

A socio-historical reading of the French Nuclear Tests in the Algerian Sahara

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Abstract---This paper examines the French nuclear tests conducted in the Algerian Sahara from a historical and sociological perspective, with a particular focus on their political, economic, social, psychological, environmental, and cultural dimensions. The study analyzes manifestations of French imperial-capitalist domination and its repercussions on local populations, including radioactive pollution, social and psychological transformations, and the restructuring of local economic systems. The paper also highlights the efforts of the Algerian state after independence in developing scientific research, strengthening environmental monitoring, and promoting community participation in order to address the consequences of this nuclear legacy. In addition, it discusses the role of media and culture in documenting these tests and raising public awareness, alongside international comparisons that situate these experiments within a broader global context. The study concludes by drawing a set of strategic lessons related to the protection of human rights, the strengthening of national sovereignty, and the promotion of sustainable development pathways, while seeking to transform the nuclear legacy from a source of threat into a field of learning and future benefit.

Keywords---nuclear tests, French colonialism, Algerian Sahara, social and environmental impact, national sovereignty, sustainable development.

Introduction

The nuclear tests conducted by France in the Algerian Sahara during the 1950s and 1960s represent one of the clearest manifestations of the intersection between military strategy and imperial-capitalist domination. These tests were not merely part of the global nuclear arms race, but also an instrument for achieving colonial political and economic interests aimed at consolidating French influence over natural resources and geopolitical balances in the region (Hodgkin, 2005; Sidi-Yakhlef, 2010). Historical analysis of these tests reveals the dual dimensions of colonialism: a military-technical dimension aimed at

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strengthening French nuclear power, and an imperial-economic dimension seeking control over land and resources while establishing economic structures serving the colonial center at the expense of local populations (Ben Cherifa, 2018; Shepherd, 2012).

From a sociological perspective, these tests constituted a profound societal shock, causing environmental and health damages that accumulated across generations. They contributed to reshaping the collective memory of the region, influencing the social and cultural identities of local communities, and generating public awareness of colonial and capitalist injustice (Bensa, 2009; Amrane-Minne, 2007). Hirsch (2015) argues that this interaction between individual and collective memory reflects how local populations perceive imperial power and its long-term effects, highlighting the role of sociological narrative in providing an integrated picture linking historical events to their social consequences.

Furthermore, a comparative reading of these tests with other colonial nuclear experiments, whether in the Algerian Sahara or the Pacific region, allows for a deeper understanding of the relationship between military power, capitalist colonialism, and mechanisms of domination. It also reveals the connection between economic exploitation and the control of environmental and social spaces (Fussell, 2011; Priest, 2013). The imperial-capitalist dimension of these tests demonstrates that nuclear technology was not merely a scientific or military project, but a tool for sustaining colonial domination, which necessitates integrating historical analysis with sociological perspectives to understand how social meanings of nuclear activity were constructed and how these tests shaped local social structures and forms of resistance (Checker, 2005; Lohmann, 2007).

From this standpoint, the study of nuclear testing in the Algerian Sahara constitutes a model for examining the colonial nuclear legacy, combining military aggression, economic control, and capitalist exploitation. It also underscores the importance of documenting these experiences through a multidimensional approach that integrates history, sociology, and political economy, particularly in relation to environmental and economic dimensions (Mekki-Berrada, 2014; Saïd, 2019).

1. Historical and Imperial Context of Nuclear Tests in the Algerian Sahara

The Algerian Sahara, during the period extending from the mid-1950s to the early 1960s, constituted a strategic space for the implementation of French nuclear tests within an international context marked by intense competition among major powers over the development and possession of nuclear weapons after the Second World War (Hodgkin, 2005). The selection of this desert region was based on precise military and scientific considerations, including its vast territory, low population density, and the difficulty of international monitoring. These factors made southern Algeria, particularly the Reggane region, an ideal site for conducting nuclear explosions in a relatively isolated environment.

However, these tests were not merely technical operations related to nuclear weapons development; they formed part of a broader French strategic framework aimed at strengthening France's position among emerging nuclear powers and consolidating its geopolitical presence within the post-colonial international system.

From a deeper perspective, these tests are closely linked to the imperial structure of French capitalism, where scientific and technological superiority was employed as an instrument of political and economic domination, enabling the reproduction of unequal power relations between the colonial center and the colonized periphery (Sidi-Yakhlef, 2010). The Algerian Sahara was effectively transformed into an "open nuclear laboratory," where French military capabilities were tested outside international scrutiny, while the voices of local populations were excluded and their rights to environment, health, and human security were marginalized.

This intensive use of colonial geographical space reflects the relationship between science and power, where nuclear knowledge was not separated from domination but was embedded within a political project that sought to transform technology into a tool of global control (Hecht, 2009).

These tests produced multidimensional impacts on the populations of the Algerian Sahara, extending from environmental to social, psychological, and cultural domains. Environmentally, nuclear explosions and radioactive leakage caused widespread contamination affecting soil, air, and groundwater, thereby disrupting the fragile ecological balance of the desert region and producing long-term health consequences for humans and living organisms.

Socially, these tests contributed to reshaping local patterns of life by generating persistent health anxiety, instability, and a growing collective sense of environmental threat. They also contributed to the construction of a collective memory associated with colonial violence, as nuclear testing became a symbol of domination and oppression and a central element in local narratives of memory and resistance (Bensa, 2009; Amrane-Minne, 2007).

From a sociological perspective, this nuclear legacy can be understood as part of a comprehensive system of exploitation that extended beyond natural resources to include humans, space, and memory. It reproduced unequal relations between colonial power and local populations, where environmental and human dimensions were subordinated to military and strategic objectives. It also contributed to strengthening a growing collective awareness of colonial domination, as local populations increasingly recognized that these tests were not isolated events but part of a structured colonial project aimed at controlling territory, resources, and people simultaneously (Shepherd, 2012).

At the geopolitical and economic levels, the analysis of these tests reveals a strong connection between the French nuclear program and its imperial structure. The objective was not limited to developing nuclear weapons but also included strengthening France's position in the international system, securing strategic autonomy vis-à-vis major powers, and employing scientific and technical knowledge in the service of economic and military interests (Fussell, 2011; Priest, 2013).

These programs contributed to reshaping global power balances by integrating France into the group of nuclear powers, thereby granting it increased influence in international relations during the Cold War. In this context, the nuclear legacy in the Algerian Sahara becomes more than a historical event or environmental consequence; it emerges as a complex system combining science, power, colonialism, and memory. It represents a clear model of the interconnection between military, economic, and social dimensions within the imperial project, requiring a multidisciplinary analytical approach that integrates history, sociology, and political science to understand its deep implications and long-term effects on society and collective memory, as it remains relevant in contemporary debates on environmental justice, national sovereignty, and human rights (Checker, 2005; Lohmann, 2007).

2. Social and Health Impacts of Nuclear Tests and Their Link to Imperial-Capitalist Structures

The French nuclear tests in the Algerian Sahara were not limited to their military and technological dimensions; they also produced profound and multidimensional impacts on local populations, affecting health, social, cultural, and environmental conditions. Historical and sociological studies show that nuclear explosions led to widespread contamination of air, soil, and water, contributing to serious health consequences, including increased rates of chronic diseases—particularly cancer—as well as congenital malformations in subsequent generations, alongside long-term psychological and social effects within these communities (Bensa, 2009; Amrane-Minne, 2007).

This situation was not merely accidental but was closely tied to an imperial-capitalist political structure that located these tests in remote desert areas outside international oversight, effectively turning local populations into indirect subjects of experimentation in service of the French military project. This

reflects a clear intersection between economic exploitation and mechanisms of military control (Shepherd, 2012; Checker, 2005).

From a sociological perspective, this nuclear legacy contributed to reshaping the symbolic structure and collective identity of local populations, where the experience of nuclear testing in the Algerian Sahara became a defining marker in collective memory, symbolizing colonial domination and structural violence. This generated new social dynamics characterized by forms of symbolic and community resistance through the documentation of testimonies and the production of alternative narratives that challenge the official discourse, which sought to minimize risks or confine the tests to a purely technical and military dimension (Hirsch, 2015; Saïd, 2019).

The capitalist dimension of these tests is also evident in the use of geographical location and natural resources to serve the French nuclear project, reflecting the integration of military objectives within a broader economic logic aimed at strengthening France's position in global markets for energy and technology, thereby reproducing postcolonial forms of domination (Fussell, 2011; Lohmann, 2007).

Furthermore, these tests had long-term effects on social structures, as environmental and health risks—both real and perceived—led to profound changes in local lifestyles, including forced migration, population redistribution, and impacts on education and employment opportunities, as well as disruptions in the region's economic and social structures (Priest, 2013; Mekki-Berrada, 2014).

From this perspective, the analysis reveals that the nuclear tests in the Algerian Sahara were not an isolated military event, but part of an integrated imperial system that used technology as a tool of domination and exploited the social and economic vulnerability of local populations (Tazi, 2016; Klein, 2013).

Accordingly, integrating historical and sociological approaches provides a more comprehensive understanding of these tests as a multidimensional phenomenon combining military power, economic domination, and social control, and highlights that the legacy of French nuclear testing in the Algerian Sahara remains a significant factor in shaping collective memory and contemporary social structures.

3. The Imperial-Capitalist Economic and Political Dimension of French Nuclear Tests in the Algerian Sahara

Historical and political analyses indicate that the French nuclear tests in the Algerian Sahara were not merely military projects of a scientific and technical nature. Rather, they formed part of a comprehensive imperial-capitalist strategy aimed at strengthening French influence in North Africa, consolidating its position within global power structures, and controlling nuclear technology while using the Saharan space as an experimental field outside international oversight (Ben Cherifa, 2018; Fussell, 2011).

France employed these tests as a multifunctional instrument to reinforce its geopolitical presence through control of military and technical infrastructure and the transformation of the Algerian Sahara into a nuclear testing laboratory beyond international scrutiny. This reflects a colonial logic that converts science and technology into instruments of domination rather than tools for collective progress (Sidi-Yakhlef, 2010; Priest, 2013). In this sense, the nuclear project was not separate from the imperial structure of French capitalism but rather an extension of it in a more complex form based on scientific knowledge as a mechanism of control and reproduction of power.

Economically, the French nuclear tests in the Algerian Sahara were closely linked to the logic of capitalist expansion. France sought to strengthen its nuclear capabilities to secure a position within the global markets of energy and military industries and to control the production pathways of nuclear knowledge and technology (Lohmann, 2007; Checker, 2005). The exploitation of natural and human resources in former colonies further supported this project, within an unequal center-periphery

relationship that transformed colonial space into an indirect source of capital accumulation and economic dominance.

Politically, these tests served as a means of reproducing French sovereignty and reinforcing its symbolic status as an emerging nuclear power. They demonstrated scientific and technological superiority in the nuclear domain and conveyed a political message regarding France's ability to control colonial spaces and regional and international power balances (Hodgkin, 2005; Hirsch, 2015). This contributed to strengthening France's position within the international system and consolidating its ability to use nuclear capability as an instrument of diplomatic and political influence in line with its long-term strategic interests (Amrane-Minne, 2007; Saïd, 2019).

The imperial-capitalist analysis reveals that the French nuclear tests in the Algerian Sahara were not an isolated local event but part of a global system linking military domination, control over natural resources, and the reproduction of economic power in a postcolonial context, where traditional colonial structures intersect with transformations in global capitalism (Fussell, 2011; Mekki-Berrada, 2014). From this perspective, understanding this experience requires a multidimensional approach integrating history, political economy, and sociology to analyze its enduring effects on local society and collective memory.

Accordingly, the imperial-capitalist dimension of the French nuclear tests in the Algerian Sahara makes them a complex model for the use of scientific and technological power in the service of domination projects, transforming them from a technical military activity into a tool for restructuring economic, political, and social relations at both local and global levels.

4. Collective Memory and Cultural Resistance of Local Communities in the Algerian Sahara

Collective memory is one of the most significant intangible outcomes of the French nuclear tests in the Algerian Sahara, as the impact of these tests transcended the historical event itself to become a structural element in shaping social identity and reconstructing collective consciousness among local populations. These tests became embedded in social imaginaries through narratives of pain, suffering, environmental trauma, and historical rupture, forming an enduring memory transmitted across generations through oral and cultural practices (Hirsch, 2015).

This legacy contributed to the production of a deep collective sense of historical injustice and structural oppression, prompting local communities to develop various forms of cultural and symbolic resistance. These included civil protests, the documentation of oral testimonies, and the production of written and oral local narratives, as well as the use of popular arts and traditional storytelling to preserve memory and counter attempts to minimize or erase the consequences of the French nuclear tests in the Algerian Sahara (Saïd, 2019; Bensa, 2009).

From a sociological perspective, this memory contributed to reshaping collective identity by linking the nuclear experience to the broader colonial structure, transforming these tests from mere technical or military events into a condensed symbol of modern colonial domination and structural violence associated with the use of science and technology as tools of control (Ben Cherifa, 2018; Amrane-Minne, 2007). This transformation turned memory into a tool for critical historical re-reading, exposing power relations and restoring visibility to victims.

This awareness also extended into the legal and environmental spheres, contributing to the emergence of civil and academic initiatives aimed at documenting radiation effects, collecting health and environmental data, and incorporating the issue of French nuclear tests in the Algerian Sahara into international debates on environmental justice and human rights (Checker, 2005; Tazi, 2016). Thus, memory shifted from a mere recollection of the past to an active instrument in the public sphere, capable of influencing political and rights-based discourse.

5. The Long-Term Environmental Impact and Developmental Challenges of the French Nuclear Tests in the Algerian Sahara

The environmental dimensions of the **French nuclear tests in the Algerian Sahara** represent one of the most complex and persistent impacts, given the non-degradable nature of radioactive contamination and its long-term intergenerational consequences. Environmental studies have confirmed that these tests caused widespread contamination of soil, air, and groundwater, leading to severe disruptions in the fragile ecological balance of the desert ecosystem (Priest, 2013; Lohmann, 2007).

This contamination was not limited to the immediate effects of nuclear explosions but evolved into a structural factor reshaping the relationship between humans and the natural environment. It contributed to soil fertility degradation, vegetation loss, decline in livestock resources, and cumulative health effects resulting from direct and indirect exposure through water and the food chain (Checker, 2005; Mekki-Berrada, 2014). These transformations significantly altered traditional livelihoods, particularly pastoralism and mobility, thereby reshaping the local social and economic structure.

From a developmental perspective, this environmental legacy constitutes a structural obstacle to sustainable development in the region, as it poses complex challenges related to land rehabilitation, monitoring contamination levels, and ensuring public health safety, all within the constraints of limited technical and financial resources required to address decades-long impacts (Shepherd, 2012). This situation also raises critical questions of environmental justice and historical responsibility of the French colonial state, emphasizing the need to acknowledge and address the consequences of the **French nuclear tests in the Algerian Sahara** within an ethical and legal international framework (Tazi, 2016; Saïd, 2019).

The imperial-capitalist analysis reveals that transforming the Algerian Sahara into a testing ground was not a neutral technical choice, but rather a political decision reflecting a colonial logic based on exploiting natural space for military and economic purposes, without regard for long-term environmental costs (Fussell, 2011; Ben Cherifa, 2018). Thus, these tests generated a long-lasting environmental legacy that continues to shape development trajectories and the human–environment relationship.

6. International Policies and the French Role in Consolidating Imperial Capitalist Hegemony

The **French nuclear tests in the Algerian Sahara** must be understood within a complex international context marked by intensified nuclear arms competition during the Cold War. These tests were not merely technical military activities but a strategic instrument for repositioning France within the international system as an independent nuclear power (Hodgkin, 2005; Fussell, 2011).

France deliberately conducted these tests in colonial spaces beyond international oversight, enabling it to bypass growing ethical and political pressures against nuclear experimentation and to transform colonial territories into functional spaces within its nuclear program. This approach reflects a continuation of an imperial-capitalist logic that merges scientific superiority with military power to ensure global dominance (Sidi-Yakhlef, 2010; Ben Cherifa, 2018).

Economically, the objective extended beyond nuclear weapons development to include strengthening France's control over nuclear knowledge, energy markets, and technological systems, thereby ensuring long-term strategic superiority and global capital accumulation. In this sense, the **French nuclear tests in the Algerian Sahara** became part of a broader system for managing economic and scientific power in service of the imperial center.

At the international level, France benefited from the legal vacuum of the time, as nuclear test ban treaties were not yet fully binding, granting it significant diplomatic and political maneuvering space. It also used its nuclear capability as a leverage tool within the United Nations and in its relations with major powers to strengthen its influence in Africa and North Africa (Priest, 2013; Hirsch, 2015).

From a sociopolitical perspective, this situation produced new forms of dependency in the postcolonial era, where France's influence persisted through control over technology, scientific knowledge, and economic structures, rendering political independence insufficient for achieving true developmental sovereignty (Shepherd, 2012; Saïd, 2019).

Thus, the **French nuclear tests in the Algerian Sahara** were not an isolated local event but part of a global imperial system linking international politics, capitalist economy, and scientific technology.

7. Legal Dimension and Human Rights in the Context of the French Nuclear Tests in the Algerian Sahara

The **French nuclear tests in the Algerian Sahara** raise profound legal and ethical issues related to human rights and environmental justice, particularly due to the absence of a binding legal framework that could have properly assessed nuclear risks to populations and the environment in advance. These tests were conducted under a colonial context that was not subject to modern international environmental law standards or human protection conventions, revealing a legal gap that allowed military and political objectives to override humanitarian considerations (Checker, 2005; Tazi, 2016).

This situation reflects the imperial-capitalist nature of the nuclear project, where the Sahara and its inhabitants were treated as a functional testing space rather than a sovereign community with health, environmental, and human rights. As a result, nuclear risks were reduced to a "collateral cost" within a strategic scientific-military project (Hodgkin, 2005; Priest, 2013).

From a human rights perspective, medical and sociological studies reveal long-term impacts of the **French nuclear tests in the Algerian Sahara**, including increased rates of cancer, chronic diseases, congenital malformations, as well as intergenerational psychological and social effects, making this a case of intergenerational justice (Bensa, 2009; Amrane-Minne, 2007).

This situation has fueled growing demands to hold the former colonial state accountable, not only through political recognition but also through compensation and environmental and health remediation. Environmental justice here intersects with international human rights law, exposing the limitations of the global legal system in addressing the legacy of technological colonialism (Saïd, 2019; Hirsch, 2015).

Therefore, the legal dimension of these tests goes beyond accountability, extending to a broader reconsideration of the capacity of international law to regulate the long-term impacts of imperial technological projects and to protect affected communities.

8. Scientific Research and Environmental Monitoring After Independence: Algeria's Approach to the Legacy of French Nuclear Tests in the Algerian Sahara

After independence in 1962, Algeria faced a complex environmental and health legacy left by the French nuclear tests in the Algerian Sahara. This legacy was neither geographically nor temporally limited; rather, it became a long-term challenge for national development and environmental stability. The Algerian state was confronted with a situation where radiation-related health risks overlapped with the degradation of already fragile ecological systems, requiring a multi-level scientific and methodological approach (Mekki-Berrada, 2014; Priest, 2013).

Within this framework, Algerian authorities launched scientific research and environmental monitoring programs aimed at measuring radiation levels, analyzing soil and water, and studying health impacts on local populations. These efforts sought to build national knowledge about the nuclear legacy and to reconstruct the relationship between the state and the environment on scientific foundations, moving away from the logic of colonial neglect (Shepherd, 2012; Checker, 2005).

Studies showed that the effects of the French nuclear tests in the Algerian Sahara were not localized but spread throughout the Saharan ecosystem, affecting groundwater, soil, and vegetation, which in turn impacted traditional economic activities such as pastoralism and limited agriculture. This reality required long-term environmental rehabilitation policies demanding significant technical and financial resources (Fussell, 2011; Ben Cherifa, 2018).

From a sociological perspective, these scientific efforts contributed to raising public awareness of radiation risks and strengthened interaction between scientific institutions and local populations, leading to the emergence of a form of “shared knowledge” about environmental and health risks. This also helped transform society from passive recipient of colonial legacy into an active participant in environmental monitoring and in demanding rights to health and development (Amrane-Minne, 2007; Saïd, 2019).

The Algerian experience also highlighted the importance of international scientific cooperation, whether through knowledge exchange or the use of advanced technologies for radiation measurement and environmental rehabilitation. At the same time, it revealed the limitations of national capacities in the face of a complex nuclear legacy. This situation also underscores the unequal burden left by colonial policies, as the French nuclear tests in the Algerian Sahara produced long-term consequences borne by the independent state without sufficient support or fair compensation (Lohmann, 2007; Klein, 2013).

Thus, this dimension represents a key transitional phase in dealing with the nuclear legacy, as it gradually shifts from a persistent environmental and health threat into a field of scientific research and development planning, reflecting the Algerian state’s capacity to rebuild its scientific and institutional tools in response to the consequences of former imperial domination.

9. Cultural and Media Dimension: Documenting French Nuclear Tests in the Algerian Sahara and Resisting Hegemony

The French nuclear tests in the Algerian Sahara went beyond their material and military nature to become a major cultural and media subject that contributed to reshaping collective awareness of colonialism and its technological mechanisms. Local and international media, alongside Algerian literary and artistic production, played a central role in documenting these tests and exposing their environmental, health, and social consequences, in a context where the official French narrative attempted to minimize or obscure the extent of radiation-related damage (Hirsch, 2015; Saïd, 2019).

In this context, the media was not merely a channel of information transmission but became a space of symbolic struggle over historical truth. It enabled the publication of testimonies from affected populations and the reconstruction of alternative narratives that challenged the colonial discourse portraying the tests as neutral scientific achievements. This contributed to the production of a resistant collective memory based on oral documentation, images, and unofficial archives preserving the experience from the victims’ perspective (Bensa, 2009; Amrane-Minne, 2007).

From a sociological perspective, this cultural and media interaction contributed to reshaping local collective identity, as the French nuclear tests in the Algerian Sahara became a central symbol of imperial-capitalist domination and, at the same time, a marker of resilience and cultural resistance. Writers and artists expressed this legacy through various forms of creativity—poetry, novels, theatre, and visual arts—linking historical suffering with the colonial experience and revealing the violent use of science and technology as tools of domination (Ben Cherifa, 2018; Checker, 2005).

The media role also extended to the international level, where it helped transmit testimonies and images to global human rights and environmental spaces, contributing to the internationalization of the debate on colonial responsibility and accountability. This turned media into a tool of symbolic and ethical pressure, where cultural, legal, and human rights dimensions intersected against attempts to erase or reinterpret the colonial reality of these tests (Lohmann, 2007; Klein, 2013).

Thus, the cultural and media dimension was not a passive reflection of events but an active force in reconstructing historical memory, transforming the French nuclear tests in the Algerian Sahara into an ongoing issue that transcends the colonial period and enters contemporary debates on justice, memory, and domination.

10. Strategic Lessons and Future Development Challenges in Light of the French Nuclear Tests in the Algerian Sahara

The French nuclear tests in the Algerian Sahara constitute a key analytical reference for understanding the relationship between scientific colonialism and contemporary development challenges in Algeria. These tests reveal the deep connection between nuclear technology and imperial-capitalist projects of domination, and their long-term impacts on people, environment, and development (Fussell, 2011; Ben Cherifa, 2018).

Strategically, these tests demonstrated that the absence of strict scientific and legal regulation of nuclear activities leads to long-term environmental and health consequences across generations. This prompted the Algerian state after independence to adopt a preventive approach based on developing national systems for environmental and radiological monitoring and strengthening scientific research institutions to protect health and environmental sovereignty (Shepherd, 2012; Priest, 2013).

The lessons from this legacy can be summarized in three interconnected axes:

First, strengthening national scientific capacity through investment in scientific research and environmental technologies, enabling independent assessment of radiation risks and transforming scientific knowledge into a sovereign tool for protecting society (Lohmann, 2007; Mekki-Berrada, 2014).

Second, involving local communities in environmental governance, as experience has shown that populations affected by the French nuclear tests in the Algerian Sahara have become key actors in monitoring pollution and sharing environmental knowledge. This reflects a shift toward participatory approaches that enhance environmental justice and reduce historical marginalization (Amrane-Minne, 2007; Saïd, 2019).

Third, developing legal and institutional frameworks to ensure accountability for long-term environmental damage and to establish environmental justice as an extension of human rights within an international legal context (Checker, 2005; Tazi, 2016).

From a sustainable development perspective, these tests reveal the complex relationship between colonialism and unsustainable exploitation of natural resources, where nuclear technology functioned not only as a tool of progress but also as a mechanism for reproducing power relations and control. Therefore, addressing this legacy requires a comprehensive development vision integrating economy, environment, and public health, while placing national decision-making sovereignty at its core (Klein, 2013; Hirsch, 2015).

This legacy can also be transformed into an opportunity to strengthen Algerian scientific sovereignty by developing specialized training programs in energy and nuclear environmental studies, enabling the creation of national expertise capable of safely and responsibly managing modern technologies, turning past experience into a driver of scientific progress rather than a historical burden (Fussell, 2011; Ben Cherifa, 2018).

Thus, this section provides a comprehensive strategic vision showing that understanding the French nuclear tests in the Algerian Sahara extends beyond historical analysis to the construction of future policies capable of balancing development, sovereignty, and the protection of both people and the environment within a multidisciplinary framework combining history, politics, law, and sociology.

11. The Psychological and Social Legacy Across Generations in Light of the French Nuclear Tests in the Algerian Sahara

The impact of the French nuclear tests in the Algerian Sahara extends far beyond direct environmental and health damage, forming a complex psychological and social legacy that has accumulated across generations and contributed to reshaping patterns of awareness and behavior within affected local communities. These tests generated a persistent collective anxiety linked to fears of radiation exposure

and long-term illnesses, reflected in the spread of psychological disorders such as chronic anxiety, persistent stress, and depression, alongside collective trauma associated with living in an environmentally and medically threatened space (Bensa, 2009; Amrane-Minne, 2007).

From a sociological perspective, these transformations reshaped the local social structure, as health-related fears linked to the French nuclear tests in the Algerian Sahara influenced settlement patterns and pushed some families to modify their economic activities or relocate to less exposed areas. This also weakened certain traditional forms of solidarity based on agricultural and pastoral livelihoods, due to the altered relationship with land as a source of survival and security (Shepherd, 2012; Mekki-Berrada, 2014).

In a deeper sense, these tests produced what can be described as a “prolonged social trauma,” where fear of radiation became not merely an individual response but part of a transmitted collective memory conveyed through oral narratives, family experiences, and informal education. This accumulation contributed to the formation of a critical collective consciousness toward technological colonialism, linking health risks to the imperial policies that originally produced these conditions (Hirsch, 2015; Saïd, 2019).

This psychological and social legacy also played a role in shaping younger generations’ identities, as they grew up with historical awareness of the dangers of the French nuclear tests in the Algerian Sahara. Collective memory thus became an active element in informal education and in producing a resistant narrative based on historical testimony and shared suffering. In this way, memory shifted from a mere recollection of the past to a tool for understanding the present and building awareness of environmental and social risks (Ben Cherifa, 2018; Checker, 2005).

Moreover, this legacy highlights the need for a multidisciplinary approach combining social psychology, sociology, and public health to understand the invisible and long-term effects of these tests, and to develop psychological and social support policies capable of addressing collective trauma and improving quality of life in affected regions. It also confirms that the impacts of nuclear colonialism do not end with the historical event itself but persist as a long-term process involving memory, the body, and society.

Thus, this section demonstrates that the psychological and social legacy of the French nuclear tests in the Algerian Sahara represents one of the most complex and enduring dimensions, as it affects collective consciousness and continuously reshapes the relationship between humans, environment, and history within an ongoing tension between memory, suffering, and resistance.

12. Comprehensive Strategic Assessment of the French Nuclear Tests in the Algerian Sahara and Their Lessons for National and Global Policy

The French nuclear tests in the Algerian Sahara constitute a paradigmatic case for understanding the intersection between nuclear technology and imperial-capitalist colonial logic, revealing a complex system of military, political, and strategic dimensions that went beyond scientific experimentation to become an instrument of global domination (Fussell, 2011; Ben Cherifa, 2018).

From a strategic standpoint, these tests were not merely a technical activity but part of a long-term state project aimed at establishing France as an independent nuclear power by exploiting colonial territories as testing zones beyond international oversight. This exposed the limitations of the international system at the time in regulating nuclear technology within colonial contexts, allowing high-risk activities to proceed without effective accountability (Hodgkin, 2005; Checker, 2005).

At the national level, this experience highlights the importance of building a sovereign system for managing nuclear risks based on scientific research, environmental and health monitoring, and the involvement of local communities in assessment and surveillance processes. It also underscores the

need for a comprehensive approach that considers environmental, social, and historical dimensions when addressing nuclear legacies (Shepherd, 2012; Saïd, 2019).

At the international level, the French nuclear tests in the Algerian Sahara highlight the need to reconsider the global legal framework governing nuclear experimentation by strengthening accountability mechanisms and preventing the use of geographically and politically vulnerable regions as military laboratories, thereby reinforcing environmental justice and human rights principles (Priest, 2013; Mekki-Berrada, 2014).

Thus, this experience should not be read as a closed historical event but as an analytical framework for understanding the relationship between scientific power and political domination, encouraging the development of more just and sustainable policies for global nuclear governance.

13. The Economic Dimension of the French Nuclear Tests in the Algerian Sahara (Direct and Indirect)

The French nuclear tests in the Algerian Sahara reveal a profound economic dimension embedded within the broader structure of the imperial-capitalist colonial project. These tests were not merely a military necessity but part of an economic strategy aimed at strengthening French dominance in nuclear technology and defense industries (Priest, 2013; Ben Cherifa, 2018).

At the direct level, these tests contributed to the development of France's scientific and technological capabilities, enhancing its position in the global arms and energy markets and strengthening its competitiveness within an international system driven by nuclear knowledge and technology.

At the indirect level, the French nuclear tests in the Algerian Sahara generated severe negative economic impacts on local regions, including the degradation of agricultural land, decline of pastoral activities, and loss of natural resources due to radioactive contamination. This led to the weakening of traditional economic structures and the restructuring of local production systems (Mekki-Berrada, 2014; Shepherd, 2012).

This situation produced an unequal economic relationship in which France benefited from strategic and technological gains, while local communities bore long-term environmental and health costs without adequate compensation. This reflects the logic of imperial-capitalist economics based on transferring benefits to the center while externalizing costs to the periphery (Klein, 2013; Saïd, 2019).

Thus, the economic dimension of these tests cannot be separated from their political and military aspects, as it forms part of a broader system of domination that reproduces structural inequalities between the colonial center and the local periphery.

14. International Comparison between the French Nuclear Tests in the Algerian Sahara and Other Nuclear Test Sites

The French nuclear tests in the Algerian Sahara acquire particular analytical significance when compared with nuclear testing conducted in different international contexts, such as French tests in French Polynesia, American tests in Nevada, and British tests in Australia. These cases reveal recurring patterns in the use of nuclear technology within frameworks of power, political control, and military dominance (Fussell, 2011; Lohmann, 2007).

These comparisons show that the selection of nuclear test sites was largely guided by strategic considerations aimed at distancing risks from the urban centers of nuclear powers, while directing them toward marginalized or colonized regions. This logic resulted in the transfer of environmental, health, and social burdens onto local populations. In this respect, the French nuclear tests in the Algerian Sahara converge with the Nevada and Polynesian cases in adopting the logic of the "remote zone" as a mechanism to minimize political and humanitarian costs at the center (Klein, 2013).

The comparative analysis also reveals several common features, most notably:

- Limited transparency regarding the extent and long-term effects of radioactive contamination,
- Delayed official recognition of health and environmental damages,
- Weak or absent fair compensation for victims,
- Marginalization of local communities from decision-making processes.

However, the French nuclear tests in the Algerian Sahara are distinguished by a clear historical specificity, as they were conducted within a direct colonial context. This makes them more closely linked to colonial control over territory and populations compared to other cases carried out within sovereign states with relatively stable political systems.

On the other hand, international comparison highlights differences in the responses of affected societies. Some communities succeeded in developing legal and civil movements demanding recognition and compensation, whereas Algeria faced additional challenges related to its colonial legacy and the post-independence state-building phase. Nevertheless, notable progress has been achieved in scientific research, environmental monitoring, and public health awareness (Saïd, 2019; Shepherd, 2012).

Accordingly, the French nuclear tests in the Algerian Sahara represent an important reference point in comparative nuclear studies, as they clearly reveal the interconnection between nuclear technology and imperial domination, while also showing structural similarities in the production of risks alongside differences in historical and political contexts of response and remediation.

Conclusion: A Comprehensive Reading and Lessons from the French Nuclear Tests in the Algerian Sahara

The French nuclear tests in the Algerian Sahara constitute a complex model for understanding the intersection of imperial-capitalist domination, nuclear technology, and local social structures. This case demonstrates that nuclear programs cannot be reduced to their military or technical dimensions alone, but rather extend to long-term political, economic, social, cultural, and environmental consequences that continue across generations.

Through the analysis of the various dimensions of this study, one of the key lessons is the necessity of establishing a strict legal and human rights framework to protect populations and the environment from the risks of nuclear testing. This also requires strengthening international accountability mechanisms for major powers regarding the consequences of their nuclear activities, reflecting the importance of linking international law, human rights, and environmental justice (Checker, 2005; Tazi, 2016).

The French nuclear tests in the Algerian Sahara also highlight the importance of strengthening national scientific research and continuously developing environmental and health monitoring systems. This would enable the detection and management of radioactive contamination while restoring the capacity of the state and society to control affected environments and natural resources (Shepherd, 2012; Mekki-Berrada, 2014).

Furthermore, the social, cultural, and psychological dimensions of this experience stand out, as it contributed to shaping a complex collective memory that combines suffering and resistance. It also generated diverse forms of cultural and media expression that played an important role in documenting experiences and reconstructing collective awareness of colonialism and nuclear technology (Hirsch, 2015; Saïd, 2019). This makes collective memory a powerful tool for resisting domination and reshaping local identity.

International comparisons further show that the French nuclear tests in the Algerian Sahara belong to a global pattern of nuclear technology deployment in unequal contexts, where strategic interests intersect with imperial domination. This underscores the importance of building independent national policies capable of protecting sovereignty and achieving sustainable development (Fussell, 2011; Klein, 2013).

In conclusion, this case is not an isolated historical event but rather an extended system of structural impacts whose effects remain present in memory, society, and the environment. It also demonstrates

that addressing this legacy requires integrating scientific knowledge, human rights approaches, and community participation in order to transform this nuclear legacy from a source of threat into an opportunity for learning and building a safer, more just, and more sustainable future.

This study therefore opens the way for a broader academic discussion of the French nuclear tests in the Algerian Sahara as a reference case for understanding the relationship between colonialism, technology, and environmental and social justice at the global level.

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