The goals fixed by the project makers were to implement concrete tools and bodies responsible for planning tourism development, taking into account small businesses and interests of all actors. Delivering a complete and inclusive roadmap, with joint promotion and communication actions, thus letting to each municipality the responsibility in organising and enhancing its touristic offer and infrastructures by providing training to local professionals. Indeed, shaping a network of small businesses having access to information and useful knowledge can materialise a solid socio-economic regional development (Silva et al., 2019). The initiative relies on the respect of sustainability principles : conservation and preservation of natural resources through conscious direct and indirect use of the area in the framework of intergenerational justice, using the productive chain of tourism to strengthen cooperation, information flow and planned marketing. Through proper investments and thoughtful actions, the main aim of every part of the project is to enhance the overall touristic experience in the region by proposing better quality services, products and infrastructures.

In this initiative, as well as in the first case study, incentivising economic activities owners to declare their businesses in order to map all the actors of the local economy and take a census of the potential tax payers, to increase public revenues. Furthermore, this project was also aiming in spreading more equally the touristic pressure over the entire territory in order to reduce the pressure over resources and to ensure the sustainability of the tourism sector in the municipality. The collaborative and cooperation vision grew the hope of helping nearby territories to develop further through tourism, sharing the pression, but mostly sharing the benefits. The federal policy *Programa da Regionalização do Turismo* served as a great

springboard in the decentralisation of tourism management, allowing the territory to align its development based on its specificities and local realities.

Besides sustaining economic activities related to tourism in the region, especially seaside tourism, the littoral north region of Alagoas developed a project directly wishing to preserve the coral reef ecosystem and the ecosystem services benefiting the region. Indeed, by wishing to spread tourism attraction evenly on the coast and on the infrastructure, the municipalities decided to share the benefits and revenues from tourism. Not only is this cooperation decentralising economic benefits to multiple agents, it is also decreasing the tension on the environment by lowering the number of visitors and the frequency of tourism activities. The direct economic benefits of the protection of its environmental resources allow a sustainable and effective financial and political support (Puppim de Oliveira, 2002). By planning upstream the touristic development of the region, the municipalities involved are responding to an expected over-demand from tourists. This upstream planning allows to develop adequate infrastructures at a normal-pace, taking into consideration all the available information, involving different actors and encompassing the constraints.

Brazil is ranked 32 regarding global tourism competitiveness but goes second in terms of natural resources : the marine environment and its coast of 8.5 mil square kilometres is a fundamental asset for tourism attraction, being the incentive for foreign tourism from 71,7% of tourists in 2018 (Global Economic Forum; Bouças da Silva et al., 2022). Despite 3.6 million square kilometres of Exclusive Economic Zone, only 1.6% was under protection by the government (Schulz Macedo, 2013). Besides pure economic and trade potential, coastal coral reefs protect against coastal erosion and flooding, preventing human and financially catastrophic losses (ICMBio, 2021; IPCC, 2022). Their importance within the food chain, and thus the marine biodiversity, is as well one of the main reasons for the extensive protection of the area from the ICMBio (2021), moderate to high biodiversity loss within warm-water coral reefs being expected (IPCC, 2022).

Environmental threats

The region within the borders of the APA Costa dos Corais is subjected to touristic pressure in the long run. Already suffering from the rapid development of the tourism sector through years, beaches and estuaries (cradles of lagunes and swamp ecosystems) are paying the price of an unprepared and disorganised occupation scheme, biological connectivity between each of this ecosystem interlace their wellbeing (ICMBio, 2021). The coastal ecosystems, and especially the reef, has been under overexploitation due to touristic activities, the main attraction being the *piscinas naturais* (natural pools) formed by the conjugation of the tide pattern and the presence of coral barrier. Water-based tourism activities are extremely negatively impacting the marine ecosystem as daily excursions, full of uneducated and uninformed tourists over the good practices to adopt in the site, were not subject to any kind of regulation or monitoring. Their disregard for the legal borders have been a crucial motive to go ahead with regional planning. In 2009, first timid steps had been taken by the Federal Public Minister, as the disrespect of the APA zone was made obvious, through the implementation of non-binding commercial criteria for local companies (e.g. type of boat, number of visitors, specialised guides...), however, in those type of conflict, monitoring is essential (Barboza et al., 2022). In 2013, a first *Plano de Manejo* (Management Plan) concerning the zone was developed with the actors involved in commercial or conservation work (researches, fishermen, entrepreneurs, public bodies ...). The pressure and harm made to the environment by anthropogenic activities included abandon of trash, over-fishing practices and unfortunate catching of endangered species, boat fuel pollution (fishers and touristic embarkations), perturbation of seabed by anchors, unsafe use of diving equipments and walks along the reef. Indeed, all anthropic and touristic activities generate waste, especially plastic waste, causing no less than hundreds of thousand of marine mammals to die (Embrapa, WWF-Brasil, 2019). Other pressure over the environment has been growing through the form of illegal and informal catering commodities construction. The region has seen the gradual eruption of monsters made of concrete, taking the spot of forests and swamps. Construction near the coastal line, conversion of coastal land into monoculture of sugarcane and coconut, are activities affecting natural dynamics of erosion and sediment deposit and of coral reefs lifecycle (Barboza et al., 2022; ICMBio, 2021).

Those environmental threats are already affecting the livelihoods of some traditional communities relying on artisanal fishing, negatively impacted by the pollution, the reduction of their territory, the tourism and the pressure over catches - community interest represented by the *Camara Thematic da Pesca do CONAPACC*. The management approach of oceans has an

urgent need for improvement in order to achieve a sustainable food system, as issues of inequalities are disregarded by the government (Barboza et al., 2022). In this project, as in every project in general, and especially those presented in this research study, governmental supervision and support is a prerequisite to overcome the different obstacles that could arise (Puppim de Oliveira, 2002).

Political obstacles

The Rede Governança Brasil¹¹, working to spread good practices about governance, issued a report about governance and the role mayor and municipal level have in it. The municipality of Maragogi is quoted in it as a “success story” (ILAGCP, 2021). The form of governance promoted in the report is about reducing the distance between the mayor, the public power in general, and the citizens in order to keep in mind that the final goals are to enhance the services offered to the population and enhance their daily life in general. However, there is also this aim to maintain a positive image of the municipality and the public power (i.e. being transparent to show that public agents are not corrupted) and integrate them and their desire in the action of the municipalities. Highlighting the importance to share and spread adequate governance pattern and virtuous public power moves, through the display of the runoff of bottom-up and transparent actions efficiently develop thanks to the will of the mayor, multiple actors hope to smother corruption at the local level, gaining back people confidence in public power and gradually scaling it up to the federal governmental actors.

Positive externalities

Tools and planning units were essential for this program to have impact in the long term and for those good practices to be sustained. The implementation of a tourism instance in the region coupled with a global idea of making development more regionally integrated made the flow of information and the coordination between each actor fluid, allowing for smoother action enforcement. Besides the reshaping from the federal government, the Maragogi’s secretary of tourism together with regional organisations and businesses, started a promotional campaign of the surrounding similar marine areas (e.g. Taoca & São Bento) in a first attempt to spread the flow of tourism. Environmental issues and issues of other nature due to tourism

¹¹ The network Rede Governança Brasil is a set of actors from public and private institutions, and from a large range of sector, gathering to promote governance.

development are not new and are common in unprepared territory, as well as in developing countries. Public bodies intervention and regulation patterns are often necessary to force the system to be reinvented and reshape in order to meet essential criteria. The implementation of protected areas for their great natural features usually goes behind in the list of priorities when issues such as poverty alleviation and economic development are the core concern (Puppim de Oliveira, 2002). However, the rather well-developed economic status of Maragogi allows it to put environmental protection on the list of its priorities. Effective protection and respect of the rules regarding the exploitation of the resources need to go under a social pact, as there is a limited enforcement capacity (Schulz Macedo, 2013).

The eruption of this project led by Maragogi have seen its roots in the myriad of benefits accompanying the actions : sharing organisational and implementation costs, opening new touristic offers and opportunities, increasing national and international competitiveness, developing alternative economic touristic activity aligned with sustainable principles and following a more inclusive and distributive scheme, creating new and more diverse job opportunities, becoming important actors in sustainable development, incentivising innovation, formalising and qualifying small businesses, incentivising responsible and conscious tourism. Having in mind that without protecting its natural beauty and resources, on which rely the local tourism-based economy, the same economy could destroy itself in the long run, losing tons of money (Puppim de Oliveira, 2002). Indeed, a study from Beck et al. (2022), assesses the financial benefits derived from flood protection delivered by reefs ranging from tens to hundreds of millions of dollars per kilometre. This service only is already allowing the region to make tremendous savings, not even encompassing other services (e.g. coastal erosion ...). Destructing the zone and its ecosystems would be thus comparable to burning millions of dollars.

CASE STUDY 3 : *RECICLADO EM ALAGOAS*

MARECHAL DEODORO

The initiative *Reciclado em Alagoas* have been a projected, implemented and conducted as a partnership between SEMARH, who provided financial capacity to SEBRAE, SENAI, who gave technical trainings to the workers, and SEBRAE, who equipped the teams with managerial trainings, focusing highly on leadership, administrative and environmental management within a cooperative. The combined work of each institution was the key for this activity to be sustained in the long term, as all the tools were transmitted to the actual actors on the field. SEBRAE and SEMARH elaborated recycling market analysis, examining datas (Brazil and locally), trends and information about the risks and opportunities within the sector.

In its whole, the project *Reciclado em Alagoas*, involved 9 municipalities, accounting for a total of 243 participants in the recycling sector. Agreements between each involved party were signed. Throughout the ratification of the agreement, and in the root of the project, the wish was to get aligned with the different partners (e.g. material buyers), organising actions strengthening the relationship and the collaborative work between members engaged in recycling activities, and to meliorate the sorting process, focusing on aggregating the value of commercialised products. Those conditions were detailed as they appear fundamental for such a business to succeed, even when financial and technical help will have to step back. Promoting social insertion of members of cooperatives and recycling centres in Alagoas, and contributing to the economic development of small businesses working with recycled material, promoting greater efficiency in the disposal : those were the main socio-economic reasons for the initiative to arise. The sustainability of the project was thus even more crucial as multiple families and local economies were to be impacted if the activity had to stop.

Marechal Deodoro

Several municipalities located in Alagoas managed to join the project. The municipality of Marechal Deodoro, located in the metropolitan region of Alagoas, has been chosen as a case study in the analysis of recycling activities potential. Within the perimeter of the municipality lies a famous and crowded tourist point, Praia do Francês. The great presence of catering and hospitality services in the area were the motive to focus our investigation on their cooperative recycling. Indeed, socio economic development is uneven depending on the area and sector. Integration and economic emancipation of the workers within the local dynamics was of

crucial interest (Centro Sebrae de Sustentabilidade et al., 2014). Furthermore, the environmental catastrophe the recycling plot is avoiding since its implementation is significant.

In 2019, the city hall contracted a cooperative for the collection and sorting of municipalities' waste. Following this first step, the role of SEBRAE has been mainly a consultancy role, sharing knowledge about management, human resources, social responsibility, budgeting and accountability, marketing, data management, bringing the basic tools and skills to run a business smoothly. In Marechal Deodoro, they have been supervising and guiding the professionalisation of workers, giving them tools, such as data collection and analysis, to maintain a healthy business. Through knowledge sharing and empowerment of the sorting agents, the aim is to allow the business to be run independently by the workers, without supervision needed from external bodies. Connecting actors, allowing exchanges between different cooperatives, helping in building up a network, sharing of good practices and techniques, were also assets brought by Sebrae.

Formerly informal activities, the trash collectors have seen the support of the municipality as a great shift in the enhancement of their practices. The development of the sorting centre of Marechal Deodoro, named Coopmar (Cooperativa de Trabalho dos catadores de Marechal Deodoro), permits them to finally work under the legal status of a cooperative (see Annex 15). Presently counting 26 working members, the operating plant contributes greatly to the livelihood and life quality of its members and their families. Nowadays, their work is monitored by municipal bodies, audited by qualitative targets. Currently, the Coopmar is expecting to collect and sort at least 20 tonnes of waste per month. Figure 11 displays the recycling plant of the Coopmar.



Figure 11 : Recycling system in the Coopmar

Recycling and wasting in Brazil

Plastic production, over-consumption and over-waste has been a global issue since decades. Accumulating not less than 11,3 millions of tons of plastic annually, Brazil comes fourth in the ranking of the top plastic producers (Bouças da Silva et al., 2022). 13,5% of its overall trash content is plastic, 80% of those waste made of plastic being of single use. Single use plastic and the perpetual inexistence of alternatives to plastic is displayed by the shocking statistic regarding domestic waste composed by one third of food packaging (Bouças da Silva et al., 2022; Embrapa, WWF-Brasil, 2019).

In 2018, the global recycling index was 22,1%, still incredibly low compared to the real need. However, for Brazil, this index goes down to 1%, illustrating the lack of recycling possibilities at large scale (Abiplast, 2019; Bouças da Silva et al., 2022). In 2017, the federal government decided to handle the waste national issue, claiming their desire to close all the open landfills of the country, pressing state and local actors to apply the measure in this sense. Municipalities started to invest in the recycling sector. Taking advantage of the *Política Nacional de Resíduos Sólidos*, new opportunities from public or private businesses were possible to generate. The policy strengthened the role and the jobs of recycling cooperatives,

guaranteeing income for thousands of Brazilian households (Centro Sebrae de Sustentabilidade et al., 2014). Waste being inevitable in every sector, they have been perceived as an opportunity for socioeconomic development and in need for innovation, estimating that for each ton of recycled material, work for 3,16 *catadores* is generated. From the sector of transformation industries, plastic is the fourth sector counting the most employment, with 12 091 enterprises in the sector of plastics, including 1 073 in the recycling industry (Abiplast, 2019). Side employment was also generated such as firefighter training especially for fires in recycling plants. Former 2020 target grew the expectations of the establishment of proper treatment plants for each type of solid waste, but haven't been reached until now (Centro Sebrae de Sustentabilidade et al., 2014).

Collection and sorting process

Besides the actors mentioned above, the private company Braskem contributed in equipping the plant with technical machinery and other utensils. Indeed, after the dissemination of several PEVs (*punto de entrega voluntario*), a voluntary recycling point, specific machinery and space were needed to follow the execution of the plan. The centre collect glass (e.g. bottles, glass ...), plastics (e.g. bags, packaging...), metal (e.g. cans, pans ...), paper (e.g. newspaper, notebooks ...) and electronic materials (e.g. TV, computer ...). Even though collection and sorting of recycling materials became mandatory with the PNRS, with the risk of seeing their federal financial transfers for urban cleaning reduced, most municipalities didn't apply this law (Centro Sebrae de Sustentabilidade et al., 2014).

Challenges/Threats

The main challenges for recycling implementation and intensification come from the lack of knowledge and initiative from the civil society to improve and participate in recycling activities. The lack of environmental education is felt in this sector where the development of the activity depends on the willingness of citizens to make the effort of providing materials to the recycling plant workers. Regarding industrial waste and waste coming from businesses, the same willingness coming from owners and managers is needed, coupled as well with articulation and cooperation from several actors.

Besides this, the ongoing pandemic acted as a gigantic step backward. Firstly in the implementation of the *Reciclado em Alagoas* project, but more generally in the production and consumption of plastic at national and global level. The sanitary rules and the fear of the population pushed everyone to duplicate its over-use of plastic (Bouças da Silva et al., 2022).

RESULTS

CONCURSO DE MERENDEIRAS

Public food procurement

Public food procurement has been indicated by the federal government as an engine for local development. However, despite the implementation of laws, incentives and financial penalties, municipalities are still hindering the participation of small and local producers in those tenders. Different reasons have been raised to explain this phenomenon.

The lack of contact between public powers and family farmers, and in general the lack of communication between civil society and public powers, is one of the greatest obstacles holding back the effectiveness of actions. From the side of farmers : the lack of knowledge on how to reply to a public call, the lack of information about public calls, the lack of flexibility in contract of public calls, the lack of opportunities for farmers to be included in the public food procurement, the large volume demanded in public food procurement, the payment default of the municipality. As the main concern from rural food producers is the delay in the payment from the municipality, the law has been updated to incentivise and facilitate the payments for farmers to be included without encountering a precarious situation (Instituto Federal de Alagoas, 2022). From the side of the municipality : the difficulties in reaching farmers, the lack of information regarding the local farmers (where, who, what they produce...), the prejudice that farmers will not be able to follow the requirements of tenders, and their lack of interest. Furthermore, demand and supply don't meet and are not aligned as there isn't communication between the two sides.

Decisive role of Sebrae

The main mission of Sebrae in this program was to convince municipalities through extensive discussion and processes of the relevance and the benefits of the application of this law. Indeed, the lack of interest and involvement of the public bodies in the daily life of farmers and the fracture between this segment of the population and the members of the power unable them to understand the urge for farmers in relying on concrete and secure contracts. Small businesses, especially small farms usually run by low educated people, need support to understand and reply to the open call made by the municipality. Indeed, they need to have access to the information, they need to have someone helping them understand each

requirement and the way they can effectively respect these requirements. They need to have the ability to reply to the offers (computer, internet, ability to use a computer, ability to read) and the technical skills to detail how they are capable of meeting the requirements.

Challenges

The implementation of this programme has been a struggle regarding a lot of organisational features. Indeed, poor internet connection in almost every place where the courses were conducted ended up slowing down the process of registration of each participant. The infrastructures made available for the training were usually not adequate regarding the number of participants and were vulnerable to climate conditions (heavy rains, wind ...). The poor quality of public services in general also impacted negatively smooth organisation as state roads sometimes unable participants to come. The poor organisation and communication within the municipalities either between public power members or with the civil society didn't allow fluid information sharing.

The *merendeiras* faced an uneven situation regarding their participation in the project. Indeed, in order to participate in the project, they required their schools and their superiors to let them participate, they needed to have the possibility to be available to participate in the course, the competition days, which means not having professional or family obligation. As the role of the nutritionists is crucial in this competition, they also need to have easy access and contact with the nutritionist.

During each training session, the degree of involvement, interest and motivation by the *merendeiras* and the nutritionists have been changing depending on a lot of internal and external factors. Firstly, the inner motivation and interest from each participant. The number of participants, which was highly correlated with the availability from the chef in having close exchange with participants, was a decisive feature. Indeed, in smaller groups, when it was possible for the participants to get directly involved (by contributing into the meal preparation) and to get direct contact with the two professors, participants were showing great involvement and great interest, being highly focused, asking questions and information, desiring to go further in the program. The strength put on the beginning speech by each speaker was also highly impacting the success of the training. Obviously, the quality of the infrastructures and the adequacy of furnitures, spaces and products provided was impacting the motivation of the participants as some training had to be done in over-crowded rooms, with heavy rain noises or without enough products or kitchen tools.

Positive environmental externalities

In the attempt to support family farmers and help them thrive economically, this initiative is as well indirectly fostering ecologically virtuous externalities.

By integrating new ingredients into the diets of children, their wants and tastes are subject to change, transforming what they ask to their parents and eventually, changing their parents' diets. By shifting the diets of the population, the shared mindset reshape as well. One of the main threats to biodiversity food products consumption are the prejudices the population have against those products. Considered as a “product of the poor” or food for animals, they are absolutely disregarded by inhabitants and are not integrated into their meals. The lack of knowledge regarding the ways to cook them and to integrate them into savoury recipes is also an obstacle for people’s social acceptance. However, the training provided to merendeiras, who are also moms, daughters and part of a community and who can exchange their knowledge, allow to re-integrate the savoir-faire and to effectively spread good practices directly into the communities who live close to those products and who could pull benefits from the consumption of these products.

In diversifying plates, the program enables the diversification of lands by maintaining already cultivated areas of those products and by showing the potential economic and health benefits of growing them. The introduction of new products, fitting the local context (soil composition, climate, rain pattern ...), will gradually reduce the amount of land covered by monoculture (in small farmers' crops, not affecting industry crops). This change in land covering will change the composition and the quality of the soil, allowing for a normal nitrogen cycle, improving the global environment of the crops and potentially improving the production on the field.

In long term perspective, yet a term that might be shorter than what we expect with regards to the recent extreme rains that occur in the region, this diversity in food production is also a path to make the whole local food system more resilient to climate change. Indeed, with climate patterns, blossoming seasons, rain patterns and other climate features increasingly mutating in the world, the food production system needs to adapt to its moving environment. The species and products that are today thriving in those climatic conditions might not be suitable in the upcoming climate, thus relying on only a few species is unsustainable, survival conditions of today’s crops might be not viable to grow tomorrow. By broadening the

possibility of livelihoods and of sources of nutrients, the changes occurring will affect the productivity and the viability of products but the likelihood of having some products resistant and flourishing in the new environment will be greater.

The training over the reduction of waste and the possible use of many parts of products is also expected to have great impact on the state of the environment. Indeed, by using products that will be wasted usually, the consumption over other products is reduced, thus less resources are needed to produce one household's food baskets. Furthermore, less trash generation implies less trash to be either burned, dropped off in nature or thrown in the garbage dump, reducing pollution over the environment.

Introducing the differences in quality of industrial and traditional agricultural practices over ailments gave new tools to the women who were participating in the training. Full of awareness and with new knowledge in hands, they can now become actors of their consumption and actually make the difference in the side of food demand. Indeed, if all merendeiras, either for their personal consumption or in their work environment, decide to use this knowledge to make enlightening choices and choose local and traditional agricultural food products over intensive agro-industry products, the entire food system will be affected. Demand for industrial products will decrease and demand for local aliments will increase. However, industrial production is creating more pollution, thus harming more of the environment than small-scale farming. This trivial initiative can end up making a large impact on the country's environmental contamination and poisoning.

Furthermore, the greater impact over the environment this initiative could have is duplicated as it has been implemented in every area of the state. Indeed, through the communication over the happenings of the contest (the competition and the trainings) put publicly the highlight on the importance of preserving the great biodiversity characteristics of Brazil, and especially of the one present in Alagoas. By communicating about it with the parents, the workers in the schools (handlers, teachers ...), employees of the municipalities (secretaries, councillors ...) and the children, it participate to sharing the idea that everyone as a role to play in conserving biodiversity, whatever his reason, forging a common ambition.

PREFEITO EMPREENDEDOR

Positive environmental externalities

In this project, the ecological positive externalities are easy to spot, as the project itself consists in reducing the pressure over natural resources. Indeed, to sustain tourism in the region, the natural resources on which tourism rely, need to remain untouched. The beauty of the natural landscape appeals to tourists who come to enjoy the services and benefits provided by the coral reef ecosystems. The clarity of the water, the marine biodiversity and the broad landscape are uniquely relying on the function coral reef does in the area, providing food and shelter for fishes, cleaning the water and creating wonderful marine landscapes. By reducing the constraints over this ecosystem to sustain economic activities, the project aims at protecting and preserving the natural environment.

Challenges

The project arose from the willingness of the main actors within the municipality of Maragogi and other important actors in the area. The real challenge was to make loads of actors, coming from an environment where collaboration has never been part of any kind of decision-making, articulate their actions in a collective way. Each actor having his own interest and agenda, coordinating everything was the biggest trouble. The project showed that in order to construct a strong and reliable development framework, objectives, constraints and roles need to be defined in an participative way, set clearly.

The weaknesses have been spotted by the project leader : the lack of qualified workers, the lack of collaboration between actors and the lack of public services, thus failing to meet inhabitants, workers and tourists needs. Changing habits of tourism actors, and in general habits of actors implemented in the region for a long time, take time and patience, and need continuous involvement from the local actors involved in environmental restoration and preservation. Furthermore, to increase the interest and engagement of the powerful actors, economical benefits need to confirm the true viability of the agenda.

RECICLADO EM ALAGOAS

The goal of Sebrae regarding the development of the sorting and recycling activities in the state of Alagoas is to have at least 51 municipalities engaged in the process defined by the agreement, for the period 2022-2024. The implementation of a sorting plant within the municipality, operating under the supervision and with the financial support of the public power, acts as a great tool of local development. The regular trash collection system is a service that the municipality needs to pay for, subscribing to a contract system. The fee paid by the municipality for these services is net expenses, as it is money getting out of the municipality. By implementing a recycling plant, the public expenses made to contract agents working in the plant is acting as an investment in the municipality asset. Indeed, the work done by those agents allow to generate new revenues through the retail of recycled material, creating a virtuous cycle and enabling further local development.

The cooperative development and structuration and the PEVs dissemination which have been supported by the actions of Sebrae, were already existing initiatives. Prior to receiving help and support from the teams, the municipalities should have prepared the ground for actions to be able to happen smoothly, gathering and engaging the needed actors, articulating agents. The secretary of environment should have taken the first steps in sharing with local actors, partners and other public bodies that will support and accompany the creation of a formal recycling activity. The role of the Sebrae here is mostly to guide and support the formalisation of the activity, to bring the necessary tools and competences to guarantee the sustainable viability and independence of the continuation of the activity.

However, those prerequisites are not easy tasks in some regions. The secretary of environment in the municipality of Porto Calvo contacted actors from the Sebrae, exposing their willingness to implement a formal and effective recycling centre in the municipality. Already in contact with potential partners to carry out the creation of a sorting cooperative, many obstacles were still preventing the formation of this activity. Indeed, the two secretaries shared their disappointment and their struggles, stating that the other public actors needed to be involved in the elaboration of the project were “disregarding the role and the actions of the secretary of environment”. The two main actors who display their interest in running the business show how recycling can have a positive impact over the socio-economic status of the population. Indeed, those people don't have skills, money to invest and are looking to get engaged in any kind of activity that could help them improve their life.

Positive environmental externalities

The motivation and organisation displayed by the members, end up in better performance in general, and especially in greater financial performance for them, and for the municipality. Firstly promoting social insertion of workers, the greater efficiency in the use of solid residues and the environmental sustainability of this initiative display how socioeconomic issues can be intrinsically related to environmental ones. Improving waste sorting in Alagoas, strengthening the local economy, increasing the sales of recycled materials, each side of the society ends up as the winner. Through the implementation of the plant, the improvement in communication with the population and the training provided to the members of the cooperative, virtuous cycle have been erased. Most of the waste generated by the population is actually seen as “raw material” for agents working in the sector of sorting, recycling and reusing. This vision over the components of the sorted trash is displaying the wish from certain actors to acquire those products in order to turn them into their own source of income.

Challenges

The location of the collect and sorting centre or cooperative is a crucial characteristic in the effectiveness of a project. Workers, users, buyers, etc : every actor connected to the place needs to have easy access. Workers, with low-income, need to be able to access the sorting site without having to pay, or with the possibility for them to come by bike (e.g. not putting the centre on top of a hill). Users, trash producers, need to have access to the information necessary over the work agents are doing, in order to understand the necessity and the facility for them to get engaged in the initiative. For instance, the municipality of Viçosa, settled PEVs in the centre of the municipality, without providing information to the inhabitants and thus the potential users, about its functioning process. Thoughtless decisions like this one, lead to ineffective action, decreasing motivation to involve actors and displaying the lack of organisation in the operation led by the public power.

One main issue which has been raised by the recycling agents in the cooperative of Marechal Deodoro was the competition between informal and formal collection agents. Informal workers, going to people’s houses before the picking time of the legal collection business, are gathering the trash of people, reducing the amount of materials collected by the formal business. The population, being unaware of this issue and being unable to recognise a formal worker from an informal one, maintain this inefficient loop. Cooperation, collaboration and articulation between actors in the frame of effectiveness is not a habit anchored in the local

culture. The lack of transparency and the lack of information sharing between economic agents proved to be the greatest obstacle in the development of well-structured and efficient recycling. For instance, the municipality of Penedo, which benefited from the support of Sebrae, have been under discussion and debate during a one-year process before starting to develop further a recycling activity in the municipality, displaying the often recalcitrant actors and the need for diplomacy and delicacy towards some actors.

Issues coming directly from the work of informal workers are multiple. From an economical point of view, formal workers contracted by the municipality to work in the sorting site are not able to collect the amount of trash demanded by the municipality. The second issue, socially grounded, is the poor conditions of these informal workers and their incredibly low source of income. If they were to stop their informal work, increasing the amount of work in the formal business, it would expand the need for workers in the formal business, thus opening opportunities for those workers to get inserted in a formal and more qualitative work environment. The third issue, environmentally grounded, lay on the fact that those informal workers are performing not-structured activities. Subject to market variation, the materials they collect are either sold to industries or any interested actors, if there is some. However, when those actors don't find buyers for the materials they collected, they just drop their plunder in nature, polluting the environment in a worse manner than if the trash had been collected by the formal collectors.

In order for the sorting and recycling services to be effective and to be used by the population, reliability over the services is crucial. Indeed, for catering services professionals, the need to be able to rely on the collect services is essential for them to make the choice to give their trash to the recycling centre. Even though it is financially costless for bars and restaurants to use the sorting services, other costs can be decisive for them to contract a non-sorting trash company. If once the sorting company fails to picking-up the trash from a restaurant at the time it was expected to, police or other hygiene assessing organisations can apply a fine to the commodity, or restrain its activity for some time, ending up in considerable cost for the catering commodity.

Other issues can arise a second time, when the first step of a sustainable settlement already succeeds. For instance, the capital city of Maceio already has 4 recycling centres operating in the area, however, with regard to the amount of waste and trash generated by the population, at least 6 more should be needed.

The goal of Sebrae in increasing the quantity of recycling material in cooperatives has been more than reached, with an augmentation of more than double in the quantity of material passing through the cooperatives.

FINAL CONCLUSION

Brazilian economic development has been subject to critics from non-governmental organisations and actors working towards international environmental protection. The emergent characteristic of its economy justify the presence of inequalities regarding its territorial development and uneven growth in incomes among the population. Global cities like Rio de Janeiro and São Paulo are facing tremendous speed of development and expansion. Oppositely, a large share of the territory is under-developed, lacking public services and infrastructures. The state of Alagoas and the majority of its territory is displaying the several characteristics of an under-developed area. Limited in size, subject to extreme weather events, deploring hostile climate conditions - notably the semi-arid region-, the state struggles to improve its inhabitants life quality.

In a large and diverse country like Brazil, top to bottom actions are not effective means to address challenges as obstacles and threats encountered in the global city of São Paulo are similar to the one encountered in remote semi-arid villages in the deep countryside of the state of Alagoas. Brazil falling under a federal system, with a distinct state, headed up by governors, empowered by the possibilities to apply their own legislation and to adjust their decision, local actions and decentralisation are opportunities to further explore and to encourage. As monitoring is rather complicated, local bodies spread all over the territory, as close as possible from the population in need of help, are acting to foster local development. The organisations from the *Sistema S*, and among them SEBRAE, are implementing context-specific initiatives and programs to educate, empower and develop the local economy and its actors. However, despite the extensive work of those organisations and multiple other actors in Brazil acting to improve life conditions of the population, their efforts are at high-risk to be undermined in the upcoming years. Indeed, global climate conditions are massively changing annually since decades, when compared to pre-industrial annual changes in the global climate. Those changes aren't felt evenly in every corner of the globe. Depending on the region and its specificities, climate changes and its consequences are going to intensify the difficulties already encountered by the population, while unexpected problems will emerge. Areas of the world are threatened by climate change to different degrees. Populations encounter contrasting socio-climatic vulnerability levels. Unfortunately, most of the zones subject to high-risk of climate change impact are the cradle of the most vulnerable populations. A large segment of the people living in Alagoas meet the criteria to be considered subject to socio-climatic vulnerability and live in

areas exposed to high-risk climate changes. In order to prevent the worst scenarios, mitigation and adaptation operations should be implemented.

In an attempt to investigate the potential paths to gradually insert these necessities in people's minds, the first step was to understand if some bridges were already set up and the maturity of those. The problematic "Considering the overall state development level and the intrinsic inequalities, how far interventions from external organisations aiming to support socioeconomic development through local actions can foster positive externalities over the environment?" served as a starting point for this research. The plurality and complementarity of sources highlighted a few but major points to consider. From the theory to the context analysis, significant challenges singular to Brazil and especially to the studied area emerged and have been emphasised by the qualitative data collected. The points and arguments expressed through formal and informal meetings, bringing together a broad variety of people from different backgrounds and carrying distinct interests and convictions, tend to meet the discourse of most of the interviewees. The convergence of outcomes enables some statements to be made.

The main obstacle, also considered as a challenge to be overcome, and systematically mentioned is the lack of education. In this particular case, the lack of education was thought specifically regarding environmental knowledge and awareness. In general, all the people with whom the topic of environmental concern or consciousness have been explored, deplored a rather huge breach in average citizens' environmental knowledge. This deficiency is perceived as the fruit of disinformation or incapacity to access information, rather than a lack of interest or consideration. Behind this message is hidden the feeling of dishonesty and fraud from citizens sick of political games and swinging democracy. Indeed, even though the topic primarily discussed environmental education, protagonists claimed a lack of education in all its forms. Some explained about the failure of public schools for children, others about the hardly any jobs and studies opportunities, the decrease in public funds for education and sciences, the shut down of international exchange for students, all undermining even more the confidence from citizens towards the government. The problem struck everyone in the same manner, hopes in future generations will not concretise in actions if the population keep lagging in competences and knowledge. Socio-climatic vulnerability will accelerate if no one is capable of sowing the right seed. The agricultural sector accounts for a large share of Brazilian GDP and jobs. Educating the farmers of tomorrow, who could be useful even today, will never occur if the government decides to cut down important budgets.

The other obstacle, which seems uncrossable for more than one, is the lack of public services, slowing down processes and harshening actions that should not be. Defective road network and unadapted infrastructures are for instance the main factors which slowed down the implementation of the local actions investigated in this study. Furthermore, this deficiency is putting monitoring in lethargy. The size of the country and the distances separating each dynamic pole are increasing the burden of monitoring processes, undermining regulations and lessening the incentives to respect the laws. However, remote industries and illegal businesses will never feel a risk important enough to change their behaviour and stick to the law if the entire system does not evolve. Public infrastructures prevent effective and frequent monitoring to be executed, monitoring bodies, as for them, tend to be biased or affiliated to some group of interests, or at least are perceived as such by the civil society. The situation deepens the loss in confidence among citizens. Indeed, conflict of interest within public administration and among certain powerful groups of the society are at the core of issues perceived as immutable.

One side effect deriving from the lack of education, and creating a vicious cycle, is the almost impossibility for normal citizens to get involved in any decision process. The power in decision-taking and initiative-taking is concentrated in the hands of public bodies, elected rather for their relationship network than for their proficiency in doing the job. Through discussions with actors from both sides, it has been made clear that public participation in municipality improvement is not a subject. Even though the tendency is to go towards a more inclusive and horizontal governance, the meaning here is more about information sharing and strengthening the relationship and support between actors, than about concrete contributions. This situation is directly resulting from the prejudices that most of the people are uneducated and that public agents are not worthy of being trusted.

Gathering those findings, the role played by external organisations seems obvious. Multiple gaps need to be overcome and bridges between the population and the powerful actors are dramatically missing. Institutions from the *Sistema S*, notably SEBRAE in this case, have been fundamental in addressing those issues. Working together with both sides, providing education and tools to an unreachable segment of the society, their actions are gradually closing the gap. Enlightening municipal bodies with external advice, redefining the priority list sometimes inadequately thought due to political objectives, the path towards a reduction of clientelism and corruption will emerge from local willingness. Convincing remote and marginalised small-business owners, blindly trying to survive, of the importance to learn new techniques, get organisational skills or implement innovation within their activity, is a means to slowly raise the level of education, hoping for it to sprinkle to upcoming generations.

Socio-economic issues are central in people's concerns, leaving far behind environmental awareness. The absence of environmental education among most citizens was the main obstacle in this research study. Indeed, when climate change direct and indirect consequences were discussed, few protagonists were able to mention phenomena due to the climate crisis. Natural ecosystem services were an unknown concept and environmental harm was encompassing plastic pollution. Even though these parameters made some discussion difficult, it brought an important perspective to the study. Furthermore, it gives the hope that a large range of possibilities could emerge when adequate environmental education will be finally implemented.

The three case studies analysed showed effective positive environmental consequences. The initiatives that were implemented are either acting to protect, conserve or preserve the environment and the natural resources. Indeed, the importance of preserving natural resources and natural riches is quite well understood. The lack of understanding lies mainly on the cause-effect relation. The projects that were described here display a common characteristic that we can analyse as major in their success. All projects are aiming to explain this cause-effect relation, acting as educational actions. Furthermore, every project has been implemented within a socio-economic beneficial perspective, acting as an engine to attract participants. As engagement from a majority of actors is needed for the actions to have significant effect and as the majority of actors are willing to get engaged if economic benefits result from the action, the only possibility for positive environmental consequences is to create a co-dependent situation, where economic benefits are embedded into environmental protection or conservation. The role external institutions play in the implementation of these actions is crucial as they act as neutral bodies, not demonised by any side of the society. However, their role and aim need to stay focused on socioeconomic development, rather than on environmental protection or conservation, to guarantee the continuous adherence of the populations. Indeed, inequalities and local economic development being embedded in most of the citizens daily life, within the studied area, environmental means cannot be placed as a priority. Nevertheless, improvement in environmental education and economic development will help to gently make environmental concern progress in people's mind and priorities. Thus, actions should adapt following the same trend, little by little enhancing and strengthening positive environmental externalities.

The capacity of these initiatives to be implemented and relatively welcome by the society derived also the scale in which they have been thought. Indeed, all projects are

context-adapted and rely on local specificities. Implemented directly on the field and by local actors who benefit from the local knowledge increase the chance of success. Even if the project did not emerge from a specific demand of the civil society or were not directly implemented by citizens, they responded to local needs and were shaped in order to respect local constraints, integrating actors with different interests and goals. The small-scale and context-adapted characteristics of those case studies are requisites for success. The proximity between the actors and outcomes is needed for a great engagement and because the ones making the effort want to concretely see how their efforts were worth it, in order for them to make it again.

Even though the study is specific to the cases studied and the analysed territory, several outcomes proved to be globally significant. Indeed, despite the multiple peculiarities of Brazil and Alagoas, the same kind of patterns and prejudices are conditioning people's minds. It is impossible to state concrete actions and possibilities which will be efficient in the entire world, nonetheless, common human traits can let us think that some conditions are universal. In developed and developing countries, few projects can be viable and replicable if they do not provide socio economic benefits. As it was the case in this study, for a project to be implemented and approved by a large segment of the society, and especially for people to get engaged, socioeconomic outcomes need to be guaranteed. This condition is not a prerequisite as depending on the sample of engaged people or on the territory, environmental actions can be effective even though they don't provide socio economic benefit. However, multiple environmental actions, if well thought and implemented, can result in socioeconomic benefits, the action mainly needs to be thought of as such, integrating different actors and perspectives in order to multiply the potential sources of interest. Furthermore, turning the action into an environmental education act will create potential for further actions. Environmental knowledge and awareness is highly diverse and depends on a lot of factors, yet disinformation and cognitive biases are undermining the effect some data should create. In this scope, building environmental actions on cause-effect relation allows for universal understanding and leaves few spots for misunderstanding or false interpretation. Local actions proved to be effective in the particular settings of the cases analysed. Embedded difficulties did not prevent the project to be implemented and provide the world with positive environmental consequences. It is with this in mind that actions should be implemented globally, that's one small step for man, one giant leap for humankind.

REFERENCES

Abiplast (2019) A Indústria de Transformação e Reciclagem de Plástico no Brasil. Associação Brasileira da Indústria do Plástico

Aklin, M., Bayer, P., Harish, S. P., Urpelainen, J. (2013). Understanding environmental policy preferences : New evidence from Brazil. *Ecological Economics*. vol. 94, pp. 28-36

Arvis, B., et al., 2020, [Consequences of global climate change and their impacts on Europe — a view on agricultural commodities](#), report for the European Environment Agency, Ramboll France, Aix-en-Provence.

Barboza, R., Cunha Cardoso, A. T., Da Silva Santos, D., Ulisses dos Santos, J. & Neves Souza, C. (2022). Metodologias Participativas Para Elaboração do Diagnóstico da Pesca na APA Costa dos Corais. *Biodiversidade Brasileira*, vol. 12(2), pp. 1-12. DOI: 10.37002/biobrasil.v12i2.2177

Beck, M. W., Heck, N., Narayan, S., Menéndez, P., Reguero, B. G., Bitterwolf, S., Torres-Ortega, S., Lange, G.-M., Pfliegner, K., Pietsch McNulty, V. & Losada, I. J. (2022) Return on investment for mangrove and reef flood protection. *Ecosystem Services*. vol. 56

Bouças da Silva, D. L., Gil, J., Pinheiro do Nascimento, E., Araujo Costa, H. & Paixão, R. (2022) Poluição plástica no litoral brasileiro : percepções de gestores de meios de hospedagem sobre consumo de descartáveis. *Revista Brasileira de Pesquisa em Turismo*. vol. 16.

Brazilian Confederation of Agriculture and Livestock/CNA. (2018). *Harvesting the Future : 2018-2030*.

Cavalcanti, C. (2007). Economic Growth and environmental protection in Brazil : An unfavourable trade-off. In A. Breton et al. (Ed.) *Environmental Governance and Decentralisation : New Horizons in Environmental Economics* (pp. 49-74) Cheltenham, UK : Edward Elgar Publishing

CIRAD (April 1, 2022) L'alimentation change le monde #6 : Les lois de la transition. Nourrir le vivant.
<https://www.cirad.fr/les-actualites-du-cirad/actualites/2022/podcast-politiques-publiques-pour-la-transition>

Climate Transparency. (2020). Climate Transparency Report : Brazil.

CNT. (2021). Pesquisa CNT de rodovias. SEST SENAT.

Dias de Oliveira, L. & Sander Scarparo, A. L.. (2018). Pensando a educação alimentar e nutricional como ferramenta contra os desperdícios de alimentos. Desperdício de alimentos : velhos hábitos, novos desafios. Marcelo Zaro

EAT-Lancet Commission (2019). Food, Planet, Health : Healthy Diets from Sustainable Food Systems

ECLAC. (n.d.). Brazil - Political and electoral system.
<https://oig.cepal.org/en/countries/7/system>

Embrapa, WWF-Brasil. (2019). Manual do educador #Sem Desperdício : Transforme pequenos cidadãos em heróis contra o desperdício de alimentos.

European Environment Agency. (2021, August 30). Global climate change impacts and the supply of agricultural commodities to Europe. Retrieved September 6, 2022, from <https://www.eea.europa.eu/publications/global-climate-change-impacts-and>

FAO (2021) Public food procurement for sustainable food systems and healthy diets - Volume 2. Rome. Alliance of Bioersity International and CIAT and Editora da UFRGS.
<https://doi.org/10.4060/cb7969en>

Fundo Nacional de Desenvolvimento da Educação. (2009). Jornada de Educação Alimentar e Nutricional. Ministério da Educação. Programa Nacional de Alimentação Escolar. - 3. ed. - Brasília.

GEO. (2022, April 24). Comment Brasilia est-elle devenue la capitale du Brésil en 1960?. <https://www.geo.fr/histoire/il-y-a-60-ans-brasilia-devenait-la-capitale-du-bresil-200484>

Governança pública municipal: Transformando sua administração / Instituto Latino-Americano de Governança e Compliance Público, coordenação – 2. ed. – Brasília: NT Editora, 2021.

Grisa, C. & Fornazier, A. (2018). O desperdício de alimentos e as políticas públicas no Brasil : entre ações produtivas e políticas alimentares. Desperdício de alimentos : velhos hábitos, novos desafios. Marcelo Zaro

Grottera, C., Pereira Jr, A. O., La Rovere, E. L. (2014). Impacts of Greenhouse Gas Emission Reduction Policies on Income Inequality in Brazil. Climate & Development Knowledge Network.

Guia Prático para Sustentabilidade nos Pequenos Negócios: Ferramentas para o desenvolvimento territorial e fomento à criação de negócios inovadores e sustentáveis / Centro Sebrae de Sustentabilidade, Sebrae em Mato Grosso e Sebrae em Mato Grosso do Sul – Cuiabá: Sebrae/MT, 2014.

ICMBio (2021) Plano de manejo da área de proteção ambiental Costa dos Corais.

Instituto Federal de Alagoas. (2022). Manual para execução de compras por chamada pública de gêneros alimentícios da agricultura familiar e/ou empreendedor familiar rural no âmbito do programa nacional de alimentação escolar (PNAE) no IFAL - ed. 1

IPCC. (2022). Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. In Press.

IPCC. (2014). Climate change 2014 synthesis report. IPCC: Geneva, Switzerland.

Le monde (2022, 9 May) Climat : par quoi commence Macron?

Le monde (2022, 16 May) Climat : faut-il faire payer les riches ?

Lyra, G. B., Oliveira-Júnior, J. F., & Zeri, M. (2014). Cluster analysis applied to the spatial and temporal variability of monthly rainfall in Alagoas state, Northeast of Brazil. *International Journal of Climatology*, 34(13), 3546-3558.

Mongabay Environmental News. (2021, August 11). Platform presents unpublished data on Brazilian biodiversity. Retrieved September 7, 2022, from <https://news.mongabay.com/2021/08/platform-presents-unpublished-data-on-brazilian-biodiversity/>

Peixoto, M. (2018). Perdas e desperdício de alimentos : panorama internacional e proposições legislativas no Brasil. *Desperdício de alimentos : velhos hábitos, novos desafios*. Marcelo Zaro

Porpino, G. (2018). Quais os porquês do desperdício de alimentos entre consumidores? Compreendo o comportamento do consumidor para delinear soluções. *Desperdício de alimentos : velhos hábitos, novos desafios*. Marcelo Zaro

Puppim de Oliveira, J. A. (2002). Implementing environmental policies in developing countries through decentralisation : the case of protected areas in Bahia, Brazil. *World Development*. Vol.30, n°10, pp1713-1736. Elsevier Science Ltd

Oliveira, J. A. (2002). Implementing Environmental Policies in Developing Countries Through Decentralisation: The Case of Protected Areas in Bahia, Brazil. (vol 30, *World Development*, Vol. 30, Issue 10, pp 1713-1736, ISSN 0305-750X, [https://doi.org/10.1016/S0305-750X\(02\)00067-0](https://doi.org/10.1016/S0305-750X(02)00067-0)).

Schulz Macedo, H., Vivacqua, M., Castro Lima Rodrigues, H., Cavaleri Gerhardinger, L. (2013) Governing wide coastal-marine protected territories : a governance analysis of the Baleia Franca Environmental Protection Area in South Brazil. *Marine Policy*. vol. 41. pp. 118-125

SEBRAE. (2006). *Histórias de sucesso : agronegócios : mandiocultura e fruticultura*. Ed. : Renata Barbosa de Araujo Duarte. Brasília

Silva, G., Di Serio, L.C., Bezerra, E.D. (2019). Public Policies on Innovation and Small Businesses in the Swinging Economy. *Brazilian Administration Review*. vol.16, nº3. <http://dx.doi.org/10.1590/1807-7692bar2019180140>

Smits, P., Sagoenie, Y. & Cuppen, H. (2018). Small and Medium-sized Enterprises in Brazil. Netherlands Enterprise Agency

Statista. (2021) Brazil - Statistics & Facts
https://www.statista.com/topics/1537/brazil/#topicHeader_wrapper

Thomson, S. (2019, 30 July). Bangladesh is a world leader in climate change adaptation. This is how it did it. Global Center on Adaptation. Retrieved the 24 June 2022
<https://gca.org/bangladesh-is-a-world-leader-in-climate-change-adaptation-this-is-how-it-did-it/>

Tillous-Borde, P. (2021). Nourrir les populations. *Le cercle des économistes*

Torres, R. R., Lapola, D. M., Marengo, J. A., & Lombardo, M. A. (2012). Socio-climatic hotspots in Brazil. *Climatic change*, 115(3), 597-609.

WFP, W., & UNICEF. (2022). *The State of Food Security and Nutrition in the World 2022*.

APPENDIX

Appendix 1 : Map of all the municipalities participating to the program *Cidade Empreendedora*

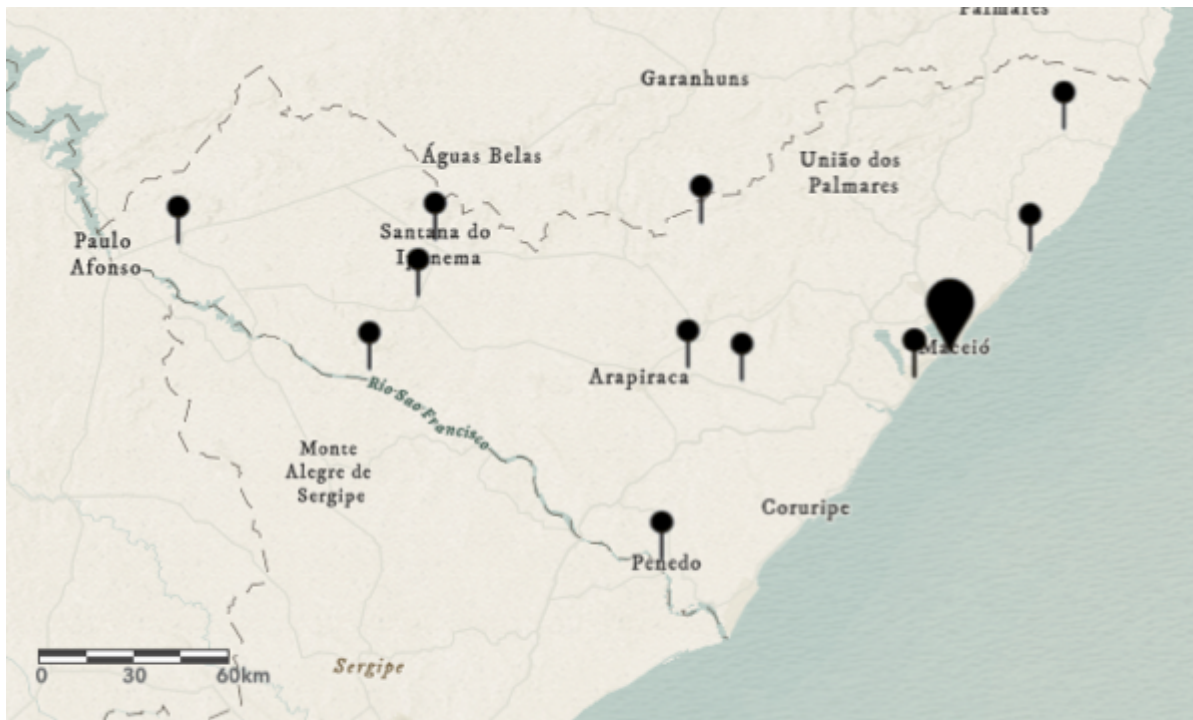


Appendix 2: List of meetings, events and interventions

Date	Location	Actors presents	Topic
31/03	Vergel do Lago, Maceio	IABS Workers from the neighbourhood	Circular economy project in the poor neighbourhood of Vergel do Lago : communities living around the lake, relying on sururu's fishing and generating tons of shell's waste. The project managed by IABS and co-financed by the BID and an architecture company, is providing a complementary economic activities to the communities while using the waste to product bricks.
31/03	Maceio	Curators	Artisanat in the region.
01/04	Maceio	Sebrae	Visit of the new Centre for Innovation : gathering place for actors from the creative economy, entrepreneurs and ICT's workers.
13/04	Quebrangolo	Several secretaries of Penedo (tourism, public procurement ...) Analyst from Sebrae (agriculture, recycling, publicprocurement)	Presentation of the program "Cidade Empreendedora"; presentation of the support pole Tourism and Recycling provided by Sebrae; assessment game
03/05	Penedo	Several secretaries of Penedo (tourism, public procurement ...) Analyst from Sebrae (agriculture, recycling, publicprocurement)	Presentation of the program "CidadeEmpreendedora"; assessment game
05/05	Porto Calvo	Several secretaries of Penedo (tourism, public procurement ...) Analyst from Sebrae (agriculture, recycling, publicprocurement)	Presentation of the program "Cidade Empreendedora"; assessment game
05/05	Barra de Santo Antonio	The mayor and several secretaries of Barra de Santo Antonio (education, public procurement ...) Analyst from Sebrae (agriculture, tourism, public procurement)	Presentation of the program "Cidade Empreendedora"; assessment game
09/05	Maceio	Most of the mayors and secretaries from the municipalities participating to the contest "Prefeito Empreendedor"	Awards ceremony for the contest "Prefeito Empreendedor 2022"
11/05	Maceio	Nutritionists	Opening ceremony of the contest "Concurso de merendeiras"

Date	Location	Actors presents	Topic
18/05	Maceio	Small entrepreneurs	One-week event "Semana do MEI", trainings for small entrepreneurs about communication techniques, organisations ...; local bank offering their support to small entrepreneurs...
24/05	Pão de Açúcar	Merendeiras, nutritionists	Training for school cooks and school nutritionists within a school of the municipality.
24/05	Olho d'agua dos Flores	Merendeiras, nutritionists	Training for school cooks and school nutritionists within a school of the municipality.
25/05	Santana do Ipanema	Merendeiras, nutritionists	Training for school cooks and school nutritionists within a school of the municipality.
25/05	Santana do Ipanema	Municipal agents responsible for helping entrepreneurs	Training on how to get inserted in the tax system as a small entrepreneur
25/05	Delmiro Gouveia	Merendeiras, nutritionists	Training for school cooks and school nutritionists within a school of the municipality.
15/06	Porto Calvo	Secretaries of the environment	Training for school cooks and school nutritionists within a school of the municipality.
20/06	Limoeiro	Merendeiras, nutritionists	Training for school cooks and school nutritionists within a school of the municipality.
20/06	Campo Alegre	Merendeiras, nutritionists	Training for school cooks and school nutritionists within a school of the municipality.
28/06	Marechal Deodoro	Catadores	Visit of the recycling plant Coopmar; exchange with the workers
28/06	Marechal Deodoro	Workers from the cooperative	Visit of the cooperative transforming cooking oil from local catering establishment into soap
30/06	Maceio	Local female entrepreneurs with their family	Participation to the event "Brasil para Elas"; trainings for small entrepreneurs; catering services; leisure activities for women
01/07	Maceio	Merendeiras, nutritionists	Training for school cooks and school nutritionists within a school of the municipality.

Appendix 3 : Map of municipalities include in the fieldwork



Legend

- Capital city - Maceió
- Other municipalities

Appendix 4 : List of semi-directive interviews

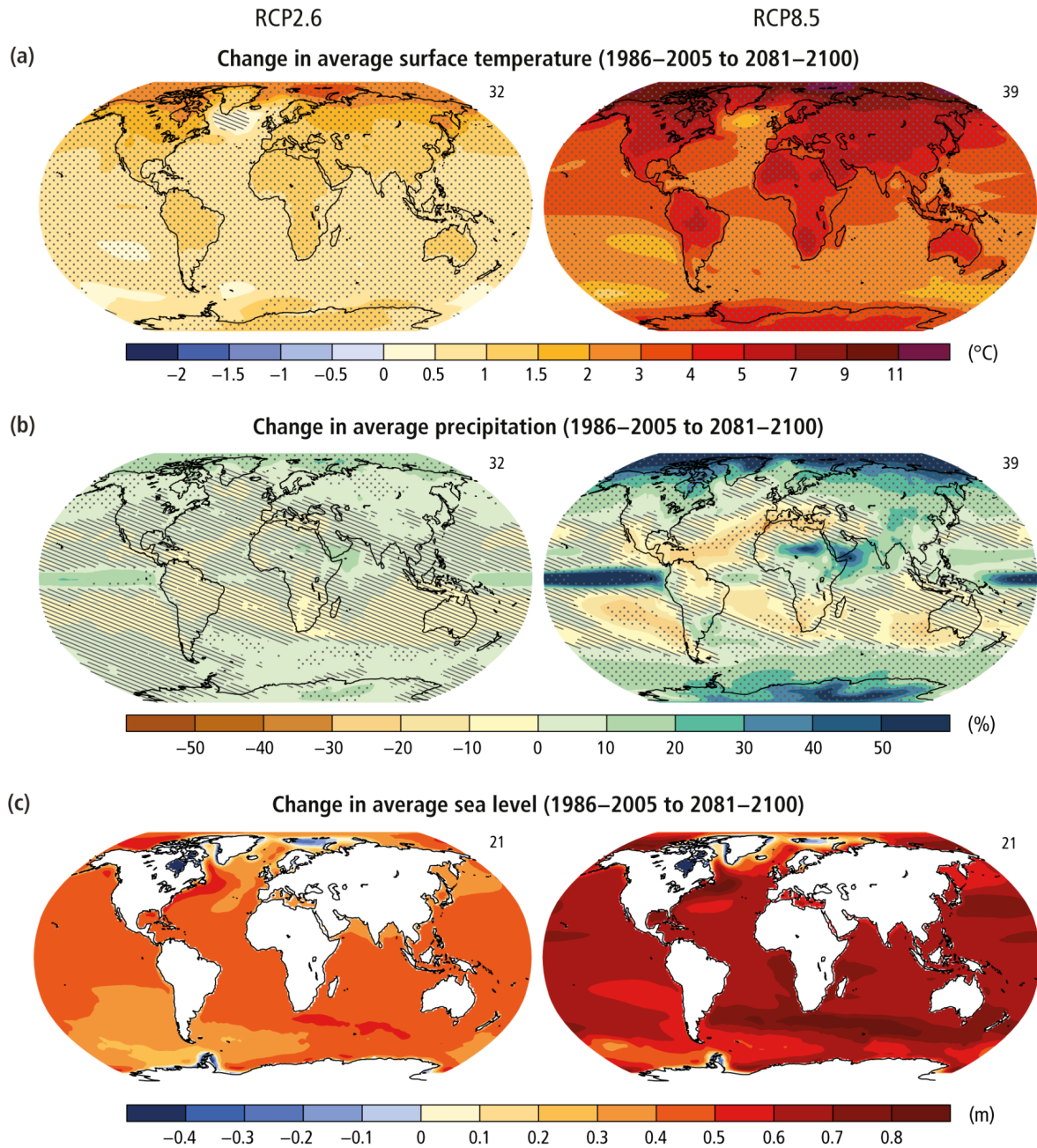
Category	Interview identification number	Date	Interviewee	Role	Institution	Duration
A	A1	21/06	Gustavo Porpino	Senior Analyst in Research and Development	Embrapa	01 : 29 : 36
B	B1	21/06	Camila Nascimento	Analyst specialised in public procurement and juridical matters	Sebrae	01 : 07 : 18
B	B2	22/06	Yanna Caldas	Juridical consultant	Sebrae	01 : 14 : 45
B	B3	23/06	Cristina Loureiro	Analyst specialised in agriculture and rural development	Sebrae	01 : 57 : 27
A	A2	25/06	Helena Menezes	Nutritionist	Embrapa	01 : 12 : 33
B	B4	28/06	Agda França	Analyst specialised in environment and recycling	Sebrae	01 : 18 : 30
A	A3	29/06	Diego Vasconcelos	Secretary of tourism	Municipality of Maragogi	00 : 42 : 32
C	C1	29/06	Roberta Roxilene Dos Santos Daiane Dupim	Regional director Technical consultant	IABS	01 : 46 : 17
D	D1	29/06	Gustavo Cabral Ariane Maria	Students in environmental engineering	UFAL	02 : 54 : 18

Appendix 5 : Template of axis discussed during the semi-directive interviews

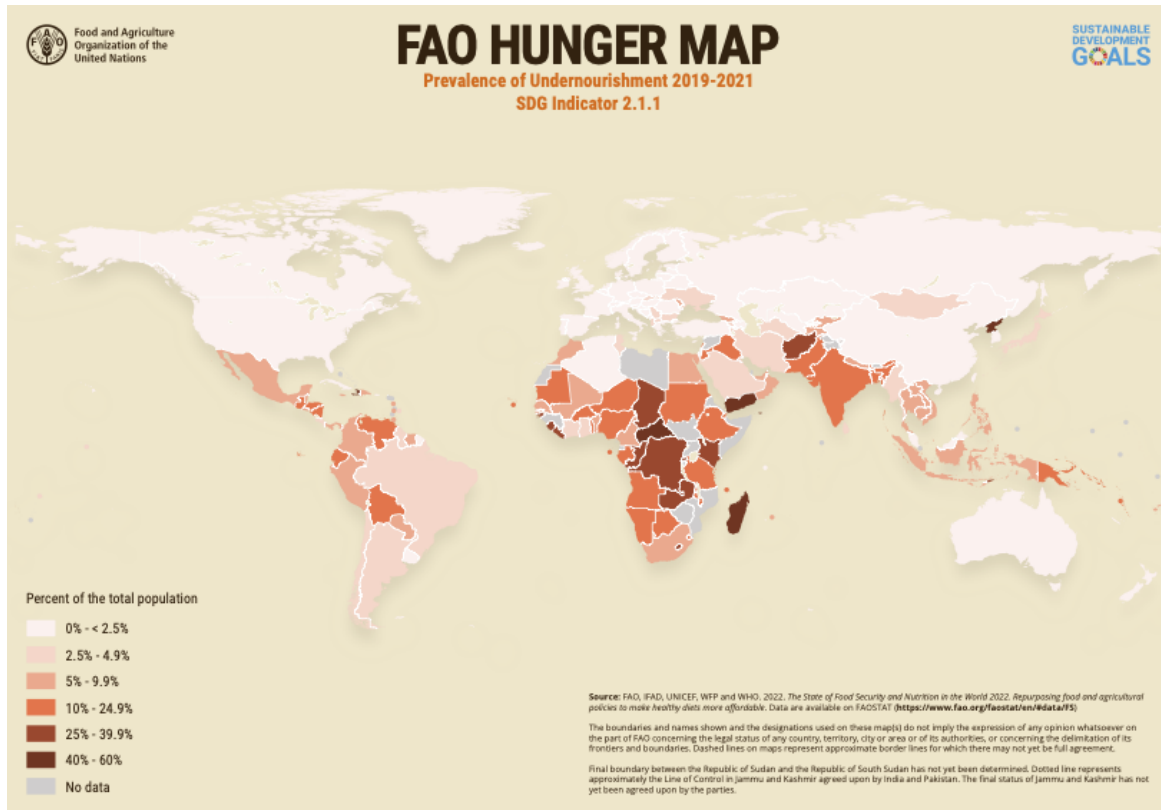
	Category A/C	Category B	Category D
Introduction/ presentation of the project	Assessment of the opportunities furnished by the implementation of local actions Scope of the entire state of Alagoas Main actors : municipalities, entrepreneurs, small-scale enterprises, SEBRAE Interrogation about environmental concerns regarding the civil society, public and private organisations		
Personal information and data	Permission for recording and use of data Basic information : <ul style="list-style-type: none"> - Full name - Current job and professional path - Origin, familiarity with the state - Perception over its job 		
Common open questions	<p><u>SEBRAE</u> How do you perceive the organisation's role ? How do you think the overall population perceive it ?</p> <p><u>Governance</u> What kind of governance system is in place in Brazil ? In Alagoas ? Do you think local actions are more effective than global actions ? What are the largest challenges and obstacles in Brazil and Alagoas especially ? How to overcome those challenges ? What is lacking to alleviate inequalities ?</p> <p><u>Local actors</u> How close are municipal agents and the population ? What about the trust between those people ?</p> <p><u>Government and politics</u> What should be improve in priority at the federal level ? What are the obstacles hindering a further development of the country ? Of the state ? What do you think about public policies implemented by the federal government ? Do you think that local actors have the opportunity to strengthen environmental conservation ? What should be further improve in terms of public policies ?</p> <p><u>Environmental concerns</u> How much concern are Brazilian by environmental issues ? How much the climate crisis is it a political and national debate ? What are you more concern about when it comes to the destruction of the environment ? Can you think of environmental issues addressed by governmental actions ? Why is the population not as concern as she should be ? How far the population get involve in mitigating climate change ? What should be address firstly in order to raise awareness about the importance of protecting the environment ?</p> <p><u>International relations</u> Are non-governmental organisations or other country helping Brazil in facing its issues ? How do you perceive the relationship between Brazil and other country ? How other countries could help Brazil to overcome its issues ?</p>		
Specific questions	How your organisation/ municipality is dealing with environmental issues ? How do you finance their environmental conservation actions ? What is the main aim in the project(s) ?	Involvement in each initiative + set of questions about the initiative they worked on (challenges, opportunities...) What is the engagement of SEBRAE in environmental questions ?	How do they started to be involve in environmental protection ? Why ? How is it perceive around them ? What are their hopes for the future regarding environmental awareness in Brazil ? In Alagoas ? What are the present opportunities to increase environmental awareness ?

ANNEX

Annex 1 : Global changes from the period 1981-2005 to 2081-2100 with projection under RCP2.6 (greenhouse gas concentration trajectory $+2,6W/m^2$) on the left side and under RCP8.5 on the right (IPCC., 2014)



Annex 2 : The FAO Hunger Map (2019-2021) (WFP et al., 2022)



Annex 3 : Map of the world centred on Europe and displaying the real size of Brazil (in blue) overlapping Europe (Software : The True Size of)

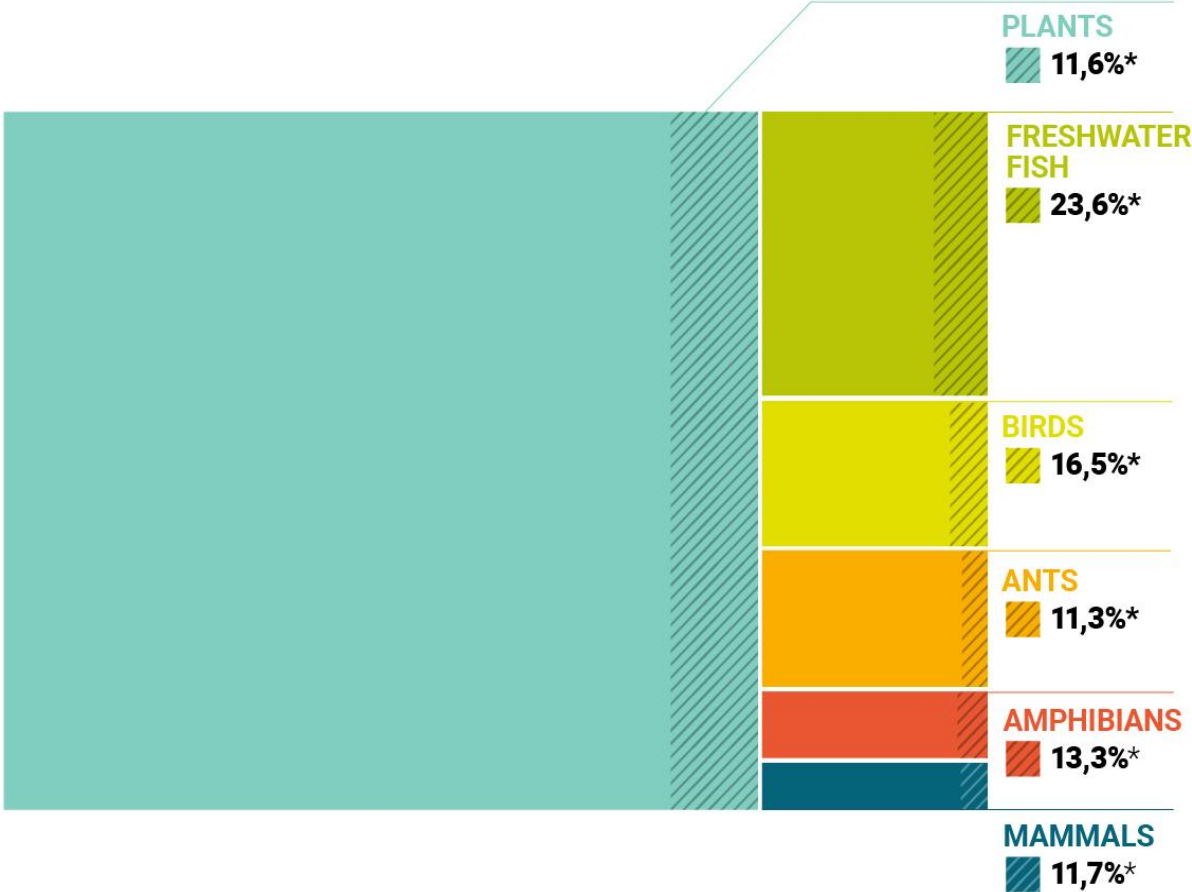


Annex 4 : Photos of recent flooding in Recife, Pernambuco, and Penedo, Alagoas (Alice Terpereau, 2022; Municipality of Penedo, 2022)



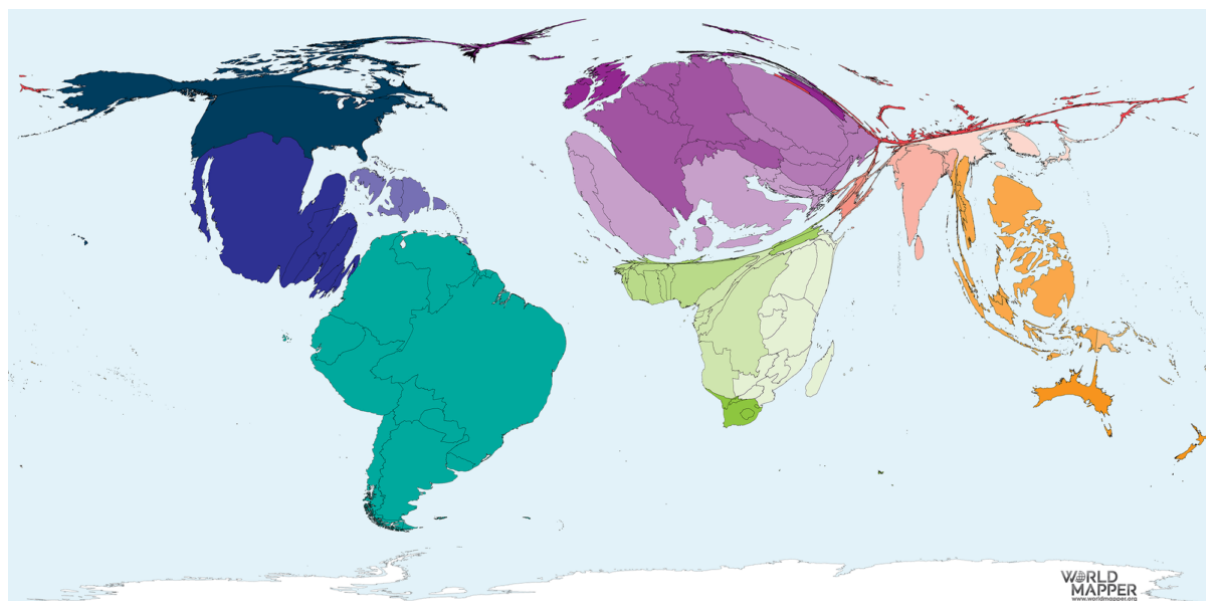
Annex 5 : Infographic displaying the share of global biodiversity(the coloured rectangle) attributed to Brazil (the hatched rectangle) (Mongabay Environmental News, 2021)

BRAZIL'S CONTRIBUTION TO GLOBAL BIODIVERSITY



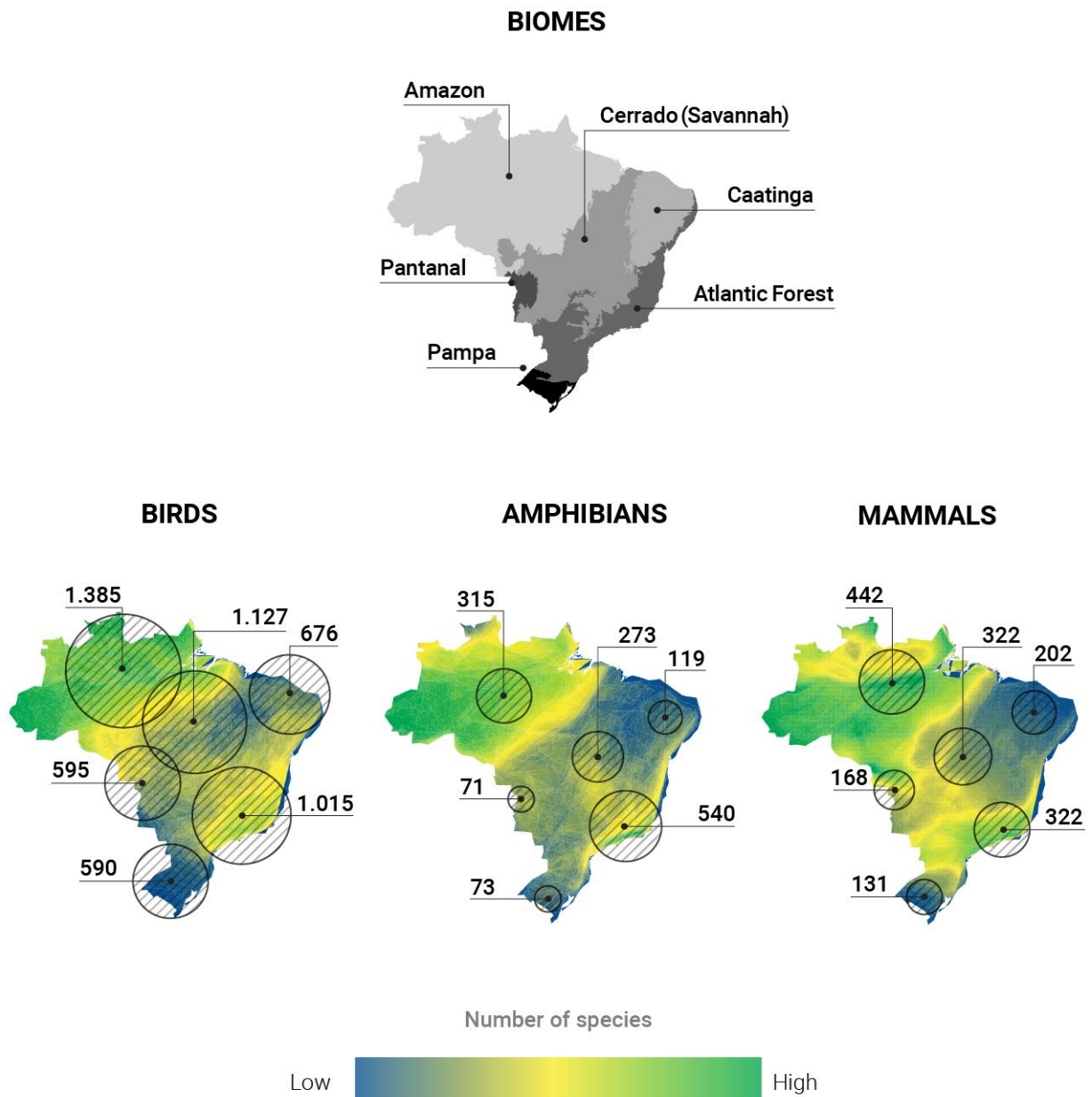
* In the infographic above, the colored rectangles represent the world's total for different groups of species, while the hatched area indicates the proportion found in Brazil for each group.

Annex 6 : Map of the concentration of the catholic population displayed by the size of each territory (WorldMapper, 2018)



Annex 7 : Brazilian biomes and biodiversity hotspot (Mongabay Environmental News, 2021)

BRAZILIAN BIODIVERSITY MAP
 NUMBER OF SPECIES PER BIOME

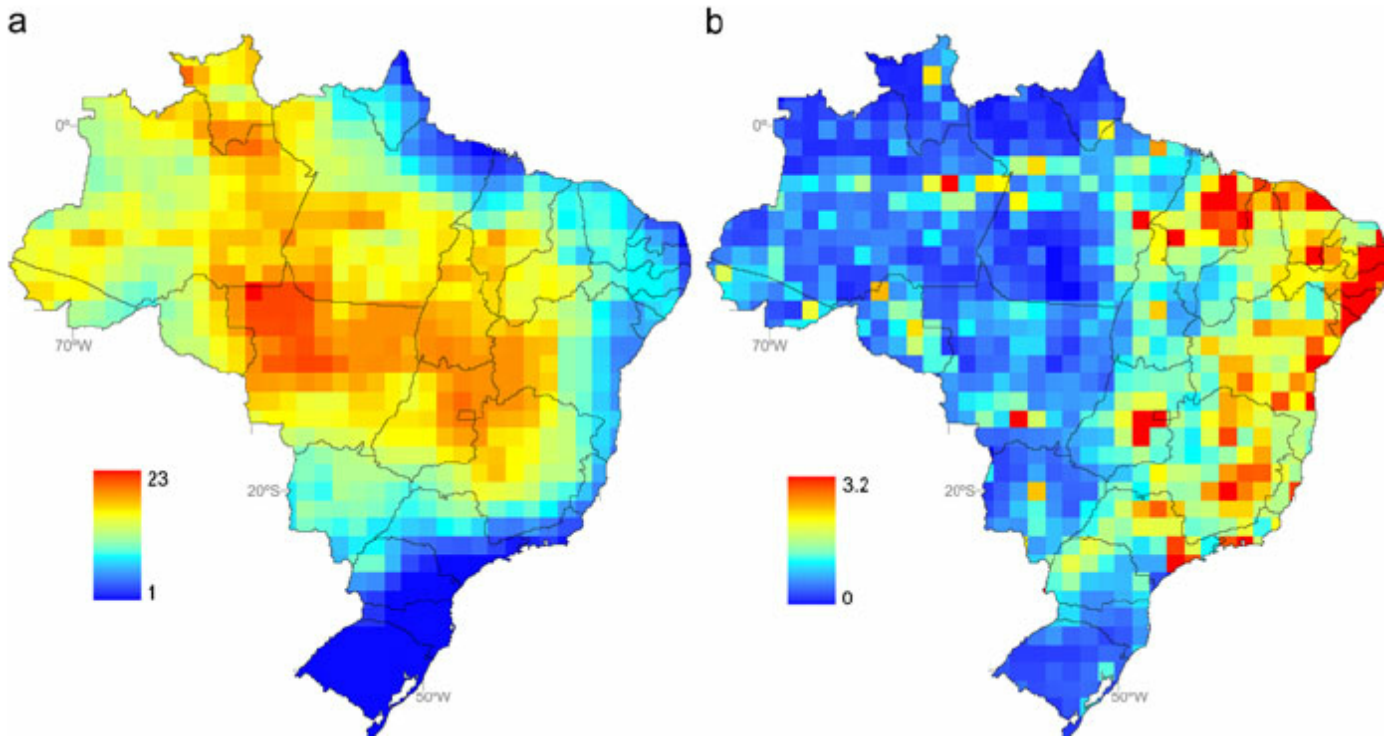


On the maps above, green colours indicate the regions of Brazil that are home to a greater variety of species, while blue indicates regions where the number of species is comparatively smaller. The circles indicate the number of species per group in each of the six Brazilian biomes.

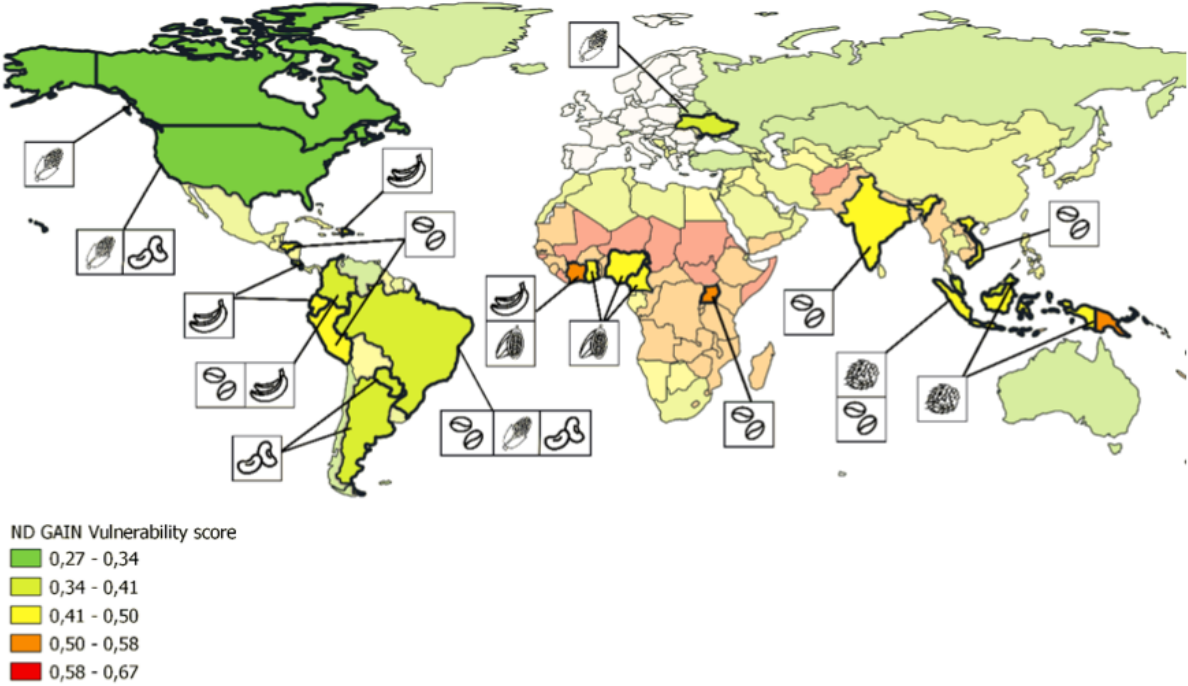
Annex 8 : Distances and time travel in Alagoas

Distances from each municipality (in kilometres)								Approximate journey times by car in normal traffic conditions (in hours and minutes)							
	Maceió	Arapiraca	Maragogi	Penedo	Delmiro Gouveia	Santana do Ipanema	Marechal Deodoro		Maceió	Arapiraca	Maragogi	Penedo	Delmiro Gouveia	Santana do Ipanema	Marechal Deodoro
Maceió		130	130	148	294	204	30	Maceió		2:00	2:00	2:20	4'30	3:10	0:35
Arapiraca	130		253	72	165	95	116	Arapiraca	2:00		3:45	1:10	2'45	1:40	1:50
Maragogi	130	253		289	390	322	158	Maragogi	2:00	3:45		4:05	6'10	4:50	2:35
Penedo	148	72	289		238	165	144	Penedo	2:20	1:10	4:05		3'45	2:40	2:10
Delmiro Gouveia	294	165	390	238		96	278	Delmiro Gouveia	4:30	2:45	6:10	3'45		1:30	4:20
Santana do Ipanema	204	95	322	165	96		192	Santana do Ipanema	3:10	1:40	4:50	2'40	1:30		3:00
Marechal Deodoro	30	116	158	144	278	192		Marechal Deodoro	0:35	1:50	2:35	2'10	4:20	3:00	

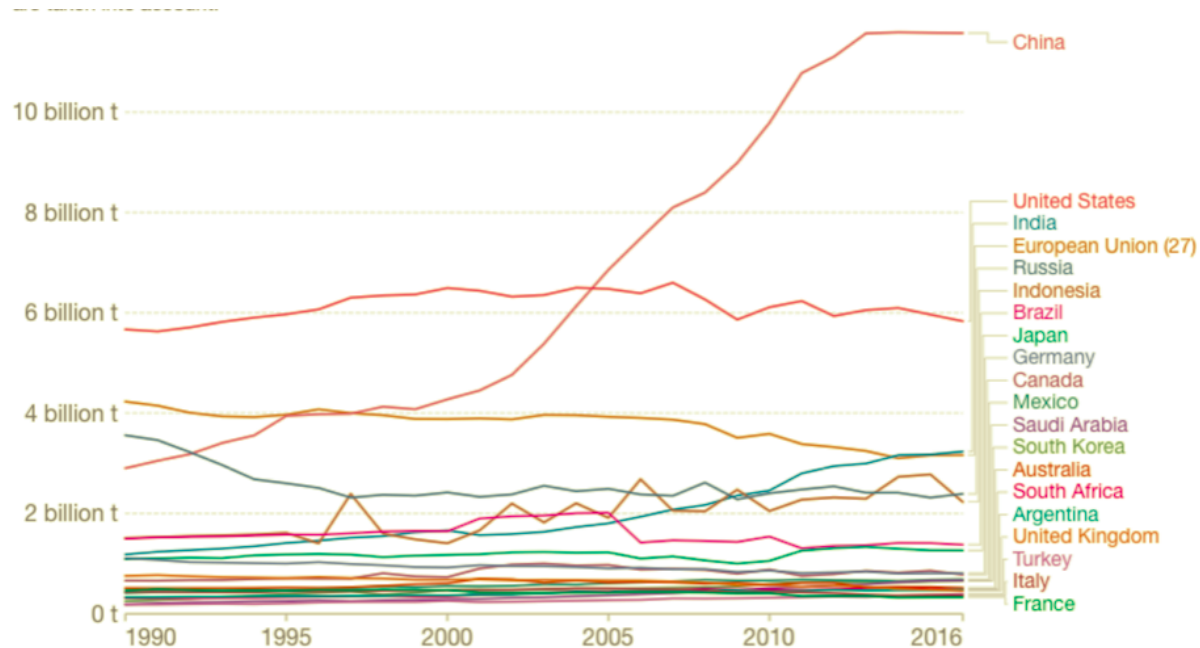
Annex 9 : Vulnerability of the Brazilian territory and population : Regional Climate Change Index (left) and Socio-Climatic Vulnerability Index (right) (Torres et al., 2012)



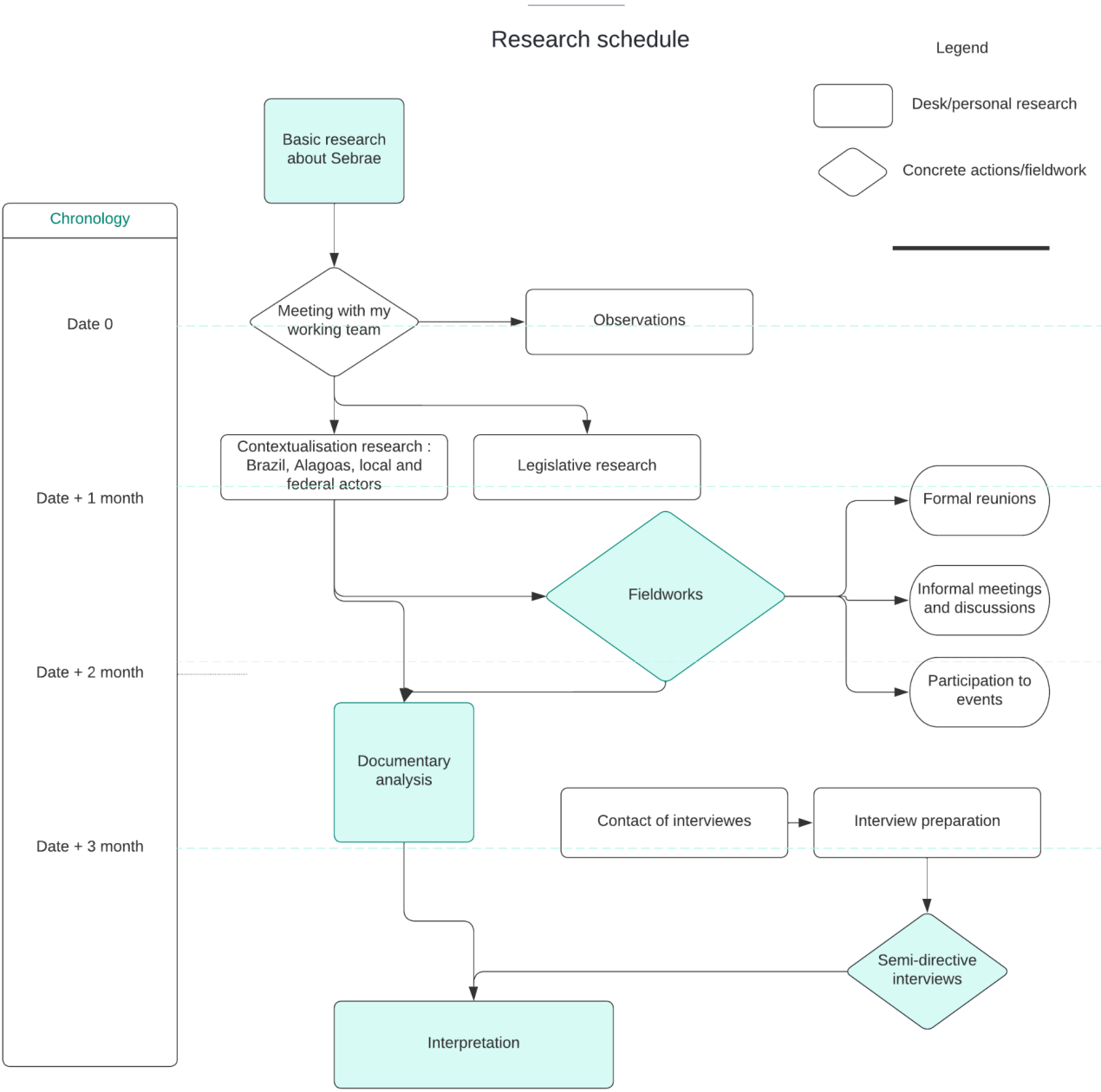
Annex 10 : Spatial representation of countries contributing to top 80% of imports for six key commodities (Arvis et al., 2020)



Annex 11 : Total greenhouse gas emissions from 1990 to 2016 (Source : OurWorldinData, 2016)



**Annex 12 : Flowchart of the research schedule over the period dedicated to the study
(Software : Lucidchart)**



Annex 13 : Photo taken during a meeting with the secretaries of Environment in Porto Calvo



Annex 14 : Photos of training sessions provided in the framework of the *Concurso de Merendeiras*



End of a training session



Regular shooting photo at the end of a session



Coco de ouricuri, local food products

Annex 15 : Photos of the recycling plant COOPMAR



Metal and precious material recycling zone



Pile of packed recyclable materials, cooperative front



Flyer distribute by the cooperative to the citizens