

# Descriptive Meta-Analysis of Technology Association with the Brazilian Northeastern Semi-arid

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## Abstract

The purpose of this article is to present a comprehensive meta-analysis of articles published in journals, conference, seminars, etc., as well as books, pamphlets and books that address the coexistence techniques with the semi-arid northeast, as well as descriptions, representations, meanings and importance of these techniques. Our methodology is to relate them to each other from some categorical relations, such as the categories of geographical location; types of coexistence technologies; research problem, hypothesis, objectives, and outcomes research proposal.

**Keywords:** scientific production; coexistence with the semi-arid; coexistence technologies; descriptive meta-analysis.

## 1. Introduction

Meta-analysis is generally understood as a process of using statistical methods and to combine the results of different studies (Kontopantelis & Reeves, 2009; Krombie & Davies, 2009). In our case, we use the term “descriptive meta-analysis” attempting to describe a study of argumentative points in common of several published academic texts analyzed here, a total of nineteen. All texts studied here are descriptive, which facilitates our qualitative work, however, as we propose a “meta-analysis”, there are qualitative data analyzed in tables and graphs qualitatively and descriptively. Therefore, we consider “descriptive meta-analysis” - if such a contract is possible - a method of qualitative and quantitative analysis of several texts published which have in common the same focus of research - in our case, roughly speaking, the living with the semi-arid Northeast. We think the descriptive meta-analysis as a study primarily qualitative data that can't do without, quantitative approach and analysis.

That said, we intend here to make a “descriptive meta-analysis” of journal articles, congress, seminars, etc., as well as books, pamphlets and books that address the coexistence techniques with the semi-arid northeast, as well as descriptions, representations, meaning and importance of these techniques.

We justify this little work to recognize that worldwide, there are big gap recovery projects of degraded areas and/or analysis of recovered areas, particularly in semi-arid. We highlight the theme of the production shortages related to coexistence with the semi-arid in the state of *Alagoas*.

Finally we questioned about what makes your study an important issue? Why it is meaningful for you to explore it? We answer that first the Brazilian semi-arid is similar to semi-arid from around the world, especially the African. Because of this, we argue that the successful experiences of peaceful coexistence and sustainable, with the semi-arid is of great importance to anyone interested in expanding, improve and take successful experiences of coexistence with the semi-arid region. This article makes current publications surveys on the subject. These publications are descriptive, showing subjective, social and everyday aspects of living with the semi-arid, while presenting some of coexistence with the semi-arid technologies and how they were received, adopted and improved. We believe this work will contribute greatly to the study of positive living, sustainable and semi-arid valorizing of the planet Earth.

## 2. Methodology

Our methodology consisted of preliminary survey of the above productions, through research conditional on key words, researched especially in Google Scholar, and, from there, we relate them to each other from some categorical relations, such as geographical categories of region, state, county and city/or community; coexistence technologies; research problem, hypothesis, objectives, and outcomes research proposal. As the ideal research methodology, we were inspired by the methodology proposed by Bloor and Wood (2006) in sue book “Keywords in qualitative methods”.

That said, this is initial research to bring the meta-analysis of a new descriptive perspective, that is, considering the qualitative aspect of the information collected, and also discusses quantitative and qualitative data collected form. These data often are not quantitative. So, we want to make a much broader survey team and the inclusion of research groups from Brazilian universities in northeastern Brazil region. We aim to produce various articles, and books, submit for discussion at conferences and present them in a international perspective

for those interested so that we know that there is much in common between people living with the semi-arid of the planet and that can help us by exchange of such experiences- - not only numerical, quantitative, but that values the subjectivities of people.

### 3. Results and discussion

After surveying the available productions on search sites, such as *Capes*<sup>1</sup> and Google Scholar Journal, this survey was conditional on specific guiding keywords, namely living with the semi-arid; coexistence technologies; Agricultural social technologies, among others (Table 01).

Most productions have a descriptive and qualitative characteristic, but both in its entirety, enable us to assess also through quantitative data. Are presentations in congress by graduate students, articles published in specialized journals, booklets and books; some items are in state of the art when considering the publication date between 2012 and 2015.

In Table 03, above, are the occurrences of keywords with other terms related in articles studied here, so understanding coexistence with the Brazilian semiarid region requires an interdisciplinary approach.

Finally, the order of the titles of the works below remains as a reference to the analysis of graphs and tables that follow:

1. The partnership state/associations and public policy for coexistence with semiarid in Sisal territory in the State of Bahia;
2. A brief study of the *Serra da Meruoca* and its potential in *Ceará* semiarid region;
3. Sustainable rural development programs and family farming in Brazil: approaches, actors and scales;
4. Reframing and social re-appropriation of nature: Practices and Programs "Living with the Semi-Arid" in the Territory of Juazeiro - Bahia;
5. The fields in the bush;
6. P1 + 2: Program a land and two waters Towards a sustainable semi-arid;
7. Finding the coexistence of paths with the semi-arid in the *Palmares* settlement in *Crateús-EC*;
8. Redesign of agro-ecosystems and social innovation to build local sustainability;
9. II experiences of specifications: agro-ecology and climate change;
10. 100 years of DNOCS: marches and setbacks of living with droughts;
11. The action of associations, water use and local / regional development in Bahia;
12. Diversification of productive activities and prospects of adopting agroecological techniques in dairy system in semiarid *Sergipe*;
13. Agricultural Family School Jacaré: promoting sustainable development in the mining semiarid;
14. Architectural Design of a residence adapted to the semiarid climate;
15. sustainable living techniques with drought in the semiarid region: a case study in São Bento-PB;
16. A sense of belonging to the Brazilian semi-arid territory: the redefinition of *backcountrying* territoriality by living;
17. Reversing desertification: landscapes revitalized by the communities;
18. Adapted Technologies for Sustainable Development Semi-Arid Brazilian.

The research locus of the work corresponds to specific places showing field research - Table 02. This corresponded to the cities, towns, villages, communities and settlements in at least six states. These articles present, here and there, various coping techniques with the semi-arid according to the demands of the place; contextualize of living and subsistence activities, relating them to the practices of family farming; the concepts arising from agro-ecology; treat living from the perspective of power, desertification, lack, depletion of natural resources; sustainability; land use, etc. (SILVA, 2014; OLIVEIRA, 2014; MALUF, 2010; CARVALHO, 2010; Ramos and Sampaio, 2007; SANTOS, 2014a, Santos, 2014b; VIVIEN, SILVA, ASSISI, 2015; Alves *et al.*, 2015.)

In other articles evidenced a production corresponding to an overview of the coexistence of concepts in their social, political and ideological aspects, and these items have a strictly qualitative nature descriptive and more general (Gnadlinger, SILVA, 2007; POMONET, 2009; BIRTH, SANTOS, 2015; QUEIROGA, ALMEIDA, 2015; CARVALHO, 2011; Furtado, BARACUHY, FRANCISCO, NETO and SOUSA, 2014; Silveira, Freire, OAK, CHAVEZ-TAFUR, ROWAN, Jiménez, 2012).

The latter attach importance to the subjective aspects of living together as a basic instance of coexistence practices. For example, Lima (2005) have claimed that in contrast to this negative view invented the semi-arid region, that is extremely difficult to convivencialidade emerged new references about the perception/view of the Brazilian semiarid, as a new way of thinking, acting and reflecting called coexistence

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<sup>1</sup> It is a Higher Level Personnel Training Coordination (*Capes*), Foundation of the Ministry of Education (MEC), playing the key role in the expansion and consolidation of strict sense graduate (Masters and Doctorate) in all States of the Brazilian Federation. In 2007, also started to work in basic education teacher training expanding the scope of their actions in the training of qualified personnel in Brazil and abroad.

with semiarid. This statement alleges that previous practices, an interested ideology was to intimidate indifference and even disrupt the coexistence initiatives with the Brazilian semiarid, through negative and derogatory meanings.

In this table (02), it is also possible to specify the amount of each academic textual production and in its entirety - which highlights the technical production of qualitative level on the subject living with the Brazilian semiarid region.

In table 03, it is evident the relationship type of production and year on the topic of coexistence technologies - which shows that the issue is a concept and a practice in construction, in the form of rescue and recovery mechanisms and social coexistence technologies with the semi-arid arising from the experiences of traditional communities, settlements, family agriculture, for example.

This shows the growing interest among serious researchers even as a theme in outline, a new theme. Among these, the lack of common financial initiative by the beginning of the century, did not intimidate the research and own finance, considering the importance and urgency of the issue. For example, at the beginning of the century, the concept of coexistence with the semiarid was not properly inserted in the interests, in discussions, in government programs and actions; only in the last decade we have seen the growing political engagement certainly moved by the alerts, the evidence and the global campaigns against global warming.

### 3.1. The semiarid

The Brazilian semiarid, Figure 01, according to official data of the Ministry of Integration, covers an area of 969,589.4 square kilometers and includes 1,133 municipalities in nine states of Brazil: Alagoas, Bahia, Ceará, Minas Gerais, Paraíba, Pernambuco, Piauí, Rio Grande do Norte and Sergipe. According to the Brazilian Institute of Geography and Statistics - IBGE (2000) live 22 million people, representing 11.8% of the population. Located, in the most part, in the northeastern states (84.48%), to the north of Minas Gerais (11.01%) and northern Espírito Santo (2.51%), except in the state of Maranhão.

In this region, live 22 million people, representing 11.8% of the population, according to the Brazilian Institute of Geography and Statistics (IBGE), and is the Semi-Arid most populous in the world, according to the Semi-Arid Articulation (ASA 2004).

The characterization by which is conventionally describe the northeastern semiarid usually presented around the frequent droughts resulting from the periodic absence of rain most of the time of year. The lack of rain is related to the high spatial and temporal variability; the scarcity of natural water resources, except in places near around the São Francisco River. Another difference in the semiarid is that most of its territory is covered by Caatinga - Biome complex, which has a wide variety of fauna, flora, and yet, one must consider their abiotic dimension. According to the Ministry of the Environment, The savanna covers an area of about 844,453 square kilometers, equivalent to 11% of the country. Covers Alagoas states, Bahia, Ceará, Maranhão, Pernambuco, Paraíba, Rio Grande do Norte, Piauí, Sergipe, and the North of Minas Gerais. Rich in biodiversity, the biome is home to 178 species of mammals, 591 birds, 177 reptiles, 79 species of amphibians, 241 fish and 221 bees. About 27 million people live in the region, the most needy and dependent on the biome resources to survive.

According to the Semi-Arid Articulation (ASA, 2004), the Brazilian semiarid region is the wettest among other semiarid the planet because its average rainfall ranges from 200 mm to 800 mm per year, depending on the region. However, rainfall is irregular in time and space. Furthermore, the amount of rain is less than the rate of evaporation, which is 3000 mm / year, that is, the evaporation is three times greater than the rain that falls.

For example, the Territory of Sisal, in the state of Bahia/Brazil. The Sisal Territory is currently composed of 20 municipalities: Conception of Coité, Retirolândia, Monte Santo, Itiúba, Cansanção, Northeastern, Fires, Quijingue Toucan Araci, Teofilândia, Biringinga, Ichu, Lamarão, Serrinha, Baroque, Candeal, Valente, Santa Luz and Santo Domingo.

Among all these places presented an intriguing case that draws our attention is the almost complete absence of articles, books and other texts with research in technologies for coexisting with semiarid in Alagoas.

### 3.2. Coexistence technologies with the semiarid

The technologies that provide living with the Brazilian semiarid region are tanks, dry toilets, dams, flour mill, mill community, planting in contour; dry coverage, and coverage of manure fermentation, well or water hole, underground dam, trench *barreiro* or *barreiro* for use in salvation irrigation, small dams, Cauldron (stone tank or *caixio*), *Mandala* (Sapo), *Cacimbado* settlement, board Cistern; ecological stoves, irrigation; evaporimeters tanks for gray water treatment; production of silage, inter alia.

According to the Ministry of Environment, there are related projects, such as the combating desertification in settlements and communities with mechanisms and social technologies. With the State Secretariat of Environment and Water Resources of Sergipe partnership, it is about the amount of R\$ 1,007,770.00.

Sustainable development project nesting *mandacaru* with the integration of technologies for coexisting

with semiarid and conservation of natural resources from Enterprise Technical Assistance and Rural Extension of Ceará – EMATER-CE in the amount of R\$ 577,574.92.

Multiple Technologies and Use of Diffusion Integrated and Sustainable Natural Resource to Improve Water Security, Food, Energy and Best Coexistence with the Semi-Arid, Contributing Technologies for Adaptation and Mitigation of Climate Change. Sustainable Development Foundation of Araripe, in the amount of R \$ 418,024.00, are some examples of institutional initiatives, government, civil society and NGOs, all of Climate Fund resources - MMA-BNDES

#### 4. Final considerations

The article entitled The partnership state/associations and public policy for coexistence with semiarid in Sisal territory in the State of Bahia is proposed to examine the nuances of the relationship between the State and the Community, productive associations, youth organization, communication and education, focused on the idea of coexistence with the semiarid in the Sisal Territory, in the state of Bahia.

The article, a brief study of the *Serra da Meruoca* and its potential in Ceará semiarid region is a brief analysis of the municipality of *Serra da Meruoca*, located north of Ceará, where due the development of public policies that seek to exploit the natural potential of the site. Even located in the semiarid region, and join all the negative representations about the area, one can see that there is a constant deconstruction of the negative aspects unmasked, thus presenting the landscape aspects and positive coexistence of the place.

The work entitled sustainable rural development programs and family farming in Brazil: approaches, actors and scales, deals with the themes of sustainability and sustainable rural development that guide public programs and actions aimed at the family farm in Brazil.

Reframing and social reappropriation of nature: Practices and Programs “Living with the Semi-Arid” in Juazeiro Territory - Bahia is the title of the doctoral thesis of Luzineide Golden Oak dealing with Reframing and social reappropriation of nature as Practices and Programs “Living with the Semi-Arid” in the Territory of Juazeiro - Bahia.

The fields in the bush are a popular booklet, funded by international institutions such as Dka Austria; CRS Catholic Relief Service; MISEREOR (Germany). Visa talk to the field man in objectified language intending to exchange information traditionally put as coexistence technologies with the semiarid region.

The P1 + 2: Program a *land and two waters for sustainable semi-arid* is a Social project with the semi-arid, which aims to ensure the rural population access to land and water, both for family consumption and animals as for food production, teaching yourself to take care of the land in a sustainable manner (p. 63).

In the article entitled, Discovering the coexistence of paths with the semi-arid in the *Palmares* settlement in *Crateús*-EC deals with the research and identification of families in everyday life, the various modes of coexistence and nature of ownership in the Semi-Arid held in settlement *Palmares*, in the municipality of *Crateús*, State of Ceará. Shows that families settled using different strategies to live in semi-arid such with the use of savanna resources, culture in different forms of expression, seed storage techniques and rain water, agriculture and livestock, non-agricultural activities, demonstrating that it is possible to live in the Semi-Arid Region.

In this article, Redesign of agro-ecosystems and social innovation to build local sustainability, the authors argue that the construction of a new perspective for rural semiarid Northeast should be supported in approaches with a multidisciplinary approach, in which the context is the reference and to promote the break with the conventional pattern of agricultural modernization. This study aimed to demonstrate methodological contributions approach in rural areas, in order to build resistance elements to the traditional model through social mediation for the redesign of agricultural ecosystems.

The II experiences of specifications: agro-ecology and climate change deals with agroecology as sustainable coexistence technique in the face of climate change.

Article 100 years of DNOCS: marches and setbacks of living with drought is a brief résumé, political, social, anthropological and ecological of DNOCS. Also seeks to emphasize that the weather phenomenon that plagues the semiarid Northeast, “has always approached from the wrong perspective and that, at present, many misconceptions are perpetuated” (POMPONET, 2009, p. 59).

Article The action of associations, water use and local / regional development in Bahia synthesize an aspect of this research is the relationship between the action of associations and change initiatives in a secular paradigm of representation in academic discourses allocated in a majority epistemology that is, the idea that the Brazilian semiarid region is poor and miserable due to the dry and impossible to live with.

The article, diversification of production activities and the prospects of adopting agroecological techniques in dairy system in semiarid *Sergipe*, deals with the soil and climatic conditions present in *Sergipe* semiarid in the face of cattle as less risky option for family farmers in the region, often, associated with other productive activities in the system. Thus, the work intended to characterize a family dairy system in semiarid *Sergipe*, where are developed different productive activities, analyzing the coping strategies with drought and



prospects of adopting agroecological techniques.

In *Jacaré Farm Family School*: promoting sustainable development in the mining semiarid, the hypothesis of the authors is that the school in the urban area does not value human knowledge from the field in the construction of an emancipatory and inclusive education, further contributing to the cultural erosion and aggravating the dispossession of those people - which is on the prospects of coexistence and appreciation of where they live. The article evaluates the actions of the Family Farm School (EFA) *Jacaré - Itinga (MG)*, and their contribution to the role of the peasant, using the Pedagogy of Alternation as a tool in promoting sustainability.

Article *Architectural Design of a residence adapted to semi-arid climate*, presents the architectural design of a residence in the backlands of Paraíba where the climate is semi-arid and, within this context, also analyzes and presents the favorable terms of execution for its construction in order to meet the prerequisites, such as: the best use of space, environmental comfort and aesthetics.

The text called, *sustainable living techniques with drought in the semiarid region: a case study in São Bento-PB* is an article that set out to identify sustainable techniques for dealing with drought in the semiarid region, specifically in the rural municipality of São Bento-PB. As methodological media were field visits, data collection with informal conversations.

The article, *a sense of belonging to the Brazilian semi-arid territory: the redefinition of territoriality backcountrying by living aimed to learn to live with the semiarid a subjective perspective in their research subjects*. It examined the idea of *living together* as an idea-project of interaction between of nature and culture through contextualizing practices, organizational and socio-productive programs in educational fields. In this sense, the conceptual itinerary Article want to present that in contemporary Brazilian semiarid, there are different meanings being put to it, but that the 'Living' is in building a redefinition and re-appropriation of the semi-arid nature, understanding it in a contextual way and the so-called relational *Polygon Drought*, namely, the regions of *Alagoas, Bahia, Ceará, Paraíba, Pernambuco, Piauí, Rio Grande do Norte* and *Sergipe*, plus the north of *Minas Gerais*.

*Reversing desertification: landscapes revitalized by communities* is a publication the *Journal Agricultures*, v. 9 - n. 3, December 2012, indicated in the articles: *Combating desertification: lessons from rural communities*, p. 4 - 7; *Intensification without simplification: to combat desertification strategy*, p. 8-16; *Living with semiarid as a strategy for combating desertification*, p. 17-22; *An experience in the Hinterland of success Araripe. Examples in West Africa*, p. 23-25; *There is no other way out except for Agroecology*, p. 26-28; *Fighting for a world without land degradation*, p. 29-31; *Micro-dams and alpacas*, p. 32-34; *Publications*, p. 35 - 35. You want to discuss the issue related to desertification ways of living together as fighting phenomenon plaguing 230,000 km<sup>2</sup> of semiarid Northeast, according to the Laboratory for Analysis and Satellite Image Processing, Federal University of *Alagoas*.

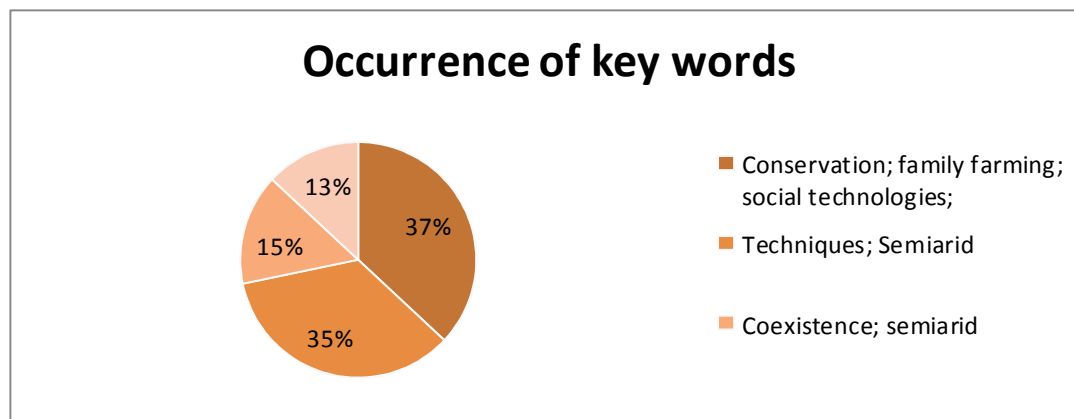
The text, *Adapted Technologies for Sustainable Development of the Brazilian semiarid*, the book, in his first published volume, addresses issues dealing with the collection, conservation and water use, production, conservation and use of food for humans and animals, and also the conservation of natural resources. Themes are such great importance to the sustainable development of the region (p. 09).

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**Table 01** - occurrence of keywords and correlation issues in research in the text of articles, books and presented books.



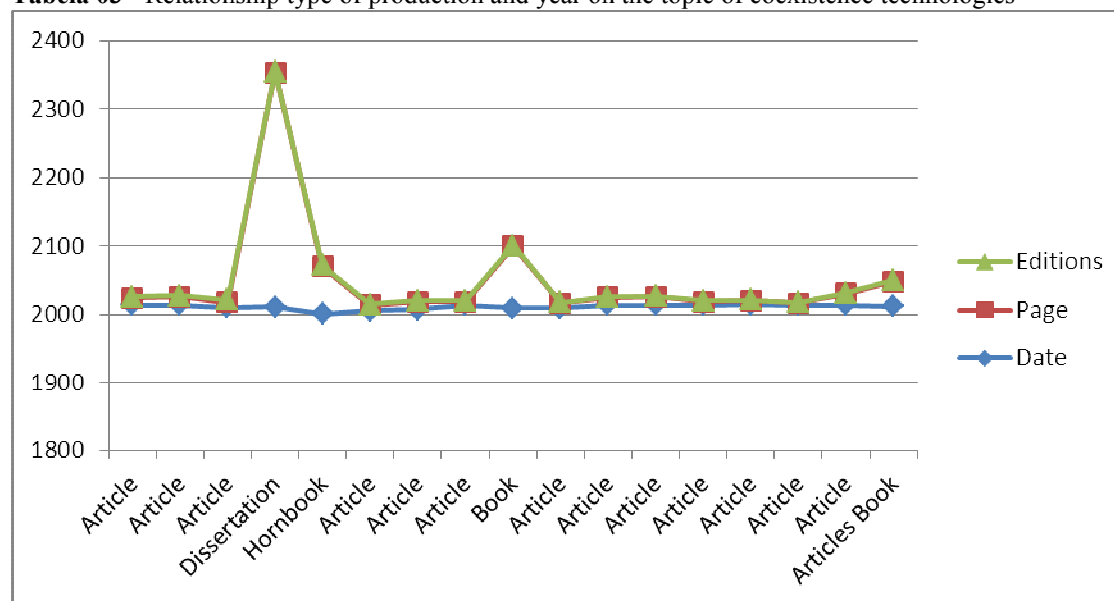
**Source:** the authors

**Table 02** - *Cities searched in sequence for each article.*

Region, State, City e/o City	Order	Year	Pages
Territory of Sisal - BA	01	2014	10
Mountain range of Meruoca - CE	02	2014	12
Marabá (Pará), Campina Grande (PB) and Valley of Taquari (RS)	03	2010	08
Territory of Juazeiro - BA	04	2011	342
All the cities and cities of the hinterland	05	2001	69
Semiarid from northeastern	06	2005	09
Palmares nesting in the city of Crateús-CE	07	2007	12
Community Small farm Sands, Sobral-CE	08	2014	05
Semiarid from northeastern	09	2009	91
Polygon of Seca <sup>[1]</sup>	10	2009	08
20 cities of the Territory of Sisal - BA	11	2014	11
Semiarid from Sergipe brazilian state	12	2014	12
Jacaré, city of Itinga - Valley of the Jequitinhonha - MG	13	2014	05
Hinterland of the Paraíba	14	2015	05
City of Is Bentinho-PB	15	2014	03
Drought Polygon	16	2014	17
Semiarid from northeastern, over all, desertificated areas	17	2012	36
Semiarid	18	2010	310

**Source:** of the authors

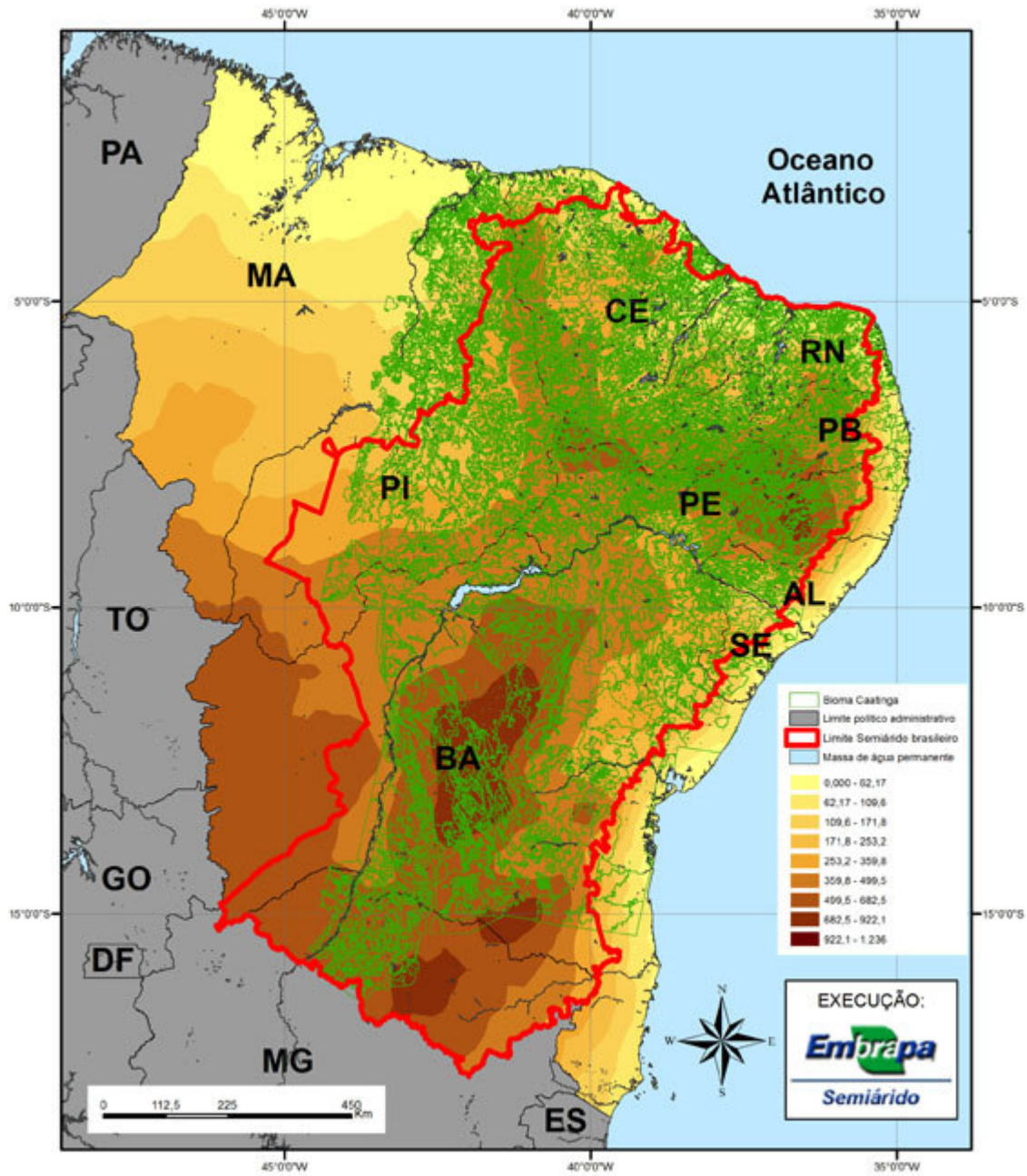
**Tabela 03** - Relationship type of production and year on the topic of coexistence technologies



Source: the authors



Figure 01 - Brazilian Semiárid



Source: CNPTIA agency EMBRAPA

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