

Entreciencias: Diálogos en la Sociedad del Conocimiento

Año 13, Número 27, Artículo 2: 1-18. Enero - Diciembre 2025
e-ISSN: 2007-8064



La sinfonía del desgaste: La “enfermedad canguro” y el desgaste oculto en los cortadores de caña de azúcar

The Symphony of Wear and Tear: “Kangaroo disease” and Hidden Wear and Tear in Sugarcane Cutters

DOI: 10.22201/enesl.20078064e.2025.27.89391
e25.89391

Sabrina Ângela França da Silva Cruz ^{a*}
<https://orcid.org/0000-0003-4886-2702>
Diego de Oliveira Souza ^{b*}
<https://orcid.org/0000-0002-1103-5474>
José Rodolfo Tenório Lima ^{c*}
<https://orcid.org/0000-0003-2453-6515>
Jarbas Ribeiro de Oliveira ^{d*}
<https://orcid.org/0000-0001-8519-2432>

Fecha de recepción: 20 de agosto de 2024.
Fecha de aceptación: 27 de enero de 2025.
Fecha de publicación: 7 de febrero de 2025.

^a Autora de correspondencia
sabrina.cruz@arapiraca.ufal.br

* Universidade Federal de Alagoas

Se autoriza la reproducción total o parcial de los textos aquí publicados siempre y cuando se cite la fuente completa y la dirección electrónica de la publicación.
CC-BY-NC-ND



RESUMEN

Propósito: analizar el proceso de determinación social de la salud de los trabajadores en el corte de caña de azúcar en Alagoas, Brasil.

Diseño metodológico: estudio de caso con análisis temático. Esta investigación utiliza premisas teóricas de la salud de los trabajadores y de la salud colectiva, con enfoque en la teoría histórico-crítica. La metodología implicó la selección de un caso específico. Las categorías analizadas fueron: “determinación social de la salud”, “cargas de trabajo”, “desgaste”, “sobreexplotación” y “alienación”.

Resultados: el trabajo en el corte de caña de azúcar se caracteriza por diversas cargas físicas, químicas, biológicas, fisiológicas y psicológicas, que contribuyen a un importante desgaste de los trabajadores. El estudio revela que la “enfermedad canguro” representa un proceso de deshumanización de los trabajadores, evidenciado por la sobreexplotación de la mano de obra. Esta sobreexplotación se manifiesta a través de la intensificación del trabajo de producción, las largas jornadas laborales y los bajos salarios, lo que tiene como consecuencia el deterioro de la salud y la deshumanización de los trabajadores. El agotamiento prematuro observado demuestra que, incluso con la mecanización, persisten los problemas de salud, lo que subraya la necesidad urgente de reformar las prácticas de trabajo y la remuneración en el corte manual de la caña de azúcar.

Limitaciones de la investigación: el enfoque de estudio de caso puede limitar la generalizabilidad de los resultados a otros contextos o lugares.

Hallazgos: la “enfermedad canguro” refleja la sobreexplotación y deshumanización de los trabajadores en el corte manual de caña de azúcar, convirtiendo el trabajo en una fuente de degradación física y psicológica.

Palabras clave: determinación social de la salud, carga de trabajo, trabajo, sobreexplotación, caña de azúcar.

ABSTRACT

Purpose: To analyze the social determination process of workers' health in sugarcane cutting in Alagoas, Brazil.

Methodological design: Case study with thematic analysis. This research uses theoretical premises from workers' health and collective health, with a focus on historical-critical theory. The methodology involved selecting a specific case. The categories analyzed were “social determination of health,” “workloads,” “wear and tear,” “overexploitation,” and “alienation.”

Results: Work in sugarcane cutting involves various physical, chemical, biological, physiological, and psychological stresses, leading to significant wear and tear on the workers. The study indicates that “kangaroo disease” signifies a dehumanization of workers, evidenced by the overexploitation of the workforce. This overexploitation is evident in the intensification of production work, extended working hours, and low wages, resulting in poor health and the further dehumanization of the workers. The observed premature exhaustion demonstrates that, even with mechanization, health issues remain, highlighting the urgent need for reforms in working conditions and compensation in manual sugarcane cutting.

Research limitations: The case study approach might restrict the generalizability of the results to different contexts or locations.

Findings: “Kangaroo disease” symbolizes the overexploitation and dehumanization of workers involved in manual sugarcane cutting, transforming their labor into a source of both physical and psychological degradation.

Keywords: Social determination of health, workload, labor, overexploitation, sugarcane.

INTRODUCTION

This study examines the health-disease process of sugarcane cutters, focusing on the context of the state of Alagoas, Brazil. Notably, we begin with a condition associated with overwork, known as “kangaroo disease” among the sugarcane laborers in the region.

The health issues of sugarcane cutters are complex. They include work processes based on historical tensions (the formation of latifundia, overexploitation of the workforce, and environmental destruction, among other aspects) and socio-sanitary repercussions for workers, such as poverty and illness.

In this context, it is essential to analyze the process of cutters becoming ill as a reflection of working conditions. Historically, these conditions have been characterized by longer working hours, intense physical labor, wage suppression (payment based on production), power dynamics, a lack of labor rights and social protection, seasonality, and instability associated with migratory processes, among other factors that heighten the risk of illness (Verçoza, 2018; Cruz, 2020).

While cutting sugar cane, workers experience extreme exertion, delivering more than 3 700 machete strikes a day and nearly 4 000 spinal rotations. This leads to significant physical stress, with cardiovascular levels that can soar to 200 beats per minute. On average, the workers burn 3 517.95 kcal daily and consume 8.9 liters of water. They walk approximately 4 400 meters and carry around 6 tons over distances of 1.5 to 3 meters each day. Furthermore, the work is performed in high temperatures while wearing heavy clothing and tools (Cruz, 2020).

Cutting sugarcane demands high daily production, with some workers harvesting over 10 tons a day, akin to the efforts of high-performance athletes (Verçoza, 2018). Despite the use of machinery in the sugarcane fields, the industry still recruits the most efficient workers for manual harvesting, known as the “golden knife” (Lima & Carvalho, 2023). This selection boosts cutting averages but also increases the strain on workers in the pursuit of greater productivity. Machines operate in flat areas, while manual harvesting continues in hilly regions, such as Alagoas, intensifying the burden on workers to meet industry demands (Cruz, 2017).

Alongside this scenario, rising daily cutting averages among sugarcane cutters are often incentivized by productivity rewards, such as food baskets and cell phones. However, working conditions are extremely stressful. Workers have been reported to faint after cutting large volumes of sugarcane in one day, requiring intravenous hydration in hospitals (Silva et al., 2012).

As part of this process, excessive work has led to frequent clinical issues among sugarcane cutters, with symptoms including headaches, severe cramps, fainting, and cardiorespiratory arrest. The high incidence of cramps throughout the body can, in some cases, progress to sudden death, with the victim contorting into a posture reminiscent of a kangaroo. Due to this symptom, the condition has been referred to as “kangaroo disease” in the state of Alagoas (Verçoza, 2018).

“Kangaroo disease” is a recognized clinical condition among cane cutters in Alagoas, yet it remains relatively unknown outside this context. This is mainly due to the challenge of establishing a direct link between the symptoms and the act of cutting cane through purely medical analysis, as overwork may not leave external visible marks or detectable pathophysiological indicators.

The bodies of sugarcane cutters reflect the overexploitation present in the sugarcane industry, leading to their early exhaustion (Verçoza, 2018) or even death (Alves, 2006; Silva, 2013; Costa, 2017). Furthermore, those workers who, due to the context of overexploitation they endure, lose their ability to work begin to confront a true “*via crucis*” to access social security benefits. This reality indicates that the suffering experienced in the sugarcane industry is magnified and felt in other facets of social life (Reis, 2018).

According to social security data from Brazil, it was found that between 2012 and 2021, the primary illnesses affecting this occupation were back pain (18.96%), disorders of the vertebral disc (6.39%), and synovitis and tenosynovitis (3.55%). Together, these conditions accounted for nearly 30% of absences, with a recognized causal link for manual sugarcane workers (SmartLab, 2023).

In light of this reality, workers’ self-sacrifice for the sake of capital emphasizes that organization and wor-

king conditions are more closely tied to the work process than to biological factors (Cruz, 2020). The intensification of work, precariousness, and flexibility—elements of modern times—have a profound impact on workers' health.

Given this context, this study aimed to analyze the social determinants of health affecting sugarcane cutting workers in Alagoas, Brazil.

To this end, the current research draws on theoretical foundations from classic Marxist literature on workers' health and collective health, including Breilh (1977), Laurell (1982), and Laurell and Noriega (1989). Additionally, the theory of dependency plays a crucial role in explaining the persistence of unfavorable and unequal working conditions in Latin America's agricultural economies. The exploitative nature of these conditions is most evident in the wear and tear and premature exhaustion of the workforce, rendering the illness and death of rural workers a direct consequence of economic relations within the capitalist system, rather than merely a biological or isolated health issue.

Five cases were selected during the research and extension activities of the (name removed to ensure blind evaluation) Research Group to connect the broader debate with the specific details of the object studied.

Theoretical foundations

The understanding that social factors interfere with health has progressively been constructed throughout history from different perspectives. In the 20th century, a social and academic movement emerged that came closer to social theories capable of explaining the dynamics of the supposed factors as a dialectical totality: Latin American Social Medicine (Souza, 2021).

Pioneering authors such as Breilh (1977) and Laurell (1982) developed the understanding that health, although expressed biologically in the individual organism, is the result of a social process.

This process cannot be reduced to a set of overly autonomous factors that simply happen to be related. Beyond a mere relationship of factors, this new perspective recognizes that social relations are historically constructed and that, in class societies, structural inequalities shape how human beings relate and live. It is precisely in this context that a field of social possibilities emerges for

diseases, or the health-disease process, to manifest in various ways within communities, depending on the contradictions of class, gender, ethnicity, and other mediating issues (Breilh, 2013).

Thus, the concept of the social determination of health underscores the centrality of the workforce as a fundamental aspect of societal formation. From this perspective, social class becomes significant in the analysis of health conditions, leading Laurell and Noriega (1989) to propose that workload and wear-and-tear are essential components for understanding the effect of labor on workers' health and, to some degree, how these factors relate to the external impacts of the work environment.

The concept of loads was proposed by Laurell and Noriega (1989) to more accurately designate the risks that work poses to workers' health. However, unlike the traditional view of occupational risks, which often normalizes the presence of risks and merely associates them with potential harm, the perspective of these authors regards loads as dynamic elements that interact with each other and arise from a historical-social process, primarily rooted in forms of exploitation and control within the workplace. This dynamic results in occupational illnesses and also contributes to wear and tear processes, which often do not lead to well-defined diagnoses (Laurell and Noriega, 1989).

The loads can be external to the worker's body, related to the characteristics of objects and work tools, or internal, connected to elements of work organization that affect physiological and psychological aspects. They can be physical, chemical, biological, or mechanical.

In addition to these aspects, adopting a critical perspective on the reality of countries like Brazil, it is essential to understand that the illnesses of workers in agricultural contexts, often poorly paid, cannot be separated from broader social issues, such as the structural dependence of Latin American countries (Marini, 2017). This is because the historical particularity of these nations highlights a unique type of social development founded on the overexploitation of the workforce. Consequently, occupational diseases in this context are less linked to biological predispositions or organic abnormalities that affect individuals in isolation and are more, or rather primarily, associated with the organization of work and the conditions under which it occurs (Cruz, 2020). Marxist-based critical theory regarding Latin American

reality can be understood through the lens of Rui Mauro [Marini \(2000\)](#). According to this author, in fulfilling its roles within the international division of labor as a dependent economy subservient to centers of capital accumulation, Latin America is characterized by super-exploitation, which is seen as the domestic political expression of the specific conditions of capitalist development in the periphery. In Marxist dependency theory, therefore, super-exploitation is defined as the particular form of exploitation present in dependent capitalism ([Marini, 2000](#)).

In this sense, while the central countries tend to accumulate wealth through relative surplus value, driven by the development of their industrial-technological base's productive forces, the peripheral countries, such as those in Latin America, are based on super-exploitation, understood in the historical context of capitalist development.

From this perspective, this paper examines the Brazilian sugar-alcohol sector as a typical industry of a dependent country. It has developed unevenly and combined, relying on the super-exploitation of labor to accumulate wealth.

In general, the exploitation of labor consists of appropriating the work of others. In capitalism, this appropriation occurs in a specific manner, through capital, which seizes the value generated by the workforce during the production of goods—specifically, the value that exceeds the cost of the workforce itself.

Super-exploitation, on the other hand, is an intensified form of exploitation. It occurs when the value of the workforce is violated, meaning that the worker is exploited beyond normal limits. This indicates that super-exploitation is not merely a worsening of exploitation but a breach of the value of the workforce itself.

The central characteristic of super-exploitation is that workers are denied the conditions necessary for the re-composition of their labor power. This denial can occur in two main ways: 1) by forcing workers to exert more physical effort than needed, resulting in premature exhaustion, or 2) by removing the opportunity to consume the minimum required to sustain their workforce under normal operating conditions ([Marini, 2000](#)).

In the context of rural sugarcane cutter workers, overexploitation emerges when the mill owner extracts

surplus value that exceeds what is necessary for the workforce's basic reproduction, paying wages that are lower than what is essential for them to recover physically. In this scenario, the violation of the workforce's value takes on a distinctly super-exploitative character.

Additionally, there are at least four forms of super-exploitation or violations of the essential conditions for the production and reproduction of the workforce. These include 1) increasing work intensity, 2) extending the workday, 3) converting part of the worker's consumption fund into a capital accumulation fund, and 4) raising the value of the workforce without adequately compensating for the necessary amount to do so. These forms of super-exploitation can occur individually or in combination, depending on the current phase of accumulation, resulting in greater wear and tear on the workforce and leading to premature exhaustion and limitations for the worker ([Marini, 2000](#)).

One form of overexploitation in the Brazilian sugar-alcohol sector, known as work intensification, became particularly evident in the 1990s. This violation of the workforce's value escalated dramatically after the sugarcane sector regained its production dynamism in the 2000s.

In realities like the state of Alagoas, in addition to the various technological innovations in sugarcane production, the so-called "management by results" was also intensified through productive restructuring. Continued involvement in the sugarcane industry became increasingly tied to the individual productivity levels of the workers ([Queiroz, 2013](#)). Fewer individuals began to accomplish more work as a result of the so-called "slimming down", which only became feasible due to a greater intensification of labor. One of the largest mills in Alagoas, Coruripe, employed 6 000 workers at the end of the 1980s but reduced this number to 2 800 after implementing new management practices ([Cruz, 2017](#)). Management that demands ever-higher productivity per worker per day and selects individuals based on strict performance criteria is progressively reducing jobs in this sector, which in turn is fueling both migratory processes and a heightened intensification of work. In addition to the intensity of work in sugarcane cutting today and the devaluation of labor power, there is another serious factor to consider: payment by production. Even though compensation is based on producti-

vity, the numerous issues surrounding its measurement persist—since the worker cuts meters of cane and their output is gauged in tons—the fatigue experienced by those cutting cane at an intense pace is not reflected in their pay. As a result, the value of labor power is undermined, because “the intensification of work involves an increasing expenditure of labor power over a specific period, and despite the rise in the number of products or use values, their value and price remain unchanged” (Osório, 2013, p. 60). Therefore, “the consumption of more use values cannot compensate for the intense wear and tear on the worker’s body” (Luce, 2012, p. 129). Moreover, as Luce (2012) points out, “one indicator to determine whether we are facing increased intensity and, consequently, greater physical-psychological strain on the workforce is the prevalence of occupational diseases” (p. 132). If this is a crucial aspect for understanding work intensity and thus overexploitation, what about work that is fatal? It is estimated that, due to the working conditions in sugarcane fields, the lifespan of a worker who cuts sugarcane at today’s intensity is comparable to that of black slaves in colonial Brazil; that is, today’s sugarcane worker has an estimated lifespan of about 15 years (Silva, 2007). Another critical point to consider is the significant role played by the mass of unemployed workers within this context of overexploitation. : The establishment of an industrial reserve army, as described by Marx (2013), directly impacts capitalist accumulation, as the existence of a large unemployed population creates conditions for heightened and more intensive exploitation of the workforce. Thus, the proportional size of the industrial reserve army corresponds with the increase in wealth concentration. However, as this reserve army grows in proportion to the active workforce, the mass of entrenched overpopulation also increases, whose suffering is inversely related to the oppression of their labor. Ultimately, the greater the impoverished segments of the working class and the reserve army, the more pronounced the official pauperism becomes. This is the overarching, absolute law of capitalist accumulation.

METHODOLOGICAL DESIGN

The methodology of this study aimed to explore the dynamics and characteristics of the social determination process of “kangaroo disease” through a detailed case study. The primary objective was to formulate preliminary hypotheses for future research. This methodological approach is particularly beneficial for examining complex aspects and situating phenomena within a specific context, revealing influential factors and interactions that may be overlooked in broader studies. In this regard, the flexibility of the case study enhances the existing knowledge base by providing an in-depth understanding of specific social dynamics (Braun & Clarke, 2019).

The case study was chosen because of its ability to provide a contextualized and detailed analysis of the social determination of manual workers’ health in sugarcane cutting. The case was selected based on the following criteria:

- 1) Relevance to the research - Representativeness of the problem: This case is relevant because it exemplifies a potentially serious medical condition associated with strenuous work that may not be widely recognized or studied. “Kangaroo disease” provides an opportunity to investigate poorly understood health conditions within a specific work context.
- 2) Unique characteristics - Distinctive aspects: The case presents distinctive features, such as a combination of severe cramps, extreme working conditions (high temperatures, heavy clothing, and equipment), and intense physical exertion, which yield valuable insights into the interaction between environmental factors and health.
- 3) Aspects of social and economic impact - Implications for workers: The condition known as “kangaroo disease” affects several workers, suggesting a collective health issue that may reflect large-scale working conditions and merits detailed analysis.
- 4) Contribution to scientific knowledge - Filling gaps in the literature: This case offers an opportunity to enhance knowledge about health conditions associated with intense manual logging work, particularly in the context of Alagoas.

We used oral history as a resource for the interviews since this technique allows us to grasp elements of the subjects’ experiences immersed in the phenomenon under investigation, helping to reconstruct their history. In addition, this technique prioritizes the depth of the analysis of experiences, which allows it to be applied to a smaller number of interviews. Rather than repeating elements or generalizing the case, the aim is to immerse oneself in the experiences analyzed in their historical dimension.

The subject selection process involved field research with workers engaged in manual sugarcane cutting in the rural municipality of Teotônio Vilela, Alagoas. A questionnaire included sociodemographic, clinical, work-related, and other social questions. Participants were selected based on:

- a) Relevance and suitability for the case: Interviewees needed to be directly related to the case in question.
- b) Informed consent: All interviewees were required to provide informed consent before participating in the research.
- c) Availability and access to participants.
- d) Ability to provide relevant data - Quality of information: Interviewees should be capable of sharing experiences, observations, and knowledge that contribute to a deeper understanding of the case. Based on these criteria, five interviews were chosen from a total of twelve that met the research objective.

The data was analyzed using thematic analysis, following the steps: 1) data collection and transcription; 2) coding of the statements; 3) identification of themes and patterns; 4) in-depth analysis; 5) construction of narratives; and 6) critical validation of the statements. The analysis was conducted from the perspective of workers’ health, based on the historical-critical matrix. The categories analyzed were: “social determination of health,” “workloads,” “wear and tear,” “over-exploitation,” and “alienation.” The first three relate to workers’ health and Marxist collective health. The category “super-exploitation” is discussed on the basis of Marxist Dependency Theory (Marini, 2017), and “alienation” in the light of Georg Lukács (2013). While the case study offers a detailed analysis of “kanga-

roo disease”, it is important to note that its generalizability may be limited. The uniqueness of the case may not reflect variations of the condition in different sugarcane workers or regions.

ANALYSIS AND DISCUSSION OF RESULTS

Results

Case 1

A 43-year-old white male worker exhibits signs of dehydration and physical exhaustion, along with dermatological lesions from sun exposure. He resides in the rural area of Teotônio Vilela, Alagoas, Brazil, where he lives with his wife, three daughters, and a grandson. He works cutting sugar cane by hand and is employed by a sugar-alcohol organization. He has worked in agriculture since he was 11 years old and has held an employment contract for cutting sugar cane for 14 years.

The worker reports being paid based on productivity, earning approximately R\$70.00 to R\$80.00 per day in Brazilian currency, which amounts to about R\$2,000 per month. At the current exchange rate of around R\$5.62 per dollar, this translates to approximately \$12.46 to \$14.24 per day, closely equivalent to \$356.22 US dollars per month. He works six days a week, dedicating around 10 to 11 hours each day to his job. He takes a 15-minute break in the morning and an hour for lunch. Additionally, he consumes about 10 liters of water daily and performs 3 994 spinal rotations each day while working in an environment with temperatures exceeding 30° Celsius.

He claims to have “kangaroo disease,” as cane cutters refer to it, with symptoms that began just before he turned 40. He experiences frequent episodes (1-2 times a week) of cramps in his chest, back, arms, wrists, legs, and jaw, followed by fainting and vomiting. These symptoms occur at work, towards the end of the day, on his way home, or even after he arrives home. His colleagues or family members typically transport him to the emergency hospital, where he has been admitted several times. He often receives intravenous fluids for electrolyte replacement and is then discharged. At all times, the assistance he received has always come from third parties and never from the company he works for.

According to the worker, no laboratory tests have been carried out to confirm what appears to be associated with rhabdomyolysis due to overwork. Serum levels of creatine kinase (CK), myoglobin, potassium, uric acid, and lactate dehydrogenase (LDH) could verify this.

It is noteworthy that the day after experiencing cramps, the worker returns to work to avoid income deductions and to keep his right to the basic food basket provided as a reward for attendance. "I have several colleagues with these symptoms," which is why they collectively refer to it as "kangaroo disease". This term comes from the contorted postures workers assume during cramps, where their arms, wrists, and legs resemble those of kangaroos.

The employers' measures include the daily supply of electrolyte replacement fluids and water. However, no changes to the work process mitigate the excessive physical effort that leads to "kangaroo disease."

Case 2

A 65-year-old male worker residing and working in the municipality of Teotônio Vilela has Indigenous physical features and suffers from dermatological lesions due to sun exposure. He lives alone but has two children. He has been cutting sugarcane for over 10 years, currently working informally for two to three days a week. "I can't work more days a week because of the pain in my body. I suffer from cramps, and there have been several times when I've been paralyzed in the harvest field; I've fainted and blacked out a few times in the cane field. On days when I eat less and drink little water, that's when the condition appears. I feel sick."

The cane cutter's workday starts at 7 am and ends at 3 pm. His income varies depending on how many days he works in a week. He earns about R\$15.00 per ton of sugarcane cut, which translates to \$3.00 USD for his productivity. Since he cuts between 4 and 6 tons a day, his daily earnings range from R\$60.00 to R\$90.00 (approximately \$12.00 to \$18.00 US dollars), leading to a monthly income of R\$720.00 to R\$1,200.00 (around \$144.00 to \$240.00 US dollars), which is below the Brazilian minimum wage. "When I get cramps, it's my colleagues who help me. The company offers no support; they just provide me with water." Because he lacks an employment contract, he doesn't receive the serum given to other formal workers.

The only remedy he uses after experiencing cramps is to drink three yogurts, which he pays for himself. "I've told my colleagues to buy yogurt since they also suffer from this problem, but they claim they don't purchase it because the price is too high." As a result, he has no professional health monitoring and has never undergone any tests. Finally, he remarked, "This is quite common. I've seen cutters die while holding the cane."

Case 3

A 41-year-old Black male worker states that he has been cutting cane for nearly 15 years, starting at age 7. For most of that time, he worked illegally without an employment contract. "I spent most of my time working without a contract, illegally. Now I don't cut cane anymore. I'd rather beg than continue with this job."

He lives in Junqueiro with his wife (his fourth marriage) and daughter. He has worked in the municipality of Junqueiro, Alagoas, and in a municipality in the state of Paraná. His working hours were from 7 am to 3 pm, with a 40-minute break in the morning and lunch from 12 pm to 1 pm. The worker's pay, like the previous ones, is also based on productivity. "When I worked cutting sugar cane, my monthly income was between R\$1,200.00 and R\$1,400.00," which in US dollars corresponds to between \$240.00 and \$280.00. The worker described the stages of the kangaroo episode in the following order: "Vomiting, that green water comes out, your eyes get deep, your body feels dehydrated, tired, fatigued; a knot in your arm, cramps, or your arm feels weak, your hand gets cold, you can't drop the machete on the ground, cramps all over your body, back pain, your tongue curls up, you forget everything, and you start sweating. My colleagues came to my rescue, laid me on the ground, and gave me a rehydration serum. After about five minutes, I started to recover." These symptoms lasted for hours. "The day after the episode, I had a lot of pain in my body, no strength in my hands, and diarrhea. I went to the hospital on my own. I received rehydration and vitamins, but they didn't perform any laboratory tests."

It should be noted that this episode, the most serious, occurred when the worker was 22 years old, but he suffered from kangaroo syndrome on other occasions, with up to two episodes a week. As assistance, the plant offered

serum, water, and bananas. Sometimes, there was an ambulance from the plant which took him home. He says he saw several colleagues suffering from the same problem and heard from the inspectors: "You can take it; finish this job." Some of his colleagues died, at which point the plant's administrators called a meeting to tell them that they "had to rest."

Case 4

Black male worker, 38 years old, married, and father of three young children. He lives in the municipality of Teotônio Vilela, in the state of Alagoas, and has been working in the sugarcane sector for 15 years, the first five of which were as a clandestine worker. He is currently registered as an employee of a mill in his region, with a formal employment contract (CLT), and has already been registered for three years. During his daily shift, he cuts cane, with an average of 80 strokes a day. Depending on how much cane he cuts, he earns around R\$1,200.00 a month, or \$240.00 USD, which should be enough to support his wife and three young children. "The work is very tiring, and I know that the pressure is on the body all the time". This worker's health has been a major challenge over the years, with the physical wear and tear accumulated by the harsh working conditions. He began to feel the first symptoms of what is popularly known as "kangaroo" around the age of 33, after a season of intense work in extreme heat. "It's an immense weight on the body," accompanied by severe cramps in his legs and arms, nausea, and excessive sweating. This extreme tiredness is followed by shortness of breath, and in some cases, he even faints in the field. He has already suffered episodes of fainting while working, needing to be helped to the plant bus by his colleagues. Unlike other workers, he had the opportunity to be attended to once by the plant's medical team when the "kangaroo" affected him more intensely. He was given an intravenous drip, which gave him some relief, but the muscle and joint pain persisted for several days afterwards. Despite lectures on the importance of hydration and the plant's availability of water, the worker reports that the amount supplied is not enough to meet the

demand of so many workers, especially on days of extreme heat. "We ask for more water, but it's just that tank there, and it's for everyone," he says, showing his dissatisfaction with the limited resources available. In addition, the working conditions, with the intense heat and dust in the fields, have caused serious respiratory problems. He also suffers from constant back pain, which has arisen due to repeated physical exertion over the years. "I feel tired, and it doesn't go away, even on days when I'm not working. It feels like my body can no longer cope with the pace the activity demands." Although he has had some medical tests, this worker has not yet received regular medical follow-up from the plant, which is a major concern for him. Recently, he had to seek medical attention on his own when he began to feel difficulty breathing and intense pain in his lower back. After the hospitalization, he didn't receive any kind of follow-up or ongoing guidance, which made him even more apprehensive. "When the situation worsens and the 'kangaroo' becomes unbearable, I try to hydrate myself with saline, but I always feel that the water available at work is never enough to prevent the problem. The pain and tiredness build-up, and I know that when my body can't take it anymore, I can't stop because I have to keep working to support my family. It gets bad, but after a while, I can't cut cane anymore. I only go back because my family needs me". He continues his working day, aware that the physical condition of his body is deteriorating, but still hoping that one day he will have a more dignified job that better respects workers' health. Until then, he continues, not by choice but out of the need to provide for his family.

Case 5

A 40-year-old single male worker of brown descent lives in the municipality of Junqueiro, Alagoas. He has been employed in the sugarcane industry for 18 years, having started working in sugarcane cutting at the age of 9. For most of that time, he worked informally, without formal registration; however, in the last two years, he has managed to get registered at the mill where he currently works.

Throughout his career, he has faced the physical demands of working in the field, earning a monthly income that ranges from R\$1,000.00 to R\$1,200.00, which corres-

ponds to approximately \$220.00 to \$240.00 in US dollars, depending on productivity. His daily activities involve cutting sugar cane, a strenuous task that requires physical strength and endurance. Although he lives alone, he sends part of his salary to his family, who lives far away.

Since he was young, he has experienced the effects of hard work from cutting cane, particularly on his joints and muscles. “The problem with ‘kangaroo’ began when I was still a teenager, but over the last 10 years, the symptoms have worsened significantly. It gets heavier; it feels like my body can’t handle it. When the chest pains occur, you think you’re going to die.” This refers to the severe cramps often felt in the legs and back, coupled with extreme fatigue.

Despite living with these symptoms, he has never received adequate medical care from the plant. The only support he received was in collective situations, such as during the most serious “kangaroo” episodes, when serum is distributed to the workers. “The thing is to keep to yourself, don’t complain; otherwise, it’s over. The company doesn’t do anything, but when someone dies, there’s that despair,” he comments, emphasizing the company’s lack of interest in the workers’ well-being, which is only acknowledged during more extreme situations.

Faced with health challenges and unstable working conditions, the worker began to adopt personal strategies to manage the symptoms of “kangaroo”. “I’ve started to pay more attention to what I eat and my water intake, but I know there’s no escaping the burden of working in the fields. There’s a lot of pressure not to miss work because if I do, I’ll lose my basic food allowance, and I could face trouble with the inspectors and even my colleagues,” he said.

When the “kangaroo” attacks him more fiercely, he tries to hold back as much as he can until he finds a moment to rest. “The secret is to control yourself, not let it get to you, because otherwise you’re done. But there’s not much you can do,” he says, emphasizing the challenge of managing the condition without adequate support.

For this worker, the daily routine of cutting sugarcane is characterized by persistent fatigue and a body that can no longer keep up with the required pace. Nevertheless, he can’t afford to miss work, as he relies on his salary to support his family. He endures the pain and effects of the “kangaroo” without much hope for improved working

conditions or treatment from the plant. The absence of proper medical care and the ongoing pressure to produce is integral to his reality, and he continues, despite everything, to manage himself in order to survive another day at work.

Discussion

For medical science, “kangaroo” is the result of an electrolyte imbalance disorder related to dehydration caused by the intense physical activity involved in cutting sugarcane. Additionally, in some cases, it can be linked to rhabdomyolysis, which involves damage to muscle cells due to physical exertion. The loss of electrolytes and mineral salts caused by the high intensity of the work and the long hours under the scorching sun, if not treated quickly, can lead to sudden death.

In these cases, technical health actions are crucial for establishing a clinical diagnosis and the causal link to work, which has been overlooked. This is a significant step towards interpreting kangaroo disease as a condition that surpasses a mere pathophysiological state, such as probable rhabdomyolysis.

In the social context of the cases under study, this condition takes on a unique dimension, highlighting the process of overexploitation to which the workers are subjected, which dehumanizes them to the point of being identified with the kangaroo, an animal known for its physical strength and contorted postures. In other words, the expression “kangaroo disease” denotes a problem that transcends dehydration and rhabdomyolysis, as it concerns the process of dehumanization that occurs through the particularities of manual sugarcane cutting in Alagoas.

This identification allows us to examine disease beyond its biomedical definition as a socially determined process (Breilh, 2013). It can be assumed that social determination is based on exploitation, which involves long working hours, excessive physical effort, and low performance. These factors must compromise the full satisfaction of various biological and social needs that are essential to health.

Workloads and wear and tear

As the research results show, the workday is long, with workers dedicating over 10 hours each day to cutting cane. In some cases, workers labor six days a week, as illustrated in Case 1. Even those with shorter hours, like in Case 2, still endure an intense pace that leaves little room for adequate rest periods, which are extremely limited. For instance, in Case 1, the worker has only a 15-minute break in the morning and an hour for lunch. This contributes to physical exhaustion, especially under harsh conditions of heat and intense effort. Working in the blazing sun, with temperatures exceeding 30°C, increases the risks of dehydration and physical overload, as noted in Cases 1 and 4, where workers drink around 10 liters of water daily to stay hydrated yet do not receive sufficient support from their employer. The primary form of payment is based solely on productivity, meaning workers are compensated according to the amount of cane they cut. This results in an extremely low daily income, which is insufficient to meet their basic needs. Moreover, workers face significant financial insecurity because their payment varies with productivity, leading to unstable earnings. For example, workers in Case 2 receive pay that fluctuates depending on their cutting capacity. Workers also rely on benefits, such as the basic food basket, to ensure a minimum income, as emphasized in Case 1, where the worker feels compelled to continue working despite serious illness symptoms to retain these benefits.

The set of physiological loads to which these workers are exposed is striking, but other loads are added to the process, as described in Chart 1.

All of these loads can be described as a complex process of wear and tear, involving various potential accidents and illnesses, such as dermatoses, skin neoplasms, musculoskeletal disorders, intoxications, and mental disorders, among others.

In addition to this wear and tear, occupational illnesses such as the so-called “kangaroo disease,” which causes intense cramps, fainting, extreme tiredness, and other serious symptoms of dehydration and physical exhaustion, are a reality in the sugarcane industry.

Chart 1. Summary of the workloads identified in the case study

	Temperature variation
Physical loads	Extreme heat
	Non-ionizing radiation (solar)
Chemical loads	Pesticides
	Smoke from burning sugarcane
Biological loads	Microorganisms in general
	Venomous animals
Mechanical loads	Sharp instruments
	Lack of personal protective equipment
	Long working hours
	Intense pace of work
Physiological loads	Excessive physical effort
	Spinal rotations
	Repetitive movement (repetition of blows)
	Cutting on steep slopes
	Pressure for productivity - payment by production
	Strict control and supervision mechanism
	Mechanism of punishment and lower pay
	Lack of labor and social rights
Psychological loads	Lack of health care
	Fear of illness/death
	Insecurity about the income workers receive from their work
	Insecurity due to precarious employment relationships
	Insecurity due to migration
	Fear of losing the job

Source: Author’s elaboration.

In several cases, such as Case 1, the worker reports frequent episodes of cramps and loss of consciousness, while basic treatment (hydration) is provided only to a limited extent, without adequate medical follow-up. In the cases described, workers do not receive adequate medical care from their employers. In Cases 1, 2, and 3, for example, workers only receive emergency care (such as intravenous saline or hydration) and do not undergo regular medical follow-up. In many instances, assistance is minimal and often outsourced or provided by coworkers. This results in a lack of proper medical diagnoses, as in Case 1, where the worker lacked access to laboratory tests to confirm his condition.

For the purposes of this analysis, the process of dehumanization that underlies “Kangaroo disease” should be noted since it reveals the human condition’s subordination to the imperatives of overexploited work.

Theoretically, this condition is more precisely de-

signed in the Marxist category of “alienation.” It is marked by the fact that work, responsible for becoming human, contradictorily alienates the human condition, subsuming it to the interests of capital in the midst of its inequalities (Lukács, 2013; Souza, 2021).

Labor rooted in the exploitative relationship between sugarcane industrial capitalists (the owners) and sugarcane cutters results in a state where work leads to the physical, psychological, and moral degradation of the workers. This degradation is so severe that the workers themselves find it appropriate to compare their condition to that of animals. Thus, work, which is meant to foster human self-construction, simultaneously becomes the cause of human degradation and the loss of its inherent meaning.

Super-exploitative and ransom

The super-exploitative nature of sugarcane work, a term coined by Marini (2017), in the conditions described in the cases presented can be analyzed from the perspective of how the super-exploitation of labor reflects the structural dependence of Latin American countries, particularly in sectors like agriculture and the extractive industry, including the sugarcane sector. Super-exploitation refers to the extreme use of the workforce to maximize profits without a fair return for the workers.

When we examine the international sugar market, primarily driven by sugarcane plantations, a few players emerge as the top exporters and importers. On the supply side, Brazil, Thailand, India, and Australia collectively account for 64% of sugar exports from the 2022/2023 harvest. The leading buyers include Indonesia, China, the United States, Bangladesh, and the European Union, which made up 34% of purchases during the same period (United States Department of Agriculture [USDA], 2023). Brazil stands as a key player in this sugar market, reinforcing its role of dependence on the international division of labor through the export of agricultural products.

In addition to this leading role in cultivation, Brazil also stands out as the world’s largest sugar producer, having produced 22% of the world’s sugar in the 2022/2023 harvest, or around 38 million tons. Around 73% of this amount was destined for export, making the country the world’s largest sugar exporter (USDA, 2023).

Alagoas, where the case study takes place, is one of Brazil’s main sugarcane-growing states, as well as the largest sugar producer in the North-Northeast (Lima, 2021a). In the case of Alagoas, the trend to focus its production on the foreign market is also evident, as nearly 80% of the sugar produced during the 2022/2023 harvest was exported (Sindacúcar, 2023).

Thus, this sector is important for the Brazilian capitalist class. It is one of the strategic areas to compensate for Brazil’s losses, especially those caused by the import of other products from production chains reserved for the dominant countries. Not by chance, this sector has historically been one of the most conducive to the development of the mechanisms of super-exploitation.

The reality surrounding the high productivity levels of Brazilian sugarcane has allowed the country to remain among the global leaders in low production costs for decades. In 2007, Brazil ranked among the countries with the lowest production costs in the world, and even with a slight decrease, it continues to hold a prominent position in global rankings (Embrapa, 2023). However, this competitiveness relies on a system of overexploitation that reflects the historical dependence of Latin American countries and their economies on commodity exports. For Brazil, sugarcane illustrates this dynamic clearly, as workers endure significant exploitation to maintain competitiveness in the global market, which paradoxically jeopardizes their health. A vivid example of this situation can be found in Case 2, where workers earn between R\$60.00 and R\$90.00 a day, translating to approximately \$12 to \$18 US dollars daily. By the end of the month, their total income ranges from R\$720.00 to R\$1,200.00, which falls below the minimum wage. This pay structure, solely linked to productivity, fails to reflect the intense physical effort required, nor does it take into account the harsh working conditions, such as extreme heat and insufficient hydration. With work hours exceeding 10 to 11 hours a day, six days a week, the constant pressure for productivity represents a clear form of workforce expropriation, where the physical and psychological burdens on workers are systematically overlooked.

The possibility of workers consuming the minimum necessary to maintain their workforce in a normal state, often due to low pay, is a reality in the sugarcane labor

market. It is worth remembering that the works by [Lima and Carvalho \(2023\)](#) and [Lima \(2021b\)](#) point out that payments for manual workers generally fall below 1.5 minimum wages (a figure corresponding to approximately 376.87 US dollars), considering that sugarcane cutters represent the layer of the workforce in this sector with the lowest incomes.

When cutting sugarcane, the working day often exceeds the 8 hours a day stipulated by the CLT, reaching an average of 11 hours in Alagoas ([Verçoza, 2016](#)). Despite the payment of overtime, the pay does not compensate for the intense physical wear and tear, compromising the real value of the workforce. The worker’s preparation for cutting also extends beyond the cane field, as pointed out by [Santos \(2013\)](#), who describes the time spent from dawn, including organizing the float and preparing the equipment. This shows how production time consumes what is necessary for the worker’s reproduction. In addition, commuting to distant sites, often precarious and without adequate compensation, aggravates physical and psychological exhaustion, making wages insufficient to cover the impact of long working hours ([Marini, 2017](#); [Osório, 2013](#)).

Super-exploitation also manifests in the absence of labor rights and limited access to medical care. Even when workers are formalized, as in Case 4, working conditions remain extremely precarious. The formalization of the employment relationship does not significantly improve conditions in practice since the benefits provided by the mills are minimal and medical assistance is restricted to emergency situations. In many instances, workers only receive aid in emergencies, such as fainting or severe cramps, and have no access to regular medical care. The absence of a social protection network for these workers highlights Latin America’s structural dependency, where a large portion of the workforce remains on the fringes of social rights, lacking adequate access to health, education, and basic dignity at work.

Another notable aspect of overexploitation in the sugarcane sector is the physical and psychological exhaustion of the workers. Kangaroo sickness, mentioned in all the reports, exemplifies this wear and tear. Workers experience severe cramps, fainting, extreme fatigue, and other conditions linked to increased work intensity, excessive heat, and dehydration. The fact that many workers, like the one in Case 1, continue to work

despite severe cramps or, like the one in Case 5, who seek alternative methods to manage symptoms on their own illustrates that the pressure to produce outweighs the need for healthcare. The intensity of the work and the harsh environmental conditions compromise the health of the workers, forcing them to continue working to secure their livelihoods, but at a significant cost to their physical and psychological well-being.

Without a doubt, overexploitation in the sugarcane sector is directly linked to the extreme social inequality typical of dependent economies. Workers like the one in Case 2, who earn less than R\$1,000 a month (approximately \$240 US dollars), live in extreme poverty, lacking access to essential services and a support network to ensure a dignified life. This type of inequality reflects a dependent productive structure, where Brazil and other Latin American countries serve as exploiters of natural resources and providers of cheap labor while local economies struggle to create quality jobs or implement a social welfare system that protects the working class. In this context, overexploitation serves as a strategy to reduce production costs and maintain high profits, but it does so at the expense of workers’ health, well-being, and dignity.

In summary, this research has identified three mechanisms manifesting the overexploitation of the workforce: an increase in working hours, an increase in the intensity of work without adequate remuneration, and a reduction in the value of the workforce ([Marini, 2017](#)).

Health and work

Other studies confirm that sugarcane cutters fall ill and die due to overexploitation. [Verçoza \(2018\)](#), in interviews with sugarcane cutters, along with ergometric tests, heart rate monitoring during work, the application of the Nordic Questionnaire of Musculoskeletal Symptoms, and physical evaluations, points to a direct relationship between working in sugarcane fields and the early depletion of workers’ physical and spiritual energies, particularly highlighting “kangaroo disease.” Similarly, [Santos \(2013\)](#), [Silva \(2013\)](#), and [Costa \(2017\)](#) note that, in addition to various illnesses, mortality remains a concerning and historical reality in Brazilian

sugarcane fields. Both authors report dozens of deaths in São Paulo's sugarcane fields involving migrants from the Northeast during a short period at the end of the first decade of the 2000s. These deaths were linked to *Birôla* disease, the local name for “kangaroo disease” in the sugarcane fields of São Paulo. Additionally, [Barbosa \(2010\)](#) demonstrated the connection between rhabdomyolysis and excessive work among sugarcane cutters in the state of São Paulo, Brazil, through pulmonary and cardiological assessments and blood indicators.

This sector has a history of health issues among workers. Despite the introduction of machinery, health problems continue to change or accumulate. [Lima and Rumin \(2023\)](#) indicate that mechanized production in this Brazilian sector reduces accidents but does not resolve the issue of mortality. The authors present data on accident incidence in sugarcane cutting from 2012 to 2020, revealing a decrease from 23.49 to 12.03 in manual cutting and from 12.7 to 7.59 in mechanized cutting. Simultaneously, the lethality rate (per thousand) increased from 2.88 to 5.98 in manual cutting while remaining stable in mechanized cutting, at 7.71 in 2012 and 7.56 in 2020.

Consequently, the literature suggests that the issue is not solely the type of technology utilized but also the organization of work (i.e., exploitation). This aligns with the thesis of social determination regarding the overexploitation and health of sugarcane workers, where alienation reflects their dehumanization. A pertinent example is “kangaroo disease,” in which workers are treated like animals as their health declines.

CONCLUSIONS

This study reveals the complex reality faced by sugarcane-cutting workers in Alagoas, highlighting how the so-called “kangaroo disease” encompasses more than just physiopathological conditions; it reflects a profound phenomenon of dehumanization and overexploitation. The exploitative nature is connected to Latin America's historical dependence on imperialist countries or wealthier economic centers. The Brazilian economy, like those of other Latin American countries, is structured around the export of commodities, such as sugarcane, which requires intensive use of labor and minimizes production costs. This export-oriented production

model fails to foster internal development or guarantee a dignified life for the working population. Instead, it keeps Latin American economies subordinate in the global market while workers continue to face exploitation to ensure the competitiveness of products within global production chains. Therefore, the overexploitation of the workforce arises as a strategy within the framework of world capitalism, allowing peripheral economies to maintain some level of competitiveness. Viewed as a political manifestation of dependency, overexploitation stems from the denial of essential conditions needed to replace the workforce. This manifests through the imposition of longer workdays than workers should typically endure, resulting in premature exhaustion, as evidenced in the cases analyzed.

In this sense, retrieving the analysis of the various physical, chemical, biological, mechanical, physiological and psychological burdens faced by these workers reveals a situation of extreme adversity and exhaustion, where suffering goes beyond unhealthy working conditions and reveals systematic exploitation.

It may be said that the “kangaroo disease” emerges as a significant metaphor for the suffering imposed by the current work model. It illustrates how the workforce is reduced to a mere instrument of production. This phenomenon is a direct reflection of the overexploitation described by dependency theory and the Marxist analysis of alienation, where the workforce is sacrificed in the name of capital's interests.

Therefore, the “kangaroo disease,” more than just a medical condition, reflects the structural inequalities and overexploitation in the sugar-alcohol sector, highlighting the physical and psychological suffering of the workers. This illness can be understood through the lens of critical theory, which emphasizes how power relations and dehumanization in dependent capitalism directly affect the health of the working class. Rather than being an isolated biological issue, “kangaroo disease” is a symptom of the extreme working conditions imposed by an economic model that exploits the workforce to maintain competitiveness in global production chains. Understanding the disease within this broader social and economic context allows us to recognize that workers' suffering extends beyond physiological conditions and is, in fact, a manifestation of the degradation of the workforce in a system that prioritizes economic interests



over human well-being. In this sense, “kangaroo disease” should be viewed not only as a direct consequence of the physical demands of work but also as a reflection of the profound social and economic inequalities that characterize dependent capitalism, where workers are at the mercy of a production model that does not guarantee fair living conditions.

REFERENCES

- Alves, F. (2006). Por que morrem os cortadores de cana? *Saúde e Sociedade*, 15 (3), 90-98. <https://doi.org/10.1590/S0104-12902006000300010>
- Barbosa, C. M. G. (2010). *Avaliação cardiovascular e respiratória em um grupo de trabalhadores cortadores de cana-de-açúcar queimada no estado de São Paulo*. (Doctoral Thesis). Faculdade de Medicina da Universidade de São Paulo.
- Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Psychology*, 16 (2), 297-319. <https://www.tandfonline.com/doi/full/10.1080/2159676X.2019.1628806>
- Breilh, J. (1977). *Crítica a la interpretación capitalista de la epidemiología. Un ensayo de desmitificación del proceso salud-enfermedad* (Master's Thesis). Universidad Autónoma Metropolitana. Unidad Xochimilco. <https://repositorio.xoc.uam.mx/jspui/handle/123456789/2481>
- Breilh, J. (2013). La determinación social de la salud como herramienta de transformación hacia una nueva salud pública (salud colectiva). *Revista Facultad Nacional de Salud Pública*, 31 (supl. 1), 13-27. http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0120-386X2013000400002
- Costa, C. da. (2017). Morte por exaustão no trabalho. *Caderno Crh*, 30 (79), 105-120. <https://doi.org/10.1590/S0103-49792017000100007>
- Cruz, S. A. F. S. (2020). Por que o trabalho na cana tem moído gente e espalhado bagaços? *Revista Katálysis*, 23 (3), 674-686. <https://doi.org/10.1590/1982-02592020v23n3p674>
- Cruz, S. A. F. S. (2017). Superexploração da força de trabalho no setor sucroalcooleiro: Alagoas e a realidade do trabalho no corte da cana. In N. Alcântara & S. M. Freira, *Desigualdades, políticas públicas e trabalho em Alagoas* (pp. 123-145). Edufal.
- Embrapa. (2023). Trajetória/desempenho recente do agro nacional: Cana de açúcar. *Embrapa*. <https://www.embrapa.br/visao-de-futuro/trajetoria-do-agro/desempenho-recente-do-agro/cana-de-acucar>
- Laurell, A. C. (1982). La salud-enfermedad como proceso social. *Cuadernos médicos sociales*, (19), 1-11. <https://red.amr.org.ar/wp-content/uploads/sites/3/2015/10/n19a061.pdf>
- Laurell, A. C., & Noriega, M. (1989). *Proceso de producción e saúde: trabalho e desgaste operário*. Hucitec.
- Lima, J. R. T. (2021a). A realidade produtiva do setor sucroalcooleiro alagoano no período de 2008 a 2018. *Revista Contexto Geográfico*, 6 (11), 01-18. <https://www.seer.ufal.br/index.php/contextogeografico/article/view/11416>
- Lima, J. R. T. (2021b). Mais mecanizada, mais escolarizada e mais bem remunerada: a nova realidade dos canaviais brasileiros com a incorporação de tecnologias mecânicas. *Debates em Educação*, 13 (31), 1154-1180. <https://doi.org/10.1590/1982-5017v13n31a7>
- Lima, J. R. T., & Carvalho, C. P. D. (2023). Mecanização da produção canavieira e suas alterações para o mercado de trabalho no período de 2008 a 2018. *Pegada - a revista da geografia do trabalho*, 24 (1), 195-228. <https://doi.org/10.33026/peg.v24i1.9205>
- Lima, J. R. T., & Rumin, C. R. (2023). Menos acidentes, mais mortes. A mecanização agrícola nos canaviais brasileiros e seus reflexos sobre os trabalhadores, no período de 2012 a 2020. *Saúde e Sociedade*, 32 (4), e220603pt. <https://doi.org/10.1590/S0104-12902023220403>
- Luce, M. S. (2012). A superexploração da força de trabalho no Brasil. *Revista da Sociedade Brasileira de Economia Política*, 32, 119-141. <https://doi.org/10.1590/0101-6628.384>
- Lukács, G. (2013). *Para uma ontologia do ser social II*. Boitempo.
- Marini, R. M. (2017). Dialética da dependência. *Germinal: Marxismo Educ Deb*, 9 (3), 325-356. <https://doi.org/10.9771/gmed.v9i3.24648>
- Marini, R. M. (2000). *Dialética da dependência*. Vozes.
- Marx, K. (2013). *O capital: Crítica da economia política* (Livro I). Boitempo.
- Osório, J. (2013). Fundamentos da superexploração. In N. Almeida Filho, *Desenvolvimento e dependência: Cátedra Ruy Mauro Marini* (p. 233). Ipea.
- Queiroz, A. S. (2013). *Entre a formalização e a precariedade: o trabalho e o emprego dos cortadores de cana de Alagoas* (Master's Thesis). Universidade Federal do Rio Grande do Sul, Porto Alegre.

- Reis, T. (2018). *Ceifando a cana... Tecendo a vida: Um estudo sobre o pós/trabalho nos canaviais*. (Doctoral Thesis). Universidade Federal de São Carlos.
- Silva, M. A. M. (2007). Trabalho e trabalhadores na região do “mar de cana e do rio de álcool”. In J. R. Novaes & F. Alves, *Migrantes. Trabalho e trabalhadores no Complexo Agroindustrial Canavieiro: Os heróis do agronegócio brasileiro* (pp. 55-86). EdUFSCAR.
- Silva, M.A. M., Martins, R., Godoi, S., de Melo, B., Vettoracci, A., Bueno, J., and Ribeiro J. (2012). Del Karoshi en Japón al Birôla en Brasil: Los rostros del trabajo en el capitalismo globalizado. *Revista: NERA*, (8), 74-108. <https://doi.org/10.47946/rnera.v0i8.1447>
- Silva, M. A. M. (2013). Sabe o que é ficar borrado no eito da cana? *Estudos Sociedade e Agricultura*, 21 (2), 359-391. <https://revistaesa.com/ojs/index.php/esa/article/view/373>
- Santos, A. P. (2013). *O moinho satânico do agronegócio canavieiro no Brasil: Dependência e Superexploração do trabalho na região de Ribeirão Preto-SP*. (Doctoral Thesis). Universidade Estadual de Campinas, IFCH.
- SmartLab. (2023). *Segurança e saúde no trabalho*. <https://smartlabbr.org/>. Retrieved: August 17, 2023.
- Sindicúcar – Sindicato da Indústria do Açúcar e do Alcool de Alagoas. (2023). *Boletim Quinzenal de Cana: Safra 2022/2023*. Maceió.
- Souza, D. de O. (2021). Cuidado em saúde e alienação: relação mediada pela tecnologia. *Interface - Comunicação, Saúde, Educação*, 25, e200776. <https://doi.org/10.1590/1807-57622020.0206>
- United States Department of Agriculture [USDA], (2023). *Sugar: world markets and trade*. USDA. <https://downloads.usda.library.cornell.edu/usda-esmis/files/z029p472x/4x51k466h/r207w7721/sugar.pdf>. Retrieved: February 7, 2024.
- Verçoza, L. V. de. (2016). *Os saltos do “canguru” nos canaviais alagoanos: Um estudo sobre trabalho e saúde* (Tesis de doctorado). Universidade Federal de São Carlos.
- Verçoza, L. V. (2018). *Os homens-cangurus dos canaviais alagoanos: um estudo sobre trabalho e saúde*. Edufal.

AUTHOR'S NOTES

^a Ph.D. em Trabajo Social por la *Universidad do Estado do Rio de Janeiro*. Professor and researcher at the *Universidade Federal de Alagoas*, Brasil. Research line: work, health and society. Email: sabrina.cruz@arapiraca.ufal.br.
ORCID: <https://orcid.org/0000-0003-4886-2702>.

Latest publications

Cruz, S. Â. F. da S. (2020). Por que o trabalho na cana tem moído gente e espalhado bagaços? *Revista Katalysis*, 23, 674-686. <https://doi.org/10.1590/1982-02592020v23n3p674>

Cruz, S. Â. F. da S., Souza, D. O., Santos, M. L. C., Santos, E. P. de A., & Magalhães, A. P. N. de. (2023). O trabalho de Enfermagem a partir da experiência de enfermeiras da linha de frente contra Covid-19: na trilha da precarização. *Interface - Comunicação, Saúde, Educação*, 27, e230021. DOI: 10.1590/interface.230021.

Silva Cruz, S. Â. F. da, Magalhães, A. P. N. de, Souza, D. de O., Macêdo, F. P. de, Pereira-Abagaro, C., & Rosales-Flores, R. A. (2023). Condições de trabalho em enfermagem no enfrentamento da Covid-19 sob o prisma da precarização. *Revista Brasileira de Enfermagem*, 76, 1-9. <https://doi.org/10.1590/0034-7167-2022-0679pt>

^b Ph.D. em Trabajo Social por la *Universidad do Estado do Rio de Janeiro*. Professor and researcher at the *Universidade Federal de Alagoas*, Brasil. Research line: work, health and society. Email: diego.souza@arapiraca.ufal.br.
ORCID: <https://orcid.org/0000-0002-1103-5474>.

Latest publications

Souza, D. O. (2020). A pandemia de COVID-19 para além das Ciências da Saúde: reflexões sobre sua determinação social. *Ciência & Saúde Coletiva*, 25, 2469-2477. DOI: 10.1590/1413-81232020256.1.11532020.

Souza, D. O. (2021). As dimensões da precarização do trabalho em face da pandemia de Covid-19. *Trabalho, Educação e Saúde*, 19, e00311143. DOI: 10.1590/1981-7746-sol00311.

Souza, D. O., Santos, M. L. C., Santos, E. P. de A., Magalhães, A. P. N. de., & Cruz, S. Â. F. da S. (2023). O trabalho de Enfermagem a partir da experiência de enfermeiras da linha de frente contra Covid-19: na trilha da precarização. *Interface - Comunicação, Saúde, Educação*, 27, e230021. DOI: 10.1590/interface.230021.

^c Ph.D. em Sociología por la Universidad Federal de São Carlos (UFSCar). Professor and researcher at the *Universidade Federal de Alagoas*, Brasil. Research line: sociology of work, rural and organizational issues.
Email: jrtlma@gmail.com.
ORCID: <https://orcid.org/0000-0003-2453-6515>.

Latest publications

Lima, J. R. T., Coelho, R. P. de S., & Araújo, A. H. dos S. (2023). O campo dos estudos sobre o trabalho nos canais brasileiros: um olhar sobre as primeiras décadas do século XXI. *Revista Campo-Território*, 18 (52), 72-96. <https://doi.org/10.14393/RCT185270803>.

Lima, J.R.T., & Rumin, C.R. (2024). Menos acidentes, mais mortes. Mecanização agrícola nas plantações de cana-de-açúcar brasileiras e seus efeitos sobre os trabalhadores de 2012 a 2020. *Saúde e Sociedade*, 32 (4). <https://doi.org/10.1590/S0104-12902023230603pt>

Lima, J. R. T., Gonçalves, B. S., & Coelho, R. P. de S. (2023). Mercado de trabalho, incorporação das tecnologias mecânicas e o reforço das assimetrias regionais na produção canavieira brasileira: uma análise sobre o período de 2008 a 2018. *Raízes: Revista De Ciências Sociais e Econômicas*, 43 (1), 40-59. <https://raizes.revistas.ufcg.edu.br/index.php/raizes/article/view/818>

^d Ph.D. em Saúde pública por la Escuela Nacional de Salud Pública Sergio Arouca (ENSP)/Fiocruz. Professor and researcher at the *Universidade Federal de Alagoas*, Brasil. Research line: health and society. Email: jarbas.oliveira@arapiraca.ufal.br.
ORCID: <https://orcid.org/0000-0001-8519-2432>.

Latest publications

- Oliveira, J., Cavalcanti, F., & Ericson, S. (2024). Medicalização da subjetividade e fetichismo psicofármaco: Uma análise dos fundamentos. *Saúde e Sociedade*, 33, 1-13. <https://doi.org/10.1590/S0104-12902024220833en>
- Araujo, L. G. S., Nobre, I. E. S., Almeida, A. K. A., Sampaio, M. E. B., Dantas, J. E. F., & Oliveira, J. R. (2023). Contribuições da educação em saúde para saúde da mulher quilombola. *Revista Extensão em Debate*, 12, 1-7. <https://seer.ufal.br/index.php/extensaoemdebate/article/view/15349>
- Souza, D. de O., Santos, E. M. N., Batista, E. de L., Messias, M. G. da S., Santana, N. T., Rodrigues, W. T. B., Silva, T. de O. E., Silva, D. P. da, Correia, E. A. do N., & Oliveira, J. R. de. (2022). A feira como espaço de intersecção entre questão ambiental e promoção da saúde. *Research, Society and Development*, 11 (13). <https://rsd-journal.org/index.php/rsd/article/view/35658>