
Panorama of Ecological-Economic Zoning in Brazil

Panorama de la Zonificación Ecológico-Económica en Brasil

Panorama do Zoneamento Ecológico-Econômico no Brasil

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Abstract

The aim of this article is to present the historical context whereupon the Ecological-Economic Zoning (ZEE) was instituted in Brazil, the legal frameworks that regulate it and its basic methodological guidelines. It is a basic and documentary research whose basic methodological guidelines started from the elaboration of the Ecological-Economic Zoning projects established by Federal Decree nº 4.297/2002. The work indicates that the ZEE Program in almost forty years has made small progress and not all units of the federation have carried out their projects. The few advances verified, however, confirm that the ZEE is an excellent territorial management instrument, current and relevant, been able to leverage other instruments for more sustainable territorial management.

Keywords: Sustainability, Environment, Territorial Management, Territorial Dynamics

Resumen

El objetivo del artículo es presentar el contexto histórico en el que se instituyó la Zonificación Ecológico-Económica (ZEE) en Brasil, los marcos legales que la regulan y sus lineamientos metodológicos básicos. Se trata de una investigación básica y documental cuyos lineamientos metodológicos básicos partieron de la elaboración de los proyectos de Zonificación Ecológico-Económica establecidos por el Decreto Federal nº 4.297 / 2002. El trabajo mostró que el Programa ZEE en casi cuarenta años ha avanzado poco y no todas las unidades de la federación han llevado a cabo sus proyectos. Los pocos avances verificados, sin embargo, confirman que la ZEE es un

excelente instrumento de gestión territorial, actual y relevante, y puede apalancar otros instrumentos para una gestión territorial más sostenible.

Palabras clave: Sostenibilidad, Medio ambiente, gestión territorial. Dinámica territorial

Resumo

O objetivo do artigo é apresentar o contexto histórico no qual o Zoneamento Ecológico-Econômico (ZEE) foi instituído no Brasil, os marcos legais que o regulamentam e suas diretrizes metodológicas básicas. Trata-se de uma pesquisa básica e documental cujas diretrizes metodológicas básicas partiu da elaboração dos projetos de Zoneamento Ecológico-Econômico estabelecidas pelo Decreto Federal nº 4.297/2002. O trabalho apontou que o Programa de ZEE em quase quarenta anos avançou pouco e nem todas as unidades da federação executaram seus projetos. Os poucos avanços verificados, contudo, confirmam que o ZEE é um excelente instrumento de gestão territorial, atual e relevante, podendo alavancar outros instrumentos para uma gestão territorial mais sustentável.

Palavras-chave: Sustentabilidade, Meio Ambiente, Gestão Territorial. Dinâmicas Territoriais

Introduction

The economic transformations that Brazil underwent in the second half of the 20th century significantly increased the pace of environmental degradation and its consequent social and environmental impacts. While the profusion of environmental degradation all over the world aroused the attention of a considerable portion of the world population for a not-too-distant future in which the intense exploitation of natural resources, the exponential increase in demand for food and water, and the rapid increase in environmental degradation could derail the existence of the human being.

Such factors, among others, forced Brazil to create mechanisms aiming to minimize the pollution caused by industrialization in the country, prohibit hunting, predatory fishing and illegal deforestation in order to reduce environmental degradation in addition to the socio-environmental impacts arising from it. In this context, among several laws and decrees instituted by the Military Government in the 1960s, 1970s and 1980s, the National Environmental Policy (PNMA) was established, which have created the National Environment System (SISNAMA) and have instituted various defense instruments for the Environment, including Environmental Zoning.

Over the years, Brazilian Government have adopted the term Ecological-Economic Zoning (ZEE) for this instrument of PNMA, instead of environmental zoning, and have coined its own methodology for its execution. Whose theoretical foundation is based on landscape analysis and on the Theory of Ecodynamics proposed by Tricart (1977).

Throughout the development of the ZEE methodology, however, Brazilian Government technicians and academics involved sought to place greater weight on social and legal-institutional factors, thus moving it away from a broadly biogeophysical approach and directing it towards an approach that gives greater weight to the territorial dynamics and the construction of the geographic space.

The Ecological-Economic Zoning aims to promote sustainable economic growth in the Brazilian territory, while this paper aims to present it, contextualizing its emergence and presenting its methodology and its programmatic and institutional structure, albeit briefly, in addition to the current stage of project execution (BRASIL, 2006; LOPES LOURENÇO, REUSS-STRENZEL, 2016). The Ecological-Economic Zoning (ZEE) is one of the instruments of the National Environmental Policy; its theoretical-methodological foundation is based on the analysis of landscape dynamics. Throughout the development of its methodology, Brazilian Government technicians and researchers involved sought to establish greater weight for social and legal-institutional factors, thus transforming it from a zoning totally based on biotic and abiotic aspects of the landscape to a zoning that incorporates the dynamics of the territory and the construction of geographic space (BRASIL, 2006).

The aim of this paper is to present the Ecological-Economic Zoning - ZEE projects carried out or being carried out, so far, by the Federal Government and the States, in order to draw an overview of the progress of the ZEE Program in Brazil.

The information presented brings together, in addition to the projects carried out within the scope of the ZEE, the projects carried out in compliance with the National Coastal Management Plan (BRASIL, 1988) and the State Coastal Management Plans that track the same methodological guidelines.

Methodological procedures

The methodology applied in this research was on qualitative investigation, using bibliographic survey and documentary research. For the figures elaboration, the Quantum Gis software was employed. The databases were imported from the Ministry of the Environment website (BRASIL, 2014). Basic methodological guidelines for the elaboration of Ecological-Economic Zoning projects were established by Federal Decree nº 4.297/2002 (BRASIL, 2002).

The decree has given to the Federal Public Authority the elaboration and execution of the National Ecological-Economic Zoning and the Regional Ecological-Economic Zoning (State Ecological-Economic Zoning), when their goal is biomes or major river basins. Preparation and execution of the State Ecological-Economic Zoning were in charge of their respective governments, eventually, an agreement may be signed with the Federal Public Authority for a joint elaboration. All projects must, however, be submitted for validation by the Federal Government (BRASIL, 2002).

Zoning as an Instrument of Environmental Planning

An Environmental Zoning consists of the delimitation of zones or territorial units for the purpose of assigning compatible uses and activities with environmental characteristics of each of them. Following the definition of Gandra (2008, p. 16),

Environmental zoning can be considered as the definition of sectors or areas with specific management goals and standards, in order to provide ways and conditions for the development and economic activities of a region exists effectively and its harmony with the nature and natural resources conservation. The zoning process can be defined as the controlled and ordered fragmentation of a territory, according to discriminated criteria (GANDRA, 2008, p. 16, our translation).

For Santos (2004, p.35, our translation) the zones “refer to the areas identified in a landscape (for example, river basins) capable of being delimited [...] which have similar structure and operation”. The zones “are defined by groupings of variables (components, factors and environmental attributes) that present a high degree of

association within the landscape” (SANTOS, 2004, p. 35, our translation) so that their strengths and weaknesses are defined.

According to Ross (2006), the knowledge of the strengths and weaknesses of each zone must go through the surveys of all the components of the geographic stratum, as soils, relief, rocks and minerals, hydrology, climate, flora and fauna, among others.

The author also argues that for the analysis of the fragility of the zones, the characteristics of all these components must be evaluated in an integrated way, based on "the principle that nature presents itself with intrinsic relationship between its physical and biotic components" (ROSS, 2006, p. 154, our translation).

Brazilian Government has adopted the term Ecological-Economic Zoning (ZEE) to refer to the environmental zoning carried out in the national territory and has coined its own methodology to be followed by its zoning program, adding to the systemic approach and the analysis of landscape dynamics, recurrently concepts used by Human Geography as a territory and networking. Thus analyzing, in an integrated way the natural dynamics, territorial dynamics and the production of geographical space, setting it apart from a strictly biogeophysical design, characteristic of most zoning found in the literature scientific

Ecological-Economic Zoning aims, as has been expressed in Art. 3 of the Federal Decree n° 4.297/2002 (BRASIL, 2002, our translation) “[...] to organize in a linked manner the decisions of public and private officials, regarding plans, programs, projects and activities that, directly or indirectly, uses the natural resources, ensuring the full maintenance of capital and the environmental services of ecosystems”.

In other words, its main goal is to promote economic growth in our country, taking into account the weaknesses of ecosystems in order to achieve sustainability.

This is an important territorial planning instrument, which has implemented in Brazil for land occupation in order to reduce the rate of landscape degradation seeking for sustainability.

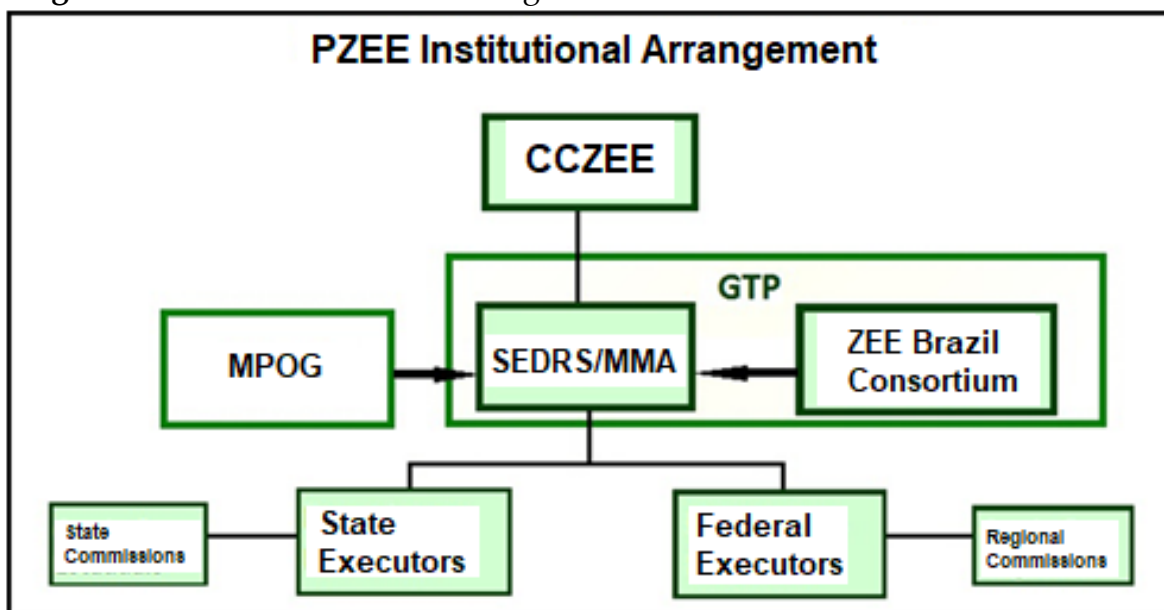
The Ecological-Economic Zoning Program

Ecological-Economic Zoning Program (PZEE) has established in order to run the ZEE in Brazil in an integrated manner with planning systems at all levels of public administration and managing the required information for the management of the territory at various levels of treatment (BRASIL, 2006).

PZEE is based on eight basic political or technical principles, namely: Territorial/Spacial Understanding; Ecological and Economic Sustainability; Democratic Participation; Institutional Articulation; Systemic Approach; Appreciation of Multidisciplinarity; Application of Information Systems; and Development of Future Scenarios (BRASIL, 2006).

PZEE is structured in a regionalized and multi-scale management, bringing the development of several projects in different scales, prepared by different public officials, with each project playing a specific role within the program.

Diagram 1- PZEE Institutional Arrangement.



Source: BRASIL (2006). Note: Adapted by the authors.

The overall coordination of the program is responsibility of the Coordinating Committee of Ecological-Economic Zoning (CCZEE) which is assisted technically by the Permanent Working Group (GTP), constituted by the ZEE Brasil Consortium and by technicians from the Department of Territorial Zoning of the Secretariat of

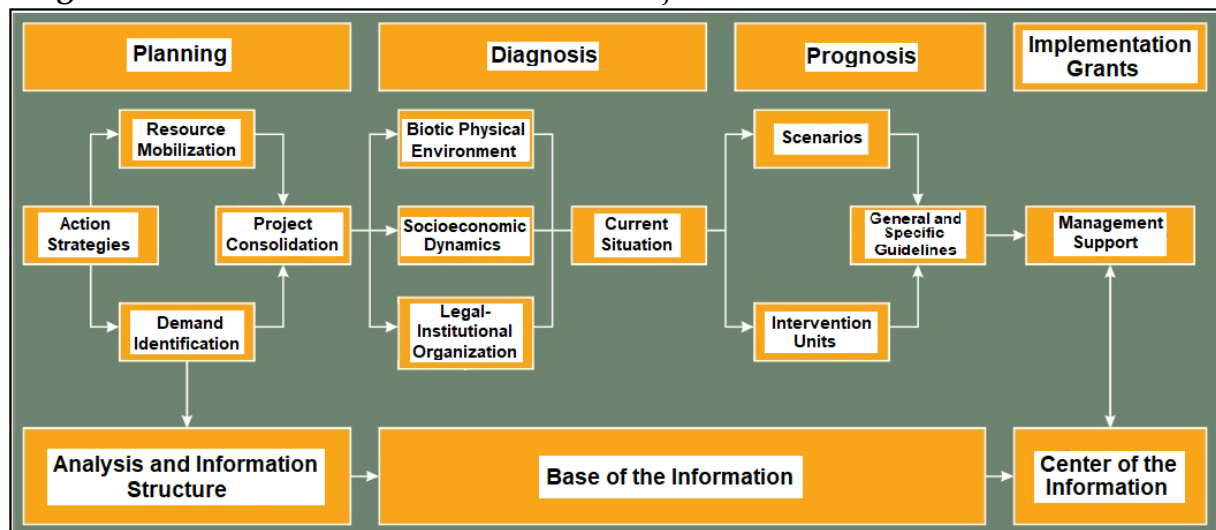
Extractivism and Sustainable Rural Development (MMA). It is up to the Department to develop ZEE methodologies for the States and regions, execute the ZEE at the federal government level and support the states and other executors. For each Regional or State project, a commission must be established, created by federal decree (for projects involving more than one State) or by State Decree. In case of river basin ZEE, according to Brazil (2006), the regional commission may be linked to the basin committee. It is up to the State or regional technical commissions to advise on the results of executing agencies in the states or regions, as outlined (diagram 1).

ZEE Brazil Project Methodological Procedures

ZEE Brazil Project at the Federal Government level establishes the general methodological framework for the various work scales of the Ecological-Economic Zoning Program, whose basic guidelines have imposed by Federal Decree n° 4.297/2002 (BRASIL, 2002), previously presented in this chapter. It is noteworthy that the specific operational procedures for each project vary depending on the different scales.

ZEE Brazil Project comprises four phases of work, as illustrated in diagram 2:

Diagram 2- Work Phases of the ZEE Brazil Project.



Source: BRASIL (2011). Note: Prepared by the authors.

The ZEE Brasil Project has as general objectives to subsidize the elaboration of territorial policies, guiding decision makers in the adoption of policies that converge

with the country's strategic planning guidelines; to establish and to build a database with environmental and socioeconomic information needed to macro-regional planning; to support federal projects regarding to the implementation of sectorial policies and related infrastructure; to provide states and municipalities general diagnostics and a global perspective on the reality of the country as well as the general guidelines of the ZEE proposed by the federal government (BRASIL, 2006).

According to Brasil (2006), the planning phase precedes technical studies and comprises institutional articulation, mobilization of resources (human and financial), requirement identifications, analysis and structuring of information, and project consolidation.

In the subsequent stage of planning, the construction of bases of information begins, which starts with the diagnosis phase and will support the prognosis. Construction of the bases will be based on three elementary activities: creation a database in a Geographic Information System; use of cartographic databases, in accordance with technical standards, in the appropriate scale, observing the provisions of the legislation; and finally, the organization of the database in a Geographic Information System (BRASIL, 2006).

Diagnosis phase includes the studies of physical-biotic environment, which should be analyzed in an integrated manner and present as synthesis products the Environmental Systems Units and the Qualitative Integrity Assessment; studies of socioeconomic dynamics, which aim to understand the dynamics of territorial occupation and the use of natural resources presented in two synthesis products: Occupation and Regional Articulation Trends and Synthetic Social Indicators; studies of the legal-institutional organization, including analysis of the administrative and environmental meshes that share power in the territory, the plans, programs and projects that influence the current and future use of the territory and the discussion of legal and forms of implementation of zoning, in order to establish a basis for the design standardization of feasible proposals in relation to the national reality and regional specificities (BRASIL, 2006).

Development of the diagnosis serves as a subsidy for the prognosis, which will establish proposals for Intervention Units, Future Scenarios, the Interventions and will determine general and specific guidelines for the institution of laws to regularize the situations.

Finally, phase of ZEE subsidies implementation gathers the institution of specific laws and propositions of programmatic guidelines, leading priority actions for each zone.

Projects Executed or in Execution by the Federal Government

According to information obtained from the Ministry of the Environment (BRASIL, 2014), there are four projects that are already have been executed or under execution, under its coordination: ZEE of the Lower Parnaíba River, Macro ZEE of the Legal Amazon, Macro ZEE of the Cerrado Biome, and Macro ZEE of the São Francisco River Basin. Details of the progress of each project are shown in Frame 1, which follows:

Frame 1: ZEE Projects Coordinated by the MMA.

ZEE PROJECTS COORDINATED BY MINISTRY OF THE ENVIRONMENT							
PROJECT	SCALE	SITUATION					
		Planning	Diagnostic	Prognostic	Management Proposal	Standardization	Federal Validation
ZEE of the Lower Parnaíba River	1:100.000	Concluded	Concluded	Concluded	Concluded	No	Yes
Macro ZEE of the Legal Amazon	1:1.000.000	Concluded	Concluded	Not Prepared	Concluded	Federal Decree nº 7.378/2010	Yes
Macro ZEE of the Cerrado Biome	1:1.000.000	Concluded	In Review	In Progress	Uninitiated	No	No
Macro ZEE of the São Francisco River Basin	1:1.000.000	Concluded	In Review	Uninitiated	Uninitiated	No	No

Source: BRASIL (2014). Note: Prepared by the authors.

ZEE of the Lower Parnaíba River served as a pilot for the application of the Methodological Guidelines for Ecological-Economic Zoning in Brazil and had all phases completed (BRASIL, 2014).

Total area covered by this project is 10.520 Km², corresponding to the sum of the municipality territories: Água Doce do Maranhão, Araisos, Magalhães de Almeida, Paulino Neves and Tutoia in the State of Maranhão; Bom Princípio do Piauí,

Buriti dos Lopes, Cajueiro da Praia, Caxingó, Ilha Grande, Joaquim Pires, Luís Correia, Murici dos Portelas and Parnaíba in the State of Piauí; and Chaval and Barroquinha in the State of Ceará (Picture 1).

This is an area with rich biodiversity, characterized by ecological tension between the Caatinga, the Cerrado and marine ecosystems, where the delta of Parnaíba River is located and where an extensive area of mangroves and dunes has developed.

Photo 1- Coverage area by the ZEE of the Lower Parnaíba River.



Source: BRASIL (2014). Note: Viewing in Google Earth Pro™ (Evaluation Version). Prepared by the authors.

From the data analysis and satellite images, units of the environmental systems were established in the diagnosis phase, various uses and production systems present in the area were defined, and the permanent preservation areas and the existing protection areas (Conservation Units) were surveyed. From the analysis of the indicators, the economic and social potential, the weaknesses of the environmental systems and the legal incompatibilities present in the covered area were identified. Intervention units have defined, each with its capabilities, problems and limitations. Finally, two scenarios have established (trend and desired), in addition to general and specific strategies.

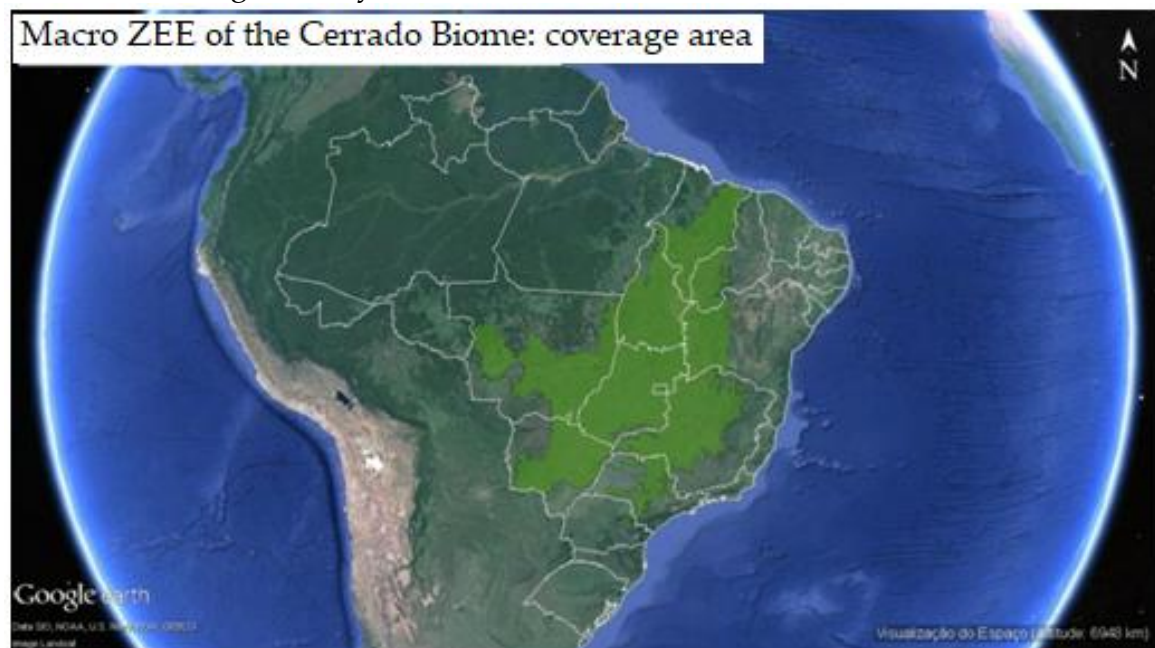
Photo 2- Coverage area by the Macro ZEE of the Legal Amazon.



Source: BRASIL (2014c). Note: Viewing in Google Earth Pro™ (Evaluation Version). Prepared by the authors.

In addition to ZEE of the Lower Parnaíba River, the Macro ZEE of the Legal Amazon was completed. It has validated by the Federal Government, although the prognosis has not prepared, and standardized by Presidential Decree nº 7.378/2010 (BRASIL, 2010). It covers an area of approximately 5.219.619 Km², relative to the sum of the areas of all the states that comprise the Legal Amazon (Picture 2).

Photo 3- Coverage area by the Macro ZEE of the Cerrado Biome.



Source: BRASIL (2014c). Note: Viewing in Google Earth Pro™ (Evaluation Version). Prepared by the authors.

Unlike previous projects, the Macro ZEE of the Cerrado Biome is underway. The second phase of project - the diagnosis - is under review and the prognosis is under preparation (BRASIL, 2014b). Macro ZEE of the Cerrado Biome covers an area of approximately 2.052.463 Km², that extends through the States of Bahia, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Paraná, Piauí, São Paulo, Tocantins, in addition to the Federal District, as shown in Photo 3.

Photo 4- Coverage area by the Macro ZEE of the São Francisco River Basin.



Source: BRASIL (2014c). Note: Viewing in Google Earth Pro™ (Evaluation Version). Prepared by the authors.

Macro ZEE of the São Francisco River Basin comprises a total area of 637.536 Km², relative to the homonymous basin, which drains part of the territories of Alagoas, Bahia, Pernambuco, Sergipe, Minas Gerais, Goiás and the Federal District. According to information from the Ministry of the Environment (BRASIL, 2014b), this project is in progress, and the second phase - the diagnosis - is under review. Also according to the MMA (BRASIL, 2014b), the financial resources for elaboration of the Macro ZEE of the São Francisco River Basin come from the Interágua project (Photo 4).

State Projects of ZEE

According to information from MMA (BRASIL, 2014b), there are currently more than forty ZEEs or Macro ZEEs projects have elaborated or in process of being elaborated by the States, with different scales and methodologies.

It is noteworthy the fact that, after the publication of Federal Decree n° 4.297/2002 (BRASIL, 2002), all projects began to be prepared following the methodological guidelines established by him, which did not prevent, however, the specific methodology of each project would undergo adjustments, in accordance with what was established by the Decree itself.

The publication of Law n° 12.651/2012 (BRASIL, 2012) stands out, which established a maximum period of five years (2017) for all States to prepare their respective projects, according to methodological guidelines legally instituted, which explains the fact that almost all states have already prepared their project or are working on its elaboration.

An overview of the implementation of State projects of ZEE in Brazil is presented below. For a better presentation, the states were divided into five topics, each corresponding to a major Brazilian region.

South Region

The ZEE projects underway or already carried out by the States that composes the Southern Region are listed in Frame 2:

Frame 2- ZEE Projects in the Southern States.

ZEE PROJECTS IN THE SOUTH REGION STATES							
STATE	PROJECT	SCALE	SITUATION				
			Planning	Diagnostic	Prognostic	Management Proposal	Federal Validation
PR	ZEE of the Paraná State Coastal	1:50.000	Concluded	Concluded	Not Prepared	Concluded	No
	ZEE of the State of Paraná	1:250.000	Concluded	In Progress	Uninitiated	Uninitiated	No
RS	ZEE of the North Coast of the State of Rio Grande do Sul	1:100.000	Concluded	Concluded	Not Prepared	Concluded	No
	ZEE of the State of Rio Grande do Sul	1:250.000	Concluded	In Progress	Uninitiated	Uninitiated	No
SC	ZEE of the Coastal Zone of the State of Santa Catarina	1:50.000	Concluded	Concluded	Not Prepared	Concluded	No

Source: BRASIL (2014b). Note: Prepared by the authors.

According to information obtained from Ministry of the Environment (BRASIL, 2014b), State of Paraná currently has a completed ZEE at a scale of 1:50,000 that cover the entire coastline. State Decree n° 7.750/2010 (PARANÁ, 2010), have established the Coordinating Commission of ZEE of the State of Paraná, within which the executing commission was created. A second project is underway (diagnostic phase), and will cover the entire State, under the coordination of the State Institute of Lands, Cartography and Geosciences (ITCG).

As well as in the State of Paraná, State of Rio Grande do Sul has a Coastal ZEE have been prepared by the State Foundation for Environmental Protection (FEPAM) that covers the Northern Coast of the State. Secretariat of the State for Environment (SEMA) is currently executing a ZEE project that will cover the entire territory of the State. This project is in the diagnosis phase. A provisional technical chamber has created by Consema Resolution n° 280/2013 (RIO GRANDE DO SUL, 2013) to deal with the ZEE. The expected duration is two years (BRASIL, 2014b).

The State of Santa Catarina, through the Secretary of State for Planning, has developed, in compliance with the National Coastal Management Plan and the State Coastal Management Plan, established by State Decree n° 5.010/2006 (SANTA CATARINA, 2006), the ZEE of the Coastal Zone. According to information from the MMA (BRASIL, 2014b), no project covering the territory of the State of Santa Catarina in its entirety has yet been started.

Southeast Region

ZEE of the State of Espírito Santo and the Coordinating Commission has been established by State Decree n° 2.086-R/2008 (ESPÍRITO SANTO, 2008). The project did not have a prepared prognosis and has not been validated by the Federal Government (BRASIL, 2014b).

ZEE of the State of Minas Gerais was prepared by the Secretariat of the State for Environment and Sustainable Development (SEMAD) and is concluded. Just as the

ZEE of the State of Espírito Santo, it has not been validated by the Federal Government (BRASIL, 2014b).

State of Rio de Janeiro, according to Ministry of the Environment (BRASIL, 2014b), has two projects in progress. The first one is being prepared under the State Coastal Management Plan and will cover only the Hydrographic Region of Ilha Grande Bay. The second will cover the entire territory of the State, on a scale of 1:100.000 (BRASIL, 2014b), in accordance with the provisions of State Law n° 5.067/2007 (RIO DE JANEIRO, 2007). Coordinating Commission of ZEE of the State of Rio de Janeiro have been established by State Decree n° 41.099/2007 (RIO DE JANEIRO, 2007).

State of São Paulo has two completed projects, which together cover the entire coast of the State, carried out within the scope of State Plan for Coastal Management (SÃO PAULO, 1998); and a third project that will cover the state territory in its entirety, which is in the diagnosis phase (BRASIL, 2014b).

The ZEE projects underway or already carried out by the States of the Southeast Region are listed in Frame 2:

Frame 3- ZEE Projects in the Southeast States.

ZEE PROJECTS IN THE SOUTHEAST REGION STATES							
STATE	PROJECT	SCALE	SITUATION				
			Planning	Diagnostic	Prognostic	Management Proposal	Federal Validation
ES	ZEE of the State of Espírito Santo	1:250.000	Concluded	Concluded	Not Prepared	Concluded	No
MG	ZEE of the State of Minas Gerais	1:250.000	Concluded	Concluded	Concluded	Concluded	No
RJ	ZEE of the State of Rio de Janeiro	1:100.000	Concluded	In Review	Uninitiated	Uninitiated	No
	ZEE of the Coastal Ilha Grande Bay Hydrographic Region	1:25.000	Concluded	In Progress	Uninitiated	Uninitiated	No
SP	ZEE of the Coastal Zone of the State of Santa Catarina	1:50.000	Concluded	Concluded	Not Prepared	Concluded	No
	ZEE of the North Coast of the State of São Paulo	1:50.000	Concluded	Concluded	Not Prepared	Concluded	No
	ZEE of the State of São Paulo	1:250.000	Concluded	In Progress	Uninitiated	Uninitiated	No

Source: BRASIL (2014b). Note: prepared by the authors.

Midwest Region

Coordinating Commission of the ZEE of the State of Goiás has been established by the State Decree n° 6.707, published on December 28, 2007 (GOIÁS, 2007). A Macro ZEE has been drawn up on a scale of 1:1.000.000, under the coordination of Secretariat of the State for Infrastructure, Cities and Metropolitan Affairs. The project's coverage area includes entire territory of the State, as well as three other projects that include only portions of the State. None of them have been validated by the Federal Government.

There are two ZEE projects carried out in the State of Mato Grosso, one on a scale of 1:1.500.000, carried out in the 1990s by the Secretariat of the State for Planning and General Coordination (SEPLAN), and regulated by the State Law n° 5.993, published on June 03, 1992 (MATO GROSSO, 1992); and another, carried out by the Department of the State for the Environment collaboratively with SEPLAN, on a scale of 1:250.000, regulated by State Law n° 9.523/2011 (MATO GROSSO, 2011), under a court injunction. Both projects cover the entire state territory. ZEE State Commission has been established by the State Decree n° 1.139/2008 (MATO GROSSO, 2008).

State Law n° 3.839 of December 28, 2009 have established the Territorial Management Program (PGT) of the State of Mato Grosso do Sul and the Coordinating Committee of the PGT, responsible for preparing, updating and revising the ZEE in the State. ZEE oh the State of Mato Grosso do Sul has been executed under the coordination of the State Secretariat for the Environment, Cities, Planning, Science and Technology (Semac), and it is also concluded and regulated by State Law n° 3.839/2009 (MATO GROSSO DO SUL , 2009). It is the only one, among all the projects already carried out in this region, validated by the Federal Government.

All projects of Midwest Region are listed in Frame 4:

Frame 4- ZEE Projects in the Midwest States.

ZEE PROJECTS IN THE MIDWEST REGION STATES							
STATE	PROJECT	SCALE	SITUATION				
			Planning	Diagnostic	Prognostic	Management Proposal	Federal Validation
DF	ZEE of the Federal District	1:100.000	Concluded	Concluded	Concluded	In Progress	No
GO	ZEE of the Surrounding Area of the Federal District	1:250.000	Concluded	Concluded	Not Prepared	Concluded	No
	ZEE of the of the Meia	1:250.000	Concluded	Concluded	Not Prepared	Concluded	No

	Ponte Microregion						
	ZEE of the Urban Agglomerate of Goiânia	1:50.000	Concluded	Concluded	Concluded	Concluded	No
	Macro ZEE of the State of Goiás	1:1.000.000	Concluded	Concluded	Not Prepared	Concluded	No
MT	Macro ZEE of the State of MAto Grosso	1:1.500.000	Concluded	Concluded	Concluded	Concluded	No
	ZEE of the State of Mato Grosso	1:250.000	Concluded	Concluded	Concluded	Concluded	No
MS	Macro ZEE of the State of Mato Grosso do Sul	1:1.000.000	Concluded	Concluded	Concluded	Concluded	Yes

Source: BRASIL (2014b). Note: Prepared by the authors.

District Decree n° 28.369/2007 (DISTRITO FEDERAL, 2007) has provided for the ZEE of the Federal District and has instituted the ZEE District Commission. Project implementation is under responsibility of Secretariat of the State for Environment and Water Resources (SEMARH).

Northeast Region

According to information from MMA (BRASIL, 2014b), State Decree n° 9.091 of May 4, 2004 (BAHIA, 2004) has established the Special Commission of the ZEE, while State Decree n° 14.530 of June 4, 2013 (BAHIA, 2013) has regulated the implementation of the ZEE in the State of Bahia, whose execution is coordinated by the Secretary of the State for Environment (SEMA) and by the Secretary of the State for Planning (SEPLAN).

State Superintendency for Environment (SEMACE) was responsible for the execution of two completed projects in the State of Ceará, while Ceará Meteorology and Water Resources Foundation (FUNCEME) is responsible for the ongoing project. None of the projects is regulated.

State Decree n° 29.359 of September 11, 2013 (MARANHÃO, 2013) has established the State Commission of ZEE and the Technical-Scientific Committee of the ZEE of the State of Maranhão. Secretariat of the State for Planning and Budget (SEPLAN) is responsible for carrying out the projects.

In the State of Paraíba, State Decree n° 15.149 of February 19, 1993 (PARAÍBA, 1993) was responsible for creating the project and for establishing the State Commission. The only project started so far is in process of being implemented under

the coordination of the Secretariat of the State for Water Resources, Environment and Science and Technology (SERHMACT).

In the State of Pernambuco, two projects covering the North Coast and the South Coast have been coordinated by the Secretariat of the State for Science, Technology and Environment (SECTMA) and are regulated by State Decree n° 21.972 of December 29, 1999 (PERNAMBUCO, 1999) and by State Decree n° 24.017 of February 7, 2002 (PERNAMBUCO, 2002), respectively. Both projects were carried out under the State Plan for Coastal Management and have established by Law n° 14.258/2010 (PERNAMBUCO, 2010). Project that covers the Metropolitan nucleus of Recife, coordinated by the Secretariat of the State for Environment and Water Resources (Semas), has not yet been completed.

State Decree n° 14.504 of June 20, 2011 (PIAÚÍ, 2011) has established the Interinstitutional Coordinating Commission of the ZEE in the state of Piauí. MacroZEE of the State is coordinated by the Secretary of State for Environment and Water Resources (SEMAR) and the management proposal is in progress.

ZEE projects in progress or already completed by the states with form the Northeast Region are listed in Frame 5.

Frame 5- ZEE Projects in the NortEast States.

ZEE PROJECTS IN THE NORTHEAST REGION STATES							
STATE	PROJECT	SCALE	SITUATION				
			Planning	Diagnostic	Prognostic	Management Proposal	Federal Validation
AL	ZEE of the Coastal Zone of the State of Alagoas	1:100.000	Concluded	Concluded	Not Prepared	Concluded	No
BA	ZEE of the State of Bahia	1:250.000	Concluded	Concluded	Concluded	In Progress	No
CE	ZEE of the Coastal Zone of the State of Ceará	1:25.000	Concluded	Concluded	Concluded	Concluded	No
	ZEE of Caatinga and Humid Mountains of the State of Ceará	1:750.000	Concluded	Concluded	Concluded	Concluded	No
	ZEE of Susceptible to Desertification Areas in the State of Ceará	1:100.000	Concluded	Concluded	In Progress	In Progress	No
MA	Macro ZEE of the State of Maranhão	1:1.000.000	Concluded	Concluded	Concluded	In Progress	No
	ZEE of the State of Maranhão	1:250.000	In Progress	Uninitiated	Uninitiated	Uninitiated	No
PB	ZEE of the State of Paraíba Cariri Region	1:100.000	Concluded	Uninitiated	Uninitiated	Uninitiated	No
PE	ZEE of the South Coast of the State of Pernambuco	1:100.000	Concluded	Concluded	Not Prepared	Concluded	No
	ZEE of the North Coast of	1:100.000	Concluded	Concluded	Not Prepared	Concluded	No

	the State of Pernambuco						
	ZEE of the Recife Metropolitan Center	1:100.000	Concluded	Concluded	Uninitiated	Uninitiated	No
PI	Macro ZEE of the State of Piauí	1:1.000.000	Concluded	Concluded	Concluded	In Progress	No
RN	ZEE of the East Coast of the State of Rio Grande do Norte	1:50.000	Concluded	Concluded	Not Prepared	Concluded	No
SE	ZEE of the State of Sergipe	1:100.000	Concluded	Uninitiated	Uninitiated	Uninitiated	No

Source: BRASIL (2014b). Note: Prepared by the authors.

State Law n° 7.871 of July 20, 2000 (RIO GRANDE DO NORTE, 2000) has regulated the ZEE of the East Coast of Rio Grande do Norte, coordinated by the Institute of the State for Sustainable Development and Environment (IDEMA).

In the States of Alagoas and Sergipe projects have been coordinated by the Federal University of Alagoas (UFAL) and the Secretariat of State for Environment and Water Resources (SEMARH), respectively.

North region

According to MMA (BRASIL, 2014b), State Decree n° 503 of April 6, 1999 (ACRE, 1999) has instituted the State Program and the ZEE Commission of the state of Acre. Both projects have been coordinated by the Secretariat of the State for Environment (SEMA). Second phase have been regulated by State Law No. 1904 of June 5, 2007 (ACRE, 2007).

In the State of Amapá, State Commission for ZEE has established by State Decree n° 277 of December 18, 1991 (AMAPÁ, 1991), while State Law n° 919 of August 18, 2005 (AMAPÁ, 2005) witch has provided for the territorial ordering of the State. In this State, projects have been coordinated by the Institute of Studies and Research of the State of Amapá (IEPA).

In the State of Amazonas, State Decree n° 23.477 of June 16, 2003 (AMAZONAS, 2003) modified by State Decree n° 24.048 of February 18, 2004 (AMAZONAS, 2004), has established the State Commission of ZEE. The three projects have been coordinated by the Secretariat of the State for Environment and Sustainable Development (SDS), two of them have completed and have regulated. ZEE of the State

by the State Law n° 3.417 of July 31, 2009 (AMAZONAS, 2009) and ZEE of the Purus River Region by the State Law n° 3.645 of August 8, 2011 (AMAZONAS, 2011).

State Decree n° 1.026 of June 5, 2008 (PARÁ, 2008) has established the ZEE Supervisory Committee, the Technical-Scientific Committee and the Working Group, responsible for coordinating and executing projects in the State.

Macro ZEE of the State of Pará has concluded and has regulated by State Law n° 6.745 of May 6, 2005 (PARÁ, 2005). Its execution was coordinated by the Secretariat of the State for Science, Technology and Environment (SECTAM). State Law n° 7.243 of January 9, 2009 (PARÁ, 2009) has regulated ZEE for the West Zone of the State of Pará, whose execution has coordinated by the State Secretariat for Strategic Projects (SEPE). SEPE also has coordinated execution of the ZEE project for the East Zone and Northern Channel of the State of Pará, which has concluded and has regulated by State Law n° 7.398 of April 16, 2010 (PARÁ, 2010).

Decree n° 5.562 of April 30, 1992 (TOCANTINS, 1992) has established State Commission for ZEE of the State of Tocantins. In the State, Secretariat of the State for Planning and Public Management Modernization (SEPLAN) is the responsible agency for coordinating the execution of projects. ZEE of the State of Tocantins is still under development, while the ZEE of the North of the State of Tocantins is completed and regulated by the State Law n° 2.656 of December 6, 2012 (TOCANTINS, 2012).

Both projects in the State of Rondônia have completed, first has regulated by the Complementary Law n° 52 of December 20, 1991 (RONDÔNIA, 1991) and second by State Complementary Law n° 233 of June 6, 2000 (RONDÔNIA, 2000), amended by State Complementary Law n° 312 of May 6, 2005 (RONDÔNIA, 2005). In the state, the agency responsible for carrying out the projects was Secretariat of the State for Environmental Development (SEDAM).

Finally, Roraima, whose project is under coordination of the Secretariat of the State for Planning and Development (SEPLAN) through the Institute for Science, Technology and Innovation of the State of Roraima (IACTI). The standardization of the project has given by the State Complementary Law n° 143 of January 15, 2009

(RORAIMA, 2009), amended by State Complementary Law n° 144 of March 6, 2009 (RORAIMA, 2009b). State Decree n° 6.817-E of December 28, 2005 (RORAIMA, 2005) has established the management committee for geotechnology, cartography, planning and territorial ordering and the Permanent Work Group, responsible for execution and detailing of the ZZE in that state.

Frame 6 lists the projects executed or under execution by the States of the North Region.

Frame 6- ZEE Projects in the North States.

ZEE PROJECTS IN THE NORTH REGION STATES							
STATE	PROJECT	SCALE	SITUATION				
			Planning	Diagnostic	Prognostic	Management Proposal	Federal Validation
AC	ZEE of the State of Acre - Phase I	1:1.000.000	Concluded	Concluded	Concluded	Concluded	No
	ZEE of the State of Acre - Phase II	1:250.000	Concluded	Concluded	Concluded	Concluded	Yes
AP	ZEE in the South Area of the State of Amapá	1:250.000	Concluded	Concluded	Not Prepared	Concluded	No
	ZEE of the State of Amapá	1:250.000	Concluded	In Progress	Uninitiated	Uninitiated	No
AM	Macro ZEE of the State of Amazonas	1:1.000.000	Concluded	Concluded	Concluded	Concluded	Yes
	ZEE of the Purus Sub-region	1:250.000	Concluded	Concluded	Concluded	Concluded	Yes
	ZEE of the Madeira Sub-region	1:250.000	Concluded	In Progress	Uninitiated	Uninitiated	No
PA	Macro ZEE of the State of Pará	1:1.000.000	Concluded	Concluded	Concluded	Concluded	Yes
	ZEE of the West Zone of the State of Pará (influence area of the BR-163 and BR-230 highways)	1:250.000	Concluded	Concluded	Concluded	Concluded	Yes
	ZEE of the East Zone and Northern Canal of the State of Pará	1:250.000	Concluded	Concluded	Concluded	Concluded	Yes
	ZEE of the Coastal Zone of the State of Pará	1:100.000	In Progress	Uninitiated	Uninitiated	Uninitiated	No
TO	ZEE of the North Region of the State of Tocantins (Bico do Papagaio)	1:250.000	Concluded	Concluded	Not Prepared	Concluded	No
	ZEE of the State of Tocantins	1:250.000	Concluded	In Progress	Uninitiated	Uninitiated	No
RO	ZEE of the State of Rondônia - 1st approach	1:1.000.000	Concluded	Concluded	Concluded	Concluded	No
	ZEE of the State of Rondônia - 2nd approach	1:250.000	Concluded	Concluded	Concluded	Concluded	Yes
RR	ZEE of the State of Roraima	1:250.000	Concluded	In Review	In Review	In Review	No

Source: BRASIL (2014b). Note: Prepared by the authors.

Environmental zoning, especially the ZEE, is an important tool for environmental planning, since by pointing out guidelines based on the weaknesses

and potentials presented by each component of the landscape, from a detailed environmental diagnosis, they allow predicting future scenarios, which may or may not be built. Thus, they also allow for the consolidation of policies and a legal framework in order to achieve a desirable scenario that reconciles socioeconomic development and sustainability. Mainly in case of Brazil, which, due to its territorial dimension, is composed of completely heterogeneous regions historically, socially and economically, with a variety of diverse landscapes and rich biodiversity to be preserved, where the ZEE ends up playing a crucial role.

To evaluate the zoning methodology adopted by the Brazilian Government in detriment of many others found in the literature is not among the aims of this work. However, this does not prevent, although, from emphasizing the importance of integrating dynamic socioeconomic for the environmental diagnosis and prognosis. This is because, first of all, Brazil has a very significant demographic dynamics that should not be disregarded. Secondly, because it is a still developing economy, which means, in practice, the development of industry, increased exploration and consumption of natural goods, increased income, demand for water, electricity, coal, natural gas and oil. Thus, socioeconomic analysis may indicate in which regions consumption will be greater, as well as the impact of exploitation of natural goods in the dynamic population of the country.

Final Considerations

Regarding to the Ecological-Economic Zoning Program, it is important to emphasize the way it is structured, taking advantage of the collaboration of different spheres of administration, different institutions and the right interdisciplinary. It is noteworthy, however, the length progress of the ZEE projects across the country, and consequently the PZEE. Taking into account that the establishment of the National Environmental Policy dates back to 1981 and, consequently of its institution, more than thirty years has passed and so far not all the Federation Units have carried out their projects. Likewise, the Federal Government was only able to carry out, except for

the pilot project (ZEE of the Lower Parnaíba River), a macro ZEE: Macro ZEE of the Legal Amazon.

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