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Hirschman and Furtado's contributions to a historical discussion on regional economic resilience to droughts in the Brazilian semiarid: an evolutionary approach

ABSTRACT

This paper aims to analyze the economic resilience of Brazil's semiarid region to the phenomenon of droughts in the first half of the 20th century. Specifically, it uses Hirschman and Furtado's analyses of economic development and the question of droughts in the Brazilian Northeast to establish the notion of resilience to droughts from an evolutionary perspective. The paper highlights certain political and institutional aspects as determinants of regional resilience by studying the evolution of government-backed initiatives to cope with such droughts. It also shows how this particular economy has become vulnerable and susceptible, limited in its ability to learn from or adapt to such shocks, thereby effectively lacking any resilience to droughts.

Keywords

Droughts; Brazil's Semi-arid; Celso Furtado; Albert Hirschman; Regional Resilience.

JEL Classification: B31, O10, R11.

RESUMO

O objetivo deste artigo foi analisar a resiliência econômica do Semiárido Brasileiro ao fenômeno das secas na primeira metade do século XX. Parte-se das análises de Hirschman e Furtado sobre desenvolvimento econômico e a questão das secas no Nordeste como contribuições à construção da noção de resiliência em uma perspectiva evolucionária. O trabalho evidencia os elementos políticos e institucionais como determinantes da resiliência regional, analisando a evolução das ações governamentais contra as secas e mostra como essa economia se tornou vulnerável e pouco resistente, com baixa capacidade de aprendizado e adaptação aos choques, isto é, não resiliente às secas.

Palavras-chave

Secas; Semiárido Brasileiro; Celso Furtado; Albert Hirschman; Resiliência Regional.

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Introduction

This paper analyzes the phenomenon of droughts in the Brazilian Northeast from the concept of regional resilience, using an evolutionary perspective. Historical elements were drawn upon to show how political action shaped the resilience to drought in the region, taken from the works of Albert Hirschman and Celso Furtado. The concept of resilience seeks to capture the ways in which regional economies prepare, respond, recover and adapt to exogenous shocks – economic, political or environmental and how they deal with the consequent uncertainty, volatility and rapid changes. This analysis focuses on the debate on drought control that took place up until 1959 – the period marked by the interfaces between these two authors' works.

The theoretical link between Hirschman and Furtado appears in two major fields. As for the theoretical conception of development, it is interesting to note a review of Hirschman's *The Strategies of Economic Development* (1958), in which Furtado (1959b) highlights the relationship between the theory discussed in the book and the theoretical approach taken by Latin American economists. As an analysis of the practice of economic policy and planning it is important to note that Hirschman (1963) dedicates his book *Journeys Toward Progress* to Celso Furtado and throughout the course of this work, analyzes Furtado's role in the creation of the Northeast Development Authority (Sudene).

Hirschman and Furtado's works overlap in the field of Development Economics. However, this present paper displaces their original *locus*, inserting them instead into the recent discussion on regional resilience. It is, therefore, important to note that regional economic development is not a smooth straightforward process, being subject to all kinds of disruptions and ruptures (SIMMIE; MARTIN, 2010). In this particular case, successive droughts have made the Brazilian Northeast's economic development process a very bumpy one indeed.

Simmie and Martin (2010) stress that the ways in which regional economies respond and adjust to shocks can influence the processes and patterns of their respective development. Therefore, the notion of resilience is very pertinent when analyzing how regions react to and recover from shocks, and in understanding the role that these shocks have in shaping the spatial dynamics of economic development over time (MARTIN; SUNLEY, 2015). In the Brazilian Northeast, this shock occurs with such

frequency that resilience is expected to exert a high level of influence on the respective development path of this region. Hirschman and Furtado's analysis makes this abundantly clear.

A distinction of concepts should be made here, since we appropriate ideas from the field of Development Economics: Resilience is not necessarily related to a higher level of development or previous economic success. A region's success may not be maintained following a change in its conditions. Thus, a resilient region is not only economically successful but maintains success over time when facing the inevitable adaptations that are required by the shock induced changes in the system (CHRISTOPHERSON; MICHIE; TYLER, 2010). According to Christopherson, Michie and Tyler (2010), resilience involves maintaining that success in the future, particularly when the region is faced with an economic recession or other challenges. For them, the likelihood that success will hold up over time will depend crucially on such an ability to adapt to changing circumstances and adjust to external shocks when they occur.

The elements we sought in Hirschman and Furtado to help us discuss the question of economic resilience primarily emphasized decision-making and political issues that interfere with and are interfered with by economic processes. Political and economic processes are at the heart of the concept of resilience as they create governance capacities and determine how vulnerable a given region is to events that are beyond its residents' control, as in the case of droughts in the Northeast (CHRISTOPHERSON; MICHIE; TYLER, 2010).

In terms of Hirschman's contributions, we begin with his analysis of the Brazilian Northeast in *Journeys Toward Progress*, published in 1963. In Furtado's case, his vision and interpretation of drought and the initiatives employed to combat it in the region are taken from the document entitled *Uma política de desenvolvimento econômico para o Nordeste* [An Economic Development Policy for the Northeast], produced as part of the Working Group for the Development of the Northeast (GTDN) and from *A Operação Nordeste* [The Northeast Operation], both from 1959, as well as from the book entitled *A Fantasia Desfeita* [The Fantasy Undone] of 1989.

The emergence of the concept of resilience in debates on regional economic development

Regional studies have increasingly turned their attentions to regional resilience in response to growing external shocks and ever more diverse transitions, such as financial crises, terrorist acts and extreme weather events (PIKE *et al.*, 2010). The potential vulnerability of localities to these dangerous and exogenous hazards, according to these studies, has intensified as part of the growing permeability and interdependence between different places and regions. This increase in the perception of vulnerability has stimulated a search for new paths to “resilience”, through adaptation and survival formulas that are aimed at coping with a perceived growth in economic, political and environmental risks (CHRISTOPHERSON; MICHIE; TYLER, 2010).

The idea of resilience has emerged rapidly in policy discourses across different regions and localities, focusing people’s attention on the particularly powerful combination of crisis pressures and imperatives for change (BRISTOW, 2010). The recent context of intersection between economic and environmental crises (CHRISTOPHERSON; MICHIE; TYLER, 2010) has again focused our attention on the ability of governments to mitigate shock impacts, as well as the different effects and consequences of government intervention (DAVIES, 2011).

In general terms, resilience is understood as the way a system behaves after being struck by an external shock. The term has commonly been used in the exact sciences, such as engineering, physics, ecology and psychology studies (PENDALL, R.; FOSTER, K.; COWELL, M., 2010, MARTIN; SUNLEY, 2015) and it has only relatively recently emerged in discussions and studies on regional economies.

As a new concept, we must first define what we mean by a resilient region, which can be described in a number of ways: One that resumes a possible state or trajectory of balance or full pre-shock employment through an approach referred to as engineering resilience, which admits the existence of a state of unique equilibrium, as in neo-classical economics; One that, after the shock, is able to achieve a new trajectory or state of equilibrium where its functions, structures and performance have been improved, in a view related to the existence of multiple equilibria and associated with so-called ecological resilience; Or, one that has the capacity to continuously adapt and

transform its structure, functions and performance when faced with a shock, compatible with optics that discard the existence of equilibrium, and in which the concepts of robustness, adaptation and adaptability emerge and are related to Complex Adaptive Systems and the Evolutionary Economy (SIMMIE; MARTIN, 2010; PIKE, A.; DAWLEY; S.; TOMANEY, J., 2010; PENDALL, R.; FOSTER, K.; COWELL, M. 2010; MARTIN, 2012; FINGLETON, B.; GARRETSEN, H.; MARTIN, R., 2012; MARTIN; SUNLEY, 2015).

The evolutionary resilience option was the choice of our study, and this can be better defined as:

The capacity of a regional or local economy to withstand or recover from market, competitive or environmental shocks to its developmental growth path, if necessary by undergoing adaptive changes to its economic structures and its social and institutional arrangements, so as to maintain or restore its previous developmental path, or transit to a new sustainable path characterized by a fuller and more productive use of its physical, human and environmental resources. (MARTIN; SUNLEY, 2015, p. 13)

From an evolutionary perspective, regional resilience can be understood as a process composed of elements that, as a result of a given shock can affect a region's development trajectory. Through this, regions respond and adapt to shocks until they resume or adopt a new alternative development path. We highlight, from among these different elements, the vulnerability and exposure of regions to shocks of varying natures and intensities, as well as the sensitivity or resistance of regional economic systems once they have been submitted to such shocks and proved resilient to them (SIMMIE; MARTIN, MARTIN 2012; MARTIN; SUNLEY, 2015).

Moreover, recent literature on resilience points to the role of robustness and adaptation, that is, a region's capacity to withstand a shock while maintaining its fundamental functions and characteristics. This is in addition to its adaptability, which is related to the ability of the same regional economy to change its structure in response to a shock, maintaining the functions, structures and institutions that make the system dynamic while at the same time, transforming those that have become obsolete (CHRISTOPHERSON; MICHIE; TYLER, 2010., 2010, PIKE, A.; DAWLEY; S.; TOMANEY, J., 2010, MARTIN; SUNLEY, 2015).

Our particular interest is to extract, from Albert Hirschman and Celso Furtado's analyses, the political and institutional determinants of the economic resilience of the regions in the Brazilian Semi-arid to recurrent environmental shocks – primarily the phenomenon of drought. One should, however emphasize that elements such as productive specialization, specific characteristics of the labor market, innovation systems and financial arrangements are also recognized as important determinants of regional resilience.

Contributions to the discussion on the economic resilience to droughts in the Brazilian semi-arid

Shock and Vulnerability at the level of the Local Economy

Firstly, it is important to define the nature of the shock that motivates this present study in terms of its origin, form, incidence, scale and duration. According to Martin and Sunley (2015), shocks can take many forms and have very different implications to resilience. Shocks may be disturbances in a local or regional economy caused by economic events, as in, for example bank crashes or the closure of a major regional employer, or caused by natural disasters or environmental disruptions, as in the case of the Brazilian Semi-arid region. They originate in different spatial scales and tend to be sudden, unexpected and extraordinary events that are highly destabilizing and invariably spatially unequal (MARTIN; SUNLEY, 2015).

Hirschman (1963) considers droughts to be spectacular and sudden events with which individual action is completely unable to cope³. Repeated droughts tend to occur “capriciously” at random intervals (average recurrence of 10 years), although they are totally unpredictable, and this leads to a break down in the region's agricultural and pastoral activities according to Furtado. In the GTDN document⁴, Furtado details the phenomenon:

3. One can understand here that being ‘completely unable to cope’ effectively means being totally non-resilient.

4. Although published as an official document, the document was written by Celso Furtado, not the technicians who formed the group, and was known as the Celso Furtado Report. Furtado himself reports: “The text was designed and written by me. There was no time to submit it to the critical reading of other people” (FURTADO, 1989, p. 56).

The rainfall in the region covered by the Drought Polygon, strictly speaking, cannot be considered low, since even in the caatingas the average is between 500 mm and 700 mm per year. It is therefore a region that has remained far from arid and has a relatively small volume of water. Therefore, this precipitation is very concentrated [...] Drought is caused by an aggravation of these phenomena: Low precipitation level and higher concentration. Sometimes the drought results mainly from a disturbance in the distribution of rainfall; at other times, its basic cause is in the fall of the level of precipitation. The most common is the combination of the two abnormalities (GTDN, [1959] 1967, p. 64).

When analyzing resilience, we should question whether a drought actually constitutes normality or whether it is, in fact, an exogenous shock that causes rupture in the regional economy (MARTIN; SUNLEY, 2015). It should be noted that the vast area described as the “Drought Polygon” is by no means a homogeneous region (HIRSCHMAN, 1963). On the one hand, there is the southern region (near the São Francisco river) where periodic droughts are less pronounced but where rainfall is lower and aridity tends to be an on-going condition. In this region, drought can be considered more a condition of normality than an actually shock.

However, in the *Sertão* (the Hinterland), as Hirschman (1963) points out, the problem is less its aridity and more the irregularity of its dry periods. This phenomenon is unique to the region, especially occurring as it does in such an extensive and populated area (FURTADO, 1989). Such a distinction between normality and shock has important implications when considering possible solutions. In terms of the basic structure of the problem, the region is best compared to places where an unpredictable calamity is imminent than other arid areas (HIRSCHMAN, 1963).

Characteristics of aridity that are similar to those experienced in places such as Mesopotamia or Egypt would suggest using existing solutions. However, in this case as rainfall irregularity can reach extremes, the possibilities for agricultural use are particularly restricted: “xerophytic vegetation can make its own water forecasts, but annual cycle crops become unfeasible” (FURTADO, 1989, p. 18). Hirschman (1963) compares the prospect of droughts in the region with the situation of areas close to volcanoes in Japan and Italy: Those living in Brazil’s Northeast region share with these people a refusal to worry about the possibility of disasters – if they do occur then they expect the government to act. Furtado (1989) states that, up until the be-

ginning of the 20th century, the only defense measures in place involved storing surface water to cope with difficult periods. It was up to the government to ensure, through the use of emergency measures, that hunger did not afflict the population during these trying times.

This increasing interest in the idea of resilience is precisely a reaction to a number of extraordinarily specific events and shocks that obtained different types of response from public policies (SIMMIE; MARTIN, 2010). The approximation between this discussion and the analyses of Hirschman and Furtado clearly highlights this characteristic of periods of drought, which drew and still draw a variety of different responses from public policies, albeit not always so readily. When very recurrent, says Hirschman, droughts have led not only to the resumption and expansion of government measures (such as public works expenditure) initiated in past periods of drought, but also to the establishment of entirely new institutions.

This inability to deal with the phenomenon is associated by Furtado (1959) with the creation of a structurally vulnerable and unstable economic system that is not adapted to the environment in which it operates. According to him, it would be difficult to explain the phenomenon of droughts as we know it by restricting analysis to the forces of nature, since the economy's and society's system expansion logic in the Northeast has increasingly exposed them to the serious effects of climate irregularities (FURTADO, 1989).

Settlement in this region occurred in a very primitive way, induced as it was by the dynamics of sugarcane production in the wetlands on the coast that in turn created demand for working animals and livestock and generated a supply of personnel that fueled the occupation of the territory (FURTADO, 1989). This occupation was based, from the outset, on extensive cattle ranching, which guided the region's socio-economic organization (FURTADO, 1959).

With the stagnation of the sugar industry, the economic *raison d'être* of the region ceased to exist, but the occupation of land of inferior quality and more subject to the phenomenon of droughts continued. The combination of a cotton-based agriculture⁵ – offering extremely low income, and cattle raising created an economy

5. Cotton-wool consists of a native cotton variety which is a xerophyte shrub that is highly resistant to drought (FURTADO, 1989).

that attracted too high a demographic burden to the region. Ultimately, the more demographic surplus you have, the more profound is the social impact of drought (FURTADO, 1959).

Drought causes, above all, a crisis in subsistence agriculture: “A change in the distribution of rainfall or a reduction in the volume of rainfall that makes subsistence agriculture impossible is enough to disrupt all economic activity” (GTDN, [1959] 1967, p. 64). The almost total loss of subsistence agriculture production explains the seriousness of the phenomenon in the region and its prolongation as a social calamity. In the case of livestock, on the other hand, the loss is more reflected in the herd’s loss of weight, reducing the meat ratio. Thus, the drought tends to cause a production concentration that inflicts greater losses on the working classes who have fewer defense mechanisms and less economic resistance (FURTADO, 1959).

Therefore, this present analysis looks at the effects of these sudden and uncertain exogenous shocks, which are particularly frequent, and considers the decisive impact they have on a region naturally prone to this natural phenomenon and on an economic and social system that is eminently vulnerable to it. Next, the discussion turns to the ways in which the region has handled these shocks in the short and long-term periods, addressing the issues of resistance and adaptation. The background of this contextualization considers the actions of governments and the political issues involved.

Downturns in economic and political cycles are, according to Bristow (2010), inflection points in short and long-term development paths which create imperatives for changes in habits, routines, conventions and policies, not only to mitigate their effects, but also to prepare for future crises. Indeed, as shown by Furtado (1989), when the economic and social implications of the shocks became a national scandal, these droughts effectively forced the government into action, thereby making it a decisive factor in the subsequent evolution of the regional picture.

A proper understanding of the concept of resilience requires that one first comprehend how the distinctive power, policy, contestation, and cooperation relationships between capital, labor, state, and civil society are effectively delineated (PIKE, A.; DAWLEY, S.; TOMANEY, J., 2010). It is crucial to understand how policy formulation and the structure of governance enable and facilitate change (CHRISTOPHERSON; MICHIE; TYLER, 2010., 2010).

Government Action and Resistance to Droughts

In the Brazilian Northeast, governments basically acted by means of immediate relief for drought refugees – relief consignments and the organization of emergency public works – and new initiatives aimed at finding better ways to deal with the problem (HIRSCHMAN, 1963). This action was characterized by short-term measures, which resulted in the creation of sources of occupation that allowed the most affected population to maintain a long-term income. This was especially focused on the construction of dams and wells to access groundwater and on projects for water retention in rivers (GTDN [1959] 1967).

It should be noted that government efforts, especially the most significant ones, depended predominantly on the occurrence of severe droughts at the time (HIRSCHMAN, 1963). Hirschman (1963) identifies crises as important ingredients in the implementation of reforms. The emergence and evolution of a crisis provides situations that are particularly favorable to solving problems. Firstly, because a crisis directs the attentions of the authorities to that particular context. Secondly, it offers the authorities an opportunity to take any action needed against potentially “well entrenched” and invulnerable groups, and finally, crisis can stimulate action and, *a priori*, help us learn about a problem that we previously knew little or nothing about.

Generally, drought-fighting efforts were focused on engineering projects, such as the construction of dams to retain water both during droughts and during normal dry seasons (HIRSCHMAN, 1963). Part of the first initiatives against drought, implemented by the Federal Inspectorate of Drought Works (IFOCS), the largest dams were intended to serve as “strengths” of drought resistance in the hinterland itself (HIRSCHMAN, 1963). Smaller reservoirs, constructed in cooperation with the owners of large-scale farms in the region, would be useful in mitigating the damaging effects of droughts. The larger ones, financed entirely by the federal government, were aimed at promoting a fundamental transformation in the agricultural economy of the region through irrigation downstream (HIRSCHMAN, 1963; GTDN, [1959] 1967).

Hirschman (1963) pointed out that the construction of highly costly large-scale reservoirs could only make economic sense if they were used for irrigation. Despite

the high costs involved, irrigation could provide greater stability to food production (FURTADO, 1959). This would reduce the need for the population to emigrate during droughts and, by allowing for the sale of annual crops, help sustain life in the hinterland during the dry years (HIRSCHMAN, 1963).

Road construction, according to Hirschman (1963), was another important component of public works programs in the Northeast for facilitating the evacuation of people from the *Sertão* during droughts, allowing too for the delivery of relief, construction materials and equipment and enabling the movement of people within the *Sertão* itself in search of more humid lands, perennial rivers and reservoirs.

Furtado (GTDN, [1959] 1967) emphasized that neither the short-term nor the long-term measures that were implemented had until then [time of writing the document] fundamentally resolved the problems faced. In the case of the short-term problems, these droughts represented production crises that mainly affected the supply of food. Simply creating jobs to help the population was not enough, given the huge increase in demand that came abruptly with the fall in production of self-sufficient families (GTDN, [1959] 1967). As for the engineering initiatives, Furtado pondered that despite the importance of these works, one could not state for certain that such investments had effectively contributed to making the region's economy more resistant to droughts.

The reasons why public works and investment programs have failed to transform the economy of Brazil's Northeast into a more drought-resistant system will be discussed in more detail in the next section, where we analyze the concept of adaptive capability and its impact on regional resilience. To Pike, Dawley and Tomaney (2010), while in the short-term resilience is confronted with the quantitative aspects of the immediate challenges faced, the long-term vision should better connect with qualitative issues, with a reflection on different solutions and more appropriate trajectories aimed at avoiding the recurrence of such shocks. According to Christopherson *et al.* (2010), long-term policy decisions contribute to the determination of physical capacity, regional resilience and risk distribution of the adverse consequences of shocks and disturbances between residents and external agents.

Political and institutional aspects and the lack of an adaptive capability

In analyzing the long-term aspects of the Northeast's resilience, we emphasize how firms, workers and institutions in the region adjust and adapt to shocks, including the role of external mechanisms, public interventions and support structures, which Martin and Sunley (2015) had defined as *robustness*. In this regard, our analysis focuses on the mechanisms by which agents and institutions in the region respond and adjust to shocks in order to mitigate their effects and the scope of reorientation and structural adaptation and reallocation of economic resources in the region.

Learning and preparing for future shocks

Evolutionary resilience is related to the ability of a region to undergo successful changes in its structure, functions and behavior after experiencing a shock event (MARTIN; SUNLEY, 2015). The concept involves, according to Martin and Sunley (2015) deliberate changes undertaken by individual or collective agents in anticipation or preparation for certain types of shock. In their view, the experience gleaned from such events can lead to the implementation of measures that minimize the impact of any recurrence of such shocks. In the case of droughts in Brazil's Semi-arid region, this aspect deserves special attention given the high frequency with which they occur in the region.

According Hirschman (1963), the Northeast has always offered particularly favorable conditions for the learning process to unfold, which would enable a greater adaptive capacity to develop in the long term and ultimately lead to a greater level of resilience. The challenges and difficulties faced by policymakers during and after each drought event in the region were essentially the same and offered them an excellent opportunity to accumulate a vast wealth of experience to help in attacking the problem and seeking to avoid or prevent its impact in the future.

However, a lack of urgency in reacting to the problem in hand, maladministration, arbitrary practices, a lack of continuity, abuse in the distribution of aid funds and the use of these funds for individual enrichment and political advantage (HIRSCHMAN, 1963) are just some of the elements that have thwarted any possibility of success in

these attempts. There is also the question of the different impact of droughts experienced by the different social groups of large producers, sharecroppers and rural workers, leading to the enrichment of some groups through the exploitation of aid to the needy and misappropriation or misallocation of funds from public works⁶.

Hirschman (1963) points out that the scarcity of investment projects ready to be deployed at the time of an emergency led to many missed opportunities and false starts. According to him, at other times and despite the availability of resources for initiatives in the region, the lack of ideas for allocating these resources made it difficult to implement or prevented further action. The creation of the Comissão do Vale do São Francisco (CVSF)⁷ is a good example of this. The allocation of resources to invest in the São Francisco River Valley – at least 1% of federal revenues – was guaranteed by a constitutional amendment but, it was only after its approval that lines of action, projects and priorities began to be discussed (HIRSCHMAN, 1963). The author highlights that the results of this process were predictable: resources were dispersed throughout the vast area covered by the CVSF and allocated to a large number of easy-to-execute projects, thereby facilitating considerable political influence over projects (HIRSCHMAN, 1963).

The lack of continuity of implemented measures should be highlighted as yet another barrier to the adaptation of the region to droughts in the long-term. Public action during the severe drought of 1900 is a perfect example of this. According to Hirschman (1963), the few public works that were undertaken or resumed their activities as a result of this particular shock were interrupted as soon as the rainy period began in 1901, a fact celebrated by the government of the time as a reduction in the “sacrifices” imposed by these works on the National Treasury’s coffers. Not even the Inspectorate, an institution created to combat this lack of continuity, was able to guarantee greater stability for anti-drought initiatives in the region.

6. For example, through the building of dams and roads to benefit the properties of friends and family or to consolidate the political influence of a few political leaders in the interior (HIRSCHMAN, 1963)

7. The São Francisco River is the second largest river in Brazil and most of its course flows through the northeastern territory at its southern portion. Because of its location and size, it has been the subject of numerous projects and attempts at action against droughts, especially in the northern areas of its basin (HIRSCHMAN, 1963). The CVSF, an autonomous company, was created in 1948 with the task of regularizing the course of the river in terms of navigation, flood control, irrigation and electric energy production. According to Hirschman (1963), the CVSF was given the task of providing more minor services, such as “access roads, infirmaries, health centers, water supplies, and energy for small cities”, etc.

This irregularity can also be seen in the flows and guarantees of National Treasury resources, based on the revenues of the federal government. Hirschman (1963) shows that at various times in the past such resources earmarked for actions against drought were only secured by virtue of articles in the Constitution. However, political instability at a national level very often compromised the continuity of such resources.

An even more striking example of this lack of continuity was seen in the transition between presidents Epitácio Pessoa and Artur Bernardes. Pessoa, himself a north-eastern Brazilian, promoted a series of large-scale projects contracted by the Ifocs. Expenditure on these consumed a very considerable proportion of the federal government's budget, mainly because of the great drought of 1919 (HIRSCHMAN, 1963) but most of the projects were suspended before they could be completed once his successor, Bernardes, took office⁸.

The evolution of public efforts aimed at irrigation in the surrounding areas of the major dams also evidenced a serious lack of learning or understanding behind such initiatives. Furtado (1989) classified the inexistence of an irrigation law in a region where so many resources were invested in the construction of dams as a scandal. Up until the 1930s, irrigation did not even appear as a major concern in drought-control plans, despite the focus on constructing large reservoirs. Irrigation, according to Hirschman (1963), from that point on should have been a required phase of the process after the construction of these reservoirs. In the 1950s, however, despite an explicit concern for the subject, there was only one repetition of previous patterns: Construction of dams without any planning for irrigation. The author concludes: "While understandable during the thirties because of a lack of experience in relation to the problem, this absence of 'complementary efforts' had become the butt of jokes by the fifties" (HIRSCHMAN, 1963, p. 47).

Furtado (1959) also identified the lack of coordination in their actions between different divisions of government.

There were a multitude of policies in place in the Northeast: One run by the Dnocs and one by the CVSF; One by the DNER and one by the DNEF; Finally, there were as many policies as

8. Upon assuming the presidency in 1922, Artur Bernardes abolished the Special Fund created previously to give financial support to the Inspectorate, paralyzing most of the projects and suspending all public works in the Northeast for the next six years.

Federal Government agencies operating in the region, all growing very slowly, repeating things they did in the past, good or bad, as far as they could, and almost all with enormous difficulties because they could not see the problem as a whole. (FURTADO, 1959, p. 18)

Based on Martin and Sunley (2015), such a lack of “anticipatory adaptation” - even a lack of learning from recurring problems - manifests itself as a lack of resilience. Davies (2011) stresses that resilience depends on the ability of policymakers to ensure effective planning and implementation strategies as a response to shocks and social learning capacity. But the evident fact in this context is that “each successive drought in the Northeast brought out one of several ways in which preceding efforts at strengthening the region’s resistance to the scourge had gone awry” (HIRSCHMAN, 1963, p. 262).

Impact of regional political forces and the macroeconomic environment

Christopherson, Michie and Tyler (2010) emphasize that regions exist in a multiscale space of action, in which political and economic actors make decisions that have consequences for anything located in this space. In an analysis of public action in the Northeast, this characteristic deserves attention on two fronts: The issue of regional political forces and the dependence of national economic cycles on spending policies.

In Hirschman’s (1963) interpretation, the Pessoa-Bernardes episode illustrates a general principle: “[...] country with one area that is rich and growing and another that is poor and stagnant, the latter is likely to be the stepchild of public investment for a prolonged period.” (HIRSCHMAN, 1963, p. 36). The paradox is that spending in poor areas tends to be associated with the characteristics typical of private spending on luxury goods: carried out only during periods of extreme prosperity and likely to be cut as soon as the first financial constraints appear.

In this regard, Furtado (1959) states that as the inequality between standards of living and income between regions reaches certain levels, it tends to be institutionalized. Once such a phenomenon gains institutional strength “its spontaneous reversion is practically impossible” (FURTADO, 1959, p. 14). Furthermore, as the command of politics belongs to the most powerful economic groups: “reversion through the performance of political bodies also becomes extremely difficult” (FURTADO, 1959, p. 15).

Several examples of this dependence on decisions taken at higher geographic levels arise from this analysis: during the decline of coffee prices, the activities of the Drought Inspectorate were limited due to financial constraints; during the Artur Bernardes government, works in the Northeast were the first victims of ongoing financial austerity, as described by Hirschman (1963). In addition, and indeed as occurred during many other governments, aid expenditure in the Northeast was invariably blamed for inflationary pressures.

According to Hirschman (1963), the pattern was only broken in those moments when the severity of the droughts made them a problem of national urgency. During the Vargas government, for example, although the years of 1930 and 1931 experienced dry conditions, resources allocated to the Inspectorate were limited because of the desire to restrict spending. It was only when the drought became very severe and affected a very large area that resources were finally allocated to funding aid programs and emergency public works (HIRSCHMAN, 1963)⁹.

Institutional Aspects

Pike, Dawley and Tomaney (2010) argue that the challenge of the adaptation and adaptability of regions and therefore of regional resilience necessarily requires an institutional coordination of multiple agents between different spatial levels. In addition, they emphasize the need for a degree of institutional stability, with guarantees for the continuity of the capacity of the institutions in a region to interpret and give meaning to the challenges brought about by such shocks. In this analysis, some institutional difficulties facing drought resilience deserve special mention.

As previously mentioned, the development of irrigation near large dams is necessary to give economic coherence to such works. However, unlike in totally arid areas¹⁰, Hirschman (1963) suggested that the way the Northeast was originally colonized cre-

9. In 1932, expenditure on the Inspectorate reached 10% of federal revenue, being cut after the acute crisis had passed, but by a smaller percentage than that of its original increase, thereby allowing for the continuity of construction of some dams and roads (HIRSCHMAN, 1963).

10. Irrigation is a necessary condition in these totally arid areas in order to allow for their colonization and, therefore, in these areas the construction of dams and the development of irrigation necessarily and naturally go together (HIRSCHMAN, 1963).

ated certain institutional barriers to the question of irrigation. Northeasterners never acquired the tradition, the experience or indeed any kind of favorable disposition to deal with the question of irrigation. Thus, the state assumed a preponderant (and omnipresent) role to accumulate knowledge through research, to modify attitudes and to redesign property or land relations. In addition, irrigation was embedded in a series of socioeconomic problems (HIRSCHMAN, 1963).

According to Hirschman (1963), property relations were a marked institutional difficulty, mainly due the appropriation of the land downstream of the reservoirs and the headwaters of the perennial rivers, incompatible with the objectives of irrigation. This structure created a barrier, preventing the benefits of these major works being fully realized and fairly distributed. As soon as the large reservoirs were completed, it became clear that their benefits would not be equally shared or fully realized unless changes and severe interference in existing property relations were promoted (HIRSCHMAN, 1963).

The highly differentiated effects of droughts on, and the traditional ways of dealing with them by the different social groups in the region are evident. Government action in the region, in Furtado's (1989) view, only served to reinforce the existing *status quo*. In addition to reinforcing the existing social, economic and political structures, the author showed that these actions, dominated by large landowners and cotton farmers, merely aggravated the social effects of droughts:

The society of the semiarid region was formed within the scope of the farms. Economic power and political power were two sides of the same coin [...]. Tax collection, policing and justice were exercised by landlords on behalf of the state government. During the drought periods, federal government action was carried out by intermediaries of the local constituents, who used labor paid with public money to construct local roads and similar works, strengthening the existing structures. (FURTADO, 1989, p. 22).

During the drought of 1958, Furtado notes that while the living conditions of the rural working population were dire, the class of landowners did not seem to be significantly affected. Nevertheless, government action prevented the population from being decimated by hunger and from emigrating, eliminating this "natural solution" and ensuring the survival of traditional structures.

In the areas benefiting from government resources for the construction of dams, “the totality of the public and private legacy for the benefit of some ranchers” paid “hunger wages” (FURTADO, 1989). The water was provided almost free of charge, the channels were funded with nonrefundable resources and maintained by the government. In addition, merchants who pre-financed emergency works benefited, on the one hand, from a sharp increase in the prices of basic necessities and, on the other, from the very high interest rates charged of workers receiving cash advances from them (FURTADO, 1989). Thus, Furtado (1989) suggested that drought could be a large and prosperous business opportunity for the so-called “drought industrialists”.

Finally, we explain the importance of agents' actions and their relationships with structures for the understanding of adaptation mechanisms, showing the different levels of resilience that exist between regions (PIKE; DAWLEY; TOMANEY, 2010). In times of drought, the traditional solution for the poorer people in the countryside is to make their way down the perennial rivers in the hope of finding safe non-agricultural work and assistance, especially focusing on the more humid enclaves or reservoirs in the *Sertão* as well as cities along the Coast and in the south of the country, only returning with the first rains (HIRSCHMAN, 1963).

This large number of refugees requiring assistance was often pointed to as evidence of the complete lack of success of the initiatives implemented to combat drought (HIRSCHMAN, 1963). However, for Hirschman (1963), with a more developed road network and advances in motorized transport, “people no longer had to stay behind to die of starvation, thirst or root poisoning. Thus what was taken as evidence of failure could also be interpreted as the partial success of one type of remedial action ” (HIRSCHMAN, 1963, p. 68).

Over time, Hirschman (1963) reckoned that the numerous efforts of agents, individuals and governments in the region, who sought to avoid the destructive consequences of these major droughts, despite failing to achieve their ultimate goals, were nevertheless successful in making a living in the region more tolerable. This factor provided the basis for colonization during normal years, attracting an ever greater population contingent which, for him, raised the prospects for catastrophes of even larger dimensions when new droughts came along.

Theoretical contributions to the discussion on drought resilience

This paper has looked at the economic resilience of the Northeast region of Brazil, based on the analyses carried out by Hirschman and Furtado for a period up until the end of the 1950s. What emerged were the political and institutional elements that largely determined the region's ability to withstand, cope with and adapt to recurring occurrences of the climate phenomenon in question. In this effort, the discussion on resistance to drought initiated by Celso Furtado and on the problem-solving styles in Latin America by Hirschman (1969) is all the more pertinent and interesting.

Resistance to drought according to Furtado

In the final year of the period covered by this article, Celso Furtado was hired to help create and run Sudene as its planner and first superintendent. We should stress here the major intellectual effort that was employed to make a realistic diagnosis of the policies that had been used to combat drought until that point and, above all, to suggest new directions and ideas for the development of a socioeconomic system that might be more resistant to this environmental phenomenon. It is worth noting that in the short term, raising the level of resistance has a recognized impact on the resilience of a region as a whole.

Furtado (1989) above all stressed the need to increase the resistance of the semi-arid economy by somehow incorporating climatic irregularity into the population's livelihoods, better preparing them to face droughts on a regular basis. The author argued in favor of the need for a general reorientation of the government's policies, hitherto focused on the "water solution" through dams, with their benefits restricted to extensive livestock farming. He understood that the issue was not one of combating the shock, in this case the drought, but rather of promoting a coexistence between the economy and society and this recurring event, primarily through the creation of an agricultural system that might take the region's specificities fully into account.

Thus, if, on the one hand, an inadequate economy extremely vulnerable to drought was developed in the *Caatinga* region, this same biome still had the potential to produce drought-resistant tree fodder (FURTADO, 1959). Any plan of action in this di-

rection would need to focus on creating a drought-resistant economy with the highest productivity possible. In addition, this same economy would not necessarily be compatible with a high population density, implying therefore the existence of a surplus population that would have to be absorbed. This would then require that the action plan include an expansion of the agricultural frontier and an increase in industrial investments in the region (FURTADO, 1959).

In Furtado's (1959) interpretation, the economic consequences of drought represent a crisis in the purchasing power of the local population. To create a resistant economy - and according to this interpretation, a resilient economy - one must have a plan that aims to absorb the unemployed population. Then, if there is a collapse in subsistence activities, the regional economy must ensure adequate compensation so that people can continue to work, maintain their purchasing power and purchase the foodstuffs available in the market. Thus, Furtado highlights the importance of replacing an action purely focused on the fight against the effects of drought, with an action that transforms the regional socioeconomic structure and functions into a system that is more adapted to the environment in which it is inserted.

Problem-solving style and the learning process according to Hirschman

Some of the analyses of economic policy in Latin America carried out by Hirschman (1963) contribute to our understanding of resilience, especially when one considers the relevance of political factors in solving problems such as the shocks mentioned here. These elements are related to the learning process previously discussed.

Hirschman (1963) makes a distinction between the possibilities of "pressing" problems, whose actions are based on motivation and "chosen" problems that underlie actions by the planners' understanding.

If mistakes are made in handling "pressing" problems, the policy-maker will be told so quite promptly, since the original pressures that led him to act in the first place will not abate and may even increase. On the other hand, if "chosen" problems are mismanaged, corrective forces will be slower to assert themselves, since there are no pressures to start with. (HIRSCHMAN, 1963, p. 235).

In this sense, the nature of this learning process - important to regional resilience - will depend on the type of problem being dealt with. The drought and its effects, recurrent in the Northeast, are evidently “pressing problems”¹¹.

A second issue involves the style of problem solving that characterized the implementation of actions against drought. Hirschman (1963) characterizes this style as the tendency of *action motivation* to move ahead of the problem’s understanding. This is the typical behavior of societies that are eager to solve a wide range of problems without, however, considering whether their resources, skills and attitudes are in sync with the challenges they face. Since comprehension remains lagging behind motivation, a high incidence of errors and failures occur, reflected in the repeated and endless appeals for full, integrated, rapid and definitive solutions.

The frequent creation of new institutions, as seen in the Northeast, is also a characteristic of this style: “In the absence of understanding, the sharpened motivation to do something about a problem finds a welcome outlet in the establishment of an agency to which the problem solving task is delegated” (HIRSCHMAN, 1963, p. 270). This should be distinguished, however, from those agencies whose creation resulted in little, if any, progress in understanding the problem, such as the CVSF, or those institutions that gleaned new knowledge and fought significant battles in favor of change in institutional and social structures, such as Sudene.

This style is also characterized by what Hirschman (1963) describes as “*la rage de vouloir conclure*”, or “the fury of wanting to conclude”. In the case of “pressing” problems, such as drought, policymakers are motivated to act, in the first instance, merely to pacify or suppress dissatisfaction (through aid to drought victims, for example). These first reactions are carried out with a minimum of knowledge of the problems, to try to remedy the situation. Given the low initial level of understanding, any action is likely to be defective; hence the problem continues or even worsens. Persistence or aggravation of the problem, in turn, leads formulators to seek “fundamental” solutions, usually coming from a foreign source or based on external solutions (HIRSCHMAN, 1963).

11. For Hirschman (1963) the San Francisco River Valley development plan was a good example of a “chosen” problem: “bogged down during a long period of time without any strong outcry since the CVSF had not been set up to remedy a specific and strongly felt problem” (HIRSCHMAN, 1963, p.235).

This reflects the anxiety of local planners to grasp some ready-made solution, which prevents the creation of a genuine process of learning around the problem. Such actions, often based on successful experiences elsewhere, are, in this case, doomed to failure as a consequence of the incongruity between borrowed and hurried elements, improvised goals and the reality of a pressing problem that is more than evident (HIRSCHMAN, 1963).

The learning process has often been blocked by these actions that are based on saving solutions which, however, at the slightest sign of failure, are readily replaced by new constructions - usually borrowed from other experiences too and just as ambitious (Hirschman, 1963). Thus, there is a recurrent process of abandonment of policies previously considered as guarantees of salvation: "When such a policy is proven a failure, it will be emphatically dismissed, ridiculed, described as a total failure and an abomination" (HIRSCHMAN, 1963, p. 241).

Such a learning pattern generates recurring and profound fluctuations in the process of policymaking and makes constant changes in the guidelines more likely as a result of sudden shifts from one broad solution to another. This is the case of the understanding trajectory of the reservoirs and dams constructed during the period under study here: "these reservoirs turned from panacea into the laughing stock of the Northeastern experts" (HIRSCHMAN, 1963, p. 241).

Moreover, Hirschman (1963) indicates that an insistence on censoring past efforts creates obstacles to further progress and learning. An "almost morbid insistence on declaring past policy-making to have been a series of half-hearted, piecemeal efforts, doomed to failure" (HIRSCHMAN, 1963, p. 243) is a common ingredient in this style. Such a characteristic becomes harmful in so far as it leaves behind or suppresses useful information or elements of incipient or partial success contained in the experiences of the past that it seeks to forget or deconstruct. In the experience of dealing with drought in the Northeast, Hirschman sees an apparent lack of memory on the part of policymakers who take this ingredient to an astonishing level:

Each time a new agency is proposed or a new program is launched with high hopes and the best of intentions and with success being freely predicted, the fact that similar hopes and predictions animated earlier efforts seems to be all but forgotten. Few attempts are made to canvass either what went right or why disappointments were encountered. (HIRSCHMAN, 1963, p. 243-244).

It is, therefore, evident that the style identified by the author in solving problems, and specifically that of droughts, has a direct influence on the learning process of policy makers in dealing with this kind of shock. It is clear, as already mentioned, that learning difficulties reduce adaptive capacity in the long term, making it more difficult for the region to become resilient to the phenomenon.

Final remarks

Based on the elements drawn from Hirschman and Furtado's analyses of the droughts in the Brazilian Northeast, it was possible for us to elaborate a historical framework on the issue regarding efforts to create an economy more resistant to shocks, in this case represented by droughts. In this aspect, the purpose of this work was to frame these authors' analytical contributions within a discussion about economic resilience to droughts in the Brazilian Semi-arid. The drought phenomenon is classified as a sudden shock of uncertain occurrence, despite the high periodicity with which it affects the Northeastern economic system. In addition, it was possible to observe that this particular economy is very vulnerable to such shocks due to its configuration.

The main aim of this article was to identify the political and institutional elements that form the basis of any debate on economic resilience in the region. Thus, the discussion on the long-term characteristics of state intervention in the region showed a great inability to learn from previous experiences, even in the face of a scenario in which, for at least fifty years, governments were challenged by successive shocks of the same nature. Drought, although uncertain and difficult to predict, occurs with a high frequency in the Northeast. However, the economic and social system in which this phenomenon occurs is described as structurally vulnerable to its effects, unsuited to the environment in which it finds itself and, therefore, unable to deal with the phenomenon that affects it so periodically.

The logic of combating drought and its effects in the Northeast brings government and its actions directly to the center of the debate, thanks to the centrality of the emergency initiatives and actions it takes and its short and long-term planning. In this sense, we verified that actions aimed at resistance to droughts in the period

analyzed, primarily focused on emergency aid and engineering works or “water solutions”, proved a failure over time in improving the way the effects of shocks were and are felt in the region.

Another important consideration regarding the lack of regional resilience in the face of recurrent droughts is the weak propensity to learn from previous experience and to prepare for future shocks, obviously jeopardizing the region's adaptive capacity, and hence its evolutionary resilience. This absence of an adaptive capacity reflects a scarcity of projects in place to deal with emergencies, a lack of continuity of already implemented measures, administrative problems caused by mismanagement, cases of corruption and the misuse of resources.

The institutional dimension was also very relevant in understanding the framework that was designed in the region regarding its resilience, especially in terms of the structure of land ownership in the region and the highly differentiated effects of droughts and benefits of government actions. In addition, we highlight the relevance of the style of problem solving identified by Hirschman in the ways in which drought-fighting actions were conducted throughout the period.

At the end of the 1950s, in referring to the Northeast Operation, Furtado stated that even after fifty years of drought-based struggles, as detailed by him and Hirschman in their works, the type of economy that could survive in the Caatinga region remained uncertain, clear evidence of the lack of adequate adaptation to the problem of periodic shocks. The conclusion is therefore that over the period covered by this article, the economy of the Northeast remained far from resilient to the phenomenon of droughts.

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