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environment in the amazon**  
**Sustainability and Adaptations to global changes**

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<b>Coordinators/WP4</b>	Marcel Bursztyn (Center for Sustainable Development - University of Brasilia) Martin Coy (Innsbruck University)		
<b>Contact</b>	Marcel Bursztyn	<b>E-mail</b>	marcel@unb.br
	Martin Coy		martin.coy@uibk.ac.at
<b>Authors/Deliverable 4.2</b>	Larisa Ho Bech Gaivizzo; Stéphani Nasuti; Michelle Morimura; Louise Cavalcante; Beatriz Santos.		

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## **Introduction**

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The project ODYSSEA “Sustainability and adaptation to global changes”, started in 2016 bringing together researchers from different countries with the purpose of producing knowledge and tools for the development of an interdisciplinary observatory to analyse and monitor the socio-environmental dynamics in the Amazon. The project was constituted by five work packages (WP). This progress report focuses on the initial findings of the WP4 “Vulnerability, adaptation and environmental governance”, coordinated by the Sustainable Development Centre (Centro de Desenvolvimento Sustentável - CDS) at the University of Brasília (UnB), in collaboration with the University of Innsbruck (UIBK).

To that end, the report will be divided into three sections. The first section will discuss strategic elements that will be integrated into a methodological-conceptual framework to enable the analysis of regional policies combining adaptation approaches of ecosystems and communities. These aspects are grounded in the literature review and in the summarised findings related to public policies analysed by WP4 researchers in the Amazon, which are presented in the second section of this report. The third section consists of a training proposal by means of a summer school (one of the pathways for the implementation of ODYSSEA), focusing on a more in-depth analysis of the conceptual-methodological framework here proposed.

Amongst the many activities carried out by ODYSSEA, it is worth highlighting as a reference for the report the field work on the BR-163 and the 3<sup>rd</sup> Project Scientific Meeting in Belém, in the state of Pará (PA), between September 27<sup>th</sup> and 29<sup>th</sup> 2017. This meeting brought together research and educational institutions, as well as representatives of Amazon society who are active at the regional and at the local scale. The active role of such organizations and their horizontal interaction with academia in terms of expectations and perspectives are principles that underpin participative science, providing one of the “guiding-elements” of this report.

### **Section I. Adaptation to climate change based on ecosystems and communities: conceptual elements in the methodological framework for the analysis of regional policies**

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The year that marks the thirtieth anniversary of the environmentalist Chico Mendes’s murder will also see a renewal of the discussions about the development of the Amazon in light of his

legacy during the Meeting of the Peoples of the Forests and Waters (Encontro dos Povos da Florestas e das Águas) in Acre. Issues such as the discontinuities of social and environmental policies, the growth of agribusiness and increase in deforestation, and the land insecurity felt by traditional communities and peoples will return to the local political scenario with new urge, and new “narratives”, such as land sparing (VIEIRA, 2017).

Between 2015 and 2016, with the help of the Satellite Monitoring Project for the Amazon Forest (Prodes) an increase in the area of deforestation in the Legal Amazon became evident, setting back by over a decade the trend that had witnessed a drop of the phenomenon (PRODES, 2017; VIEIRA, 2017). The increase in the annual deforestation rate constitutes a serious risk in terms of achieving the target established by the National Policy on Climate Change – reduction of 80% up until 2020 (BRASIL, 2010).

Currently, 20% of the Amazon has been deforested. When this figure reaches 40%, the climate models point to a potential large scale change towards a drier climate, which would affect the climate in the region and throughout the continent (NOBRE et al., 2012; NOBRE, 2014).

On the other hand, an analysis of the socio-environmental system (SES) that monitors deforestation in conservation units (ISA, 2018), shows that federal units of sustainable use, in a region where there are 52,104 families, are more efficient in terms of curbing deforestation, even when the units are located in municipalities seen as priorities regarding deforestation control (BRASIL, 2018; CALEGARE, 2014; PPCDAm, 2013).

This supports the thesis that sustainable and long-term adaptive interventions to climate change (CC) should be informed by what Huq et al. (2017) described as “pivotal forces” – the local scale, the human communities, and their interdependent relations with the ecosystems – the socio-ecological systems (SES) (LINDOSO, 2013).

In that context, adaptation processes led by communities (CbA), supported by their own priorities, knowledge and experiences, have more potential to ensure resilience of livelihoods, to identify, and to combat the causes of vulnerabilities such as poverty, unequal control over resources and limited access to basic services (BENNET et al., 2015; GIRO et al., 2014; HUQ; REID, 2007; REYES-GARCIA et al., 2016, 2017).

The CbA approach in combination with an adaptive approach based on ecosystems (EbA) and aimed at the sustainable use of biodiversity and eco-systemic services within a broader adaptation strategy framework (especially in developing countries), can increase the positive interactions to build resilience and reduce vulnerability focusing on:

- i) The conservation of ecosystems and maintenance of eco-systemic services (of support, provisions, regulation and cultural) (MEA, 2005);
- ii) The recognition of limits and capacities supporting these ecosystems (PNA, 2016);
- iii) The strengthening of collective, decentralised, and flexible collective decisions; and,
- iv) The integration of local, traditional and scientific knowledge (HUQ et al., 2017; GIRO et al., 2017; IUCN, 2008).

Giro *et al.*, (2014, p 16) have defined the integration of EbA with CbA as

“the planning and implementation of adaptive measures that integrate human rights and environmental sustainability principles, recognising their interdependent roles for the construction of human communities and resilient ecosystems in the face of the climate variations and long-term changes”.

One of the main critiques towards integration is regarding analytical scales. The EbA is multi-scale, while the CbA is local. However, this does not mean that the latter is only concerned with the community scale, but rather with processes led by communities. The outcomes of the local scale, through networks, proactive partnerships, and community innovations are expanded (and shared) with the regional, national and global scales, with multi-scale impact that are significant to socio-environmental governance (GIRO et al., 2014; SAYRE, 2010).

Another aspect of the integration between the EbA and CbA is the alignment between adaptation and sustainable development. Development policies prioritise the reduction of poverty, inequality, and environmental degradation, while adaptation policies prioritise vulnerability and risks in the face of CC (PNA, 2016; KASECKER et al., 2017). Adger and Brown (2009) highlight that vulnerability is socially differentiated, a common thread that

permeates these perspectives. The socio-ecological systems that are more vulnerable to CC are those that lose a significant proportion of their capacity to support livelihoods where a substantial part of the poor population resides, who are also the most vulnerable (KASECKER et al., 2017; IPCC, 2014; IUCN, 2008, 2009).

We use the studies by Lindoso (2013) as the conceptual reference for adaptation and vulnerability, understood as the susceptibility by SES to suffer the harmful effects and financial loss due to their low capacity of preventing and coping with such losses. Three characteristics are associated with this vulnerability: exposure, sensitivity, and adaptive capacity. The relation between exposure and sensitivity can be moderated through adaptation, here understood as every adjustment in systems under stress that reduces the sensitivity, takes advantage of opportunities, and increases adaptive capacity in the face of adverse effects of climate, whether present or future. On the other hand, resilience is related to the quantity of disturbance that a system is able to absorb without having to change its characteristics, functions and structure, as well as its capacity to learn and adapt. The loss in resilience is related to irreversible changes in SES, to the increase in vulnerability, and to flow reduction in eco-systemic services (BROWN; ADGER, 2009; LINDOSO; RODRIGUES-FILHO, 2016).

These indicators encompass one of the main challenges when planning for adaptation, namely, chronic and persistent poverty. According to classic development theories, for poverty to be overcome, it is necessary to invest in a particular asset that may be restricting opportunities or capacities amongst the population, for example, access to the market or to knowledge (LADE et al., 2017). However, theories that are informed by the interactions in SES advocate that traditional perspectives reinforce the poverty cycle by not taking into account the multiple external vectors that impact communities, as well as institutional, cultural and intergenerational barriers, in particular, the role of inequality in perpetuating the cycle (HAIDER et al., 2018; LADE et al., 2017).

Poverty, according to Haider et al. (2018, p.2), “is lived as a multidimensional experience”; as a situation of un-sustainability reinforced by negative interactions between social and environmental systems. It follows that a new perspective to overcome it must take into account that SES interact as complex adaptive systems, with multiple relations between scales of time and space where adaptation policies and actions can be designed to both strengthen the positive interactions and minimise the negative ones.

Combined with a perspective that enhances structure, local and municipal governments have a key role in the implementation of EbA and CbA approaches, by means of broadening the participation of communities as leaders in the adaptive process (VIEIRA, 2017; KASECKER et al., 2017). The implementation of policies and practices at the local level are guided by processes of policy-making, which in turn depend on the content of the political agenda. The integration of EbA and CbA with this cycle includes analytical perspectives such as:

- i) CC impact;
- ii) Extreme climate events;
- iii) Sustainability goals;
- iv) Reduction of disaster risks;
- v) Increase in health and productivity of ecosystems;
- vi) Non-regressive practices of adaptation as part of a broader strategy of adaptation interventions; and,
- vii) Socio-environmental protection of communities and their livelihoods (JOHNSON et al., 2013).

Figure 1 presents a preliminary table for the analysis of the policy cycle. It has as a starting point the adaptation principles based on ecosystems and communities. Identification, selection and evaluation of the adaptation policies and projects will be carried out in three stages of the cycle, focusing on the strategic, regulatory and operational levels along with respective vertical and horizontal integration. The analytical criteria are based on some premises: first, in terms of temporal framing, we have opted for the period starting in 2005, year of publication of the Ecosystems Evaluation Report (MEA, 2005), which stands for the origin of the approaches based on eco-systemic services. Secondly, setting off from collective exercises, the agendas and policies will be measured through the reconnaissance of connection evidences, and direct propositions (or sub-products) based on EbA and CbA. While the measuring may adopt a variety of references, it is worth highlighting the importance of opting for a multi-methodological path that can be understood by all those involved (TEDDLIE; TASHAKKORI, 2010). For example, Huq et al. (2017) propose the attribution of weights to the policies in participatory workshops with focal groups – using a system of simplified points system:

- i) +++ for a very strong relationship and/or directly mentioned in the agendas and policies;



- ii) ++ for a strong relationship and/or indirectly mentioned;
- iii) + for a weak relationship and/or achieved by means of sub-products; and
- iv) SD without relation.

Policy studies will also be carried out in light of the elements proposed by Stead (2008): political cooperation – dialogue and information analysis; political coordination – coherence and transparency analysis; political integration – analysis of objectives linked to interaction between policies, as well as analysis of climate policies as a vector for sectorial policy integration carried out by Bursztyn (2015).

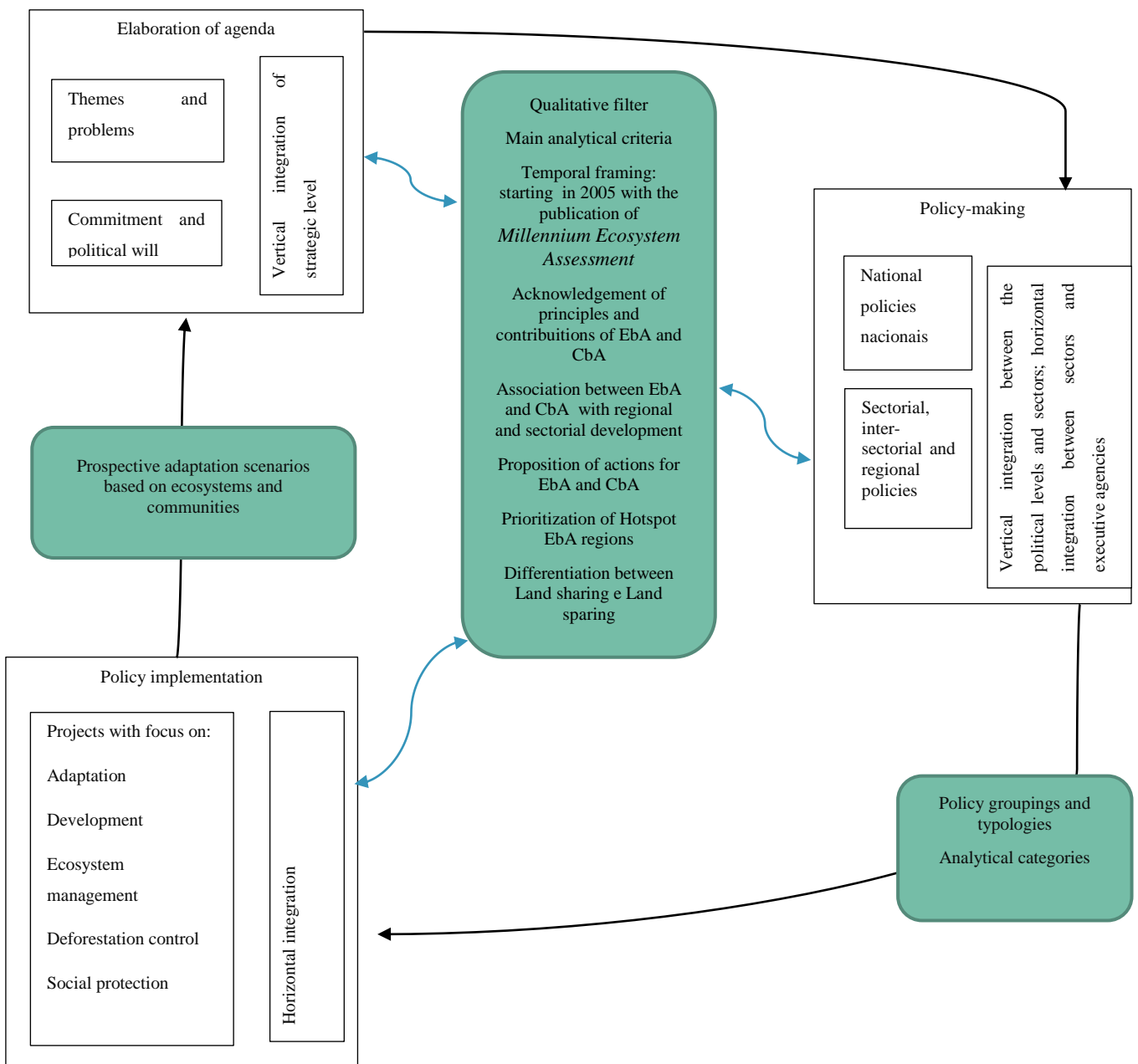


Figure 1. Preliminary methodological diagram (adapted from Huq et al., 2017 based on Giro et al., 2014; Kasecker et al., 201; Vieira, 2017)

It is a great challenge to integrate sectoral policies. Each one has different influences on the environment, society and the economy, sometimes with antagonistic goals that can make difficult to be reached. For example, an environmental policy that targets the conservation of the environment may conflict with economic development policies that aims to increase pasture, encouraging forest suppression.

Several methodologies of public policy analysis are focused on evaluating a single dimension: social, environmental or economic. Guéneau (2013) states that one of the major problems of this approach is the isolated analysis, such as Forest Stewardship Council (FSC), disregarding its interaction with other processes, which under a systemic vision would result in different environmental conditions. It is proposed, therefore, an analysis of policy coherence at the horizontal (between sectors) and vertical (between administrative levels) levels (DI GREGORIO et al., 2016; LAFFERTY AND HOVDEN, 2003; JORDAN AND LENSCHOW, 2010). In order to understand the integration of multiple objectives, governance arrangements, and policy processes related to the adaptation of climate change (DI GREGORIO et al., 2016).

The analysis of interaction between sectoral policies occurs in *two phases*. The first is to identify policies that directly or indirectly influence social actors in a particular locality (community or municipality), (MERMET et al., 2010) with respect to adaptation, social protection, development, and ecosystem management (Appendix A). This results in a matrix of analysis of policy interaction on different indicators, understood as an operational tool to monitor reality in different dimensions (social, economic, environmental, climatic, territorial and cultural) for the formulation and analysis of public policies (LE TOURNEAU, 2013).

The second phase consists on stakeholder participation to assess the influence of policy instruments on indicators. Such a score can vary from -1 to +1, considering -1 (constraining) as a negative influence of the policy instrument on the indicator; 0 (consistent) represents the lack of significant interactions; and finally, +1 (enabling) refers to the creation of conditions to promote the indicator (MERMET et al., 2010; NILSSON et al., 2016)

Moreover, social, environmental and climate indicators adopted by Kasecher et al. (2017) will be used as guideline for the prioritization of regions. Authors have analysed the 5,565 Brazilian municipalities having as a reference the poverty level (social indicator), plant coverage (environmental indicator) and exposure to CC (climate indicator). Based on that information, authors identified 398 priority municipalities for the formulation and implementation of adaptive policies – the EbA Hotspot. Out of these 398 hotspots, 104 are in the Cerrado area, 151 in the Caatinga area, and 97 in the Amazon. In this latter region, hotspots cover an area of 1,851,544 Km<sup>2</sup>, with 742,596 km<sup>2</sup> of natural vegetation, 1,021,155 Km<sup>2</sup> of protected areas, 30,009,641,211 of carbon stock (tons of C), with a population of 2,295,599 people, of which 1,241,023 (54%) live in poverty.

To understand all these elements within a conceptual-methodological framework for policy analysis is the challenge that this report sets forth. It is not our intention to exhaust the theme in this paper; to the contrary, the intention here is to present initial guiding elements as a potential for evaluation and (re)planning of effective adaptive strategies, associated with the endeavour to achieve sustainable development goals (SDG) – in particular SDG 1,13, and 15, which are in direct dialogue with the integration of EbA and CbA approaches (ONU, 2013; HUQ et al., 2017; LADE et al., 2017).

## **Section II. Research outcomes in priority region of ODYSSEA: Santarém region**

The ODYSSEA project aims at bringing together a number of research networks in the Amazon with the purpose of facilitating the scientific exchange and building a common methodology to observe the socio-environmental dynamics in the region. To that end, the second part of this report presents some of the findings of the studies carried out by project researchers in the Amazon region.

One of the focuses of research was the municipality of Santarém, situated in the western part of Pará, where development projects have had a high environmental, economic and social impact. Such projects include: the BR-163, a highway that connects Brasília and Belém (BR-010), hydro-electric projects, and the expansion of the agricultural border in the north of Mato Grosso state to the western region of Pará, mostly boosted by the construction of the highways. As the main city in the western region of Pará, Santarém plays an important role in

the articulation between different areas, having been greatly impacted by those development projects.

While the region has attracted many development projects, basic sanitation is still incipient, even if it is a right secured by the Constitution and recognised through Law 11,445/2007 (Federal Law of Basic Sanitation). This Law is the core principle in the sanitation regulatory framework in the country. However, in 2010, only 38.1% of households in Santarém had access to adequate sewage system and only 7.8% of urban households were located on public roads with appropriate urban infrastructure (IBGE, 2010).

Recent data on the situation of basic sanitation in the largest one hundred cities in the country published by the Institute Trata Brasil, have ranked Santarém sixth in the list of the ten worse municipalities, with an indicator of only 45.34% of treated water (ITA, 2017). As for access to sanitary sewers, the data is also unfavourable. Santarém's city council states that the sanitary sewer system in the urban area includes an extension of 50 km of incomplete work, lacking a main sewer pipeline, a treatment plant, and an outfall or discharge points. The drainage system covers 53.32 km, which is the equivalent of 8.94% of the city's road system (AMAZONAS, 2013).

It is important to understand how those indicators are configured in order to discuss the interaction between sanitation and other vulnerability factors in a context of climate change (CC), and for the analysis of adaptation policies in such environments, and in particular, their regional integration.

Low access to sanitary sewers in the rural areas of the municipality, such as the district of Lago Grande do Curuai, results in Diseases Related to Inadequate Environmental Sanitation (DRSAI), especially waterborne diseases (WDs), such as: hepatitis, diarrhoea and cholera. It is worth noting that such diseases can be controlled through sanitation measures (JURAS; MACHADO, 2015). Taking into account the precarity of sanitation infrastructures and the concentration of poverty at district level WDs are frequent. Shortcomings regarding local integration with national health policies point to the lack of interaction between urban, environmental and climate policies, increasing the vulnerability of families and reducing their adaptive capacity. This finding, in turn, highlights the need for a theoretical-conceptual framework with multidimensional approaches to analyse the integration of policies at the local scale.

The evaluation of health programs pertinent to the management of WDs has identified that the programs are conceived at the level of federal management, which anticipates local integration. That said the execution at this scale is limited due to insufficient human resources, poor internet access and regular management training. Epidemiological and environmental surveillance should be streamlined to identify risk factors for population health and implement corrective measures, but this does not occur in practice (CAVALCANTE, 2017).

Findings revealed that health data are processed in a fragmented manner, which makes it difficult to detect any problems ahead. In the ambit of health programs, there is a variety of information systems geared towards health risk management; however, these systems do not speak to each other. Lack of integration between the systems is simultaneously cause and consequence of the misuse, or lack of use, of the available data in the decision-making process, hindering the objective of supporting the management of the National Health System (SUS). In Santarém, the final destination of data is their input in an information system. In practice, this system is nothing more than a databank, failing to achieve the objective of supporting decision-making (CAVALCANTE, 2017).

The precarity of basic services is a critical factor in adaptive planning. Sanitation is a key element in the system's sensitivity, which together with exposure, determines the intensity of environmental and climatic impacts and, combined with adaptive capacity, indicate the vulnerability level of the systems (ADGER, 2006). One example of the adaptive capacity that reflects the recovery potential in the face of the exposure vector is the capacity of political mobilization by a given social group affected by climatic events (ADGER, 2006; GALLOPÍN, 2006; FUSSEL, 2007). This includes the capacity to organise themselves with the purpose of adapting to a situation by demanding direct public measures from the local government.

Such analysis informs one of the elements highlighted in Part I of this report: the importance of adopting referential frameworks that are grounded in the role of communities in defining their own priorities, establishing social control mechanisms, demanding their rights, and integrating these measures into a broader adaptive strategy. These elements translate into an adaptation based on communities.

Another outcome of the research is the case studies about urban development policies and their interaction with climate change carried out in two neighbourhoods in Santarém. The urbanization process in the city took place over a short period and often following the logic of peri-urbanization whereby the economic activities of the urban population are intertwined with those of the rural population. This means that many families depend on activities that rely on natural resources and their insertion into the urban fabric is precarious, especially in terms of housing and access to basic services. In Brazil, 14.4% of these populations are concentrated in the North, 10.1% of which in the state of Pará (IBGE, 2010). Studies show that depending on how policies are designed and applied, they can increase vulnerability to climate and restrict adaptation. In Santarém, the urban public projects under analysis seemed to have contributed to a worsening of pre-existing vulnerabilities, not to mention the emergence of new vulnerabilities due to hydro-meteorological phenomena, because the specificities of Amazonian environments were not taken into account during implementation (SANTOS, 2017).

The neighbourhoods analysed in the city of Santarém were the focus of government intervention projects and were included in a municipal development plan. One of these projects is the housing initiative *Minha Casa Minha Vida* by the Federal Government, a priority in the national political agenda to minimise the housing deficit and promote the inclusion of low-income families. However, inconsistencies were found pointing to a gap between the public policy's objective and execution. Lack of coherence between policies, particularly their integration with the climatic variable, has led to contradictory interventions at the local level, which increase vulnerability (SANTOS, 2017).

Another point worth mentioning is the extensive field work on the BR-163 case study area (Sinop region), undertaken in August and September 2017. The aim of the fieldwork was to study different aspects of rural-urban-linkages and related vulnerabilities of local-/regional communities. A large number of interviews with different stakeholders and representatives of different public authorities and private/civil society institutions was carried out. At the moment, the material from the interviews is being compiled and analysed and initial publications are under preparation. In what follows, some preliminary observations during fieldwork are presented.

Besides the traditional conflicts in rural areas of northern Mato Grosso we have also observed development problems in urban areas, in particular in some municipalities alongside the BR

163 (Sorriso, Lucas do Rio Verde, and with a special focus, Sinop). The lack of infrastructure and other urbanisation problems emerge as a consequence of fast demographic and spatial growth and inadequate urban and municipal policies. Socioeconomic disparities e.g. marginalisation of underprivileged citizens in contrast with a growing number of gated communities reflect growing inequalities and subsequent conflicts in urban areas.

Another observed phenomenon is that urbanisation in the area is not only a matter of demographic increase and concentration. Rather, this is a consequence of increasingly centralized political and economic power in urban areas – even though there is significant economic growth in rural areas (e.g. soybean, corn, and cotton production as cash crops and their commercialization in global markets). Due to the predominant inclusion of the savanna regions of Northern Mato Grosso (the so called Cerrado) into globalized commodity and value chains, especially the soybean and corn value chains, the former pioneer towns of this region, which were founded mainly in the 1970s as urban centres of private colonization projects, are today “agribusiness towns” (*ciudades do agronegócio*).

This trend of global agribusiness and resulting dominance of large-scale global traders (more specifically the so-called “big four”: ADM, Bunge, Cargill, Louis Dreyfuß) goes hand in hand with new vulnerabilities of these areas: economic vulnerabilities against global economic crises, such as international commodity price oscillations, social vulnerabilities resulting from the exclusive dependency of regional stakeholders on global business, as well as socio-ecological vulnerabilities, which are caused, for instance, by the non-adaptation of the dominant agricultural production systems (soybean or corn monoculture).

Furthermore, we see evidence that while rural and urban development are increasingly intertwined, decisions about regional (including rural) development are taken by stakeholders (e.g. companies) localized in urban areas. Northern Mato Grosso cities tend to be in charge of the central roles in regional development as they become the main port of call for a vast variety of services linked to the agribusiness (traders, land machinery, agrochemicals etc.). In addition, social infrastructure (education, health) becomes concentrated in Sinop as a regional service centre for northern Mato Grosso. On the other hand, the rural areas are more and more limited to their role as “production machines”, gradually losing their functions as living spaces. This is due to the size and the organization of work in soybean (or corn) farms.

Considering the outlined characteristics of Sinop (and other urban centres) as the current regional and urban development pattern, we ask ourselves how the process of concentration contributes to local urban development. How do aspects of sustainability reflect different development processes and strategies? In which ways does economic consolidation, and not only in Sinop, lead to new local economic structures?

The following indicators appear to underpin emerging urban development problems:

- i) the distribution of income and income disparities;
- ii) poverty;
- iii) socio-spatial fragmentation (the proliferation of gated communities, low-income neighbourhoods, social housing schemes (MCMV), and others);
- iv) infrastructure in general, in combination with socioeconomic disparities;
- v) basic sanitation and its dissemination in urban spaces;
- vi) economic changes (changes in the urban economy, especially in the service sector);
- vii) the dependence on agribusiness by local trade; and,
- viii) the (direct and indirect) absorption of the local labour force by the agribusiness sector (COY; KLINGLER, 2014; COY et al., 2017)

Generally speaking, these findings reference the preliminary design of the conceptual-methodological framework for policy analysis in the region based on ecosystems and communities, presented in Section I of this report, and support the proposal for a summer school, elaborated in the following section.

### **Section III. Next steps: summer school and workshop on the methodology for the evaluation of regional policies**

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ODYSSEA started with the intent of being a unidirectional research observatory, and providing training to deepen some structural topics, strengthening the integration between researchers and students from a number of institutions involved with the observatory, both in Brazil and in Europe, and governmental and non-governmental actors. Thus, the next stage of



the WP4, addresses the proposal of a summer school, its objectives, participants and methodology.

### *Objectives*

The WP4 proposes a *summer school* to be run over the course of five days, the culmination of which will be a workshop with the participation of stakeholders. This proposal aims at deepening the knowledge about methodologies for an integrated evaluation of regional public policies, with *the purpose of bringing together the theoretical-methodological approaches and those concerning the adaptation to climate change based on ecosystems (EbA) and communities (CbA)*.

The relevance of this educational activity is not only because this is a key moment to enhance existing knowledge, but also because of the possibility of promoting the achievement of the observatory's goals: 1) to evaluate the structure and recent changes to institutional arrangements by the governance regarding the sustainable development of the Brazilian Amazon, and more specifically, the promotion of adaptation; 2) to analyse the implementation and development of public policies concerned with sustainable development.

### *Participants*

The target public of the summer school is researchers and post-graduate students working with ODYSSEA, as well as guest stakeholders involved with the policies considered relevant for the region under analysis, informed by the analysis of fieldwork data and information obtained during a seminar that took place in Belém-PA in 2017. The stakeholders will be selected through the Stakeholder Analysis and Mapping (SAM) methodology (DALAL-CLAYTON; BASS, 2002), which identifies interest groups and experts, thereby enhancing the practical aspect of the summer school.

It is therefore suggested that: 10 places should be allocated to researchers of the institution in the application, 10 places to partners institutions, and another 10 to stakeholders, of which five should be representatives of governmental bodies and five from civil society organizations, duly identified through the methodology (*SAM*).

### *Methodology*

The pedagogical work will start with problematization, focusing on the relationship between theory and practice, and on the inter-disciplinary aspect of the measures in the teaching-learning process. To that end, the following methodological procedures will be used: dialogical expositions, dynamics, collective debates, and group work, further deepening the proposed conceptual-methodological framework.

The summer school will consist of five days of immersion amounting to 30 hours, with lectures given by guest speakers and convened by members of the WP4 team. The first three days will focus on consolidating the knowledge by participants regarding the CbA and EbA approaches, and on probing questions, such as: Which are the main problems in the institutional arrangement in a given region? How are they influenced by public policies? What is the level of integration between them? How is it possible to overcome resulting obstacles? The last two days of the summer school will be dedicated to applying the conceptual-methodological framework to a concrete situation (case study), which would have been previously, and collectively, selected.

In order to achieve the desired objectives of the summer school, the following participatory methodological tools will be used: *Expert Panel* (RSC, 2010) and *Process Flow Diagram (PFL)* (BARRUTIA et al., 2015). The former aims at organising the opinions by experts, summarising complex information including recommendations for the (re)formulation of policies (RSC, 2010). As for the PFL, it is a participatory research tool used to make salient the different stages involved in a process, and in this specific case, to reveal the implementation stages of policies and measures, including its synergies and obstacles. Other methodological approaches may be adopted, depending on the development of the analyses and conversations in the ambit of the WP4.

At the end of the summer school all participants will receive a certificate as proof of their participation, which can be validated at the University of Brasília (CDS/UnB) as an academic extension activity.

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## Appendix A

Policies that directly or indirectly influence social actors in a particular locality, with respect to adaptation, social protection, development, and ecosystem management.

Four dimensions	Analysis categories	Indicator	Environmental policy		Agricultural policy		Other sectoral policy
			Political instrument (PI) 1	PI 2	PI 1	PI 2	PI
Economic	1 Insertion into market/	Access routes available					
		Diversification of market activities					
		Access to credit					
	2 Work conditions	Child labor					
		unemployment rate					
		Work accident					
	3 Economic situation of the municipality	Per capita income (PIB)					
		Income distribution (Gini)					
		Transformation of product					
		Diversification of productive activities					
Social	4 Livelihoods assets	Access to tap water					
		Access to electric power					
		Right to land					
		Food and nutrition security					
	5 Promotion of human capability/ social protection	Access to health care					
		Education (% population attended)					
Environmental	6 Compliance with environmental legislation	attention to environmental protection areas (APP, UCs)					
		Access to sewer treat					
		Waste collection					
	7 Sustainability	Use of non-timber forest products					
		Alternative technology (ex:ecological cookers)					
	8 Maintenance of eco-systemic services	Plant Coverage (proportion)					
		Landscape and biodiversity change					
		Forestry production					
		Payments for environmental services					
Climatic	9 Exposure	Temperature change					
		Precipitation change					
		areas susceptible to desertification					